Test& Measurement

Product Catalog

2013



Turnkey Test & Automation Solution Provider

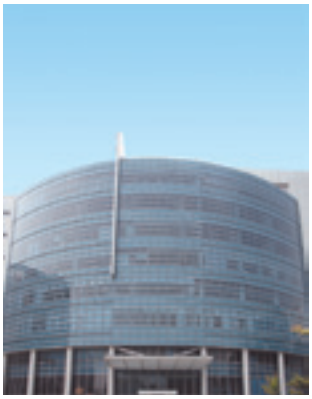
Table of Contents

Introduction	1-1
Functional Index	2-1
Model Index	2-3
New Products	3-1
Battery Test & Automation Solution	4-1
Photovoltaic Test & Automation Solution	5-1
Semiconductor/IC Test Solution	6-1
Laser Diode Test Solution	7-1
LED/Lighting Test Solution	8-1
Flat Panel Display(FPD) Test Solution	9-1
Video & Color Test Solution	10-1
Automated Optical Inspection(AOI) Solution	11-1
Power Electronics Test Solution	12-1
Passive Component Test Solution	13-1
Electrical Safety Test Solution	14-1
General Purpose Test Solution	15-1
Thermoelectric Test & Control Solution	16-1
PXI Test & Measurement Solution	17-1
Manufacturing Execution Systems(MES) Solution	18-1
Customer Support & Service	19-1
Global Service Network	20-1

Chroma Group and Global Operation Sites



Headquarters: Hwa-Ya Technology Park, Taiwan



Hsinchu Science Park, Taiwan



Kaohsiung, Taiwan

CHROMA GROUP

CHROMA ATE INC.

Neworld H.K.	MAS Automation/Taiwan	Chroma Investment	Chroma New Material	Testar Electronics
Chroma/Beijing	MAS Automation/Nanjing	Chroma/USA	Novatest Electronics	EVT Technology
Chroma/Shanghai	MAS Automation/Xiamen	Chroma/Netherlands		DynaScan Technology
Chroma/Suzhou		Chroma/Finland		ADLINK Technology
Chroma/Chongqing		Chroma/Japan		
Chroma/Xiamen				
Chroma/Shenzhen				
Chroma/Dongguan				



Irvine, U.S.A.



Foothill Ranch, CA



Shenzhen, China



Shanghai, China



The Netherlands, Europe



Shinyokohama, Japan



Suzhou, China



Beijing, China

Functional Index

Battery Test & Automation Solution

Recycling Li-ion Cell Formation System	★17000	4-1
Automatic Battery Test Equipment	★17800/17900 Series	4-2
Battery Charge & Discharge Test System	★17011	4-3
Regenerative Battery Pack Test System	★17020	4-5
Regenerative Battery Pack Test System	★17030	4-7

Photovoltaic Test & Automation Solution

Solar Wafer Inspection System	★3710-HS	5-1
Solar Cell Test/Sorting System	3720	5-2
Solar Cell Inspection Test/Sorting System	3730	5-3
Solar Wafer/Cell Diffusion Loader/Unloader Equipment	★3775	5-4
Automatic Optical Solar Wafer/Cell Inspection System	★7200 Series	5-5
c-Si Solar Cell Tester	58301	5-8
Solar Cell/Module I-V Tester	53310 Series	5-9

Semiconductor/IC Test Solution

VLSI Test System	3360-D	6-1
VLSI Test System	3360-P	6-2
VLSI Test System	3360	6-3
VLSI Test System	3380-P	6-4
VLSI Test System	★3380	6-5
SoC/Analog Test System	3650-CX	6-6
SoC/Analog Test System	★3650	6-8
Programmable Pin Electronics Module	36010	6-10
Four-quadrant DUT Power Supply	36020	6-11
Hybrid Sinle Site Test Handler	★3110	6-12
Final Test Handler	★3160	6-13
Automatic System Function Tester	3240	6-14
Automatic System Function Tester	3260	6-15
Miniature IC Handler	3270	6-16
xSD Card Tester and Handler	3280	6-17
Touch Panel Multi-sites Test Handler	3813	6-19
CMOS Image Sensor Inspection System	7970	6-20

Laser Diode Test Solution

Laser Diode Burn-In Test System	★58601 Series	7-1
Laser Diode Characterization System	★58620	7-3
VCSEL Tester	★58173-V	7-5

LED/Lighting Test Solution

ESD Test System	58154 Series	8-1
LED Electrical Test Module	58221-200-2	8-2
LED Total Power Test System	58173	8-3
LED Flip Chip Total Power Test System	★58173-FC	8-5
LED Burn-in Test System	★58266	8-7
LED Light Bar Test System	58182	8-8
LED Light Bar Electrical Test System	58183	8-9
LED Lighting Test System (For Lab.)	★58158	8-10
LED Lighting In-line Test System	★58158-SC	8-11

Flat Panel Display(FPD) Test Solution

OLED Lifetime Test System	★58131	9-1
OLED Display Shorting Bar Pattern Generator	★58166	9-2
LTPS Display Shorting Bar Pattern Generator	★58167	9-3
LCD Shorting Bar Pattern Generator	58162 Series	9-4
LCD Shorting Bar Pattern Generator	58168	9-5
LCM Pattern Generator Card	27010 Series	9-6
LCM Tester	27011	9-7
LCM Tester	27012	9-8
LCM Tester	27013	9-9
LCM ATS	29130/29132/29133/29135	9-10
LCM ATS	2915	9-12
LCM ATS	2916	9-14
LCM ATS	2917	9-16
DC Power Supply for LCM Oven Burn-In System	67300 Series	9-18

Video & Color Test Solution

Selection Guides		10-1
Video Pattern Generator	22293	10-3
Video Pattern Generator	22293-A	10-5
Video Pattern Generator	22293-B	10-7
Video Pattern Generator	★22294/22294-A	10-9
Video Pattern Generator	2233	10-11
Video Pattern Generator	2233-A	10-13
Video Pattern Generator	2233-B	10-15
Video Pattern Generator	2234	10-17
Video Pattern Generator	23293-B	10-19
Video Pattern Generator	23294	10-21
Video Pattern Generator	2333-B	10-23
Video Pattern Generator	2401/2402	10-25
HDMI Distributor	A222907	10-27
SDI Module	A222915	10-28
Pattern Analyzer	★A222917	10-29
Digital Video Distributor	28101/ 28102/ 28111	10-30
Display Color Analyzer	7123	10-31
Spectrocolorimeter	★71611	10-33
Front Projector ATS	★7600A	10-35
Display Multi-probe ATS	7660	10-36

Automated Optical Inspection(AOI) Solution

Video Microscope	7310	11-1
Sub-nanometer 3D Optical Profiler	★7503	11-3
Wafer Inspection System	★7935	11-5

★ New products are asterisked.

Functional Index

Power Electronics Test Solution

Selection Guides		**12-1**
Programmable DC Electronic Load	6310A Series	**12-5**
Programmable DC Electronic Load (LED Load Simulator)	★ 63110A/63113A/ 63115A	**12-10**
High Power DC Electronic Load	63200 Series	**12-12**
High Speed DC Electronic Load	6330A Series	**12-17**
Programmable DC Electronic Load	★ 63600 Series	**12-23**
Programmable AC&DC Electronic Load	63800 Series	**12-28**
Programmable AC Source	61500 Series	**12-30**
Programmable AC Source	61600 Series	**12-34**
Programmable AC Source	61700 Series	**12-38**
Regenerative Grid Simuator	★ 61800 Series	**12-40**
Programmable AC Source	6400 Series	**12-42**
Programmable AC Source	6500 Series	**12-45**
Power Analyzer	6630/6632	**12-47**
Digital Power Meter	★ 66200 Series	**12-48**
Programmable DC Power Supply	62000P Series	**12-51**
Programmable DC Power Supply	★ 62000H Series	**12-55**
Programmable DC Power Supply (Solar Array Simulator)	★ 62150H-600S/ 62150H-1000S	**12-59**
Modular DC Power Supply	62000B Series	**12-63**
Switching Power Supply ATS	★ 8000	**12-65**
Switching Power Supply ATS	8200	**12-68**
PC Power Supply ATS	8010	**12-69**
Adapter/Charger ATS	8020	**12-71**
LCD Inverter ATS	8490	**12-73**
LED Power Driver ATS	★ 8491	**12-77**

Passive Component Test Solution

Selection Guides		**13-1**
LCR Meter	11021/11021-L	**13-3**
LCR Meter	11022/11025	**13-4**
Precision LCR Meter	1061A/ 1062A/ 1075	**13-5**
Capacitance Meter	11020	**13-6**
Automatic Transformer Tester	★ 13350	**13-7**
Automatic Transformer Test System	3250/3252/ 3302	**13-9**
Telecom Transformer Test System	3312	**13-11**
Test Fixture of Auto Transformer Scanning Box		**13-12**
Bias Current Source	1310/1320/ 1320S/1320-10A	**13-13**
Bias Current Test System	11300	**13-14**
Electrolytic Capacitor Analyzer	13100	**13-15**
Ripple Current Tester	11800/11801/ 11810	**13-17**
Capacitor Leakage Current/IR Meter	11200	**13-18**
Programmable HF AC Tester	★ 11802/11803/ 11805/11890/ 11891	**13-19**
Milliohm Meter	16502	**13-21**
Component Test Scanner	13001	**13-23**
Magnetic Component Test System	1810	**13-24**
Component ATS	8800	**13-25**
Electrical Double Layer Capacitor ATS	8801	**13-27**
EDLC Leakage Current Monitoring System	8802	**13-29**
Options of Passive Component Test Instruments		**13-31**

Electrical Safety Test Solution

Selection Guides		**14-1**
Electrical Safety Analyzer	19032/19032-P	**14-3**
Wound Component EST Scanner	19035 Series	**14-5**
Wound Component EST Analyzer	★ 19036	**14-7**
Multi-channel Hipot Tester	19020 Series	**14-9**
AC/DC/IR/SCAN Hipot Tester	19052/19053/19054	**14-10**
Hipot Analyzer	★ 19055/19055-C	**14-11**
Hipot Analyzer	★ 19056/19057	**14-12**
AC/DC/IR Hipot Tester	19070 Series	**14-13**
Electrical Safety Test Scanner	19200	**14-14**
Ground Bond Tester	19572	**14-16**
Hipot Calibrator	9102	**14-17**
Electrical Equipment ATS	8900	**14-18**
Medical Electrical Safety ATS	8910	**14-19**
High Capacitance Electrolytic Capacitor ATS	★ 1911	**14-20**
Options of Electrical Safety Test Instruments		**14-21**

General Purpose Test Solution

6½ Digital Multimeter	12061	**15-1**
GNSS Signal Simulator	49003	**15-3**

Thermoelectric Test & Control Solution

Thermal/Multi-function Data Logger	★ 51101/51101C Series	**16-1**
TEC Controller	★ 54100 Series	**16-4**
Heat Pipe Test System	★ 51200 Series	**16-7**

PXI Test & Measurement Solution

PXI General-purpose Chassis	52100 Series	**17-1**
PXI Mini Chassis	52131	**17-2**
PXI Backplane	52200 Series	**17-3**
Four Quardrant Source	★ 52400 Series	**17-4**
Programmable DC Power Supply	52912/ 52914	**17-5**
Current Source/Measure Module	52953	**17-6**
Leakage Test Module	52958	**17-7**
Dual Channel NANO-AMP Meter	52961	**17-8**
Extension Card	52906	**17-9**
3U cPCI Hot SwapPower Supply	cPWR-59100 Series	**17-10**
6U cPCI Hot Swap Power Supply	cPWR-59400 Series	**17-11**

Manufacturing Execution Systems (MES) Solution

Manufacturing Execution System	★ Sajet MES Series	**18-1**
Data Collection Station	★ 98020	**18-3**

★ New products are asterisked.

Model Index

1061A	Precision LCR Meter	**13-5**
1062A	Precision LCR Meter	**13-5**
1075	LCR Meter	**13-5**
11020	CLC/IR Meter	**13-6**
11021	LCR Meter	**13-3**
11021-L	LCR Meter	**13-3**
11022	LCR Meter	**13-4**
11025	LCR Meter	**13-4**
11200	CLC/IR Meter	**13-18**
11300	Bias Current Test System	**13-14**
11800	Ripple Current Tester	**13-17**
11801	Ripple Current Tester	**13-17**
11802	Programmable HF AC Tester	**13-19**
11803	★ Programmable HF AC Tester	**13-19**
11805	Programmable HF AC Tester	**13-19**
11810	Ripple Current Tester	**13-17**
11890	HF Hipot Tester	**13-19**
11891	★ HF Load Life Tester	**13-19**
12061	6½ Digital Multimeter	**15-1**
13001	Component Test Scanner	**13-23**
13100	Electrolytic Capacitor Analyzer	**13-15**
1310	Bias Current Source	**13-13**
1320	Bias Current Source	**13-13**
1320-10A	Bias Current Source	**13-13**
1320S	Bias Current Source (Slave)	**13-13**
13350	★ Automatic Transformer Tester	**13-7**
16502	Milliohm Meter	**13-21**
17000	★ Recycling Li-ion Cell Formation System	**4-1**
17011	★ Battery Charge & Discharge Test System	**4-3**
17020	★ Regenerative Battery Pack Test System	**4-5**
17030	★ Regenerative Battery Pack Test System	**4-7**
17800/17900 Series	★ Automatic Battery Test Equipment	**4-2**
17800	★ OCV/ACR Test Equipment	**4-2**
17910	★ Barcode Binding Equipment	**4-2**
17920	★ Rework Sorter	**4-2**
17930	★ Grouping Equipment	**4-2**
1810	Magnetic Component Test System	**13-24**
19020 Series	Multi-channel Hipot Tester	**14-9**
19020	Multi-channel Hipot Tester	**14-9**
19020-4	Multi-channel Hipot Tester	**14-9**
19021	Multi-channel Hipot Tester	**14-9**
19022	Multi-channel Hipot Tester	**14-9**
19022-4	Multi-channel Hipot Tester	**14-9**
19032	Electrical Safety Analyzer	**14-3**
19032-P	Electrical Safety Analyzer	**14-3**
19035 Series	Wound Component EST Scanner	**14-5**
19035	Wound Component EST Scanner	**14-5**
19035-M	Wound Component EST Scanner	**14-5**
19035-S	Wound Component EST Scanner	**14-5**
19036	★ Wound Component EST Analyzer	**14-7**
19052	AC/DC/IR Hipot Tester	**14-10**
19053	AC/DC/SCAN Hipot Tester	**14-10**
19054	AC/DC/SCAN Hipot Tester	**14-10**
19055	★ Hipot Analyzer	**14-11**
19055-C	★ Hipot Analyzer	**14-11**
19056	★ Hipot Analyzer	**14-12**
19057	★ Hipot Analyzer	**14-12**
19057-20	★ Hipot Analyzer	**14-12**
19070 Series	AC/DC/IR Hipot Tester	**14-13**
19071	AC Hipot Tester	**14-13**
19073	AC/DC/IR Hipot Tester	**14-13**
1911	★ High CapacitanceElectrolytic Capacitor ATS	**14-20**
19200	Electrical Safety Test Scanner	**14-14**
19572	Ground Bond Tester	**14-16**

22293	Video Pattern Generator	**10-3**
22293-A	Video Pattern Generator	**10-5**
22293-B	Video Pattern Generator	**10-7**
22294	Video Pattern Generator	**10-9**
22294-A	★ Video Pattern Generator	**10-9**
2233	Video Pattern Generator	**10-11**
2233-A	Video Pattern Generator	**10-13**
2233-B	Video Pattern Generator	**10-15**
2234	Video Pattern Generator	**10-17**
23293-B	Video Pattern Generator	**10-19**
23294	Video Pattern Generator	**10-21**
2333-B	Video Pattern Generator	**10-23**
2401	Video Pattern Generator	**10-25**
2402	Video Pattern Generator	**10-25**
27010 Series	LCM Pattern Generator Card	**9-6**
2701007	LCM Pattern Generator Card	**9-6**
2701007 10 bit	LCM Pattern Generator Card	**9-6**
27011	LCM Tester	**9-7**
27012	LCM Tester	**9-8**
27013	LCM Tester	**9-9**
28101	Digital Video Distributor	**10-30**
28102	Digital Video Distributor	**10-30**
28111	Digital Video Distributor	**10-30**
29130	LCM ATS	**9-10**
29132	LCM ATS	**9-10**
29133	LCM ATS	**9-10**
29135	LCM ATS	**9-10**
2915	LCM ATS	**9-12**
2916	LCM ATS	**9-14**
2917	★ LCM ATS	**9-16**

★ New products are asterisked.

Model Index

❸

3110	★ Hybrid Single Site Test Handler	6-12
3160	★ Final Test Handler	6-13
3240	Automatic System Function Tester	6-14
3250	Automatic Transformer Test System	13-9
3252	Automatic Component Analyzer	13-9
3260	Automatic System Function Tester	6-15
3270	Miniature IC Handler	6-16
3280	xSD Card Tester and Handler	6-17
3302	Automatic Component Analyzer	13-9
3312	Telecom Transformer Test System	13-11
3360	VLSI Test System	6-3
3360-D	VLSI Test System	6-1
3360-P	VLSI Test System	6-2
3380	★ VLSI Test System	6-5
3380-P	VLSI Test System	6-4
3650	★ SoC/Analog Test System	6-8
3650-CX	SoC/Analog Test System	6-6
36010	Programmable Pin Electronics Module	6-10
36020	Four-quadrant DUT Power Supply	6-11
3710-HS	★ Solar Wafer Inspection System	5-1
3720	Automatic Solar Cell Test/Sorting System	5-2
3730	★ Solar Cell Inspection Test/Sorting System	5-3
3775	★ Solar Wafer/Cell Diffusion Loader/Unloader Equipment	5-4
3813	Touch Panel Multi-sites Test Handler	6-19

❹

49003	GNSS Signal Simulator	15-3

❺

51101/51101C Series	★ Thermal/Multi-function Data Logger	16-1
51101 -1	Thermal/Multi-function Data Logger	16-1
51101C -1	★ Thermal/Multi-function Data Logger	16-1
51101-8	Thermal/Multi-function Data Logger	16-1
51101C-8	★ Thermal/Multi-function Data Logger	16-1
51101-64	Thermal/Multi-function Data Logger	16-1
51101C-64	★ Thermal/Multi-function Data Logger	16-1
51200 Series	Heat Pipe Test System	16-7
51201	Heat Pipe Test System	16-7
52100 Series	PXI General-purpose Chassis	17-1
52101	PXI 8-slot General-purpose Chassis	17-1
52102	PXI 14-slot General-purpose Chassis	17-1
52105	PXI 18-slot General-purpose Chassis	17-1
52131	PXI Mini Chassis	17-2
52200 Series	PXI Backplane	17-3
52201	PXI 8-slot PXI Backplane	17-3
52205	PXI 18-slot PXI Backplane	17-3
52207	PXI 14-slot PXI Backplane	17-3
52400 Series	Four Quardrant Source	17-4
52401-25-200m	Four Quardrant Source	17-4
52405-25-1	Four Quardrant Source	17-4
52420-100-4	Four Quardrant Source	17-4
52906	PXI Extension Card	17-9
52912	PXI Programmable DC Power Supply	17-5
52914	PXI Programmable DC Power Supply	17-5
52953	PXI Current Source/Measure Module	17-6
52958	PXI Leakage Test Module	17-7
52961	PXI Dual Channel NANO-AMP Meter	17-8
53310 Series	Solar Cell/Module I-V Tester	5-8
53311	c-Si Cell I-V Tester	5-8
53312	c-Si Module I-V Tester	5-8
53313	TF Module I-V Tester	5-8
53314	Multi-junction & CPV Cell I-V Tester	5-8
54100 Series	★ TEC Controller	16-4
54115-24-8	TEC Controller	16-4
54130-24-13	TEC Controller	16-4
54180-40-20	★ TEC Controller	16-4
54204	Heat Source Controller	16-7
54215	Heat Source Controller	16-7
58131	★ OLED Lifetime Test System	9-1
58154 Series	ESD Test System	8-1
58154-8KV	ESD Test System	8-1
58154-A	ESD Test System	8-1
58154-B	ESD Test System	8-1
58154-C	ESD Test System	8-1
58158	★ LED Lighting Test System (For Lab.)	8-10
58158-SC	★ LED Lighting In-line Test System	8-11
58162 Series	LCD Shorting Bar Pattern Generator	9-4
58162	LCD Shorting Bar Pattern Generator	9-4
58162-A(E)	LCD Shorting Bar Pattern Generator	9-4
58162-E(E)	LCD Shorting Bar Pattern Generator	9-4
58166	★ OLED Display Shorting Bar Pattern Generator	9-2
58167	★ LTPS Display Shorting Bar Pattern Generator	9-3
58168	LCD Shorting Bar Pattern Generator	9-5
58173	LED Total Power Test System	8-3
58173-FC	★ LED Flip Chip Total Power Test System	8-5
58173-V	★ VCSEL Tester	7-5
58182	LED Light Bar Test System	8-8
58183	LED Light Bar Electrical Test System	8-9
58221-200-2	★ LED Electrical Test Module	8-2
58266	★ LED Burn-in Test System	8-7
58301	c-Si Solar Cell Tester	5-8
58601 Series	★ Laser Diode Burn-In Test System	7-1
58601-500m	★ Laser Diode Burn-In Test System	7-1
58601-1	★ Laser Diode Burn-In Test System	7-1
58601-5	★ Laser Diode Burn-In Test System	7-1
58601-20	★ Laser Diode Burn-In Test System	7-1

★ New products are asterisked.

58601-40	★ Laser Diode Burn-In Test System	**7-1**
58620	★ Laser Diode Characterization System	**7-3**

⑥

61500 Series	Programmable AC Source	**12-30**
61501	Programmable AC Source	**12-30**
61502	Programmable AC Source	**12-30**
61503	Programmable AC Source	**12-30**
61504	Programmable AC Source	**12-30**
61505	Programmable AC Source	**12-30**
61511	Programmable AC Source	**12-30**
61512	Programmable AC Source	**12-30**
61600 Series	Programmable AC Source	**12-34**
61601	Programmable AC Source	**12-34**
61602	Programmable AC Source	**12-34**
61603	Programmable AC Source	**12-34**
61604	Programmable AC Source	**12-34**
61605	Programmable AC Source	**12-34**
61611	Programmable AC Source	**12-34**
61612	Programmable AC Source	**12-34**
61700 Series	Programmable AC Source	**12-38**
61701	Programmable AC Source	**12-38**
61702	Programmable AC Source	**12-38**
61703	Programmable AC Source	**12-38**
61704	Programmable AC Source	**12-38**
61705	Programmable AC Source	**12-38**
61800 Series	★Regenerative Grid Simuator	**12-40**
61845	★Regenerative Grid Simuator	**12-40**
61860	★Regenerative Grid Simuator	**12-40**
62000B Series	Modular DC Power Supply	**12-63**
62015B-15-90	Modular DC Power Supply	**12-63**
62015B-150-10	Modular DC Power Supply	**12-63**
62015B-30-50	Modular DC Power Supply	**12-63**
62015B-60-25	Modular DC Power Supply	**12-63**
62015B-80-18	Modular DC Power Supply	**12-63**
62000H Series	★ Programmable DC Power Supply	**12-55**
62050H-40	★ Programmable DC Power Supply	**12-55**
62050H-450	★ Programmable DC Power Supply	**12-55**
62050H-600	★ Programmable DC Power Supply	**12-55**
62050H-600S	★ Programmable DC Power Supply	**12-59**
62075H-30	★ Programmable DC Power Supply	**12-55**
62100H-30	★ Programmable DC Power Supply	**12-55**
62100H-40	★ Programmable DC Power Supply	**12-55**
62100H-450	★ Programmable DC Power Supply	**12-55**
62100H-600	★ Programmable DC Power Supply	**12-55**
62100H-600S	★ Programmable DC Power Supply	**12-59**
62150H-1000S	★ Programmable DC Power Supply	**12-59**
62150H-40	★ Programmable DC Power Supply	**12-55**
62150H-450	★ Programmable DC Power Supply	**12-55**
62150H-600	★ Programmable DC Power Supply	**12-55**
62150H-600S	★ Programmable DC Power Supply	**12-59**
62000P Series	Programmable DC Power Supply	**12-51**
62006P-100-25	Programmable DC Power Supply	**12-51**
62006P-300-8	Programmable DC Power Supply	**12-51**
62006P-30-80	Programmable DC Power Supply	**12-51**
62012P-100-50	Programmable DC Power Supply	**12-51**
62012P-40-120	Programmable DC Power Supply	**12-51**
62012P-600-8	Programmable DC Power Supply	**12-51**
62012P-80-60	Programmable DC Power Supply	**12-51**
62024P-100-50	Programmable DC Power Supply	**12-51**
62024P-40-120	Programmable DC Power Supply	**12-51**
62024P-600-80	Programmable DC Power Supply	**12-51**
62024P-80-60	Programmable DC Power Supply	**12-51**
62050P-100-100	Programmable DC Power Supply	**12-51**
6310A Series	★ Programmable DC Electronic Load	**12-5**
63101A	Programmable DC Electronic Load	**12-5**
63102A	Programmable DC Electronic Load	**12-5**
63103A	Programmable DC Electronic Load	**12-5**
63105A	Programmable DC Electronic Load	**12-5**
63106A	Programmable DC Electronic Load	**12-5**
63107A	Programmable DC Electronic Load	**12-5**
63108A	Programmable DC Electronic Load	**12-5**
63110A	★ Programmable DC Electronic Load	**12-10**
63112A	★ Programmable DC Electronic Load	**12-5**
63113A	★ Programmable DC Electronic Load	**12-10**
63115A	★ Programmable DC Electronic Load	**12-10**
63123A	★ Programmable DC Electronic Load	**12-5**
63200 Series	★ High Power DC Electronic Load	**12-12**
63201	High Power DC Electronic Load	**12-12**
63202	High Power DC Electronic Load	**12-12**
63203	High Power DC Electronic Load	**12-12**
63204	High Power DC Electronic Load	**12-12**
63205	High Power DC Electronic Load	**12-12**
63206	High Power DC Electronic Load	**12-12**
63207	High Power DC Electronic Load	**12-12**
63208	High Power DC Electronic Load	**12-12**
63209	High Power DC Electronic Load	**12-12**
63210	High Power DC Electronic Load	**12-12**
63211	★ High Power DC Electronic Load	**12-12**
6330A Series	★ High Speed DC Electronic Load	**12-17**
63301A	High Speed DC Electronic Load	**12-17**
63302A	High Speed DC Electronic Load	**12-17**
63303A	High Speed DC Electronic Load	**12-17**
63305A	High Speed DC Electronic Load	**12-17**
63306A	High Speed DC Electronic Load	**12-17**
63307A	High Speed DC Electronic Load	**12-17**
63308A	High Speed DC Electronic Load	**12-17**
63310A	★ High Speed DC Electronic Load	**12-17**
63312A	★ High Speed DC Electronic Load	**12-17**

Model Index

63313A	★ High Speed DC Electronic Load	12-17
63315A	★ High Speed DC Electronic Load	12-17
63323A	★ High Speed DC Electronic Load	12-17
63600 Series	★ Programmable DC Electronic Load	12-23
63610-80-20	Programmable DC Electronic Load	12-23
63630-600-15	★ Programmable DC Electronic Load	12-23
63630-80-60	Programmable DC Electronic Load	12-23
63640-80-80	Programmable DC Electronic Load	12-23
63800 Series	Programmable AC&DC Electronic Load	12-28
63802	Programmable AC&DC Electronic Load	12-28
63803	Programmable AC&DC Electronic Load	12-28
63804	Programmable AC&DC Electronic Load	12-28
6400 Series	Programmable AC Source	12-42
6404	Programmable AC Source	12-42
6408	Programmable AC Source	12-42
6415	Programmable AC Source	12-42
6420	Programmable AC Source	12-42
6430	Programmable AC Source	12-42
6460	Programmable AC Source	12-42
6463	Programmable AC Source	12-42
6490	Programmable AC Source	12-42
6500 Series	Programmable AC Source	12-45
6512	Programmable AC Source	12-45
6520	Programmable AC Source	12-45
6530	Programmable AC Source	12-45
6560	Programmable AC Source	12-45
6590	Programmable AC Source	12-45
66200 Series	★ Digital Power Meter	12-48
66201	Digital Power Meter	12-48
66202	Digital Power Meter	12-48
66203	★ Digital Power Meter	12-48
66204	★ Digital Power Meter	12-48
6630	Power Analyzer	12-47
6632	Power Analyzer	12-47
67300 Series	Modular DC Power Supply for LCM Burn-in Applications	9-18
67322	Modular DC Power Supply for LCM Burn-in Applications	9-18
67346	Modular DC Power Supply for LCM Burn-in Applications	9-18
67366	Modular DC Power Supply for LCM Burn-in Applications	9-18

7

7123	Display Color Analyzer	10-31
71611	★ Spectrocolorimeter	10-33
7200 Series	★ Automatic Optical Solar Wafer/Cell Inspection System	5-5
7201	★ Solar wafer geometry&surface inspector	5-5
7202	★ Solar Wafer Quality Inspector	5-5
7211-D	Solar Cell Color Classifier	5-5
7212-HD	Solar Cell Frontside Printing & Surface Inspector	5-5
7213-AD	Solar Cell Backside Printing & Surface Inspector	5-5
7214-D	Anti-Reflection Coating Inspector	5-5
7231	★ Solar Wafer Sawmark Inspector	5-5
7310	Video Microscope	11-1
7503	★ Subnanometer 3D Optical Profiler	11-3
7600A	★ Front Projector ATS	10-35
7660	Multi-probe Display ATS	10-36
7935	★ Wafer Inspection System	11-5
7970	CMOS Image Sensor Inspection System	6-20

8

8000	★ Switching Power Supply ATS	12-65
8010	PC Power Supply ATS	12-69
8020	Adapter/Charger ATS	12-71
8200	Switching Power Supply ATS	12-68
8490	LCD Inverter ATS	12-73
8491	★ LED Power Driver ATS	12-77
8800	Component ATS	13-25
8801	Electrical Double Layer Capacitor ATS	13-27
8802	EDLC Leakage Current Monitoring System	13-29
8900	Electrical Equipment ATS	14-18
8910	Medical Electrical Safety ATS	14-19

9

9102	Hipot Calibrator	14-17
98020	★ Data Collection Station	18-3

A ~ C

A222907	HDMI Distributor	10-27
A222915	SDI Module	10-28
A222917	★ Pattern Analyzer	10-29
cPWR-59100 Series	3U CompactPCI Power Supply	17-10
cPWR-59102	3U CompactPCI Power Supply	17-10
cPWR-59104	3U CompactPCI Power Supply	17-10
cPWR-59105	3U CompactPCI Power Supply	17-10
cPWR-59400 Series	6U CompactPCI Power Supply	17-11
cPWR-59401	6U CompactPCI Power Supply	17-11
cPWR-59402	6U CompactPCI Power Supply	17-11
Sajet MES Series	★ Manufacturing Execution System	18-1

★ New products are asterisked.

Recycling Li-ion Cell Formation System — Model 17000



- ERM (Energy Recycling Module) recycles discharged energy
- BVT (Battery Voltage Tracking) reduces power consumption while battery charging
- Energy savings monitor: tracks kW, kWh, reduced CO2 or plated-tree display
- Plug-in module design simplifies service and maintenance
- Real-time outer-loop resistance check
- System safety/test reliability through PLC/IPC monitoring of all sensors (temperature, smoke, device type and battery tray position)
- Systems are linked as a LAN offering remote monitoring and control
- Automated handling and sorting are available

See Page 4-1

Programmable Charge/Discharge Tester — Model 17011



- High precision output and measurement up to 0.02%
- Independent channel execution & testing
- Channel parallel output function
- High sampling rate
  - Battery test : 100ms
  - Electrical double layer capacitor test : 10ms
- CC/CC-CV/CP charge/discharge mode
- Built-in two types of battery DCIR test functions providing fast and easy DCIR tests (DCIR=Ro+Rp, ACIR≒Ro)
- Flexible sampling recording (Δt, ΔV, ΔI, ΔQ)
- Real time data capturing and recording (Q, Vt, It, time), and step cut off status (Q, V_end, I_end, time)
- Linear circuit design, low ripple current

See Page 4-3

Regenerative Battery Pack Test System — Model 17020/17030



- Regenerative battery energy discharge
  - Energy saving
  - Environment protection
  - Low heat output
- Channels paralleled for higher currents
- Charge / discharge mode (CC, CV, CP)
  - Constant current
  - Constant voltage
  - Constant power
- Driving cycle simulation
- High precision measurement accuracy
- Fast current conversion
- Smooth current without over shoot
- Testing data analysis function
- Data recovery protection (after power failure)
- Independent protection of multi-channel (Model 17020)
- Total harmonic distortion: less than 5% of rated power (Model 17020)

See Page 4-5
See Page 4-7

Solar Wafer/Cell Diffusion Loader/Unloader Equipment — Model 3775



- Low Breakage rate
- High Throughput
- Flex picker robot transfer
- Surface Inspection ： Option
- Loader: Quartz Boat
- Unload ： Manz Box / Cassette(option)

See Page 5-4

Solar Wafer Inspection System — Model 3710-HS



- Good for 5 inches and 6 inches mono/multi-crystalline silicon cells
- High throughput and low breakage rate ≦0.2%
- Loader can automatically pick up and place cell finished by firing
- Efficiency and Color classes and Sorting Bins can be defined by customers' request
- Integrated with Inspector and IV Tester by customers' request (see above stand-alone series)
- High cell positioning repeatability to ensure consistent test result
- Sorting Bins can be extended by module

See Page 5-1

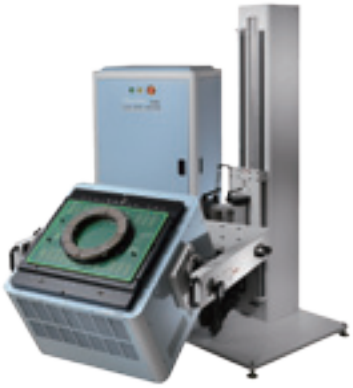
Automatic Optical Solar Wafer/Cell Inspection Modules — Model 7200 Series



- Adjustable criteria for different process application or model
- Flexible algorithms programming editor for mono-crystalline and multi-crystalline silicon solar cells
- Multiple interface to communicate with manufacturing equipment or information system
- Various defects inspection capability from multilayer LED lighting design
- Flexible design that can be easily integrated to your in-line printing system and sorting system

See Page 5-5

VLSI Test System — Model 3380



- 50/100 MHz clock rate
- 50/100 Mbps data rate
- 1024 I/O pins (Max :1280 I/O pins)
- Up to 1024 sites Parallel testing
- 32/64 M pattern memory
- Various VI source
- Flexible HW-architecture (Interchangeable I/O, VI, ADDA,)
- Real parallel trim/match function
- Time & frequency measurement unit (TFMU)
- High-speed time measurement unit (HSTMU)
- AD/DA test option
- SCAN test option (max 1G M/chain)
- ALPG test option for embedded memory
- STDF tools support
- Test program/pattern converter (J750, D10, V50, E320, SC312, V7, TRI-6020, ITS9K)
- User friendly windows 7 environment
- CRAFT C/C++ programming language
- SW (Software) same as 3380P & 3360P

See Page 6-5

SoC/Analog Test System — Model 3650



- 50 / 100MHz; 200Mhz (MUX) Clock Rate
- 50 / 100Mbps; 200Mbps (MUX) Data Rate
- Up to 512 digital I/O pins
- 16/32 (option) MW vector memory
- 16/32 (option) MW pattern instruction memory
- Per-pin timing/PPMU/frequency measurement
- Up to 8-32 16-bit ADDA channels option
- SW configurable scan chains in 1024M depth or up to 32 scan chains/board
- ALPG option for memory test
- Up to 32 high-voltage pins
- 32 high-performance DPS channels
- Overall timing accuracy < ±550ps
- 8 ~ 32-CH / board for VI45 analog option
- 2 ~ 8-CH / board for PVI100 analog option
- MRX option for 3rd party PXI instruments
- Microsoft Windows® XP OS
- C++ and GUI programming interface
- CRISP, full suite of intuitive software tools
- Test program and pattern converters for other platforms
- Accept DIB and probe card of other testers directly
- Support STDF data output
- Air-cooled, small footprint tester-in-a-test-head design

See Page 6-8

Hybrid Single Site Test Handler — Model 3110



- FT + SLT Handler – Two In One
- Perfect for Device Engineering Characterization Gathering and Analysis
- Auto Tray Load/unload & Device Sorting capability
- Tester Zero waiting time
- Without socket damage issue
- Air damper for good contact balance
- Shuttle remain IC check function
- Camera for real time system monitoring
- Tri-temp IC test function (optional)
- High power cooling function (optional)
- Diskless download function (optional)

See Page 6-13

Laser Diode Burn-In Test System — Model 58601 Series



- For Burn-In, Reliability and Life Testing
- Up to 800 channels
- Up to 40A per device (preliminary)
- Up to 150˚C
- Batch processing via device carriers
- Conversion Kit Interface - change kit for adaption to multiple products

See Page 7-1

Laser Diode Characterization System — Model 58620



- Full Turn-Key Automated Test for edge-emitting laser diodes
- High precision and large capacity carrier, interchangeable with other automated equipment
- Fully automated alignment for fiber-coupled tests
- Automated optical inspection to decrease mechanical positioning delays
- Highly accurate TEC temperature controller with stability up to ±0.01˚C
- PXI-Based SMU and power meter for fast test times
- Full suite of software analysis tools for laser diode characterization (Ith, Rs, Vf, slope efficiency, λ p, etc...)

See Page 7-3

VCSEL Tester — Model 58173-V



- Complete wafer map generation with localized or remote post-processing
- Ability to generate datasets compatible to INK or Die Sort Processes
- Ability to handle broken wafers or singulated die
- Capable of handling 3" or 4" VCSEL wafers natively, no modications necessary
- Several modes of operation, including fully manual or automated
- High speed VCSEL wafer indexing
- Ability to handle singulated probes or fully congured probe cards
- Fine resolution CCD scanner. Can be used for automated wafer alignment or individual die photographs
- Temperature controller capability
- Accurate and Fast 4-quadrant SMU source for full VCSEL Sweep Characteristics
- Complete Characterization Capability
  - L-I-V : Light, Current, and Voltage
  - ITH : Threshold Current
  - IOP : Typical Operating Current
  - VF : Forward Voltage
- Breakdown Characteristics
  - Kink : Output Power Linearity
  - Rollover : Output power reduction as forward current is increased
  - Spectral : Peak wavelength or Spectral Bandwidth

See Page 7-5



LED Flip Chip Total Power Test System — Model 58173-FC

- Wide LED power test range (200V/2A)
- Chroma Huge Photo Detector (Measurement Angle=148°)
- Semi-automatic LED wafer/chip prober
- Unique chuck design that has no vacuum holes in the testing area
- Unique Edge Sensor with stable probe pressure with fatigue and pressure change problem
- Unique screen intuitive pin adjustment
- Machine visual position system to minimize the time for manual operation
- Combining Prober and Tester to boost the efficiency
- Auto random test function
- Broad chip scale application (to meet the tests from Chip Size 7 to 120 mil)
- Auto broken wafer scanning algorithm
- Lends hood design to eliminate the interference of background light

See Page 8-5



LED Burn-in Tester — Model 58266

- Flexible channels output: 32/64/128 channels
- Each channel can offer up to 500mA /400V
- Each channel can parallel connection for high current requirement. Ex: 2-ch: 1A, 4-ch: 2A
- High accuracy of current output and voltage measurement

See Page 8-7



LED Lighting Test System for Laboratory — Model 58158

- Simulate the real AC test condition and environment
- Integrate AC, DC, and optical features test to one platform
- Support DC test for AC LED
- Support dual-optical test module in one platform (Integrating sphere or average intensity) (optional)
- Support AC /DC LIV Analysis
- Offer standard light source for calibration

See Page 8-10



LED Lighting In-line Test System for Production — Model 58158-SC

- Mass production application: LED lamp, LED bulb, LED bar, LED streetlight, and other luminaries
- Less error comparing to integrating sphere measurement
- High speed test and flicker measurement
- Provide standard light source for calibration which is international standard traceable
- Thermal control fixture adaptable (option)

Test Items

- Optical Power characteristics : Lm, lm/w, LED operating frequency (Flicker)
- Color characteristics : CIExy, Duv, CIEu'v', CCT, CRI
- Power characteristics :
  AC mode : Power factor (PF), Irms, Vrms, THD
  DC mode : Forward voltage

See Page 8-11



Wafer Inspection System — Model 7935

- Maximum 8 inch wafer handling capability (10 inch inspection area)
- Unique detection algorithm can be replaced or added for different customer or model
- No precise wafer loading is needed because of auto alignment function
- Edge finding to test various wafer shapes
- Defect criteria editor for versatile pass/fail criteria setting
- Chip Optical Character Recognition > 98%
- Combine AOI and upstream machine data and upload a final mapping file for downstream machine
- Customized inspection report for defect analysis
- Suitable for LED, laser diode, CIS, and other wafer chip

See Page 11-5

OLED Display Shorting Bar Pattern Generator — Model 58166



- Provide the test signal for different sizes of OLED display
- Powerful PC-based platform
- Flexible waveform editor
- Auto FTP download
- Engineer analysis function
- Lock function during testing
- 0-255 steps waveform output
- Auto discharge

See Page9-2

Video Pattern Generator — Model 22294/22294-A



- Fully Comparable with HDMI 1.4 Standard
  - 3D Format Output
  - Audio Return Channel
  - Ethernet Channel
  - 4Kx2K / 1080P 120Hz
  - sYCC601 / Adobe RGB / Adobe sYCC601
  - CEC / Deep Color / Lip-Sync / xvYCC
- Multi ports output test application
  - HDMI port output x 3 (Model 22294)
  - HDMI port output x 4 (Model 22294-A)
  - SCART port x 2 (output x1/input x1)
- 330MHz digital (DVI) frequency
- Support Dual HDCP in DVI test application
- HDCP ON/OFF IN DVI & HDMI Interface
- S-Video/CVBS/SCART/RGB/Y.Pb.Pr/ Y.Cb.Cr/Y,R-Y,B-Y/D-terminal
- NTSC/PAL/SECAM signals
- EDID Read/Write/Compare/Analysis
- Optical/coaxial audio input/output (SPDIF)
- Support pattern dynamic scrolling
- HDMI/DVI Hot-Plug function
- ESD protection circuit
- PIP & OSD function

See Page 10-9

Front Projector ATS — Model 7600A



- 0.001 Lux ultra low illumination display range
- Comply with ANSI-1997, JBMIA, IEC & SJ/T projector testing standards
- 29 sets chroma meter & Illuminance meter measuring at the same time, high test throughput
- Integrated with Video Pattern Generator and one click to complete all measurements
- Accurate chroma meter with tuned color filters (closely approximates CIE 1931 color matching functions), and cosine correctors
- User-defined calibration function facilitates the system maintenance
- Testing criteria storage for various models requirements
- "Pre-Test" function to edit testing items setting for non-ANSI standard tests
- Automatic white balance adjustment
- Auto maximum brightness selection and DC-index compliance with chromaticity specification
- Complete test items: ANSI Lumens, Light Uniformity, Color Uniformity, Contrast Ratio and Correlated Color Temperature
- High accuracy measurement: Y : ±2%±1 digit ; x, y : ±0.002
- Precise repeatability measurement: Y : ±0.5%±1 digit ; x, y : ±0.0005

See Page 10-35

3D Optical Profiler — Model 7503



- Up to 0.1 nm height resolution for measurement
- Use white light interference measurement technique to do nondestructive and rapid surface texture measurement and analysis
- Modulized design to select parts based on test demands or budget concerns
- Work with color or monochrome camera to do 2D measurement and enable the measuring microscope function
- Equipped with electric nose gear to mount various lens for switch programmatically
- LED or halogen light source for selection
- Measurement range 150 mm x150 mm
- Integrate low magnification lens (5X & 2.5X ratio) for large area 3D measurement
- Provide various surface measurement parameters, such as sectional difference, included angle, area, dimension, roughness, waviness, film thickness and flatness
- Powerful STA (Surface Texture Analysis) Master software providing more than 150 lines and surfaces profiling parameters
- Automated rapid self calibration to ensure the system's measurement capability
- Provide measurement script for auto test

See Page 11-3

New Products

EVSE ATS — Model 8000



- For Electric Vehicle Supply Equipment (EVSE) testing
- Complying with SAE-J1772 or customized for other regulations
- Open architecture software platform
- Other hardware expandable upon request
- Windows 98/NT/2000/XP or higher based software

See Page 12-65

LED Power Driver ATS — Model 8491



- For LED Power Driver testing
- Capable to test Multi-UUT/Multi-output concurrently that improve productivity
- Provide optimized standard test items for the Unit Under Test (LED Power Driver) to deliver excellent test performance
- Open architecture software
  - Expandable hardware support
  - Support instrument with GPIB/RS-232/RS-485/I^2C interface
  - User editable test library
  - User editable test programs
  - User editable reports
  - Statistical report
  - On-line Softpanel
  - User authority control
  - Release control
  - Activity log
  - Support bar code reader
- Windows 98/2000/NT/XP based software

See Page 12-77

Programmable DC Power Supply — Model 62150H-600S/1000S

Solar Array Simulator



- Voltage range : 0 ~600V&1000V
- 3U/15kW high power density module with easy master/slave parallel operation up to 150kW
- Fast transient response solar array simulation
- Simulation of multiple solar cell material's I-V characteristic (fill factor)
- Simulation of dynamic irradiation intensity and temperature level from clear day to cloud cover conditions
- Shadowed I-V curve output simulation
- Low leakage current (< 3mA)
- Build-in dynamic MPPT test profile of EN50530, Sandia, CGC/GF004
- Auto I-V program: 100 I-V curves & Dwell time 1-15,000s

See Page 12-59

Programmable DC Electronic Load — Model 63110A/63113A/63115A

LED Load Simulator



- Unique LED mode for LED power driver test
- Programmable LED dynamic resistance (R_d)
- Programmable internal resistance (Rr) for simulating LED ripple current
- Fast response for PWM dimming test
- Up to eight channels in one mainframe
- 16-bit precision voltage and current measurement with dual-range
- Full Protection: OC, OP, OT protection and OV alarm

See Page 12-10

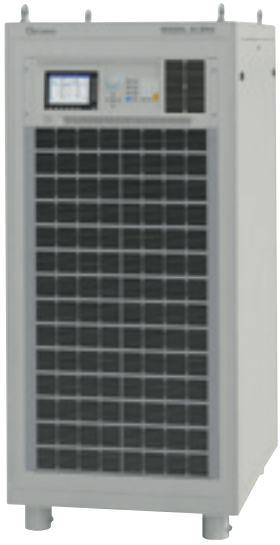
Programmable AC & DC Electronic Load — Model 63800 Series



- Power Rating : 1800W, 3600W, 4500W
- Voltage Range : 50V - 350Vrms
- Current Range : Up to 18Arms, 36Arms, 45Arms
- Peak Current : Up to 54A, 108A, 135A
- Frequency Range : 45 to 440Hz, DC
- Crest Factor Range : 1.414 to 5.0
- Power Factor Range : 0 to 1 lead or lag (Rectified mode)
- CC, CR, CV, CP for DC Loading
- Constant & Rectified Load Modes for AC Loading
- Analog Voltage & Current Monitor
- Measurement : V, I, PF, CF, P, Q, S, F, R, Ip-/+ and THDv
- Full Protection : OC, OP, OT protection and OV alarm

See Page 12-28

Regenerative Grid Simulator — Model 61800 Series



- Power rating - 61845: 45kVA ; 61860: 60kVA
- Voltage range: 0-300V
- Frequency: DC, 30Hz-100Hz
- Full regenerative capability based on 100% of output current rating
- Specifically designed for PV inverter, Smart Grid and EV related test applications
- Single phase or three-phase output selectable
- Programmable slew rate settin for changing voltage and frequency
- Programmable voltage and current limit
- Turn on, turn off phase angle control
- TTL signal which indicates Output transient
- LIST, PULSE, STEP mode functions for testing Power Line Disturbance (PLD) simulation
- Voltage dips, short interruption and voltage variation simulation
- Harmonics, inter-harmonics waveform synthesizer
- Comprehensive measurement capability, including current harmonics
- Analog programmable interfaces
- Remote interface: GPIB, RS-232, USB and Ethernet
- Provide parallel feature for meeting high power test applications

See Page 12-40

Digital Power Meter — Model 66200 Series



- Embedded high speed DSP, 16 bits Analog/Digital converters
- 5mA minimum current range(66203/66204) and 0.1mW power resolution
- Meet ENERGY STAR / IEC 62301 / ErP ecodesign measurement requirement
- Accumulated energy methods for unstable power measurement
- User-define criteria for automatic PASS/FAIL judgment
- Dual shunts for current range selection providing high accuracy over a wide current range (66202)
- THD and user-specify orders distortion measurement (66202)
- Inrush current and Energy measurement (66202)
- Voltage/current harmonics measurement up to 50 orders
- Capable of displaying input waveform DC component measurement reading
- Half rack size and 4 input modules design (66204)
- Support different wiring configuration power measurement (1P2W/1P3W/3P3W/3P4W) (66203/66204)
- Support external shunt and CT for higher current measurement application (66204)

See Page 12-48

Automatic Transformer Tester — Model 13350



- Compensation for individual channel
- *Combined measurement unit and scan box to reduce measurement errors
- *USB storage interface
- *10-100 LAN/ USB-H interface (option)
- *Built-in programmable 100mA bias current (RJ-45)
- *Test frequency, voltage and speed set separately
- *Fail Lock function
- *Auto Test function
- *Equipped with external standard test on 20ch scan test unit
- *Reduce the short-circuit loss in secondary side for leakage (Lk) test (A133502 20ch scan unit)
- *Short-circuit pin selectable for every test item
- *RS232 interface compatible SCPI commands (option)

* New features compared to Chroma 3250 Series

See Page 13-7

Wound Component EST Analyzer — Model 19036



- 5 in 1 composite analyzer scanner (AC / DC/ IR / IWT / DCR)
- 5kV AC/6kV DC Hi-pot test
- 5kV Insulation Resistance test
- Impulse Winding Tester (IWT)
- IWT high sampling rate(200MHz)
- 10 channels 4-wire DCR test
- △ /Y motor DCR calculation
- HSCC (High Speed Contact Check)
- Support max. 40 channels scanning test
- English, Traditional Chinese and Simplified Chinese User Interface
- USB waveform storage& Hand copy function

See Page 14-7

Hipot Analyzer — Model 19056/19057



- 10kV AC & 20kV DC withstand voltage test
- 0.1MΩ~50GΩ insulation impedance test
- BDV (BreakDown Voltage test)
- HVCC (High Voltage Contact Check)
- OSC (Open Short Check)
- GFI (Ground Fault Interrupt) human protection circuit
- Fast charge/discharge function
- Programmable output & test limit
- Standard RS232 & HANDLER interface
- Optional GPIB interface
- Key lock function

See Page 14-12

Thermal/Multi-function Data Logger — Model 51101/51101C Series



- Models with 1, 8, and 64 channels on-line data recording. Multi-sets linked to a PC for hundreds of channels are doable
- Support B, E, J, K, N, R, S, and T type thermocouple with ITS-90 defined temperature range
- Individual channel cold junction compensation with <±0.3˚C accuracy
- Temperature resolution up to 0.01˚C, error down to (0.01% of reading+0.3˚C)
- Voltage full range ±480VDC, ±10VDC; resolution 1mV, 100uV; error down to (0.1% of reading+1mV), (0.015% of reading+100uV)
- 1000VDC channel to channel isolation, full protection for testing points with charge and guarantee for accurate measurements
- Thermocouple open circuit detection
- PC-based operation with powerful software for recording and analyzing data
- 1 and 8 channel models are USB powered. No battery or external power supply is required

See Page 16-1

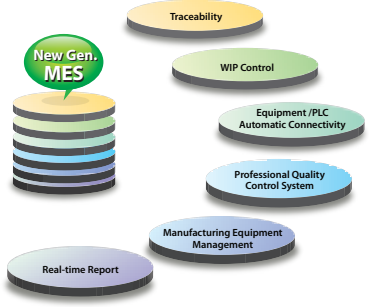
TEC Controller — Model 54100 Series



- Bidirectional driving with 150W (24V/8A), 300W (24V/13A) or 800W (40V/20A) output
- Filtered PWM output with > 90% driving power efficiency while maintaining linear driving with current ripples < 20 mA
- Temperature reading and setting range -70 to 250˚C with 0.01˚C resolution and 0.3˚C absolute accuracy
- Short term stability (1 hour) ±0.01˚C and long term stability ±0.05˚C with optimal PID control
- Feature true TEC large signal PID auto tune for best control performance
- 2 T-type thermocouple inputs, one for control feedback and the other for monitor and offset, providing versatile control modes
- RS232, USB2.0, LAN communication port for PC remote operation and thermal data recording
- Powerful and user-friendly PC program available
- Perfect matching all Chroma designed temperature controlled platforms

See Page 16-4

Manufacturing Execution System — Model Sajet MES Series



- Complete Production Process Trace
  - Traceability
- Full Production Information Monitoring
  - WIP Control
- Equipment /PLC Automatic Connectivity
  - Computer Integrated Manufacturing: CIM
  - Equipment Automation Program: EAP
- Professional Quality Control System
  - Statistical Process Control: SPC
  - Corrective Action Report: CAR
  - Out of Control Action Plan: OCAP
- Manufacturing Equipment Management
  - Equipment Management System: EMS
  - Overall Equipment Effectiveness: OEE
- Real-time Report
  - Yield Rate Report
  - WIP Report

See Page 18-1

Recycling Li-ion Cell Formation System 4-1
Automatic Battery Test Equipment 4-2
Battery Charge & Discharge Test System 4-3
Regenerative Battery Pack Test System 4-5



Recycling Li-ion Cell Formation System



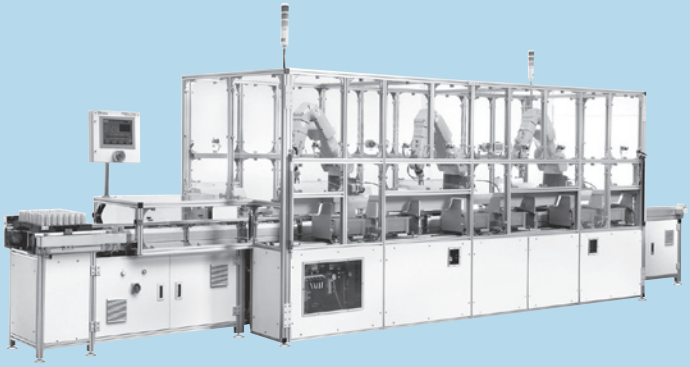
OCV/ACR Test Equipment



Barcode Binding Equipment



Rework Sorter



Grouping Equipment



Battery Charge & Discharge Test System





Regenerative Battery Pack Test System

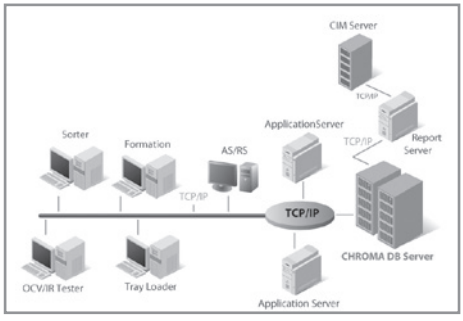




Hot Swap & Redundant DC Power Supplies



Plug In & Precise Electronic Modules



With Manufacturing Execution System

KEY FEATURES

- ERM (Energy Recycling Module) recycles discharged energy
- BVT (Battery Voltage Tracking) reduces power consumption while battery charging
- Energy savings monitor: tracks kW, kWh, reduced CO2 or plated-tree display
- Plug-in module design simplifies service and maintenance
- Real-time outer-loop resistance check
- System safety/test reliability through PLC/IPC monitoring of all sensors (temperature, smoke, device type and battery tray position)
- Systems are linked as a LAN offering remote monitoring and control
- Automated handling and sorting are available

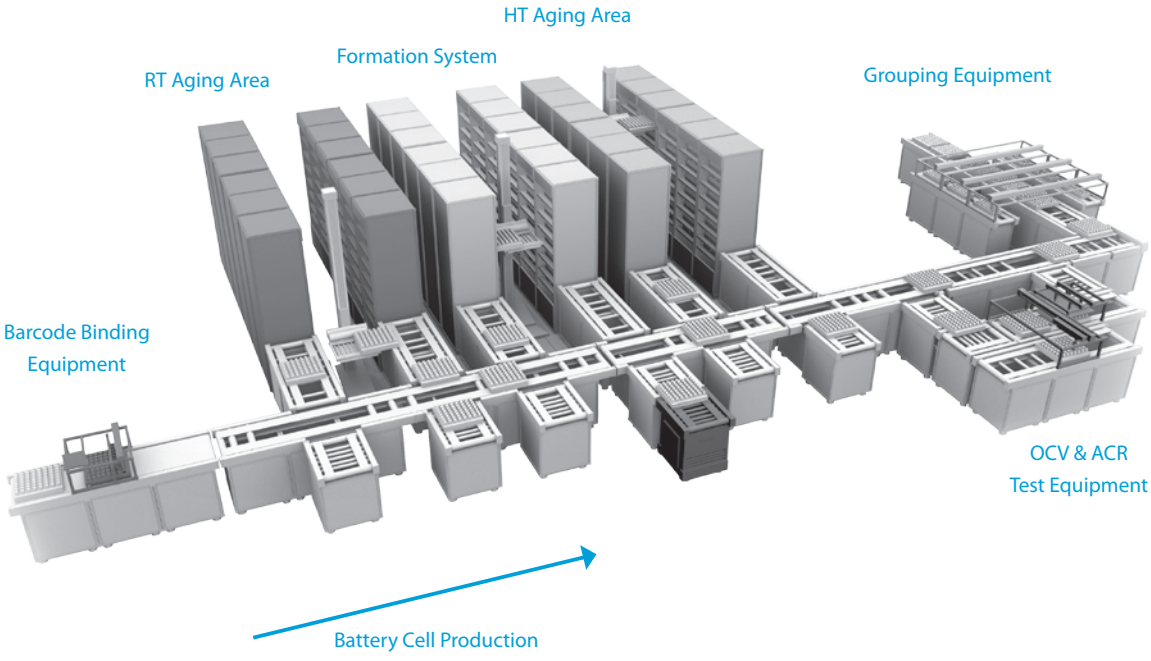
Chroma 17000 series is specifically designed for the formation of Lithium Ion and Lithium Polymer secondary batteries. The 17000 series is a complete turn-key system, including carrier trays, robust battery probe contacts, high quality charge/discharge modules and intuitive software all under computer control.

Patented Battery Voltage Tracking (BVT) DC-DC conversion power modules minimize power consumption in battery charging, and Energy Recycle Modules (ERM) recycle the discharged energy directly back to the DC power system for increased power efficiency. These power saving designs provide a planet friendly solution along with cost savings by reducing energy consumption.

The intuitive software provides a flexible selection in the charge/discharge channel, current rating, and modules under test. These features allow the Series 17000 to be used for final cell development, pilot line production, high volume production and ongoing reliability monitoring/ quality control.

ORDERING INFORMATION

17000 : Recycling Li-ion Cell Formation System



All specifications are subject to change without notice.



17800 : OCV/ACR Test Equipment

KEY FEATURES

- High-Precision Measurement
- High Sampling Rate
- Automated Test Equipment
- Remote Control/Management
- Customization and Automation
- High Efficiency & Reliability
- Avoid Operation Error
- Remote Control/Management

Chroma specifically developed battery cell test solution which is an integrated solution for battery cell formation & grading processes. From battery cell formation procedure to grouping process, Chroma 17900 series are customized with professional planning service which includes manufacturing flow path planning, test station/ equipment planning, test data management and so on to create high performance manufacturing capability.

Measuring OCV (Open Circuit Voltage) and ACR (AC Resistance) are one of the most important tests during battery cell manufacturing. In order to have high-speed and high-reliability OCV/ ACR measurement readings, customized Chroma 17800 can follow customers' manufacturing process flow to test a batch of battery cell OCV/ ACR with in process tray or any other carrying method.

Chroma 17800 can be designed to test both OCV/ ACR in a time sequence or individually. High-speed measurement can catch a batch of battery cell accurate readings and upload to test result database by Ethernet. Through customized probing unit can totally fit the tray size and battery cell size. Automated contact design improves the reliability of electrodes connection and keeps the contact consistence.

Chroma 17900 Automatic Equipment includes following automated equipment. Chroma 17910 Barcode Binding Equipment links the serial numbers of battery cell & its carrying tray. Then upload them to server or management system. This link provides a traceability of each battery cell. Furthermore, its high efficiency and low cost advantages bring improvement of manufacturing performance.

Chroma 17920 Rework Sorter helps to pick defect battery cell up during whole formation processes at rework station. According to the definitions of flow path planning in MES, operators will know how to deal with those battery cells. This function properly controls process flow and also avoids quality issues by unexpected operation errors.

Chroma 17930 Grouping Equipment is automated grading equipment. It will follow pre-defined criteria to grade battery cells with specific ranks. Different rank of battery cell will be moved to different outgoing tray by grouping equipment. Users can define the grading criteria by battery cell characteristics and test results from formation processes. Automatic grouping equipment helps the grading process to be more reliable and avoid unexpected operation errors.

ORDERING INFORMATION

17800 : OCV/ACR Test Equipment
17910 : Barcode Binding Equipment
17920 : Rework Sorter
17930 : Grouping Equipment



17910 : Barcode Binding Equipment



17920 : Rework Sorter



17930 : Grouping Equipment



KEY FEATURES

- High precision output and measurement up to 0.02%
- Independent channel execution & testing
- Channel parallel output function
- High sampling rate
  - Battery test : 100ms
  - Electrical double layer capacitor test : 10ms
- CC/CC-CV/CP charge/discharge mode
- Built-in two types of battery DCIR test functions providing fast and easy DCIR tests (DCIR=Ro+Rp, ACIR≅Ro)
- Flexible sampling recording (Δt, ΔV, ΔI, ΔQ)
- Real time data capturing and recording (Q, Vt, It, time), and step cut off status (Q, V_end, I_end, time)
- Linear circuit design, low ripple current
- Built-in C (Capacitance, F) and DCR test for EDLC providing fast and easy output of test results (For 17202-5-20 & 17202-5-30 only)
- Real time external circuit resistance monitoring function
- Equipped with redundant DC power supply to avoid affecting the cycle life test because of power failure factor
- Modular design for easy maintenance and service

FUNCTIONS

- Battery charge/discharge test
- Battery capacity and DCIR test
- EDLC charge/discharge test (For 17202-5-20 & 17202-5-30 only)
- EDLC capacitance and DCR test (For 17202-5-20 & 17202-5-30 only)

APPLICATIONS

- Charge/discharge cycle life test
- Quality assurance for shipping inspection
- Quality assurance for incoming inspection
- Battery capacity analysis
- Material test
- Production
- Battery voltage balance application

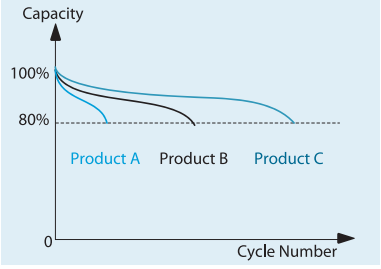
Chroma 17011 has fast output and measurement recording capability with highly accurate specification to assure the test quality. Its stable performance is applicable for various tests requiring reliable data. The flexible programming function is capable of sending formula to each channel for independent test. Moreover, the modular design of multi-channel architecture can be configured based on the quantity desired for test. Meanwhile, the channel supports parallel output that can be setup flexibly for large current tests. The application range covers various types of single lithium-ion battery testing in different capacities or battery module characteristics testing with large capacity. The high utilization of the test system makes no need to purchase a variety of equipment in different specifications for testing the diversified products.

Chroma 17011 uses Ethernet interface to connect an external computer and to control and program each channel independently with multiple test modes built in. It is able to implement the charge and discharge tests of CC-CV, CC, CP, battery DCIR tests, capacitance tests for ultra capacitor and DCR tests. The step conversion is performed based on the time, voltage, current or power set in each test mode; while the data collected contains the returned test step, status, voltage, current and capacity. In addition, sampling via the conditions of time, voltage, current or capacity can be set for selection flexibly.

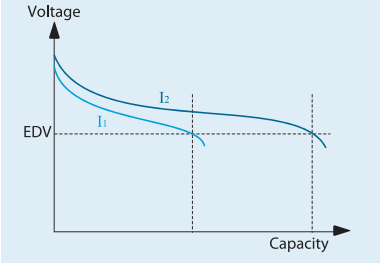
Multiple safety designs are made for Chroma 17011 for testing such as contact check and polarity check to confirm the circuit status before the test starts, also to ensure the safety of charge and discharge. It has over voltage, over current and loop resistance detecting functions to make sure the safety of test process . It also has data archive mechanism to store the data in memory without loss when the computer is encountering short and power outage error. It can log the interrupted status and select to continue the test after rebooted.

Chroma 17011 Programmable Charge/Discharge Test System is a high precision equipment designed specifically for testing Lithium-ion secondary batteries and Electrical Double Layer Capacitors (EDLC). It is suitable for cycle life testing, incoming and shipping inspection, product characteristics screening, material experiment and small batch trial run. The built-in IEC 62391 (same as EIAJ-2377) for capacitance and DCR measurement solution are supplied for EDLC tests, which allows the user to utilize the standard to calculate the capacitance and internal resistance value without programming and data calculation.

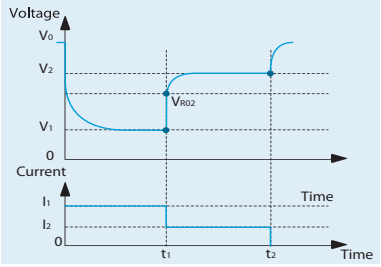
Lithium-ion secondary battery testing



Battery capacity curve

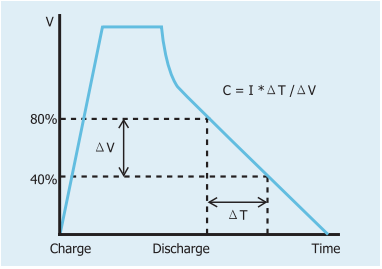


Cycle life testing curve

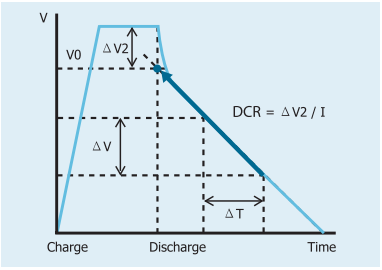


DCIR test

Electrical Double Layer Capacitor Test



Capacitance test



DCR test

System Structure

Chroma 17011 Programmable Charge/Discharge Test System is composed of Chroma 17200 Programmable Charge/Discharge Tester and Chroma 62000B redundant DC Power Supply along with an optional Chroma 51101 Data Logger.

The system uses 62000B as the power input of charge/discharge tester to ensure the long process of cycle life test is stable and reliable. If any of the switching power is failure, the rest of the modules will enhance the output to support stable power supply. In addition, the 62000B has hot swap function that can be maintained without shutting down the device. It has unmatchable reliability when comparing with general switching power supply systems as it does not affect the tests on-going.

Chroma 17200 Programmable Charge/Discharge Tester

- Module 17200-5-10
  Maximum 5 test modules with 10 channels in total
- Module 17202-5-20
  Each module has 2 channels with 5V/20A output capability



Chroma 62000B Modular DC Power Supply

- Module 62000B-6-1
  Maximum 6 test modules
- Module 62015B-24-62
  24Vdc output with maximum power1.5kW

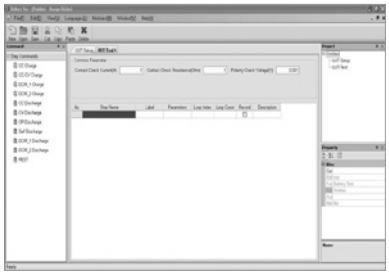


All specifications are subject to change without notice.

Chroma 51101 Thermal/Multi-function Data Logger

- Optional temperature channel (8ch/card) available
- Test 64 temperature channels maximum

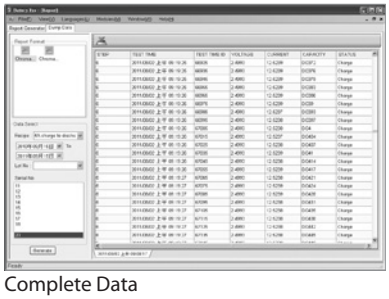




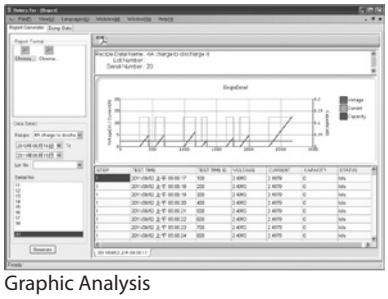
Formula Editing Window



Multi-channel Real-time Monitoring Window



Complete Data



Graphic Analysis

SPECIFICATIONS				
Frame	**17200-5-10**		**17200-5-10**	
Module	**17202-5-20**		**17202-5-30 *1**	
Maximum Voltage / Current	5V/20A		5V/30A	
Maximum Channel	2 ch/module, 10 ch/frame (maximum)		2 ch/module, 10 ch/frame (maximum)	
Parallelable Output Current	40A, 100A, 200A		60A, 150A, 300A	
Control Method	CC/CV/CP/DCIR charge, discharge models		CC/CV/CP/DCIR charge, discharge models	
Voltage				
Setting Range	0 mV ~ 5000 mV, resolution 1mV		0 mV ~ 5000 mV, resolution 1mV	
Reading Range	0.0 mV ~ +5199.9 mV		0.0 mV ~ +5199.9 mV	
Accuracy	± 0.04% of F.S.		± 0.05% of F.S.	
Current				
Setting Range	3A	1mA ~ 3,000mA , resolution 1mA	4A	1mA ~ 4,000mA , resolution 1mA
	20A	0.01A ~ 20.00A , resolution 0.01A	30A	0.01A ~ 30.00A , resolution 0.01A
Reading Range	3A	0.0mA~ 3,150.0mA, resolution 0.1mA	4A	0.0mA~ 4,200.0mA, resolution 0.1mA
	20A	0 A ~ 21.000A , resolution 0.001A	30A	0 A ~ 31.500A , resolution 0.001A
Accuracy	3A	± 0.04% of Range	4A	± 0.1% of Range
	20A	± 0.06% of Range	30A	± 0.1% of Range
Power				
Setting Range	15W	10 mW ~ 15,000 mW, resolution 1 mW	20W	10 mW ~ 25,000 mW, resolution 1 mW
	100W	0.05 W ~ 100.00 W, resolution 0.01 W	150W	0.05 W ~ 150.00 W, resolution 0.01 W
Reading Range	15W	0 mW ~ 15,600.0 mW, resolution 0.1 mW	20W	0 mW ~ 26,000.0 mW, resolution 0.1 mW
	100W	0 W ~ 104.000 W, resolution 0.001 W	150W	0 W ~ 160.000 W, resolution 0.001 W
Accuracy	15W	± 0.08% of Range	20W	± 0.15% of Range
	100W	± 0.1% of Range	150W	± 0.15% of Range
General Specifications				
Flow Edit Capability	Max. step number in one flow: 500 steps Max. cycle number in one step: 999999 steps			
Data Storage	Battery mode : 100ms~60min EDLC mode : 10ms~60min *2			
Frame Dimension (H x W x D)	222 mm x 428 mm x 630 mm			
Weight (Full module)	Approx. 63 Kg			

62015B-24-62 DC Power Supply Module, 24V/62.5A/1500W	
Output Power	1500W
Output Voltage	1~24
Output Current	62.5A
Line Regulation	0.1% of F.S.
Load Regulation	1% of F.S.
Setting Accuracy	1% of F.S.
Efficiency	> 87% @ full load
AC Input Voltage	187 ~ 250 Vac (3 Phase 4 Wire, △ Connection) or 323 ~ 437 Vac (3 Phase 5 Wire, Y Connection) / 45 ~ 65 H

Note *1 : Call for availability

Note *2 : EDLC mode has higher sampling rate, thus the current and power accuracy specification of EDLC mode is a bit lower than battery mode.

ORDERING INFORMATION

17011 : Programmable Battery Charge & Discharge Test System
17200-5-10 : Programmable Charge/Discharge Tester Frame for 5 modules
17202-5-20 : Programmable Charge/Discharge Tester Module 5V/20A, 2 channels
17202-5-30* : Programmable Charge/Discharge Tester Module 5V/30A, 2 channels
62000B-6-1 : 62000B Series Mainframe for 6 Modules
62015B-24-62 : Modular DC Power Supply 24V/62.5A/1500W (For 17202-5-20 & 17202-5-30 only)
51101-64: Thermal Multi-function Data Logger 64 channel (option)
* Call for availability



KEY FEATURES

- Regenerative battery energy discharge
  - Energy saving
  - Environment protection
  - Low heat output
- Channels paralleled for higher currents
- Charge / discharge mode (CC, CV, CP)
  - Constant current
  - Constant voltage
  - Constant power
- Driving cycle simulation
- High precision measurement accuracy
- Fast current conversion
- Smooth current without over shoot
- Testing data analysis function
- Data recovery protection (after power failure)
- Independent protection of multi-channel
- Total harmonic distortion: less than 5% of rated power

Chroma's 17020 is a high precision system specifically designed for secondary battery modules and pack tests. Accurate sources and measurements ensure the test quality that is suitable to perform repetitive and reliable tests that are crucial for battery modules / packs, for both incoming or outgoing inspections as well as capacity, performance, production and qualification testing.

Chroma's 17020 system architecture offers regenerative discharge designed to recycle the electric energy sourced by the battery module either back to the channels in the system performing a charging function or to the utility mains in the most energy efficient manner. This feature saves electricity, reduces the facilities thermal foot print and provides a green solution by reducing the environmental impact on our planet.

Chroma's 17020 system is equipped with multiple independent channels to support dedicated charge / discharge tests, on multiple battery modules / packs, each with discrete test characteristics. The channels can easily be paralleled to support higher current requirements. This feature provides the ultimate flexibility between high channel count and high current testing.

Chroma's 17020 system has flexible programming functions and may be operated with Chroma's powerful Battery Pro software. Battery Pro utilizes the system to create cycling tests from basic charge or discharge to complex drive cycle testing for each channel or channel groups. A thermal chamber control can be integrated into a profile and triggered by time or test results yielding a dynamic profile. Battery Pro's features allows quick and intuitive test development to eliminate the need of tedious scripting or programming by a software engineer.

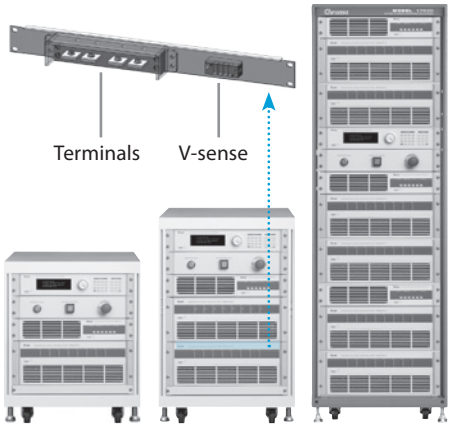
17020's Regenerative Module / Battery Pack Test System uses bi-directional AC-DC converter and bi-directional DC-DC tester with a battery charge/ discharge controller that is composed of the three standalone units featured below:

- Battery Charge/Discharge Controller : Model 69200-1
- DC/AC Bi-directional Converter : Model A691101
- Regenerative Charge/Discharge Tester : Model 69206-60-8 Model 69224-100-4 Model 69224-60-4 Model 69212-60-4 Model 69212-24-4

Flexible System Configuration

17020 Regenerative Battery Pack Test System can be configured to specified requirements and expandable to 60 channels.

The driving cable can connect the front panel or rear outlet, users can choose their own.

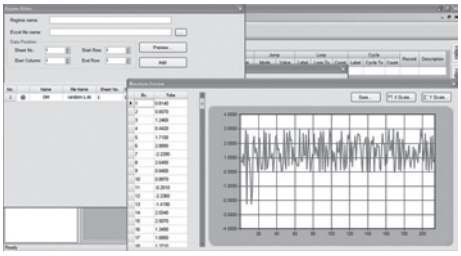


Operating Mode

- Constant current (CC) mode
- Constant voltage (CV) mode
- Constant power (CP) mode
- Constant voltage-limit current mode (CC-CV)
- Waveform current mode
- DCIR mode
- Rest

Driving Cycle Simulation

The battery pack always is used at quick and un-regular current condition. The system simulates the real condition on battery pack by working condition simulator.



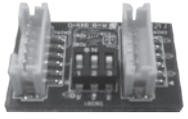
Software function-Battery Pro

The 17020 Test system is specifically designed to meet the various requirements for testing secondary battery packs with high safety and stability. Charge and discharge protection aborts tests when abnormal conditions are detected. Data loss, storage and recovery are protected against power failure.



Temperature Measurement

- Temperature measured for each channel within the range of 0~90°C±2°C
- 4 sets of measurements (Max) per channel to measure the battery surface temperature



Software Integration

- BMS communication interface : Collect the BMS data to controls the charge/ discharge profile and protection setting
- Data logger : Collect the data logger to controls the charge/ discharge profile and protection setting.
- Thermal Chambers : It synchronize temperature control with charge/discharge profile



Thermal/Multi-function Data Logger
Model 51101-64 (See Page 16-1)

All specifications are subject to change without notice.

SPECIFICATIONS						
Model 69200 Series		69206-60-8	69212-24-4 *	69212-60-4 *	69224-60-4 *	69224-100-4*
Channel		8	4	4	4	4
Charge / Discharge Mode	Voltage Range	7.5-60Vdc	2.8V-24Vdc	7.5V-60Vdc	7.5V-60Vdc	12.5V-100Vdc
	Maximum Current	12A	60A	60A	60A	50A
	Max Power	600W	1.2kW	1.2kW	2.4kW	2.4kW
	CC mode Accuracy	0.1% stg.+0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg.+0.05% F.S.	0.1% stg.+0.05% F.S.	0.1% stg.+0.05% F.S.
	Current Resolution	1mA	5mA	5mA	5mA	5mA
	CV mode Accuracy	0.1% stg.+0.05% F.S.	0.1% stg. + 0.05% F.S.	0.1% stg.+0.05% F.S.	0.1% stg.+0.05% F.S.	0.1% stg.+0.05% F.S.
	Voltage Resolution	1mV	0.5mV	1mV	1mV	2mV
	CP mode Accuracy	0.2% stg. +0.1% F.S.	0.2% + 0.1% F.S	0.2% stg. +0.1%F.S.	0.2% stg. +0.1%F.S.	0.2% + 0.1% F.S.
	Power Resolution	0.1W	0.2W	0.3W	0.3W	0.5W
Measurement	V/I Sampling Rate *1	20us				
	Voltage Range	0~60V	0~24V	0~60V	0~60V	0~100V
	Voltage Accuracy	0.02% rdg.+0.02% F.S.	0.02% rdg.+0.02% F.S.	0.02% rdg.+0.02% F.S.	0.02% rdg.+0.02% F.S.	0.02% rdg.+0.02% F.S.
	Voltage Resolution	1mV	0.5mV	1mV	1mV	2mV
	Current Range	4.8A/12A	24A/60A	24A/60A	24A/60A	20A/50A
	Current Accuracy	0.05% rdg.+0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.	0.1% rdg. + 0.05% rng.
	Current Resolution	1mA	5mA	5mA	5mA	2mA
	Power Accuracy	0.08% rdg.+0.08% rng.	0.12% rdg.+0.07% rng.	0.12% rdg.+0.07% rng.	0.12% rdg.+0.07% rng.	0.12% rdg.+0.07% rng.
	Power Resolution	0.1W	0.1W	0.3W	0.3W	0.5W
	Temperature Range	0~90˚C	0~90˚C	0~90˚C	0~90˚C	0~90˚C
	Temperature Accuracy	±2˚C	±2˚C	±2˚C	±2˚C	±2˚C
	Temperatur Resolution	0.1˚C	0.1˚C	0.1˚C	0.1˚C	0.1˚C
Others	Protection	UVP, OCP, OPP, OTP, FAN, Short				
Temperature Coefficient	Voltage / Current	50ppm/˚C				
Dimension (H x W x D)		177 x 428 x 600.7mm / 7.0 x 17 x 24 inches	177 x 428 x 700mm/ 7.0 x 17 x 28 inches	177 x 428 x 700mm/ 7.0 x 17 x 28 inches	177 x 428 x 700mm/ 7.0 x 17 x 28 inches	177 x 428 x 700mm / 7.0 x 17 x 28 inches
Weight		38.6kg / 85lbs	37kg / 82lbs	37kg / 82lbs	37kg / 82lbs	37kg / 82lbs

Note * : Call for availability

Model A691101 DC/AC Bi-direction Converter	
Regenerative Bi-Direction Power	
Voltage Range	1Ø 200~240V ±5%, 47~63Hz
Current Range	45A
Current THD	< 5% at Related Power
Power Factor	> 0.9 at Related Power
Protection	UVP, OCP, OPP, OTP, FAN, Short
Dimension (H x W x D)	83.94 x 425.8 x 696 mm / 3.3 x 16.8 x 27.4 inch
Weight	25kg / 55.2lbs

Model 69200-1 Battery Charge/Discharge Controller	
Data Acquisition Rate to PC	Minimum 40ms@17020 (4CH), 100ms@17020(60CH)
PC Interface	Ethernet
Dimension (H x W x D)	88.1 x 428 x 420mm / 3.5 x 16.9 x 16.5inch
Weight	9.4kg / 21lbs

General Specifications		
Temperature	Operation	0˚C ~ 40˚C
	Storage	-40˚C ~ 85˚C
Safety & EMC		CE
Input AC Power	Voltage range	1Ø 100~240V ±10%, 47~63Hz

Note*1: 20us sampling rate for calculating battery capacity and energy.

ORDERING INFORMATION

17020 : Regenerative battery pack test system 600W/60V/12A per channel, 8~56CH
17020 : Regenerative battery pack test system 1200W/24V/60A per channel, 4~60CH
17020 : Regenerative battery pack test system 2400W/100V/50A per channel, 4~60CH
69200-1 : Battery Charge/discharge Controller
69206-60-8 : Regenerative Charge/Discharge Tester 600W/60V/12A/8CH
69212-24-4 : Regenerative Charge/Discharge Tester 1200W/24V/60A/4CH
69212-60-4 : Regenerative Charge/Discharge Tester 1200W/60V/60A/4CH
69224-60-4 : Regenerative Charge/Discharge Tester 2400W/60V/60A/4CH
69224-100-4 : Regenerative Charge/Discharge Tester 2400W/100V/50A/4CH
A170201 : IPC for battery test system
A691101 : DC/AC Bi-direction Converter
A692003 : Thermal sensor with cable
51101-64 : Thermal Multi-function Data logger 64 channel (Option)

All specifications are subject to change without notice.



KEY FEATURES

- Regenerative battery energy discharge
  - Energy saving
  - Environment protection
  - Low heat output
- Channels parallelable for higher currents
- Charge / discharge mode
  - Constant Current
  - Constant Voltage
  - Constant Power
- Driving cycle simulator
- High precision measurement accuracy
- Fast current conversion
- Smooth current without overshot
- Testing data analysis function
- Data recovery function when power failure

The 17030 system is a high precision integrated solution specifically designed for high power battery pack tests. Accurate sources and measurements ensure the test quality that is suitable for performing exact and reliable testing that is crucial for battery pack incoming or outgoing inspections, as well as capacity, performance, production and qualification testing.

Software (Battery Pro)

The 17030 test system is specifically designed to meet various requirements for testing high power battery packs with a graphic and friendly software platform. Charge and discharge protection aborts tests when abnormal conditions are detected. Extra memory is set for testing data recovery when power failure.

Recipe Editor

- 255 charge/discharge steps
- Dual layer loops (Cycle & Loop) with 9999 loops per layer for setting
- Maximum charge and discharge current switch with minimum 10ms
- Testing step : CV / CC / CP / CC-CV / Waveform current / DCIR
- Cut-off conditions (time, current, capacity, cut-off voltage, cut-off current, etc.)
- Next step : Next / End / Jump / Rest

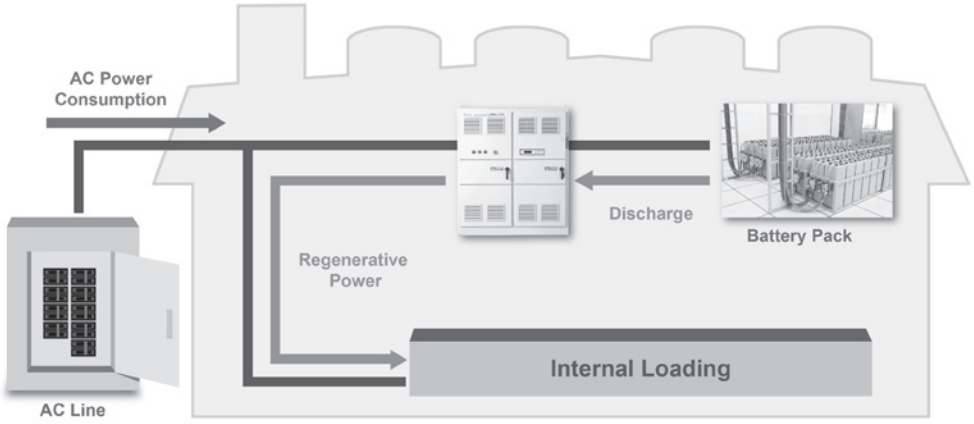
Ethernet

Testing Data

- Generate the detailed report and step report
- Report analysis function: users can decide the parameters of the X and Y axes in line for creating customized report. Such as Life-cycle report, Q-V report, V/I/T-time report and etc.
- Diversified reports & charts: real-time report, cut-off report, X-Y scatter chart report

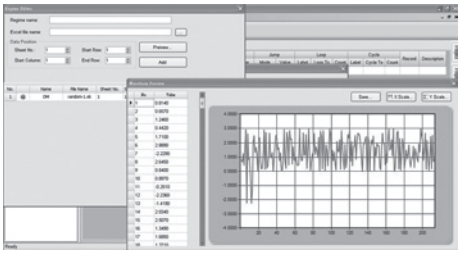
System Features

- Regenerative battery energy discharge
  - Low heat out
  - Reduces air-conditioner power consumption
- THD is under 5% at rated power
- The PF is over 0.9 at rated power
- OVP/UVP/OCP/OTP/OQP protection
- Wire loss protection
- Data logger data (Option)



Driving Cycle Simulation

The battery pack always is used at quick and un-regular current condition. The system simulates the real condition on battery pack by working condition simulator.

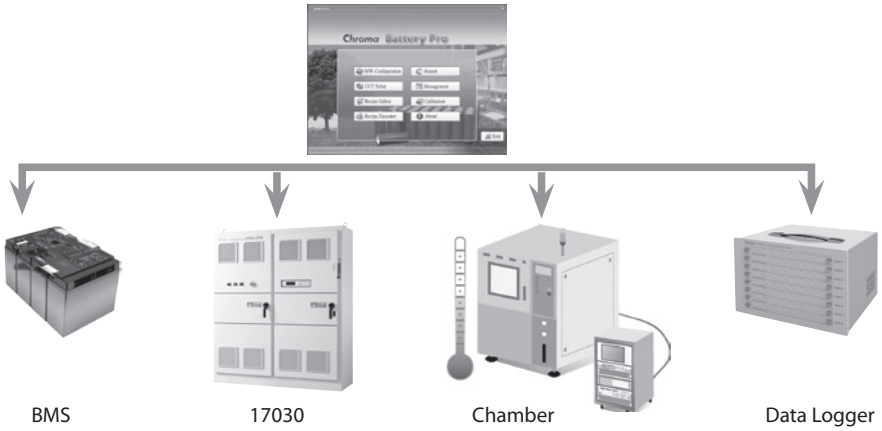


- Import dynamic charge/discharge waveforms to simulate the DRIVE CYCLE or the actual application
- Support Excel (xls) format
- There are 720,000 points of driving profile memory to save the waveform current in each channel
- Minimum △t : 10ms

System Integration

Integrates to thermal chambers, data logger and BMS communication interface. Full function control per charge/ discharge profile or results (customized service)

- BMS communication interface : Collecting BMS data to control charge/discharge profile and protection setting
- Data logger : Collecting measured battery cell voltage and temperature to control test procedure and protection setting
- Thermal Chamber : Synchronizing temperature control with charge/discharge profile



All specifications are subject to change without notice.

SPECIFICATIONS							
Model		**17030**					
Channel		1		1		1	
Charge / Discharge Mode							
Voltage Range		15V~450Vdc		20V~600Vdc		40V~900Vdc	
Maximum Current		200A		300A		400A	
Max Power		90kW		180kW		240kW	
Measurement							
Voltage Range *1		0~450V		0~600V		0~900V	
Voltage accuracy		0.05%+0.05% F.S.		0.05%+0.05% F.S.		0.05%+0.05% F.S.	
Voltage resolution		10mV		15mV		20mV	
Current Range		0~50A	0~200A	0~80A	0~300A	0~100A	0~400A
Current accuracy		±0.2%F.S.	±0.1% F.S.	±0.2%F.S.	±0.1% F.S.	±0.2%F.S.	±0.1% F.S.
Current resolution		10mA		15mA		20mA	
Power range		90kW		180kW		240kW	
Power accuracy		±0.2% F.S.		±0.2% F.S.		±0.2% F.S.	
Power resolution		5W		10W		20W	
AC Input							
Voltage Range		3Ø 200V/220V/380V/440V/480V ±5%, 47~63Hz					
Others							
Interface		Ethernet					
Operation Temperature		0 ˚C ~ 40 ˚C					
Dimension (H x W x D)	Transformer	1111 x 813 x 686mm / 43.75 x 32 x 27 inch		1257 x 1041 x 813mm / 49.5 x 41 x 32 inch		1257 x 1041 x 813mm / 49.5 x 41 x 32 inch	
	Power Enclosure	2286 x 2007 x 609mm / 90 x 79 x 24 inch		2286 x 2007 x 609mm / 90 x 79 x 24 inch		2286 x 2007 x 609mm / 90 x 79 x 24 inch	
Weight	Transformer	approx. 465 kg / 1025 lbs		640 kg / 1400 lbs		640 kg / 1400 lbs	
	Power Enclosure	approx. 1500 kg / 3306 lbs		approx. 1500 kg / 3306 lbs		approx. 1500 kg / 3306 lbs	

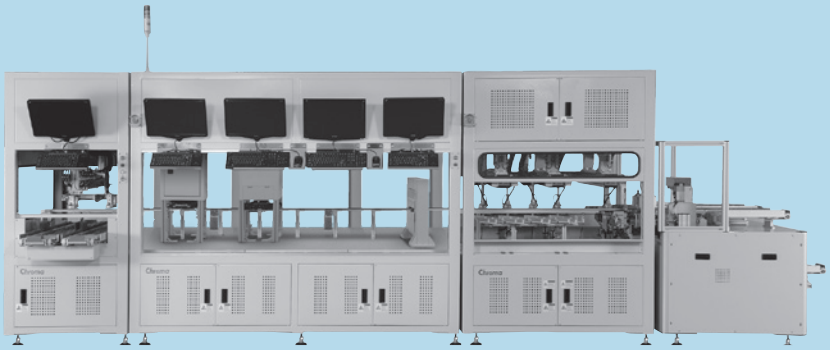
Note*1: The output voltage range is referred by the cabling.

ORDERING INFORMATION

17030 : Regenerative Battery Pack Test System 90kW/450V/200A
17030 : Regenerative Battery Pack Test System 180kW/600V/300A
17030 : Regenerative Battery Pack Test System 240kW/900V/400A
17030 : Regenerative Battery Pack Test System 350kW/700V/500A
A693000: Battery Charge/discharge Controller
A693001: Battery Charge/discharge Measurement Unit
A170201 : IPC for battery test system
51101-64 : Thermal Multi-function Data logger 64 channel (Option)

Solar Wafer Inspection System 5-1
Solar Cell Test/Sorting System 5-2
Solar Cell Inspection Test/Sorting System 5-3
Solar Wafer/Cell Diffusion Loader/Unloader Equipment 5-4
Automatic Optical Solar Wafer/Cell Inspection System 5-5
c-Si Solar Cell Tester 5-8
Solar Cell/Module I-V Tester 5-9

Overview



Solar Wafer Inspection System



Solar Cell Test/Sorting System



Solar Cell Inspection Test/Sorting System



Solar Wafer/Cell Diffusion
Loader/Unloader Equipment



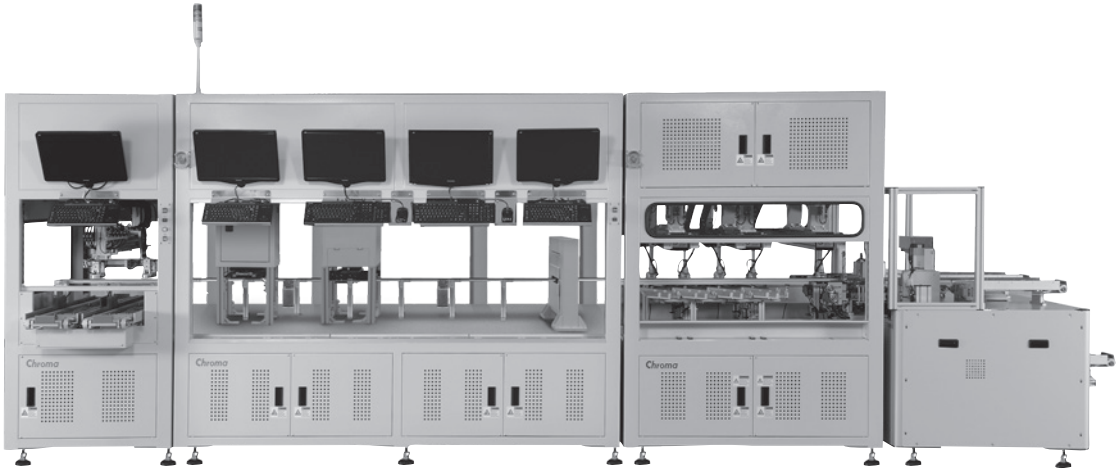
Automatic Optical Solar Wafer/Cell
Inspection System



c-Si Solar Cell Tester



Solar Cell/Module
I-V Tester



KEY FEATURES

- Good for 5 inches and 6 inches wafer
- High throughput and low breakage rate ≤0.1%
- 2D geometry inspection
- Surface inspection
- Micro Crack inspection
- Saw Mark Inspection
- Resistively/ Thickness tester
- Lifetime tester
- Easy trouble shooting
- Loader : Manz box
- Unload : Coin stack / cassette

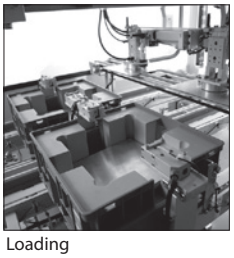
Integrated with 2D Geometry, Surface, Micro Crack, Saw mark inspection system and Resistively & Thickness, Lifetime tester by customer defined, Chroma 3710-HS is a fully user configuration wafer sorter system with very low breakage rate and high through put.

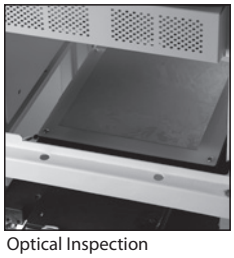
Chroma 3710-HS solar wafer inspection system is ideal for PV incoming process. Plus wafer can be sorted by user defined algorithm fully automatically into coin stack or cassette. The unique auto coin stack/cassette exchange feature eliminates system down time when changing full coin stack/cassette to empty coin stack/cassette manually.

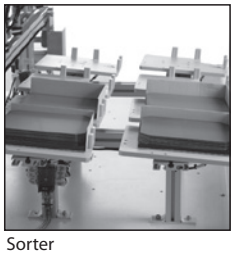
For the breakage rate that is one of the key concern for PV wafer handling system. The 3710-HS uses state-of-the-art cell transportation technique to ensure minimum breakage rate.

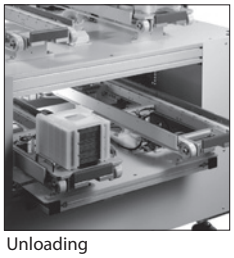
ORDERING INFORMATION

3710-HS : Solar Wafer Inspection System


Loading


Optical Inspection


Sorter


Unloading

All specifications are subject to change without notice.

Solar Cell Test/Sorting System

Model 3720



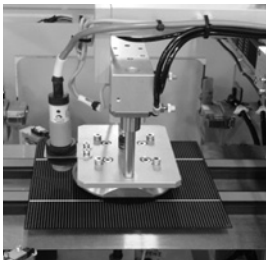
KEY FEATURES

- c-Si Solar Cell Tester : Chroma 58301
- High throughput - UPH : 1,500
- Low breakage rate : ≦0.2%
- Type of sorting bins : Auto & Manual
- Sorting Bins can be user defined
- Small footprint
- Applicable for 5", 6" mono/multi-crystalline silicon PV cells
- High cell positioning repeatability to ensure consistent test result

Integrated with Chroma 58301 c-Si Solar Cell Tester, Chroma 3720 is a fully user configuration cell sorter with very low breakage rate and high throughput. The sorting criteria is selectable by user based on application. For instance, PV cell manufacturers may use Pmpp or Efficiency to sort PV cells. However, for c-Si PV module manufacturers, FF can be used as sorting criteria to minimize the power loss due to cell mismatch.

ORDERING INFORMATION

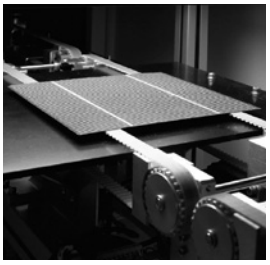
3720 : Solar Cell Inspection/Sorting System



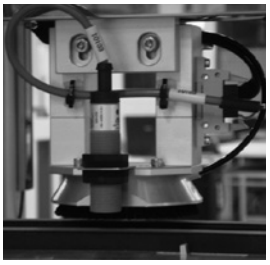
Loading



Testing



Handling



Sorting



Solar Cell Inspection Test/Sorting System Model 3730



KEY FEATURES

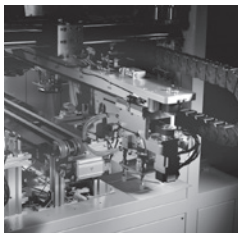
- Good for 5 inches and 6 inches mono/ multi-crystalline silicon cells
- High throughput and low breakage rate ≦0.2%
- Loader can automatically pick up and place cell finished by firing
- Efficiency and Color classes and Sorting Bins can be defined by customers' request
- Integrated with Inspector and IV Tester by customers' request
- High cell positioning repeatability to ensure consistent test result
- Sorting Bins can be extended by module

Chroma 3730 Solar Cell Inspection Test/Sorting System is ideal for PV backend process. In loader it can automatically pick up and place PV cell finished by firing. Then it will inspect cell surface and backside defects and will automatically sort the cells into carrier by different efficiency and color classes defined by customers' request.

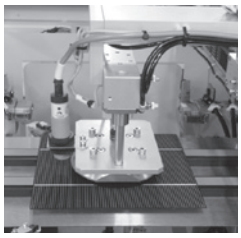
Breakage rate is one of the key concern for PV cell handling system. Chroma 3730 uses state-of-the-art cell transportation technique to ensure minimum breakage rate. Based on customer's requirement of different processes, the carrier type and the amount of sorting bins also can be designed and adjusted.

ORDERING INFORMATION

3730 : Solar Cell Inspection Test/Sorting System



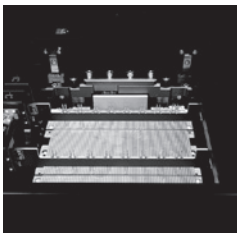
Firing Unload



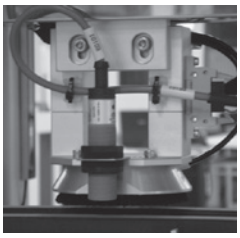
Loading



AOI



IV Testing



Sorting

All specifications are subject to change without notice.

Solar Wafer/Cell Diffusion Loader/Unloader Equipment Model 3775



KEY FEATURES

- Low Breakage rate
- High Throughput
- Flex picker robot transfer
- Surface Inspection：Option
- Loader: Quartz Boat
- Unload：Manz Box / Cassette(option)

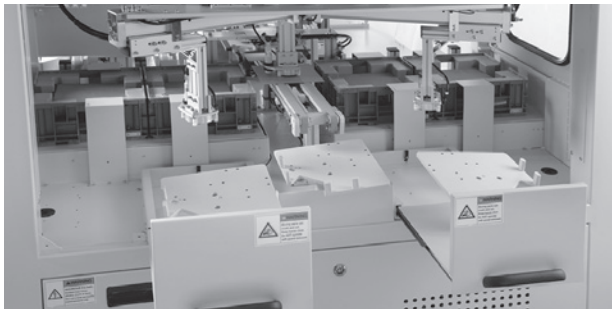
Furnace tube process is commonly used for wafer phosphorous diffusion . Chroma is not only providing short boat but also long boat for diffusion process loader/Unloder system to our customers. High speed flex picker robots are used on wafer transfer . Chroma provide the lower breakage, high throughout and low cost loader and unloader system in diffusion process and met our customer all of diffusion process function requirement.

ORDERING INFORMATION

3775 : Solar Wafer/Cell Diffusion Loader/Unloader Equipment



Loading

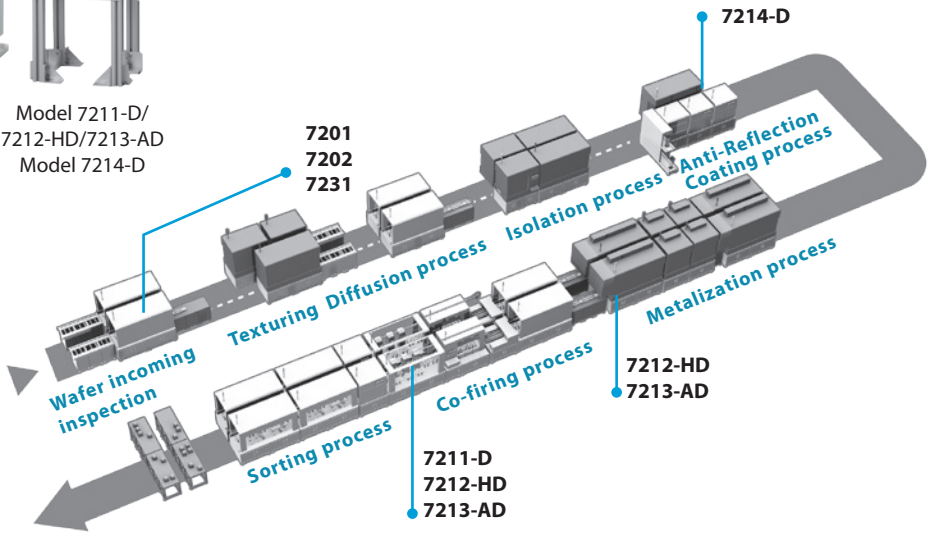


Unloading

All specifications are subject to change without notice.



Model 7201 Model 7202 Model 7231 Model 7211-D/ 7212-HD/7213-AD Model 7214-D



KEY FEATURES

- Adjustable criteria for different process application or model
- Flexible algorithms programming editor for mono-crystalline and multi-crystalline silicon solar cells
- Multiple interface to communicate with manufacturing equipment or information system
- Various defects inspection capability from multilayer LED lighting design
- Flexible design that can be easily integrated to your in-line printing system and sorting system

Among several factors for PV to achieve grid-parity, reliability of the PV modules plays an important role. Since it's known that some of the cell defects such as edge chips/ flakes, bumps of cell surface were proved to be source of infant mortality of the c-Si PV modules, therefore, to detect those defects is very important for c-Si cell manufacturers.

However, most of cell defects are inherited by wafers. Therefore, both cell and wafer defect inspections are crucial to final PV module quality and reliability.

Due to the increasing BIPV and rooftop application, even for those defects that does not directly link to reliability issues such as water mark, surface stain, have to be detected and considered as fail or secondary grade of cells for c-Si cell buyers.

Conventionally, those defects were visually inspected by operators. But, the inconsistent inspect result makes fully automatic optical inspection (AOI) solution becomes unavoidable equipment for c-Si cell & wafer lines.

Chroma 7200 series are specially designed for detecting wide variety of defects observed on c-Si cells & wafers for all sizes and crystallizations. Base on the process needs, eight inspectors are available for both incoming wafer and final cell sorting requirements.

Function Guide	7201	7202	7231	7211-D	7212-HD	7213-AD	7214-D
Sawmark			✓				
Geometry (Length, angle, area…etc)	✓						
Surface stain (Particle, water mark, finger print…etc)	✓	✓			✓	✓	✓
Printing defect (Fat, interruptions, nodes…etc)					✓	✓	
Color defect (Coloring, variation, spot…etc)				✓			✓

Solar wafer geometry and surface inspector
Model 7201

The Chroma 7201 was designed to measure wafer lengths, widths, diagonal, orthogonal and chamfer size and angle, it is also capable to detect surface stains. User friendly software and GUI enable versatile parameter settings and result, it also provides defect display and storage function for further analysis or potential MES/CIM integration.

- Capable to be integrated to any wafer sorters
- Flexible algorithms editor for mono-crystalline, multi-crystalline and quasi-crystalline wafers, and works for both 5" and 6"
- Multiple interface to communicate with different equipment or manufacturing execution system (MES)
- Ready for diamond-saw wafers inspection
- Self-monitor and calibration systemi

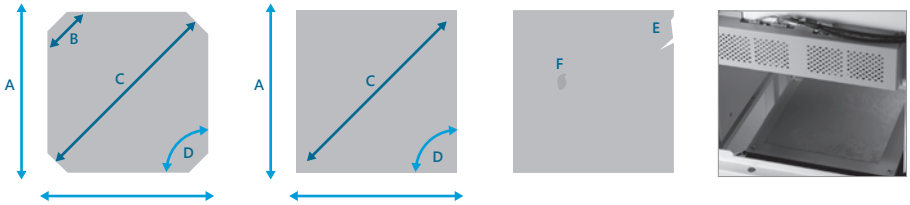


Illustration on 7201 inspection items

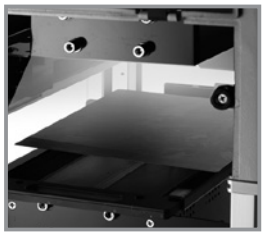
A: Side length
B: Chamfer length
C: Diagonal
D: Orthogonal
E: V-cut
F: Stain

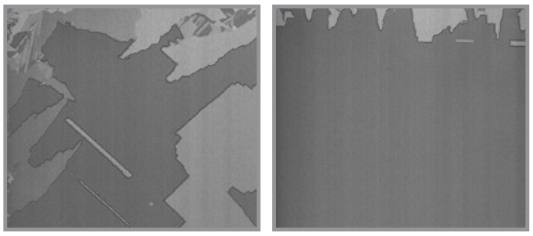
All specifications are subject to change without notice.

Solar Wafer Quality Inspector
Model 7202

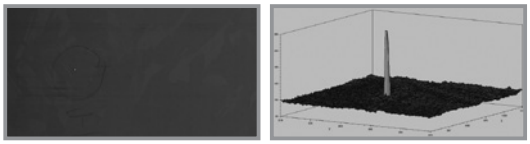
In the design of 7202, Chroma come out a unique optical design that ensures the result of grain-size calculation is highly repetitive. Since the classification of different grain-size could be quantified, the inspected wafers can be applied to the proper cell manufacturing lines to get highest possible cell efficiency.

Pinhole defect can also be detected by 7202. The pinhole defect is known to be cause of μ-crack or severe local shunting that will lead to reliability issue to the PV module.





Examples on the grain-size inspection result on 7202

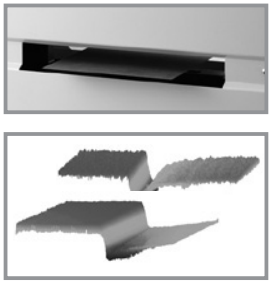


Analysis on pinhole defect

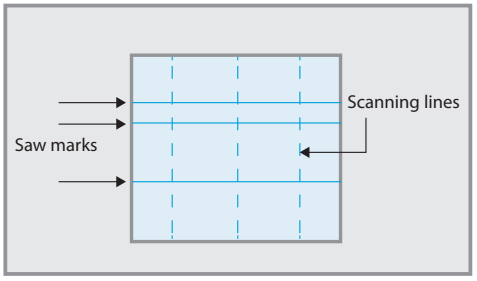
- Capable to be integrated to any wafer sorters
- Flexible algorithms editor for mono-crystalline, multi-crystalline and quasi-crystalline wafers, and works for both 5" and 6"
- Multiple interface to communicate with different equipment or manufacturing execution system (MES)
- Unique illumination design to ensure the repeatability of grain-size

Solar Wafer Sawmark Inspector
Model 7231

Sawmarks happened during the wafering process because of the impurities or vibration of the wires. It happens sometimes in near the edge and sometimes in the center. By following the British standard of EN 50513 2009, Chroma is able to provide the solution that also sense the sawmarks in the center.



Different sawmark profiles

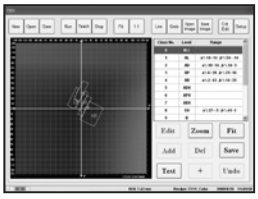


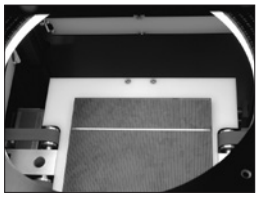
Sawmark inspection methodology

- Capable to be integrated to any wafer sorters
- Flexible algorithms editor for mono-crystalline, multi-crystalline and quasi-crystalline wafers, and works for both 5" and 6"
- Multiple interface to communicate with different equipment or manufacturing execution system(MES)
- Follow the British standard of EN 50513 2009 to measure different wafer properties

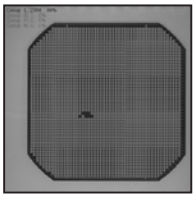
Color Classifier
Model 7211-D

The Chroma 7211-D c-Si cell color classifier was designed to provide high repetitive color classification for c-Si PV cells. CIE 1931 Lab color space and up to 60x60 grids for entire cell surface allows Chroma 7211-D to provide numeric color severities down to each of the 3600 blocks throughout the cell under test. By using the color information of each block and user definable algorithm, user may determine the represented color for non-uniform color cells such as poly-crystalline cells or cells have uneven anti-reflection coating thickness.

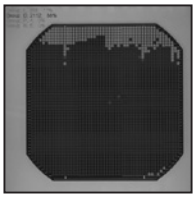




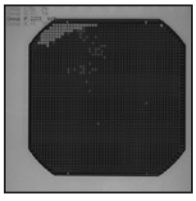
Chroma 7211-D can be used right after anti-reflection coating process to ensure only cells with acceptable color uniformity go down to metallization process. And the fail cells may then be sent for re-work. It can also be integrated to in-line or off-line sorter for final inspection prior to shipping.



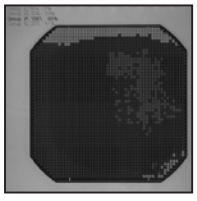
Light Blue



Dark Blue



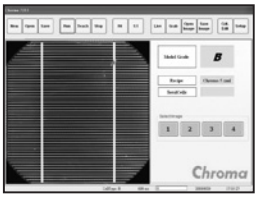
Purple

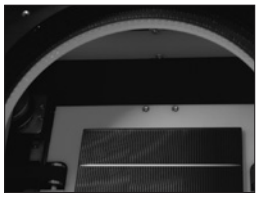


Mix Color

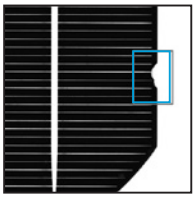
Frontside Printing and Surface Inspector
Model 7212-HD

Defects causes by front-side (sunny side) printing process of c-Si PV cells may cause performance, reliability or appearance impact. Therefore, a reliable and repetitive inspection to defects such as losing Ag paste on busbars, gridline interruptions, printing shift or rotation, water mark etc., have to be detected and avoid shipping those cells to ensure shipping quality. Chroma 7212-HD c-Si cell front-side printing inspector equips with high resolution CCD camera and superior software algorithm to recognize the unwanted defects on front-side of c-Si PV cells.

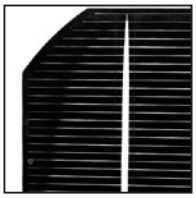




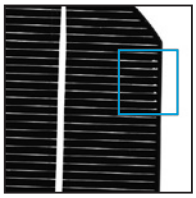
Chroma 7212-HD can be used right after front-side process to retire cells with major defects. This allows best use of the capacity of the following process like I-V testing and sorting which is known to be one of the bottlenecks of c-Si cell line. It can also be integrated to in-line or off-line sorter for final inspection prior to shipping.



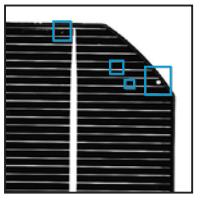
Chipping



Discoloration



Finger Width

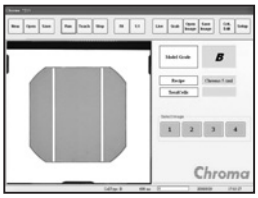


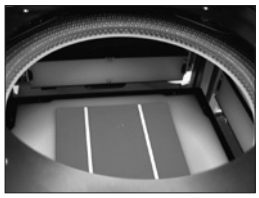
Stains

• Continued on next page ➟

A Backside Printing and Surface Inspector
Model 7213-AD

Defects causes by back-side printing process of c-Si PV cells will also cause performance, reliability impact. Among all the back-side printing defects, bumps caused by improper printing may cause high cell breakage rate during lamination of c-Si module process. Chroma 7213-AD c-Si cell back-side printing inspector uses unique lighting technique to detect common back-side printing defects plus most demanding bumps.

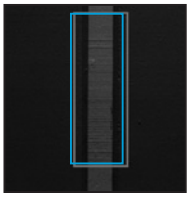


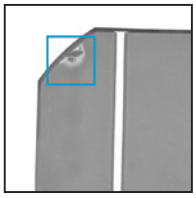


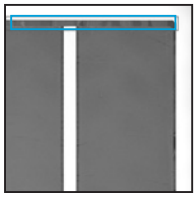
Another model Chroma 7213, with same inspection capability but was designed for special upward-detection. This brings unparallel advantage against conventional downward-detection design. With upward detection, the cell can be checked without being flipped twice which helps to minimize the cell breakage and reduce the production line length.

Same as Chroma 7212-HD, Chroma 7213-AD can be used after back-side process to retire cells with major defects. It can also be integrated to in-line or off-line sorter for final inspection prior to shipping.


Bump


BUSBar Defect


Stain


Alignment Shift

Anti-Reflection Coating Inspector
Model 7214-D

Chroma 7214-D is the inspector for Anti-reflection coating process. With 4M mono CCD and Chroma's experience RGB illumination design, we could assure that each defined defects could be identified through our specified combination. The 7214-D anti-reflection inspector could be applied in discovering :
(1) Color difference, **(2)** Brownish stains, **(3)** Stripe shape watermark, **(4)** Particles, **(5)** Belt mark, **(6)** Acid mark, **(7)** Stacking cells, **(8)** Chipping

With our flexible hierarchy software design, customer could set up the parameters to perfectly meet their unique manufacturing process. Chroma understood that every different manufacturing equipment will sometimes generate different failure patterns, we would closely work with our valuable customer to come out with a solution that meet our customer's requirement.


Stain


Watermark stripe shape


Particles


Acid mark

SPECIFICATIONS

Model	7201	7202	7231
Description	Solar wafer geometry & surface inspector	Solar wafer quality inspector	Solar wafer sawmark inspector
Wafer size	5' or 6'wafers, for mono c-Si, multi c-Si and quasi mono c-Si		
Detection limit	80 μm	80 μm	5 μm
Inspection items	Length, Width, Diagonal, Chamfer length, Pinhole, Stain, Chipping, Grain-size, Sawmark, backside		
UPH*2	3000~3600		
Interface	TCP/IP Option: IO,RS-232		
Options	RAID, UPS, MES,		

Note *1 : 40 μm resolution is also available
Note *2 : When work with Chroma 3710-HS

Model	7211-D	7212-HD	7213-AD	7214-D
Camera	1024x768 color CCD	16M mono CCD	4M mono CCD	4M mono CCD
Resolution	240μm	60μm	90μm	90μm
Light Source	LED strobe lighting			RGB LED strobe lighting
Lens	Low distortion Lens			
Dimension(WxDxH)	320mm x 324mm x 1032mm			
Weight	35kg			
Accessory	External Keyboard, Mouse, PC, Monitor			
Interface	Ethernet, Option : IO, RS-232			

ORDERING INFORMATION

7201: Solar wafer geometry and surface inspector
7202: Solar Wafer Quality Inspector
7231: Solar Wafer Sawmark Inspector

7211-D: Solar Cell Color Classifier
7212-HD: Solar Cell Frontside Printing and Surface Inspector
7213-AD: Solar Cell Backside Printing and Surface Inspector
7214-D: Anti-reflection Coating Inspector

All specifications are subject to change without notice.

c-Si Solar Cell Tester

Model 58301

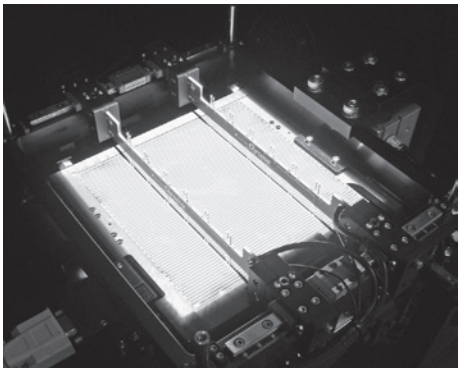


I-V test is the most important test for PV cell/ module manufacturing because the measured power rating or efficiency of the cell or module directly affect the selling price of the product. Therefore, highly accurate and repeatable I-V test result is not only for quality issue but also for Business issue.

However, PV cell I-V testing represents several technical challenges; therefore, it's extremely hard to achieve stable and accurate test results even if class AAA type of solar simulator is used. Those challenges include:

- Spectral mismatch correction
- Minimize impact of non-uniformity
- Simultaneous measurement to avoid error caused by temporal instability of irradiance intensity
- Temperature correction or control to STC or desired temperature
- Low stress probing to avoid cell breakage
- Maximize probe-contact repeatability & minimize probing shadow

Chroma 58301 c-Si Solar Cell (Crystalline Silicon) Tester is ideal for both RD & in-line production (see Chroma 3720) application. Using Wacom® class AAA+ solar simulator, comprehensive irradiance/temperature correction technique and probing system, Chroma 58301 c-Si Solar Cell Tester achieves the highest test repeatability and measurement accuracy for most demanding customers.



SYSTEM FEATURES

- Measurements: Eff, Pmpp, Impp, Vmpp, Isc, Voc, FF, Rshunt, Rs, Irev.
- Full four-quadrant source for both light forward/reverse & dark forward / reverse test
- Class AAA+ solar simulator
- Versatile system software and user editable test sequences
- Low stress probe
- Patterned probe-bar to ensure minimum probe shadow
- PV cell sorter integration (Chroma 3720)

ORDERING INFORMATION

58301: c-Si Solar Cell Tester

SPECIFICATIONS	
Model	**58301**
Solar Simulator Section	
Lamp Type	Xenon Short Arc
Lamp Life	1,000 hrs
Illumination Area	163mm x163mm
Light Source	Steady State (w/Shutter Control)
Air Mass	AM1.5G (IEC60904-3)
Irradiation Intensity	100mW/cm2±15% (1 Sun±15%)
Spectral Mismatch	±25% or Better
Positional Non-uniformity	2% or Better
Temporal Stability	1% or Better
Light Collimation	<5°
Power Section	
Voltage	
Voltage Forward Range	20V
$V_{FORWARD}$ Program Resolution	16 bits
$V_{FORWARD}$ Ripple	<3mVrms
Voltage Reverse Range	-20V
$V_{REVERSE}$ ProgramResolution	16 bits
$V_{REVERSE}$ Ripple	<3mVrms
Transient Response Time	< 100µs
Load regulation	0.002% F.S.
Line regulation	0.002% F.S.
Slew Rate	1V/µs
Current	
Current Forward Range	20A
$I_{FORWARD}$ Program Resolution	16 bits
$I_{FORWARD}$ Ripple	<0.03%
Current Reverse Range	-20A
$I_{REVERSE}$ Program Resolution	16 bits
Transient Response Time	< 75µs
Load regulation	1mA
Line regulation	0.005% F.S.
Slew Rate	1.25A/µs
Power	
Power Rating	400W
Measurement Section	
Voltage	
Voltage Measurement Range - Forward	1V
$V_{FORWARD}$ Measurement Resolution	16 bits
$V_{FORWARD}$ Measurement Accuracy	0.05% F.S.
Measurement Points per I-V - Forward	40-200 programmable
Voltage Measurement Range - Reverse	-15V
$V_{REVERSE}$ Measurement Resolution	16 bits
$V_{REVERSE}$ Measurement Accuracy	0.05% F.S.
Measurement Points per I-V - Reverse	40-100 programmable
Current	
Current Measurement Range - Forward	10A/20A
$I_{FORWARD}$ Measurement Resolution	16 bits
$I_{FORWARD}$ Measurement Accuracy	0.1% F.S.
Measurement Points per I-V - Forward	40-200 programmable
Current Measurement Range - Reverse	-0.1A/-1A/-15A
$I_{REVERSE}$ Measurement Resolution	16 bits
$I_{REVERSE}$ Measurement Accuracy	0.1% F.S.
Measurement Points per I-V - Reverse	40-100 programmable
Irradiance (Forward Only)	
Input Range	200mV
Irradiance Measurement Resolution	16 bits
Irradiance Measurement Accuracy	500uV
Measurement Points per I-V - Forward	40-200 programmable
Temperature Sensing Section	
Measurement Type	IR/Thermopile
Temperature Range	0~500°C
Reproducibility	± 0.5°C



KEY FEATURES

- For both indoor simulated or outdoor natural sun light I-V testing
- Configure to use any type of solar simulators (not included)
- Measurements: Eff, Pmpp, Impp, Vmpp, Isc, Voc, FF, Rshunt, Rs, Irev (53311, 58314 only)
- Full four-quadrant source for both light-forward/reverse & dark forward /reverse test
- Versatile system software and user editable test sequences

I-V test is the most common test for various type of PV technologies including crystalline silicon cell/module, Si-base, CIGS, CdTe TF modules & GaAs-base multi-junction cell etc. The only two differences among different types of PV technologies are : Solar simulator illuminated area and intensity I-V tester's voltage/current and power ranges.

Chroma 53310 series Solar Cell/Module I-V Testers provide various models for different types of PV devices that give proven solution for professional or in-house system integrators. Or the system alone can be used for outdoor I-V testing.

The system provides all necessary hardware handshaking and software interface that allows users to integrate any type of solar simulators that best fit to the application.

Chroma also provide integration service by using customer defined solar simulator to give complete PV module or III-V PV cell test solution.

SPECIFICATIONS				
Model	**53311**	**53312**	**53313**	**53314**
Application	c-Si Cell	c-Si Module	TF Module	Multi-junction &CPV Cell
Power Section				
Voltage				
Voltage Forward Range	20V	100V	200V	20V
$V_{FORWARD}$ Program Resolution	16 bits	16 bits	16 bits	16 bits
$V_{FORWARD}$ Ripple	<3mVrms	<3mVrms	<5mVrms	<3mVrms
Voltage Reverse Range	-20V	-100V	-200V	-20V
$V_{REVERSE}$ ProgramResolution	16 bits	16 bits	16 bits	16 bits
$V_{REVERSE}$ Ripple	<3mVrms	<3mVrms	<5mVrms	<3mVrms
Transient Response Time	< 100µs	< 40µs	< 150µs	< 100µs
Load regulation	0.002% F.S.	0.002% F.S.	0.002% F.S.	0.002% F.S.
Line regulation	0.002% F.S.	0.002% F.S.	0.002% F.S.	0.002% F.S.
Slew Rate	1V/µs	10V/µs	5V/µs	1V/µs
Current				
Current Forward Range	20A	4A	1A	20A
$I_{FORWARD}$ Program Resolution	16 bits	16 bits	16 bits	16 bits
$I_{FORWARD}$ Ripple	<0.03%	<0.03%	<0.03%	<0.03%
Current Reverse Range	-20A	-4A	-1A	-20A
$I_{REVERSE}$ Program Resolution	16 bits	16 bits	16 bits	16 bits
Transient Response Time	< 75µs	< 30µs	<120µs	< 75µs
Load regulation	1mA	1mA	1mA	1mA
Line regulation	0.005% F.S.	0.005% F.S.	0.005% F.S.	0.005% F.S.
Slew Rate	1.25A/µs	0.25A/µs	15mA/µs	1.25A/µs
Power				
Power Rating	400W	400W	200W	400W
Measurement Section				
Voltage				
Voltage Measurement Range-Forward	1V	50V/100V	100V/200V	10V
$V_{FORWARD}$ Measurement Resolution	16 bits	16 bits	16 bits	16 bits
$V_{FORWARD}$ Measurement Accuracy	0.05% F.S.	0.05% F.S.	0.05% F.S.	0.05% F.S.
Measurement Points per I-V-Forward	40-200 programmable			
Voltage Measurement Range-Reverse	-15V	-100V	-200V	-20V
$V_{REVERSE}$ Measurement Resolution	16 bits	16 bits	16 bits	16 bits
$V_{REVERSE}$ Measurement Accuracy	0.05% F.S.	0.05% F.S.	0.05% F.S.	0.05% F.S.
Measurement Points per I-V-Reverse	40-100 programmable			
Current				
Current Measurement Range-Forward	10A/20A	2A/5A/10A	0.5A/1A	2A/10A/20A
$I_{FORWARD}$ Measurement Resolution	16 bits	16 bits	16 bits	16 bits
$I_{FORWARD}$ Measurement Accuracy	0.1% F.S.	0.1% F.S.	0.1% F.S.	0.1% F.S.
Measurement Points per I-V-Forward	40-200 programmable			
Current Measurement Range-Reverse	-0.1A/-1A/-15A	-0.2A/-2A/-10A	-0.1A/-1A	-0.2A/-2A/-20A
$I_{REVERSE}$ Measurement Resolution	16 bits	16 bits	16 bits	16 bits
$I_{REVERSE}$ Measurement Accuracy	0.1% F.S.	0.1% F.S.	0.1% F.S.	0.1% F.S.
Measurement Points per I-V-Reverse	40-100 programmable			
Irradiance (Forward Only)				
Irradiance Sensor	Optional irradiation sensor or Pyranometer for indoor or outdoor I-V testing			
Input Range	200mV	200mV	200mV	200mV
Irradiance Measurement Resolution	16 bits	16 bits	16 bits	16 bits
Irradiance Measurement Accuracy	500uV	500uV	500uV	500uV
Measurement Points per I-V-Forward	40-200 programmable			
Temperature Sensing Section				
Measurement Type	IR/Thermopile	IR/Thermopile	IR/Thermopile	Optional base on application
Temperature Range	0~500˚C	0~500˚C	0~500˚C	
Reproducibility	± 0.5˚C	± 0.5˚C	± 0.5˚C	

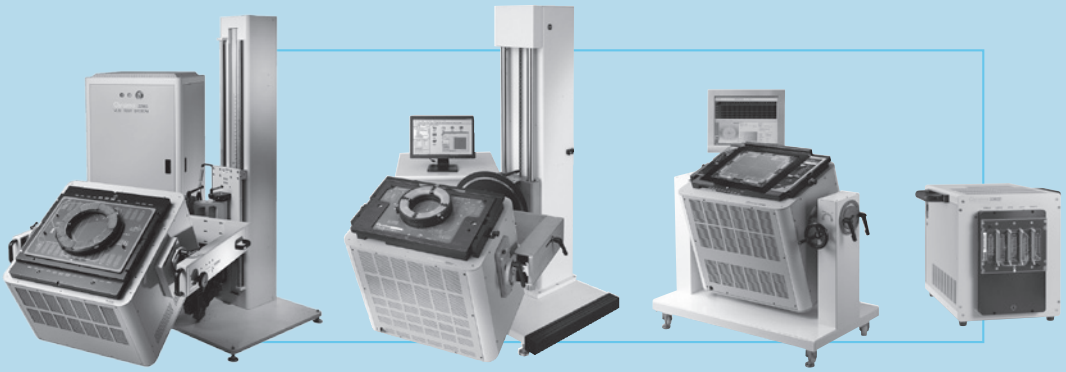
ORDERING INFORMATION

53311: c-Si Cell I-V Tester
53312: c-Si Module I-V Tester
53313: TF Module I-V Tester
53314: Multi-junction & CPV Cell I-V Tester

All specifications are subject to change without notice.

Semiconductor/IC Test Solution

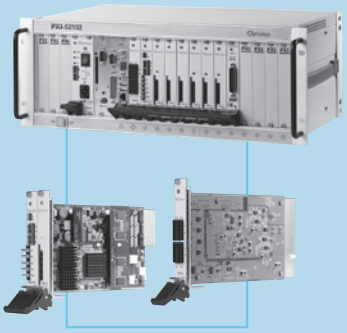
VLSI Test System 6-1
SoC/Analog Test System 6-6
Programmable Pin Electronics Module 6-10
Four-quadrant DUT Power Supply 6-11
Hybrid Single Site Test Handler 6-12
Final Test Handler 6-13
Automatic System Function Tester 6-14
Miniature IC Handler 6-16
xSD Card Tester and Handler 6-17
Touch Panel Multi-sites Test Handler 6-19
CMOS Image Sensor Inspection System 6-20



VLSI Test System



SoC/Analog Test System



Programmable Pin Electronics Module
Four-quadrant DUT Power Supply

Overview



Hybrid Single Site Test Handler



Final Test Handler



Automatic System Function Tester



Miniature IC Handler



xSD Card Tester and Handler



Touch Panel Multi-sites Test Handler



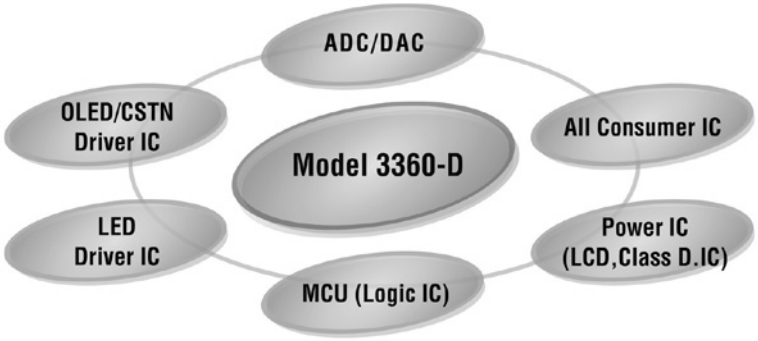
CMOS Image Sensor Inspection System



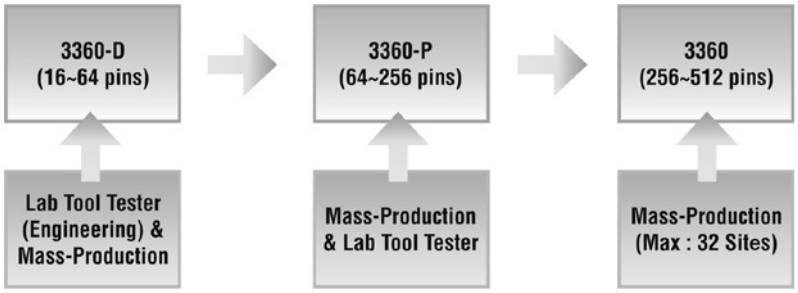
KEY FEATURES

- 50 MHz Test Rate
- 32/64 I/O Channels
- 8M(standard) /16M(option) Pattern Memory
- Flexible Configuration
- Parallel Testing : Max 8 DUTs
- Real Parallel Trim/Match Function
- Timing / Frequency Measurement Unit (TFMU)
- Test Program/Pattern Converter (V7, V50, SC312, J750)
- Analog PE Card Option (16 bits)
- SCAN Test Option (512M)
- ALPG Test Option for Memory
- STDF Tools Support (Option)
- User Friendly Windows XP Environment
- CRAFT C/C++ Programming Language
- Real Time Pattern Editor With Fail Pin/Fail Address Display
- Versatile Test Analysis Tools : Shmoo Plot, Waveform Display, Wafer Map, Pin Margin, Scope Tool, Histogram Tool and Etc.

The Full Application Functions – Logic, ADDA, LCD, LED, Power, ALPG, Match···etc



3360-D Bridge Test Development to Mass-Production



SPECIFICATIONS	
Model	**3360-D (I/O)**
Test Rate	50MHz
Pin Channels	32/64 Pins
Pattern Memory	8M (16M Option)
Parallel Testing Capability	Max 8 DUTs
Edge Placement Accuracy	± 625ps
Resource Per Pin Architecture	Yes
DPS (±16V, ±400 mA)	8
PMU (±16V, ±100 mA)	8
PPMU (-2V ~ +7V, ±25 μA)	Per Pin
Programmable Load (Active Load)	Per Pin (± 35 mA)
Windows Environment	Windows® XP
Programming Language	C\C++
Test Option	
LCD Channel (±80V)	Max 32 LCD Output Pins
AD / DA Converter Test Option	4 AWG / DGT (16 Bits AWI board)
STPHI/GPIB	TTL (Handler) / GPIB (Prober)
SCAN Option	512M / IO board
ALPG Memory Test Option	16X, 16Y, 16D
System and Dimension	
Power consumption	Max. 1KVA (90~240 Vac - 1phase 3W)
Only Test Head	W330 x D560 x H390 mm (Max. 35 Kg)

All specifications are subject to change without notice.

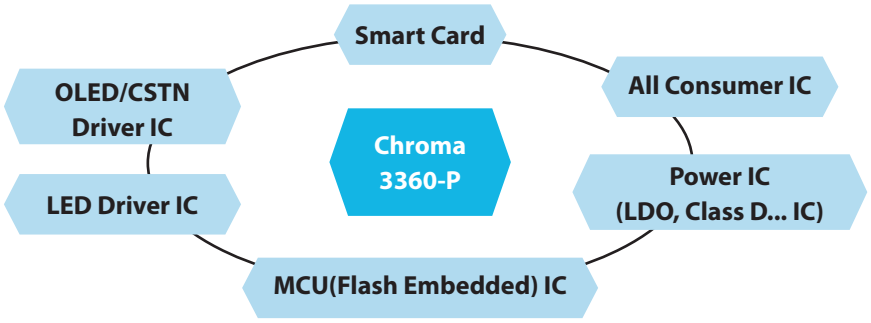


KEY FEATURES

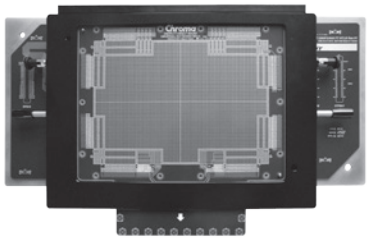
- 25/50 MHz clock rate
- 25/50 Mbps data rate
- 256 I/O channels
- 8/16 M pattern memory
- Flexible HW configuration (Interchangeable I/O, VI, ADDA, and LCD)
- Max 32 DUTs parallel testing
- Real parallel trim/Match function
- Time & Frequency Measurement Unit(TFMU)
- Test program/pattern converter (V7, TRI6020, V50, E320, SC312, D10, J750, ITS9K, TS670)
- AD/DA test option
- SCAN test option (max 512M/chain)
- ALPG test option for embedded memory
- STDF tools support
- User friendly Windows XP environment
- CRAFT C/C++ programming language



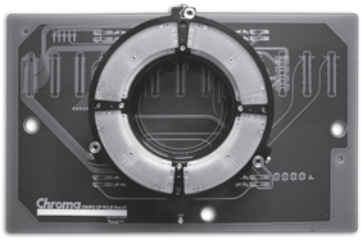
The Full Functions - Logic, LCD, LED, ADDA, Power, ALPG, SCAN, Match... etc.



Engineering Board Available for Test Development on-the-spot & Ready for Direct-mount Solution



3360P FT Direct-mount Solution



3360P CP Direct-mount Solution

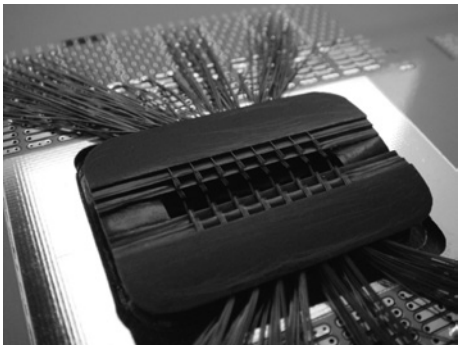
SPECIFICATIONS	
Model	**3360-P (I/O)**
Test Rate	25/50MHz
Data Rate	25/50Mbps
Logic I/O Channels	Max. 256 Pins
Pattern Memory	8M (16 M option)
Parallel Testing Capability	Max. 32 DUTs
EPA	± 625ps
Resource Per Pin Architecture	Yes
DPS (± 10V, ± 2 A)	8
PMU (± 48V, ±100mA)	16
PPMU (± 0.5V ~ 6.5V, ± 35mA)	Per Pin
TFMU function (Max 400Mhz)	Per Pin
Programmable Active Load (±35mA)	Per Pin
Windows Environment	Windows XP
Programming Language	C\C++
Test Option	
Hi-V (LCD- 80V) Channel	Max. 224 LCD pins
AD / DA Converter Test Option	4 AWG / 4 DGT (16 Bits)
Mixed-Signal Test Option (PXI)	24bits / 200 MS/s(14bits)
LXUVI (DPS ± 10V, ± 500 mA)	16 CH / board
LXREF(DPS ± 48V, ± 250 mA)	16 CH / board
HVREF-48(DPS ± 48V, ± 500 mA)	8 CH / board
HV100(-6V ~+100V, ± 250 mA)	8 CH / board (with EPB option)
HVREF (DPS ± 60V, ± 1A)	8 CH / board (with EPB option)
SCAN Option	512M / board
ALPG Memory Test Option	16X, 16Y, 16D
System And Dimension	
Power Consumption	Max. 3KVA
Only Test Head	W640 x D470 x H639 mm (Max. 90 Kg)

All specifications are subject to change without notice.



KEY FEATURES

- 50 MHz Test Rate(100Mhz HSCLK)
- 608 I/O channels
- 8M(standard) /16M(option) Pattern Memory
- Flexible Configuration (Interchangeable I/O, UVI, ADDA and LCD)
- Parallel Testing for 32 devices
- Real Parallel Trim/Match function
- Accepts SC312, TS670 probe card
- Test program/pattern converter (V7, TRI6020, V50, SC312, J750, ITS9K, TS670, ND1)
- Analog PE card option (16 ~24bits)
- SCAN test option (512M)
- ALPG test option for Memory
- STDF tools support
- User friendly Windows XP environment
- CRAFT C/C++ programming language
- Real time pattern editor with fail pin/fail address display
- Versatile test analysis tools:
  Shmoo plot, Waveform display,
  Wafer Map, Pin Margin, Scope tool,Histogram tool and etc.



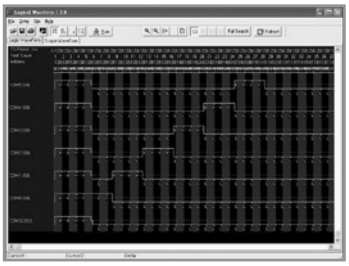
32 Sites Parallel Production Card

CRAFT

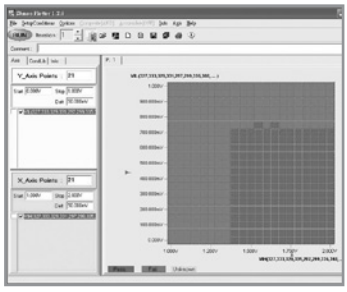
User Friendly and Powerful
Test Development Software



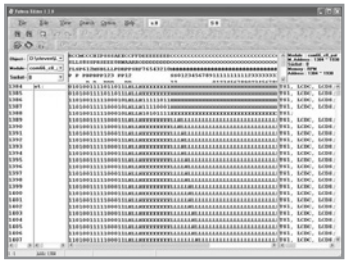
The Craft Software Tool



Waveform Tool



Shmoo Tool



Pattern Editor Tool

SPECIFICATIONS

Model	3360
Standard	
Test Rate	50MHz (high-speed clock 100MHz)
IO Channel	608 Pins (Max.)
Pattern Memory	8M (16 M Option)
Parallel Testing Capability	Maximum 32 DUTs
Edge Placement Accuracy	±625 ps
Resource Per Pin Architecture	Yes
DPS (±10V, ±2 A)	24 (8 DPS, 16 PREF ±45V)
PMU (±45V, ±100mA)	32
PPMU (±0.5V ~ 6.5V, ±35mA)	Per Pin
Programmable Load (Active)	Per Pin (±35 mA)
Windows Environment	Windows XP
Programming Language	C or C++
Test Option	
LCD Channel	Max. 544 LCD Pin
AD/DA Test Option	4 AWG / 4 DGT (16 bits)
High accuracy ADDA Option	2 AWG/ 2 DGT (24 bits)
SCAN Test Option	512 M (Per I/O Board)
ALPG Memory Test Option	16X, 16Y, 16D
UVI (±10V, ±500mA)	16
System Dimension	
Power Consumption	8KVA Max.
Cooling system	Forced air cooling
Test Head (WxDxH)	700 x 700 x 430 mm
Mainframe (WxDxH)	960 x 670 x 1750 mm

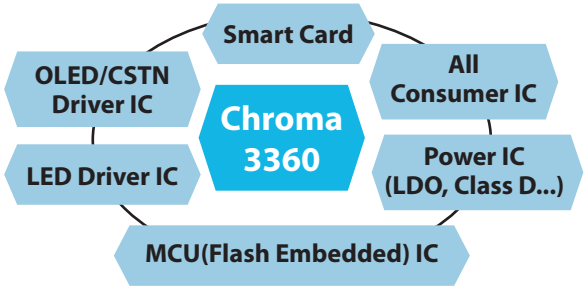
The Most Efficient Patterns/Test Program Converter

for V7, TRI6020, V50(scud-1a), SC312, J750, ITS9K, TS670, ND1

Mounting SC312/TS670 probe cards directly -
In addition to patterns/program converter , Chroma 3360 has a special Pogo-ring tower to mount the SC312/TS670 probe cards directly.

Most Flexible Configuration for Various Devices

(Logic, LCD, LED, ADDA, ALPG, SCAN, Power and etc.)



3360 / 3360-P / 3360-D VI SOURCE SPECIFICATION

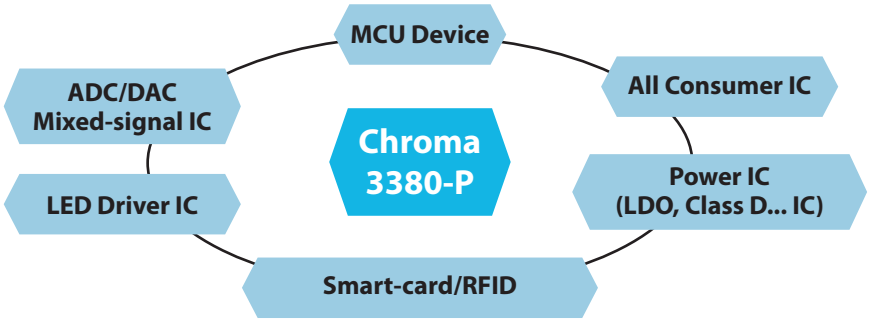
	STDPS	STPMU	LXUVI	LFUVI	HVREF	HVREF-48	HV-100	HCDPS	LXREF-48	SPREF	PMUVI-16	PMUVI-48
V Range	± 10 V	± 48 V	± 10 V	24 V	± 60 V	± 48 V	± 100 V	± 32 V	± 48 V	± 48 V	± 16 V	± 48 V
I Range	± 2 A	± 100 mA	± 500 mA	± 1.5A	± 2 A	± 500mA	± 200 mA	± 6 A	± 250 mA	± 100 mA	PMU : ±100mA UVI : ±250mA	PMU : ±100mA/ UVI : ±250mA
Channel	8 /board	8 /board	16 /board	4 /board	8 /board	8 /board	8 /board	8 /board	16 /board	8 /board	8+8/board	8+8/board
Slot	DPS slot	PMU slot	I/O slot	I/O slot	I/O slot	I/O slot	I/O slot	DPS slot	I/O slot	PREF slot	PMUVI slot	PMUVI slot
EPB module	None	None	None	None	Yes	None	Yes	Yes	None	None	None	None (3360-D-48)
3360-D	X	X	O	X	X	X	X	X	O	X	S	O
3360-P	S	S	O	O	O	O	O	O	O	X	X	X
3360	S	S	O	O	X	X	X	X	X	S	X	X
Accuracy	± 1.5mV	± 1.25mV	± 1.0mV	± 0.5mV	± 1.5mV	± 1.5mV	± 2.5mV	± 1.5mV	± 1.25mV	± 1.0mV	± 0.75mV	± 1.0mV

S : Standard O : Option X : None

All specifications are subject to change without notice.

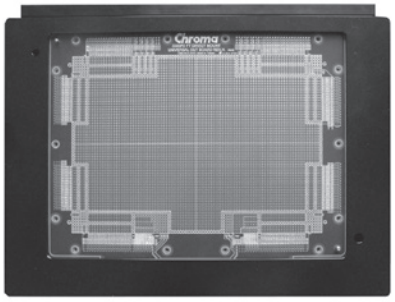


Most Flexible Configuration for Various Devices

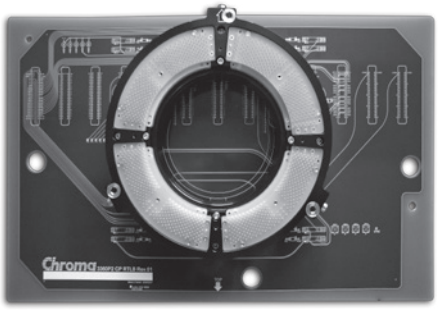


CP/FT Direct/Cable Mount Solutions

CP/FT Direct/Cable Mount Solutions available from engineering to Production;
Maintain Compatibility to 3360 & 3360P



3380-P FT Direct-mount



3380-P CP Direct-mount

KEY FEATURES

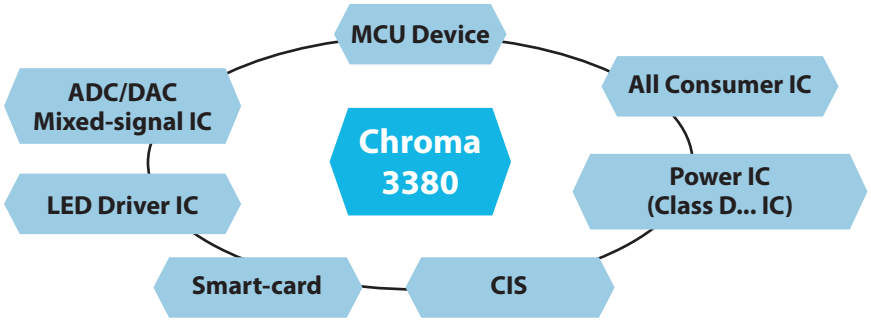
- 50/100 Mhz clock rate
- 50/100 Mbps data rate
- 512 digtial I/O pins (Max 576 digtial I/O pins)
- Up to 512 sites parallel testing
- 16/32M pattern memory
- Various VI source
- Flexible HW-architecture (Interchangeable I/O, VI, ADDA)
- Real parallel trim/Match function
- Time & Frequency Measurement Unit (TFMU)
- AD/DA test option
- SCAN test option (max 1G/chain)
- ALPG test option for embedded memory
- STDF tools support
- Test program/pattern converter (J750, D10, V50, E320, SC312, V7, TRI-6020, ITS9K)
- User friendly Windows 7 environment
- CRAFT C/C++ programming language
- Software same as 3360 & 3360-P

SPECIFICATIONS	
Model	**3380-P**
Clock Rate	50 / 100Mhz
Data Rate	50 / 100Mbps
I/O Channels	512 Pins (Max:576Pins)
Pattern Memory	16M / 32M(Option) 2X: 32M / 64M(option)
Parallel Testing Capability	512 DUTs
EPA	± 500ps
Resource Per Pin Architecture	Yes
VI source	8CH: MXDPS, 16CH: MXUVI/MXREF, 32CH: MLDPS
PMU(± 48V, ± 100 mA)	16 Channels /board
HV-Pins driver (+5.9V to +13.5V)	4 channels /board
PPMU (-2V~+ 6V, ± 32 mA)	Per Pin (FIMV/FVMI)
Programmable Active Load (± 12 mA)	Per Pin
TFMU (Time/Freq Measure unit:Max 400Mhz)	Per Pin
Free-run Clock (Max: 200Mhz)	Per Pin
Windows Environment	Window 7
Programming Language	C\C++
Test Option	**Specification**
AD/DA Converter Test Option	4 AWG / 4 DIG (16 bits)
Mixed- Signal test option (PXI)	24bits, 200MS/s
MXUVI (DPS ±12V, ± 1A, CG max : ±4A)	16 Channels /board
MXDPS (DPS -8V~+16V, ±2A)	8 Channels /board
MXREF (DPS ±48V, ±250mA, CG max : ±1A)	16 Channels /board
MLDPS (DPS +12V/±500mA, ±5V/±1A, CG max : ±4/8A)	32 Channels /board
SCAN Option	1G bits/ chain
ALPG Memory Test Option	16X, 16Y, 16D /board
System And Dimension	
Power Consumption	Max : 3KVA
Only Test Head	W640xD470XH639 mm (Max:100Kg)

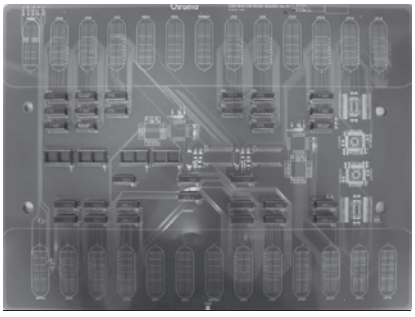
*** Note 1:** "Direct-Mount" as Standard, "Cable-Mount" as Option



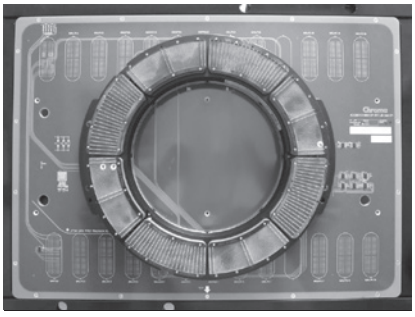
Rich Functions and Wide Coverage : Logic, MCU, ADDA (Mixed-signal); Power, LED driver, Class D; CIS, SCAN, ALPG, Match..etc



CP/FT Direct mount solutions available from engineering to production; CP maintain compatibility to J750



3380 FT Direct-mount



3380 CP Direct-mount (compatibility with J750)

KEY FEATURES

- 50/100 MHz clock rate
- 50/100 Mbps data rate
- 1024 I/O pins (Max :1280 I/O pins)
- Up to 1024 sites Parallel testing
- 32/64 M pattern memory
- Various VI source
- Flexible HW-architecture (Interchangeable I/O, VI, ADDA,)
- Real parallel trim/match function
- Time & frequency measurement unit (TFMU)
- High-speed time measurement unit (HSTMU)
- AD/DA test option
- SCAN test option (max 1G M/chain)
- ALPG test option for embedded memory
- STDF tools support
- Test program/pattern converter (J750, D10, V50, E320, SC312, V7, TRI-6020, ITS9K)
- User friendly windows 7 environment
- CRAFT C/C++ programming language
- SW (Software) same as 3380P & 3360P

SPECIFICATIONS	
Model	**3380**
Clock Rate	50 / 100Mhz
Data Rate	50 / 100Mbps
I/O Channels	1024 Pins (Max:1280 Pins)
Pattern Memory	16M / 32M (Option)2X: 32M / 64M (option)
Parallel Testing Capability	1024 DUTs
EPA	± 500ps
Resource Per Pin Architecture	Yes
VI source	8CH : MXDPS, 16CH : MXUVI/MXREF, 32CH : MLDPS
PMU (± 48V, ± 100 mA)	32 Channels
HV-Pins driver (+5.9V to +13.5V)	4 channels /board
PPMU (-2V~+ 6V, ± 32 mA)	Per Pin (FIMV/FVMI)
Programmable Active Load (± 12 mA)	Per Pin
TFMU (Time/Freq Measure unit:Max 400Mhz)	Per Pin
Free-run Clock (Max: 200Mhz)	Per Pin
Windows Environment	Window 7
Programming Language	C\C++
3380 Test Option	**Specification**
AD/DA Converter Test Option	4 AWG / 4 DIG (16 bits)
Mixed- Signal test option (PXI)	24bits, 200MS/s
MXUVI (DPS ±12V, ± 1A, CG max : ±4A)	16 Channels /board
MXDPS (DPS -8V~+16V, ±2A)	8 Channels /board
MXREF (DPS ±48V, ±250mA, CG max : ±1A)	16 Channels /board
MLDPS (DPS +12V/±500mA, ±5V/±1A, CG max : ±4/8A)	32 Channels /board
SCAN Option	1G bits/ chain
ALPG Memory Test Option	16X, 16Y, 16D /board
System And Dimension	
Power Consumption	Max : 8KVA
Test Head	W714 x D717 x H458 mm (Max : 165Kg)
Main Frame	W766 x D700 x H1562 mm (Max : 160Kg)

*** Note *1:** "Direct-Mount" as Standard

All specifications are subject to change without notice.

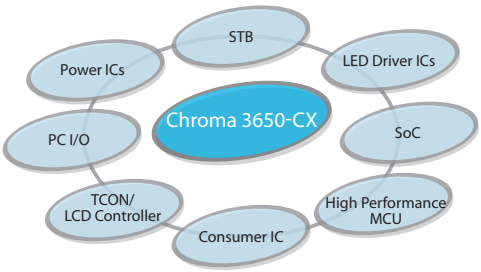


KEY FEATURES

- 50 / 100MHz; 200Mhz (MUX) Clock Rate
- 50 / 100Mbps; 200 Mbps (MUX) Data Rate
- Up to 256 digital I/O pins
- 16/32 (option) MW vector memory
- 16/32 (option) MW pattern instruction memory
- Per-pin timing/PPMU/frequency measurement
- Up to 4-32 16-bit ADDA channels option
- SW configurable scan chains in 1024M depth or up to 32 scan chains/board
- ALPG option for memory test
- Up to 16 high-voltage pins
- 16 high-performance DPS channels
- Overall timing accuracy < ±550ps
- 8 ~ 32-CH / board for VI45 analog option
- 2 ~ 8-CH / board for PVI100 analog option
- Microsoft Windows® XP OS
- C++ and GUI programming interface
- CRISP, full suite of intuitive software tools
- Air-cooled, All-in-one design and space-saving footprint
- Cable mount / Direct mount

APPLICATIONS

- MCU/MCU + Embedded Memory
- NAND Flash Controller
- PC I/O
- Switch ICs
- Smart Power Management Devices
- Mixed Signal, Digital and Analog ICs
- ADC/DAC/CODEC ICs
- Consumer ICs
- Engineering, Wafer Sort and Final Test
- Power ICs
- LED Driver ICs



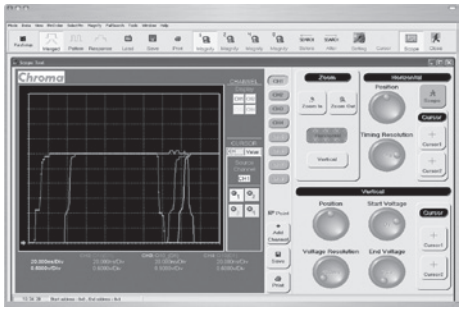
Chroma 3650-CX brings you the low cost and high performance test solution

3650-CX adopts the all-in-one design to provide a compact size ATE with very low cost, high accuracy and high throughput for customers to save the cost and raise the profit. With the versatile test capabilities and powerful software tools, 3650-CX is designed for MCU, NAND flash controllers, the peripheral devices of PC, switch devices, LED driver ICs, power ICs and consumer SoC devices.

CRISP, the powerful system software for 3650-CX

The 3650-CX features powerful suite of software tools using Chroma Integrated Software Platform, CRISP. It not only provides the rapid test developing functions, CRISP also covers all needs for test debugging, production and data analysis. Base on the Microsoft Windows XP® operation system and C++ programming language, CRISP provides powerful, easy-to-use, intuitive and fast-runtime GUI tools for users. The CRISP includes test plan debugger, pattern editor, waveform tool, scope tool, pin margin, Shmoo, wafer map, histogram, STDF tool, datalog and etc.





All-in-one design and compact size to save the floor space

With the air-cooled and zero footprint tester-in-a-test-head design, 3650-CX delivers high throughput in a highly integrated package for minimum floor space. With an optional manipulator, 3650-CX can be used in both package and wafer sort test.

Peripheral

The 3650-CX provides multiple drivers for communications with handler and prober by GPIB and TTL interface. The supported handlers or probers include SEIKO-EPSON, SHIBASOKU, MULTITEST, ASECO, DAYMARC, TEL, TSK and OPUS II, and so forth.

All specifications are subject to change without notice.

• Continued on next page ➟

SPECIFICATIONS	
Model 3650-CX	
Clock Rate	50 / 100Mhz; 200Mhz (MUX mode)
Data Rate	50 / 100Mbps; 200Mbps (MUX mode)
Pattern Memory Size	16 / 32M (Option)
Overall Timing Accuracy	±550ps (Window), ±450ps (Edge)
Software /Programming Language / OS	CRISP/ C++ / Windows XP
Pin Electronics Board	LPC
IO Channels	64-pin / Board X 4 Boards / System
Vector Depth	16 / 32M per pin
Drive VIL / VIH	-2 ~ +6V / -1.9 ~ +7V
Maximum Driver Current	50mA (static) / 100mA (dynamic)
Comparator VOL / VOH	-2 ~ +7V
Compare Modes	Edge, Window
EPA (Drive / IO / Compare)	±300ps / ±300ps / ±300ps
Dynamic Load Current	±35mA
Timing Sets	32 sets per pin
Timing Edges	6 (2 Drive, 2 Drive & IO, 2 Compare)
Rate / Edge Resolution	125 / 62.5ps
Waveform Sets	32 sets per pin
Waveform Format	4096 Timing-Waveform Combination Changes on-the-fly
Utility Pin Relay Control	64 (8 / Board), 128 bit relay board option available
PPMU/Frequency Measurement Unit (OSC)	per pin
DUT Power Supply	DPS
Channels	16-CH / Board X 1 Boards / System
Voltage Range	±8V, ±16V
Maximum Output Current	0.8A / 1-CH
Current Gang Channels	8
Precision Measurement Unit	PMU
Channels	2-CH / Board X 4 Boards / System
Voltage Range	±2.5V, ±8V, ±16V
Current Range	±800nA ~ ±250mA
Options	
ADDA/HD-ADDA	
Channels	1 ADDA CH / LPC or 32 CH HD-ADDA / board
AWG / Digitizer	per channel
Resolution / Max. Conversion Rate	ADDA: 16-bit / 500KHz ; HD-ADDA: 16 Bit 500KHz
Voltage Range	±2.5V / ±4.5V / ±9V
Algorithm Pattern Generator (ALPG)	X = 16, Y = 16 / D = 16
Scan	1 / 2 / 4 / 8 / 16 / 32 scan chains, Max 1024M depth
VI45	
Channels	8 ~ 32-CH / Board
Voltage / Current Range	±45V / ±100mA
Current Ganged Channels	4 buses for 8 channels, x2 – x8, 800mA max
TMU	per channel
PVI100	
Channels	2 ~ 8-CH / Board
Voltage / Current Range	±100V / ±2A , ±50V / ±4A
Current Ganged Channels	x2 – x8, 32A max
TMU	per channel
System and Dimension	
Power Consumption	3.5KW Max
Cooling System	Forced Air Cooling
Frame Size	L 643 x W369 x H 760 mm
Weight	130Kg

All specifications are subject to change without notice.



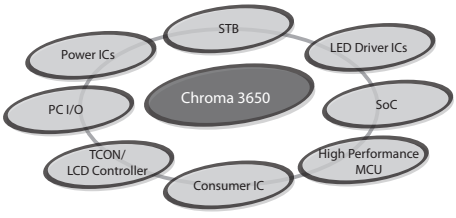
50/100 MHz

KEY FEATURES

- 50 / 100MHz; 200Mhz (MUX) Clock Rate
- 50 / 100Mbps; 200Mbps (MUX) Data Rate
- Up to 512 digital I/O pins
- 16/32 (option) MW vector memory
- 16/32 (option) MW pattern instruction memory
- Per-pin timing/PPMU/frequency measurement
- Up to 8-32 16-bit ADDA channels option
- SW configurable scan chains in 1024M depth or up to 32 scan chains/board
- ALPG option for memory test
- Up to 32 high-voltage pins
- 32 high-performance DPS channels
- Overall timing accuracy < ±550ps
- 8 ~ 32-CH / board for VI45 analog option
- 2 ~ 8-CH / board for PVI100 analog option
- MRX option for 3rd party PXI instruments
- Microsoft Windows® XP OS
- C++ and GUI programming interface
- CRISP, full suite of intuitive software tools
- Test program and pattern converters for other platforms
- Accept DIB and probe card of other testers directly
- Support STDF data output
- Air-cooled, small footprint tester-in-a-test-head design

Chroma 3650 brings you the most cost-effective SoC tester

Chroma 3650 is an SoC tester with high throughput and high parallel test capabilities to provide the most cost-effective solution for fabless, IDM and testing houses. With the full functions of test, high accuracy, powerful software tools and excellent reliability, 3650 has the versatile test capabilities for high-performance microcontroller, analog IC, consumer SoC devices, and wafer sort applications.



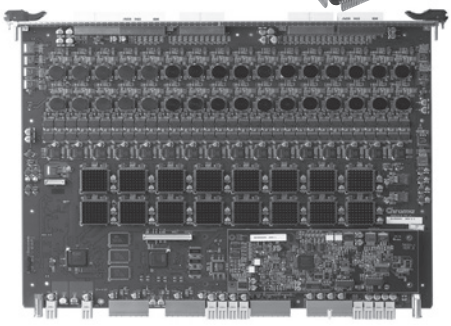
High performance in a low-cost production system

The 3650 achieves lower test cost not only by reducing the cost of tester system but also by testing more devices faster and the high parallel test capability. With the Chroma PINF IC and the sophisticated calibration system, 3650 has the excellent overall timing accuracy within ±550ps. The pattern generator of 3650 has up to 32M pattern instruction memory. By having the same depth as the vector memory, Chroma 3650 allows to add pattern instruction for each vector. Moreover, the powerful sequential pattern generator provides the variety of pattern commands to meet the demands of complex test vectors. The true test-per-pin architecture and the flexible site mapping with no slot boundaries are designed for multi-site test with high throughput. Up to 512 digital pins, 32 device power supplies, per-pin PMU and the analog test capability, 3650 delivers a combination of high test performance and throughput with cost-effective test solution.

High parallel test capability

The powerful, versatile parallel pin electronics resources of 3650 can simultaneously perform identical parametric tests on multiple pins. The 3650 integrates 64 digital pins onto one single LPC board. In each LPC board, it contains 16 high performance Chroma PINF ICs which supports 4 4 channels timing generator. The integration of local controller circuitry manages resources setup and result readout, and therefore cuts the overhead time of the system controller. With the any-pin-to-any-site mapping design,3650 provides up to 32 sites high throughput parallel testing capabilities to enlarge the mass production performance with more flexible and easy layout.



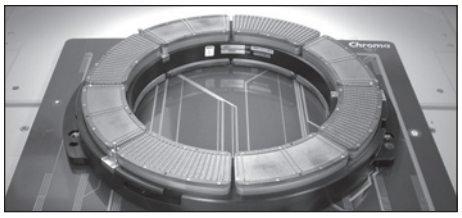


64 channel Digital Pin Card

Flexibility

The semiconductor industry is a fast moving one, and capital equipment
must be built to outlive several device generations and applications. With varieties of available options, such as AD/DA converter test, ALPG for memory test, high voltage PE, multiple scan chain test, VI45 & PVI100 analog options, Chroma 3650 makes sure that it will serve you for years to come.

Moreover, Chroma 3650 platform architecture allows development of focused instruments by third-party suppliers that can be easily added for specific applications. It can stretch the boundaries of test by covering a broader range of devices than ever before possible in a low-cost production test system.



CP Docking Solution for other Tester Platform

Powerful suite of software tools – CRISP

The 3650 features the powerful suite of software tools using Chroma Integrated Software Platform, CRISP. Not only provides the rapid test development function, CRISP covers all needs for test debugging, production and data analysis. The CRISP integrates the software functions of test development, test execution control, data analysis and tester management together. Based on the Microsoft Windows XP® operation system and C++ programming language, CRISP provides the powerful, easy-to-use, intuitive, and fast-runtime GUI tools for users. In the Project IDE tool, test developer can easily shift between standard template, user-defined template and C++ code-based editor to create their test program quickly and automatically scale to multi-site for parallel test. Besides, CRISP also provides the test program and test pattern converters to facilitate the test conversion from other tester platforms to 3650.

For the test program execution controller, user can select the System Control tool or Plan Debugger tool for normal mode or debugging mode. In the Plan Debugger tool, user can control the execution of test program by setting break point, step, step-into, step-over, resume execution, variable-watch and variable-modify, etc. For the test debugging and data analyzing purposes, 3650 provides abundant software utility tools. Datalog, Waveform and Scope tools are designed to support the measured data and digital waveform display. To find the parametric margin, SHMOO and Pin Margin tools can easily accomplish debug

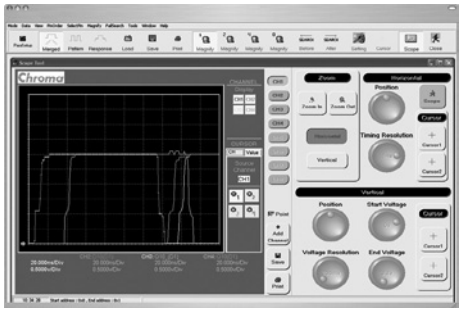


System Control

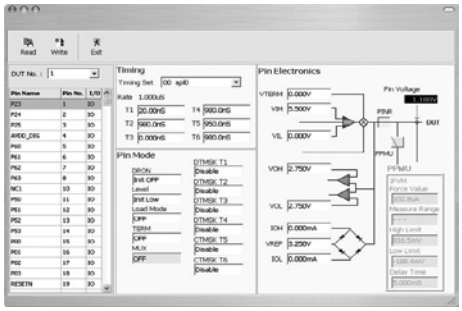


Test Program Debugger

• Continued on next page ➟



Scope Tool



Channel Debugger

by auto-mode or manual-mode execution. Besides, the Wafer Map, Summary, Histogram and STDF tools are very helpful and powerful for collecting the test results and analyzing the parametric characterization. As for the Test Condition Monitor and Pattern Editor tools, they provide the superior functions for run-time debugging to change the test conditions or pattern data without breaking the test or modifying the source files. Besides, CRISP also prepares the ADDA tool and Bit Map tool for the analog and ALPG option. Using the ADDA tool, user can not only see the AD/DA test result by graphic tool, user can also create the ADC pattern easily.The full suite of powerful GUI tools will definitely meet the various purposes for test debugging and test report.

The OCI tool is the solution of CRISP for mass production.Easy-and-correct operation is the most important request for production run. Programmer can customize the setup of OCI tool by the Production Setup tool to meet the production environment requirement in advance. Then, what an operator has to do is just to select the planned process to start the mass production.

Peripheral

The 3650 provides multiple drivers for communications with handler and prober by GPIB and TTL interface. The supported handlers or probers include SEIKO-EPSON, SHIBASOKU, MULTITEST, ASECO, DAYMARC, TEL, TSK and OPUS II, and so forth. In addition to provide the convenient converter tools for test platform migration, 3650 provides the adaptor board solution for existed tester platform to save the cost of users. Through theadaptor board solution, Chroma 3650 can accept the DIB and probe card of other testers directly to save the cost for making the new load boards and probe cards.

Small footprint

With the air-cooled and small footprint tester-in-a-test-head design, 3650 delivers high throughput in a highly integrated package for minimum floor space. A mainframe cabinet contains the power distribution units and the space for third-party instruments. With an optional manipulator, 3650 can be used in both package and wafer test.

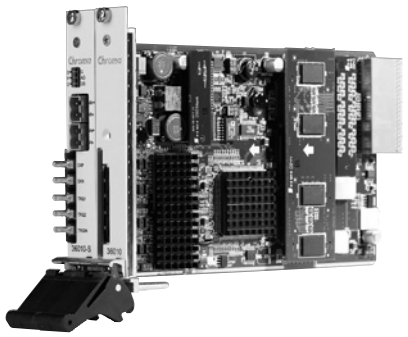
Application support

Chroma offers the application support solutions to its new and established customers to accurately meet user needs. On request Chroma can provide customized support designed around your specific needs. Whether you need ramp up production, want to capitalize on emerging market opportunities, enhance productivity, lower testing costs with innovative strategies, Chroma worldwide customer support staff is committed to generate timely and efficient solution for you.

SPECIFICATIONS	
Model	**3650**
Clock Rate	50 / 100Mhz; 200Mhz (MUX mode)
Data Rate	50 / 100Mbps; 200Mbps (MUX mode)
Pattern Memory Size	16 / 32M (Option)
Overall Timing Accuracy	±550ps (Window), ±450ps (Edge)
Software /Programming Language / OS	CRISP/ C++ / Windows XP
Pin Electronics Board	LPC
IO Channels	64-pin / Board X 8 Boards / System
Vector Depth	16 / 32M per pin
Drive VIL / VIH	-2 ~ +6V / -1.9 ~ +7V
Maximum Driver Current	50mA (static) / 100mA (dynamic)
Comparator VOL / VOH	-2 ~ +7V
Compare Modes	Edge, Window
EPA (Drive / IO / Compare)	±300ps / ±300ps / ±300ps
Dynamic Load Current	±35mA
Timing Sets	32 sets per pin
Timing Edges	6 (2 Drive, 2 Drive & IO, 2 Compare)
Rate / Edge Resolution	125 / 62.5ps
Waveform Sets	32 sets per pin
Waveform Format	4096 Timing-Waveform Combination Changes on-the-fly
Utility Pin Relay Control	64 (8 / Board), 128 bit relay board option available
PPMU/Frequency Measurement Unit (OSC)	per pin
DUT Power Supply	DPS
Channels	16-CH / Board X 2 Boards / System
Voltage Range	±8V, ±16V
Maximum Output Current	0.8A / 1-CH
Current Gang Channels	8
Precision Measurement Unit	PMU
Channels	2-CH / Board X 8 Boards / System
Voltage Range	±2.5V, ±8V, ±16V
Current Range	±800nA ~ ±250mA
Options	
ADDA	
Channels	1 ADDA CH / LPC or 32 CH HD-ADDA / board
AWG / Digitizer	per channel
Resolution / Max. Conversion Rate	ADDA: 16-bit / 500KHz ; HD-ADDA: 16 Bit 500KHz
Voltage Range	±2.5V / ±4.5V / ±9V
Algorithm Pattern Generator (ALPG)	X = 16, Y = 16 / D = 16
Scan	1 / 2 / 4 / 8 / 16 / 32 scan chains / LPC maximum 1024 / 2048M scan depth
VI45	
Channels	8 ~ 32-CH / Board
Voltage / Current Range	±45V / ±100mA
Current Ganged Channels	4 buses for 8 channels, x2 – x8, 800mA max
TMU	per channel
PVI100	
Channels	2 ~ 8-CH / Board
Voltage / Current Range	±100V / ±2A , ±50V / ±4A
Current Ganged Channels	x2 – x8, 32A max
TMU	per channel
MRX	Mixed Resource BoX
No of slots	10 slots per chassis (max 2 chassis)
Instruments	PXI-based instruments
System and Dimension	
Power Consumption	5.5KW / forced air cooling
Test Head Dimension (L X W X H)	800 X 744 X 612 mm
Mainframe Dimension (L X W X H)	850 X 850 X 1680 mm

All specifications are subject to change without notice.

Programmable Pin Electronics Module Model 36010



KEY FEATURES

- Standard PXI 3U form factor
- 100MHz maximum data rate
- 8 channels with per-pin, per-cycle bidirectional control
- Scalable architecture to provide up to 64-pin
- 32M sequence command memory
- More than 17 pattern sequence commands
- Per-pin architecture
- 32M vector memory per pin
- 32 sets of clock and waveform per pin
- Waveforms changes on-the-fly
- Programmable tri-level driver in 610uV resolution
- One high voltage driver per board
- Per-channel PMU
- Per-channel timing measurement unit
- Support scan pattern function
- Windows 2000/XP operating system
- Support LabView and LabWindows
- Proprietary software tools option

APPLICATIONS

- Logic and mixed signal validation and test
- Digital pattern generator and vector capture
- Consumer IC and electronics test
- Logic test subsystem for DC and RF ATE

The 36010 is a 100MHz programmable pin electronic module designed for characterizing, validating and testing digital and mixed signal IC or electronics. Each module consists of a Sequence Pattern Generator and Logic Pin Electronics Card containing 8 channels. The 36010 module is expandable to provide up to 64 channels hardware resource for various purposes. Besides, based on the per-pin architecture, each channel is equipped with 32M vector memory, 32 sets of clocks, 32 sets of waveforms and one PMU channel. It provides fast and accurate testing, with same performance and features as other stand ATE equipment.

Sequence Pattern Generator

The Sequence Pattern Generator of the 36010 module provides more than 17 sequence commands including "jump", "match", "loop", "repeat" and etc. to control the flow of pattern execution. It equips with 32M sequence command memory, which allows each vector to has its own sequence command to control the flow of pattern execution flexibly. Besides, each Sequence Pattern Generator can support up to 8 Logic Pin Electronics Cards, which means it can support up to 64 I/O channels and performs testing on 8 DUT simultaneously.

Logic Pin Electronics Card

In each Logic Pin Electronics Card, it adopts Chroma® PINF ICs on it to achieve high timing accuracy and flexible waveform output functions. The per-pin timing generator provides 32 sets of clock containing 6 programmable edges. As for the per-pin waveform generator, it provides each digital I/O channel 32 sets of programmable waveform with the change-one-the-fly feature. In the analog function, the Logic Pin Electronics card has the tri-level driver and comparator with 610uV programmable resolution. It also equips with active load, per-pin PMU and high voltage driver functions. Moreover, the 36010 supports scan pattern function for scan test.

Proprietary Software, CRISP

In addition to support the LabView and LabWindows environments, Chroma® also provides the proprietary software option, CRISP. To cover the various requirements for the IC debugging, CRISP contains lots of software modules. Running on the Microsoft Windows XP® operation system and using C++ as the test program language, CRISP provides users the flexible, easy-to-use and fast-runtime GUI software to meet the various demands. The project IDE tool makes it easy to create the test program quickly. In the test program debugging stage, CRISP provides the suite of debugging software tools for user, which includes Plan Debugger, Datalog, Waveform, Scope, SHMOO, Pin Margin, Wafer Map, Summary, Histogram, STDF, Test Condition Monitor, Pattern Editor, and so on.

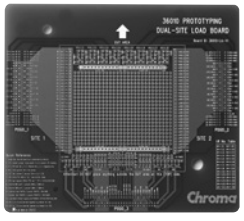
ORDERING INFORMATION

36010 : Programmable Pin Electronics Card
A360100 : Sequence Pattern Generator
A360101 : Load Board Test Fixture
A360102 : 250W/48V DC Power Supply
Universal Load Board
CRISP System Software

SPECIFICATIONS

Model	36010
Test Rate	50/100MHz
Channels Per Board	8 (Scalable to 64 channels)
Vector Depth	32M
Sequence Control Memory	32M
Number of Sequence Control Command	17
Parallel test capability	8
Timing Generator Per Pin	
No. of Edges	6 edges / pin (2 Driver, 2 Driver & I/O, 2 Strobe)
No. of Timing Sets	32 sets / pin
Rate / Edge Setting Resolution	125ps / 62.5ps
Rate Setting Range	20nS → 1mS
Waveform Generator Per Pin	
No. of Waveform Sets	32 sets / pin
Driver	
VIL/VIH Range	-1.5V~+5.9V / -1.4V~+6V
VIL/VIH Accuracy	±5mV@VIH ≧ VIL+200mV
Output Current (Static/Dynamic)	±50mV/±100mA
Output Impedance	50±5Ω
Comparator	
VOL/VOH Range	-1.5V ~ +6V
VOL/VOH Accuracy	±15mV

Programmable Load	
IOL/IOH Range	±12mA
IOL/IOH Accuracy	±25uA
VREF Setting Range	-1.5V ~ +6V
VREF Accuracy	±50mV
High Voltage Driver	
HV Channel	1 HV channels / board
VIL/VIH Range	0V ~ +13.5V
VIL/VIH Accuracy	±20mV
VIL/VIH Output Current	±60mA
Scan Chain	
Chain number / LPC	1/2/4
Size per chain	256M/128M/64M
PPMU	
Channel Number	1 channel / 1 pin
Voltage Force Range	-1.5V ~ +6V
Current Measured Range	32mA/2mA/200μA/20μA/2μA
Current Forced Range	32mA/2mA/200μA/20μA/2μA
Voltage Measured Range	-1.5V ~ +6V
Power and Dimensions	
Power Consumption	25W per Slot
Size	PXI 3U Standard Board (Extendable)
Cooling System	Standard PXI Chassis Fan (Forced Air Cooling)



Universal Load Board



Load Board Test Fixture

All specifications are subject to change without notice.



KEY FEATURES

- 4 channels in a PXI Standard 3U form factor
- +5V/-2V and +10V/-2V force ranges
- 16-bit voltage force resolution
- 18-bit current measurement resolution
- 6 selectable ranges from 5uA to 250mA for current measurement
- Programmable current clamp function
- Ganged function available for larger current
- Board-to-board isolation
- Windows 2000/XP operating system
- Support LabView and LabWindows
- Proprietary software tools for data analysis

APPLICATIONS

- Logic and mixed signal validation and test
- Consumer IC and electronics test
- DUT Power Supply

The 36020 is a four-quadrant programmable DUT power supply in a single-slot 3U PXI module. Each 36020 features 4 channels with the ability to source voltage and measure current. There are two selectable voltage ranges, +5V/-2V and +10V/-2V, with 16-bit resolution for programming the voltage output. In order to provide better accuracy, 36020 provides six selectable current ranges including ±5μA, ±25μA, ±250μA, ±2.5mA, ±25mA and ±250mA with 18-bit resolution for the current measurement functionality. Moreover, the board-to-board isolation design makes it possible to source the larger voltage than 10V by the series connection with multiple 36020 modules. The versatile supply rails and high accuracy make 36020 an excellent general-purpose, four-quadrant power supply for design validation and manufacturing test application. Especially, the extraordinary accuracy in the small current measurement makes the 36020 very suitable for semiconductor IC test.

Power Supply with Precision Source and Measurement Capability

The 36020 uses a combination of switching and linear regulation to provide the excellent voltage source and accuracy. It has the ability to source voltage from each of its four outputs. It can be programmed in 113μV steps on the +5V/-2V range and 189μV steps on the +10V/-2V channels. As a current measure unit, it can measure in minimum 47.6pA resolution on each channel in the ±5μA current range. You can use this impressive level of current resolution in many power supply applications.

Proprietary Software, CRISP

In addition to support the LabView and LabWindows environment, Chroma® provides the front panel tool of the 36020 for users to quickly troubleshoot or debug. Users can monitor or refer the setting of the 36020 through this front panel tool. Besides, Chroma® also provides the proprietary software option, CRISP, for the 36020 to meet the demands of users for various purposes. Based on Microsoft Windows XP® operation system and C++ programming language, CRISP provides the powerful, easy-to-use, intuitive, and fast-runtime GUI tools for users. For the test debugging and data analyzing purposes, CRISP provides users the abundant software modules for the 36020, including Datalog, SHMOO, Summary, Histogram, STDF and Test Condition Monitor.

ORDERING INFORMATION

36020 : Four-quadrant DUT Power Supply
CRISP System Software



SPECIFICATIONS		
Model		**36020**
Input		**PXI Internal Power**
Channel Number		4
Voltage Source		
Range		VR1: +10v/-2v VR2: +5v/-2v
Resolution		16bits
Accuracy		± 0.1%+4.64mV
Noise		3mVrms
Current Measurement		
Range		±5μA, ±25μA, ±250μA, ±2.5mA, ±25mA, ±250mA
Resolution		18bits
Accuracy	250mA	± 0.2%+200μA
	25mA	± 0.15%+20μA
	2.5mA	± 0.15%+2μA
	250μA	± 0.15%+200nA+1nA/V
	25μA	± 0.15%+150nA+1nA/V
	5μA range	± 0.15%+50nA+1nA/V
Slew Rate		5v/25μs
Load Regulation		2mV
Load Transient		
Time Response		100μs
Voltage Response		50mv
Overshoot/Undershoot		<3%
Clamp Flag Response		100μs
Clamp Resolution		10bits
Protection Function / Alarm Flag		Short current limit Clamp alarm flag
Max Stable Load Capacitance		100μF

All specifications are subject to change without notice.

Hybrid Single Site Test Handler

Model 3110



KEY FEATURES

- FT + SLT Handler – Two In One
- Perfect for Device Engineering Characterization Gathering and Analysis
- Auto Tray Load/unload & Device Sorting capability
- Tester Zero waiting time
- Without socket damage issue
- Air damper for good contact balance
- Shuttle remain IC check function
- Camera for real time system monitoring
- Tri-temp IC test function (optional)
- High power cooling function (optional)
- Diskless download function (optional)

Chroma 3110 is a sigle site pick & place IC handler which supports various types of package such as QFP, QFN, TSOP, BGA, μBGA and CSP, etc. The handler uses P & P technology to pick up devices from JEDEC trays, move them to the test site. The 3110 consists system level tests that are designed to fully exercise programs as a whole and check all integrated elements function properly. It is capable to handle tri-temperature test environment since ambient to thermal or low temperature.

In addition to the capability of handling 3x3mm to 55x55mm devices, the machine is equipped with 1 auto stacks and 2 manual bin plates to maximize the loading and unloading capacity. It features a user-friendly graphic user interface based on Windows system and also provides interfaces for docking with various testers.

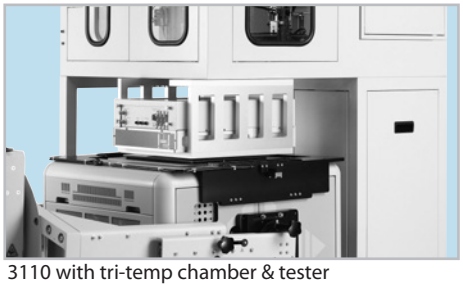
ORDERING INFORMATION

3110 : Hybrid Single Site Test Handler
3100-TT : Tri-temp Control (option)
3100-A : Active Thermal Control Module (option)
3100-P : Unity Passive Thermal Control (option)
3100-C : Cooling Pipe (option)

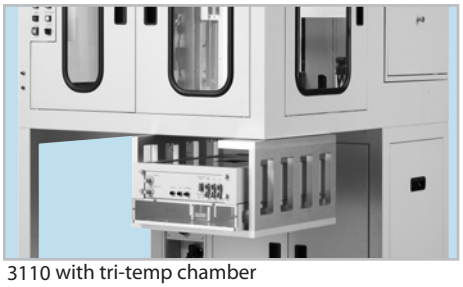
SPECIFICATIONS	
Model	**3110**
Dimensions and Weight	Dimensions : 900 mm (W) by 1250mm (D) by 1800 mm (H) (Signal Tower excluded)
	Net Weight : 500kg
Power Requirement	Power Supply : AC 220V, 50/60 Hz Single-phase
	Maximum Power Consumption : 3.0KVA Max
	Controller Circuit: 1.0 KVA Max.
	Heater Circuit : 2.0 KVA (Option)
Compressed Air	Dry Air of 5.0 kg/cm2 (0.49 Mpa) or higher, constant supply
Applicable Device	Type : BGA series, μBGA, QFP series, QFN, Flip-Chip, TSOP
	Outer dimensions : 3 mm x 3 mm to 55 mm x 55 mm
	Depth : 0.5 mm to 5 mm
	Lead / Ball pitch : 0.4 mm / 0.5 mm and above
Tester Interface	Standard RS-232,TCP/IP, Optional GPIB and TTL
Jam Rate	1/3000
Categories	4 Categories (128 bin signals for RS232)
Contact Force	80 kgf (Accuracy ±1kgf)
	125Kgf (Option)
Temperature	Operating Mode : Ambient
Tri Temp Control (Option)	Temperature Range : -40 ~ 135°C ± 1°C (150°C Optional)
ATC Module (Option)	Temperature Range : Ambient ~ 135°C ± 1°C (150°C Optional)
Unity PTC (Option)	Temperature Range : Ambient ~ 85 °C (up to 300W Heat Dissipation)
Cooling Pipe (Option)	Temperature Range : Ambient ~ 85 °C (up to 125W Heat Dissipation)
Advantage	ECD function (Easy-edit communication define) Single Movement Retest Contact pick and place system Yield control (Average yield of socket) PoP Function for Stacked die or 3D Chips Continue Fail
Option	Remote Control RCAA – Real Time Camera Auto Alignment Rotation (±90 degree) Auto Load / Unload : 1 input / 2 unload (with 2 manual unload) Fixed Load / Unload : 1 input / 4 unload

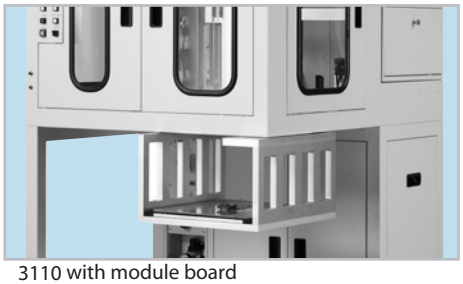
Final Test Configuration


3110 with tester


3110 with tri-temp chamber & tester

System Level Test Configuration


3110 with tri-temp chamber


3110 with module board

Chroma Thermal Control Solutions	Products	Capability	Configurations						
			Test Plug Design	Compressed Air	Dry Air	Standalone Water Chiller	Chamber	TEC Controller	External Piping
Active Thermal Control Solution	3100- TT	-40°C ~ 135 °C ± 1°C	Heat Exchanger+TEC (Peltier)	No	Yes	Yes	Yes	Yes	Yes
	3100-A	Ambient ~ 135 °C ± 1°C	Water Chiller Cooling+TEC (peltier)	No	No	Yes	No	Yes	Yes
			Closed-loop Liquid Cooling+TEC (peltier)	No	No	No	No	Yes	No
Passive Cooling System	3100-P	Ambient ~ 85°C (< 300W Heat Dissipation)	Closed-loop Liquid Cooling	No	No	No	No	No	No
	3100-C	Ambient ~ 85°C (<125W Heat Dissipation)	Cooling Pipe	70 LPM	No	No	No	No	No

All specifications are subject to change without notice.



KEY FEATURES

- Programmable quad pitch probes
- Shorten tray to shuttle moving distance
- Air spring to reduce contact force impact
- Short Index time
- Auto Contact Force Learning
- Capable to do tray supplements during production
- Color Tray Mode availability
- Continue Fail / Yield Control (yield rate of socket)
- Optional precise ATC temperature control within ±1°C at test site

Chroma 3160 is a productive pick and place handler for high volume / multi-site IC testing. It is capable of handling various package types of device and bin them upon sorting result. High throughput with low jam rate is the consequence result from the reliable handling mechanism and functionality outfit. Intelligent contact force learning and IC leftover check reduce unexpected damages occurred.

Chroma 3160 also provides upgradable configuration with flexible DUT sites as well as Active Thermal Control (ATC) Module to control test environment since ambient till high temperature up to 150°C*.

SPECIFICATIONS	
Model	**3160**
Dimensions and Weight	Dimensions : 1,700 mm (W) x 1,300 mm (D) x 2,000 mm (H)
	Weight : Approx. 900 kg
Facility	Power: AC220, 50/60 Hz Single-Phase, 10 KVA Max. Compressed Air: 0.5 MPa or more (dry and clean air), Consumption 120 l/min, constant supply
Applicable Device	Type : BGA, QFP, CSP, QFN, Flip chip, TSOP, etc. Package Size : 3 mm x 3 mm to 50 mm x 50 mm
Contact Mode	Direct Contact / Drop and Press
Interface	TTL, GPIB (GPIB/RS232 optional)
Multiple Site	4 sites (1 x 4 pitch X = 40mm) Site Pitch : Dual sites 80mm / Quad sites 40mm by in-line
Contact Area	Test Site : Single, Dual, Quad sites (in-Line) Test Head Area : 550 mm (from socket center), Height: 1,000 mm (900/1, 100mm option)
Index Time	0.4 sec (excluding tester communication time)
Jam Rate	1/10000
Applicable Tray	JEDEC
Category	6 categories (3 Auto, 3 Manual)
Binning for TTL	Single site 8 Bin (Line to Line)/ Dual sites 8 bin (Line to Line) / Quad sites 8 Bin (Line to Line) *Optional 16 bin line to line categories
Contact Force	Max. 50 kgf (accuracy ±1 kgf)
High Temperature (Option)	Operating Mode : 40 °C~ 125 °C (Heating Time : within 30 min.) Accuracy : Contact Head ± 3 °C, Pre-heater ± 5 °C
ATC Temperature Control (Option)	Operating Mode : 25°C ~ 135°C * Accuracy : ± 1 °C

ORDERING INFORMATION

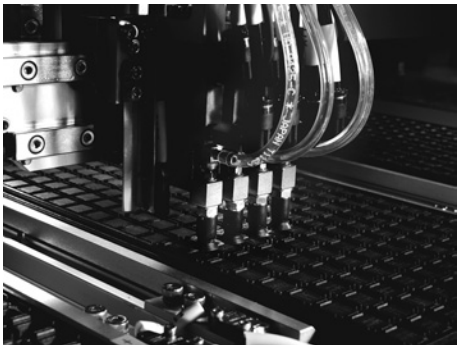
3160 : Final Test Handler



Loading



Test One Shut



Loading

All specifications are subject to change without notice.

Automatic System Function Tester

Model 3240



KEY FEATURES

- Reliable high-speed pick & place handler
- Tester zero waiting time
- Gull wing package capability
- No socket damage
- Air damper for contact balance
- IC-in-socket protection
- NS-5000/6000 change kits compatible

Chroma 3240 is an innovative handler for high volume/multi-site IC testing at system level. It is capable of handling packages of various types including QFP, TQFP, BGA, PGA, etc. The handler uses pick and place technology to pick up devices from JEDEC trays, move them to the test site, then move them to the appropriate bin after test. It features a 90-degree device rotation which is required for various pin one orientations.

Chroma 3240 can test up to 4 devices in parallel at high temperature with ATC (Auto Temperature Cooling) ranging from 50˚C to 125˚C..



SPECIFICATIONS

Model	3240
Dimensions and Weight	Dimensions : 1640 mm (W) by 1190mm (D) by 1774 mm (H) "Excluding Signal Tower" Net Weight : 800kg
Power Requirement	Power Supply : AC 220V , 50/60 Hz Single-phase Maximum Power Consumption : 3.0 KVA Max Controller Circuit : 3.0 KVA Max. Heater Circuit : 1.0 KVAMax.
Compressed Air	Dry Air of 5.0 kg/cm^2 (0.49 Mpa) or over constant supply
Vacuum Source	Built-Diaphragm Vacuum Pump : Pumping Volume 100 L/min Ultimate Pressure : 100 Torr Max.
Applicable Device	Package Type : BGA series , µGA, PGA, QFP series, CSP, BCC, QFN , Flip-Chip , TSOP Dimensions : 7 mm x 7 mm to 40 mm x 40 mm Depth : 0.9mm to 5mm Lead / Ball pitch : 0.4mm / 0.5mm and above Weight : 0.2g to 20g
Multiple Testing Layout	4 sites (Pitch 400 mm)
Index Time	2.1 sec (Excluding test communication time) / One site cycle time : 3.2 Sec.
Jam Rate	1/3000 pcs
Applicable Tray	Type : Input / Empty Tray : 130 mm ~ 143 mm (D) by 310 mm ~ 330 mm (W) Output Tray : 135 mm ~ 150 mm (D) by 290 mm ~ 330 mm (W) Capacity : Input / Empty Tray : Elevator with 210 mm stroke (JEDEC) Output Tray 1, 2, 3 : Elevator with 210 mm stroke (JEDEC)
Categories	3 Categories (Max. 128 bin signals with RS-232)
Contact Area	Test Site Pitch : 400mm Test Module Dimensions : 400 mm x 400 mm
Contact Force	Max. 50 kgf (Accuracy ±1kgf)
High Temperature (Optional)	Operating Mode : Room Temperature / High Temperature Temperature Range : Ambient to 125˚C (Heat-up time : Within 30 min) Accuracy : Pre-heater Buffer ±5˚C , Contact Area ± 3˚C
Tester Interface	Standard : TTL, Optional : RS-232, GPIB
Special Function	Tray map fit for producion analysis Universal kit design Change over time within 15 min. ECD function (Easy -edit Communication Define) for various equipment Two Tray (Color tray) mode available Continue Fail Alarm Auto Z function Yield Control (Average yield of socket) Yield Monitor (Per contact head plug) ATC (Auto Temperature Cooling) High Temperature Function
Option	Test Site Floating Function Ion Fan Function

ORDERING INFORMATION

3240 : Automatic System Function Tester



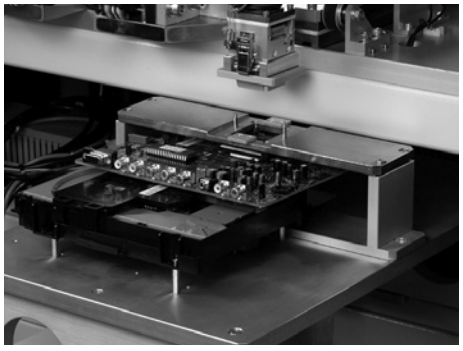


KEY FEATURES

- Reliable high-speed pick & place handler
- Tester zero waiting time
- Gull wing package capability
- No socket damage
- Air damper for contact balance
- IC-in-socket protection
- Invention patent 190373, 190377, 1227324 & 125307
- Thermal Control Configurations
  - Tri Temp Control
  - Close-Loop Active Thermal Control (ATC) Module
  - Unity PTC (Passive Thermal Control)
  - Cooling Pipe

Chroma 3260 is an innovative handler for high volume/multi-site IC testing at system level. It is capable of handling packages for various types including QFP, TQFP, BGA, PGA, etc. The handler uses pick and place technology to pick up devices from JEDEC trays, move them to the test site, then move them to the appropriate bin after test.

Chroma 3260 can test up to 6 devices in parallel at high temperature with ATC (Auto Temperature Cooling) ranging from -40˚C to 125˚C.



SPECIFICATIONS		
Model	**3260**	
Dimensions and Weight	Dimensions: 2570 mm (W) x 1360 mm (D) x 1780 mm (H)	
	Weight: 1300Kg	
Power Requirement	Power: AC 220, 50/60 Hz Single-Phase	
	Maximum Power Consumption: 6.0 KVA Max	
	Controller Circuit: 3.0 KVA Max	
	Heater Circuit: 3.0 KVA (Option)	
Compressed Air	Dry Air of 5.0 kg/cm^2 (0.49 Mpa) or higher, constant supply	
Vacuum Source	Build-in Diaphragm Vacuum Pump: Pumping Volume: 100 L/min	
	Ultimate Pressure: 100 Torr (-13.3 Kpa) Max.	
Applicable Device	Type: BGA series, μ BGA, Pga, QFP series, CSP, BCC, QFN, Flip-Chip, TSOP	
	Outer dimensions: 4 mm x 4 mm to 45 mm x 45 mm	
	Lead / Ball pitch: 0.4 mm / 0.5 mm and above	
Multiple Testing Layout	6 sites (Pitch 400 mm)	
Index Time	3.0 sec (excluding test communication time)/ One site cycle time: 3.5 Sec	
Ram Rate	1/5000 pcs	
Applicable Tray	JEDEC and EIAJ	
Categories	4 categories (6 categories for option)	
Contact Force	Max. 60 Kgf (accuracy ± 1kgf) by servo motor (80 Kgf for Option)	
Soak Hot Temperature (Option)	Operating Mode: Room Temperature / High Temperature	
	Temperature Range: 50˚C to 150˚C (Heat-up time: Within 30 min)	
	Accuracy: Pre-heater Buffer ± 5˚C, Contact Area ± 3˚C	
	Cooling Head: 10˚C + 5˚C	
Temperature Control (Option)	Operating Mode: Room Temperature / Cold Temperature Temperature Range: room temperature ~ -55˚C Accuracy: Contact Area ± 3˚C	
	Tri Temp Control (Option)	Temperature Range : -40˚C ~ 135˚C ± 1˚C (150˚C Optional) / or -55˚C ~ 135˚C ± 1˚C (150˚C Optional)
	ATC Module (Option)	Temperature Range : Ambient ~ 135˚C ± 1˚C (150˚C Optional)
	Unity PTC (Option)	Temperature Range : Ambient ~ 85 ˚C (up to 300W Heat Dissipation)
	Cooling Pipe (Option)	Temperature Range : Ambient ~ 85 ˚C (up to 125W Heat Dissipation)
Tester Interface	Standard RS-232, Optional GPIB, USB and TTL	
Features	Universal kit design	
	ECD function (Easy-edit communication define)	
	Two tray (Color tray) mode available	
	Continuous tail retest function	
	Real pick and place system	
	Yield control (Average yield of socket)	
	Yield monitor (Per contact head plug)	
	System Invention Patent No.: 190373	
	Process Invention Patent No.: 190377	
Option	CCD camera for device orientation detection	
	Socket sensor / Socket CCD	
	RF Shielding Box: 55db for PCIe, 80~90db for PCI/USB/RS232	
	Rotator (90 degree)	
	On-fly RC	
	Built in Continuity Test (BICT)	
	PoP handling capacity	

ORDERING INFORMATION

3260 : Automatic System Function Tester



All specifications are subject to change without notice.

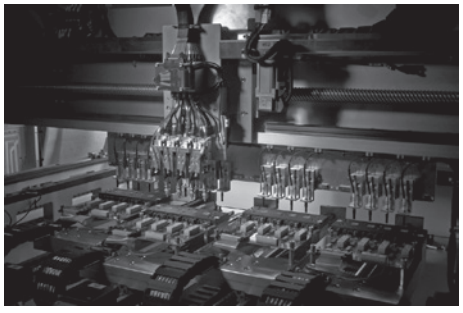


KEY FEATURES

- High throughput for CIS Testing
- Reliable high-speed pick & place handler
- 3x3 mm miniature device handling capability
- Air damper for contact balance
- Socket damage free

Chroma 3270 is an innovative handler for high volume/multisite miniature IC testing, especially for CIS Testing (CMOS Image Sensor), at system level. It is capable of handling devices of a large variety of package types including QFP, TQFP, BGA, PGA, etc. The handler uses pick and place technology to pick up devices from JEDEC trays, move them to the test site, then move them to the appropriate bin after test.

Chroma 3270 can handle 16 devices for parallel test at ambient temperature to high temperature 50˚C



SPECIFICATIONS

Model	3270
Dimensions and Weight	Dimensions : 2100 mm(W) x 1540 mm(D) x 1720 mm(H) Net Weight : 1300 kg
Power Requirement	Power supply : AC220V ± 10%, 50/60 Hz 3-Phase Maximum power consumption : 12KVA, 20A Compressed Air : Dry air of 5.0 kg/cm^2 (0.49 Mpa) or higher, constant supply
Applicable Device	Type : BGA series, µBGA, PGA, QFP series, CSP, WCSP, PLCC, QFN, TSOP Outer dimensions : 3 mm x 3 mm to 14 mm x 14 mm Lead / Ball pitch : 0.4 mm / 0.5 mm above
Multiple Test Sites	16 sites
Index Time	5 sec (Exclude power and communication time)
Cycle Time	One site cycle time 6 sec (4 site simultaneously, tray pitch fixed)
Jam Rate	1/2000 pcs
Applicable Tray	Standard tray size : JEDEC 135.9 mm(W) x 315 mm(L) Tray thickness : 7.62 mm
Categories	5 Categories, 1 Auto, 4 Fixed (accepts 128 bin signals for RS-232)
Contact Force	Max. 50 kgf (Accuracy force ±1kgf)
High Temperature (Optional)	Operating mode : room temperature / high temperature Temperature setting range : Ambient to 50˚C
Tester Interface	Standard : RS-232

ORDERING INFORMATION

3270 : Miniature IC Handler





KEY FEATURES

- Tester & Handler Integration
- Test 120pcs micro SD in parallel
- Test-in-Tray, no pick & place arm before sorting
- UPH = 5400 with 70 sec test time
- SD Protocol Aware Tester
- DC Measurements
- 32MB Buffer Memory per site
- Microsoft Windows XP OS
- Software provides tray map and binning information
- Compact Size: 164cm X 79cm X 180cm
- Options:
  - 3rd party test tools
  - Change Kits for mini SD, SD and MMC
  - Loading Content

The Chroma 3280 is an innovative integration system for testing and handling SD cards in parallel without picking any part before sorting. SD Protocol Aware and Focused DC tests in the 3280 brings a revolutionary test methodology to all SD cards (include MMC). The benefit to customers is lower manufacturing cost from the high throughput of the 3280. The compact size of 3280 also saves floor space in the manufacturing facility.

The cost sensitivity involved with consumer products challenges traditional final test methodology. To reduce the cost to consumers, manufacturers must recognize the fact that SD cards are built upon Known Good Die (KGD). This recognition will narrow the tester's focus to assembly related defects rather than retesting KGD. A new focused tester that tests for assembly will be smaller and less expensive than traditional solutions. That smaller size then allows for more parts to be tested in parallel in a reduced area, further reducing the unit of test cost. Additionally, the high yield of SD cards using KGD leads to a small footprint Test-in-Tray mechanism. This integrated combination of tester and handler with a reduced footprint facilitates low cost solution of the Chroma 3280.

Chroma 3280 provides a high throughput solution to SD cards manufacturers

Test-In-Tray provides the most efficient method to move DUTs from input site to test site without the use of a pick-and-place arm. The average index time from input stack to test hive about 10 seconds for 120pcs micro SD cards.

High Parallel Test A Test Hive is integrated into Chroma 3280 which provides the capability to test 120pcs micro SD cards simultaneously. Typically, it takes 70 seconds test time for 120pcs 1GB micro SD card.

Pick Up Reject SD card Only By using the Test-In-Tray and high yield SD cards, the Chroma 3280 only picks up defective devices from the sorting tray to the reject tray and replaces the good devices from the buffer tray to the sorting tray. Assuming a 98% yield rate only need to be removed 2~3 devices from the sorting tray. Therefore, the average sorting time is less than the average testing time. That also enables the testing and sorting to be concurrent, so sorting will be completed before testing.



Test-in-Tray

Firecracker II

The design circuit of the Firecracker II is identical to a single test circuit (Fire Channel) in the test hive of the Chroma 3280. The Firecracker II provides a very convenient tool for generating a test program off line. Users can plug in micro SD, mini SD, SD and MMC devices on the left side of the cartridge. USB connector is located at the right side of the Firecracker II which can be connected with a USB cable to communicate with a portable device such as a notebook computer.



Test Coverage

SD Protocol Aware Tests

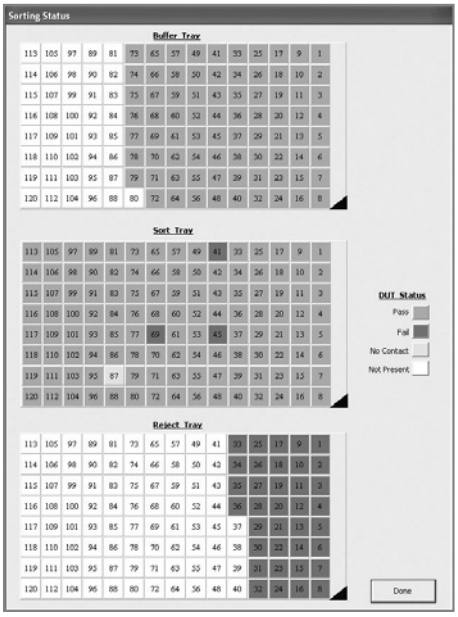
- Check CID Reg
- Check CSD Reg
- Check OCR Reg
- Check SCR Reg
- Check SD Status
- Functional Test

DC Measurements

- Open/Shorts
- ESD Diodes
- Power Up Idd
- Leakage

Software Functions

- Password control system for user privileges management
- Provide safety detecting alarm system
- Auto alarm for binning time-out error
- Visual display for error jam area
- Provide off-line mode for dummy running
- Real-time testing result display
- Individual DUT enable and disable control
- Yield display for each output tray
- Real-time UPH display
- Multiple yield stop monitor functions
- Loading device counter control
- Door-opened interrupt protecting function
- Emergency stop control
- Keep alarm log for over 30 days



Sorting Status

All specifications are subject to change without notice.

SPECIFICATIONS	
Model	**3280**
System	SD Cards Handler & Tester
Basic Specification	Temperature Control Range: Ambient
	Tray Input: 1 Auto Stack. Output Tray: 1 Auto Stack
	Test hive interfaced with Tester
	Tester integrated into Handler
	One Pick & Place arm, one buffer tray and one reject tray
Tester	Chroma TnT Production Test Tool
	Skymedi Production Test Tool
	By Customer Request: Phison, Silicon Motion & InCOMM
Change Kit	One micro SD change kit per handler
	SD, Mini SD and MMC (optional)
Facility Requirement	Power Source: 220VAC ± 10%, 50/60 Hz, single phase, less than 4KW
	Compressed Air: 0.5MPa
Applicable Package	micro SD
	mini SD, SD and MMC (Optional)
Applicable Tray	Standard tray size: JEDEC 135.9mm(W)x 315mm(L)
	Applicable tray thickness: 7.62mm
Dimensions and Weight Limit	1640 mm (W) x 790 mm(D) x 1800 mm(H); WEIGHT: 650KG
Index Time and Throughput	Max. UPH = 42,000, when test time is 0
	UPH = 5400, when test time is 70 sec with DUTs better than 97% yield
Pick & Place Arm	X Arm Max. Speed: 2.9 M.P.S.
	Y Arm Max. Speed: 3.75 M.P.S.
	Regular Sorting Speed: 6 sec per failed DUT
	Sorting concurrently occurs with testing
Device Contact method	960 Pogo Pins each insertion
	7.1 Newton per DUT
	8 Pogo pins per DUT
	Current Motor Max. Force: 320KG F
Test Interface	RS-232
	USB
	Ethernet optional
Loader and Un-loader Capacity	Input Tray Stacker: 1 Automatic with 30 JEDEC Trays
	Output Tray Stacker: 1 Automatic with 30 JEDEC Trays
System Jam Rate	Less than 1/5000 devices
Kit conversion time	Less than 5 min. for SD products
	Change Kit Setting File is saved in handler. Any necessary software and hardware adjust within 1 minute

ORDERING INFORMATION

3280 : xSD Card Tester and Handler

All specifications are subject to change without notice.



KEY FEATURES

- Reliable Touch Panel Test Handler
- For both digital and analog touch panel test
- Touch panel size:
  6 inch x 3 sites or 12.1 inch x 1 site
- Up to 6 sites for test at the same time
- No test panel contact force damage problem
- Able to measure the test pressure efficiently from 15g~1000g: ≦ ±3g
- Able to draw dot, line
- Real time monitoring program (optional)

Chroma 3813 is a brand new Touch Panel Multi-sites Test Handler that can work with the resistive and conductive panels for test. The handler uses new parallel test technology on the touch panel for diverse tests. The unique contact bar design is able to move the direction of X, Y and Z axis for contact. It can apply the footprints set by customer or convert the files directly from CAD for test. In addition, it can set multiple test items and up to 6 sites can be tested at the same time. The 3813 is equipped with user-friendly Graphic User Interface (GUI) in both English and Chinese mode, Windows Operating System and connecting interfaces for the use of various test devices.

SPECIFICATIONS	
Model	**3813**
Dimensions & Weight (W x L x H)	Dimensions:1200 x1600 x1400 mm(H) (total height include warning light 1800mm) Weight : 600Kg
Facility	Power : AC single phase 220V1Ø/60HZ, 16A ; Max 3.6KW Compressed Air : 0.3MPa Vacuum Source : -70KPa
Multiple Site	Panel Thickness : 0.1 mm ~ 2.0 mm Test Panel : 6 inch x 3 sites or 12.1 inch x 1 sites Max. Working Stage Dim. For 1 set : X : 480mm, Y : 360mm
Panel Loading	Manual
Contact force	15g~1000g : ±3g
Transfer accuracy	±0.2 % (Within 50mm)
Temperature	Operating Mode : AMB
Isolation impedance (DC 25V; 1~20MΩ)	Accuracy : ±1%
End point impedance (100~5kΩ)	Accuracy : ±1%±1Ω
Loop impedance (0~100)	Accuracy : ±2%
Testing speed	250mm/sec
Panel fix type and accuracy	Type : Vacuum Accuracy : +/-0.5mm

All specifications are subject to change without notice.

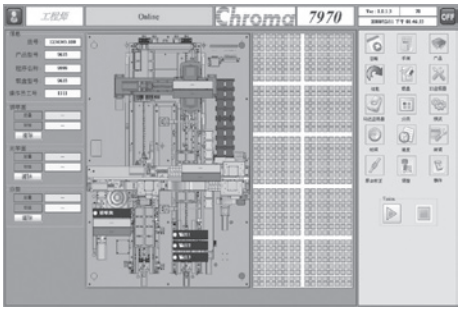
CMOS Image Sensor Inspection System Model 7970



Chroma 7970 CMOS Image (CIS) Sensor Inspection System is an automatic inspection system for tray-based CMOS image sensor. There are five main stations in Chroma 7970: loader, ball side inspector, optical side inspector, sorter and unloader. Each station can operate simultaneously to increase inspection time.

The appearance feature of image sensor and defects on it can be clearly conspicuous by using advanced illumination technology. Illumination condition can be adjusted depended on the type of image sensor. Applied with high speed camera and software algorithms, the throughput can reach UPH 6600 for 4mmX4mm chip size.

In addition, Chroma 7970 owns a friendly user interface to reduce user's learning time. All of inspection information, like tray map, station condition, is visualized for easy reading.

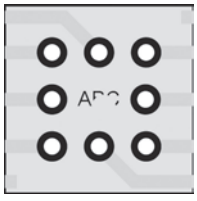
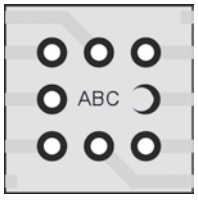
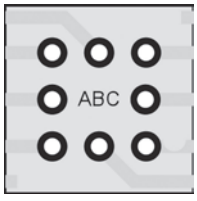
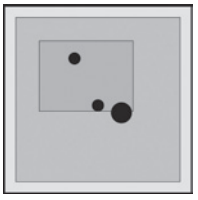
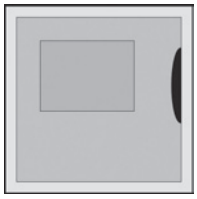
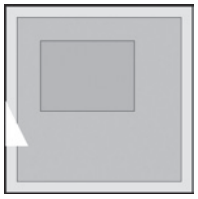
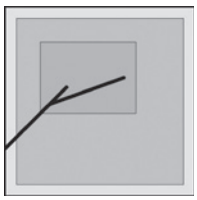
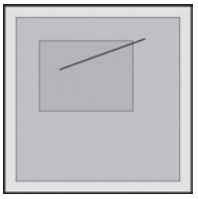


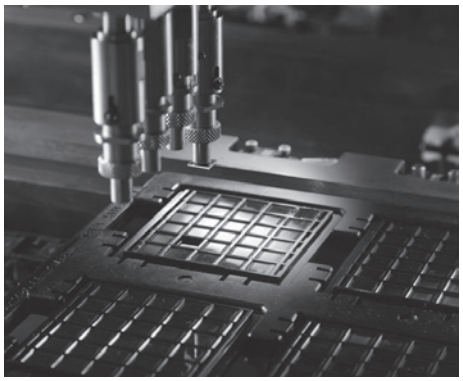
ORDERING INFORMATION

7970 : CMOS Image Sensor Inspection System

KEY FEATURES

- High speed tray-based CMOS image sensor inspection system
- Complete chip appearance inspection including glass and ball side of the chip
- On-fly acquisition can get clear images and reduce processing time.
- Multi-nozzles pick & place technology (patented) to improve throughput
- Advance and flexible illumination modules are suitable for specific defect mode
- Adjustable inspection criteria can be set for different type of the chip

Marking Defect	Ball Defect	Lead Defect	Blemish
			
Over Glue	**Chipping**	**Broken Glass**	**Scratch**
			



SPECIFICATIONS	
Suitable IC and Package Type	
Applicable Package	Jedec tray, chips need to be carried in chip tray
Chip Size	3mm x 3mm to 6.5mm x 6.5mm
Package Type	CSP
Inspector Spec	
Inspection Section	Ball side inspector unit X 1, optical side inspector unit X 2
Resolution	Ball side inspector: 12um, optical side inspector: 6um
Throughput	UPH Over 6600, base on 4mmX4mm chip size, 90% yield
Loader/ Unloader and Sorting	
Tray Stacker	Input and output, motor control, elevator stroke >= 200mm
Sorting Buffer	8 chip trays for good chip, 16 chip trays for fail chip categories
Facility Requirement	
Power Input	220VAC ± 10%, 50/60 Hz, 3 phase 5 line, 5 KW
Compressed Air	300 Liter/min @ 5 KG/cm2 (0.49Mpa)
General Spec	
Dimension	1200 mm(W) x 1600 mm(D) x 2100 mm(H)
Weight	800kg

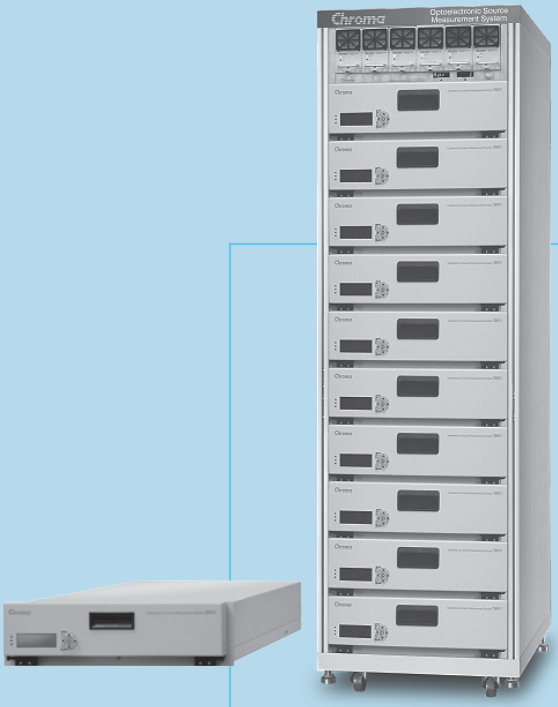
All specifications are subject to change without notice.

Laser Diode Test Solution

Laser Diode Burn-In Test System 7-1

Laser Diode Characterization System 7-3

VCSEL Tester 7-5



Laser Diode Burn-In Test System



Laser Diode Characterization System



VCSEL Tester



KEY FEATURES

- For Burn-In, Reliability and Life Testing
- Up to 800 channels
- Up to 40A per device (preliminary)
- Up to 150˚C
- Batch processing via device carriers
- Conversion Kit Interface - change kit for adaption to multiple products



Optoelectronic Source Measurement Module

Burn-in, Reliability & Life Test

The Chroma 58601 is a high density, precision multi SMU (Source-Measurement Unit) Module with temperature control and exchangeable interface developed for burn-in, reliability and life test of optoelectronic components including laser diodes, LEDs, OLEDs, photo-diodes and other similar components. Each module has up to 80 discrete SMUs which may be used as device drives, device biasing and/or measurement.

Current Sources

Five power levels are offered where discrete SMUs are available to 5-amps and series device drives for 20-40-amp (preliminary) sources. Discrete voltage measurements are available for high current devices placed in series. Multiple current sources may also be paralleled (exchanging the conversion interface board) to support higher power devices.

Ultimate Flexibility

Chroma brings the Conversion Kit fexibility used in the semicon-ductor industry to optoelectronics. Through a Conversion Kit (conversion interface board & device carrier) the Chroma 58601 can be conÿgured to other similar devices in minutes for:

- High Channel Density
- Higher Currents (Paralleling Channels)
- Optical Power Monitoring (Si or InGaAs stabilized detectors)
- Monitor Photodiode Measurements
- Dark Current Measurements
- Component Biasing
- Discrete Voltage Measurements (Series Drive Conÿguration)
- Bypass of Failing Devices (Series Drive Conÿguration)
- Multiple Device Types

Efficient Processing

- Higher temperatures reduce aging times and provide quicker results while lowering cost by requiring fewer channels
- The high density design reduces foor space over other similar solutions
- Batch processing is performed through device carriers. Carriers may be used between aging and characterization testing. Software tracks acquired data between all Chroma testing
- Same base system may be used for many device types. A Conversion Kit provides quick, cost e˜ective adaptation to prototypes and new products or variation in production
- Fine pitch probing for aging of small sub-assemblies prior to expensive packaging
- Hot swappable power supplies eliminate this type of failure mode while reducing MTBF/MTTR

ORDERING INFORMATION

58601-500m : Laser Diode Burn-In Test System 500mA/5V
58601-1 : Laser Diode Burn-In Test System 1A/5V
58601-5 : Laser Diode Burn-In Test System 5A/5V
58601-20 : Laser Diode Burn-In Test System 20A/40V
58601-40 : Laser Diode Burn-In Test System 40A/40V

All specifications are subject to change without notice.

SPECIFICATIONS				
Model	**58601 Series**			
Devices	Type	Laser Diodes, LED, SLED, OLED, MPD, Photodetectors		
	Package Type	CoC, TO-Can, C-Mount, Custom		
Module	Wavelength Monitoring	390 nm ~ 1700 nm		
	Devices Per Module	1 to 80 each*1		
	Carriers Per Module	2 each (typical)		
	Operation	Microprocessor Controlled		
	Data Sample Time	10 sec to 48 hrs		
	Internal Nonvolital Memory	Ethernet - TCP/IP		
	Communication	Virtually Unlimited		
	Change Kit Device Adaptability	With Calibration Board & DMM		
	User Site Calibration	Yes		
	Internal Water Leak Detectors	40˚C to 150˚C*2		
	Feature	**Definition**	**Uncertainty Accuracy ± (% value + offset)**	**Random Uncertainty(Stability)**
Model 58601-500m (500 mA)	500mA Current S/M Range	500.0 mA	0.1% + 100 uA	100 uA
	500mA S/M Resolution	18 uA	--	--
	500mA Voltage S/M Range	± 5.000 V	0.1% + 1 mV	1 mV
	500mA Voltage S/M Resolution	175 uV	--	--
Model 58601-500m (500 mA +)	Current 2 Range	2 mA	0.1% + 1 uA	400 nA
	Current 2 Resolution	70 nA	--	--
	Current 3 Range	200 uA	0.1% + 100 nA	40 nA
	Current 3 Resolution	7 nA	--	--
	Current 4 Range	20 uA	0.1% + 10 nA	4 nA
	Current 4 Resolution	700 pA	--	--
Model 58601-1 -013 (1A)	Current S/M Range	1.000 A	0.1% + 200 uA	200 uA
	S/M Resolution	36 uA	--	--
	Voltage S/M Range	± 5.000 V	0.1% + 1 mV	1 mV
	Voltage S/M Resolution	175 uV	--	--
Model 58601-5 -053 (5A)	Current S/M Range	5.000 A	--	--
	S/M Resolution	180 uA	--	--
	Voltage S/M Range	± 5.000 V	--	--
	Voltage S/M Resolution	175 uV	--	--
Model 58601-20 024 (20A, preliminary)	Current S/M Range	20.00 A	--	--
	S/M Resolution	720 uA	--	--
	Voltage S/M Range	± 40.00 V	0.1% + 8 mV	8 mV
	Voltage S/M Resolution*3	1.400 mV	--	--
Model 58601-40 044 (40A,preliminary)	Current S/M Range	40.00 A	--	--
	S/M Resolution	1.44 mA	--	--
	Voltage S/M Range	± 40.00 V	0.1% + 8 mV	8 mV
	Voltage S/M Resolution*3	1.400 mV	--	--
SystemFeatures	Modules Per System	1 to 10 Modules		
	Systems Per Server	1 to 4 Systems		
	System Thermal Deviation	± 5˚C		
	System Internal Power	Chroma 62000B High Rel, Redundant, Hot Swappable Power Supply		
SystemRequirements	Power Requirements	208 3-Phase VAC or 187 to 250 VAC		
	Water Temperature	18˚C to 20˚C		
	Water Flow (per Module)	6 Liters/Min		
	Ambient Temperature	23˚C ± 5˚C		
	Ambient Relative Humidity	< 60 %RH		
	Rack Size (HxWxD)	~84" x 19" x 36"		

Note *1 : Number of devices based on device type, measurement features and form factor.
Note *2 : Device Temperature range dependent on device type and power.
Note *3 : Designed for up to 16 DUT in Series. Discrete device voltage measurement at 175 uV resolution. Device Bypass for series configurations available for some power levels.



KEY FEATURES

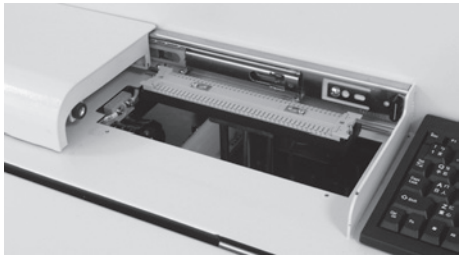
- Full Turn-Key Automated Test for edge-emitting laser diodes
- High precision and large capacity carrier, interchangeable with other automated equipment
- Fully automated alignment for fiber-coupled tests
- Automated optical inspection to decrease mechanical positioning delays
- Highly accurate TEC temperature controller with stability up to ±0.01˚C
- PXI-Based SMU and power meter for fast test times
- Full suite of software analysis tools for laser diode characterization
  (Ith, Rs, Vf, slope efficiency, λ p, etc...)

Laser Diodes are becoming more ubiquitous. Current applications range from medical and defense, to being the critical backbone of the world's fiber optic communication networks. There are several highly precise processes involved in the production of Laser Diodes. These processes are all quite cost intensive ranging from wafer growth all the way to fibre alignment and package high speed testing.

The Chroma 58620 Laser Diode Characterization Station is a state-of-the-art full turnkey system designed specifically for Laser Diodes. Its features range from macro inspection of the facette or aperture active area to a full suite of electro-optical parametric tests. When Chroma's high capacity carrier is used, multiple devices can be rapidly repeatably indexed improving not only test times but the reliability of the tests themselves. The Chroma 58620 is equipped with a highly stable, large scale, temperature control platform to provide the ability to incorporate R&D style tests in a production environment. This enables the ability to study correlation between laser diode forward current and temperature.

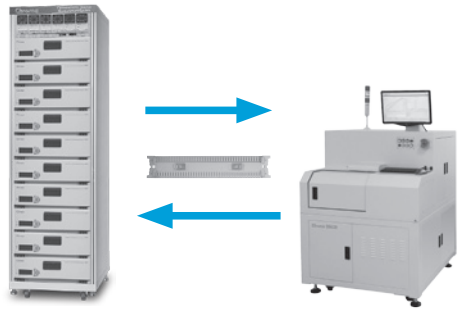
Ultra-precise Carrier Design

Chroma's high precision carriers can be adapted to suit multiple form factors such as Chip on Carrier, Submounts, or Laser-Bar's. The innovative bi-lateral design is symmetrical with components placed on both sides to allow for a larger volume of components. The carrier is multi-layered to allow for components to be easily placed in their respective pockets yet secured once the other layers are mounted. The thermal interface structure allows for efficient component thermal contact along with a high degree of temperature control during heating and cooling cycles. At the touch of a button, an operator can perform full-scale automated testing once a carrier has been inserted.



Sharing Carrier

One of the primary uses of high performance laser diodes are in the fields of optical data and telecommunications where the requirements for fiber coupling are quite stringent. If most DC parametric and optical characteristics are understood before a laser diode is inserted into the final product there is a greater cost savings and higher degree of in-field reliability. The Chroma 58620 is equipped with a fully automated alignment station to simulate a real-world fiber package coupling test to predict coupling efficiencies and spectral performance. Multiple optical heads and fibers may be used and coupled to an optical receiver such as an Optical Spectrum Analyzer (OSA) to analyze full spectral characteristics such as Side Mode Suppression Ration and Center Wavelength (λ p, λ c). Since every device is traceable with data, the Chroma 58620 affords the ability to correlate unpackaged optical performance with final package performance and helps in justifying a reduced final package test requirement.

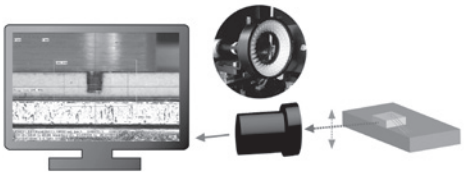


Burn-In system Model 58601

Characterization System Model 58620

Auto-aligment Fiber with AOI Assistance

From developed technology in Semiconductor IC test technology, Chroma 58620 introduces batch processing through the sharing carrier and changing kit to the Laser Diode industry. The carrier protects the laser diode from being handled and damaged as it is processed as test lots through the burn-in and test process while providing the hooks for data tracking thus increasing both productivity and yields. This same carrier is designed to operate with the Chroma 58601 OptoElectronic SMU Module for seamless burn-in & test processing. Through a 58620 change kit, as the laser diode under test changes (by evolving design or new product), the systems can adapt to various form factors and features. This flexibility allows for one solution to potentially test TO-Can, Chip on Carrier, Laser-bar, etc.

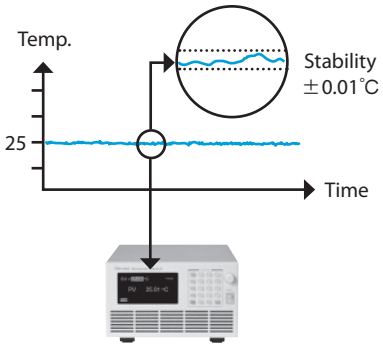


High Precision Control Platform

External and Internally induced thermal stresses on Laser Diodes strongly influence spectral and other electro-optical characteristics. Due to these issues, the Chroma 58620 includes a temperature control platform using a high precision Chroma 54130 - 300W TEC Controller and a Chroma 51101 Data Logger. These are highly regarded as world class instruments to ensure the uniformity of the carrier temperature and hence the devices under test. There are several thermal sensors placed along the carrier platform to ensure both a high degree of temperature uniformity and stability.



Data Logger

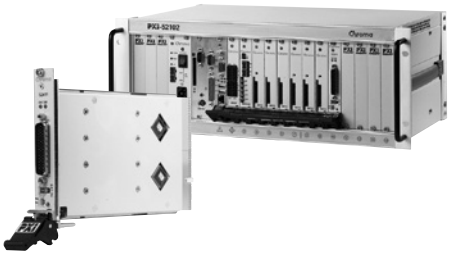


TEC Controller

All specifications are subject to change without notice.

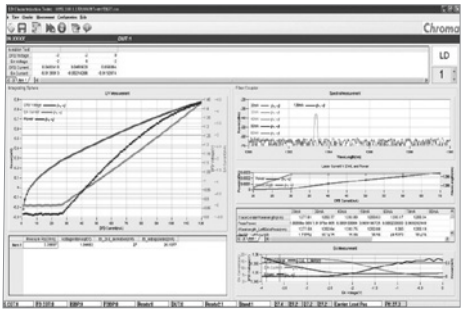
PXI Test Platform

Chroma's PXI Turnkey Test Solutions product offering are open and flexible platforms that can be rapidly integrated into production. High performance test instruments such as the Chroma 52400-Series 4-Quadrant current/voltage Source Measurement Unit (SMU) along with the Chroma 52961 Optical Power Meter (with various wavelength detectors) can perform an ultra-fast current source and detection sweep with a high dynamic range (80dB) for testing various Laser Diode demonstrating a wide range of output power and irradiance characteristics.



Friendly and Flexible User Interface

The Chroma 58620 is equipped with a complete Graphical User Interface (GUI) which includs recipe generation, test execution, and data management. There are checks and balances to ensure correct part placement in the carrier such as enabling the user to photograph every device and provide an ability to adjust before testing begins, saving time. Recipe generation enables the user to create test plans for an entire carrier down to the device level. Test execution provides the user with an in-depth window into the performance of every DUT from tabular opto-electronic parameters to graphical curves of spectral magnitude or any combination thereof. Depending on how test limits are managed, the Chroma 58620 can be a dumb data gathering tool with no pass/fail criteria or provide the user with an accurate picture of final test yield. Once tests are performed, Data Management is extremely flexible ranging from viewing on the tester itself to remote database and file storage systems for cross-enterprise data sharing.



Flexible User Interface

ORDERING INFORMATION

58620 : Laser Diode Characterization System

SPECIFICATIONS	
Model	**58620**
Device Under Test	
Form Factor	CoC, CoS, Edge-emission laser (singlet or bar)
Channels in Carrier	80 Channels per cycle *1
Current Ranges (Chroma Model 52401)	
Current Range (Source & Measurement)	±200nA / 2μA / 20μA / 200μA /2mA / 20mA / 200mA
Current Resolution	±1.6pA/±16pA/±160pA/±1.6nA/±16nA/±160nA/±1.6μA
Current Accuracy (Source & Measurement)	I range ≥ 1mA : 0.1% + 0.1% FS ; I range < 1mA : 0.05%+0.2% FS
Voltage Ranges	
Compliance Voltage Range	± 0.5V/1V/2.5V/5V/10V/25V
Compliance Voltage Accuracy	≥ 1V: 0.05% + 0.01%FS ; <1V: 0.05% + 0.1%FS
Voltage Measurement	± 3.8nV~ ± 25V
Voltage Measurement Accuracy	0.05% + 38nV @0.5V to 0.05% + 1.9mV @25V
Test Parameters	
Electrical	L-I-V Curves, Ith, Vf, Rs, Linearity (Kink)
Spectral	λ p, λ c, λ rms, λ FHWM, Mode spacing and others
Optical Spectrum Analyzer*(Optional)	
Wavelength Range	700 nm to 1700 nm
Resolution bandwidth	< 0.1 nm
SMSR Measurement	< 1 dbm
Wavelength Accuracy	±0.03 nm
Integrated Shpere	
Integrating Sphere Diameter	2 inch
Detector Port area	3mm
Wavelength Range	400~2000nm
CCD Camera	
Working Distance	6.5 mm
Resolution	6.7 um
Magnification	8x~16x
Optical Power Meter (Chroma Model 52962)	
Channel	Dual channels
Wavelength Range (InGaAs Based)	900 to 1700nm
Minimum Power / Current	-70 dBm
Maximum Power / Current	+10 dBm
Resolution	0.01dB
Dynamic Range	80dB
Accuracy	±5%
Linearity	0.1dB
Measurements per Second	>5000
Fibre Types Supported	50/125um，62.6/125um multimode and single
Connector Interface	FC
Form Factor	3U PXI
Thermal-Electrical Controller (Chroma Model 54130)	
Output Power	300W
Temperature Range	0 ˚C ~80˚C
Temperature Accuracy	0.3 ˚C
Temperature Uniformity*	±0.5˚C
Cooling System	External chiller
Mechanical Specification	
Motion Stage Travel Distance	400 mm
Minima Fine Stage Resolution	20 nm
System Size	1000mm（W）x1200mm x(D）1350mm （H）
System Weight	400 ± 20 Kg
Power Input	220V single phase，50/60 Hz
Water flow Rate	<3~5 lpm
Operating Environment	Temperature : 20˚C ~25 ˚C ; Humidity : <70%
Software	
Operating System Supported	Microsoft Windows® 2000，XP or 7

Note *1: Capacity of carrier depends on the DUT size and form factor

Note *2: Chroma 58620 is compatible with multiple Optical Spectrum Analyzers. Please inquire for further details.

Note *3: Temperature uniformity is dependent on operating temperature ±(1 ˚C+ 1%ΔT)

All specifications are subject to change without notice.



Low Tempeture -40~80 ˚C

KEY FEATURES

- Complete wafer map generation with localized or remote post-processing
- Ability to generate datasets compatible to INK or Die Sort Processes
- Ability to handle broken wafers or singulated die
- Capable of handling 3" or 4" VCSEL wafers natively, no modications necessary
- Several modes of operation, including fully manual or automated
- High speed VCSEL wafer indexing
- Ability to handle singulated probes or fully congured probe cards
- Fine resolution CCD scanner. Can be used for automated wafer alignment or individual die photographs
- Temperature controller capability
- Accurate and Fast 4-quadrant SMU source for full VCSEL Sweep Characteristics
- Complete Characterization Capability
  - L-I-V : Light, Current, and Voltage
  - ITH : Threshold Current
  - IOP : Typical Operating Current
  - VF : Forward Voltage
- Breakdown Characteristics
  - Kink : Output Power Linearity
  - Rollover : Output power reduction as forward current is increased
  - Spectral : Peak wavelength or Spectral Bandwidth
- Various options for other non-chip form factors for correlatio

Chroma is a world leader in LED Wafer characterization and test systems. The addition of the 58173-V to Chroma's product line, designed for VCSEL wafer characterization and test, extends this lead. Able to be user-configurable, this platform can be run in several modes. Manually driven, to be used in R&D and QA for individual or group complete device characterization and validation or automatically in a fully automated mode for rapid production test. There are also various mechanical adapters to enable the use of other package types.

The Chroma 58173-V system is suitable for a wide range of wavelengths, from visible to long wavelengths (500~1600nm) by selecting the respective optical modules & software settings. With the use of an integrating sphere as the main medium of output power collection, along with a database of pre-dened or custom algorithms, the system gathers all necessary data from the VCSEL DUT. It may be as simple as singular data point measurement or output power or as complex as a fully detailed LIV sweep. The system is capable of real time limits calculation to display pass/fail criterion or perform a full suite of post processing tests once the raw data is gathered (see Figure 1).

The Chroma 58173-V is available with a wafer chuck suitable for 3" and 4" VCSEL wafer substrate diameters. There is an optional temperature controller for a greater degree of test capability at various levels of thermal stress on the DUT.

Leveraging Chroma's world lead in PXI-Based precision source measure systems, the Chroma 58173-V uses a 52400 series 4-quadrant PXI Source-Measure Unit (see Figure 3) for both test speed and accuracy. This product has up to 7 current force/sense ranges (200mA max) with a very low noise oor for low level leakage measurements. The fast slew-rate driver enables pulsed measurement from a few micro-seconds to CW for added exibility.

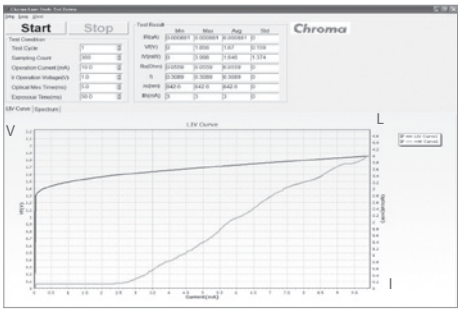


Figure 1 : Chroma® VCSEL Software System

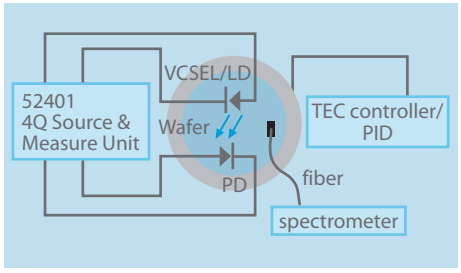


Figure 2 : System Topology

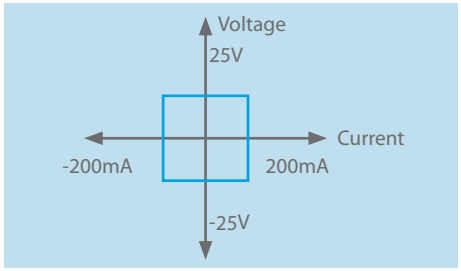


Figure 3 : 4-quadrant source/measurement unit

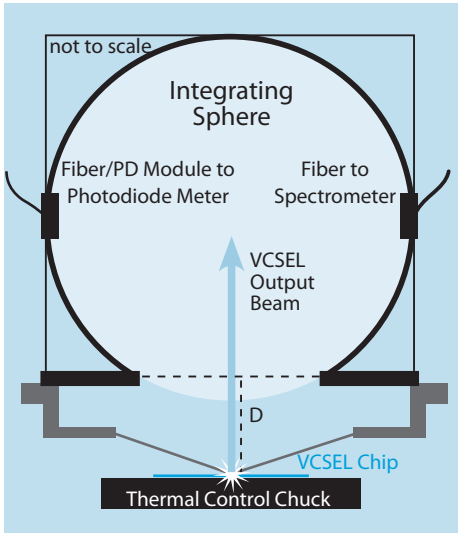


Figure 4 : Method of VCSEL/Laser diode wafer total power measurement by integrated sphere

All specifications are subject to change without notice.

SPECIFICATIONS	
Model	**58173-V**
Compatible Package	
Form factor	2"~4" wafer. Die/TO/OSA and Others as Options
Current Range	
Current Ranges	0 ~ 200mA
Current Accuracy	±1.6nA/±16nA/±160nA/±1.6μA
Current Measurement	I range ≥ 1mA: 0.1% + 0.1% FS I range < 1mA: 0.05%+0.2% FS
Current Measurement Accuracy	See Specification-2 , 0.05%+100 μ V (@200mA)
Voltage Range	
Compliance Voltage Range	± 0.5V/1V/2.5V/5V/10V/25V
Compliance Voltage accuracy	≧1V: 0.05% + 0.01%FS <1V: 0.05% + 0.1%FS
Voltage Measurement	± 3.8nV~ ± 25V
Voltage Measurement Accuracy	0.05% + 38nV @0.5V to 0.05% + 1.9mV @25V
Main Measurement Parameter	
Electrical	L-I-V , I_{th} , I_{op} , V_f , R_s , Slope Efficiency
Optical	λp , $\Delta\lambda$, λ_{FWHM}
Additional Measurement Parameter (thermal control)	
Electrical	ΔI_{th} , $\Delta V_f/\Delta T$, $\Delta\eta/\Delta T$
Optical	$\Delta\lambda_p/\Delta T$
Wavelength Measurement	
Detector Type *1	2" Integrating Sphere
Spectrometer	Chroma 52962HR
Wavelength Range *2	500~1000nm (NIR range is an option)
Fiber Core Diameter	62.5 μ m or customizable
Spectrometer Resolution	2048 Pixel CCD ; 14 bit A/D
Total Measurement LD Angle	≧30°
Wavelength Resolution	Optical : ~0.05 nm ; Pixel : ~0.5 nm
Dominant Wavelength Repeatability *3	±0.2 nm
Optical Power Meter	
Minimum Input Current	15nA
Maximum Input Current	9.5mA
Range	10mA/1mA/100A/10A/1A/100nA
Resolution	15bit
Accuracy	10mA : ±1% ± 2 μ A / 1mA : ±1% ± 0.2 μ A 100 μ A : ±1% ± 0.1 μ A / 10 μ A : ±3% ± 30nA 1 μ A : ±3% ± 10nA / 100nA : ±3% ± 5nA
Thermal-Electrical Controller	
Output Power	300W
Temperature Range	-40 ˚C~80 ˚C
Temperature Accuracy	1.2 ˚C
Cooling System	external chiller
Mechanical Specification	
Prober	Thermal Control Chuck/ LD TO-Can Holder
Chuck Size	6 inch
Dimension	970 (L) x 970 (W) x 2250 (H)mm
Weight	580kg
Power Input	220V
Operation Environment	Temperature : 23 ˚C~28 ˚C ; Humidity : <70%
Software	
Operation System Supported	Microsoft Windows® 2000 , XP or 7

Note *1 : 6" larger Integrate sphere is optional
Note *2 : NIR range measurement from 950nm~1600 nm by InGaAs detector
Note *3 : Variations o n p ixel r esolutio n are gr ating de pendent. Customized gratings available
Note *4 : Dependent on DUT quality without thermal effect

ORDERING INFORMATION

58173-V : VCSEL Power Tester

LED/Lighting Test Solution

ESD Test System 8-1
LED Electrical Test Module 8-2
LED Total Power Test System 8-3
LED Flip Chip Total Power Test System 8-5
LED Burn-in Tester 8-7
LED Light Bar Test System 8-8
LED Light Bar Electrical Test System 8-9
LED Lighting Test System (For Laboratory) 8-10
LED Lighting In-line Test System (For Production) 8-11



LED Electrical Test Module



ESD Test System



LED Total Power Test System
LED Flip Chip Total Power Test System



LED Burn-in Tester



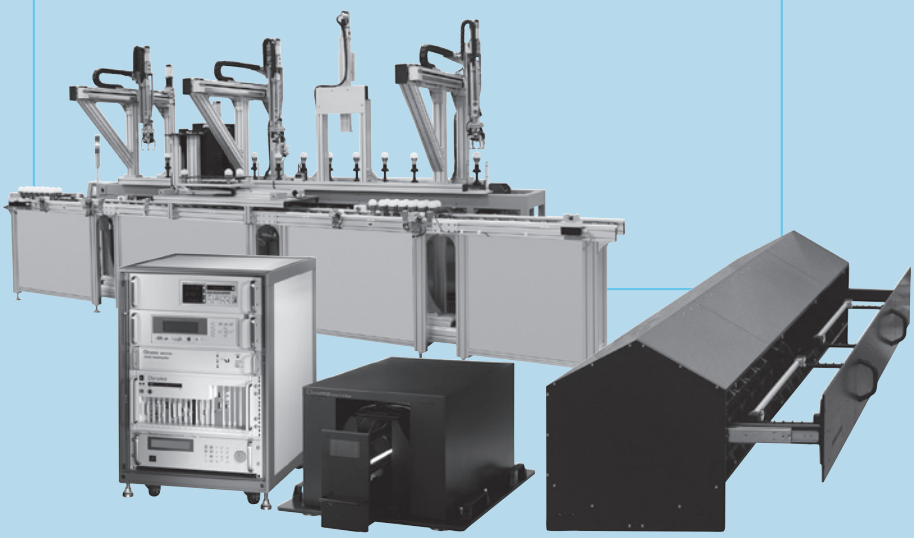
LED Light Bar Test System



LED Light Bar
Electrical Test System



LED Lighting Test System
(For Laboratory)



LED Luminaires In-line Test System
(For Production)



KEY FEATURES

- Two Model ESD Pulse Generation : Human body model and Machine model
- Programmable Auto Test : Interval, cycle and polarity are programmable
- Resolution : 5V per-step for Machine model, 20V per-step for Human body model (58154)
- Resolution : 10V per-step for Machine model, 20V per-step for Machine model, 30V per-step for Human body model (58154-B)
- Resolution : 10V per-step for Machine model, 30V per-step for Human body model (58154-C)
- Diversity Control Interface : PCI DIO card
- Up to 8000V (58154-C)

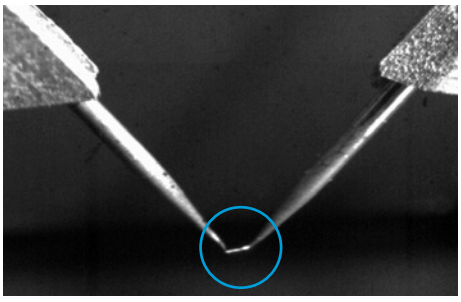
Chroma 58154 series ESD (Electrostatic Discharge) Test Systems are PXI/PCI controlled module to simulate electrostatic discharge pulse during electronic device testing. The 58154 series offer both ESD STM5.1-2001-Human Body Model and ESD STM5.2-1999-Machine Model. The user friendly software offers programmable and flexible features, such as sampling test on a wafer, ESD model, ESD pulse polarity, ESD pulse interval in a sequence, and automatic testing function.

The 58154 series includes a control module and a pulse output external box. High voltage power supply unit (PSU) and pulse shaping circuits provide the ESD STM standards compliant pulse waveform.

The 58154 series offer a flexible, widely and totally ESD test solution to customers. Furthermore, the ESD pulse is generally applied to the device under test before measuring device electric parameters and the 58154 series can be perfectly integrated with Chroma 58173 and 58173-FC to provide a total solution in production line.

ORDERING INFORMATION

PXI-58154 : ESD Test System (4kV/400V)
PCI-58154 : ESD Test System (4kV/400V)
58154-A : ESD Test System (6kV/500V)
58154-B : ESD Test System (6kV/800V)
58154-C : ESD Test System (8kV/800V)
58154-8KV : ESD Test System (6kV/800V)



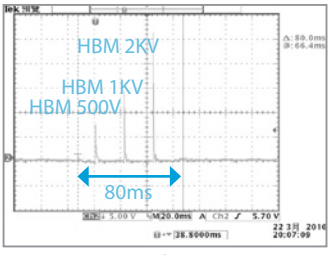
ESD Test on LED chip



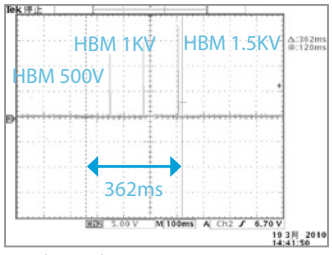
58154-A, 58154-B, 58154-C



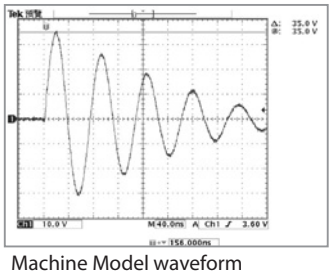
58154--8KV



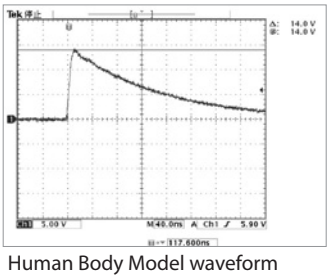
New Function and improvement -
3 HBM pulses within 80 ms



Traditional way -
3 HBM pulses within 362 ms



Machine Model waveform



Human Body Model waveform

SPECIFICATIONS			
Model	**58154**	**58154-B**	**58154-C**
Parameter	Value		
ESD Mode	Machine Model / Human body model		
Pulse Voltage	Machine model: 50V to 400V ± 5V Human body model: 500V to 4KV ± 20V	Machine model: 100V to 800V ± 10V Human body model: 250V to 6KV ± 30V	Machine model: 100V to 800V ± 10V Human body model: 250V to 8KV ± 30V
ESD Specification *1	Machine model reference on STM5.2-1999 ; Human body model reference on STM5.1-2001		
Pulse Interval	20 ms to 1 s (User definable)		
Pulse Repetition	Single or multiple		
Pulse Polarity	Positive or negative (software control)		
AC Input	100 to 240V, 47 to 63 Hz		
Dimensions	434.6mm(W) x 97.7mm(H) x 306.8mm(D)		
Weight	11kg		

Pattern No: 95137265
Pattern Name: Discharge and remote feedback integrated testing system
Note*1 : The test condition is under output terminal of equipment

All specifications are subject to change without notice.



Chroma 58221-200-2 is a module specially designed to test the electrical features of LED in full range. It has all functions required for testing the LED electrical features. The 58221-200-2 supplies high accuracy current source up to ±200V/±100mA for High voltage (HV) and up to ±10V/±2A for High Power (HP). Besides the standalone operation the 58222-200-2 is featured in, the USB interface and other integrated design can also be applied for synchronous measurement.

ORDERING INFORMATION

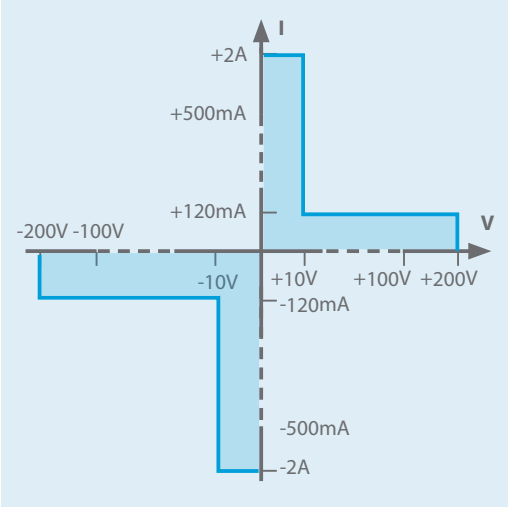
58221-200-2 : LED Electrical Test Module

KEY FEATURES

- Focuses on LED test application
- Cover High Voltage (HV) and High Power (HP) LED test requirement
- Build-in hardware sequencer
- Build-in program memory and data memory
- Support LED SCR characteristic detect function

TEST ITEMS

- Forward voltage (Vf)
- Reverse breakdown voltage (Vrb) Leakage (Ir)
- LIV
- I-V characterization



SPECIFICATIONS				
Model	**58221-200-2**			
Current Source Accuracy				
Range	Programming Resolution	Source Accuracy (±% rdg.+Amps)	Default Measurement Resolution	Measurement Accuracy (±% rdg.+Amps)
±20 μA	1nA	0.08%+5nA	1nA	0.06%+5nA
±500 μA	10nA	0.08%+125nA	10nA	0.06%+125nA
±20mA	1 μA	0.08%+5 μA	1 μA	0.06%+5 μA
±500mA	10 μA	0.1%+125mA	10 μA	0.25%+125mA
±2A	100 μA	0.1%+5mA	100 μA	0.25%+5mA
Voltage Source Accuracy				
Range	Programming Resolution	Source Accuracy (±% rdg.+Volts)	Default Measurement Resolution	Measurement Accuracy (±% rdg.+Volts)
±10V	1mV	0.08%+3mV	1mV	0.06%+3mV
±100V	10mV	0.08%+15mV	10mV	0.06%+15mV
±200V	10mV	0.08%+30mV	10mV	0.06%+30mV
General Specification				
Interface	USB/Stand alone			
Trigger	Available			
RAM (6 bits)	16M			
Operatoin Environment	0~50˚C, 70% R.H. up to 35˚C, derate 3% R.H. / ˚C, 35~50˚C			
Power Consumption (VA)	70VA			
Dimensions (WxHxD)	432x110x432 mm			
Weight (kg)	10			



The Chroma 58173, in automatic operation, comes with unique design and a whole new method for LED total power measurement. In bare wafer/chip LED test production, partial flux correction of total flux is the common measurement method in LED epitaxy industry. (See Figure 1 on flip page) However, conventional method causes some disadvantages, i.e., lower accuracy, low S/N ratio, and slow test time etc., and which are difficult to be applied on LED bar wafer/chip total power/flux test production.

Chroma has developed a high speed and high accuracy measurement method of LED total power/flux. (See Figure 2 on flip page) Appling this innovative test method enhances to gather more LED partial flux than using the conventional method. (See Figure 1 on flip page) It improves the accuracy dramatically and significantly.

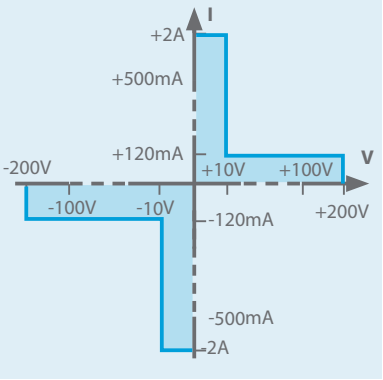
Benefited Chroma's unique optical and mechanical design, LED total radiant flux will be collected by a wide photo detector. Other optical features like dominant wavelength, peak wavelength, CCT, etc. will be detected by Chroma's spectrometer. In addition, the 58173 offers a 6-inch wafer chuck and a packaged LED holder which users can collect variety of samples in one station. With a wide range of power source and meter, users can gather all of LED electrical data like forward voltage, leakage current, and reverse break voltage in one test step.

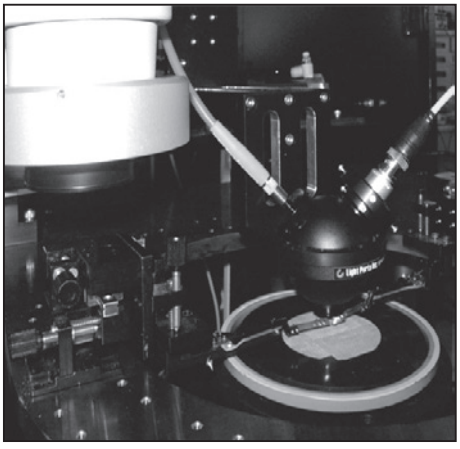
KEY FEATURES

- Wide LED power test range (200V/2A)
- Chroma Huge Photo Detector (Measurement Angle=128°)
- Semi-automatic LED wafer/chip prober
- Unique Edge Sensor with stable probe pressure with fatigue and pressure change problem
- Machine visual position system to minimize the time for manual operation
- Auto sampling test function
- Flexible and adjustable software operating interface
- Fast wafer scanning system
- Auto broken chip scanning algorithm
- Lends hood design to eliminate the interference of background light
- Real-time displaying single spot data scatter diagram
- Comprehensive mass production test statistic report and analysis tool

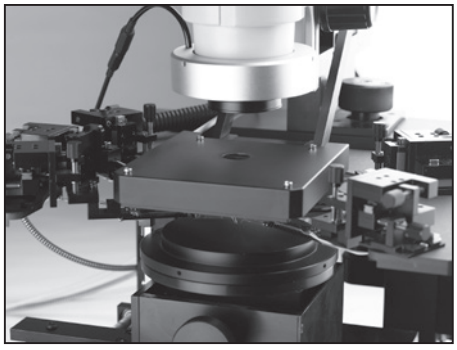
HARDWARES

- Semi-automatic LED wafer/chips prober
- Leakage test module
- Source/measure module
- Optical test module
- Optional ESD test module





Integrating Shere



Chroma® Huge Photo Detector

Standard Optical Module

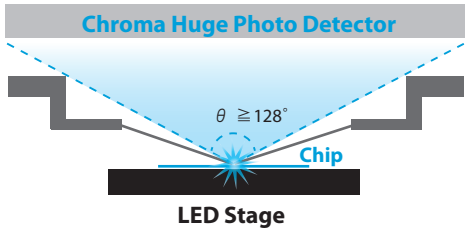


Figure 1 - Chroma's Innovative Method of LED Total Flux Measurement by Huge Photo Detector

Optional Optical Modules

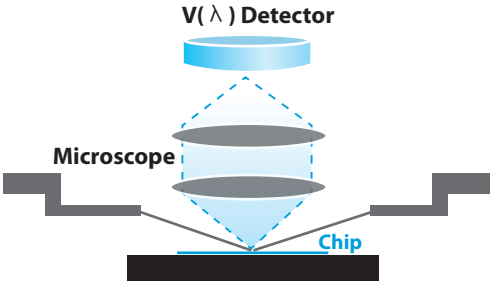


Figure 2 - Conventional Method of LED Wafer/chip Total Flux Measurement by Microscope Module

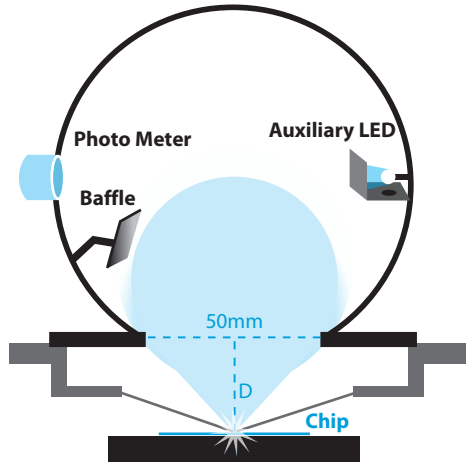
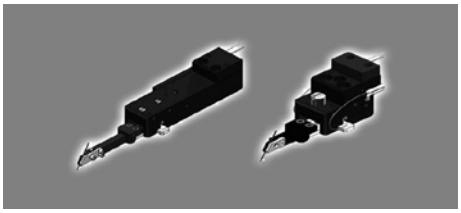


Figure 3 - Conventional Method of LED Wafer/chip Total Flux Measurement by Integrating Sphere

All specifications are subject to change without notice.



Edge sensor

- Unique Edge Sensor with stable probe pressure with fatigue and pressure change problem.
- Highly sensitive and stable probe pressure to ensure the probe life and pin trace specification of products.
- Adjustable probe pressure within the range of 0.5g~10g.
- Adopting curved surface contact design, no carbon accumulation and poor contact problem on the point-of-contact

SPECIFICATIONS		
Model		**58173**
Application		
Pad Size		≧70 μm
Maximum Optical Receiving Angle		128°
Electrical Parameter Measurements		
PowerRange		≦ 20W, as figure shows
Voltage	Source Range	±10V / ±100V / ±200V
	Source Accuracy	±0.08% + 10mV / ±0.08% + 20mV / ±0.08% + 40mV Note1
	Measure Range	±10V / ±100V / ±200V
	Measure Accuracy	±0.06% + 10mV / ±0.06% + 20mV / ±0.06% + 40mV Note1
Current	Source Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Source Accuracy	±0.08% + 10nA / ±0.08% + 300nA / ±0.08% + 10uA / ±0.3% + 1mA / ±0.3% + 12mA *1
	Measure Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Measure Accuracy	±0.06% + 10nA / ±0.06% + 300nA / ±0.06% + 10uA / ±0.25% + 1mA / ±0.25% + 12mA *1
SCR Test Function		Yes
Wavelength / Color Measurements		
Spectrometer	Detector Type	2048 Pixels
	Wavelength range	380~780nm (Optional 360~780nm)
	Pixel Resolution	0.4nm
Radiant Flux repeatability (mW)	Range	3W Max.
	Repeatability	±3%
Wp	Repeatability	±1 nm
Wd	Repeatability	±0.3 nm
Operation Environment	Temperature	20° ~ 30°
	Humidity	40% ~ 70%
Mechanical Specifications		
Scan CCD		Resolution 1024X768 Pixel Gray scale CCD (256 scales)
θ axis		±15°
Dimension		970 (L) × 970 (W) × 2250 (H)mm
Weight		580kg
Power Input		220V

Note *1: Test condition is under point of sensing

ORDERING INFORMATION

58173 : LED Total Power Test System



The Chroma 58173-FC, semi-automatic LED wafer/chip prober machine, is designed for flip-chip type LED. No vacuum holes design in transparent chuck (see figure 1), thus no interference along the optical path, and it makes the measurement more accurate.

The 58173-FC also applies Chroma's innovative total power measurement method, (See figure2), which may collect more LED partial flux than the conventional probers, and that also improves the speed and accuracy significantly

Benefited from Chroma's unique optical and mechanical design, all LED's optical parameters, such as total radiant flux, dominant wavelength, peak wavelength, CCT, etc., can be measured fast and accurately. For LED's electrical parameters, with a wide range of power source and meter in the system, users can gather all of LED electrical data like forward voltage, leakage current, and reverse break voltage in one test step.

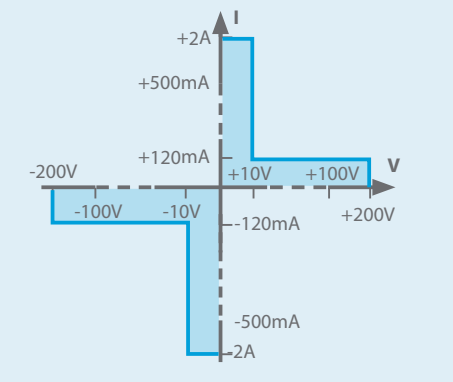
The 58173-FC integrates Prober and Tester completely that has flexible software operating interface and the best logic algorithm to increase the production efficiency significantly. The comprehensive mass production statistic reports and analysis tools allow the user to master the production status easily.

KEY FEATURES

- Wide LED power test range (200V/2A)
- Chroma Huge Photo Detector (Measurement Angle=148°)
- Semi-automatic LED wafer/chip prober
- Unique chuck design that has no vacuum holes in the testing area
- Unique Edge Sensor with stable probe pressure with fatigue and pressure change problem
- Unique screen intuitive pin adjustment
- Machine visual position system to minimize the time for manual operation
- Combining Prober and Tester to boost the efficiency
- Auto sampling test function
- Broad chip scale application (to meet the tests from Chip Size 7 to 120 mil)
- Flexible and adjustable software operating interface
- Fast chip scanning system
- Auto broken wafer scanning algorithm
- Lends hood design to eliminate the interference of background light
- Real-time displaying single spot data scatter diagram

HARDWARES

- Unique chuck design that has no vacuum holes in the testing area.
- Chroma Huge Photo Detector (Measurement Angle=148°)
- Semi-automatic LED wafer/chip prober
- Wide LED power test range (200V/2A)
- Optional ESD test module



No vacuum hole design in transparent chuck

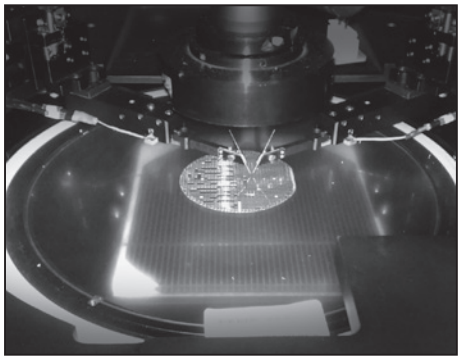


Figure 1 - Chuck with no vacuum holes that makes the measurement more accurate.

Standard Optical Module

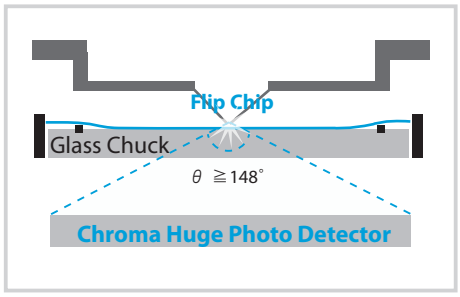
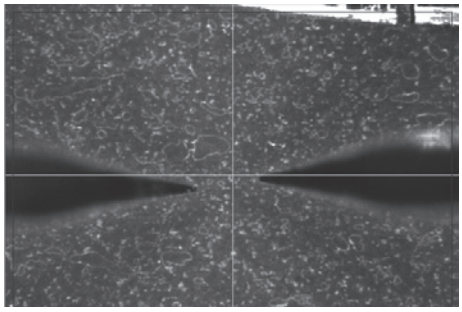


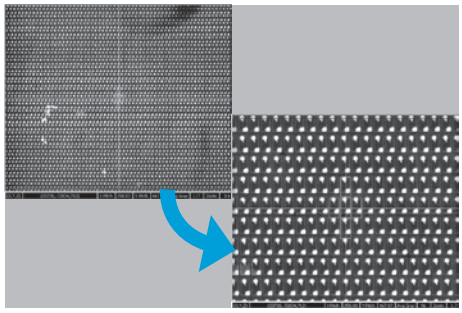
Figure 2 - Chroma's Innovative Method of LED Flip Chip Total Flux Measurement by Huge Photo Detector



Powerful Scanning Algorithm

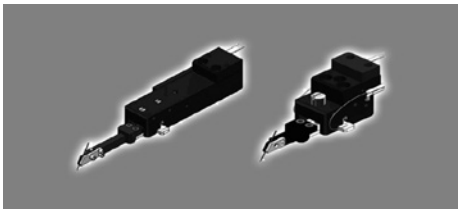


Unique screen intuitive pin adjustment for fast probing



Digital Enlarge Preview Function

All specifications are subject to change without notice.



Edge sensor

- Unique Edge Sensor with stable probe pressure with fatigue and pressure change problem.
- Highly sensitive and stable probe pressure to ensure the probe life and pin trace specification of products.
- Adjustable probe pressure within the range of 0.5g~10g.
- Adopting curved surface contact design, no carbon accumulation and poor contact problem on the point-of-contact

SPECIFICATIONS		
Model		**58173-FC**
Application		
Die Size		7~120mil
Pad Size		≧70 μm
Chuck Size		5.3 inch For Extended Ring / 7.3 inch For Extended Ring / 10 inch For Extended Ring
Maximum Optical Receiving Angle		148° *1
Electrical Parameter Measurements		
PowerRange		≦ 20W, as figure shows
Voltage	Source Range	±10V / ±100V / ±200V
	Source Accuracy	±0.08% + 10mV / ±0.08% + 20mV / ±0.08% + 40mV *2
	Measure Range	±10V / ±100V / ±200V
	Measure Accuracy	±0.06% + 10mV / ±0.06% + 20mV / ±0.06% + 40mV *2
Current	Source Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Source Accuracy	±0.08% + 10nA / ±0.08% + 300nA / ±0.08% + 10uA / ±0.3% + 1mA / ±0.3% + 12mA *2
	Measure Range	±20uA / ±500uA / ±20mA / ±500mA / ±2A
	Measure Accuracy	±0.06% + 10nA / ±0.06% + 300nA / ±0.06% + 10uA / ±0.25% + 1mA / ±0.25% + 12mA *2
SCR Test Function		Yes
Wavelength / Color Measurements		
Spectrometer	Detector Type	2048 Pixels
	Wavelength range	380~780nm (Optional 360~780nm)
	Pixel Resolution	0.4nm
Radiant Flux repeatability (mW)	Range	3W Max.
	Repeatability	±3%
Wp	Repeatability	±1 nm
Wd	Repeatability	±0.3 nm
Operation Environment	Temperature	20° ~ 30°
	Humidity	40% ~ 70%
Mechanical Specifications		
Glass Chuck Size		5.3 inch For Extended Ring / 7.3 inch For Extended Ring / 10 inch For Extended Ring
Scan CCD		Resolution 1024X768 Pixel
θ axis		±12°
Dimension		970 (L) × 970 (W) × 2250 (H) mm
Weight		580 kg
Power Input		220V

Note *1 : LED dies distribution diameter after extention has to be smaller than 3" / 5" / 8"
Note *2 : Test condition is under point of sensing

ORDERING INFORMATION

58173-FC : LED Flip Chip Total Power Test System

All specifications are subject to change without notice.



Chroma 58266 is a LED Burn-in Tester that each channel can offer a constant current up to 500mA but also has 0~400V voltage measurement function. For product application, various programmable power supplies can be applied for multi-channel constant current output and voltage measurement. The user can integrate several power supplies based on the demands of channels and current for multi-channel test.

ORDERING INFORMATION

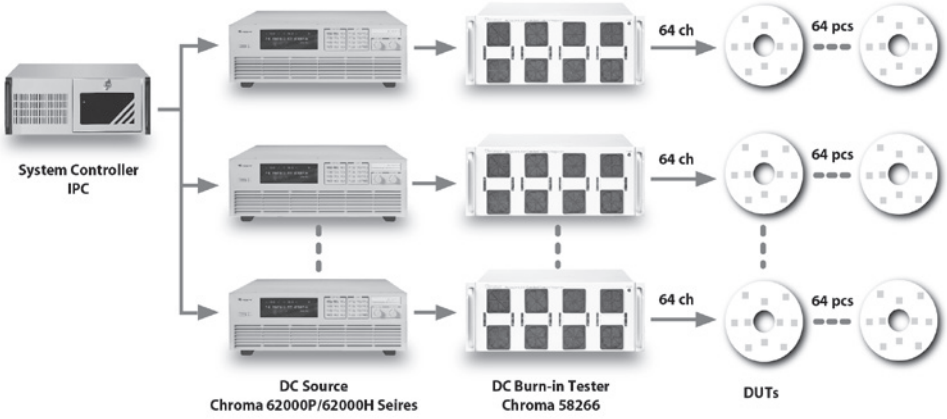
58266 : LED Burn-in Tester

KEY FEATURES

- Flexible channels output: 32/64/128 channels
- Each channel can offer up to 500mA /400V
- Each channel can parallel connection for high current requirement. Ex: 2-ch: 1A, 4-ch: 2A
- High accuracy of current output and voltage measurement

SYSTEM ARCHITECTURE

- DUT: single LED, LED array, LED light bar or LED module
- Support channels: 64 ch
- Force Current: Max. 500mA per-channel
- Support parallel connection: Ex: 2-ch: 1A
- Voltage measurement: Max. 400V



CONFIGURATION

Programmable DC Power Supply	LED Burn-in Tester	Force I range	Measure V Range
Model 62012P-40-12 40V/120A/1200W	Model 58266	500mA	30V
		400mA	35V
Model 62012P-100-50 100V/50A/1200W	Model 58266	500mA	32V
		170mA	95V
Model 62024P-80-60 80V/60A/2400W	Model 58266	500mA	70V
		440mA	75V
Model 62024P-100-50 100V/50A/2400W	Model 58266	500mA	70V
		350mA	95V
Model 62024P-600-8 600V/8A/2400W	Model 58266	110mA	300V
		80mA	400V
Model 62050P-100-100 100V/100A/5000W	Model 58266	500mA	95V
Model 62050H-450 450V/34A/15KW (380V/3Φ4W)	Model 58266	500mA	400V

SPECIFICATIONS

Model	58266			
Electrical Specification				
Channels	64			
Force Current Range	1uA~ 10μA	10uA~ 100μA	100uA~ 100mA	100mA~ 500mA
Force Current Accuracy	±(0.1%+15nA)	±(0.1%+150nA)	±(0.1%+50μA)	±(0.2%+1mA)
Measure Voltage Range	0.1V~40V		40V~400V	
Measure Voltage Accuracy (2wires)	±(0.2%+50mV)		±(0.3%+500mV)	
Input Voltage limit *1	V input – V read<10V			
General Specification				
Interface	USB			
Operatoin Environment	Temperature: 0~50°C/Humidity:10~70%RH			
Temperature Coefficient	0~18°C & 28~50°C ±(0.5 x accuracy specification)/°C			
Weight (kg)	70			
Warm-up Duration	1 hour			

Note *1: The difference of DC output voltage and DUT read voltage is suggested to less 10V.

All specifications are subject to change without notice.

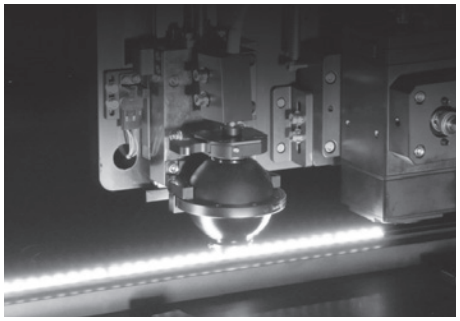
LED Light Bar Test System

Model 58182

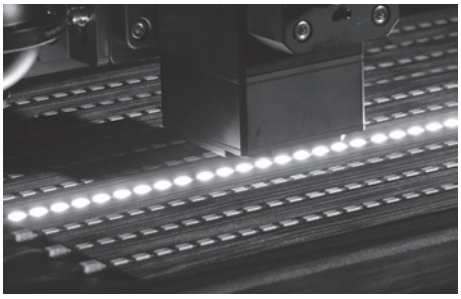


Chroma 58182 LED Light Bar Test System is a fully automatic test system able to measure the top-view/side-view light bar uniformity composed of white light. With image recognition function, it can accurately capture the location of LED and identify the center of LED under the measurement. With automatic mechanical and optical measurement function, the 58182 can perform extremely accurate optical and electrical measurement.

The 58182 integrates image recognition function, automatic mechanical and optical measurement. It can not only improve the yield rate by sifting out the defect products, but also reduce the product verification time and development cost. In addition, the 58182 has a flexible measurement platform to adapt different type of top-view / side-view LED light bar measurement, and friendly user interface to reduce user's learning time. Consequently, the 58182 is the best choice for testing top-view/side-view light bar.



CIE127 Partial Flux Measurement Module



CIE127 Condition B measurement Module

KEY FEATURES

- Measure the top-view/side-view light bar uniformity composed of white light
- Equipped with image recognition function to capture the LED location accurately
- Excellent optical performance
- ESD damaged sorting function
- FPC/PCB light bar adaptability

ORDERING INFORMATION

58182 : Top-view LED Light Bar Test System

SPECIFICATIONS

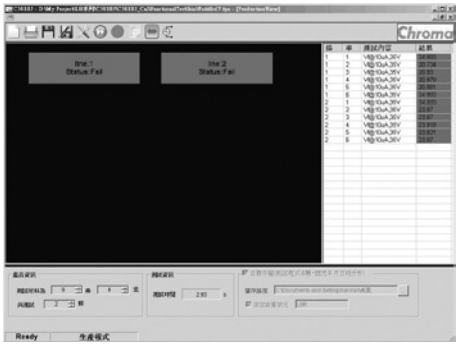
Model		58182		
Optical Module		CIE 127 condition B optical tube or Partial flux measurement module		
Average Intenstive (mcd)	Range	100~10000mcd		
	Accuracy	±5%		
	Repeatability	±2%		
CIE x, y	Accuracy	±0.004		
	Repeatability	±0.002		
Spectrumeter	Wavelength Range	380~780nm		
	Optical resolution	2nm		
	A/D	16 bits		
Light Bar length		600mm		
Offer Channels		20 X 12 Ch		
Power Supply	Voltage	0~200V	0~60V	0~300V
	Current	10uA~5mA	1mA~2A	40mA~2A
	Voltage accuracy	0.3%+0.1%F.S	0.01%+10mV	0.05%+0.05%F.S
	Current accuracy	0.3%+0.1%F.S	0.01%+1mA	0.03%+40mA
Data output	Format	Excel (*.csv)		
	Output items	mcd, CIEx, CIEy		
XY moving range		600x250mm		
Dimension		1300 (D) × 2360 (W) × 1815 (H)mm		

All specifications are subject to change without notice.

LED Light Bar Electrical Test System Model 58183



Chroma 58183 is a PC base test system for LED light bar electrical test. In hardware design, Chroma 58183 not only offers a accurately current (10uA~5mA) to test LED electrical features but also can integrate an extra high power supply for high current test. Otherwise, Chroma 58183 offers multi-channels test function. It is widely used in many application. In LED light bar manufactory, 58183 can test more 10 pieces Light bar at the one time. In LED backlight manufactory, 58183 can test 4 pieces LED backlight via a 4 channels control box. To sum up, 58183 is a very strong and powerful tool for LED light bar and LED backlight manufactories.





KEY FEATURES

- Integrating customer's extened power supply
- PC base design
- Support multi- channels test
- Using general DUT adapter to offer test application widely
- Software support authority managerment

ORDERING INFORMATION

58183 : LED Light Bar Electrical Test System

SPECIFICATIONS			
Model		**58183**	
System specifications			
Power supply	Output voltage	1~200V	
	Output current	10μA~5mA *1	
Program Accuracy	Voltage Range	1~200V	
	Voatage Accuracy	±0.3% ±0.2% FS	
	Current Range	100μA / 5mA	
	Current Compliance	±5% ±0.2% FS	
Applicative Type		Top / Side-view LED light bar	
Dimension (D x W x H)		IPC 418 x 330 x 175 , RelayBox 430 x 276 x 102 mm	
Weight		18 Kg(IPC 13Kg, RelayBox 5Kg)	
Electrical measurement specifications			
Testing condition		2 wires	
Voltage	Accruacy (1~200V)	±0.3% ±0.2% FS	
	Resolution	50mV	
RelayBox specifications(Not in live wire)			
		Ch1~24	Ch25~32
Switch voltage		200VDC	300VDC
Carry current		300mA	600mA
Life expectancy of mechanical		10^6	10^6
Power IN			
IPC		110 / 220V,50~60Hz, 7 /3.5A	
RelayBox		110 / 220V,50~60Hz,2A	
Others			
General purpose relay		32 Channels	
Operation environment		Temperature:10~40˚C ; Humidity:10%~70%	

Note*1 : Specifications not contain AUX Power, need to check relaybox loss if use AUX Power.

All specifications are subject to change without notice.



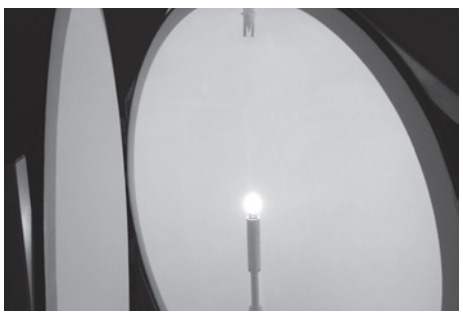
For Laboratory

KEY FEATURES

- Simulate the real AC test condition and environment
- Integrate AC, DC, and optical features test to one platform
- Support DC test for AC LED
- Support dual-optical test module in one platform (Integrating sphere or average intensity) (optional)
- Support AC /DC LIV Analysis
- Offer standard light source for calibration

Chroma 58158 LED Lighting Test System, compliances the AC LED Device National Standard, has integrated Chroma's Power Electronics Test Equipment - Programmable AC Power Source and Digital Power Meter to offer users a real AC environment for measuring AC LED.

Furthermore, the 58158 also integrates Chroma DC Power Supplies with the flexible optical test platform which equips with integrating sphere, photo detector, and etc.. Users can measure optical and electrical parameters of AC/DC LED through a friendly softtware interface.



For Laboratory Test

SPECIFICATIONS (50 cm Integrating Sphere)		
Model		**58158**
Measurement Items		
Optical Measurement Items		Lumens (lm), CIE(x,y)), CIE(u',v'), CCT, CRI
Electrical Measurement Items		Frequency, Real power P, power factor PF, THD (Option), Vf (Option)
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range *1	<5,000 lm (>5K lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array (optional)
	Optical Fiber Connector	SMA 905
Lumen accuracy		±5%
CIExy accuracy		±0.004
Lumen Repeatability		±2%
CIExy Repeatability *2		±0.001
Electrical AC Source		
Output Rating-AC		500VA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Line Regulation	0.10%
	Load Regulation	0.20%
Max.Current / Phase	RMS	4A/2A (150V/300V)
	peak	24A/12A (150V/300V)
Electrical AC Meter		
Power	Range (W)	1.5W~1KW (Model 66201) ; 1.5W~10KW (Model 66202)
	Power Factor Accuracy *3	0.006+(0.003/PF)KHz
Harmonic	Range	2~50 order
DC Measurement (Optional)		
DC Power Supply	Output Voltage	0~64V (> 64V optional)
	Output Current	0~3A (> 3A Optional)
	Ripple and Noise	1400 uVrms & 14 mVp-p / < 1mA
	Line Regulation	0.01% +4mV / 0.01% + 300 μ A
	Load Regulation	< 6mV / 0.01% + 300 μ A
	Program Accuracy	0.02% + 10mV / 0.01%+1mA
	Read back Accuracy	0.02% + 10mV / 0.01%+1mA
Others		
Dimension (H x W x D)		1081 x 532 x 700 mm
Weight		100k g
Power Consumption		300 W
Operating		100~240V VAC 50/60HZ
Software Support DC Source		
Chroma 6200P-300-8, Chroma 11200 (650V), Chroma 11200 (800V), Keithley 24XX Series		

Notes *1: 20 inch Integrating Sphere without ND filter.
Notes *2 : The unit under test is 10W halogen lamp
Notes *3 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges

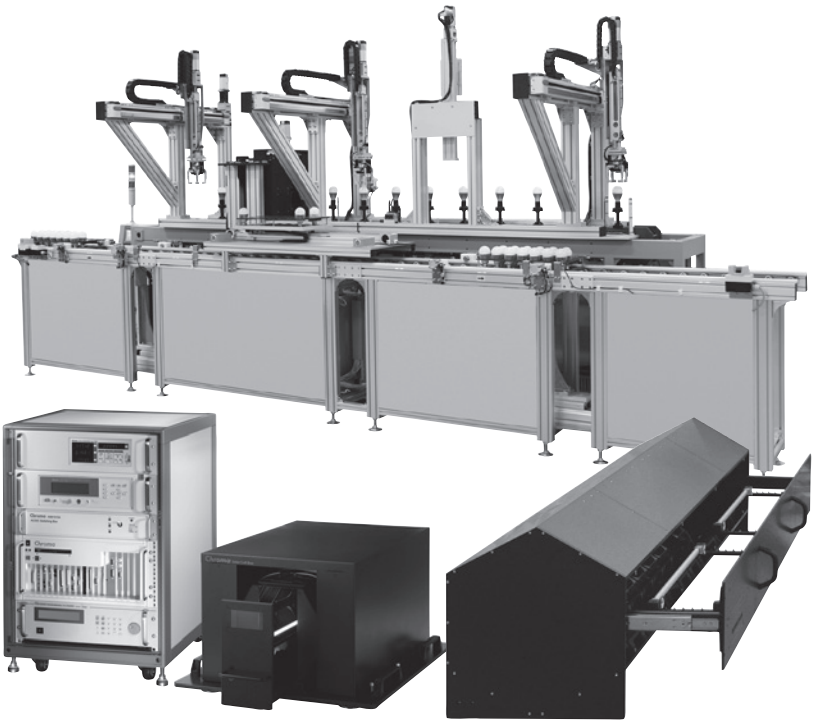
ORDERING INFORMATION

58158 : LED Lighting Test System (for laboratory Test)

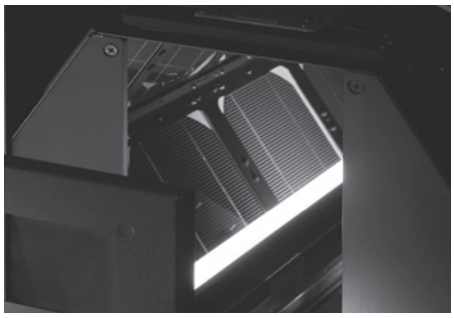
Optical Module	50cm integrating sphere	1m integrating sphere	2m integrating sphere
Luminaire	small lamp, bulb, MR-16	middle lamp, 2 feet T8/T5 tube	large lamp, 4 feet T8/T5 tube, street light
Application	laboratory	laboratory	laboratory

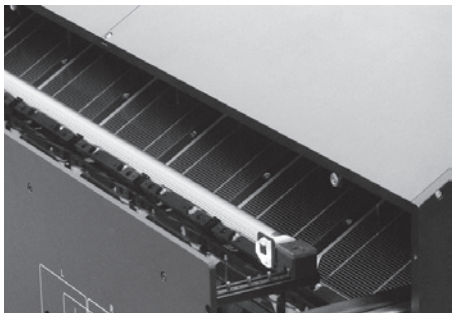
Note : Customization for 3m integrating sphere

All specifications are subject to change without notice.

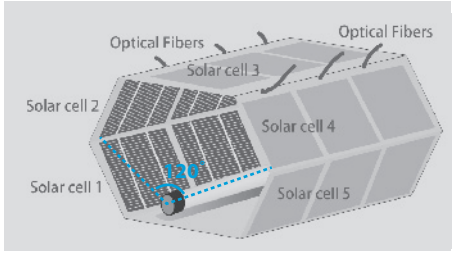


Test Instruments Solar Cell Modules

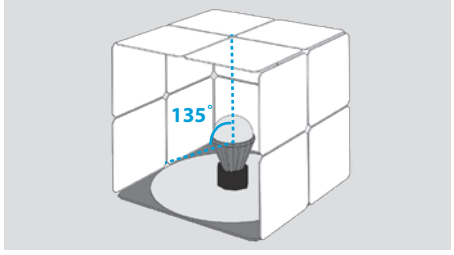




Solar Cell Box Interior



Solar Cell Module for JEL 801 LED Tube



Solar Cell Module for Omnidirectional lamp

For Production

KEY FEATURES

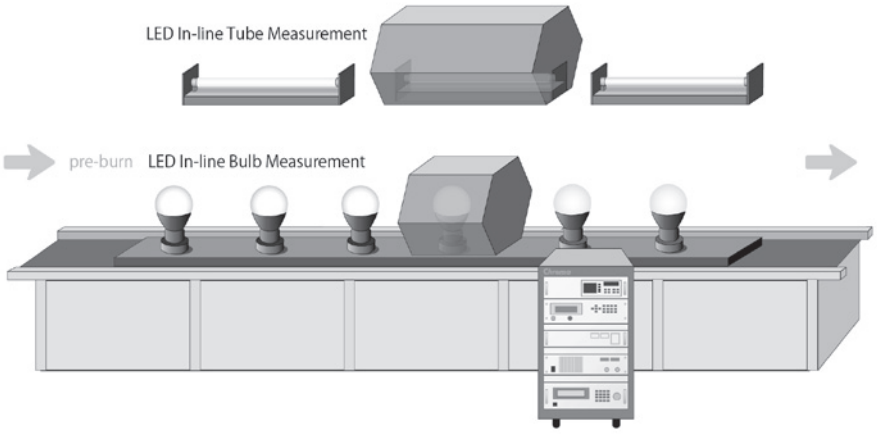
- Mass production application: LED lamp, LED bulb, LED bar, LED streetlight, and other luminaries
- Less error comparing to integrating sphere measurement
- High speed test and flicker measurement
- Provide standard light source for calibration which is international standard traceable
- Thermal control fixture adaptable (option)

TEST ITEMS

- Optical Power characteristics :
  Lm, lm/w, LED operating frequency (Flicker)
- Color characteristics :
  CIExy, Duv, CIEu'v', CCT, CRI
- Power characteristics :
  AC mode : Power factor (PF), Irms, Vrms, THD
  DC mode : Forward voltage

The design concept of Chroma LED high speed measurement module is to combine several large size detectors and add up the luminous flux obtained by each detector to calculate the total flux of LED light. This design not only overcomes the shortcoming of previous inconvenient measurement for total flux by conventional integrating sphere, it also implements the inline test on production line. Chroma is able to provide the customer a fully automatic production line that covers both quality and productivity.

Rapid Test for LED luminarie Mass Production

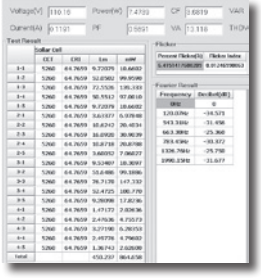


All specifications are subject to change without notice.

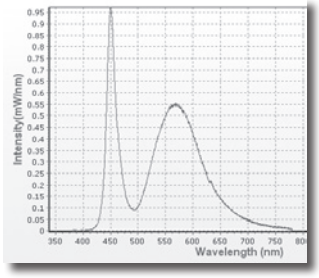
SPECIFICATIONS (25cm Integrating Sphere)		
Model		**58158 -SC**
Measurement Items		
Optical Measurement Items		Lumens (lm), CIE(x,y)), CIE(u',v'), CCT, CRI
Electrical Measurement Items		Frequency, Real power P, power factor PF, THD (Option), Vf (Option)
Optical Measurement		
Photo Detector	Wavelength Range	380~780nm
	Lumens Range *1	<5,000 lm (>5K lm optional)
Spectrometer	Detector Type	2048 Pixels Linear CCD array
	Optical Fiber Connector	SMA 905
Lumen measurement Repeatability		±2%
CIExy Repeatability *2		±0.001
CCT Repeatability		±30K @ 3000K
CRI Repeatability		±0.1
Electrical AC Source		
Output Rating-AC		500VA
Voltage	Range/Phase	150V/300V/Auto
	Accuracy	0.2%+0.2%F.S.
	Resolution	0.1V
	Line Regulation	0.10%
	Load Regulation	0.20%
Max.Current / Phase	RMS	4A/2A (150V/300V)
	peak	24A/12A (150V/300V)
Electrical AC Meter		
Power	Range (W)	1.5W~1KW (Model 66201) ; 1.5W~10KW (Model 66202)
	Power Factor Accuracy *3	0.006+(0.003/PF)KHz
Harmonic	Range	2~50 order
DC Measurement (Optional)		
DC Power Supply	Output Voltage	0~64V (> 64V optional)
	Output Current	0~3A (> 3A Optional)
	Ripple and Noise	1400 uVrms & 14 mVp-p / < 1mA
	Line Regulation	0.01% +4mV / 0.01% + 300 μ A
	Load Regulation	< 6mV / 0.01% + 300 μ A
	Program Accuracy	0.02% + 10mV / 0.01%+1mA
	Read back Accuracy	0.02% + 10mV / 0.01%+1mA
Others		
Dimension (H x W x D)		1081 x 532 x 700 mm
Weight		100k g
Power Consumption		300 W
Operating		100~240V VAC 50/60HZ
Software Support DC Source		
Chroma 6200P-300-8, Chroma 11200 (650V), Chroma 11200 (800V), Keithley 24XX Series		

Notes *1: 10inch Integrating Sphere without ND filter. Chroma also offers 12 and 20 inch integrating sphere for higher
Notes *2 : The unit under test is 10W halogen lamp
Notes *3 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges

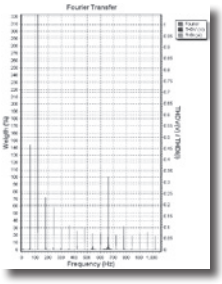
Analysis Tools



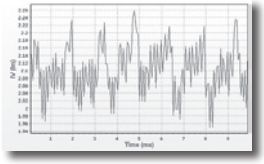
Power Analysis :
Im, Im/W, PF, Power



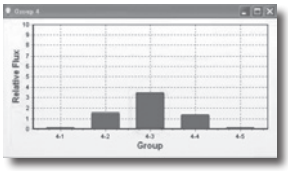
LED Spectrum Analysis :
CCT, CRI, Duv



THD Analysis



Flicker Analysis



Flicker Analysis

ORDERING INFORMATION

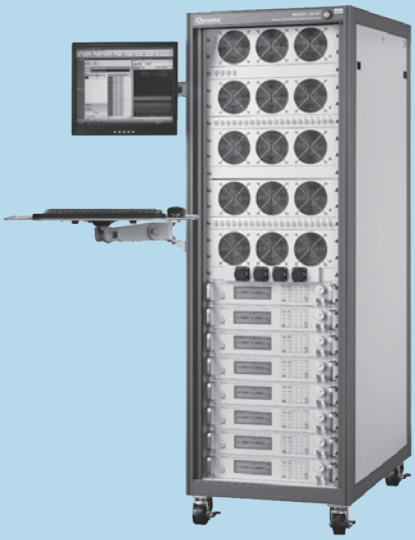
58158-SC : LED Luminaires In-line Test System *
*Call for customized availability

Flat Panel Display (FPD) Test Solution

OLED Lifetime Test System 9-1
OLED Display Shorting Bar Pattern Generator 9-2
LTPS Display Shorting Bar Pattern Generator 9-3
LCD Shorting Bar Pattern Generator 9-4
LCM Pattern Generator Card 9-6
LCM Tester 9-7
LCM ATS 9-10
DC Power Supply for LCM Burn-in Applications 9-18



OLED Lifetime Test System



OLED Display
Shorting Bar Pattern Generator

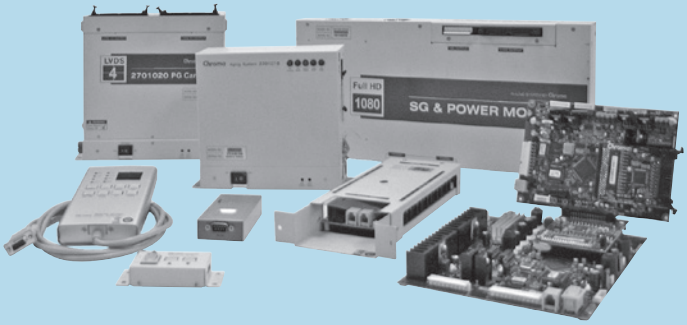


LTPS Display
Shorting Bar Pattern Generator



LCD Shorting Bar Pattern Generator

In-line Application
Signal Generator & DC Power

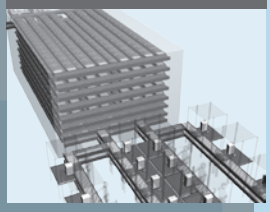




Off-line Application
DC Power Supply

Off-line Application
LCM Pattern Generator Card

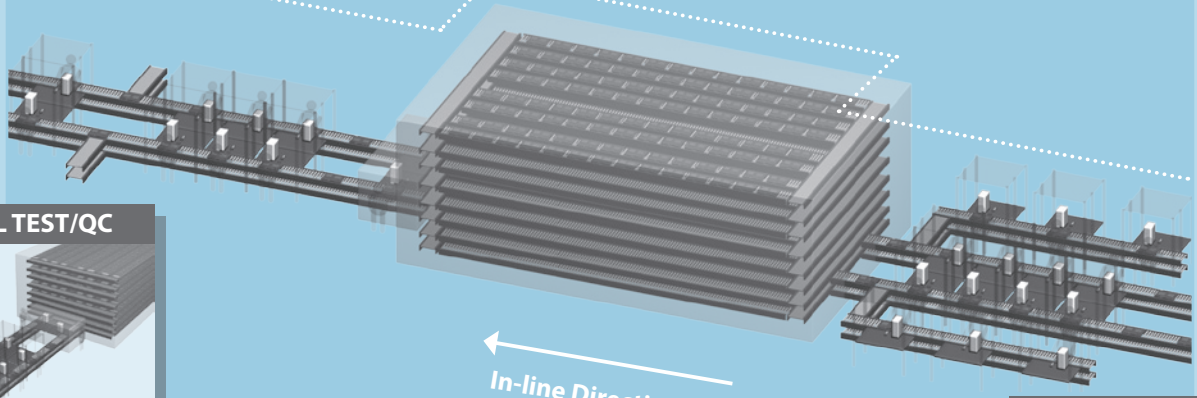
AGING OVEN



IN LINE APPLICATION

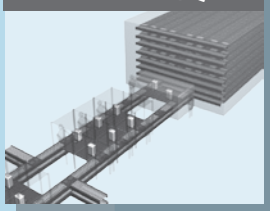
LCM Production Line

MES/CIM System

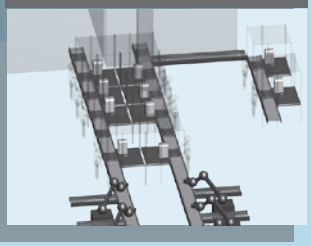


In-line Direction

FINAL TEST/QC



ASSEMBLY TEST





LCM ATS Family



LCM Tester Family

OLED Lifetime Test System

Model 58131



KEY FEATURES

- Individual PMU for each UUT
  - Precision sourcing of current/voltage per UUT
  - Precision measurement unit per UUT
  - Single UUT failure is self contained, will not interrupt or corrupt other UUT testing
- Test Function
  - Electrical Characteristics
  - Brightness
  - Programmable driving waveform (Bipolar current/voltage)
- Automatic testing and data logging
  - Standard Test System
  - PXI Chassis with Controller
  - Modular OLED test cards (one for every two OLED panels)
  - Maximum 34 UUTs/system
- Optional Components
  - TEC heater
  - Spectrometer unit for in depth optical characterization
  - Turnkey test solution
  - Flexible test fixtures (Accept different OLED panel sizes)
  - Half rack with sliding drawers (4 fixtures per drawer)

The 58131 Lifetime Test System is designed specifically for the OLED industry. Model 58131 provides twoquadrant constant current (CC) and constant voltage (CV) stimulus to each OLED panel and acquires electrical and optical characteristics automatically. Two independent and isolated precision source-and-measure units (PMU) are incorporated in one modular card, which is capable of testing two OLED panels. Additional instrument cards are added to expand test capacity.

58131 comes with a simple to use windowing graphical interface. Configuration of stimulus voltage, current, duty cycle, calibration, and test intervals can be changed easily. Adjustable measurement frequency at different time intervals allows rapid sampling at initial stages and lengthened measurement period later on. Report generation, including graphical data presentation is available to facilitate data analysis. 58131 software is comprehensive enough for R&D in depth characterization, yet simple enough for production on-going reliability test operation.

58131 OLED Lifetime Test System offers good test capacity in a very small footprint, isolated PMU for each panel, and comprehensive software with a friendly user interface. Without a doubt, it is the best OLED test solution in the market.

PXI Systems Alliance

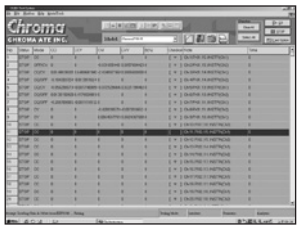
Hardware

- 18-slot PXI Chassis
- ADLINK PXI-3910 1GHz Embedded
- 52951 Two-Quadrant Source-Measure Card
- Optional 19" Rack of 20U
- Optional 19" LCD monitor, mouse & keyboard

Software

The test system provides a WindowsTM interface for easy configuration of all electrical & optical tests. Each test comprises:

- Multiple stimulus configuration
- Real time test data presentation in tabular and graphical forms
- Up to 34 UUTs
- Brightness calibration
- Automatic test termination when brightness test limit is reached



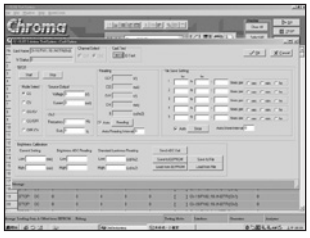
Customized Test Fixture

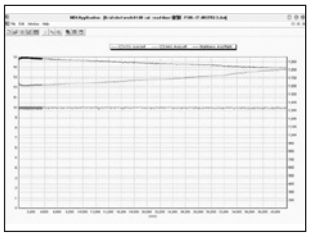
- 19" Rack Mount configuration
- Up to 34 test fixtures in drawers
- Flexible fixture design allows for different
- OLED panel sizes



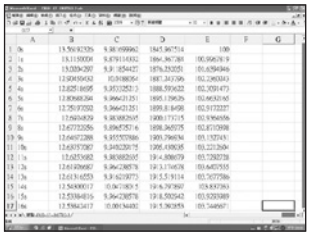
Calibration

Independent calibration data for each channel





Graphical Data Presentation



Tabular Data Presentation

SPECIFICATIONS	
HARDWARE	
Model	**58131**
Facilities	
Power source voltage	110/220VAC(50/60Hz)
Electric power consumption	Maximum 1,000Watt
Storage temperature	0 ~ 75°C
Operation environmental temperature	0 ~ 35°C
Operation humidity	35 ~ 90% RH (No condensation)
Atmosphere	No corrosive gas environment
Grounding	Grounding with 3-pin-plug
Size of System	W 600 x D1000 x H 1140 (mm)
Weight	Approximately 150kg
Constant Current Mode	
Current Range	0~10mA(0.64W)
Step Current	5uA
Accuracy	± (0.5% Programmed Value + 30uA)
Current Resolution	12Bit
Maximum Voltage	18V
Constant Voltage Mode	
Voltage Range	±18V
Step Voltage	10mV
Accuracy	± (0.5% Programmed Value + 30mV)
Voltage Resolution	12Bit
Switching Mode	
Output	CC/CV switching waveform
Cycle time	60HZ~120HZ(16.66msec~8.33msec)
Duty Cycle	1/256~256/256
Current Measurement	
Range	0~10mA
Accuracy	+/-(0.5% Programmed Value + 40uA)
Resolution	12Bit
Voltage Measurement	
Range	+/-18V
Accuracy	+/-(0.5% Programmed Value + 40mV)
Resolution	12Bit
Brightness Measurements	
Detector Type	Si Photodiode
Wavelength range	320~1100nm
Maximum Brightness	8,000 Nit
Output value	Relative Brightness

SOFTWARE
Operating Systems supported
Microsoft Windows XP or 7
Test Application
The application supports the following measurements: 1.Brightness 2. Constant Voltage mode Voltage and Current 3. Constant Current mode Voltage and Current The application support the following features: • Program restart can reload last configuration and status • Multiple stimulus configuration (CC, CV, CC/-CV switching, CC/OFF switching, CV/OFF switching) • Stimulus parameter setting (Frequency, Duty, Voltage, Current) • Up to 34 UUTs, each UUT may pause and restart testing • Automatic test termination when brightness test limit is reached • Real time graphical presentation of current, voltage, relative brightness and test time • Independent calibration data for each channel

ORDERING INFORMATION

Model 58131 : PXI OLED Lifetime Test System

All specifications are subject to change without notice.

OLED Display Shorting Bar Pattern Generator Model 58166



58166 is a Shorting Bar Pattern Generator especially designed for OLED Cell inspection. The unique PC-Based architecture can upgrade the inspection Flow settings automatically from Server through FTP network without doing it on the client side respectively that increases the production efficiency significantly. The built-in RS-232 and USB interfaces can work with any AOI and Gamma optical measurement systems. 58166 can solve the problems that traditional equipments had in complex upgrade procedures, unfriendly user interface, difficult system integration and etc.

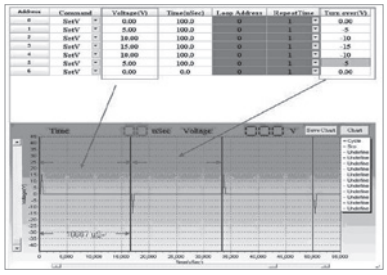
58166 works with 0.1 μS high-resolution time unit to edit the output waveforms of Source and Gate. The strong driving capacity and High Slew Rate design along with the step waveform output for maximum 255 steps can output the inspected waveform accurately that also eliminate panel from any block effect. In addition, the unique engineer analysis mode can provide engineers the best test environment for waveform analysis.

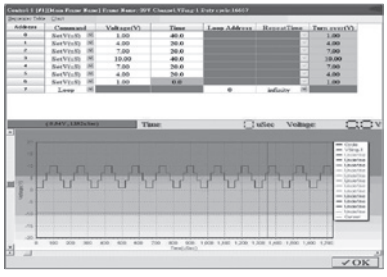
Utilizing the flexible adjustment function to change the parameters of voltage and time in real time can acquire the most applicable test conditions for the production line during mass production. Auto discharge function is especially designed to prevent the residual charge and potential ESD from damaging the panel. 58166 helps improving production yield rate, optimizing inspection process and also reduces measurement cost.

58166 is the most compatible Shorting Bar Pattern Generator for OLED testing in the market today.

KEY FEATURES

- Provide the test signal for different sizes of OLED display
- Powerful PC-based platform
- Flexible waveform editor
- Auto FTP download
- Engineer analysis function
- Lock function during testing
- 0-255 steps waveform output
- Auto discharge





SPECIFICATIONS			
Specifications of Inspection Signal			
Type of signal	Signal name	Number of signal	Voltage range
Data signal	Data1~Data24	12*2	+40V ~ -40V
Power signal	VDD(V1)	1*1	0~ + 40V
	VSS(V2)	1*1	- 40 ~ 0 V
Data signal (Vsign & WS) generator (Total 24CH)			
Vsign (Data 1~12)	Output	+ 40V ~ - 40V / 0.1A	
	Voltage accuracy	±2% ±0.1V	
	Time base	0.1 μs	
	Quantity of Ch	12	
	Load Regulation	2%	
WS (Data 13~24)	Output	+ 40V ~ - 40V / 0.1A	
	Voltage accuracy	±2% ±0.1V	
	Time base	0.1 μs	
	Quantity of Ch	12	
	Load Regulation	2%	
Power signal generator (Total 20CH+2CH)			
VDD(V1)	DC Output	+ 40V ~ 0V / 30A	
	Voltage accuracy	±1% ±0.1V	
	Load Regulation	5%	
VSS (V2)	DC Output	0V ~ - 40V / 50A	
	Voltage accuracy	±1% ±0.1V	
	Load Regulation	5%	
General Specification			
AC Power source voltage	220V/50Hz 1φ 5500VA		
Storage temperature	0 ~ 75°C		
Operation temperature	5 ~ 35°C		
Operation humidity	35 ~ 90% RH (No condensation)		
Dimension (H x W x D)	1827 x 600 x 900 mm		
Weight	Approximately 350kg		

Note*1: VDD(V1) and VSS(V2) are DC, waveform editor is not applicable

ORDERING INFORMATION

Model 58166 : OLED Display Shorting Bar Pattern Generator

LTPS Display Shorting Bar Pattern Generator Model 58167



KEY FEATURES

- Provide the test signal for E-paper and LTPS panels
- Powerful PC-based platform
- Auto FTP download
- Engineer analysis function
- Lock function during testing
- 512 steps waveform output
- Auto discharge
- 36 channels output

In the evolution of panel design, larger display and higher resolution will be the main-stream of future technology for panel manufacturers. LTPS TFT process is one of many technologies that could fulfill the abovementioned requirements. It had become a more and more important milestone for panel manufacturers who want to maintain their competitiveness.

58167 is a Shorting Bar Pattern Generator especially designed for OLED Cell inspection. The unique PC-Based architecture can upgrade the inspection Flow settings automatically from Server through FTP network without doing it on the client side respectively that increases the production efficiency significantly. The built-in RS-232 and USB interfaces can work with any AOI and Gamma optical measurement systems. 58167 can solve the problems that traditional equipments had in complex upgrade procedures, unfriendly user interface, difficult system integration and etc.

58167 is the most compatible Shorting Bar Pattern Generator for LTPS technology testing in the market today.

SPECIFICATIONS	
Model	**58167**
Power source voltage	110/220VAC(50/60Hz)
Storage temperature	0 ~ 75˚C
Operation humidity temperature	5 ~ 35˚C
Operation humidity	35 ~ 90% RH (No condensation)
Dimension of Main unit (HxWxD)	130 x 442x 505 mm
Weight	Approximately 14 kg
Data1~Data12	
Output	+ 20V ~ - 20V / 400mA
Voltage Accuracy	±2% ±0.1V
Time base	0.1 µs
Number of output	12
Line Regulation	2%(full load, 1.8m cable)
Data13~Data36	
Output	+ 40V ~ - 40V / 150mA
Voltage Accuracy	±2% ±0.1V
Time base	0.1 µs
Number of output	24
Line Regulation	2% (full load, 1.8m cable)

ORDERING INFORMATION

58167 : LTPS Shorting Bar Pattern Generator

All specifications are subject to change without notice.

LCD Shorting Bar Pattern Generator

Model 58162 Series



KEY FEATURES

- High Slew Rate of max. 2500V/μs
- Strong Driving Capacity
- 0-255 step waves output
- Auto discharge
- 12 Source Output
- 8 Gate Output (expandable up to 16 channels)
- 4 COM Output
- Powerful PC-based platform
- Auto FTP download
- Friendly Flow editing
- Easy to integrate with AOI & Optical measure system
- Real-time voltage & time parameter adjustment
- Engineer Analysis Function

58162 is a high capability Shorting Bar Pattern Generator especially designed for LCD Cell inspection. The exclusive PC-Based architecture can download the inspection Flow settings automatically from Server through FTP network for update without doing it on the client respectively that increases the production efficiency significantly. The built-in RS-232 and USB interfaces can integrate with any AOI and Gamma optical measurement systems. 58162 can solve the problems of complex upgrade for traditional equipment, unfriendly user interface, difficult system integration and etc.

58162 works with 0.5 μ S high-resolution time unit to edit the output waveforms of Source and Gate. The strong driving capacity and High Slew Rate design along with the step waves output for maximum 512 steps can output the inspected waveform accurately to eliminate panel from any block. In addition the unique engineer analysis mode can provide engineers the best test environment for waveform analysis. Utilizing the flexible adjustment function to change the parameters of voltage and time in real time can acquire the most applicable test conditions for the production line during mass production. Auto discharge function is especially designed to prevent the residual charge and ESD from damaging the panel. 58162 not only increases the panel defect inspection ability, reduce the inspection process but also improve the production yield rate and lower down the measurement cost.

58162 is expandable with Gate extension board up to 24 channels that can satisfy the a-Si/LTPS multiple panel design in the future. It is the most compatible Shorting Bar Pattern Generator in the market today.

SPECIFICATIONS

Model	58162	58162-A	58162-AE	58162-E	58162-EE
Power source voltage	110/220VAC(50/60Hz)				
Electric power consumption	Main unit : Maximum 500Watt				
Insulation resistance	Min. 10MΩ at DC500V Mega (Between AC power source terminal and housing case)				
Dielectric strength	1 minute of AC 1000V (Between AC power source terminal and housing case)				
Storage temperature	0 ~ 75˚C				
Working environmental temperature	5 ~ 35˚C				
Working humidity	35 - 90% RH (No condensation)				
Atmosphere	No corrosive gas environment				
Grounding	Grounding with 3-Pin-Plug				
Dimension of Main unit(HxWxD)	130 x 442 x 504 (mm)				
Weight	Approximately 14kg				

Type of signal	Number of signal	Voltage range	Number of signal	Voltage range	Number of signal	Voltage range	Number of signal	Voltage range	Number of signal	Voltage range
Source (Data)	6*2	-20 ~ +20V	6	-20 ~ +20V	6	-20 ~ +20V	12	-40 ~ +40V	12*2	-40 ~ +40V
Common	1*2	-20 ~ +20V	1	-20 ~ +20V	1	-20 ~ +20V				
	1*2		1		1					
Gate	4*2	-40 ~ +40V	4	-40 ~ +40V	4	-40 ~ +40V				
					12	-40 ~ +40V				

Specifications of Inspection Signal					
General					
Time base	0.5 μs				
Frame period	8,000us ~1,000,000us				
Source and Common total output power	75 Watt			--	--
Gate total output power	75 Watt				
Source signal generator					
Output	-20 ~ +20V / 400mA			--	--
Voltage accuracy	±2% ±0.1V			--	--
Number of output	12	6		--	--
Load Regulation	1.5%(full load, 2m cable)			--	--
Gate signal generator					
Output	-40V ~ +40V/ 500mA				
Voltage accuracy	±0.2V				
Number of output	8	4	16	12	24
Load Regulation	2% (full load, 2m cable)				
DC Voltage generator					
Output	-20V ~ +20V / 400mA			--	--
Voltage accuracy	±2% ±0.1V			--	--
Number of output	4	2		--	--
Load Regulation	1.5%(full load, 2m cable)			--	--
Industrial Computer					
Operating System	Windows XP Embedded				
CPU	1.6 GHz				
Hard Disk	80 Gbyte				
RAM	1 Gbyte				

Patent Name : Multi-Channel Signal Generator for Optical Display Device with Protective Circuit
Patent No. : 96208025

ORDERING INFORMATION

58162 : LCD Shorting Bar Pattern Generator 12S-8G-4C
58162-A : LCD Shorting Bar Pattern Generator 6S-4G-2C
58162-AE : LCD Shorting Bar Pattern Generator 6S-16G-2C
58162-E : LCD Shorting Bar Pattern Generator 12G
58162-EE : LCD Shorting Bar Pattern Generator 24G
A581600 : Conversion board box



Conversion board box



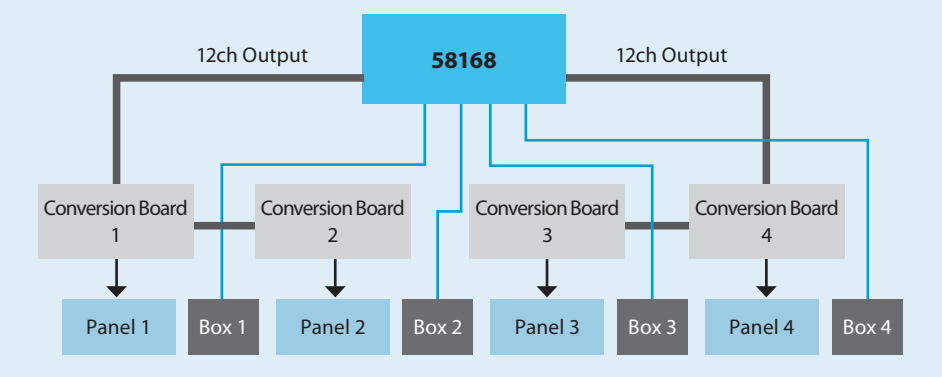
KEY FEATURES

- 24CH Output(12CH or 24CH, optional)
- 0~1024 step waves output
- Prober integration with RS-232
- Loading Recipes via SD Card
- 4 Colonization by 4 OP BOX
- Low cost

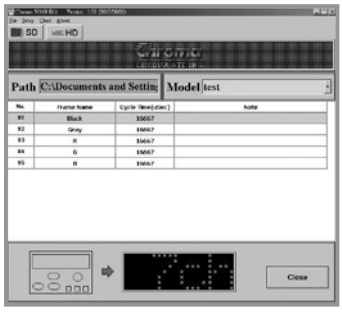
58168 is a high C/P ratio Shorting Bar Pattern Generator especially designed for small size LCD cell inspection. The exclusive modularized architecture provides the unique implement of inspections by "1 instrument, 4 Colonization", which provide 4 users 4 OP boxs to operate the only one 58168 instrument simultaneously but each one of them feel like that they own a whole instrument without interferenced by others. 58168 is truly suitable in low cost application display field.

58168 works with 0.5 μs high-resolution time unit to edit the output waveforms of Data channels. All channels of each model are edited in PC's software and saved to SD card, which is capable of more than 500 models . Fast duplication of SD which is easy in PC provide the engineer with efficiency with the lack of network. In addition no PC is required while 58168 operates ensures low power consumption.

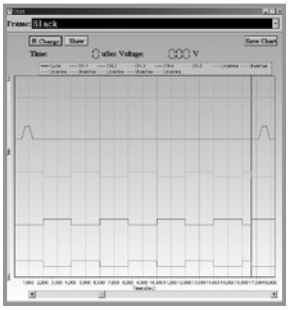
4 Colonization by 4 OP BOX



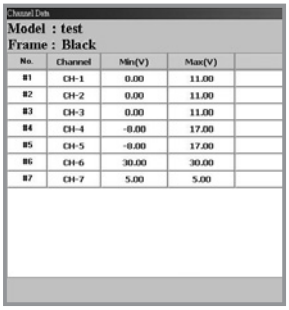
SPECIFICATIONS			
Model	**58168**		
Power source voltage	110/220VAC(50/60Hz)		
Electric power consumption	Main unit: Maximum 200Watt		
Storage temperature	0 ~ 75°C		
Operation humidity temperature	5 ~ 35°C		
Operation humidity	35 ~ 90% RH (No condensation)		
Dimension of Main unit (HxWxD)	190 x 320 x 370 mm		
Weight	Approximately 9.5kg		
Type of signal	**Signal name**	**Number of signal**	**Voltage range**
Data	Data1, Data2, Data3 Data4, Data5, Data6	6*4	-40V~+40V
Specifications of Inspection Signal			
General			
Time base	0.5 μs		
Frame period	8000us ~1000000us		
Total data output power	75 Watt		
Source signal generator			
Item	Content		
Output	-40V ~ +40V / 120mA		
Voltage accuracy	±2% ±0.1V		
Time base	0.5 us		
Number of output	24		
Load Regulation	2% (full load, 1.8m cable)		



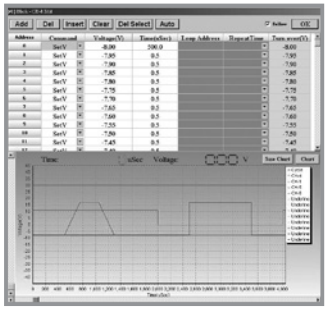
Channel Editing Screen



Waveform of all channels Screen



Channel Information Screen



Channel Editing Screen

ORDERING INFORMATION

58168 : LCD Shorting Bar Pattern Generator with 4 Colonization
A581600 : Conversion board box



Conversion board box

All specifications are subject to change without notice.



LVDS | Full HD 1080

KEY FEATURES

- LVDS / TTL (Optional) output
- Display size up to WQXGA 2560 x 1600 @60Hz max
- Data Clock: Single 135MHz / Dual 270MHz / 4 Link 330MHz max
- Data Bits: 6/8/10bit programmable max
- Vdd output 2V~13V/3.5A programmable max
- Vbl output 10V~25V/10A programmable max
- Vbl/Vdim Dimming adjustable 0~7V, 1.1V step
- Power OCP protection
- Up / down load function
- Timing / Pattern Auto / Manual Run
- Low cost
- Customer design for user define

* All specifications of 27010 series are customer design, please contact sales directly for more details.

To comply with the current digital standard signal, LCD and digital display for test application, the Pattern Generator Card is a low cost and high value-added product that can provide LCD manufactures for In-line or Batch oven of aging test.

This 27010 series LCM Pattern Generator Card can be output with LVDS signal. For the multimedia applications, the 27010 series can be support TTL(optional). By supporting the display screen up to WQXGA, it is capable of performing LCD pixel inspection during production, OLB test, burn-in test, combination test, final test and life test widely.

The PG Card uses Programmable Logic Device which is the pattern generator for LCD MODULE test. It supports VGA~WQXGA, 1 Link / 2 Link / 4 Link and 30 sets Timings, 64 sets Patterns and 30 sets Programs max for testing.

The signal transmission using the method of replacement output to panel depends on the interface the LCD Module installed for the signal (LVDS, TTL) used. As to power rating, its DC support 5~15V max input power and 3.3~12A max output power is applicable to signal and LCD Module. Furthermore the required pattern, Color and other test functions can be set manually via the system control.

The PG card is equipped with a unique window-based editing software. Its convenient operating environment allows users to set timings, create patterns, and edit programs as well as control the power on/off timings of the PG Card via PC. The created files can be uploaded or downloaded from data buffer to PG Card easily for modification. This useful and practical design enables the software and testing parameter of PG Card be updated efficiently and optimizes its functions. Under this series could be customer design by user define.

ORDERING INFORMATION

27010 : Pattern Generator Card
2CH Signal 81MHz/Dual 162MHz
2701007 : Pattern Generator Card
2CH Signal 90MHz/Dual 180MHz
2701007 10 bit : Pattern Generator Card
2CH Signal 135MHz/Dual 270MHz
2701020 : Pattern Generator Card
4CH 330MHz/10bit
A270100 : Data Bank
A2701005 : Remote Keypad
A270114 : Hub
A270121 : External Control Box
A270143 : LVDS to eDP Conversion Board

27010 Series Pattern Generator Card

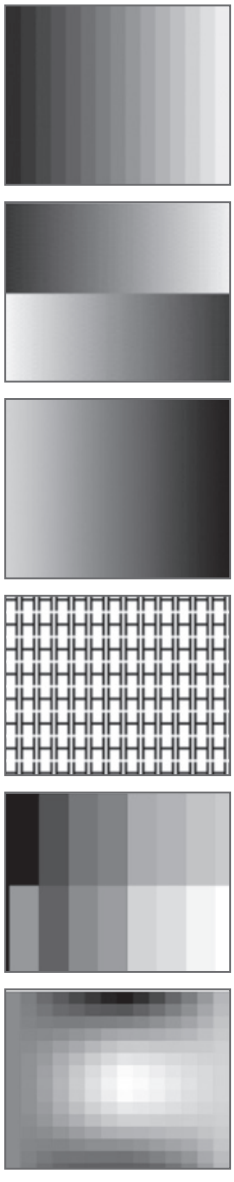


SPECIFICATIONS					
Model		**27010**	**2701007**	**2701007 10 bit**	**2701020**
LVDS Interface					
Resolution		up to 1600 x 1200/60Hz	up to 1920 x1080/60Hz	up to 2560 x1600/60Hz	up to 2560 x1600/60Hz
Pixel Rate	1 Link	81MHz	90MHz	135MHz	135MHz
	2 Link	162MHz (81MHz x 2)	180MHz (90MHz x 2)	270MHz (135MHz x 2)	270MHz (135MHz x 2)
	4 Link	-	-	-	330MHz
Color Depth		6/8 bits	6/8 bits	6/8/10 bits	6/8/10 bits (10bit for gray scale)
Output Mode		2 Channel x 2	2 Channel x 2	2 Channel x 2	2 Channel x 2 4 Channel x 1
I/O		Box Head 26pin	Box Head 34pin	Box Head 40pin	Box Head 50pin
Power Requirement					
Input (Vdd)		15V/3A	15V/3A	15V/3A	16V/10A
Output (DC)		Vdd:3.3,5V/1.5A Vbl:12,24V/6A Vif:3.3,5V	Vdd:3.3,5,12V/2.5A Vbl:12,24V/6A max Vif:3.3,5V	Vdd:3.3~12V/3A Vbl:12~24V/6A Vif:3.3/5V/1A	Vdd:3.3~13V/4A max Vbl:10~25V/26A Vif:5V
Communication Interface		RS-485	RS-485	RS-485	RS-485
Vdim		-	0~7V/0.1 step	0~7V/0.1 step	0~7V/0.1 step
Inverter Voltage		On:5V, Off:0V	On:5V, Off:0V	On:5V, Off:0V	On:5V, Off:0V
Power Sequence Resolution					
Turn-on (Vdd/Signal/Vbl)		1ms	1ms	1ms	1ms
Turn-off (Vdd/Signal/Vbl)		1ms	1ms	1ms	1ms
Operation					
Pattern Control		64 sets auto/manual (32 sets by editing)	64 sets auto/manual (30 sets by editing)	64 sets auto/manual (30 sets by editing)	64 sets auto/manual (30 sets by editing)
Timing Control		16 sets by editing (8 sets by DIP switch)	30 sets by editing	30 sets by editing	30 sets by editing
Program Control		16 programs (total 3553 sequence)	30 sets by editing	30 sets by editing	30 sets by editing
Environment					
Operation Temperature		0~60°C	0~60°C	0~60°C	0~60°C
Storage Temperature		-20~80°C	-20~80°C	-20~80°C	-20~80°C
Humidity		0~80%	0~80%	0~80%	0~80%
Dimension					
HxWxD		180x90x25 mm	180x140x30 mm	180x140x30 mm	210x230x60mm
Weight		330g	845g	845g	1870g



KEY FEATURES

- LVDS / TTL (Optional) / TMDS (Optional) output
- Pixel rate up to 162 MHz (LVDS x 2 Link)
- Display size up to UXGA (1600 x 1200)
- 16 timings selecting and editing
- 64 patterns library (32 sets by editing)
- 16 programs (total 3553 sequence)
- 12V / 5V output for backlight
- 12V / 5V / 3.3V output for Vdd
- Power on sequence for signal / Vdd
- Timing / Pattern editing via PC
- Up / down load function
- Timing / Pattern Auto / Manual Run
- Low cost



LVDS Power

To meet the high accuracy and low price requirements for LCM test device, Chroma 27011 that integrates the signal and power source provide a complete test solution for LCD Module. Its LVDS / TTL signal source fully complies with the digital signal standard, meanwhile with the 12V/5V/3.3V DC source output it is able to supply power to VDD/Backlight for LCM test without obtaining external power source. Equipped with the interface of single key to switch the timing/pattern/program rapidly for test in auto or manual mode, the 27011 is able to provide a direct and convenient test environment for LCM by its complete hardware configuration and easy operation.

To fulfill the standard test signal requirements of various panels, this device supports LVDS signal with optional TTL signal available for use. It has 16 timings, 64 patterns, auto image rotation display system and multiple test functions settings. In addition an editor software is available for editing timing / pattern / program at PC site to create a product specific test program. The design of signal and power source integration for 27011 allows it to be utilized extensively in R&D/Quality Assurance/ Quality Inspection/After Sales Services/Sales fields for LCM related tests.

The Programmable Logic Device is used in 27011 as the image generator to test the LCD Module. It supports VGA, SVGA, XGA, SXGA, UXGA and 1 Link / 2 Link digital signal output, also it has quartz oscillator built in to supply stable test signals as the standard signal source to the Device Under Test. This test device provides LVDS signal primarily, however, users can purchase the optional TTL signal conversion board for use to cope with the LCM features.

Besides the power source input of AC 90~250V, it has the 12V / 5V / 3.3V DC power switch required by the LCM Vdd in the market and the 12V / 5V power for Backlight Inverter. Moreover, it has Signal/Vdd power on sequence to fit in the LCM Turn On test sequence.

As regards operation, 27011 can switch the Timing / Pattern and Program by the Mode key on the front panel directly to show the status on a 7-segament display. Users can select the required Timing and switch it to Pattern mode by pressing the Mode key, or switch it to program; and then conduct the test automatically or manually. It can execute tests easily and quickly with the convenient operation method and multiple function keys.

ORDERING INFORMATION

27011 : LCM Tester
A270100 : Data Bank
A270111 : LVDS to TTL Signal Adapter
A270112 : TTL to TMDS Signal Adapter



A270111



A270112



A270100

SPECIFICATIONS			
Model	**27011**		
Output	LVDS		
Option	TTL (A270111) / TMDS (A270112)		
Pixel Range			
Pixel Rate	1 Link	2 Link	
25.175MHz	VGA (25.175MHz)	-	
40MHz	SVGA (40MHz)	-	
32.5MHz	XGA (65MHz)	XGA (65MHz)	
54MHz	-	SXGA (108MHz)	
81MHz	-	UXGA (162MHz)	
Signal Interface			
Signal	LVDS (6 or 8 bit)		
Connector	Box Header 26 Pin Right Angle		
Power Requirement			
Input (AC)	1Ø 110~240V ±10% V_{LH}, 47~63Hz		
Output (DC)	5V/2.5A max. and 12V/4A max. (for Backlight) 12V/5V/3.3V (for Vdd)		
Power Sequence Resolution	Main Board PWR	Vdd	Signal
Turn-on	1ms	1ms	1ms
Turn-off	-	1ms	1ms
Operation			
Pattern Control	64 sets auto / manual (32 sets by editing)		
Timing Control	16 sets auto / manual		
Program Control	16 programs (Total 3553 sequence max.)		
Environment			
Operation Temperature	0 ~ 60˚C		
Storage Temperature	-20 ~ +80˚C		
Humidity	0 ~ 80 %		
Dimension (H x W x D)	84.4 x 103.5 x 232.2 mm / 3.32 x 4.07 x 9.14 inch		
Weight	1.4 kg / 3.08 lbs		

All specifications are subject to change without notice.



LVDS Power

KEY FEATURES

- Support LCD TV Module Testing
- LVDS signals output
- TTL (Optional) signals output
- Pixel rate up to 162 MHz (LVDSX2 Link)
- Display size up to 1920X1080 @ 60Hz
- 16 timings for selection
- 64 patterns library
- 16 programs (total 3553 sequence)
- 24V / 12V / 5V output for Vbl
- 12V / 5V / 3.3V output for Vdd
- Power on sequence for signal / Vdd
- Timing / Pattern editing & download
- Timing / Pattern Auto / Manual Run
- Low cost

To meet the high accuracy and low price requirements for LCM TV test device, Chroma 27012 that integrates the signal and power source provide a complete test solution for LCD Module. Its LVDS / TTL(Option) signal source fully complies with the digital signal standard, meanwhile with the 24V/12V/5V/3.3V DC source output it is able to supply power to VDD/ Backlight for LCM test without obtaining external power source. Equipped with the interface of single key to switch the Timing/Pattern/Program rapidly for test in auto or manual mode, the 27012 is able to provide a direct and convenient test environment for LCM TV by its complete hardware configuration and easy operation.

To fulfill the standard test signal requirements of various panels, this device supports LVDS signal with optional TTL signal available for use. It has 16 timings, 64 patterns, auto image rotation display system and multiple test functions settings. In addition an editor software is available for editing Timing/Pattern/Program at PC site to create a product specific test program. The design of signal and power source integration for 27012 allows it to be utilized extensively in R&D/Quality Assurance/ Quality Inspection/After Sales Services/Sales fields for LCM related tests.

The Programmable Logic Device is used in 27012 as the image generator to test the LCD TV Module. It supports VGA~UXGA and 1 Link/2 Link digital signal output, also it has quartz oscillator built in to supply stable test signals as the standard signal source to the Device Under Test. This test device provides LVDS signal primarily, however, users can purchase the optional TTL signal conversion board for use to cope with the LCM TV features.

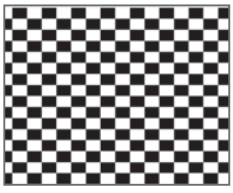
Besides the power source input of AC 100V~240V, it has the 12V/5V/3.3V DC power switch required by the LCM Vdd in the market and the 24V/12V/5V power for Backlight Inverter. Moreover, it has Signal/Vdd power on sequence to fit in the LCM TV Turn On test sequence.

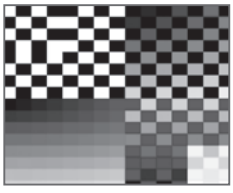
As regards operation, 27012 can switch the Timing/Pattern and Program by the Mode key on the front panel directly to show the status on a 7-segament display. Users can select the required Timing and switch it to Pattern mode by pressing the Mode key, or switch it to program for test program editing; and then conduct the test automatically or manually. It can execute tests easily and quickly with the convenient operation method and multiple function keys.

ORDERING INFORMATION

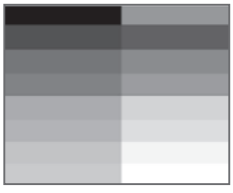
27012 : LCM Tester
A270100 : Data Bank
A270103 : Editor Software
A270111 : LVDS to TTL Signal Adapter
A270112 : TTL to TMDS Signal Adapter

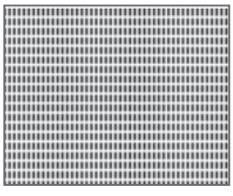














A270111



A270112



A270100

SPECIFICATIONS			
Model	**27012**		
Output	LVDS		
Option	TTL (A270111) / TMDS (A270112) / Data Bank (A270100)		
Pixel Range			
Pixel Rate	1 Link up to 81 MHz	2 Link up to 162 MHz	
25.175MHz	VGA (25.175MHz)	-	
40MHz	SVGA (40MHz)	-	
32.5MHz	XGA (65MHz)	XGA (65MHz)	
54MHz	-	SXGA (108MHz)	
81MHz	-	UXGA (162MHz)	
Signal Interface			
Signal	LVDS (6 or 8 bit)		
Connector	Box Header 34 Pin (Compatible with 27011)		
Power Requirement			
Input (AC)	1Ø 110~240V ±10% V_{LH} 47~63Hz		
Output (DC)	5V / 1.5A ; 12V / 7A ; 24V / 6.5A max. (for Vbl) ; 12V / 5V / 3.3V / 3.5A (for Vdd)		
Power Sequence Resolution	Vdd	Signal	Vbl
Turn-on	1ms	1ms	1ms
Turn-off	1ms	1ms	1ms
Operation			
Pattern Control	64 sets auto / manual (32 sets by editing)		
Timing Control	16 sets auto / manual		
Program Control	16 programs (Total 3553 sequence max.)		
Environment			
Operation Temperature	0 ~ 40˚C		
Storage Temperature	-20 ~ +70˚C		
Humidity	0 ~ 70 %		
Dimension (H x W x D)	69.6 x 310.5 x 273 mm / 2.74 x 12.22 x 10.75 inch		
Weight	3.3 kg / 7.27 lbs		

All specifications are subject to change without notice.



KEY FEATURES

- LVDS Signals support
  - 1 / 2 / 4 Channel output
  - Color depth 6 / 8 / 10bits
  - 2 output port
  - Pixel rate up to 330MHz (1 Link 135MHz / 2 Link 270MHz / 4 Link 330MHz)
- The Resolution up to 2560x1600
- 30 sets Timing / Power / Program selection
- 64 sets Pattern
- Vdd output 3.3~13V / 3.5A programmable
- Vbl by pass outside DC source
- DC Power protection OCP
- EDID Read / Write / Compare
- 10 sets EDID data store
- Auto / Manual Pattern switch
- Auto Pattern switch delay time setting
- Power on sequence for signal / Vdd / Vbl (External)
- RGB Signal reverse Hot Key
- Control by RS-232

Chroma 27013 is a portable tester that supports high resolution and large scale LCM with the signals, power supply and test patterns required for LCD Module test.

Users can edit various timing parameters and patterns on PC via software applications. Auto execution or one-key manual control on the device can switch the Timing / Pattern / Program mode rapidly. The easy and convenient operation along with compound key usage made the 27013 LCM Tester most applicable for R&D/ Quality Assurance/ Quality Verification/ Services/ Sales areas for LCM related tests.

27013 LCM Tester contains the following features:

(1) Comply with Full HD 120Hz Test: The 27013 LCM Tester supports LVDS signal with pixel rate 330MHz (1 Link 135MHz/2 Link 270MHz/4 Link 330MHz) that can test the screen resolution up to 2560x1600 pixels to meet the test requirements for standard test signal of various panels today and Full HD 120Hz (Double frame rate.)

(2) Providing, Measuring & Determining Output Power: The system provides 3.3~13V / 3.5A VDD output power for users to set auto test by LCM's electrical features. Each output channel is able to simulate the timing relationship of power on/off and over voltage protection function. Protection occurs when the power parameter exceeds the predefined range.

(3) Complete Test Patterns: The large capacity of memory provides 30 Timings/64 Patterns with many built-in standard test patterns. The 27013 not only can generate the patterns of 10Bit grayscale, pure color, stripes, text and cross.

(4) Separate RGB Signal Control: The panel of 27013 LCM Tester has several rapid one-key operation modes which include: R, G, B & Inversion signal separation and resume – it can separate or resume one of the RGB signals in the display screen; while the Inversion reverses the pattern display on the screen.

Timing / Pattern / Program / Power mode – users can create the test program specially for UUT by the PC software application and conduct one-key operation from the panel directly.

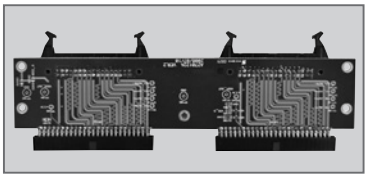
The VDD rapid key is able to switch the built-in 3 fixed voltage settings 3.3V/5V/12V directly to meet the power output conditions for most LCM tests rapidly.

(5) RS-232 Interface for Data Upload/ Download: 27013 LCM Tester with PG MASTER software can edit the test programs and upload/ download edited data through the RS-232 interface data control box. Users can update test programs on different testers via the data control box directly without controlling by PC to save the time effectively.

Chroma 27013 carried complete test functions with highly accurate signals and power source. It adopts 20x4 LCD screen in compact size with friendly user interface, and its small-scale design can be used flexibly on various tests to satisfy the work unit that needs to move often. The powerful function and fast test speed make it the best tool for production test.

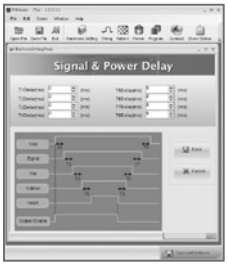
ORDERING INFORMATION

27013 : LCM Tester
A270122 : Conversion Board 50pin to 34pin

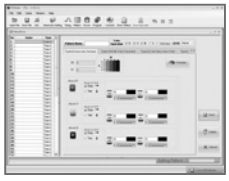


A270122

PG Master Software



Hardware Setting



Pattern Setting



Power Setting



Timing Setting

SPECIFICATIONS			
Model	**27013**		
Output	LVDS		
Option	DataBank		
LVDS interface			
Resolution	Up to 2560x1600 / 60Hz , 1920X1080 / 120Hz		
Pixel Rate	1 link up to 135MHz / 2 link up to 270MHz / 4 link up to 330MHz		
Color Deep	6/8/10bits Programmable (10bit for gray scale)		
Output mode	2 Channel x2 / 4 Channel x1		
Connector	Box Header 50Pin		
Power Requirement			
Input (AC)	1Ø 110~240V ±10% V_{LH} 47~63Hz		
Output (DC)	Vdd : 3.3V~13V, 3.5A programmable Vbl : Internal 12V / 24V 4A Max Extenal 25V / 26A Max		
Vdim	0V~7V Step 0.1V		
Inverter Voltage	On: 5V , Off: 0V		
Power Sequence Resolution			
	Vdd	Signal	Vbl
Turn-on	1ms	1ms	1ms
Turen-off	1ms	1ms	1ms
Operation			
Pattern Control	64 sets auto/manual (30 sets by editing)		
Timing Control	30 sets by editing		
Program Control	30 sets by editing		
EDID Application			
EDID 1	Read / Write / Compare		
EDID 2	Read / Write / Compare		
EEDID	Read / Write / Compare		
EDID store	10 sets EDID Data store		
Environment			
Operation Temperature	0~40°C		
Storage Temperature	-20~70°C		
Humidity	0~80%		
Dimension (H x W x D)	69 x 309.3 x 271.5 mm / 2.74 x 12.18 x 10.69 inch		
Weight	2.9 kg / 6.39 lbs		

All specifications are subject to change without notice.



Model 29130
29132
29133 CE
29135 CE

KEY FEATURES

- For full HD measurement (29132/29133/29135)
- True Color computer base LCM Testing
- LVDS/TTL(OPT)/TMDS signals support (29130 LVDS 8 bit only)
- Display Up to WUXGA @ 60Hz
- Precise programmable DC source
- Extension Power control (option)
- Power protection OVP/OCP/UVP/UCP
- Voltage/Current measurement
- GO/NOGO fast measurement
- Easy for Timing/Pattern/Program editing
- Unlimited Timing/Pattern/Program storage
- EDID read/write/compare
- LCM failure code editing & record
- Cross Mark for cell checking
- JPG/BMP/AVI/MPEG file support
- Keypad operation
- Special I/O
- Network management function (option)
- Production line process control and data collection

The Chroma 29130/29132/29133/29135 LCM Automatic Test System (ATS) which is structured in computer based system with powerful on-line network function and easy-to-use interface is designed to fulfill the key requirements of LCM tests and the production line management theory from factory. By integrating the video generator, multi-channel precision power supply and process control unit, the LCM ATS is capable of providing complete test solutions for LCM signals, patterns and electricity

The test programs performed by LCM ATS tasks can be edited by the embedded test editor. The mouse and remote keypads used by the test program editor give the production line a most complete and convenient test mode to expedite the productivity. The test functions Chroma 29130/29132/29133/29135 LCM ATS have are:

RS-232 USB CE LVDS Power Full HD 1080

(1) Test Program Editor: It contains the parameters settings of power Turn On/ Turn Off, scanning timing, pattern, over and under voltage/ current protection (OCP/OVP/UCP/UVP), and real-time voltage Ramp Up/Ramp Down based on the LCM electricity specifications for accurate and comprehensive tests.

(2) Screen Quality Test: Besides the built-in standard patterns, users can define the geometry patterns that composed of various ICONs; moreover, the natural picture file with BMP/JPG filename extension can be imported. In addition the animation function is available for the LCD Response time test. All patterns can be scaled automatically according to the LCM resolution to facilitate the pattern editing preview function.

(3 Timing Setting and Pattern Editing: It provides VESA timings and patterns; furthermore, the user-defined test timings and patterns can be created as per request. The LVDS / TMDS / TTL (OPTION) signals required by LCM are offered as well.

(4 Output voltage, current measurement and judgment: The system has 3 programmable DC power outputs 15V/4A, 16V/1A and 25V/3A and A291300 Ext. Power 25V/20A or A291301 Ext. Power 25V/10A to provide the power source required by LCM control chip, driver chip and backlight module through the RS-232 interface.

(5 Test Methods: Mouse and keypad are used to control the cross mark for cell checking and log during test, also the LCM defect types can be built by the test patterns that minimize the test time intensely. Thus the test can be done rapidly no matter it is applied in R&D or production line.

(6) Network Management Control(Option): The system administrator is able to perform the test program maintenance and management, hardware configuration, data upload/download, computing and EDID read/write/compare network on-line function via the network interface for production status control at the first time as well as analysis of production, efficiency and yield rate.

The Chroma 29130/29132/29133/29135 LCM ATS utilizes the computer based system to integrate the signal source /power source for LCM patterns and electricity specification tests, also equips with easy-to-use system program for Timing/Pattern/ Power/Program editing, mouse or keypad for LCM defect log, system self test for electricity judgment and rapid selection for defect types greatly reduce the test time in production line.

LCM Master II Software



Main Test Screen

- Model and Test Program Mapping Setting
- System layout and on-line status for factory production line
- Visualization management in factory to show real time information
- Real time production line fail rate display, warning appears when the failure rate is too high
- VDD/VBL voltage/current setting, real time reading for 2D display, and high speed auto voltage/current maximum/minimum judgment and warning
- Display all of the information required including, model, test date and time, detected date, production area, fail status, and etc.



Pattern Edit Screen

- More than 23 types of ICON for patterns creation
- Various ICON composition for logic computing
- Support BMP / JPG file format
- Various resolution auto scaling
- Support animation
- Real time preview function



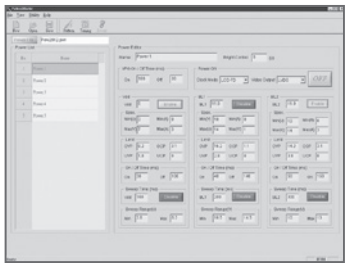
Timing Edit Screen

- H / V Display, Sync, Back-Porch, Front-Porch,setting
- H / V Sync Polarity ± setting
- LVDS / TMDS / TTL output setting
- Pixel rate setting
- 1 / 2 Clock Mode, 6 / 8 / 10 bit link setting (29130 6 / 8 bit link setting only)
- Bit Rotate setting

Battery Test & Automation Solution
Photovoltaic Test & Automation Solution
Semiconductor/ IC Test Solution
Laser Diode Test Solution
LED/ Lighting Test Solution
FPD Test Solution
Video & Color Test Solution
Automated Optical Inspection Solution
Power Electronics Test Solution
Passive Component Test Solution
Electrical Safety Test Solution
General Purpose Test Solution
Thermoelectric Test & Control Solution
PXI Test & Measurement Solution
Manufacturing Execution Systems Solution

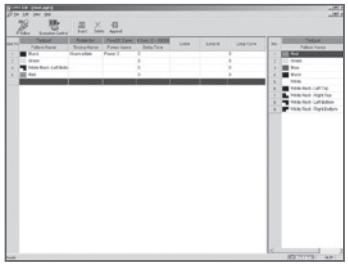
All specifications are subject to change without notice.

• Continued on next page ➟



Power Edit Screen

- 3 channel DC source setting
- OVP / OCP / UVP / UCP setting
- Vdd / Signal / Vbl On / Off sequence setting
- Vdd / Vbl / Idd / Ibl spec judgment
- Power Sweep setting



Test Program Edit Screen

- Provide TIMING / PATTERN / POWER for LCM test programs creation
- Provide Loop function
- Provide Pre-test function

ORDERING INFORMATION

29130 : LCM Automatic Test System
29132 : LCM Automatic Test System
29133 (CE) : LCM Automatic Test System
29135 (CE) : LCM Automatic Test System
A270111 : LVDS to TTL Signal Adapter
A291300 : Extension Power 20A
A291301 : Extension Power 10A
Network management function of software

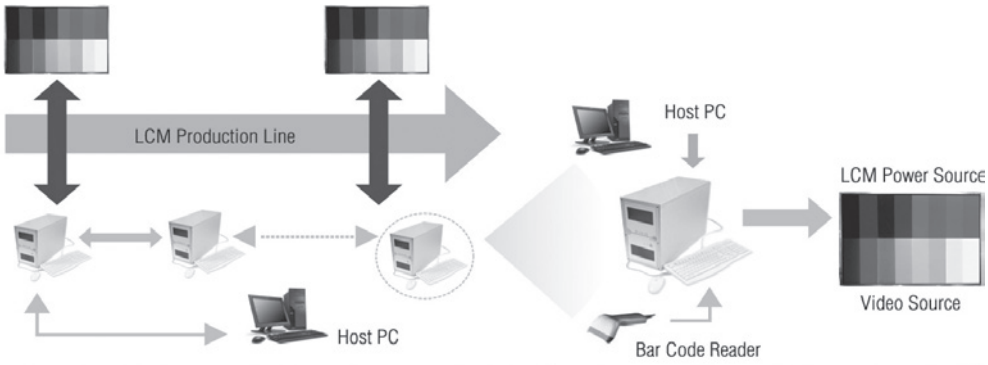


A291300/A291301



A270111

The application of LCM ATS



The Diagram of Communication | The System of Application

SPECIFICATIONS				
Model	**29130**	**29132**	**29133 (CE)**	**29135 (CE)**
LVDS Interface				
Resolution	640x480; 800x600; 1024x768; 1152x864; 1280x768; 1280x960; 1280x1024; 1400x1050; 1600x900; 1600x1024;1600x1200; 1920x1080; 1920x1200; 1280x800; 1366x768;1280x854			
Pixel Rate	1 link 90 / 2 link 162MHz		1 link 135/2 link 162MHz	1 link 135/2 link 270MHz
Signal	6 / 8 bit	6 / 8 / 10 bit (10 bit for Gray Scale)		
H,V Sync Polarity	+ or -			
Video signal output can turn ON OFF by software				
DVI Interface				
Resolution	640x480; 800x600; 1024x768; 1152x864; 1280x768; 1280x960; 1280x1024; 1400x1050; 1600x900; 1600x1024;1600x1200 ; 1920x1080 ; 1920x1200; 1280x800; 1366x768;1280x854			
Pixel Rate	Up to 162MHz			
Interlace	Non-Interlace	Interlace or Non-Interlace		
H,V Sync Polarity	+ or -			
Video signal output can turn ON OFF by software				

Internal Power Source			
Channel	**Channel 1**	**Channel 2**	**Channel 3**
Output Voltage	2 ~ 15V	3 ~ 16V	3 ~ 25V
Output Current	0 ~ 4A	0 ~ 1A	0 ~ 3A
Programmable Resolution			
Output Voltage	5mV	5mV	12.5mV
Current Protect	1mA	1mA	1mA
Meter Ratings			
Read back Voltage	0 ~ 20V	0 ~ 20V	0 ~ 30V
Read back Current	0 ~ 5A	0 ~ 2A	0 ~ 4A
Meter Resolution			
Read back Voltage	2mV	2mV	4mV
Read back Current	0.3mA	0.2mA	0.4mA
On / Off Sequence Resolution			
Turn-On/Off	1ms	1ms	1ms
V-dim function			
Vdim	PWM function Freq: 100~500Hz / 1Hz step; Duty: 0%~100%; Level: 5V / 3.3V programmable Analog function 0~8V / 0.1V step		
Others			
AC Input Voltage	1Ø 110~240V ±10% V_{LH}		
AC Input Frequency	47~63 Hz		
Operation Temperature	10~30°C		
Operation Humidity	Max. 70%		
Extension Power			
Channel	**Channel 4**		
Model	**A291300**	**A291301**	
Output Voltage	10 ~ 25V		
Output Current	0 ~ 20A	0 ~ 10A	
Programmable Resolution			
Output Voltage	20mV		
Current Protect	8mA		
Meter Ratings			
Read back Voltage	0 ~ 30V		
Read back Current	0 ~ 25A	0 ~ 12A	
Meter Resolution			
Read back Voltage	10mV		
Read back Current	2mA		
On / Off Sequence Resolution			
Turn-On/Off	1ms		

All specifications are subject to change without notice.



RS-232 USB CE LVDS 120Hz Power Full HD 1080 LED Backlight

KEY FEATURES

- LCM signal and power source test systems
- Easy for Timing/Pattern/Program editing
- Suitable for Full HD measurement
- The Resolution up to 2560x1600
- LVDS 4 channel output
- MPEG/AVI Playback
- High accurate programmable DC source
- Power source for LED backlight (OPT)
- Output voltage and current measurement
- Power protection OVP/OCP/UVP/UCP
- EDID read/write/compare
- Cross coordinate defect positioning function
- Network management function (OPT)
- In-line process control and data collection
- Operator authority control
- GO/NOGO fast measurement
- High efficient GUI for easy operation

The technology development of liquid display has been moving toward the features of large scale, high quality, high contrast and fast dynamic response recently that made the Full HD (1920X1080) high resolution specification become a new mainstream in the market. In order to meet the test requirements of today's industries, Chroma 2915 LCM ATS is structured in modulized with integrated signals and power source. The powerful on-line network function and easy-to-use interface are equipped to fulfill the test requirements such as all kinds of standard signal sources, test patterns and voltage/current measurements for various sizes of LCM.

This ATS provides LVDS signals and users can set the settings through mouse and Remote Keypad in accordance with the LCM features to give the production line a most complete and convenient test mode to expedite the productivity. The test functions Chroma 2915 LCM ATS have are:

(1) Modulized Design: To cope with the test requirements of various sizes panels, the design concept of modulization is applied to fit in the specifications of different signals and power modules for application.

(2) Test Program Editor: It contains the parameters settings of power Turn On/ Turn Off, scanning timing, pattern, over and under voltage/ current protection (OCP/OVP/UCP/UVP), and real-time voltage Ramp Up/Ramp Down based on the LCM electricity specifications for accurate and comprehensive tests.

(3) Screen Quality Test: Besides the built-in standard patterns, users can define the geometry patterns that composed of various ICONs; moreover, the natural picture file with BMP/JPG filename extension can be imported. In addition the animation function is available for the LCD Response time test. All patterns can be scaled automatically according to the LCM resolution to facilitate the pattern editing preview function.

(4) Timing Setting and Pattern Editing: The ATS allows users to define the test timings and patterns for application as need and provides LVDS signals for comprehensive LCM tests by setting the signal/ power supply activation time. Other signals like TMDS (option) can also be applied for testing.

(5) Output voltage, current measurement and judgment: This system has multiple modulized external power supplies that can be used for different sizes of panels / LED backlight constant current sources (option) and to provide the power source required by LCM control chip, driver chip and backlight module through the USB interface. Also Provide the optional of multi-channel metering system for readback applications.

(6) Test Methods: Mouse and keypad are used to control the cross mark for cell checking and log during test, also the LCM defect types can be built by the test patterns that minimize the test time intensely. Thus the test can be done rapidly no matter it is applied in R&D or production line.

(7).Network Management Control: The system administrator is able to perform the test program maintenance and management, hardware configuration, data upload/download, computing and EDID read/write/compare network on-line function via the network interface for production status control at the first time as well as analysis of production, efficiency and yield rate.

Chroma 2915 LCM ATS integrates the signal source/power source for LCM patterns and electricity specification tests. The user-friendly interface along with simple system programs can be used to edit the Timing/Pattern/Power/ Program while the mouse or keypad can be used to log the LCM defects. Moreover, the PC based platform can fully utilize the network function for data collection and analysis that makes it most applicable for production line management.

LCM Master II Software



Main Test Screen

- Model and Test Program Mapping Setting
- System Layout and on-line status for factory production line
- Visualization management in factory to show real time information
- Real time production line fail rate display, warning appears when the failure rate is too high
- VDD/VBL voltage/current setting, high speed auto voltage/current maxi
- Display all of the information required including model, test date and time, detected date, production area, fail status, and etc.



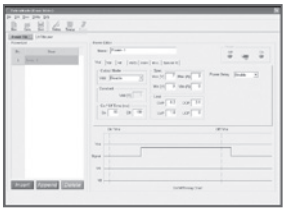
Pattern Edit Screen

- More than 23 types of ICON for patterns creation
- Various ICON composition for logic computing
- Support BMP / JPG file format
- Various resolution auto scaling
- Support animation
- Real time preview function



Timing Edit Screen

- H / V Display, Sync, Back-Porch, Front-Porch, setting
- H / V Sync Polarity ± setting
- LVDS / TMDS / TTL / ANALOG output setting
- Pixel rate setting
- Clock Mode, 6 / 8 / 10 bit link setting
- Bit Rotate setting



Power Edit Screen

- 8 channel DC source setting
- OVP / OCP / UVP / UCP setting
- Vdd / Signal / Vbl On/Off sequence setting
- Vdd / Vbl / Idd / Ibl spec judgment
- Power Sweep setting

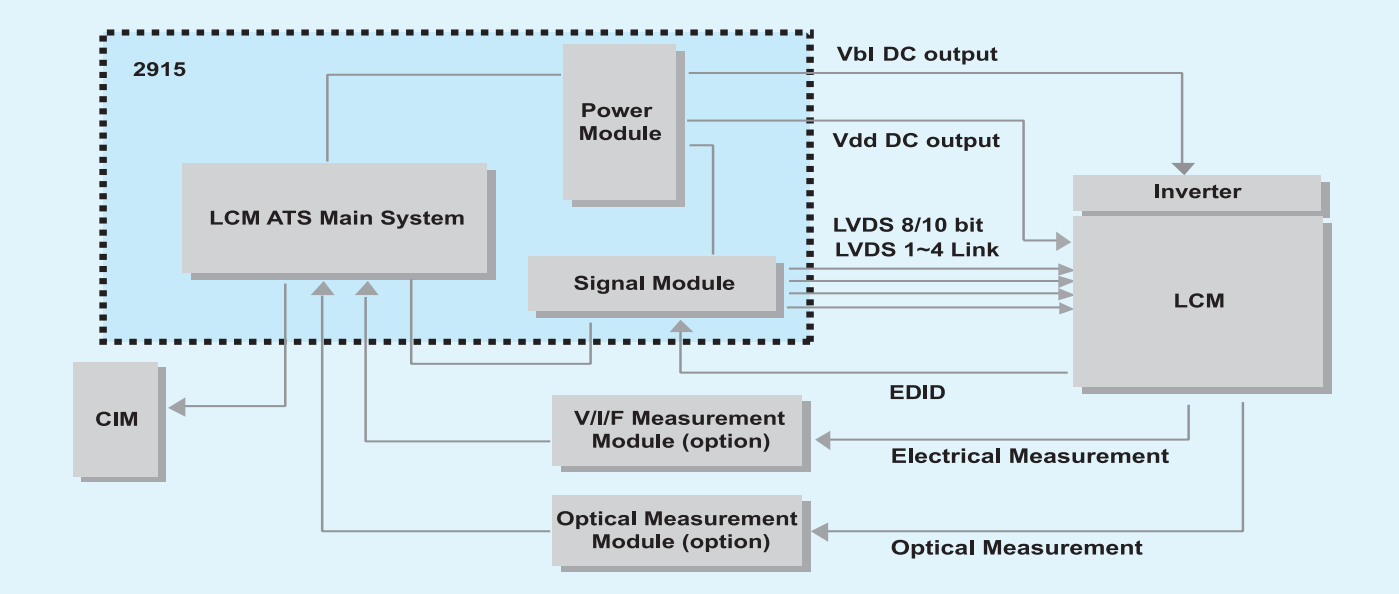


Test Program Edit Screen

- Provide TIMING / PATTERN / POWER for LCM test
- Provide Loop function
- Provide Pre-test function

• Continued on next page ➡

2915 System Application Block Diagram



SPECIFICATIONS

Model	2915 (CE)
LVDS Interface	
Resolution	640x480; 800x600; 1024x768; 1152x864; 1280x768; 1280x960; 1280x1024;1400x1050; 1600x900; 1600x1024; 1600x1200; 1920x1080; 1920x1200; 1280x800; 1366x768; 1280x854; 2560x1600
Pixel Rate	1 Link up to 135MHz 2 Link up to 270MHz (135MHzx2) 4 Link up to 297MHz (74.25MHzx4)
Signal	6/8/10 Bit and support bit rotate (10 Bit for Gray Scale)
H,V Sync Polarity	+ or -
Video signal output can turn ON OFF by software	

General specifications	
AC Input Voltage	1Ø 110~240V ±10% VLH
AC Input Frequency	47~63Hz
Operation Temperature	10~30˚C
Operation Humidity	Max 70%
Dimension & Weight	
2915 Main System	
H x W x D	150 x 320 x 422.6 mm / 5.91 x 12.6 x 16.64 inch
Weight	8 kg / 17.62 lbs
A291500 Signal module	
H x W x D	47 x 320 x 200.2 mm / 1.85 x 12.6 x 7.88 inch
Weight	2.2 kg / 4.85 lbs
A291510 Ext. Power module	
H x W x D	200 x 100 x 421.4 mm / 7.87 x 3.94 x 16.59 inch
Weight	4.6 kg / 10.13 lbs
2915 LCM ATS System (Main Unit+signal module+power module)	
H x W x D	200 x 420 x 422.6 mm / 7.87 x 16.54 x 16.64 inch
Weight	14.8 kg / 32.6 lbs

Power Source			
Channel	Channel 1	Channel 2	Channel 3~8
Output Voltage	2-20V	5-30V	0-5V
Output Current	0-4A	0-15A	0-1A
Programmable Resolution			
Output Voltage	20mV	20mV	-
Current Protect	5mA	20mA	-
Meter Ratings			
Read back Voltage	0-25V	0-35V	-
Read back Current	0-5A	0-20A	-
Meter Resolution			
Voltage	20mV	20mV	-
Current	5mA	20mV	-
On / Off Sequence Resolution			
Turn-On/Off	1 ms	1 ms	1 ms
I²C BUS Function			
SDA	3.3/5V/device select		
SCL	50~100KHz		
V-dim function			
Analog	Analog function 0~8/0.1V step		
V-pwm function			
Vpwm	Selectable 3.3/5V/FV		
Fout	100~15KHz		
Dout	0~100%1% Step		
SMBUS Function			
SDA	3.3/5V/device select		
SCL	10~100KHz		

ORDERING INFORMATION

2915 : LCM Automatic Test System
A291500 : Signal Module LVDS 135/270/297MHz
A291510 : Power Module 450W
A291511 : LED Backlight Tester
A291512 : Power Module 780W
Network Management Function of Software


A291500


A291511


A291510 / A291512

All specifications are subject to change without notice.



RS-232 USB CE LVDS 240Hz Power Full HD 1080 LED Backlight

KEY FEATURES

- LCM signal and power source test systems
- LVDS 4 channel output
- LVDS pixel rate Signal 150MHz, Dual 300MHz, 4 Link 600MHz
- The resolution up to 1920x1080/240Hz
- LVDS data Even/Odd switch support
- MPEG/AVI/GIF Playback
- Easy transfer pattern file to BMP file
- Output voltage and current measurement
- Output 8 channel DC Power
- Power protection OVP/OCP/UVP/UCP
- EDID read/write/Compare
- External control interface I²C/SMBUS/PWM individually
- Network function base on fast Ethernet (option)
- GO/NOGO fast measurement
- Operator authority control
- High efficient GUI for easy operation
- Production line process control and data collection

Chroma 2916 is a high performance, highly stable LCM Automatic Test System with modular design that can work with different signals and power modules flexibly to compose the test conditions required. It integrates the signals and power source with powerful network function and friendly interface that make it suitable for the production tests of various sizes LCMs including the standard signal source required, pattern inspection and voltage/current measurements. Chroma 2916 is an integrated LCM ATS equipment that is most applicable for production test, quality inspection or automatic system integration.

This equipment mainly supports LVDS signals with optional TMDS signal converters available for purchase to meet the standard test signals requirement for various panels and digital displays of today.

2916 LCM ATS has the following test functions:

LVDS Signal Output

It supports Signal, Dual, Quad Link output test with pixel rate up to 600MHz. The test screen resolution supports up to 1920x1080 @240Hz (refresh rate) that complies with the test specification of Full HD high multiple frequency transmission technology nowadays.

Editing Timing, Pattern & Test Sequence

Chroma 2916 supports standard JEIDA/VESA Timing Format. Users can select the timing parameters directly or build them as need.

Through the combination of Icon, the geometry patterns required for diversified tests can be built, also the natural patterns with the extension of BMP/JPG can be inputted. In the meantime it supports MPEG/AVI/GIF play format for animation and provides LCD Response time test. All patterns can be scaled based on the LCM resolution and previewed by pattern editor.

Besides the LVDS signals required for LCM test, the LCM electricity specification can be followed to provide parameter settings of Turn On/Turn Off, Scan Timing, Pattern, supply voltage/current high/low limit protection (OCP/OVP/UCP/UVP) and voltage Ramp Up/Ramp Down for the most complete and accurate LCM test.

Multiple High-Precision DC Power Supply

This system has many modulized external power supplies that are applicable for various kinds of panel sizes. It supports 8 sets of direct power output to provide the power required by LCM control chip, driver chip and backlight module via USB standard interface. Each output contains the actual readings of voltage and current. Its unique design can move the measurement point to load to prevent the transmission voltage drop also ensure the measurement accuracy reaches mV level for complete analysis of LCM working status. Meanwhile each output channel is able to simulate the timing relationship of power on/off, the Ramp-up/down waveform output and over voltage/current protection function. When the status exceeds the setting, in addition to the protection, LED and beeps are activated to remind users to fix it.

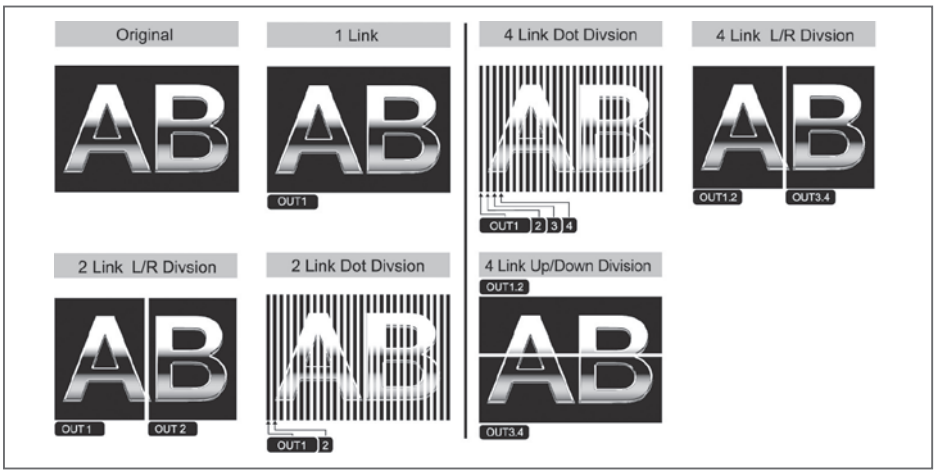
Environment & Network Control (Optional)

For production test, Chroma 2916 allows the administrator to preset the operator's access permission and unify the system management mode to reduce the human operation error. The user friendly graphic interface is very easy to use. Mouse and keypad can be utilized to control the cross coordinate defect positioning check and log during test. Moreover, the information including the LCM defect types and levels as well as all kinds of test report analysis are able to build and generate via the interface. Thus tests can be done in the fastest way to cut down the test time significantly no matter it is applied to R&D or production line.

To fulfill complete test application and management on the production line, network interface is used to maintain and manage the test programs, configure the hardware, upload/download data, compile statistics and write in EDID so that the system administrator can control the production status effectively from remote distance for productivity, efficiency as well as yield rate review. The system also has other external control interfaces such as I²C/SMBUS/PWM to extend the functions and enhance the system flexibility.

2916 LCM ATS is structured based on PC under the OS of Windows XP to give users an easy and familiar operating environment. With powerful software support and user-friendly operation interface to edit Timing/Pattern/Power/Program, the system is able to judge the electrical specification automatically and select the defect type rapidly to save the test time. In addition the test result can be exported to network easily for data gathering and analysis via network management function to provide an excellent solution for production management.

4 Link Data Mapping



SPECIFICATIONS

Model	2916 (CE)
LVDS Interface	
Resolution	640x480; 800x600; 1024x768; 1152x864; 1280x768;1280x960;1280x1024;1400x1050; 1600x900; 1600x1024; 1600x1200; 1920x1080; 1920x1200; 1280x800; 1366x768; 1280x854; 2560x1600
Pixel Rate	1 Link up to 150 MHz 2 Link up to 300 MHz (150 MHz x 2) 4 Link up to 600 MHz (150 MHz x 4)
Signal	6/8/10 Bit and support bit rotate (10 Bit for Gray Scale)
H,V Sync Polarity	+ or -
Connector	10 Bit Four Link by MDR36 x 2
Video signal output can turn ON OFF by software	

General Specifications	
AC Input Voltage	1Ø 110~240V ±10% V_{LH}
AC Input Frequency	47~63Hz
Operation Temperature	10~40˚C
Operation Humidity	Max. 70%
Dimension & Weight	
2916 Main System	
Dimension (HxWxD)	156.4x320x430 mm / 6.16x12.6x16.9 inch
Weight	8 kg / 17.62 lbs
A291600 Signal Module	
Dimension (HxWxD)	50x320x230 mm / 1.96x12.59x9.06 inch
Weight	1.7 kg / 3.8 lbs
A291512 Power module	
Dimension (HxWxD)	206.4x100x430 mm / 8.12x3.937x16.92 inch
Weight	4.6 kg / 10.1 lbs
2916LCM ATS (2916+A291600+A291512)	
Dimension (HxWxD)	206.4x420x430 mm / 8.13x16.54x16.93 inch
Weight	14.3 kg / 31.5 lbs

Power Source			
Channel	DC1	DC2	DC3~DC8
Output Voltage	2-25V	5-25V	0-5V
Output Current	0-4A	0-26.5A	0-1A
Programmable Resolution			
Output Voltage	20mV	20mV	-
Current Protect	5mA	20mA	-
Meter Ratings			
Read back Voltage	0-30	0-30V	-
Read back Current	0-5A	0-30A	-
Meter Resolution			
Voltage	20mV	20mV	-
Current	5mA	20mA	-
On / Off Sequence Resolution			
Turn-On/Off	1ms	1ms	1ms
I^2C BUS Function			
SDA	3.3 / 5V / device select		
SCL	50~100KHz		
DIM Function			
Analog	Analog function 0~8 / 0.1V step		
V-PWM Function			
Vpwm	3.3 / 5V / FV Selectable		
Fout	100~15KHz		
Dout	0~100% 1% Step		
SMBUS Function			
SDA	3.3 / 5V / device select		
SCL	10~100KHz		

ORDERING INFORMATION

2916 : LCM Automatic Test System
A291600 : Signal Module LVDS 150/300/600 MHz
A291512 : Power Module 780W
Network Management Function of Software



A291600



A291512

All specifications are subject to change without notice.



RS-232 USB CE LVDS 240Hz Power Full HD 1080 LED Backlight

KEY FEATURES

- LCM signal and power source test systems
- Easy for Timing / Pattern / Program editing
- Suitable for Full HD measurement
- The Resolution up to 1920x1080@240Hz, 3840x2160@60Hz
- LVDS 8 channel output
- MPEG/AVI Playback
- High accurate programmable DC source
- Output voltage and current measurement
- Power protection OVP/OCP/UVP/UCP
- EDID read/write
- Cross coordinate defect positioning function
- Network management function (OPT)
- In-line process control and data collection
- Operator authority control
- GO/NOGO fast measurement
- High efficient GUI for easy operation

The technology development of liquid display has been moving toward the features of large scale, high quality, high contrast and fast dynamic response recently that made the Full HD (1920X1080) high resolution specification become a new mainstream in the market. In order to meet the test requirements of today's industries, Chroma 2917 LCM ATS is structured in modulized with integrated signals and power source. The powerful on-line network function and easy-to-use interface are equipped to fulfill the test requirements such as all kinds of standard signal sources, test patterns and voltage/current measurements for various sizes of LCM.

This ATS provides LVDS signals and users can set the settings through mouse and Remote Keypad in accordance with the LCM features to give the production line a most complete and convenient test mode to expedite the productivity. The test functions Chroma 2917 LCM ATS have are:

Modulized Design

To cope with the test requirements of various sizes panels, the design concept of modulization is applied to fit in the specifications of different signals and power modules for application.

Test Program Editor

It contains the parameters settings of power Turn On/ Turn Off, scanning timing, pattern, over and under voltage/current protection (OCP/OVP/UCP/UVP), and real-time voltage Ramp Up/Ramp Down based on the LCM electricity specifications for accurate and comprehensive tests.

Screen Quality Test

Besides the built-in standard patterns, users can define the geometry patterns that composed of various ICONs; moreover, the natural picture file with BMP/JPG filename extension can be imported. In addition the animation function is available for the LCD Response time test. All patterns can be scaled automatically according to the LCM resolution to facilitate the pattern editing preview function.

Timing Setting and Pattern Editing

The ATS allows users to define the test timings and patterns for application as need and provides LVDS signals for comprehensive LCM tests by setting the signal/power supply activation time. Other signals like TMDS / TTL / ANALOG (option) can also be applied for testing.

Output voltage, current measurement and judgment

This system has multiple modulized external power supplies that can be used for different sizes of panels / LED backlight constant current sources (option) and to provide the power source required by LCM control chip, driver chip and backlight module through the USB interface. Also Provide the optional of multi-channel metering system for readback applications.

Test Methods

Mouse and keypad are used to control the cross mark for cell checking and log during test, also the LCM defect types can be built by the test patterns that minimize the test time intensely. Thus the test can be done rapidly no matter it is applied in R&D or production line.

Network Management Control

The system administrator is able to perform the test program maintenance and management, hardware configuration, data upload/download, computing and EDID read/write network on-line function via the network interface for production status control at the first time as well as analysis of production, efficiency and yield rate.

Chroma 2917 LCM ATS integrates the signal source/power source for LCM patterns and electricity specification tests. The user-friendly interface along with simple system programs can be used to edit the Timing / Pattern / Power / Program while the mouse or keypad can be used to log the LCM defects. Moreover, the PC based platform can fully utilize the network function for data collection and analysis that makes it most applicable for production line management.

High Performance Hardware Devices

Chroma 2917 LCM ATS is structured in modulized with integrated signals and power source. The powerful on-line network function and easy-to-use interface are equipped to fulfill the test requirements such as all kinds of standard signal sources, test patterns and voltage/current measurements for various sizes of LCM.



Main Unit

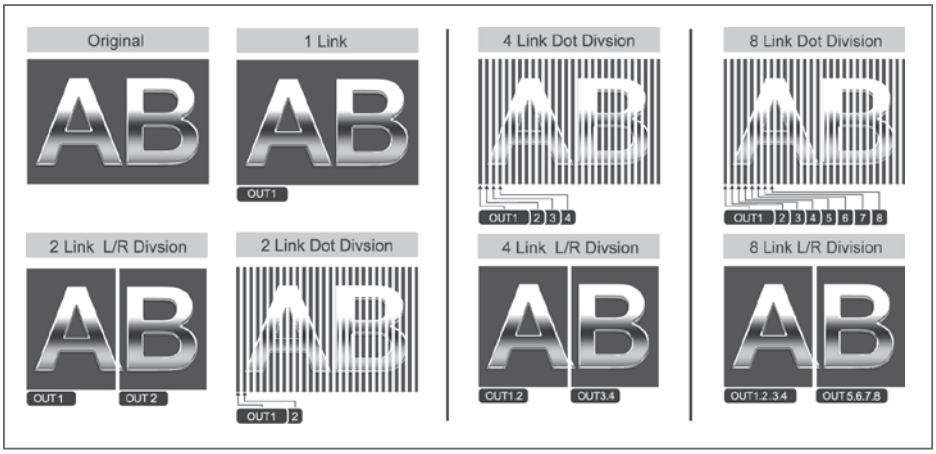
- Support 2 port LAN
- Integrated all test signals with LVDS
- Provide LVDS Signal Output
- Support 2 / 4 / 8 ch Data Output



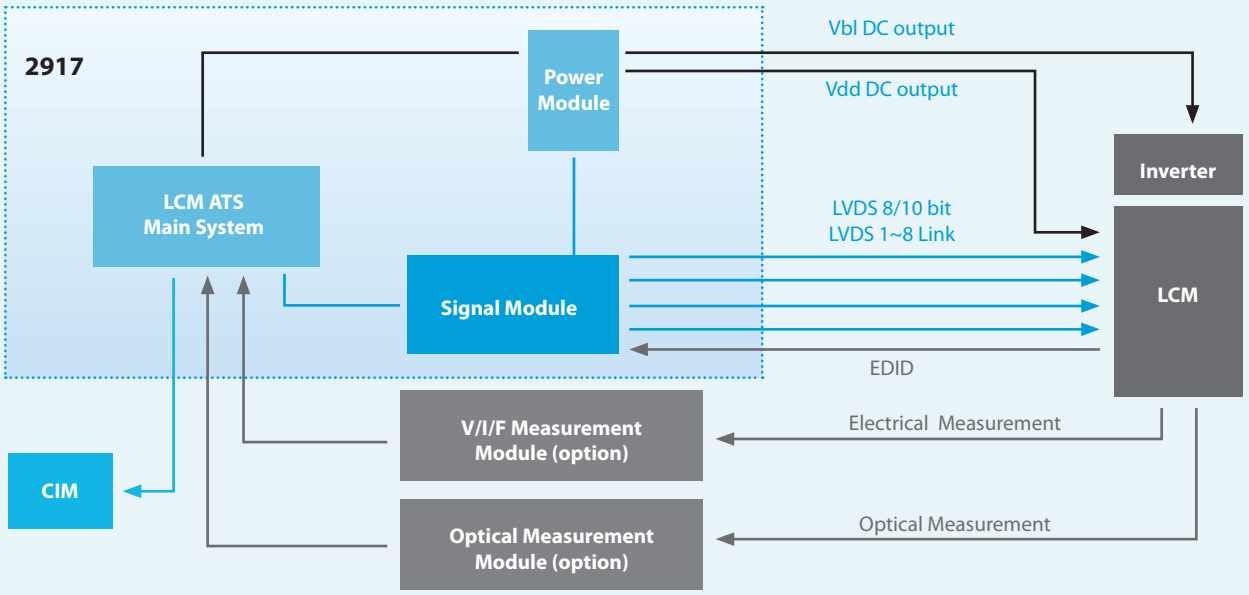
Power Module Series

- 4~8 channel Power Source (Depend on Model)
- OCP/OCP/OVP/UVP Protection
- SM Bus, I^2

4/8 LINK DATA MAPPING



2917 SYSTEM APPLICATION BLOCK DIAGRAM



SPECIFICATIONS

Model	2917
LVDS Interface	
Resolution	640x480; 800x600; 1024x768; 1152x864; 1280x768; 1280x960; 1280x1024;1400x1050; 1600x900; 1600x1024; 1600x1200; 1920x1080; 1920x1200; 1280x800; 1366x768; 1280x854; 2560x1600; 3840x2160
Pixel Rate	1 Link up to 135 MHz 2 Link up to 270 MHz (135 MHz x 2) 4 Link up to 540 MHz (135 MHz x 4) 8 Link up to 1.08GHz (135 Mhz x 8)
Signal	6/8/10 Bit and support bit rotate (10 Bit for Gray Scale)
Data Swap	+ or -
H,V Sync Polarity	+ or -

General Specifications	
AC Input Voltage	1Ø 110~240V ±10% V_{LH}
AC Input Frequency	47~63Hz
Operation Temperature	10~40°C
Operation Humidity	Max. 70%
Dimension & Weight	
2917 Main System	
Dimension (HxWxD)	20.64 x 32 x 43 mm / 8.12 x 12.6 x 16.92 inch
Weight	12.6 kg / 27lbs lbs
A291710 DC Power Source	
Dimension (HxWxD)	206.4 x 100 x 430 / 8.12 x 3.94 x 16.92 inch
Weight	4.6 kg/10.1 lbs
2917 LCM ATS (2917 Main System and A291710 DC Power Source)	
Dimension (HxWxD)	206.4 x 420 x 430 mm / 8.12 x 16.54 x 16.92 inch
Weight	17.2 kg / 37.1 lbs

Power Source			
Channel	DC1	DC2	DC3~DC4
Output Voltage	2-20V	5-50V	0-5V
Output Current	10A	22A	0-1A
Power Consumption	132W	500W	15W
Programmable Resolution			
Output Voltage	20mV	20mV	-
Current Protect	20mA	20mA	-
Meter Ratings			
Read back Voltage	0-22V	0-55V	-
Read back Current	0-11A	0-24.2A	-
Meter Resolution			
Voltage	100mV	100mV	-
Current	100mA	100mA	-
On / Off Sequence Resolution			
Turn-On/Off	1ms	1ms	1ms
I^2C BUS Function			
SDA	3.3 / 5V / device select		
SCL	50~100KHz		
DIM Function			
Analog	Analog function 0~12/0.1V step		
V-PWM Function			
Vpwm	3.3 / 5V / FV Selectable		
Fout	100~15KHz		
Dout	0~100% 1% Step		
SMBUS Function			
SDA	3.3 / 5V / device select		

ORDERING INFORMATION

2917 : LCM Automatic Test System
A291710 : Power Module 780W
Network Management Function of Software

All specifications are subject to change without notice.



RS-485

ORDERING INFORMATION

67300 : Six Position 67300 Mainframe with 1 output BUS bar, 220V 1Ø
67300 : Six Position 67300 Mainframe with 2 output BUS bar, 220V 1Ø
67300 : Six Position 67300 Mainframe with 3 output BUS bar, 220V 1Ø
67300 : Six Position 67300 Mainframe with 6 output BUS bar, 220V 1Ø
A673002 : Six Position 67300 Mainframe with 2 output BUS bar, 220V/380V 3Ø
A673003 : Six Position 67300 Mainframe with 3 output BUS bar, 220V/380V 3Ø
A673004 : Six Position 67300 Mainframe with 6 output BUS bar, 220V/380V 3Ø
A673005 : Three Position 67300 Mainframe with 2 output BUS bar, 220V/380V 3Ø
67322 : DC Power Supply Module 5V/100A/600W
67346 : DC Power Supply Module 12V/90A/1484W
67366 : DC Power Supply Module 30V/50A/1500W



Module

KEY FEATURES

- Three models: 67322 5V/100A
  67346 12V/90A
  67366 24V/50A
- N+1 Redundancy Power System Ideal for Burn-in Applications
- High Power Density (464mW / cm^3)
- Hot-swappable
- Cost-effective
- Remote Sense, 1V Line Loss Compensation
- Remote ON/OFF Signal
- Remote RS-485 Interface Control
- Graphic Softpanel Control and Monitor (option)

Chroma's new 67300 Series of modular DC power supplies offer many unique features for Burn-in applications. The features include a N+1 redundancy power system, high power density, hot-swappable for maintenance, remote ON/OFF input signal as well as the ability to create a custom burn-in chamber system.

The 67300 Series contain 3 different modules ranging from 600W to 1500W, up to 100A and 30V. The 67300 mainframe allows encasing up to six modules for parallel or stand-alone operation that made it easy to expand up to thirty units of mainframe for high power applications via RS-485 control.

The Modular DC Power Supplies of 67300 Series are cost effective with high power density (464mW/cm^3). They are most suitable for burn-in applications such as the typical LCD panel, D2D converter, power inverter, notebook, battery charger, and etc.

Modern power factor correction circuitry is incorporated in 67300 Series to increase the input power factor above 0.98 to meet the IEC regulation. It not only reduces the input current requirement but also raises the efficiency over 80%. In addition, an optional graphic Softpanel connected via RS-485 is offered to control and monitor the power system which is a user friendly tool applicable for factory automation.

SPECIFICATIONS

Model	67322	67346	67366
Electrical Specifications			
Output Ratings			
Output Voltage Range	2.5 ~ 6V	2 ~ 16V	2 ~ 30V
Default Voltage Setting	5V	15V	24V
Output Current	100A	90A	50A
Output Power	600W	1440W	1500W
Line Regulation	0.10%		
Load Regulation	5%		
Meter Accuracy	1% F.S.		
Noise (0-20MHz) : V (P-P)	100mV	100 mV	100 mV
Output Ripple (rms) : V	30 mV	30 mV	30 mV
Efficiency	> 80% @ Full Load		
Transient response time -Time	< 5 ms		
25% step change-Leve	Time for the output voltage to recover within 1% of its rated for a load changed of 25%		
Protection Function			
OVP	Automatically shuts down when over setting voltage plus 0.2V (67322) / plus 0.5V(67346 / 67366)		
OCP	0A - Full Scale setting current limit, CC mode		
OTP	Automatically shuts down		
I/O Signal			
Remote ON/OFF	Closed is enable, vice versa		
Remote Interface			
RS-485	Standard (Adjustable via DIP switch of each power supply)		
General Specifications			
Remote Sensing	1V line loss compensation		
Parallel Operation	Current Sharing (± 5%)		
Operating Temperature	-5˚C to 50˚C		
Humidity Range	0 ~ 90% RH. Non-condensing		
AC Input Voltage	220~230V ±10% V_{LN} 47~63Hz		
Input Power Factor	> 0.98@ full load		
Weight	3.7 kg / 8.15 lbs		
Dimension (H x W x D)	132.5 x 67.5 x 376 mm / 5.22 x 2.66 x 14.8 inch		
Front Panel Overview			
Control Function	V&I display change buttom, main switch		
Indications LED	Normal, Warming, V, I, 7-segment LED		

Selection Guides 10-1
Video Pattern Generator (VPG) 10-3
HDMI Distributor 10-27
SDI Module 10-28
Pattern Analyzer 10-29
Digital Video Distributor 10-30
Color Analyzer 10-31
Spectrocolorimeter 10-33
Front Projector ATS 10-35
Display Multi-probe ATS 10-36

All other brand and logo and trademarks or registered trademarks of their respective holders.

VIDEO PATTERN GENERATOR



HDMI Distributor



SDI Module



Pattern Analyzer



Signal Video Distributor







Video Pattern Generator

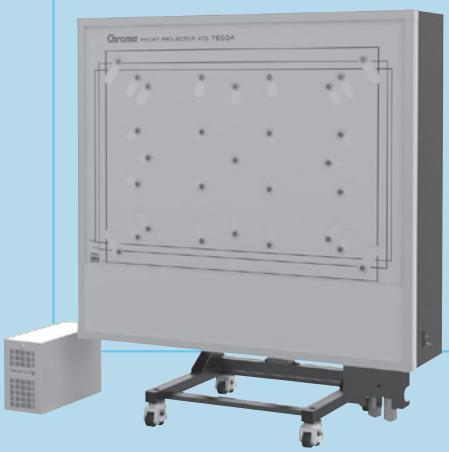
COLOR ANALYZER / SPECTROCOLORIMETER / FPD ATS



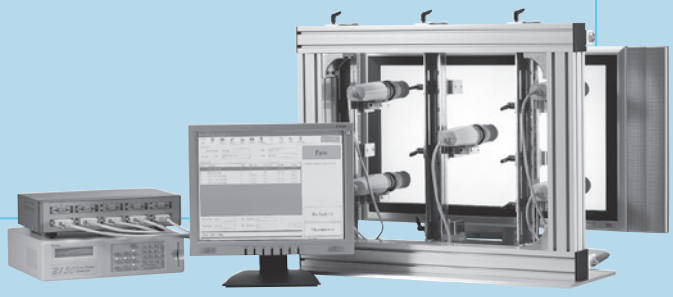
Spectrocolorimeter



Display Color Analyzer



Front Projector ATS



Display Multi-probe ATS

Video Pattern Generator Selection Guide-1

TYPE	Model	Analog	Digital					PAGE
			DVI (TMDS)	HDMI	DisplayPort	Standard	Interface	
Programmable	22293	250MHz	330MHz	* 165MHz		HDMI 1.3	HDMI x 1	10-3
	22293-A	250MHz	330MHz	* 165MHz		HDMI 1.3	HDMI x 1	10-5
	22293-B	250MHz	330MHz	* 165MHz		HDMI 1.3	HDMI x 3	10-7
	22294	250MHz	330MHz	* 165MHz		HDMI 1.4	HDMI x 3	10-9
	22294-A	300MHz	330MHz	** 300MHz		HDMI 1.4	HDMI x 4	10-9
	2233	250MHz	330MHz	* 165MHz	270MHz	HDMI 1.3 DP 1.1	HDMI x 1 DP x 1	10-11
	2233-A	250MHz	330MHz	* 165MHz	270MHz	HDMI 1.3 DP 1.1	HDMI x 1 DP x 1	10-13
	2233-B	250MHz	330MHz	* 165MHz	270MHz	HDMI 1.3 DP 1.1	HDMI x 3 DP x 2	10-15
	2234	250MHz	330MHz	* 165MHz	270MHz	HDMI 1.3 DP 1.1	HDMI x 3 DP x 2	10-17
Non-Programmable	23293-B	250MHz	330MHz	* 165MHz		HDMI 1.3	HDMI x 3	10-19
	23294	250MHz	330MHz	* 165MHz		HDMI 1.4	HDMI x 3	10-21
	2333-B	250MHz	330MHz	* 165MHz	270MHz	HDMI 1.3 DP 1.1	HDMI x 3 DP x 2	10-23
Economy	2401	165MHz						10-25
	2402	165MHz	165MHz	165MHz		HDMI 1.3	HDMI x 1	10-25

*** TMDS Rate 225MHz**
**** TMDS Rate 300MHz**

Video Pattern Generator Selection Guide-2

TYPE	Model	DTV		TV			OTHERS			PAGE
		SDTV	HDTV	NTSC	PAL	SECAM	HDCP	AUDIO	I/O	
Programmable	22293	V	V	V	V	V	V	V	USB	10-3
	22293-A	V	V	V	V	V	V	V	USB	10-5
	22293-B	V	V	V	V	V	V	V	USB	10-7
	22294	V	V	V	V	V	V	V	USB	10-9
	22294-A	V	V	V	V	V	V	V	USB	10-9
	2233	V	V	V	V	V	V	V	USB	10-11
	2233-A	V	V	V	V	V	V	V	USB	10-13
	2233-B	V	V	V	V	V	V	V	USB	10-15
	2234	V	V	V	V	V	V	V	USB	10-17
Non-Programmable	23293-B	V	V	V	V	V	V	V	USB	10-19
	23294	V	V	V	V	V	V	V	USB	10-21
	2333-B	V	V	V	V	V	V	V	USB	10-23
Economy	2401	V	V	V	V	V		V	USB	10-25
	2402						V	V	USB	10-25

All specifications are subject to change without notice.

Distributor Selection Guide					
	Model	Signal Interface			PAGE
		DVI (TMDS)	HDMI	LVDS	
Distributor	28101			V	10-30
	28102			V	10-30
	28111	V			10-30
	A222907		V		10-27

SDI Signal Module Selection Guide					
	Model	Output Signal			PAGE
		SD	HD	3G	
SDI Signal Module	A222915	V	V	V	10-28



Analog 250 MHz
DVI (TMDS) 330 MHz
HDMI V1.3b 165 MHz
(TMDS Rate 225 MHz)

KEY FEATURES

- 4K x 2K Graphic size
- Analog pixel rate 250MHz
- DVI pixel rate 330MHz
- HDMI V1.3b (with 36 bit deep color / xvYCC / CEC)
- DVI & HDMI with HDCP output
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video/CVBS/SCART/RGB/Color Component/ D-terminal
- NTSC / PAL / SECAM signal
- Closed Caption function (NTSC)
- V-Chip function (NTSC)
- Teletext function (PAL)
- E-EDID Read / Write / Compare
- Easy and variable pattern edit
- HDMI/DVI Plug & Play function
- Gamma correction
- ESD protection circuit
- USB interface
- 3.5" LCD panel display performance

xvYCC ANALOG DVI HDCP 8/10/12 BITS
NTSC/PAL SECAM | Close Caption | Teletext | V-Chip | SDTV | HDTV | Ture Color

Chroma 22293 Programmable Video Pattern Generator provides a total solution for multi-media tests that are applied in the industries of high frequency digital and analog displays such as LCD Monitor / LCD TV / PDP / Projector of today and in the future.

Large scale and high definition have become the trend as the development of video industry goes. Chroma 22293 has high speed signal transmission features that presented in a user friendly interface not only provide complete and standard digital and analog signals but also support the up-to-date interface, HDMI V1.3, for video image transmission with higher speed bandwidth and deep color.

HDMI (High Definition Multimedia Interface) is the digital signal standard interface of the latest generation. A single cable can synchronize the video image signals without any interrupts during transmission. The advantage of simple layout and high speed transmission capability has become the interface that can provide various audio and video sources in-between for the equipment like Set Top Box, DVD Player, A/V Receiver, Amplifier and all kinds of video monitors.

Chroma 22293 is able to provide analog/digital/TV signals concurrently: For the analog signal RGB output, the pixel frequency is up to 250MHz that meets the RS-343A standard, and it supports Y, Pb, Pr/Y, Cb, Cr/Y, R-Y, B-Y. Meanwhile it can select the sync signal of tri-level output to fit in the HDTV test application. For the digital signal TMDS output, the pixel frequency is 25~330MHz and the resolution of test screen supports UXGA and higher.

As to the specification of TV output, the image and chrominance signals of Chroma 22293 meet the NTSC, PAL and SECAM standards. The output signals include CVBS composite signals, BNC and Y/C (Luminance/ Chrominance) separated signals as well as S-Video/SCART output connectors. Tests for special TV functions such as Closed Caption, V-Chip and Teletext are also supported.

Chroma 22293 is designed with embedded architecture that uses Power PC to carry the high speed/high density FPGA as Graphics Rendering Engine to provide highly efficient system control and save the test time.

Chroma 22293 equipped with 3.5 inches super large screen and graphic operation interface is convenient for users to edit various timing parameters and patterns directly via the panel icon. The comprehensive, rapid and easy to understand user interface can improve the test efficiency effectively. The USB interface using VPG MASTER control software on PC can also be applied to show the patterns on display for test by running automatically or manually.

Following the rising market of new generation display the competition and demand for product quality are getting more and more sever. Under the consideration of quality and cost, Chroma 22293 Video Pattern Generator has built in the most complete multi-media test interfaces covering all standard signals output that can meet the requirements for various video tests in the industry. It is the best solution for the users in the field of RD, production and inspection.

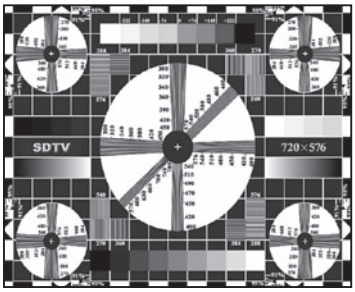


Model 22293 Rear View

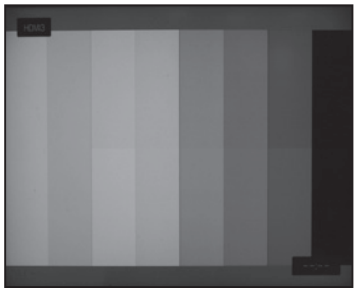
ORDERING INFORMATION

22293 : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz
(TMDS Rate 225MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

Special Pattern



China SDTV / HDTV Pattern



xvYCC Pattern

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable
	4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	BNC: Hs, Vs, Xs
	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R,G,B/RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)
MULTI OUTPUT	**Y, Cb, Cr & R,G,B independence output**

DVI (TMDS) OUTPUT	
Pixel Rate Range	25< 1 link ≤ 165MHz / 165< 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V.1.0
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3b (with 24, 30, 36 bit deep color/xvYCC/CEC)
Pixel Rate Range	25 ~ 165 MHz (TMDS rate 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720 x 483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720 x 576	50P	50			ITU 1382
			50I	25	ITU 601

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
22293 (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
22293	5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog 250 MHz
DVI (TMDS) 330 MHz
HDMI V1.3b 165 MHz
(TMDS Rate 225 MHz)
DVI Dual HDCP

KEY FEATURES

- Analog pixel rate 250MHz
- Digital (DVI) pixel rate 330MHz
- DVI Dual HDCP test application support
- HDCP supports Auto / Manual Mode
- HDMI V1.3b (with 24/30/36 bit deep color / xvYCC / CEC / Lip Sync)
- HDMI V1.3b maximum 687 billion color depth
- DVI and HDMI with HDCP output
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y color difference output
- S-Video / CVBS / SCART / RGB / Color Component / D-terminal
- NTSC / PAL / SECAM signal
- Closed Caption function (NTSC)
- V-Chip function (NTSC)
- Teletext function (PAL)
- EDID read / write / compare
- Optical / Coaxial audio input (S/PDIF)
- Easy and variable pattern edit
- Scrolling Pattern support
- HDMI / DVI plug & play function
- Gamma correction
- ESD protection circuit
- USB Host / Device

xvYCC ANALOG DVI Dual HDCP 8/10/12 BITS
NTSC/PAL SECAM Close Caption Teletext V-Chip SDTV HDTV Ture Color

Chroma 22293-A Programmable Video Pattern Generator provides a total solution for multi-media tests that are applied in the industries of high frequency digital and analog displays such as LCM Monitor / LCD TV / PDP / Projector of today and in the future.

Large scale and high definition have become the trend as the development of video industry goes. Chroma 22293-A designed with brand new architecture uses high performance CPU to carry the high speed/high density FPGA as Graphics Rendering Engine. It provides highly efficient system control as well as supports the up-to-date high resolution multimedia digital/video interface, HDMI V1.3, for the following features:

Higher bandwidth and Color Deep : It supports 24, 30, 36 bit (RGB or YCbCr) and new color standard xvYCC to implement real natural color and high resolution image screen with larger color range.

CEC (Consumer Electronics Control) Function: It allows users to activate the HD device that equipped with multiple CEC functions via a remote controller. Chroma 22293-A is able to set the CEC test parameters automatically or manually and support TX (transmission) / RX (reception) / MONITOR (monitoring) & FEATURE (user property) test modes. The built-in CEC test patterns give users easier and faster test judgment.

Lip Sync: Since the technology of digital signal process improves continuously, to have a high definition video presentation, there may have potential factors to cause delay when processing the video. HDMI 1.3 allows CE devices to compensate the time difference automatically that can synchronize both video and audio to enhance viewer's feeling.

Chroma 22293-A is able to provide Analog/ Digital/TV signals concurrently:

For the analog signal RGB output, the pixel rate is up to 250MHz that meets the RS-343A standard, and it supports Y,Pb,Pr / Y,Cb,Cr / Y,R-Y,B-Y. The digital signal output is TMDS with pixel rate up to 330MHz and the test screen resolution supports beyond UXGA. Furthermore, to cope with higher frequency signal test, Chroma 22293-A supports DVI Dual HDCP test for dual channel DVI test application.

As to the specification of TV output, the image and chrominance signals of Chroma 22293-A meet the NTSC, PAL and SECAM standards. The output signals include CVBS compound signals, BNC and Y/C (Luminance/ Chrominance) separated signals as well as S-Video/SCART output connectors.Tests for special TV functions such as Closed Caption, V-chip and Teletext are also supported.

As to operation, Chroma 22293-A has equipped with a 3.5 inches multicolor display with graphic operation interface. Users can edit various timing parameters and patterns through the icons on the panel directly or using the VPG MASTER control software via the USB interface to do remote control manually or automatically. Chroma 22293-A Video Pattern Generator has built-in the most complete multi-media test interfaces that can meet the requirements for various video tests in the industry. It is the best solution for the users in the field of RD, production and inspection.

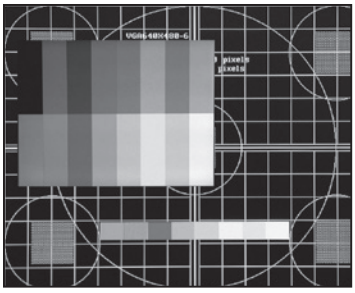


Model 22293-A Rear View

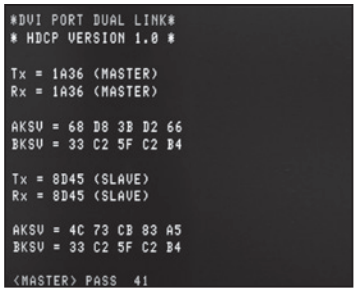
ORDERING INFORMATION

22293-A : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz
(TMDS Rate 225MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

Special Pattern



PIP Function



Dual HDCP

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	BNC : Hs,Vs,Xs ; D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25< 1 link ≤ 165MHz / 165< 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI 1.3b (with 24,30,36bit deep color/xvYCC/ CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK: 225MHz)
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4 / T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8ans+, 13ans+, 16ans+, 18ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720 x 483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720 x 576	50P	50			ITU 1382
			50I	25	ITU 601

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
22293-A	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog 250 MHz
DVI (TMDS) 330 MHz
HDMI V1.3C 165 MHz
(TMDS Rate 225 MHz)
Multi-port (HDMIx3)

KEY FEATURES

- Multi-port independent output test application
  - HDMI port output x 3
  - SCART port x 2 (output x1 / input x1)
- Analog pixel rate 250MHz
- Digital (DVI) pixel rate 330MHz
- DVI Dual HDCP test application support
- HDCP supports Auto / Manual Mode
- HDMI V1.3C (with 24/30/36 bit deep color / xvYCC / CEC / Lip Sync)
- HDMI V1.3C maximum 687 billion color depth
- DVI and HDMI with HDCP output
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y color difference output
- S-Video / CVBS / SCART / RGB / Color Component / D-terminal
- NTSC / PAL / SECAM signal
- EDID read / write / compare
- Optical / Coaxial audio input (S/PDIF)
- Easy and variable pattern edit
- Scrolling Pattern support
- HDMI / DVI plug & play function
- Gamma correction
- ESD protection circuit
- USB Host / Device

The 22293-B Programmable Video Pattern Generator provides a total solution for multi-media tests that are applied in the industries of high frequency digital and analog displays such as LCM Monitor / LCD TV / PDP / Projector of today and in
the future.

Large scale and high definition have become the trend as the development of video industry goes. The 22293-B designed with brand new architecture uses high performance CPU to carry the high speed/high density FPGA as Graphics Rendering Engine. It provides highly efficient system control as well as supports the up-to-date high resolution multimedia digital/video interface, HDMI V1.3, for the following features:

Higher bandwidth and Color Deep : It supports 24, 30, 36 bit (RGB or YCbCr) and new color standard xvYCC to implement real natural color and high resolution image screen with larger color range.

CEC (Consumer Electronics Control) Function :
It allows users to activate the HD device that equipped with multiple CEC functions via a remote controller. The 22293-B is able to set the CEC test parameters automatically or manually and support TX (transmission) / RX (reception) / MONITOR (monitoring) & FEATURE (user property) test modes. The built-in CEC test patterns give users easier and faster test judgment.

Lip Sync: Since the technology of digital signal process improves continuously, to have a high definition video presentation, there may have potential factors to cause delay when processing the video. HDMI 1.3 allows CE devices to compensate the time difference automatically that can synchronize both video and audio to enhance viewer's feeling.

The 22293-B is able to provide Analog/Digital/TV signals concurrently:

For the analog signal RGB output, the pixel rate is up to 250MHz that meets the RS-343A standard, and it supports Y,Pb,Pr / Y,Cb,Cr / Y,R-Y,B-Y. The digital signal output is TMDS with pixel rate up to 330MHz and the test screen resolution supports beyond UXGA. Furthermore, to cope with higher frequency signal test, the 22293-B supports DVI Dual HDCP test for dual channel DVI test application.

As to the specification of TV output, the image and chrominance signals of the 22293-B meet the NTSC, PAL and SECAM standards. The output signals include CVBS compound signals, BNC and Y/C (Luminance/ Chrominance) separated signals as well as S-Video/SCART output connectors. Tests for special TV functions such as Closed Caption, V-chip and Teletext are also supported. In the meantime to fulfill the test application for multi-port output, the 22293-B has built-in 3 HDMI and 2 SCART ports to reduce a great deal of test time, so as to finish the tests in the fastest way possible.

As to operation, the 22293-B has equipped with a 3.5 inches multicolor display with graphic operation interface. Users can edit various timing parameters and patterns through the icons on the panel directly or using the VPG MASTER control software via the USB interface to do remote control manually or automatically. The comprehensive, rapid and easy to understand user interface can improve the test efficiency effectively. Following the rising market of new generation display the competition and demand for product quality are getting more and more sever. Under the consideration of quality and cost, the 22293-B Video Pattern Generator has built in the most complete multi-media test interfaces that can meet the requirements for various video tests in the industry. It is the best solution for the users in the field of RD, production and inspection.

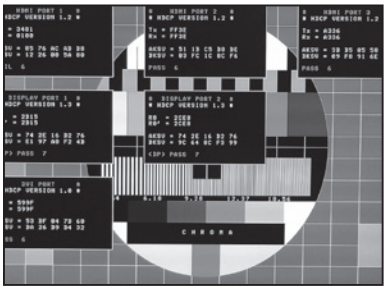


Model 22293-B Rear View

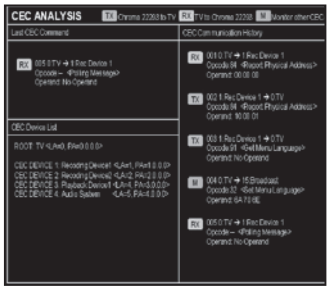
ORDERING INFORMATION

22293-B : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz
(TMDS Rate 225MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

Special Pattern



Multi-HDCP Pattern



CEC Analysis

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	BNC : Hs,Vs,Xs ; D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25< 1 link ≤ 165MHz / 165< 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI 1.3C (with 24,30,36bit deep color/xvYCC/CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK: 225MHz)
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4)/sYCC 601/Adobe RGB/ Adobe YCC 601
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit

HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4 / T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8ans+, 13ans+, 16ans+, 18ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720 x 483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720 x 576	50P	50			ITU 1382
			50I	25	ITU 601

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN}, 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
22293-B	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



	22294	22294-A
Analog	250 MHz	300 MHz
DVI (TMDS)	330 MHz	330 MHz
HDMI V1.4a	165 MHz	300 MHz
(TMDS Rate	225 MHz	300 MHz)
Multi-port	HDMIx3	HDMIx4
3D Output		

KEY FEATURES

- Fully Comparable with HDMI 1.4 Standard
  - 3D Format Output
  - Audio Return Channel
  - Ethernet Channel
  - 4Kx2K / 1080P 120Hz
  - sYCC601 / Adobe RGB / Adobe sYCC601
  - CEC / Deep Color / Lip-Sync / xvYCC
- Multi ports output test application
  - HDMI port output x 3 (Model 22294)
  - HDMI port output x 4 (Model 22294-A)
  - SCART port x 2 (output x1/input x1)
- 330MHz digital (DVI) frequency
- Support Dual HDCP in DVI test application
- HDCP supports Auto / Manual Mode
- Ethernet Browser on Screen
- HDCP ON / OFF IN DVI & HDMI Interface
- S-Video / CVBS / SCART / RGB / Y.Pb.Pr / Y.Cb.Cr / Y,R-Y,B-Y / D-terminal
- NTSC / PAL / SECAM signals
- EDID Read/ Write/Compare/Analysis
- Optical / coaxial audio input (SPDIF)
- Support pattern dynamic scrolling
- Built-in China high definition standard HD patterns
- HDMI/DVI Hot-Plug function
- Support Gamma calibration
- ESD protection circuit
- Front USB & control interface
- PIP & OSD function

Chroma 22294/22294-A Programmable Video Pattern Generator is a multi-functional test device with high speed signal transmission features. It has high resolution test quality and multiple outputs support that can meet the test requirements for the multimedia display industries such as LCD Monitor / LCD TV / PDP / Projector of today and in the future.

Chroma 22294/22294-A supports the up-to-date high resolution multimedia digital/video interface, HDMI V1.4, with the features described below.

The VPG has 3D signal standard format output, Audio Return function that is able to test the external audio source and the Ethernet function that is able to do two-way data transmission. In addition, higher bandwidth and Color Deep are equipped to support 24, 30, 36 bit (RGB or YCbCr) and the new generation color standard xvYCC, sYCC601, Adobe RGB as well as Adobe YCC601 for the implementation of 4Kx2K real natural colors and high resolution image screens with larger color range.

CEC(Consumer Electronics Control) Function: Chroma 22294/22294-A is able to set the CEC test parameters automatically or manually and support TX (transmission) / RX (reception) / MONITOR (monitoring) & FEATURE (user property) test modes.

Lip Sync : Since the technology of digital signal process improves progressively, potential factors may exist to cause delay when processing the video for a high definition presentation. The HDMI 1.3 allows CE devices to compensate the time difference automatically by synchronizing both of the video and audio to enhance viewer's experiance.

This video pattern generator is able to provide analog/digital/TV control signals concurrently: For the analog signal RGB output, the pixel rate is up to 300MHz that meets the RS-343A signal standard, and it supports Y, Pb, Pr/Y, Cb, Cr/Y, R-Y, B-Y.

The digital signal output is TMDS with pixel rate up to 330MHz and the test screen resolution supports beyond WQUXGA. Furthermore, to cope with the higher frequency signal tests, Chroma 22294/22294-A also supports DVI Dual HDCP test for dual channel DVI test application.

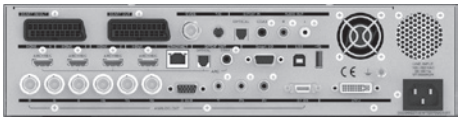
As to the specification of TV output, the image and chrominance signals of Chroma 22294 meet the NTSC, PAL and SECAM standards. The output signals include CVBS compound signals, BNC and Y/C (Luminance/ Chrominance) separated signals as well as S-Video/SCART output connectors. Tests for special TV functions such as Closed Caption, V-chip and Teletext are also supported.

For the application of multiple tests, Chroma 22294/22294-A supports a variety of audio/video and pattern file formats for play with the resolution up to 1080p. Meanwhile, to fulfill the test application for multi-ports output, multi-port HDMI have been built in to reduce a great deal of test time and finish the tests in the fastest way possible.

For operation, Chroma 22294/22294-A has adopted full color graphic interface and built in super capacity memory for storage with the diversified special test patterns like xvYCC, HDCP&E-EDID, 8/10/12bit deep color, CEC, Lipsync and Chinese high definition test patterns embedded for use. Tests can be performed easily and rapidly to save the time and control the cost. Besides using the panel or remote controller for editing, users can edit various timing parameters and test patterns via the VPG Master application. Its easy operating interface and complete test functions are applicable for all video and related industries in R&D, production test and quality assurance.



Model 22294 Rear View

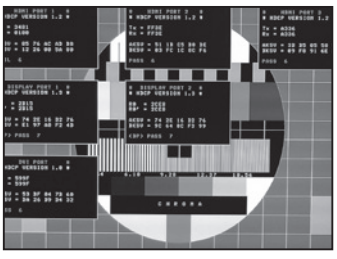


Model 22294-A Rear View

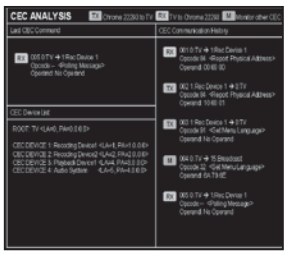
ORDERING INFORMATION

22294 : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/TV/HDTV
22294-A : Video Pattern Generator
Analog 300MHz/DVI 330MHz/HDMI 300MHz (TMDS Rate 300MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

Special Pattern



Multi-HDCP Pattern



CEC Analysis



HEC & ARC Test Pattern



3D Operation Interface

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz (Model 22294) 0.5~300MHz (Model 22294-A)
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	BNC : Hs,Vs,Xs ; D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit / Analysis
HDCP	HDCP V.1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.4b (3D Format / ARC / HEC / CEC / Lip Sync)
Pixel Rate Range	25~165MHz (Model 22294) 25~300MHz (Model 22294-A)
Support HDMI Timing	85 Timing (CEA-861E)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC (IEC61966-2-4) / sYcc601 / Adobe RGB / Adobe sYcc601
HDCP	HDCP V1.2
EDID	Read / Write / Compare / Edit / Analysis
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	1Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Closed Caption (NTSC)	C1, C2, C3, C4 / T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8ans+, 13ans+, 16ans+, 18ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV / HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720 x 483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720 x 576	50P	50			ITU 1382
			50I	25	ITU 601
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

3D VIDEO FORMAT OUTPUT	
3D Scanning Mode	Frame packing
	Field alternative
	Line alternative
	Side-by-Side (Full)
	L + depth
	L + depth + graphics + graphics-depth
	Top & Bottom
	Side-by-Side (Half)

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION & WEIGHT	
22294/22294-A	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog **250 MHz**
DVI (TMDS) **330 MHz**
HDMI V1.3b **165 MHz**
(TMDS Rate 225 MHz)
DisplayPort V1.1a 270 MHz

KEY FEATURES

- 4K x 2K Graphic size
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort with HDCP V1.3 support
- Support Automatically & Manually setting for DisplayPort function
  - 2 Link rate (1.62/2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0/3.5/6/9.5dB pre-emphasis selectable
  - 400/600/800/1200mV Swing level selectable
- HDMI V1.3b (with 24, 30, 36bit deep color/ xvYCC/CEC)
- DVI & HDM & DisplayPort with HDCP output
- Y, Pb, Pr/Y, Cb, Cr/Y, R-Y, B-Y output
- S-Video/CVBS/SCART/RGB/Color Component/D-terminal
- NTSC/PAL/SECAM signal
- E-EDID Read/Write/Compare
- Easy and variable pattern edit
- HDMI/DVI Plug & Play function
- Power saving mode support
- Gamma correction
- ESD protection circuit
- USB Host / Device
- 3.5" LCD panel display performance

Chroma 2233 Programmable Video Pattern Generator is a multi-function measurement equipment. Combining Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals with high resolution test quality and multiple output support it is capable of providing a complete test solution to customers.

HDMI is the first industry supported, uncompressed and full digitalized audio/video interface that can synchronize and integrate video/audio signals through a cable line. Since large scale and high definition have become the trend for video industry, HDMI V1.3 is able to provide higher speed bandwidth and color depth that support 24,30,36 bits (RGB or YCbCr) and new color standard xvYCC to get real natural color and high resolution image.

DisplayPort is the state-of-the-art video output interface defined by Video Electronics Standards Association (VESA). It is an open and extendable interface standard for industrial applications. The objective of this standard is to lower down the platform design cost and provide an interoperable digital communication interface for PC and components. Same as HDMI, the high definition digital audio and video frequency can be received via a digital video transmission cable. Its maximum transmission bandwidth is up to 10.8Gb/s. The sufficient bandwidth is able to fulfill the requirements for large display with higher resolution in the future.

Chroma 2233 is equipped with DisplayPort standard format with the following key features:

The connection of DisplayPort is composed of main channel, AUX CH and Hot Plug Detect (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4Lane) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes.

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acted as a communication bridge between source and sink. Chroma 2233 is able to adjust the parameters such as Lane, Main link rate and etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.

In addition Chroma 2233 supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

For TV output, the image and chromaticity of 2233 are complies with NTSC, PAL and SECAM regulations. There are CVBS composite signal, BNC and Y/C (Luminance/Chrominance) image/ chromaticity separation signal for output along with S-Video/SCART output connector. Chroma 2233 also supports special TV function tests such as Closed Caption, V-Chip and Teletext.

Chroma 2233 can use remote control box (optional) instead of editing on the panel directly. The unique Timing/Pattern/Program/User key design is the same as the editing icons on panel that can be utilized flexibly for production line test in particular.

For operation, Chroma 2233 has adopted full color graphic interface and built in super capacity memory for storage. Besides using the panel for editing, users can edit various timing parameters and test patterns via the VPG Master application on PC site. Its easy operating interface and complete test functions are applicable for all video and related industries in R&D, production test and quality assurance that can satisfy the test requirements for the multimedia displays of today and in the future.

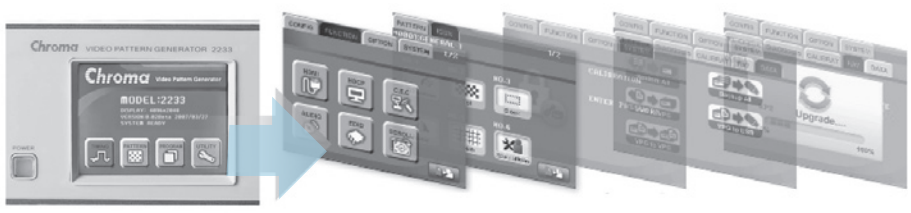


Model 2233 Rear View

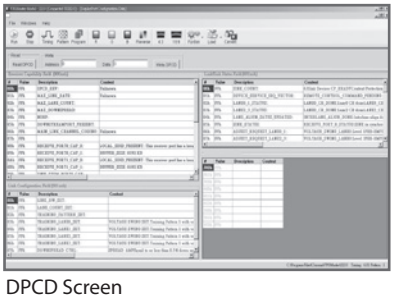
ORDERING INFORMATION

2233 : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/DisplayPort 270MHz
A222906: IR Controller
A240001: Remote Controller

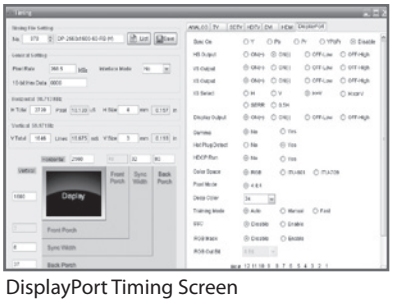
Graphic Interface



Graphic Interface Function Menu Pattern Icon Control Data Upload F/W Upgrade



DPCD Screen



DisplayPort Timing Screen

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	BNC: Hs, Vs, Xs
	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R,G,B/RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≦ 165MHz/165 < 2 link ≦ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V.1.0
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3b (with 24,30,36 bit deep color/xvYCC/CEC)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALY PORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component

HDCP Support	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2233 (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
2233	5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog	**250 MHz**
DVI (TMDS)	**330 MHz**
HDMI V1.3b (TMDS Rate 225 MHz)	**165 MHz**
DisplayPort V1.1a	**270 MHz**
DVI Dual HDCP	

KEY FEATURES

- 4K x 2K Graphic size
- DVI pixel rate 330MHz
- Support DVI Dual HDCP test application
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort with HDCP V1.3 support
- Support Automatically & Manually setting for DisplayPort function
  - 2 Link rate (1.62/2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0/3.5/6/9.5dB pre-emphasis selectable
  - 400/600/800/1200mV Swing level selectable
- HDMI V1.3b (with 24, 30, 36bit deep color/xvYCC/CEC/Lip Sync)
- DVI & HDMI & DisplayPort with HDCP output
- Y, Pb, Pr/Y, Cb, Cr/Y, R-Y, B-Y output
- S-Video/CVBS/SCART/RGB/Color Component/ D-terminal
- NTSC/PAL/SECAM signal
- E-EDID Read/Write/Compare
- Easy and variable pattern edit
- HDMI/DVI Plug & Play function
- Power saving mode support
- Gamma correction
- ESD protection circuit
- USB Host / Device

Chroma 2233-A Programmable Video Pattern Generator is a multi-function measurement equipment. Combining Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals with high resolution test quality and multiple output support, it is capable of providing a complete test solution to customers.

For the digital signal of TMDS output, the pixel rate is up to 330MHz with resolution supporting above UXGA. Moreover, for the higher frequency test application, the 2233-A supports DVI Dual HDCP for 2 Link DVI transmission.

Since large scale and high definition have become the trend for video industry, HDMI V1.3 is able to provide higher speed bandwidth and color depth that support 24,30,36 bits (RGB or YCbCr) and new color standard xvYCC to get real natural color and high resolution image.

DisplayPort is the state-of-the-art video output interface defined by Video Electronics Standards Association (VESA). It is an open and extendable interface standard for industrial applications. Same as HDMI, the high definition digital audio and video frequency can be received via a digital video transmission cable. Its maximum transmission bandwidth is up to 10.8Gb/s. The sufficient bandwidth is able to fulfill the requirements for large display with higher resolution in the future.

The 2233-A is equipped with DisplayPort standard format with the following key features:

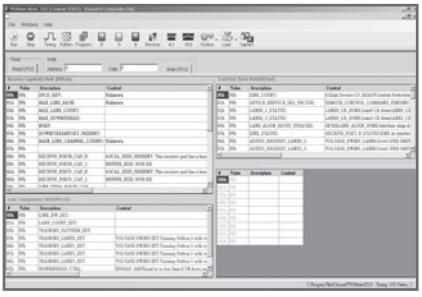
The connection of DisplyPort is composed of main channel, AUX CH and Hot Swap (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4 Lanes) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes.

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acts as a communication bridge between source and sink. The 2233-A is able to adjust the parameters such as Lane, Main link rate, etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.
In addition The 2233-A supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

For TV output, the image and chromaticity of 2233-A are complied with NTSC, PAL and SECAM regulations. There are CVBS compound signals, BNC and Y/C (Luminance/ Chrominance) image/ chromaticity separation signals for output along with S-Video/SCART output connector. The 2233-A also supports special TV function tests such as Closed Caption, V-chip and Teletext.

The 2233-A can use remote control box (optional) instead of editing on the panel directly. The unique Timing/ Pattern/ Program/User key design is the same as the editing icons on panel that can be utilized flexibly for production line test in particular.

For operation, The 2233-A has adopted full color graphic interface and built in super capacity memory for storage. Besides using the panel for editing, users can edit various timing parameters and test patterns via the VPG Master application on PC site. Its easy operating interface and complete test functions are applicable for all video and related industries in R&D, production test and quality assurance which satisfy the test requirements for the multimedia displays of today and in the future.



DPCD Screen



DisplayPort Timing Screen

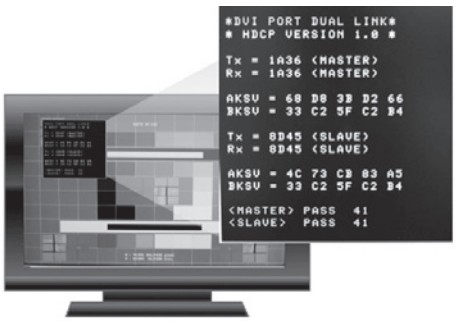


Model 2233-A Rear View

ORDERING INFORMATION

2233-A : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/DisplayPort 270MHz
A222906: IR Controller
A240001: Remote Controller

Special Pattern



DVI Dual HDCP



DPCD Information

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	BNC: Hs, Vs, Xs
	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R,G,B/RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3b(with 24,30,36 bit deep color/xvYCC/ CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALY PORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component
HDCP Support	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2233-A (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
2233-A	5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog	**250 MHz**
DVI (TMDS)	**330 MHz**
HDMI V1.3C (TMDS Rate 225 MHz)	**165 MHz**
DisplayPort V1.1a	**270 MHz**
Multi-port (HDMIx3, DPx2)	

KEY FEATURES

- Multi-port independent output test application
  - HDMI port output x 3
  - DisplayPort port output x 2
  - SCRAT port (output x 1 / input x 1)
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort with HDCP V1.3 support
- Support Automatically & Manually setting for DisplayPort function
  - 2 Link rate (1.62/2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0/3.5/6/9.5dB pre-emphasis selectable
  - 400/600/800/1200mV Swing level selectable
- HDMI V1.3C (with 24,30,36bit deep color / xvYCC / CEC / Lip Sync function)
- DVI pixel rate 330MHz
- Support DVI Dual HDCP test application
- DVI & HDMI & DisplayPort with HDCP output
- Y、Pb、Pr / Y、Cb、Cr / Y、R-Y、B-Y output
- S-Video / CVBS / SCART / RGB / Color Component / D-terminal output
- NTSC / PAL / SECAM TV signal
- EDID Read / Write / Compare
- Easy and variable pattern edit
- HDMI/DVI Plug & Play function
- Power saving mode support
- USB Host / Device

Chroma 2233-B Programmable Video Pattern Generator is a multi-function measurement equipment. Combining Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals with high resolution test quality and multiple output support, it is capable of providing a complete test solution to customers.

For the digital signal of TMDS output, the pixel rate is up to 330MHz with resolution supporting above UXGA. Moreover, for the higher frequency test application, Chroma 2233-B supports DVI Dual HDCP for 2 Link DVI transmission.

As large scale and high definition have become the trend for video industry, Chroma 2233-B supports the up-to-date high resolution multimedia digital video transmission interface, HDMI V1.3 is able to provide higher speed bandwidth and color depth. It supports 24,30,36 bits (RGB or YCbCr) and new color standard xvYCC, sYCC 601, Adobe RGB, and Adobe YCC 601 (CEA-861E) to get real natural color and high resolution image.

DisplayPort is the state-of-the-art video output interface defined by Video Electronics Standards Association (VESA). It is an open and extendable interface standard for industrial applications. The objective of this standard is to lower down the platform design cost and provides an interoperable digital communication interface for PC and components. Same as HDMI, the high definition digital audio and video frequency can be received via a digital video transmission cable. Its maximum transmission bandwidth is up to 10.8Gb/s. The sufficient bandwidth is able to fulfill the requirements for large display with higher resolution in the future.

The 2233-B is equipped with DisplayPort standard format with the following key features:

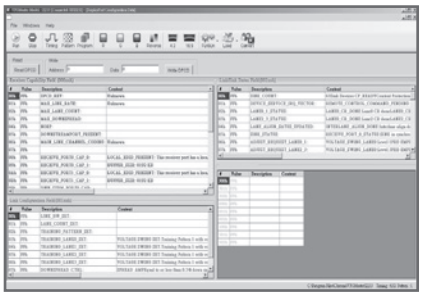
The connection of DisplyPort is composed of main channel, AUX CH and Hot Plug Detect (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4Lane) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes.

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acts as a communication bridge between source and sink. The 2233-B is able to adjust the parameters such as Lane, Main link rate, etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.

In addition the 2233-B supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

In the meantime to fulfill the test application for multi-port output, the 2233-B has built-in 3 HDMI, 2 DisplayPort and 2 SCART ports to reduce a great deal of test time, so as to finish the tests in the fastest way.

For operation, the 2233-B has adopted full color graphic interface and built in super capacity memory for storage. Besides using the panel for editing, users can edit various timing parameters and test patterns via the VPG Master application on PC site. Its easy operating interface and complete test functions are applicable for all video and related industries in R&D, production test and quality assurance that can satisfy the test requirements for the multimedia displays of today and in the future.



DPCD Screen



DisplayPort Timing Screen

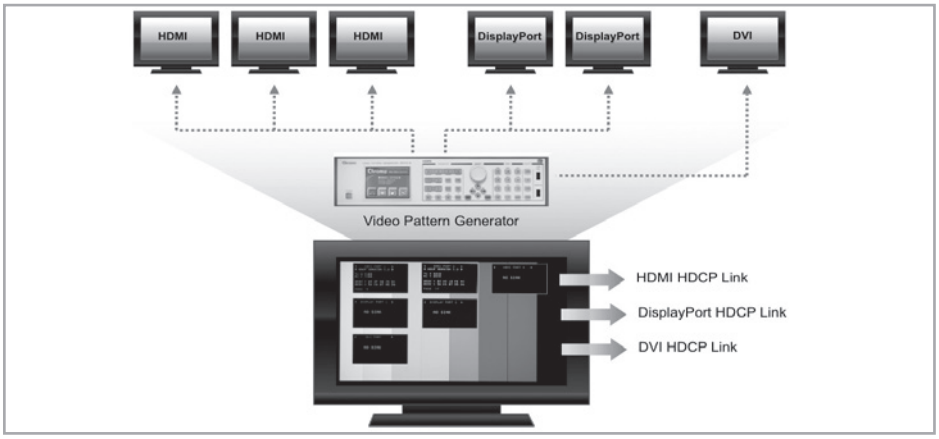


Model 2233-B Rear View

ORDERING INFORMATION

2233-B : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/DisplayPort 270MHz
A222906: IR Controller
A240001: Remote Controller

Multi-output with HDCP Test



All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	BNC: Hs, Vs, Xs
	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R,G,B/RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3C(with 24,30,36 bit deep color/xvYCC/ CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4) /sYCC 601/Adobe RGB/ Adobe YCC 601
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALY PORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component
HDCP Support	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2233-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
2233-B	5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog **250 MHz**
DVI (TMDS) **330 MHz**
HDMI V1.3C **165 MHz**
(TMDS Rate 225 MHz)
DisplayPort V1.1a **270 MHz**
Multi-port (HDMIx3, DPx2)
Multimedia Audio/Video

KEY FEATURES

- Support multimedia audio / video play formats
- Support up to 1080p high definition resolution
- Multi ports independent output test application
  - HDMI port output x 3
  - DisplayPort output x 2
  - SCART port x 2 (output x 1 / input x 1)
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort supports HDCP V1.3
- Support automatically & manually setting for DisplayPort function
  - 2 Link rate (1.62 / 2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0 / 3.5 / 6 / 9.5dB pre-emphasis selectable
  - 400 / 600 / 800 / 1200mV swing level selectable
- Support HDMI V1.3C (with 24, 30, 36bit color depth / xvYCC / CEC / Lip Sync)
- Support dual HDCP in DVI test application
- HDCP supports auto / manual mode
- HDMI and DisplayPort multiplexer function or switching for independent output
- HDCP ON/OFF in DVI, HDMI & DisplayPort interface
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video / CVBS / SCART / RGB / Color Component / D-terminal
- NTSC / PAL / SECAM signals
- EDID read / write / compare
- Optical / coaxial audio input (SPDIF)
- Scrolling pattern support
- Built-in China HD standard test patterns
- HDMI / DVI hot plug function

In order to perform motion pictures on the displays nowadays, the 2234 Video Pattern Generator has integrated the Multi-Media playback technology to provide versatile motion pictures for display quality evaluation test. It has high resolution test quality and multiple outputs support that can meet the requirements for multimedia video tests such as LCD Monitor / LCD TV / PDP / Projector of today and in the future.

This Video Pattern Generator provides both analog and digital signals, also supports multiple ports for independent output test and multimedia audio/video formats for play application. For the digital signal, the pixel rate of TMDS output is up to 330MHz and the test screen resolution is able to support beyond WQUXGA. Moreover, to cope with the higher frequency signal test for DVI Dual HDCP tests, it also supports dual link DVI test application.

Chroma 2234 has built in the up to date high resolution multimedia digital video transmission interface, HDMI V1.3, to provide high speed bandwidth and color depth. It supports 24, 30, 36 bits (RGB or YCbCr) and new color standard xvYCC along with sYCC, Adobe RGB, and Adobe YCC(CEA-861E) to implement the real natural colors and high resolution images.

DisplayPort is the state-of-the-art video output interface defined by VESA. The signal transmission is mainly composed of main channel, AUX CH and hot plug (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4 Lane) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes. Chroma 2234 supports the DisplayPort standard formats with the following key features:

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acted as a communication bridge between source and sink. Chroma 2234 is able to adjust the parameters such as Lane, Main link rate and etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.

In addition Chroma 2234 supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

For the application of multiple tests, Chroma 2234 supports a variety of audio/video and pattern file formats for play with the resolution up to 1080p. Meanwhile, to fulfill the test application for multi ports output, 3 HDMI and 2 DisplayPorts of which the output settings can be executed separately have been built in to reduce a great deal of test time and finish the tests in the fastest way possible.

For operation, Chroma 2234 has adopted full color graphic interface and built in memory for storage with the diversified special test patterns like xvYCC, HDCP&E-EDID, 8/10/12bit deep color, CEC, Lipsync and China high definition test patterns embedded for use. Tests can be performed easily and rapidly to save the time and control the cost.

A remote controller (optional) can be used to replace the direct panel editing for flexible practice in a large test area. It is suitable for mass application in the production line. In addition, various timing parameters and test patterns can be edited via the VPG Master application on PC site. The easy operating interface and complete test functions of Chroma 2234 are applicable for all video and related industries in R&D, production test and quality assurance.



Model 2234 Rear View

ORDERING INFORMATION

2234 : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/DisplayPort 270MHz
A222906: IR Controller
A240001: Remote Controller

Multimedia Operation interface





All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	BNC: Hs, Vs, Xs
	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R,G,B/RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3C(with 24,30,36 bit deep color/xvYCC/ CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4) /sYCC 601/Adobe RGB/ Adobe YCC 601
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALY PORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component

HDCP Support	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

MULTIMEDIA PLAY	
Video Format	MPEG-1(.mpg, .dat) ; MPEG-2(.vob) MPEG-4(.avi, .mp4) ; Support Up to 40Mbps(1080p)
Audio Format	MPEG-1 Layer-3(.mp3) ; LPCM(.wav) ; AAC(.aac)
Picture Format	BitMap(.bmp) ; JPEG(.jpg)
Interface	USB 2.0
File system	Internal: EXT-3, External: EXT-3 / FAT-32
Storage method	Internal: 16GB Flash Memory, External: Media USB Port

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2234 (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
2234	5.6 kg / 12.33 lbs

All specifications are subject to change without notice.



Analog 250 MHz
DVI (TMDS) 330 MHz
HDMI V1.3C 165 MHz
(TMDS Rate 225 MHz)

KEY FEATURES

- Multi-port output tests
  - 3 HDMI output ports
  - 2 SCART ports (output x1/ input x1)
- Analog Pixel rate 250MHz
- DVI Pixel rate 330MHz (dual channel)
- DVI Dual HDCP test application support
- HDMI V1.3C
  - True 30 bits color depth output
  - Support xvYCC & sYCC, Adobe RGB, Adobe YCC color space
  - Support CEC Function
  - Built-in Lip Sync test pattern
  - Digital audio output
  - 3 HDMI outputs to provide individual HDCP Enable/Disable
- DVI & HDMI with HDCP output
- Support HDCP V1.0 (DVI) / V1.2 (HDMI)
- Y, Pb, Pr / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video / CVBS / SCART / RGB / color component / D-terminal
- NTSC / PAL / SECAM TV signals
- Support Closed Caption / V-Chip / Teletext
- EDID read / write / compare
- Built-in low low-distortion audio output (2ch/8ch)
- Easy-to-use audio hot key
- Optical/Coaxial audio input (S/PDIF)
- Easy-to-use pattern editor
- Scrolling Pattern support
- HDMI / DVI plug & play function
- USB (Host & Device)
- User Key (up to 32 continuous actions can be combined)

Chroma 23293-B Video Pattern Generator is a high value-added test device that is designed by brand new architecture with high speed transmission features to provide high performance system control. It also supports the up-to-date high resolution multimedia digital/audio transmission interface, HDMI V1.3.

Chroma 23293-B has Analog/Digital/ TV signals. For the analog signal of RGB output, the pixel rate is up to 250MHz, while the digital signal of TMDS output, the pixel rate is up to 330MHz. Also, it supports the DVI dual channel HDCP test to satisfy the requirements for higher bandwidth application.

In TV output specification, the image and chromaticity signals comply with the NTSC, PAL and SECAM standards. Furthermore, the tests for special TV functions such as Closed Caption, V-chip and Teletext are supported.

The HDMI output video signals are RGB & YCbCr with the sampling modes of 4:4:4 & 4:2:2. The audio output contains the built-in low distortion sine wave. Chroma 23293-B supports the brand new HDMI V1.3 features:

Higher speed bandwidth and color depth: It supports 24,30 bits (RGB or YCbCr) and the new generation color standards xvYCC, sYCC 601, Adobe RGB and Adobe YCC 601 to attain truly natural color and high resolution image screen.

CEC (Consumer Electronics Control): The CEC parameter settings (VPG Master) support multiple test modes that is able to facilitate users for easier and faster tests with the patterns built-in specially for CEC tests.

Lip Sync: Since the technology of digital signals process improves continuously to have a high definition video presentation, there may have potential factors to cause delay when processing the video. HDMI 1.3 allows CE devices to compensate the time difference automatically that can synchronize both video and audio to enhance viewer's feeling.

To fulfill the application of multi-port output test, Chroma 23293-B has built-in 3 HDMI and 2 SCART ports that can finish testing the displays with multi-port in the fastest speed and reduce the test time in a great deal.

Various test patterns and timing parameters are built-in Chroma 23293-B for operation. Shortcuts are provided for Timing/Pattern/ Program/Audio to simplify the settings. The test program edited by the user on PC can be downloaded to Chroma 23293-B directly for storage and recall next time.

Moreover, for the function keys used frequently, a special User Key is designed to combine these functions. Up to 32 keys can be memorized for continuous actions and executed by a single key. Besides the panel operation, remote control can be enabled with a remote controller for users to operate the device more easily.



Model 23293-B Rear View

ORDERING INFORMATION

23293-B : Video Pattern Generator Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A / RS-170 / VESA (VSIS)
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3C(with 24,30,36 bit deep color/xvYCC/ CEC/Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4) /sYCC 601/Adobe RGB/ Adobe YCC 601
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

AUDIO (ANALOG) OUTPUT	
Number of Channel	2 Channel (R / L)
Sample Rate	32, 44.1 , 48 , 88.2 , 96 , 176.4 , 192KHz
Level Resolution	10mV / Step
Level Range	0V to 2V (at 600 Ohms Load)
Frequency Range	10Hz to 20KHz / 10Hz Step
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
23293-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
23293-B	4.5 kg / 9.9 lbs

All specifications are subject to change without notice.



Analog 250 MHz
DVI (TMDS) 330 MHz
HDMI V1.4a 165 MHz
(TMDS Rate 225 MHz)
3D Output

KEY FEATURES

- Multiport independent output test application
  - 3 HDMI port output
  - 2 SCART port (Input/Output x1/Outputx1)
- Analog frequency 250MHz
- Digital (DVI) frequency 330MHz (dual channel)
- DVI Dual HDCP test application support
- HDMI 1.4 standard
  - 3D standard format output
  - ARC audio return function
  - HEC network test function
  - Color vector sYCC601 / Adobe RGB / Adobe YCC601
  - CEC / Deep Color / Lip-Sync / xvYCC
- 4Kx2K graphic display capability
- CEC analysis & multi-directional monitor
- Real 30bit deep color output
- DVI & HDMI with HDCP output
- Support HDCP V1.0 (DVI) / V1.2(HDMI)
- Y, Pb, Pr / Y, Cb, Cr / Y,R-Y, B-Y Output
- S-Video / CVBS / SCART / RGB / color component / D terminal
- NTSC / PAL / SECAM TV signals
- Support Close Caption / V-Chip / Teletext
- EDID read / write / compare
- HDMI supports fiber/coaxial audio input (S/PDIF)
- ARC supports fiber/coaxial audio output (S/PDIF)
- Built-in low distortion audio output (2ch / 8ch)
- Easy to use audio shortcuts
- Support graphic dynamic movement (Scrolling) function
- Built in China high definition standard test patterns / 3D test images
- HDMI / DVI plug and play function
- ESD protective circuit
- Front USB control interface
- User Key (maximum 32 combinations of serial actions)

Chroma 23294 Video Pattern Generator provides various international standard signals with built-in 3 HDMI and 2 SCART ports that can satisfy the output tests for multiple ports to shorten the test time and improve productivity.

Chroma 23294 adopts a brand new structure design with a high performance CPU to carry high speed / high density FPGA as the graphic engine. It has highly efficient system control and supports the up-to-date high definition multimedia digital video interface HDMI V1.4 standard to supply the following features:

3D signal standard format output: It is a fast operating interface designed specially for 3D only that can adjust and switch to various 3D output easily.

The ARC (Audio Return Channel) function is able to test the external audio source and the Ethernet (HDMI Ethernet Channel) function is able to provide dual data transmission test, higher speed bandwidth & Color Deep. It supports 24, 30 byte (RGB or YCbCr) and the color standards of new generation such as xvYCC, sYCC601, Adobe RGB and Adobe YCC601 to realize the true natural color and high definition image with broader color range.

CEC (Consumer Electronics Control) Function: The CEC test parameters can be set via the proprietary software VPG MASTER which also supports the test modes of TX (send)/RX (receive)/MONITOR (monitor) & FEATURE (user's).

Chroma 23294 has analog/digital/TV control signals as well.

For the analog RGB output, its pixel frequency is up to 250MHz that complies with the RS-343A signal standard and support Y,Pb,Pr / Y,Cb,Cr / Y, R-Y& B-Y. As to the digital signal, it is TMDS pixel frequency up to 330MHz with dual channel DVI output that can support DVI Dual HDCP tests to satisfy the application for testing higher bandwidth display.

In TV output specification, the image and chromaticity signals of 23294 comply with NTSC, PAL and SECAM regulations. The output signals include CVBS composite signals, Y/C (Luminance/Chrominance) image/chromaticity separate signals and S-Video/SCART output connector. It can also support special TV test functions such as Closed Caption, V-chip and Teletext.

To supply multiple test applications, Chroma is able to play the picture file format up to 4Kx2K resolution. Moreover, 3 HDMI and 2 SCART ports are built in to satisfy the test for multiport independent output and reduce the test time substantially.

Chroma 23294 has many special test patterns such as xvYCC, HDCP&E-EDID, 8/10 bit deep color, CEC, Lipsync and China high definition patterns for easy test assessment to save the time and increase productivity efficiently. In addition, the equipped application VPG Master with easy-to-use interface and complete test functions that is capable of editing various kinds of test procedures and parameters makes Chroma 23294 suitable for the R&D, production test and quality assurance of all video and related industries.



Model 23294 Rear View

ORDERING INFORMATION

23294 : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz
(TMDS Rate 225MHz)/TV/HDTV
A222906: IR Controller
A240001: Remote Controller

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A / RS-170 / VESA (VSIS)
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.4a (3D Format / ARC / HEC / CEC / Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS rate 225MHz)
Support HDMI Timing	85 Timing(CEA-861E)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC (IEC61966-2-4) / sYcc601 / Adobe RGB / Adobe sYcc601
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

3D VIDEO FORMAT OUTPUT	
3D Scanning Mode	Frame packing
	Field alternative
	Line alternative
	Side-by-Side (Full)
	L + depth
	L + depth + graphics + graphics-depth
	Top & Bottom
	Side-by-Side (Half)

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
23293-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
23294	4.5 kg / 9.9 lbs

All specifications are subject to change without notice.



Analog	**250 MHz**
DVI (TMDS)	**330 MHz**
HDMI V1.3C	**165 MHz**
(TMDS Rate 225 MHz)	
DisplayPort V1.1a	**270 MHz**

KEY FEATURES

- Multi-port output tests
  - 3 HDMI output ports
  - 2 DisplayPort output ports
  - 2 SCART ports (output x1/ input x1)
- DisplayPort V1.1a pixel rate 270MHz
  - 2 Link Rate (1.62/2.7Gbps)
  - 1,2,4 Video Lane
- HDMI V1.3C
  - True 30 bits color depth output
  - Support xvYCC & sYCC, Adobe RGB, Adobe YCC color space
  - Support CEC Function
  - Built-in Lip Sync test pattern
  - Digital audio output
  - 3 HDMI outputs to provide individual HDCP Enable/Disable
- DVI pixel rate 330MHz (dual channel)
- DVI Dual HDCP test application support
- DVI, HDMI & DisplayPort with HDCP output
- Support HDCP V1.0 (DVI) / V1.2 (HDMI) / V1.3 (DisplayPort)
- Y, Pb, P r / Y, Cb, Cr / Y, R-Y, B-Y output
- S-Video / CVBS / SCART / RGB / color component / D-terminal output
- NTSC/PAL/SECAM TV signal
- Support Closed caption / V-Chip / Teletext
- Built-in low low-distortion audio output (2ch/8ch)
- Easy-to-use audio hot key
- EDID read/write/compare
- USB (Host & Device)
- User key (up to 32 continuous actions can be combined)

Chroma 2333-B is a high value-added test equipment that can meet the diversified demands for multi-media displays. It has high resolution test quality and multiple output types that can support comprehensive tests for large-scale application in the field of R&D, quality assurance and mass production.

Chroma 2333-B combines Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals that can satisfy the needs for testing various signals from multi-media displays.

For digital signal: The TMDS output with pixel rate 25~330MHz that supports the dual channel HDCP test is able to fit in the high bandwidth test requirements under 120Hz screen refresh rate.

xvYCC ANALOG DVI Dual HDCP

NTSC/PAL SECAM | Close Caption | Teletext | V-Chip | SDTV | HDTV | Ture Color | Multi-Port

For HDMI output: The 2333-B provides higher speed bandwidth and color depth. It supports 24,30 bits (RGB or YCbCr) and the new generation color standards xvYCC, sYCC, Adobe RGB and Adobe YCC to attain truly natural color and high resolution image screen.It also supports complete CEC and Lip Sync tests.

DisplayPort is the new video output interface promoted by Video Electronics Standards Ass ociation; VESA. It is an open and extendable interface standard for display devices. Its maximum transmission bandwidth is up to 10.8Gb/s. With the official certification of VESA, Chroma 2333-B is able to provide the consistency and integrity signals in highest standard.

DisplayPort is composed of main channel, auxiliary channel and hot swap (HPD) 3 types of signals. The main channel is made by 4 lanes (1, 2, 4 Lane) and each lane supports 2.7Gbps or 1.62Gbps transmission rate. The parameters can be adjusted automatically via DPCD connection and complete the test procedure in sequential.

For TV output, the image and chromaticity signals are complying with the NTSC, PAL and SECAM standards. Also, the tests for special TV functions such Closed Caption, V-chip and Teletext are supported.
To fulfill the application of multi-port output test, Chroma 2333-B has built-in 3 HDMI, 2 DisplayPort and 2 SCART ports that can finish testing the displays with multi-port in the fastest speed and reduce the test time in a great deal.

Various test patterns and timing parameters are built-in Chroma 2333-B for operation. Shortcuts are provide for Timing/Pattern/Program/Audio to simplify the settings. The test program edited by the user on PC can be downloaded to Chroma 2333-B directly for storage and recall next time.

Moreover, for the function keys used frequently a special User Key is designed to combine these functions. Up to 32 keys can be memorized for continuous actions and executed by a single key. Besides the panel operation, remote control can be enabled with a remote controller for users to operate the device more easily.



Model 2333-B Rear View

ORDERING INFORMATION

2333-B : Video Pattern Generator
Analog 250MHz/DVI 330MHz/HDMI 165MHz (TMDS Rate 225MHz)/DisplayPort 270MHz
A222906: IR Controller
A240001: Remote Controller

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2160
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	D-SUB: Hs (Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A / RS-170 / VESA (VSIS)
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3C(with 24,30 bit deep color/xvYCC/CEC/ Lip Sync)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 @RGB & YCbCr
Color Space	RGB/ITU-R BT.601/ITU-R BT.709/xvYCC (IEC61966-2-4) /sYCC 601/Adobe RGB/ Adobe YCC 601
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPLAYPORT OUTPUT	
Version	DisplayPort 1.1a
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10 bits per component
HDCP	HDCP V1.3
DPCD	Read / Write
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Audio	2 Channel (L-PCM)-Internal
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	S-Video, RCA								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

AUDIO (ANALOG) OUTPUT	
Number of Channel	2 Channel (R / L)
Sample Rate	32, 44.1 , 48 , 88.2 , 96 , 176.4 , 192KHz
Level Resolution	10mV / Step
Level Range	0V to 2V (at 600 Ohms Load)
Frequency Range	10Hz to 20KHz / 10Hz Step
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN}, 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2333-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch
WEIGHT	
2333-B	4.5 kg / 9.9 lbs

All specifications are subject to change without notice.



Analog	**165MHz**	
DVI(TMDS)	**165MHz**	**(2402)**
HDMI V1.3b	**165MHz**	**(2402)**
(TMDS Rate	**225MHz)**	

KEY FEATURES

- Analog pixel rate 165MHz
- Analog output with DDC
- 2K x 2K Graphic size
- NTSC / PAL / SECAM signal (Model 2401)
- Closed Caption function (NTSC) (Model 2401)
- V-Chip function (NTSC) (Model 2401)
- Teletext function (PAL) (Model 2401)
- S-Video / CVBS / SCART / RGB Color Component / D-Terminal (Model 2401)
- Bi-level SDTV format (Model 2401)
- Tri-level HDTV Format (Model 2401)
- DVI pixel rate 165MHz (Model 2402)
- HDMI V1.3b (with xvYCC) (Model 2402)
- DVI & HDMI with HDCP output (Model 2402)
- Y, Pb, Pr/ Y, Cb, Cr/ Y, R-Y, B-Y output (Model 2401)
- PC remote control
- User Define Key
- Built-in variety of video timings & patterns
- Scrolling Pattern
- USB interface
- High Capacity Memory
- ESD protection circuit
- Economy

Along with the rapid development of LCD TV industry, all manufacturers are facing the competition of producing high value added and low cost products; and seeking for a total test solution to meet their needs has become the first priority.

Chroma 2401/2402 Video Pattern Generator with the features described below is specially designed to fit in the requirements and application of production line for LCD-TV manufacturers.

(1). Lightweight Design : The size of Chroma 2401/2402 VPG is close to A4 that is portable and handy for various kinds of spaces or locations.

(2). Exclusive Signals : The mapped international standard signal sources are provided for diverse Video signals requirements such as the requisite TV and monitor that are applied in the configuration of production line planning and test workstation.

(3). Convenient & Rapid Function : The test programs created in advance increase the production efficiency; in addition for the frequently used function keys, users can edit the User KEY to work with compound functions in specific test to save the test time.

(4). USB Interface : The convenient USB interface can use USB Disk on PC to edit test programs, patterns and even to upload or download the upgrade programs to 2401/2402 to reduce engineer's workload in setup and management.

(5). Large Capacity : It has built in large capacity of storage memory that allows users to swap and save for different UUT without backup or download.(1000 TIMINGS and PATTERNS, 500 PROGRAMS)

(6). Abundant Test Patterns : It includes standard static, dynamic and pattern screens to check the characteristics response, white balance and residual of UUT. Also it can use PC to create the test patterns required.

(7). Extended Control : The default extended function on the front/rear panel is able to add remote control device or output control device for on-line link automatically.



Model 2401 Rear View

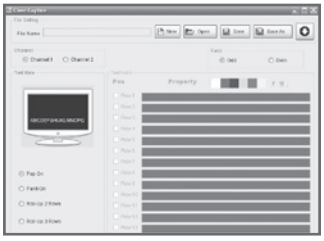


Model 2402 Rear View

ORDERING INFORMATION

2401: Video Pattern Generator
Analog 165MHz/TV/HDTV
2402: Video Pattern Generator
Analog 165MHz/DVI 250MHz/HDMI 165MHz
(TMDS Rate 225MHz)
A222906: IR Controller
A240001: Remote Controller

Software - Model 2401

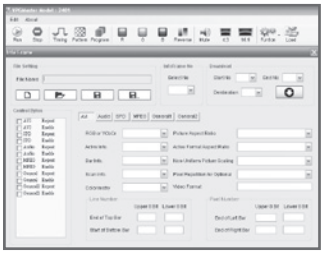


Closed Capation Screen

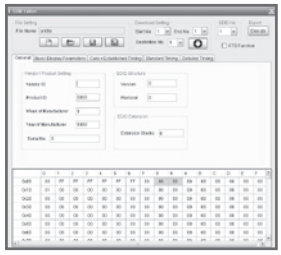


User Key Screen

Software - Model 2402



InfoFrame Screen



E-EDID Screen

All specifications are subject to change without notice.

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	2048 x 2048
Pixel Rate Range	0.5~165MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green / Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Black Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	64~8192 pixels / 2 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) / 1 line programmable 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B / RS-343A
	Y, R-Y, B-Y
	Y, Cb, Cr / ITU 601
	Y, Pb, Pr / ITU 709, RP 177, SMPTE 240M
	DDC II B

HDMI VIDEO OUTPUT (Model 2402 only)	
Version	HDMI V1.3b (with xvYCC)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing(CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 bits (1024 color)
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP Support	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32,44.1,48,88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/RL/RR/FC/LFE/RLC/RRC)
Bits per Sample	16
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DVI (TMDS) OUTPUT (Model 2402 only)	
Pixel Rate Range	25< 1 link ≤ 165MHz (256 color)
E-EDID	Read / Write / Compare / Edit
HDCP Support	HDCP V1.0
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

TV OUTPUT (Model 2401 only)									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating : G, 8 ans+, 13 ans+, 16 ans+, 18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

SDTV / HDTV FORMAT (Model 2401 only)					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
720 x 483	59.94P	60/1.001			SMPTE 293
			59.94I	59.94/2	ITU 601 SMPTE 170M
720 x 576	50P	50			ITU 1382
			50I	25	ITU 601
1920 x 1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920 x 1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280 x 720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

AUDIO (ANALOG) OUTPUT	
Frequency Range	50Hz~20KHz
Waveform	Sine wave
Number of Channel	2 Channel (R / L)
Level Range	0V to 2V (at 600 Ohms Load)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DATA STORAGE DEVICE	
Default	1000 timings + 1000 patterns
Internal Memory	1000 timings + 1000 patterns + 500 programs
External Memory	USB Host interface
OTHERS	
AC Input	1Ø 110~240V ±10% V_{LN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION	
2401 (H x W x D)	88 x 320 x 240 mm / 3.46 x 12.6 x 9.45 inch
2402 (H x W x D)	88 x 320 x 240 mm / 3.46 x 12.6 x 9.45 inch
WEIGHT	
2401	3.2 kg / 7.05 lbs
2402	3.1 kg / 6.83 lbs

All specifications are subject to change without notice.



KEY FEATURES

- One HDMI Source to connect up to 4 displays
- Support Full-HD 1080P resolution
- Compliant with HDMI V1.3
- Compliant HDCP V1.2
- HDCP Key sets allows each output independently
- Control by Smart I/O interface
- DDCIIB Plug & Play Function
- Distributor / Multiplexer Mode selection
- ESD protection
- Low cost

Chroma A222907 HDMI Distributor has HDMI signal output interface that can work with the Video Pattern Generator of Chroma to perform extended tests for HDMI signals.

This distributor has 1-In/4-Out HDMI ports that comply with the HDMI 1.3 standards to support the tests for the newest HDMI 1.3 functions.

In addition, Chroma A222907 is equipped with Distributor and Multiplexer modes that each output port can set the HDCP/EDID to be enabled or disabled concurrently or separately to facilitate the user's tests greatly.

Supporting most of CEC features which are used to communicate with HDMI network. Chroma A222907 can also output 4 CEC commands simultaneously to reduce user's test time. Depends on the showing response message from A222907 on the screen, users can verify the CEC function immediately.

In order to comply with the multi-port input design of digital FPD industry, this distributor adopts external connection with handy compact size to ease the use in variety of production lines and R&D labs.

Chroma A222907 has dynamic message function which can display HDCP key data and EDID content of TV and help users to check the data correctness.

This distributor is applicable for the Signal Generators with Smart I/O manufactured by Chroma to extend and expand the HDMI signals for various applications such as the long distance transmission of serial production line or parallel usage in demonstration room and etc. In the meantime, its special output design can be used to protect the back-end of a signal generator.

HDMI Distributor Application 1 for single unit
One A222907 has 4 outputs to test all of the HDMI ports (maximum 4) on the display directly.

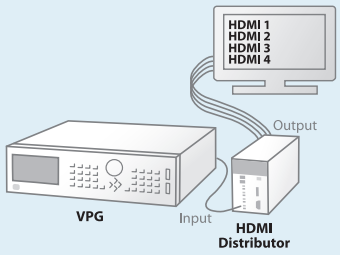
HDMI Distributor Application 2 for single unit
One A222907 can output signals to 4 displays to test the EDID & HDCP functions and interpret the data separately or concurrently.

HDMI Distributor Application 3 for multiple units
Multiple A222907 can be connected in series to test even more displays for the series-parallel application of multiple devices.

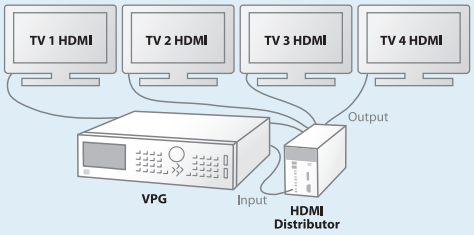
HDMI Distributor Application 4 for CEC feature
One A222907 can output features to 4 different displays to test CEC function of TV independently.

HDMI DISTRIBUTOR APPLICATIONS

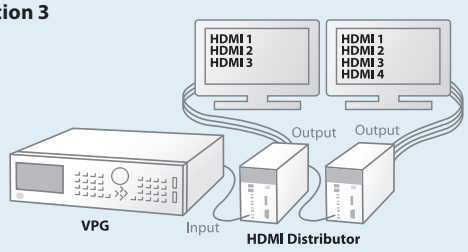
Application 1



Application 2



Application 3



SPECIFICATIONS

Output		
Signal Format		TMDS signal Link
Video Signal	Pixel Rate	25 to 165 MHz (TMDS CLK : 225MHz)
	Color Space	RGB, ITU-601, ITU-709, xvYcc
Audio Signal	Sampling Frequency	32 to 192 KHz
	Number of Channels	8 Channel
ESD / Surge protect (IEC 61000-4-2 Level 4 Regulation)		Contact 8KV / Air 15 KV
HDMI / HDCP		
HDMI Version		Version 1.3a
HDCP Version		Version 1.2
DDC		DDC2B compliant
E-EDID		Version1.3
Connector		
Input Signal Source from Chroma VPG Series		Equipped with Smart I/O port in 22xx / 23xx Series
HDMI		HDMI 19 Pin x5
Smart I/O		3 In 3 Out x1
CEC		
Support Feature		ONE TOUCH PLAY
		SYSTEM STANDBY
		OSD DISPLAY
		SET OSD NAME
		GIVE POWER STATUS
		AUDIO CONTROL
Front Control Mode		
Remote Mode		Control by VPG or Manual
Manual Mode		Output ON / OFF, or selection
Other		
User Interface		Smart I/O
DC Input		9V/2A (With Chroma adapter only)
Temperature	Operation	+5~+40 deg.C
	Storage	-20~+60 deg.C
Humidity		20~90%
DIMENSION & WEIGHT		
A222907 (H x W x D)		88 x 45 x 200 mm / 3.46 x 1.77 x 7.87 inch 750g / 1.65lbs

All specifications are subject to change without notice.

SDI Module

Model A222915



KEY FEATURES

- Convert HDMI signal to SDI signal output
- Support 48K Audio output
- SDI Output x 2
- SYNC Output x 1
- Comply with SDI Standard (SMPTE)
  - SD-SDI : SMPTE-259M
  - HD-SDI : SMPTE-274M / 296M
  - 3G-SDI : SMPTE-425M (Level A/B)
- SD/HD/3G format auto identification
- Control by Smart I/O interface
- ESD protection
- Low cost

Chroma A2229015 SDI Module is specially designed to meet the test demands of diversified low cost SDI signals for today's display industry. It has extended specifications and functions when integrated with the main VPG test device that creates the SDI signal products for applications in broad domain.

CE

It is an HMDI to SDI Adapter that can be controlled by Smart I/O. With the combination of Chroma VPG with A222915, the external module can be connected to Chroma VPG easily for various SDI tests.

Chroma A222915 has equipped with the latest 3G-SDI standard resolution which is the mainstream specification of all 1080P transmission. It can double the HDTV transmission rate in the advanced video environment, also enhance the overall broadcasting quality in the transmission network.

The industries of Chroma A222915 applied extensively include the distributed amplifier, video router and the serial connection interface of switch, camera and other devices. The SDI can use a 75Ω coaxial cable to transmit the uncompressed digital video signal within long distance range in a TV studio or a place with related equipment to achieve the high quality HD playback.

For peripheral industry, the display related customer can involve the SDI test requests directly to the application of LED TV wall, projector, outdoor large-scale display and broadcasting hardware.

In the meantime, its simple design is applicable for all SDI multimedia tests in practical use including R&D, manufacturing test and quality assurance, especially the mass production for rapid verification and assessment.

Moreover, Chroma A222915 uses HDMI as the signal input source and 2 sets of SDI can output at the same time. SD-SDI/ HD-SDI/3G-SDI supports 2CH / 8CH - 48khz Audio output that can work with VPG to test various standard static and dynamic images.

To cope with the design of multi-port inputs for the FPD in this digital age, the SDI module is developed to connect externally and in compact size to be used flexibly in any site of production line and laboratories.

SPECIFICATIONS

PIXEL RANGE				
Input : HDMI Signal		HDMI Ver1.0 ~ 1.3 (2.25Gbps)		
Output : SDI Signal		SD/HD/3G SDI SMPTE 259M/274M/296M/425M (Up to 2.97Gbps)		
Connector				
Input Signal Source from Chroma VPG Series		Equipped with Smart I/O port in 22xx / 23xx Series		
HDMI		Input : HDMI 19 Pin x1		
SDI		Output : BNC x2		
SYNC		Output : BNC x1		
ESD / Surge protect (IEC 61000-4-2 Level 4 Regulation)		Contact 8KV / Air 15 KV		
TIMING LIST				
Output format	Bit rate	Standard	Video format	
SD-SDI	270Mbps	SMPTE-259M	NTSC	720x480/59.94i
			PAL	720x576/50i
HD-SDI	1.485Gbps	SMPTE-274M	1920x1080p	30/29.97/25/24/23.98
			1920x1080i	60/59.94/50
		SMPTE-296M	720p	60/59.94/50
3G-SDI	2.97Gbps	SMPTE-425M (Level A)	1920x1080p	60/59.94/50
			1920x1080i	60/59.94/50
			1920x1080psf	30/29.97/25/24/23.98
		SMPTE-425M (Level B)	1920x1080p	60/59.94/50
Other				
User Interface		Smart I/O		
DC Input		9V/2A (With Chroma adapter only)		
Temperature	Operation	+5~+40 deg.C		
	Storage	-20~+60 deg.C		
Humidity		20~90%		
DIMENSION & WEIGHT				
A222915 (H x W x D)		88 x 45 x 200 mm / 3.46 x 1.77 x 7.87 inch 750g / 1.65lbs		



KEY FEATURES

- TV / Monitor PCBA test system
- VESA / JEIDA data mapping
- LVDS 2 channel input / output
- LVDS 6 / 8 / 10 bits
- LVDS pixel rate
  - 1 Link up to 135MHz
  - 2 Link up to 270MHz
  - 4 Link up to 540MHz (A222917 x 2)
- Timing / pattern / audio compare
- LVDS Vdd measurement
- DC voltage measurement
- PWM frequency / duty cycle measurement
- Bidirectional digital control
- Speaker / headphone audio input
- Optical / Coaxial audio input (SPDIF)
- EDID / HDCP test (with VPG)
- IR transceiver control (Option)
- ESD protection
- Modular design
- High Cost-performance value

Chroma A222917 is a multi-functional PCBA main board signal test device for display. It has ultra high speed LVDS (Low-voltage differential signaling) as image signal analysis core to provide high efficiency and stability test quality. It can form a PCBA automatic test system when integrated with the newest generation of Chroma 22XX Series Video Pattern Generator (*1) that can meet the requirements for testing the PCBA main boards automatically in present and future multi-media display industries.

The A222917 Pattern Analyzer supports various audio and video automatic testing functions for PCBA production line. The features include:

High speed LVDS video pattern standard format signal analysis interface that supports VESA and JEIDA standard with 6 / 8 / 10 color depth testing selection. The LVDS signal frequency supports up to 270MHz in Dual link mode and is able to output simultaneously during analysis so that the user can connect the panel to do screen inspection.

LVDS timing analysis
Timing analysis can be done via various detail parameters including pixel rate, horizontal and vertical timing, which can be used easily to judge if the LVDS transmission channel is correct.

Image comparison
It replaces the traditional artificial screen inspection with high speed image comparison core to do a series of comparison on each frame. The user can set the frame numbers and maximum 32 comparing blocks in each frame for comparison. It can also mark the error coordinates and inspection values for follow-up fixing latter.

Audio signal test
It has digital/analog audio signal amplitude and frequency test capability for the production line to test the audio signal interface function rapidly.

Digital control interface
It has 16 channels of bidirectional digital control interface and is able to set 3.3V or 5V interface voltage for automatic testing control or warning.

Voltage measurement module
Equipped with LVDS Vdd voltage and 8 DC voltage measurement modules, A222917 is able to measure the voltage for PCBA test points.

To achieve automated test application for PCBA production line, the A222917 Pattern Analyzer replaces the traditional screen inspection with automatic signal inspection device by programming the complex PCBA test procedures via software. Only one button is required for the actual production line inspection to complete related tests automatically. It saves the test time greatly and improve the test accuracy.

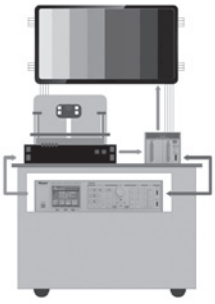
The A222917 has graphical test program editing software that gives the user an easy and fast way to manage and edit the test programs with the actual test items performed in production line. The easy-to-use operating interface and complete test functions are most applicable for all video and related industries when doing research and development, production test and quality assurance.

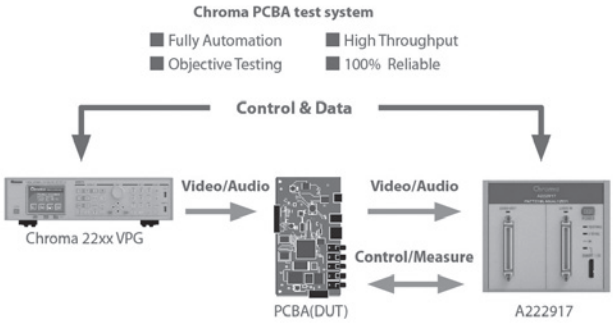
(*1) Models supported:
22293/22293-A/22293-B/22294
2233/2233-A/2233-B/2234

ORDERING INFORMATION

A222917 : Pattern Analyzer

CONFIGURATION





SPECIFICATIONS

LVDS In/Out	
Signal format	VESA / JEIDA
Color depth	6 / 8 / 10 bits
Link mode	1 link up to 135 MHz / 2 link up to 270MHz
Audio input	
Channel	2 Ch(LINE/COAX/OPTICAL) / 3 Ch(SPEAKER)
Amplitude	0 ~ 4 Vp-p(LINE) / 0 ~ 40 Vp-p(SPEAKER)
Frequency	20 Hz ~20 KHz
Digital I/O	
Voltage range	3.3V / 5V Selectable (Bidirectional)
DC voltage measurement	
Voltage range	0 ~ 20V
Connector	
LVDS	MDR 50 pin x 2
S/PDIF Input	Optical x1 / Coaxial x 1
Line in	Headphone Jack x 1
Speaker in	8 pin 2.5mm header x 1
Other	
DC Input	9V/2A (With Chroma adapter only)
Temperature (Operation/Storage)	+5~+40 deg.C / -20~+60 deg.C
Humidity	20 ~ 90%
Dimension & Weight	
A222917	88X100X200 mm / 3.46X3.94X7.87 inch (H x W x D) 1 kg / 2.2 lbs

All specifications are subject to change without notice.



KEY FEATURES

Model 28101/28102

- LVDS signal input / output
- Video pixel rate up to 85 MHz(1 link) / 170 MHz(2 link)
- Graphics display size up to XGA(1 link) / UXGA(2 link)
- Support MDR-26 Connector

Model 28111

- TMDS signal input / output
- Video pixel rate up to 165 MHz(1 link)
- Graphics display size up to UXGA(1 link)
- Support DVI-I Connector

Chroma Model 281XX Series Digital Distributors can distribute 1 signal to 5 output signals. Conforming to the digital video standards of today, they are able to work alone or be extended for additional signals for remote or multiple display devices.

The digital video distributor is suitable for applications like long distance transmission, burn-in system, production line, multi-display in exhibition, signal source protection and repair center.

The high-speed differential transmission feature provides the qualities of high volume data without any output distortion, high anti-noise, and long distance transmission that can be broadly used in video and communication industries.

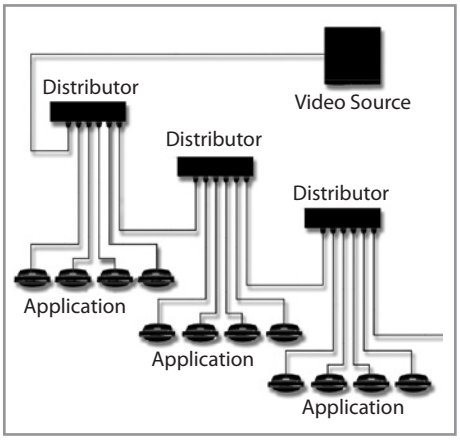
Total four models of Low Voltage Differential Signaling (LVDS), and Transition Minimized Differential Signaling (TMDS), with 1 link / 2 links are provided for various applications without changing the connectors to avoid the distortion caused by signal conversion. Its unique circuit design and internal regulator device enable it to work stably when operating under maximum frequency. The 19" Rack Mount design chassis can fit in the industrial cabinet easily for unification.

Model 28101(1 link) / 28102(2 link) are LVDS signal distributors. The frequency range for 1 link is 20MHz~85MHz that can support up to XGA display, and for 2 link is 40MHz~170MHz that can support up to UXGA display. The MDR-26 connector used has up to 10M transmission length and does not cause any signal distortion.

Model 28111(1 link) is TMDS signal distributor. The frequency range for 1 link is 25MHz~165MHz that can support up to UXGA display.

ORDERING INFORMATION

28101 : LVDS Digital video distributor 85MHz
28102 : LVDS Digital video distributor 170MHz
28111 : TMDS Digital video distributor 165MHz



1 to 5 Video Distributor Block Diagram

SPECIFICATIONS			
MODEL	**28101**	**28102**	**28111**
In / Out	1 In / 5 Out	1 In / 5 Out	1 In / 5 Out
PIXEL RANGE			
1 Link	20 - 85 MHz	20 - 85 MHz	25 - 165MHz
2 Link	-	40 - 170 MHz	-
DISPLAY			
Display Size	Up to XGA	Up to UXGA	Up to UXGA
SIGNAL INTERFACE			
LVDS	Yes	Yes	-
TMDS	-	-	Yes
DDC 2B	-	-	Yes
Connector	MDR-26	MDR-26	DVI-D
Transmission Distance	5m	5m	2m
INPUT LEVEL			
Differential Input Voltage	200mV (Typ)	200mV (Typ)	250 - 1000mV (Typ)
OUTPUT LEVEL			
Differential Output Voltage	250 - 450mV	250 - 450mV	400mV (min)
Terminator Resistance	100 Ω Typical	100 Ω Typical	50 Ω Typical
POWER			
Input Power	110V ±10%/ 60Hz 0.3A	110V ±10%/ 60Hz 0.3A	110V ±10% / 60Hz 0.5A
	220V ±10%/ 50Hz 0.1A	220V ±10%/ 50Hz 0.1A	220V ±10% / 50Hz 0.2A
Power Indicator	Yes		
ENVIRONMENT			
Operation Temp.	0 - 40˚C		
Storage Temp.	-20 - 60˚C		
Humidity	20 - 90		
DIMENSION (H x W x D)	44.5 x 424.6 x 112.5 mm / 1.75 x 16.72 x 4.43 inch		44.5 x 424.6 x 175 mm / 1.75 x 16.72 x 6.89 inch
WEIGHT	1.5 kg / 3.3 lbs	1.2 kg / 2.64 lbs	1.8kg / 3.96 lbs

All specifications are subject to change without notice.

Display Color Analyzer

Model 7123



USB Flash Disk | IIC | USB | RS-232 | CE

xyY | TΔuvY | u'v'Y | RGB | XYZ | FLVL | FMA | Contrast | Program

KEY FEATURES

- Luminance and chromaticity measurement of Color Display
- 0.005 cd/m² low luminance measurement (A712301)
- Wide range of luminance display:
  0.0001 to 25,000 cd/m² (A712301)
  0.01 to 200,000 cd/m² (A712302)
  0.01 to 6000 cd/m² (A712200)
- High accuracy measurement
- Maximum 9 display modes:
  xyY, TΔuvY, u'v'Y, RGB, XYZ, FMA(A712200), FLVL(A712200), Contrast, Program
- Support Contrast, JEITA and VESA for flicker measurements (A712200)
- Able to control Video Pattern Generator and UUT (Unit Under Test)
- Built-in contrast measurement function to calculate the contrast ratio directly
- Equipped with programmable test items that can complete the planned tests with one single button
- Support USB flash disk that can copy the test procedures to other station for use
- Judgment function embedded to judge the test result automatically with one single button
- Calibration period setting and reminding function
- Memory for storing 100 channels of standard color data and calibration data
- Built-in flat display calibration data LCD-D65 & LED-D65* to be applied for chromaticity measurement instantly
- Optional display white balance alignment system can be used to integrate all optical test stations to one single station

* It uses the typical fluorescent excited white light LED display

Chroma 7123 Display Color Analyzer adopts the design of contact and non-contact type measurements based on the probe selected to measure the luminance and chromaticity of display panels. Developed with the most advanced digital signal processor and the technology of optoelectronic transfer as well as precision optical parts and circuit design, the 7123 Display Color Analyzer is capable of performing high speed, accurate and stable color tests.

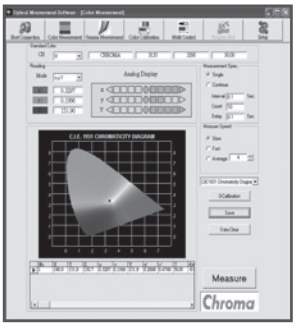
The configuration of Chroma 7123 complies with the color matching function sensor of CIE 1931 and CIE1976 UCS that can measure the luminance and chromaticity of display panel accurately. Users can switch to various types of chromaticity coordinates freely including xyY, TΔuvY, u' v' Y, RGB, XYZ, FMA (A712200), FLVL (A712200), Contrast and Program 9 modes in total. The A712301 that is designed to test the LCD characteristics with LED backlight is able to meet the low luminance test requirements of 0.005cd/m². In addition, the A712302, designed for small size display in particular can solve the problem of color analyzer measurement area larger than the display area with its 5mm measurement area.

To satisfy the needs for automation, the 7123 is equipped with the function to control the video pattern generator and the UUT without using a personal computer to cut down the acquisition and management cost. The 7123 also has the functions of contrast measurement, result judgment and programmable test items that can fulfill the auto test requirements to enhance the production efficiency.

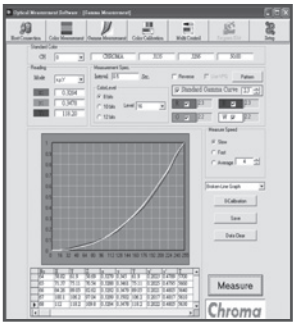
The Optical Measurement Software incorporated by Chroma 7123 is able to do chromaticity, luminance, Flicker (A712200) and Gamma measurements on PC, and then show the measured data on CIE 1931 and CIE1976 UCS chromaticity coordinate chart directly. Besides the function of drawing Gamma curve, the measured data can also be stored on PC and exported to EXCEL® for process. The example programs enclosed in optical measurement software allow users to develop the test programs that suit their needs.

Chroma 7123 Display Color Analyzer has 100 channels of built-in memory for storing the value of standard colors and calibrated data. In addition, Chroma 7123 also provides many friendly user interfaces for operation such as the way test data shows, the position set for push buttons, the positioning projector, USB and RS-232 interfaces for data transmission, calibration period setting as well as reminding function and etc. to satisfy the requirements for actual measures. Using the USB flash disk, the test procedures can be copied to other stations for use and reduce the time for repeated editing considerably.

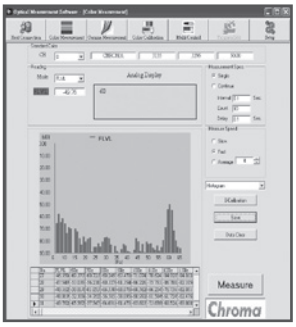
As the technology and products of flat displays have become the mainstream in the market today, every manufacturer is seeking for high value-added and low cost measurement solutions to raise its competitiveness; Chroma 7123 Display Color Analyzer is the excellent tool to assist in achieving that purpose.



Color Measurement



Gamma Measurement



Flicker Measurement

Software Development Kit (SDK)

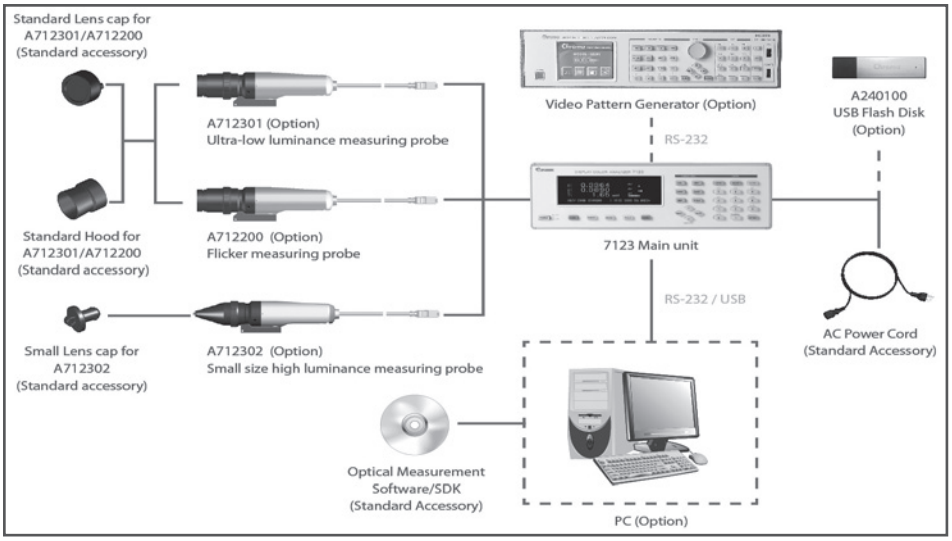
- Example Program:
  - Color Measurement
  - Gamma Measurement
  - Color Calibration
  - Multiple Control
- API Development Library

System Requirements

Operating System: Windows® 2000/XP/7

Windows® & EXCEL® are the registered trademarks of Microsoft in United States and other countries.

System Diagram



All specifications are subject to change without notice.

SPECIFICATIONS				
Model		**7123**		
Probe Model		A712301 (Ultra-Low luminance measuring probe)	A712302 (Small size high Luminance measuring probe)	A712200 (Flicker measuring probe)
Measurement Area		Ø27 mm / Ø1.06 inch	Ø5 mm / Ø0.20 inch	Ø27 mm / Ø1.06 inch
Measurement Distance		30±10mm	0~10mm	30±10mm
Acceptance Angle		± 2.5°	± 5°	± 2.5°
Display Range	Luminance	0.0001 to 25,000 cd/m²	0.01 to 200,000 cd/m²	0.01 to 6,000 cd/m²
	Chromaticity	4 or 3 digits display		
Luminance unit		cd/m² or fL, selectable via button on the front panel		
Display Mode	Digital	xyY ; TΔuvY; u' v' Y ; RGB ; XYZ ; Contrast; Program		xyY; TΔuvY; u' v' Y; RGB; XYZ; FMA; FLVL; Contrast; Program
	Analog	Δx Δy ΔY; ΔR ΔG ΔB; ΔR G/R B/R; R/G ΔG B/G		Δx Δy ΔY; ΔR ΔG ΔB; ΔR G/R B/R; R/G ΔG B/G;FMA
Luminance *1	Meas. Range	0.0050 to 6,000cd/m² (0.001 to 1751fL)	0.30 to 6,000 cd/m² (0.09 to 1751 fL)	0.10 to 6,000 cd/m² (0.03 to 1751 fL)
	Accuracy	0.0050 to 0.0199 cd/m² : ±0.0005cd/m² 0.020 to 0.099 cd/m² : ±4% ±2 digits 0.100 to 6,000 cd/m² : ±2% ±1 digi	0.30 to 6,000 cd/m² : ±2% ±1 digit	0.10 to 6,000 cd/m² : ±2% ±1 digit
	Repeatability	0.0050 to 0.0199 cd/m² : ±0.0003cd/m² 0.020 to 0.099 cd/m² : 1% + 2 digits(2σ) 0.100 to 0.999 cd/m² : 0.2% + 1 digit(2σ) 1.00 to 6,000 cd/m² : 0.1% + 1 digit (2σ)	0.30 to 2.99cd/m² : 0.2% +1 digit(2σ) 3.00 to 6,000 cd/m²:0.1%+1 digit(2σ)	0.10 to 0.99 cd/m² : 0.2% + 1 digit (2σ) 1.00 to 6,000 cd/m²: 0.1% + 1 digit (2σ)
Chromaticity *1	Accuracy	0.100 to 2.99 cd/m² : ±0.008 3.00 to 4.99 cd/m² : ±0.005 5.00 to 9.99 cd/m² : ± 0.003 10.00 to 6,000 cd/m² : ± 0.002	0.30 to 14.99 cd/m² : ± 0.008 15.00 to 119.9 cd/m² : ± 0.005 120.0 to 6,000 cd/m² : ± 0.003	0.1 to 2.99 cd/m² : ± 0.008 3.00 to 4.99 cd/m² : ± 0.005 5.00 to 9.99 cd/m² : ± 0.003 10.00 to 6,000 cd/m² : ± 0.002
	Repeatability	0.100 to 0.199 cd/m² : 0.015(2σ) 0.200 to 0.499 cd/m² : 0.008(2σ) 0.500 to 1.99 cd/m² : 0.003(2σ) 2.00 to 6,000 cd/m² : 0.001(2σ)	0.30 to 0.59 cd/m² : 0.015 (2σ) 0.60 to 1.49 cd/m² : 0.008 (2σ) 1.50 to 7.99 cd/m² : 0.003 (2σ) 8.00 to 6,000 cd/m² : 0.001 (2σ)	0.10 to 0.19 cd/m² : 0.015 (2σ) 0.20 to 0.49 cd/m² : 0.008 (2σ) 0.50 to 1.99 cd/m² : 0.003 (2σ) 2.00 to 6,000 cd/m² : 0.001 (2σ)
Flicker -Contrast Method(FMA)	Range	---	---	5 cd/m² or higher
	Display Range	---	---	0.0 to 100%
	Accuracy	---	---	±1% (Flicker frequency: 30 Hz AC/DC10 % sine wave) ±2% (Flicker frequency: 60 Hz AC/DC 10 % sine wave)
	Repeatability	---	---	1% (2σ) (Flicker frequency: 20 to 65 Hz AC/DC 10 % sine wave)
Flicker -JEITA/ VESA Method (FLVL)	Range	---	---	5 cd/m² or higher
	Display Range	---	---	6-240Hz
	Accuracy	---	---	±0.5dB (Flicker frequency: 30 Hz AC/DC10 % sine wave)
	Repeatability	---	---	0.3dB (2σ) (Flicker frequency: 30 Hz AC/DC 10 % sine wave)
Measurement Speed	xyY	Y:0.0050 to 0.0199 cd/m²: 1 times/sec (Low luminance Mode) Y:0.020 to 1.99 cd/m² : 4 times/sec. (Auto mode) ; 2.00 cd/m² and above: 15 times/sec.	0.3 to 7.99 cd/m² :1 time/sec. 8.00 cd/m² and above:15 times/sec.	0.1 to 3.99 cd/m² : 5 times/sec. ; 4.00 cd/m² and above: 15 times/sec.
	FMA	---	---	6 times/sec. (UNIV) ; 20 time/sec.(NTSC); 16 times/sec. (PAL)
	FLVL	---	---	0.5 time/sec.
Dimension		Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch	Ø 46 x 221.9(D) mm / Ø 1.81 x 8.74 (D) inch	Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch
Weight		0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs
Cord Length		2.5m / 98.43 inch		
Optical System		LED positioning function		
Main unit				
Memory Channel		100 Channels		
Sync Mode		NTSC, PAL, EXT, UNIV, INT		
Object Under Measurement		10~240 Hz		
Interface		USB(2.0), USB flash disk port, RS-232C (Baud rate max. 115200)		
Input Voltage Range		1Ø 110~240V ±10% V_{LN}, 47~63Hz, 50VA		
Operating Temperature/ Humidity Range		10°C to 30°C (50°F to 86°F); less than 75% relative humidity (with no condensation)		
Storage Temperature / Humidity Range		0°C to 40°C (32°F to 104°F); less than 75% relative humidity (with no condensation)		
Dimension (H x W x D)		115x320x260 mm / 4.5x12.6x10.2 inch		
Weight		2.7 Kg / 5.95lbs		
Other Functions		Customized light source calibration, memory channel ID storage, variable analog display range, display pause, remote control, comparison, video pattern generator and UUT control, programmable test item, test result judgment, calibration period setting and reminding function, USB flash disk supported. *2		
Certification		CE		

Note *1: Standard illuminant A is used for test according to Chroma's test condition.
***Reference standards:** IEC 61747-6, EIAJ ED-2522, ASTM E455-03, VESA Standard

Note *2: Only the USB flash disks certified by Chroma are supported.

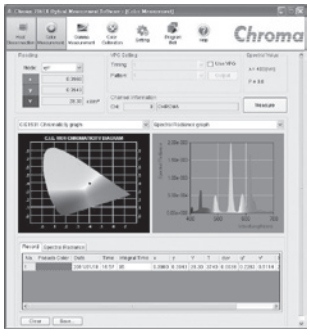
ORDERING INFORMATION

7123 : Display Color Analyzer Main Unit
A712200 : Flicker measuring probe (with 2.5m signal cable)
A712301 : Ultra-Low luminance measuring probe (with 2.5m signal cable)
A712302 : Small size high luminance measuring probe (with 2.5m signal cable)
A712102 : Tripod (including a level gauge)

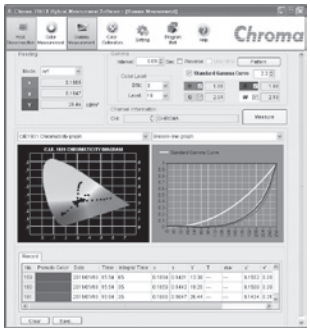


KEY FEATURES

- Use of spectrophotometric technique
- Suitable for laboratories and production lines
- Display luminance, chromaticity and spectral measurement
- 0.01 cd/m² low luminance measurement
- Wide range of luminance display: 0.01 to 2000 cd/m²
- Highly accurate measurement
- Up to 9 display modes: xyY, TΔuvY, u'v'Y, XYZ, λd/Pe, Spectral, Contrast, Program and User Define
- Wide view color LCD to facilitate the reading and operation
- Able to control the Video Pattern Generator and DUT
- Built-in contrast measurement for contrast ratio calculation
- Embedded with programmable test items to test the planned items with one key
- Support USB interface for data control and process
- Equipped with judgment function for production line to use easily
- Built-in calibration period setting and reminding function
- Able to connect external device for synchronized trigger function



Color Measurement



Gamma Measurement

Chroma 71611 Spectrocolorimeter is specially designed to meet the requirements of laboratory and production line by implementing the contact and non-contact measurement to test the luminance and color presentation of display panels. Developed with the most advanced digital signal processor and photoelectric conversion technology, Chroma 71611 is able to measure the color with high speed, accuracy and stability when integrated with precision optics and circuit design.

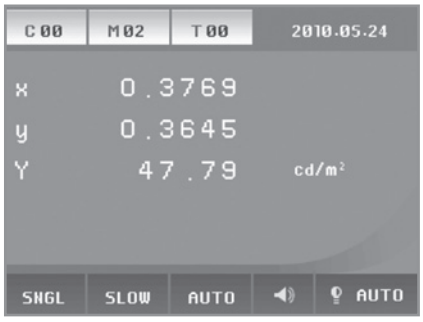
The spectrophotometric technique applied to 71611 can measure the display panel spectral precisely and calculate the luminance and chromaticity correctly. It is applicable for the displays in different technologies and solves the problem of measurement errors caused by the DUT (Device Under Test) spectral difference to save the time and cost from frequent calibrations. The user is able to change various display modes including xyY, TΔuvY, u' v' Y, XYZ, λd/Pe, Spectral, Contrast, Program and User Define. For the LCD with LED backlight, the 71611 has designed in particular to meet the 0.01cd/m² low luminance requirement.

The 71611 is able to control the Video Pattern Generator and DUT directly for automation without using a PC to save the cost of PC purchase and management. Moreover, there are functions of contrast measurement, result judgment and programmable test items to fulfill the needs of automated test and increase the production efficiency.

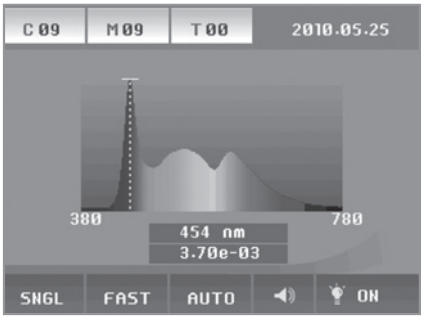
The optical measurement software 71611uses is able to measure the chromaticity, luminance, spectral and Gamma on a PC, and show the data on the chromaticity coordinate of CIE 1931 and CIE1976 directly with Gamma curve drawing. It can also save the measured data to PC or import to EXCEL® for process. The program example of optical measurement software allows the user to develop a suitable test program fits the need rapidly.

The 71611 has 9 memories built in to store the standard spectral calibration data. In addition the 71611 has many user-friendly designs to comply with the user's requirements, such as the color display, the way test data displays, the button's position, the light positioning device, the USB and RS-232 data transmission interface, as well as the setting and reminding functions of calibration period. The supported USB flash disk drive can copy the test programs to other devices for use to save the time for repeat editing.

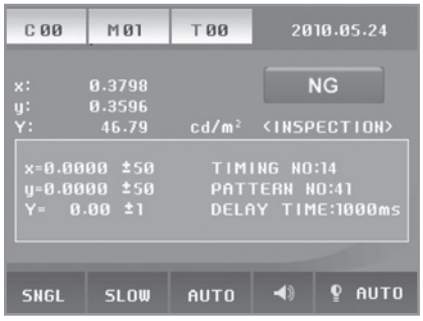
As the technology and products of flat panel display have become the mainstream of market, every manufacturer is in search of the solution for high value-added and low cost automated measurement. Chroma 71611 Spectrocolorimeter is the excellent tool to assist the FPD industry in improving the efficiency and the competitiveness.



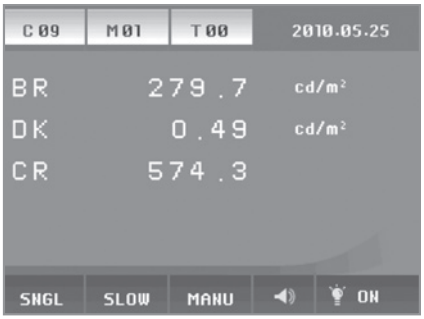
Chromaticity Measurement



Spectrum Measurement



Test Result Judgment



Contrast Measurement



71611 Rear Panel

All specifications are subject to change without notice.

Calibration Application



SPECIFICATIONS

Model		71611
Wavelength		400~700 nm
Wavelength Resolution		0.3nm/pixel
Wavelength Interval		1nm
Spectral Accuracy		±0.3nm(average wavelength:546.1nm Hg lamp)
Acceptance Angle		±2.5°
Measuring Distance		30±10mm
Measuring Area		φ27mm
Luminance Unit		cd/m² or fL
Display Mode		xyY、T△uvY、u' v'Y、XYZ、λd/Pe、Spectral、Contrast、Program、User Define
Luminance *1	Range	0.01 to 2,000 cd/m² (0.003 to 583.8 fL)
	Accuracy	0.01 to 0.99 cd/m² : ±0.02 cd/m² ±1digit 1.00 to 2,000 cd/m² : ±2 % ±1digit
	Repeatability Accuracy	0.01 to 0.99 cd/m² : 0.01 cd/m² + 1digit (2σ) 1.00 to 7.99 cd/m² : 0.5 % + 1digit(2σ) 8.00 to 2,000 cd/m² : 0.1 % + 1digit (2σ)
Chromaticity *1	Accuracy	0.50 to 0.99 cd/m² : ±0.007 1.00 to 9.99 cd/m² : ±0.004 10.00 to 2,000 cd/m² : ±0.003
	Repeatability Accuracy	0.50 to 0.99 cd/m² : 0.003 (2σ) 1.00 to 1.99 cd/m² : 0.002 (2σ) 2.00 to 3.99 cd/m² : 0.001 (2σ) 4.00 to 7.99 cd/m² : 0.0005 (2σ) 8.00 to 2,000 cd/m² : 0.0004 (2σ)
Measurement Speed		Fast: 2~10 sec./per test , Slow: 4~15 sec./per test
Optical System		LED positioning function
Data Display		Color display
Memory		9 channels
Sync Mode		EXT, INT
Sync Frequency		10~200 Hz
Data Comm. Interface		USB(2.0), USB flash disk drive communication port, RS232C (Baud rate max. 115200)
Input Voltage Range		1Ø 110~240V ±10% V_{LN}, 47~63Hz, 1A ; DC 24V 16.7A
Operating Temperature / Humidity Range		5°C to 30°C (50°F to 86°F) ; less than 80% relative humidity (non-condensing)
Storage Temperature Range		0°C to 40°C (32°F to 104°F) ; less than 80% relative humidity (non-condensing)
Dimension (H x W x D)		218 x 138 x 364 mm / 8.59 x 5.44 x 14.33 inch
Weight		5.08 kg / 11.17 lbs
Other Function		Customized light source calibration, memory channel ID storage, display pause, remote control, contrast measurement, video pattern generator and DUT control, programmable test items, test result judgment, calibration period setting and reminding, USB flash disk drive supported *2

Note*1: The standard A light source is used for test which set measure mode on AUTO and measure speed on slow.
Note*2: Only the Chroma certified USB flash disk drive is supported.
* Reference standards: IEC 61747-6, EIAJ ED-2522, ASTM E455-03, VESA Standard

ORDERING INFORMATION

71611 : Spectrocolorimeter



KEY FEATURES

- 0.001 Lux ultra low illumination display range
- Comply with ANSI-1997, JBMIA, IEC & SJ/T projector testing standards
- 29 sets chroma meter & Illuminance meter measuring at the same time, high test throughput
- Integrated with Video Pattern Generator and one click to complete all measurements
- Accurate chroma meter with tuned color filters (closely approximates CIE 1931 color matching functions), and cosine correctors
- User-defined calibration function facilitates the system maintenance
- Testing criteria storage for various models requirements
- "Pre-Test" function to edit testing items setting for non-ANSI standard tests
- Automatic white balance adjustment
- Auto maximum brightness selection and DC-index compliance with chromaticity specification
- Complete test items: ANSI Lumens, Light Uniformity, Color Uniformity, Contrast Ratio and Correlated Color Temperature
- High accuracy measurement:
  Y : ±2%±1 digit
  x, y : ±0.002
- Precise repeatability measurement:
  Y : ±0.5%±1 digit
  x, y : ±0.0005
- NIST traceable calibration
- Data output saved automatically for statistical analysis and able to upload to MES
- User authority control for system management
- Support Windows XP/7(32Bit)

Chroma 7600A is an automatic test system developed in compliance with with ANSI /NAPM IT 7.228-1997 which is defined by American National Standard Institute, JBMIA-ISO21118 (2005.8) which is defined by Japan Business Machine & Information Industry Association, IEC61947-1 (2002) which is defined by International Electrotechnical Commission and SJ/T 11340-2006 (2007.1.1) which is defined by Ministry of Industry and Information Technology of the People's Republic of China to test the front projectors. The chroma meter used in the system is designed with advanced microprocessor and precision optical components along with filters closely approximate to CIE 1931 Color Matching Function and Cosine Correction. It can offer accurate and high-speed illuminant and chromatic measurements performance and quality judgments for LCD, DLP and LCOS projectors.

The software of Chroma 7600A is a Window™ based control program with comprehensive graphic user interface that can enhance testing efficiency of the projector manufacturers and lower down the test and labor cost. With the integration of video pattern generator of Chroma, the user can complete all the ANSI-1997 testing items, acceptance criteria and file saving with just one click.

To accommodate the diversified needs users may have, Chroma 7600A provides various test results including ANSI Lumens, Light Uniformity, Color Uniformity, Contrast Ratio and Correlated Color Temperature for one's choice. In addition, a flexible formula editing wizard is offered for the user to edit the desired calculation formula. The "Pre-Test" function in the software allows the user viewing the measured values in real time to integrate into the convergence, grayscale tests and VR adjustments etc. before performing ANSI tests. And with the user-defined calibration function Chroma 7600A provides, it is very convenient for the system maintenance which can reduce the calibration cost in the future effectively.

When the performance of luminance-chrominance has become the key factor for the value of front projector, the chromaticity measurements must comply with more standards and test benchmarks. As the demand of compact, high brightness and resolution display devices is increasing quickly now, the front projector will play a leading role in the near future. Every front projector make is looking for the most cost-effective test solution to keep up with this trend. Such a versatile and easy-to-use instrument like Chroma 7600A must satisfy your intent to win competitive advantages.

SPECIFICATIONS

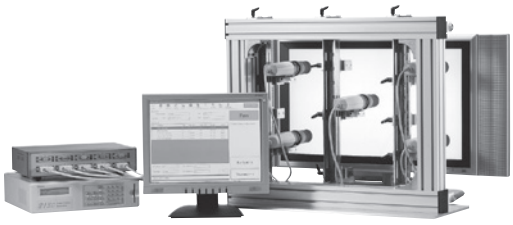
Model	7600A	
Photo Sensor	13 chroma meters (13 points) or 13 chroma meters plus 16 Illuminance meters (29 points) closely approximates CIE 1931 Color Matching Function, and cosine correctors	
Illuminance Range	0.05 to 30,000 Lux	
Display Range	0.001 to 30,000 Lux	
OS	Windows® XP/7(32bit)	
Software User Interface	Based on ANSI test standard : Illuminance & Chromaticity test (13 points) readings : Y, x, y/CCT/ Y, u', v'/ △u'v'/ANSI Lumens/Uniformity/Max/Min/ Avg. Contract Ratio analysis (16 points) readings : Y/Contrast Ratio/Max/Min/ Avg.	
	User-defined testing parameters, calculating formula, white balance adjustment, auto maximum brightness selection and DC-index compliance with chromaticity specification	
	Data storage and uploading to MES	
Measuring Area	60 in. (13 points & 29 points)	25 in. (13 points) *1
Body Modular	Fixed : 4:3, 16:9,16:10 3 in 1 : 4:3/16:9/16:10	Fixed : 4:3, 16:9,16:10 3 in 1 : 4:3/16:9/16:10
Chroma Meter Measuring Area	Ø22mm	
Repeatability (2σ) *2	Y : ±0.5% ± 1 digit ; x, y : ±0.0005	
Accuracy *2	Y : ±2%±1 digit ; x, y : ±0.002	
Data Communication	USB	
Power	1Ø 110~240V ±10% V_{LN}, 47~63Hz, 50VA	
Power Consumption	55VA max. (110V AC 60Hz)	
Operating Temp./Humidity Range	5˚C to 40˚C (41˚F to 104˚F); >75% R.H. (without condensation)	
Storage Temp./Humidity Range	0˚C to 50˚C (32˚F to 122˚F) ; >75% R.H. (without condensation)	
Certification	CE	

Note *1 : 25 in. supports 13 chroma meters only
Note *2 : Measurement condition is under 500 Lux illuminant A

ORDERING INFORMATION

7600A : Front Projector ATS
Project Board : 60 in. ,25 in.
Body Modular : Fixed - 4:3,16:9,16:10 ; 3 in 1 - 4:3/16:9/16:10
71507 Chroma meter (13 points)
71508 Illuminance meter (16 points)
A766006 : USB to I^2C Bridge
LCD Display
Video Pattern Generator : Refer to Chroma Series

All specifications are subject to change without notice.



RS-232 Socket IIC CE

KEY FEATURES

- Multiple dots non-contact luminance and chromaticity measurements for color display
- Wide luminance range: 0.0001 to 25,000 cd/m² (A712301)
- Support LCD, PDP and various types of flat panels
- Support 2, 5, 9, 16, 25 sensors measurement simultaneously with fast speed
- Available test items are: Luminance, chromaticity, color temperature, luminance uniformity, chromaticity uniformity and contrast
- Exclusive test software that can be programmed by user with high flexibility and operation efficiency
- User can complete all planned measurements by pressing a single button when integrated with video pattern generator
- Multiple Pre Test modes: Y, xyY, T Δ uvY, u' v' Y, XYZ, FMA, FLVL
- Both English and Chinese operation interfaces are available for switch as need
- Test results can be saved and output automatically for statistics analysis
- Able to work with white balance auto alignment system to integrate the optical test stations into one single station

Chroma 7660 Display Multi-Probe ATS adopts the design of non-contact type measurement with the sensor that complied with CIE 1931 and CIE1976 UCS color matching function can measure the luminance and chromaticity uniformity of display panels accurately. Developed with the most advanced digital signal processor and the technology of optoelectronic transfer as well as precision optical parts and circuit design, the probes are able to perform high speed, accurate and stable color tests.

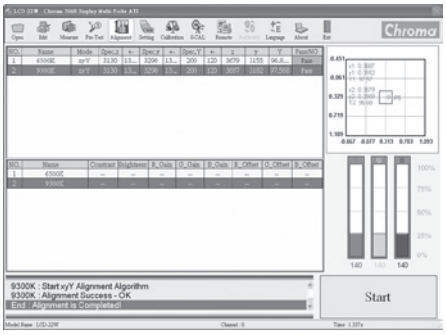
Chroma 7660 Multi-Probe Measurement Software is structured on the OS of Windows® for graphics operation. The comprehensive and easy to use interface design not only improves the test efficiency effectively but also reduces the human cost for manufacturers. Users can execute all programmed measurement items within a short time by pressing one button when a Video Pattern Generator is integrated. In the mean time, the acceptance and archive are determined automatically as well.

To satisfy different requirements from user, Chroma 7660 provides the user-defined test items that can be edited as need. The "Pre Test" function provided by control software allows users to monitor the readings of each sensor on every pattern in real time for analysis. Chroma 7660 has the function of selfcalibration that makes the system maintenance fairly convenient and reduces the succeeding calibration cost effectively.

When the presentation of light chromaticity becomes a key factor for display products, the identification of color has to be standardized and more efficient. As the technology and products of flat panel displays have turned into the mainstream in the market today, the consistency of product quality and the improvement of production efficiency as well as the reduction of cost are the competitions of all manufacturers. Chroma 7660 with excellent capability is the device of best choice for gaining and increasing competitiveness.

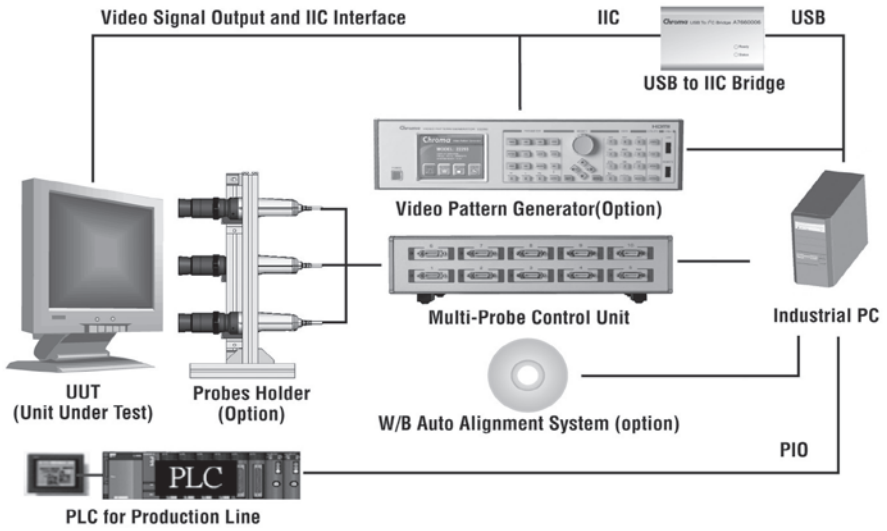
WHITE BALANCE ALIGNMENT

7660 Display Multi-Probe ATS is able to configure the optional display white balance auto alignment system (purchased additionally) to get white balance through the IIC alignment of the UUT parameters. The algorithm with learning capability (patent pending) is able to adjust the color coordinate required rapidly. Each test program is able to set the alignment for various color temperatures that can be switched by program automatically. When working with test system, it can integrate the stations of alignment and inspection into one that cuts down the signal cable connections when the stations are reduced. It can save the test time, cost and manpower a great deal.



System Requirement
Operation System : Windows® XP/7(32 bit)
Windows® and EXCEL® are the registered trademarks of Microsoft in United States and other countries.

SYSTEM STRUCTURE



ORDERING INFORMATION

7660 : Display Multi-Probe ATS (Probe *2 + Multi-Probe Control Unit *1 + IPC)
7660 : Display Multi-Probe ATS (Probe *5 + Multi-Probe Control Unit *1 + IPC)
7660 : Display Multi-Probe ATS (Probe *9 + Multi-Probe Control Unit *1 + IPC)
7660 : Display Multi-Probe ATS (Probe *16 + Multi-Probe Control Unit *2 + IPC)
7660 : Display Multi-Probe ATS (Probe *25 + Multi-Probe Control Unit *3 + IPC)
A766000 : Multi-Probe Control Unit (10 ports)
A766003 : Industrial Computer
A766004 : Multi-probe Measurement Software
A766005 : Probes Holder
A766006 : USB to I²C Bridge
A766007 : Display White Balance Auto Alignment System (S/W)
A712301 : Ultra-low luminance measuring probe (with 2.5m signal cable)
A712302 : Small size high luminance measuring probe (with 2.5m signal cable)
A712200 : Flicker measuring probe (with 2.5m signal cable)
VPG : Refer to Chroma Model

SPECIFICATIONS				
Model		**7660**		
Probe Model		A712301 (Ultra-Low luminance measuring probe)	A712302 (Small size high luminance measuring probe)	A712200 (Flicker measuring probe)
Measurement Area		Ø27 mm / Ø1.06 inch	Ø5 mm / Ø0.20 inch	Ø27 mm / Ø1.06 inch
Measurement Distance		30±10mm	0~10mm	30±10mm
Acceptance Angle		± 2.5°	± 5°	± 2.5°
Display Range	Luminance	0.0001 to 25,000 cd/m^2	0.01 to 200,000 cd/m^2	0.01 to 6,000 cd/m^2
	Chromaticity	4 or 3 digits display		
Luminance unit		cd/m^2 or fL, selectable via button on the front panel		
Display Mode	Digital	xyY ; TΔuvY ; u' v' Y ; RGB ; XYZ ; Contrast ; Program		xyY ; TΔuvY ; u' v' Y ; RGB ; XYZ ; FMA; FLVL ; Contrast ; Program
	Analog	Δx Δy ΔY ; ΔR ΔG ΔB ; ΔR G/R B/R ; R/G ΔG B/G		Δx Δy ΔY ; ΔR ΔG ΔB ; ΔR G/R B/R ; R/G ΔG B/G ; FMA
Luminance *1	Meas. Range	0.0050 to 6,000cd/m^2 (0.001 to 1751fL)	0.30 to 6,000 cd/m^2 (0.09 to 1751fL)	0.10 to 6,000 cd/m^2 (0.03 to 1751 fL)
	Accuracy	0.0050 to 0.0199 cd/m^2 : ±0.0005cd/m^2 0.020 to 0.099 cd/m^2 : ±4% ±2 digits 0.100 to 6,000 cd/m^2 : ±2% ±1 digit	0.30 to 6,000 cd/m^2 : ±2% ±1 digit	0.30 to 6,000 cd/m^2 : ±2% ±1 digit
	Repeatability	0.0050 to 0.0199 cd/m^2 : ±0.0003cd/m^2 0.020 to 0.099 cd/m^2 : 1% + 2 digits(2 σ) 0.100 to 0.999 cd/m^2 : 0.2% + 1 digit(2 σ) 1.00 to 6,000 cd/m^2 : 0.1% + 1 digit (2 σ)	0.30 to 2.99cd/m^2 : 0.2% +1 digit(2 σ) 3.00 to 6,000 cd/m^2 : 0.1%+1 digit(2 σ)	0.10 to 0.99 cd/m^2 : 0.2% + 1 digit (2 σ) 1.00 to 6,000 cd/m^2 : 0.1% + 1 digit (2 σ)
Chromaticity *1	Accuracy	0.100 to 2.99 cd/m^2 : ±0.008 3.00 to 4.99 cd/m^2 : ±0.005 5.00 to 9.99 cd/m^2 : ± 0.003 10.00 to 6,000 cd/m^2 : ± 0.002	0.30 to 14.99 cd/m^2 : ± 0.008 15.00 to 119.9 cd/m^2 : ± 0.005 120.0 to 6,000 cd/m^2 : ± 0.003	0.1 to 2.99 cd/m^2 : ± 0.008 3.00 to 4.99 cd/m^2 : ± 0.005 5.00 to 9.99 cd/m^2 : ± 0.003 10.00 to 6,000 cd/m^2 : ± 0.002
	Repeatability	0.100 to 0.199 cd/m^2 : 0.015(2 σ) 0.200 to 0.499 cd/m^2 : 0.008(2 σ) 0.500 to 1.99 cd/m^2 : 0.003(2 σ) 2.00 to 6,000 cd/m^2 : 0.001(2 σ)	0.30 to 0.59 cd/m^2 : 0.015 (2 σ) 0.60 to 1.49 cd/m^2 : 0.008 (2 σ) 1.50 to 7.99 cd/m^2 : 0.003 (2 σ) 8.00 to 6,000 cd/m^2 : 0.001 (2 σ)	0.10 to 0.19 cd/m^2 : 0.015 (2 σ) 0.20 to 0.49 cd/m^2 : 0.008 (2 σ) 0.50 to 1.99 cd/m^2 : 0.003 (2 σ) 2.00 to 6,000 cd/m^2 : 0.001 (2 σ)
Flicker -Contrast Method(FMA)	Range	---	---	5 cd/m^2 or higher
	Display Range	---	---	0.0 to 100%
	Accuracy	---	---	±1% (Flicker frequency: 30 Hz AC/DC10 % sine wave) ±2% (Flicker frequency: 60 Hz AC/DC 10 % sine wave)
	Repeatability	---	---	1% (2 σ) (Flicker frequency: 20 to 65 Hz AC/DC 10 % sine wave)
Flicker -JEITA/ VESA Method (FLVL)	Range	---	---	5 cd/m^2 or higher
	Display Range	---	---	6-240Hz
	Accuracy	---	---	±0.5dB (Flicker frequency: 30 Hz AC/DC10 % sine wave)
	Repeatability	---	---	0.3dB (2 σ) (Flicker frequency: 30 Hz AC/DC 10 % sine wave)
Measurement Speed	xyY	Y:0.0050 to 0.0199 cd/m^2 : 1 times/sec (Low luminance Mode) Y:0.020 to 1.99 cd/m^2 : 4 times/sec. (Auto mode) ; 2.00 cd/m^2 and above: 15 times/sec.	0.3 to 7.99 cd/m^2 :1 time/sec. 8.00 cd/m^2 and above:15 times/sec.	0.1 to 3.99 cd/m^2 : 5 times/sec. ; 4.00 cd/m^2 and above: 15 times/sec.
	FMA	---	---	6 times/sec. (UNIV) ; 20 time/sec.(NTSC); 16 times/sec. (PAL)
	FLVL	---	---	0.5 time/sec.
Dimension		Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch	Ø 46 x 221.9(D) mm / Ø 1.81 x 8.74 (D) inch	Ø 46 x 234.9(D) mm / Ø 1.81 x 9.25(D) inch
Weight		0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs	0.5 kg / 1.1 lbs
Cord Length		2.5m / 98.43 inch		
Optical System		LED positioning function		
Multi-Probe Control Unit				
No. of Port		10		
Communication Interface		USB		
Length of USB Cable		4.5 m / 177.17 inch		
Input Voltage Range		1Ø 110~240V ±10% V_{LN}, 47~63Hz, 50VA		
Temperature Range		Operating : 0°C to 40°C (32°F to 104°F) Storage : -20°C to 55°C (-4°F to 131°F)		
Humidity Range		Less than 85% relative humidity (at 35°C/95°F non-condensing)		
Dimension (H x W x D)		303(W) x 206(D) x 70(H) mm		
Weight		2.0 Kg		
Industrial Computer				
Operating System		Windows® XP		
Software Installation		7660 Multi-Probe Measurement Software		
Communication Interface		Socket, RS-232		
Input Voltage Range		1Ø 110~240V ±10% V_{LN}, 47~63Hz, 50VA		
Option		LCD Monitor		

Note* 1: Standard illuminant A is used for test according to Chroma's test condition
*Reference Standard: IEC 61747-6, EIAJ ED-2522, ASTM E455-03, VESA Standard, TCO

All specifications are subject to change without notice.

Automated Optical Inspection (AOI) Solution

Video Microscope 11-1

3D Optical Profiler 11-3

Wafer Inspection System 11-5



Video Microscope



3D Optical Profiler



Wafer Inspection System



The 7310 video microscope is a color CCD video-based microscope system that allows you to clearly view small objects on any TV monitor or video projector. Unlike conventional optical microscopes that are complicated and intimidating for the viewer to use, the 7310 is an easy-to-use and friendly video-based system. High resolution video viewing eliminates the operator eyestrain and fatigue associated with conventional and binocular microscopes and the unnatural "hologram effect" of optical projection systems.

The 7310 guided LED light surrounds the lens and automatically provides the best illumination for you to obtain the optimum viewing angle and color of the target object on the video monitor. By using the advanced automatic gain control of DSP technology, it gives the user distortion-free microscope quality images.

With the frame freeze button and memory switch, it allows you to freeze the images with one, or one-two frame on the screen. Image retention on hard copy and image storage are possible by simply connecting the video output of 7310 directly to an optional Color Video Printer, Video Tape Recorder (VTR), or Personal Computer (PC with appropriate image capture card installed).

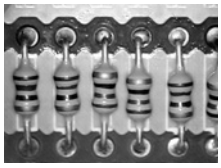
Two illumination heads of contact and non-contact measurement are available. The user can use the one that meets versatile applications of top-view angle or oblique-view angle. The compact size allows it to be hand held for observation anywhere, anytime. More than one person can observe the same clear image on the color monitor for discussion getting the best results and solutions.

The Chroma video microscope offers the sophisticated inspection methods in the applications of semiconductor, SMD PCB, electronics, tab and wire bonding, hybrid circuit, metal works, quality control, textiles, etc. The versatile and easy-to-use product introduces wholly new ways of treatment. It makes you work faster and more effectively than before.

FUNCTIONS

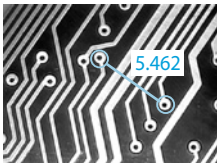
- **Handy Type Easy to Operate**
  It can be held by hand easily to view the object in clear image without adjusting the focus
- **Picture Freeze**
  You can freeze the frame and release it easily by touching the frame freeze button on the handle. Besides, you are also able to use remote cord to freeze the frame via the terminal on the rear panel.
- **Frame Split**
  If you need to compare two objects, you can choose one-two frame on the screen by switching the "Memory" to "2".
- **Measurement for Multiple Masks**
  The mask designed for multiple functions can be used with magnification lens to observe the object with non-contact, contact and oblique for three-dimension effect.
- **Fully Field Use**
  It provides complete lens combination from magnification 5X to 1000X with maximum working distance up to 18cm. To work with appropriate accessories and measurement software, the Measurement Master can meet the different requirements for various industries.
- **Multiple Peripherals Support**
  The 7310 can connect diverse recording media, color displays, and PC environment (with appropriate interface card installed) via the video out terminal. You can select the desired peripheral.

Resistor



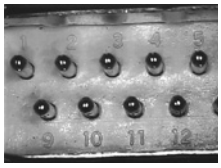
20X Contact

PCB



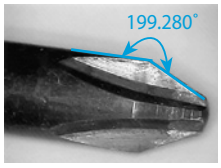
20X Non-Contact
with Measurement Master

connector



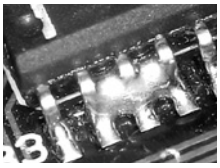
20X Non-Contact

Screw Driver



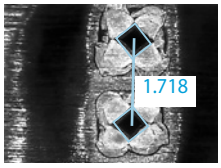
40X Contact
with Measurement Master

SMD



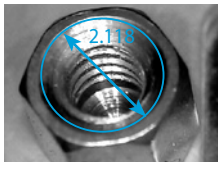
40X Oblique

Capacitor



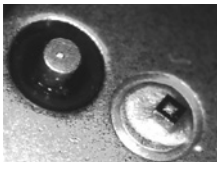
100X Non-Contact
with Measurement Master

Screw



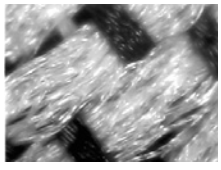
100X Non-Contact
with Measurement Master

LED



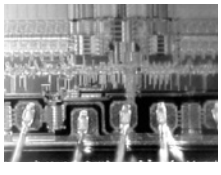
100X Non-Contact

Textile



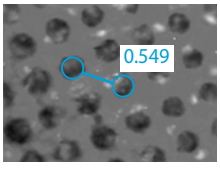
200X Contact

Die Chip



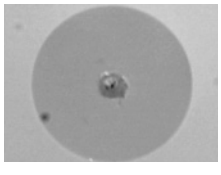
200X Non-Contact

Halftone Dot



200X Non-Contact
with Measurement Master

Fiber Connector



1000X Non-Contact

All specifications are subject to change without notice.

SPECIFICATIONS	
Model	**7310**
Camera	
Image Pickup Sensor	1/3 inch CCD
Total Pixels	
NTSC	811 (H) x 508 (V)
PAL	795 (H) x 596 (V)
Scanning Method	2:1 interlaced
Scanning Frequency	
NTSC	15.734 KHz (H) x 59.94 Hz (V)
PAL	15.625 KHz (H) x 50.00 Hz (V)
S/N	46dB
AGC	DSP Control
White Balance	Automatic
Operating Environment	
Operating Temperature	-5 to 40˚C
Operating Humidity	35 to 80% R.H. (without condensation)
Light Source	
Lamp	White LED
Service Life of Lamp	5000 hrs (avg.)
Color Temperature	7100˚k (max)
Intensity Regulation	Auto
Others	
Still Picture	1, 1/2 frame
Supply Voltage	1Ø 110~240V ±10% V_{LN}, 47~63Hz ; DC 12V 0.5A
Power Consumption	Less than 6W
Dimension (H x W x D)	Probe (without Lens Head): 57 x 50 x 160 mm / 2.24 x 1.97 x 6.30 inch Stand: 60 x 125 x 190 mm / 2.36 x 4.92 x 7.48 inch
Weight	Probe (without Lens Head): 220g / 0.48 lbs Stand: 1.0 kg / 2.2 lbs
Camera Probe Length	1.5m / 59.05 inch
Outputs	
Video Output	VBS1.0Vp-p/75Ω RCA Type

ORDERING INFORMATION

7310 : Video Microscope -NTSC, Adapter (Mark I)
7310 : Video Microscope -PAL, Adapter (Mark I)
A730001 : 20X Magnification Lens
A730002 : 40X Magnification Lens
A730003 : 200X Magnification Lens
A730007 : 100X Magnification Lens
A730009 : Suitcase
A730011 : 400X Magnification Lens
A730012 : 650X Magnification Lens (Constant Focus)
A730013 : 1000X Magnification Lens
A730015 : 35X Polarization Magnification Lens
A730016 : 40X LWD Magnification Lens
A731025 : Copy Stand (Mark I)
A731008 : Long Rod for Copy Stand
A731026 : 5X-15X Adjustable Magnification Lens
A731027 : 20X Polarization Magnification Lens
A731028 : 40X Polarization Magnification Lens
A731029 : 650X Adjustable Magnification Lens (Adjustable Focus)
A731030 : Remote cable for freeze
A731034 : USB Video Grabber

MAGNIFICATION LENS					
Model		**A731026**	**A730001**	**A731027**	**A730015**
Magnification on 14" monitor		5-15X	20X	20X Polarization	35X Polarization
Illumination Head		Non-contact	Contact, Non-contact, Oblique, Diffusion	Non-contact	Contact
View Area	Horizontal length	56 / 18.7mm	14mm	14mm	8mm
	Vertical length	42 / 14mm	11mm	11mm	6mm
	Diagonal length	70 / 23.4mm	17.8mm	17.8mm	10mm
Depth-Of-Field		≦18 / 7mm	≦8.8mm	≦8.8mm	≦3.3mm
Working distance (non-contact lightguide applied)		160 / 40mm	50mm	40mm	(Contact type only)

Model		**A730002**	**A730028**	**A730016**	**A730007**
Magnification on 14" monitor		40X	40X Polarization	40X LWD	100X
Illumination Head		Contact, Non-contact, Oblique, Diffusion	Non-contact	None	Contact Non-contact
View Area	Horizontal length	7.5mm	7.5mm	7.5mm	2.8mm
	Vertical length	6mm	6mm	6mm	2.2mm
	Diagonal length	9.6mm	9.6mm	9.6mm	3.56mm
Depth-Of-Field		≦3.85mm	≦3.85mm	≦3.5mm	≦0.55mm
Working Distance (non-contact lightguide applied)		30mm	18mm	179.5mm	4mm

Model		**A730003**	**A730011**	**A731029**	**A730013**
Magnification on 14" monitor		200X	400X	650X	1000X
Illumination Head		Contact, Non-contact	Contact, Non-contact	adjustable Focus	Contact, Non-contact
View Area	Horizontal length	1.4mm	0.7mm	0.43mm	0.28mm
	Vertical length	1.1mm	0.52mm	0.32mm	0.21mm
	Diagonal length	1.78mm	0.87mm	0.53mm	0.35mm
Depth-Of-Field		≦0.22mm	≦0.055mm	≦0.07mm	≦0.066mm
Working Distance (non-contact lightguide applied)		4mm	2.5mm	1.4mm	3.6mm

All specifications are subject to change without notice.



KEY FEATURES

- Up to 0.1 nm height resolution for measurement
- Use white light interference measurement technique to do nondestructive and rapid surface texture measurement and analysis
- Modulized design to select parts based on test demands or budget concerns
- Work with color or monochrome camera to do 2D measurement and enable the measuring microscope function
- Equipped with electric nose gear to mount various lens for switch programmatically
- LED or halogen light source for selection
- Measurement range 150 mm x150 mm
- Integrate low magnification lens (5X & 2.5X ratio) for large area 3D measurement
- Provide various surface measurement parameters, such as sectional difference, included angle, area, dimension, roughness, waviness, film thickness and flatness
- Equipped with dark point and boundary error correction algorithms
- Friendly user interface with simple graphical control system and 3D graphics display
- Exchangeable file format to save and read various 3D profile file formats
- Powerful STA (Surface Texture Analysis) Master software providing more than 150 lines and surfaces profiling parameters
- Automated rapid self calibration to ensure the system's measurement capability
- Provide Chinese/English user interface for switch
- Provide measurement script for auto test

Chroma 7503 is a sub-nano 3D Optical Profiler developed using the technology of white light interference to measure and analyze the surface profile of micro-nano structures with sophisticated scanning system and innovative algorithms. It can work with color or monochrome camera as required for 2D and microscope measurements.

The latest system modular design of Chroma 7503 has flexible configurations that can comply with diversified test applications. When equipped with electric nose gear, maximum 5 types of lens can be mounted and switched directly for use without changing manually. In addition the equipped electrical adjustment mobile platform is able to adjust and position the sample automatically. The large scanning range of vertical and horizontal axis is applicable for various auto measurements. Nondestructive and rapid surface texture measurement as well as analysis can be done on the sample without any preprocessing that is most suitable for R&D, production, process improvement and academic research.

The height resolution Chroma 7503 is up to 0.1 nm and it can achieve 100mm when Z vertical axis is used to measure the scanning stroke. Also the horizontal axis is able to reach sub-micro resolution with scanning range up to 150 × 150mm when a PC is used to control the mobile platform as demand. The fast calibration procedure and algorithm theory enables the system calibration result to be traced to NIST standard. Combined with several innovative, robust and reliable algorithms, Chroma 7503 has the quality of high precision and large scale measurement.

The configured auto scanning platform is able to find the best focus position via the automated vertical axis mobile platform with rapid autofocus algorithm. Moreover, the tilt adjustment platform is able to level the unit under test within a few seconds without complex operations.

The commercial white light interference analyzers frequently use the centroid algorithm to calculate the surface height. Since the light diffraction causes incorrect height calculation of some positions and results wrong profiling data. Chroma 7503 applies the most advanced 3D Profiler Master software along with the interference signal process algorithm of Chroma to analyze the spectrum of white light interference and prevent the boundary error problem. The system has dark point process function to filter out and correct the data that is incapable of creating interference to reduce the error in measurement. Since the dark point process runs while the data is retrieving, the dark point filter function can be executed effectively; meanwhile the correction is made by referencing the surrounding data that makes the measurement more robust and reliable.

STA (Surface Texture Analysis) Master software analyzes and corrects the data of surface texture, also provides complete profiles in icon. It has more than 150 lines or surfaces profiling parameters including roughness, ripple, flatness, apex and valley. The high pass filter, low pass filter, fast Fourier transformation and cusp removal space filter tools allow the user to filter out the high/low/bandpass signals. The software has polynomial fitting, region growth, the entire surface and multiple area leveling tools that can used in data processing and analysis flexibly.

In many hi-tech industries such as semiconductor, flat panel display, fiber communication, MEMS, biomedical and electronic packaging, the accuracy of micro structure surface texture determines the performance and function of the product, thus it needs to be monitored for quality during manufacturing. Chroma 7503 has many surface measurement parameters such as section height, included angle, area, dimension, roughness, ripple, film thickness and flatness that can meet the requirements of the industries and R&D units.

Chroma 7503 has 2D and 3D measurements with fast switch of ratio and large area map interlinking function that can cope with various applications' needs. Furthermore, the flexible modular design allows customization for practical use to gain the balance between price and performance. Chroma 7503 is the best choice for improving efficiency and saving cost.

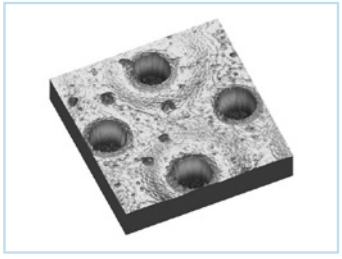
ORDERING INFORMATION

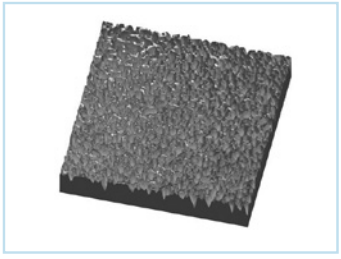
7503 : 3D Optical Profiler
Imaging system: 640x480 pixel (mono), 640x480 pixel (color), 1000x1000 pixel (mono) *1, 1000x1000 pixel (color) *1
Interference objective lens:
2.5X *2, 5X, 10X, 20X, 50X, 100X
Conventional objective lens:
5X, 10X, 20X, 50X, 100X
Tube lens: 0.45X, 0.5X, 1.0X
Nose gear:
None, Manual rotary 5 holes, Electric rotary 5 holes
Light Source:
White light LED, Halogen, Mono LED
Anti-vibration table
Software: STA Master

All specifications are subject to change without notice.

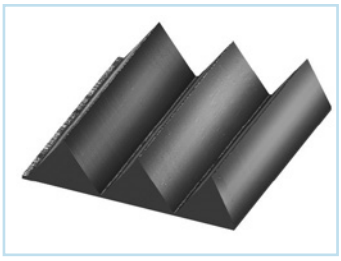
Application Examples

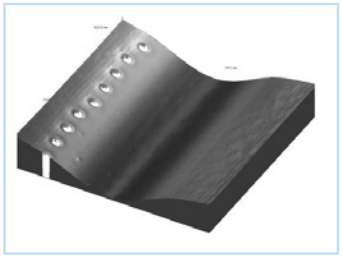

LCD-Photo Spacer

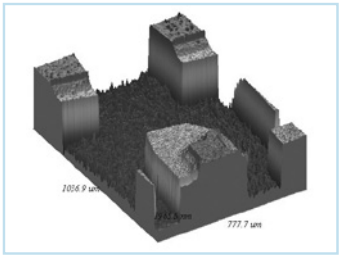

PCB-Laser Via

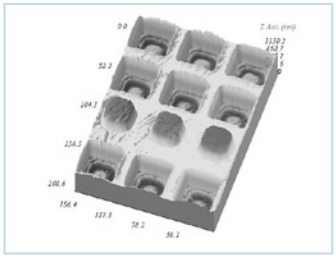

Material-Rough Surface


PCB-Wire high, wide, pitch


LCD-Prism Sheet


MEMS-Printer Nozzle


MEMS-Hard Disk Read Head


Semiconductor-Thin Film Transistor

SPECIFICATIONS			
Model			**7503**
Measurement			Noncontact 3D & 2D measurements
Imaging system (CCD video camera)			640x480 pixel (mono), 640x480 pixel (color)
			Optional 1000x1000 pixel (mono), 1000x1000 pixel (color)*1
Interference objective lens			2.5X*2, 5X, 10X, 20X, 50X, 100X
Conventional objective lens			5X, 10X, 20X, 50X, 100X
Supported tube lens ratio			0.45X, 0.5X, 1.0X
Nose gear			Electric rotary 5 holes
			Optional None, Manual rotary 5 holes
Light Source			White light LED
			Optional Halogen
Measurement Mode*3			PSI, VSI
XY mobile platform	Stroke		150 mm
	Resolution		2 μm (auto version)
	Load capacity		≦1.1 Kg (without carrying tray)
	Control mode		Auto
Level Measurement Range			150 x 150 mm
Z axis	Stroke		100 mm electrical platform, optional for 100 mm manual platform
	Resolution		< 0.5 μm (Electrical platform)
Level adjustment platform			Manual 2 axes , ± 6°
PZT Scan	Stroke		100 μm, optional 400 μm
Vertical direction	Accuracy (Step Height)	VSI	≦1.5 % *4
		PSI	≦5.0 % *5
	Repeatability (Step Height)	VSI	≦0.14 % *4
		PSI	≦1.7 % *5
	Scan speed	PZT	12 μm / sec
Operating system			Microsoft Windows® XP, Window® 7 (32-bit)
Operating environment			Noise : ≤ 60db Vibration : VC-C or above
Input voltage range			1Ø 110~240V ±10% V_{LN}, 47~63Hz, 50VA
Operating temperature/ humidity			15~35°C (47°F to 67°F) ; less than 75 % relative humidity (non condensing)
Dimension (H x W x D)			1800 x 760 x 760 mm / 70.87 x 29.92 x 29.92 inch
Weight			Approx. 220 Kg / 485 lbs *6

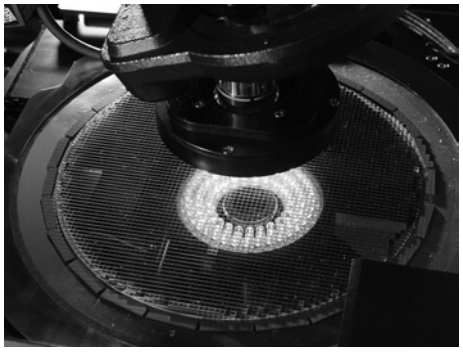
Note*1: Only support 1.0X tube lens ratio
Note*2: 2.5X objective lens have special working distance with other objective lens
Note*3: VSI: Vertical Scanning Interferometry; PSI: Phase Shift Interference
Note*4: Measured with 8.0 μm standard step height
Note*5: Measured with 46nm standard step height
Note*6: The actual weight varies with selected option



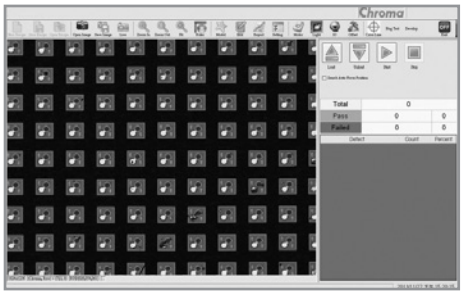
Chroma 7935 wafer inspection system is an automatic inspection system for unsawn and after-dicing wafer chip. The appearance defects of wafer chip are clearly conspicuous by using advanced illumination technology. Illumination and camera acquisition mode can be adjusted for various wafer chip, like LED, CMOS image sensor and laser diode.

KEY FEATURES

- Maximum 8 inch wafer handling capability (10 inch inspection area)
- Unique detection algorithm can be replaced or added for different customer or model
- No precise wafer loading is needed because of auto alignment function
- Edge finding to test various wafer shapes
- Defect criteria editor for versatile pass/fail criteria setting
- Chip Optical Character Recognition > 98%
- Combine AOI and upstream machine data and upload a final mapping file for downstream machine
- Customized inspection report for defect analysis
- Suitable for LED, laser diode, CIS, and other wafer chip



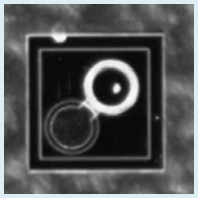
Application for Laser Diode



Laser Diode Inspection Items

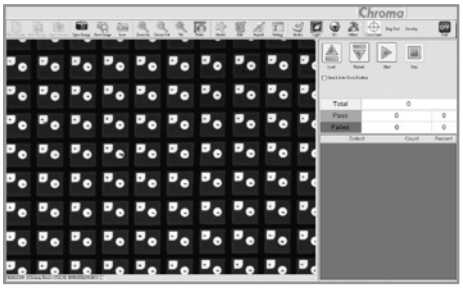


- Photosensitive Region Defect
- Bond Pad Defect
- Passivation Film Defect

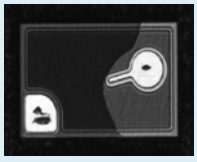


-Scribe Line Defect
-Chipping
-Double Chip

Application for LED Chip



LED Inspection Items

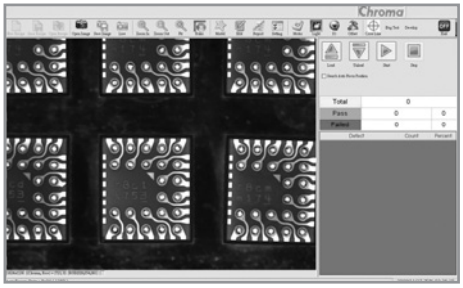


- Pad Defect
- Pad Residue
- ITO Peeling
- Finger Broken

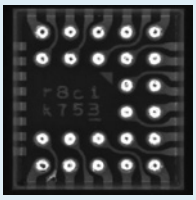


- Mesa Abnormality
- Epi Defect
- Chipping
- Chip Residue

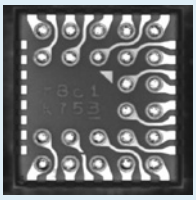
Application for CIS Ball Side



CIS Inspection Items



- Ball Missing
- Ball Chipping
- Ball Shift



- Lead Short
- Lead Open
- Lead Notch

All specifications are subject to change without notice.

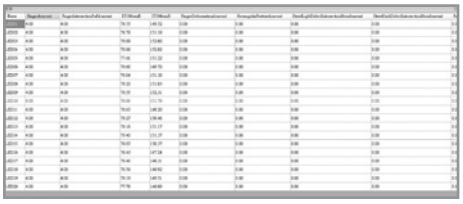
Applied with high speed camera and inspection algorithms, Chroma 7935 can inspect a 2" LED wafer in 2 minutes; the throughput is about 15 msec/chip. Chroma 7935 also provides auto focus and warpage compensation function to overcome wafer warpage and chuck leveling issue. There are three magnifications for selection by applicable chip size or defect size. The minimum resolution of the system is 0.35um that has capability to detect 1 um defect size.

System Function

After the tape expansion process, the arrangement of dies on wafer may be formed an irregular alignment. Chroma 7935 also offers software alignment function to adjust wafer alignment angle for scan. In addition, Chroma 7935 owns a friendly user interface to reduce user's learning time. All of inspection information is visualized for easy reading, like mapping map, defect region, inspection results.

Defect Analysis

All of inspection result raw data are recorded not only pass/fail and bin data. This is easily to analysis an optimal parameter that achieves the balance of overkill and underkill. The data also helps to monitor the defect trend caused by the production process, and feedback to production unit in advance.



Detail defect raw data for analysis

In conclusion, Chroma 7935 is an ideal cost and performance selection for wafer chip inspection process.

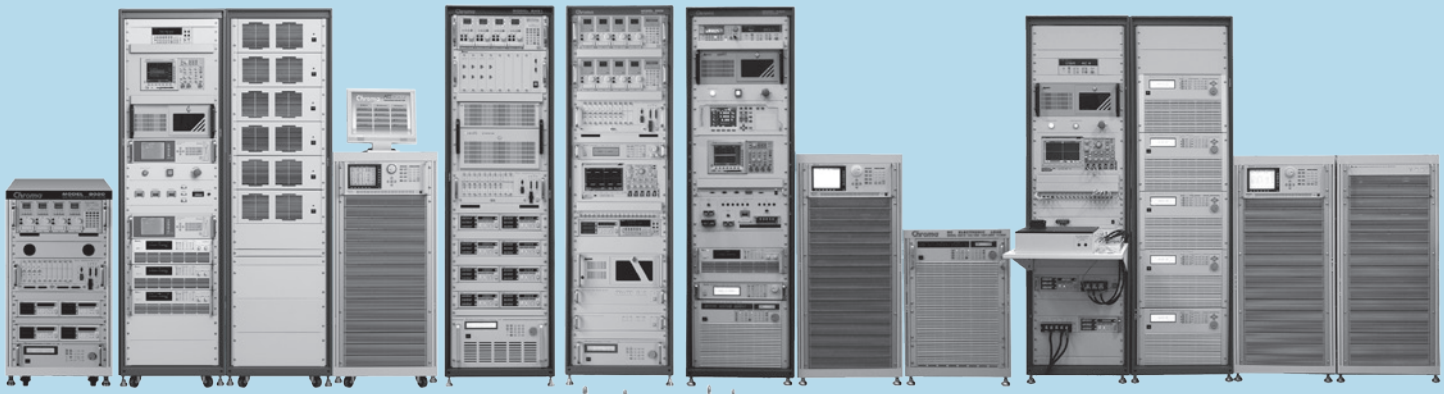
ORDERING INFORMATION

7935 : Wafer Inspection System

SPECIFICATIONS	
Model	**7935**
Suitable Chip and Package Type	
Applicable Ring	Suitable for grip ring or wafer frame
Inspection Area	10", suitable for 6" LED expanded wafer and 8" unsawn wafer
Chip Size	125um x 125um ~ 6mm x 6mm
Chip Height	10um ~ 6mm
Chip Type	LED, laser diode, CIS and other wafer chip
Inspection	
Magnification	Multiple magnification for selection, 2X, 5X and 10X
Throughput	For LED, 2" wafer in 2 minutes at 2 lighting mode
Algorithm	Provide external algorithm interface to replace or add new inspection algorithm
System	
Loading/ unloading	Auto cassette x 2
Warpage Compensation	Software auto focus and mechanical focus supporting to overcome wafer warpage
Software Function	
Monitor	Real-time wafer map display
Image Storage	All/defect image saving selectable
Report	Including chip position, defect type, inspection results
Cassette Selection	Programmable cassette selection and scheduling
Facility Requirement	
Dimension (WxDxH)	1200 mm x 1000 mm x 1600 mm
Weight	800 kg
Power	AC 220V±10%, 50/60 Hz, 1Φ, 2KW
Compressed Air	0.6 MPa

Selection Guides 12-1
DC Electronic Load 12-5
AC Electronic Load 12-28
AC Power Source 12-30
Power Analyzer / Meter 12-47
DC Power Supply 12-51
Automatic Test System 12-65

Automatic Test System





AC Source

AC Electronic Load



DC Electronic Load

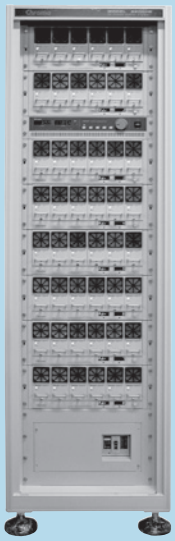
Digital Power Meter



Power Analyzer



DC Power Supply



Burn-in
DC Power Supply



Solar Array Simulation
DC Power Supply

DC Electronic Load Selection Guide					
Series	**6310A Series**	**6330A Series**	**63200 Series**	**63600 Series**	**63800 Series**
Power Rating (Modular)	200W, 100Wx2(Dual), 30W&250W, 300W, 350W, 600W, 1200W	200W, 100Wx2(Dual) 30W&250W, 300W, 350W, 600W, 1200W	2600W, 5200W, 6500W, 10400W, 14500W, 15600W	100Wx2(Dual), 300W, 400W	1800W, 3600W, 4500W
Current	Up to 240A	Up to 240A	Up to 1000A	Up to 80A	Up to 45A
Voltage	Up to 500V	Up to 500V	Up to 1000V	Up to 600V	Up to 500V
Configuration	Modular	Modular	Stand-Alone	Modular	Stand-Alone
Max. Channel / Mainframe	8	8	1	10	1
Operating Mode	CC/CR/CV/CP	CC/CR/CV/CP	CC/CR/CV/CP	CC/CR/CV/CP/CZ	CC/CR/CV/CP/ DC Rectified
Slew Rate	Up to 10A/μs	Up to 10A/μs	Up to 41A/μs	Up to 8A/μs	Up to 600A/ms
Dynamic Loading	Y	Y	Y	Y	-
Measurement	V, I, P	V, I, P	V, I, P	V, I, P, Vpeak	V, I, P, R
External Waveform Control	-	-	Y	Y	-
Short Circuit Test	Y	Y	Y	Y	Y
Von Point Control	Y	Y	Y	Y	-
V&I Monitor	-	-	Y	Y	Y
Synchronize Dynamic	-	Y	Y	Y	-
Synchronize Control Multi-load	Y	Y	-	Y	-
Master/Slave Parallel Mode	-	Y	Y	Y	Y
Data Setting (Rotary)	Y	Y	Y	Y	Y
Data Setting (Keyped)	Y	Y	Y	-	Y
Status Storage (100 files)	Y	Y	Y	Y	Y
Remote Controller	Option	Option	Option	-	-
GO/NG Test	Y	Y	Y	Y	-
Fan speed control	Y	Y	Y	Y	Y
Self test at power on	Y	Y	Y	Y	Y
Programmable test (10 Pro.)	Y	Y	Y	Y	-
RS-232 Interface	Standard	Standard	Standard	-	Standard
GPIB Interface	Option	Option	Standard	Option	Standard
USB Interface	Option	Option	-	Standard	-
Ethernet Interface	-	-	-	Option	-
PAGE	**12-5**	**12-17**	**12-12**	**12-23**	**12-28**

All specifications are subject to change without notice.

AC Power Source Selection Guide

Step 1 by Function

Series	6400 Series	6500 Series	61500 Series	61600 Series	61700 Series	61800 Series
Power Measurement	Standard	Standard	Standard	Standard	Standard	Standard
PLD simulation	-	Standard	Standard	-	Option	Standard
Arbitrary waveform	-	Standard	Standard	-	-	Standard
DC output	-	-	Standard	Standard	Standard	Standard
Programmable output impedance	-	-	Standard	-	-	-
Harmonic measurement	-	-	Standard	-	-	Standard
IEC Regulation Testing	-	Standard	Standard	-	-	Standard
GPIB interface	Option	Option	Option	Option	Option	Standard
RS-232 interface	Option	Option	Option	Option	Option	Standard
PAGE	12-42	12-45	12-30	12-34	12-38	12-40

Step 2 by Model

Series	6400 Series		6500 Series		61500 Series		61600 Series		61700 Series	61800 Series
Power	1 Ø	3 Ø	1 Ø	3 Ø	1 Ø	3 Ø	1Ø	3 Ø	3 Ø	1 Ø/3 Ø
375VA	6404	-	-	-	-	-	-	-	-	-
500VA	-	-	-	-	61501	-	61601	-	-	-
800VA	6408	-	-	-	-	-	-	-	-	-
1000VA	-	-	-	-	61502	-	61602	-	-	-
1200VA	-	-	6512	-	-	-	-	-	-	-
1500VA	6415	-	-	-	61503	-	61603	-	61701	-
2000VA	6420	-	6520	-	61504	-	61604	-	-	-
3000VA	6430	-	6530	-	-	-	-	-	61702	-
4000VA	-	-	-	-	61505	-	61605	-	-	-
4500VA	-	-	-	-	-	-	-	-	61703	-
6000VA	6460	-	6560	-	-	-	-	-	61704	-
6000VA	6463		-	-	-	-	-	-	-	-
9000VA	6490		6590		-	-	-	-	-	-
12000VA	-	-	-	-	61511		61611		61705	-
18000VA					61512		61612		-	-
30000VA					61511 + A615103		61611 + A615103		-	-
36000VA					61512 + A615103		61612 + A615103		-	-
45000VA	-		-		-		-		-	61845
60000VA	-		-		-		-		-	61860
PAGE	12-42		12-45		12-30		12-34		12-38	12-40

Power Analyzer and Power Meter Selection Guide

Model	6630	6632	66201	66202	66203	66204
Channel	1 or 3	1 or 3	1	1	3	4
Max. Voltage range	600Vrms / 2000Vpk	600Vrms / 2000Vpk	500Vrms	500Vrms	600Vrms	600Vrms
Max. Current range	20Arms / 300Apk	20Arms / 300Apk	4Arms	20Arms	20Arms	20Arms
Frequency	40-70Hz	40-70Hz	15-10kHz	15-10kHz	15-10kHz	15-10kHz
Graphical Display	V	-	-	-	-	-
Result storage	V	-	-	-	-	-
Rotary / keypad Data input	V	-	-	-	-	-
GPIB Interface	V	V	V	V	V	V
RS-232 Interface	V	V	-	-	-	-
USB Interface	-	-	V	V	V	V
Centronics Interface	V	V	-	-	-	-
Parameters	V, I, F, PF, Ø, W, Wr, Wa, P, Q, S, CF, Vpk, Vp-p, Ipk, Ip-p, THD	V, I, F, PF, Ø, W, Wr, Wa, P, Q, S, CF, Vpk, Vp-p, Ipk, Ip-p, THD	V, I, PF, W, VA, P, CF, Vpk, Ipk	V, I, F, PF, W, Wr, Wa, P, CF, Vpk, Ipk, Ip-p, THD, E	V, I, F, PF, W, VAR, VA, CF, Vpk, Ipk, THD, E, EFF	V, I, F, PF, W, VAR, VA, CF, Vpk, Ipk, THD, E, EFF
AC/DC Measurement mode	V	V	AC + DC only	AC + DC only	DC, AC+DC	DC, AC+DC
40th Harmonics Measurement Capability	V	V	-	V	V	V
Pre-Compliance IEC 61000-3-2	V	V	-	Software	Software	Software
DFT & DSP Technology	V	V	V	V	V	V
Waveform display	V	-	Software	Software	Software	Software
Waveform moving cursor	V	-	-	-	-	-
Waveform trigger function	V	-	-	-	-	-
Recording function	V	-	Software	Software	Software	Software
Stand alone operating	V	-	V	V	V	V
PAGE	12-47	12-47	12-48	12-48	12-48	12-48

DC Power Supply Selection Guide						
Model	**62000B Series / 1.5KW**		**62000H Series / 5KW & 10KW & 15KW**		**62000P Series / 600W & 1.2KW & 2.4KW & 5KW**	
Volts	**Amps**	**Model**	**Amps**	**Model**	**Amps**	**Model**
0-15	1-90	**62015B-15-90**				
0-30	1-50	**62015B-30-50**	0-250A/ 0-375A	**62075H-30/ 62100H-30**	0-80	**62006P-30-80**
0-40			0-125A/ 0-250A/ 0-375A	**62050H-40/ 62100H-40/ 62150H-40**	0-120	**62012P-40-120/ 62024P-40-120**
0-60	1-25	**62015B-60-25**				
0-80	1-18	**62015B-80-18**			0-60	**62012P-80-60/ 62024P-80-60**
0-100					0-25/ 0-50/ 0-100	**62006P-100-25/ 62012P-100-50/ 62024P-100-50/ 62050P-100-100**
0-150	1-10	**62015B-150-10**				
0-300					0-8	**62006P-300-8**
0-450			0-11.5A/ 0-23A/ 0-34A	**62050H-450/ 62100H-450/ 62150H-450**		
0-600			0-8.5A/ 0-17A/ 0-25A	**62050H-600/62050H-600S 62100H-600/62100H-600S 62150H-600/62150H-600S**	0-8	**62012P-600-8/ 62024P-600-8**
0-1000			0-10A/ 0-15A	**62100H-1000/ 62150H-1000/ 62150H-1000S**		
PAGE	**12-63**		**12-55, 12-59**		**12-51**	

All specifications are subject to change without notice.

Automatic Test System Selection Guide						
System Model	**8000**	**8010**	**8020**	**8200**	**8490**	**8491**
UUT Type						
Battery Charger	V		V			
Switching Mode Rectifier	V					
Switching Power Supply (Multi-Output)	V	V	V	V		
Adapter	V		V	V		
DC to DC Converter	V					
DC Power	V	V				
LCD Inverter					V	
LED Power Driver						V
EV Power Electronics	V					
PV Inverter	V					
Functionality						
Open System Architecture	V				V	V
Optional Instrument Extendible	V				V	V
Support Windows 98/NT/2000 or higher	V	V	V	V	V	V
User Permission Setting	V	V	V	V	V	V
System Administrator Access Log	V	V	V		V	V
Network Management	V	V	V		V	V
Support Shop Floor Control Software *1	V	V	V	V	V	V
Test Report Editing	V	V	V	V	V	V
Test Item Editing	V				V	V
Test Program Editing	V	V	V	V	V	V
Test Program Saving	V	V	V	V	V	V
Debug Run	V				V	V
GO/NO GO Test	V	V	V	V	V	V
Statistical Analysis Control	V	V	V	V	V	V
Test Report Printing	V	V	V	V	V	V
On-Line Control *2	V				V	V
Report Wizard *3	V				V	V
PAGE	**12-65**	**12-69**	**12-71**	**12-68**	**12-73**	**12-77**

Notes:

1. Support Shop Floor Control Software:

The system can work with the Shop Floor Control Software that used on the manufacturing production line to attain overall factory control and remote control through internet.

2. On-Line Control:

Enables user to operate all instruments on-line via one computer screen, which incorporates the test values from individual instrument to save time and resources.

3. Report Wizard:

It automatically generates various R&D reports including oscilloscope waveform and etc. to meet customer's needs and reduce the report preparation time.



KEY FEATURES

- Max Power: 200W, 100W × 2(Dual), 30W & 250W, 300W, 350W, 600W, 1200W
- Wide range 0~500V operating voltage
- Compatibility between 6310 and 6310A
- Up to 8 channels in one mainframe, for testing multiple output SMPS
- Parallel load modules up to 1400W for high current and power application
- Synchronization with multiple loads
- Flexible CC, CR, CP and CV operation modes
- Dynamic loading with speeds up to 20kHz
- Fast response of 0.32mA/μs~10A/μs slew rate
- Minimum input resistance allowing load to sink high current at low voltage (63123A : 0.6V@70A)
- Real time power supply load transient response simulation and output measurement
- User programmable 100 sequences. Front panel input status for user-friendly operating
- High/Low limits of testing parameters to test GO/NG
- Digital I/O control
- Over current protection (OCP) testing function
- 16-bit precision voltage and current measurement with dual-range
- Remote sensing capability
- Short circuit test
- Self-test at power-on
- Full Protection: OC, OP, OT protection and OV alarm
- USB, GPIB & RS-232 interfaces

USB RS-232 GPIB CE

The Chroma 6310A series Programmable DC Electronic Load is suitable for the test and evaluation of multi-output AC/DC power supplies, DC/DC converters, chargers and power electronic components. It is ideal for applications in research and development, production, and incoming inspection. The system is configured by plugging the user selectable load modules into the system mainframe. The user interfaces include an ergonomically designed user friendly keypad on the front panel and the following computer interfaces: RS-232, USB or GPIB.

The 6310A series has a self-diagnosis routine to maintain instrument performance. It also provides OP, OC, OT protection and alarm indicating OV, reverse polarity protection to guarantee quality and reliability for even the most demanding engineering testing and ATE applications.

Module Load Design

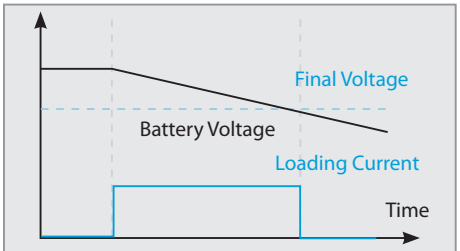
The Chroma 6314A 1400W and 6312A 700W electronic load mainframes accept the user-installable 6310A series load modules for easy system configuration and will mount in a 19" instrument rack.



Timing Function

The 6310A series of loads include a unique timing & measurement function, which allows precise time measurements in the range of 1ms to 86,400s. This feature allows the user to set the final voltage & timeout values for battery discharge testing and other similar applications.

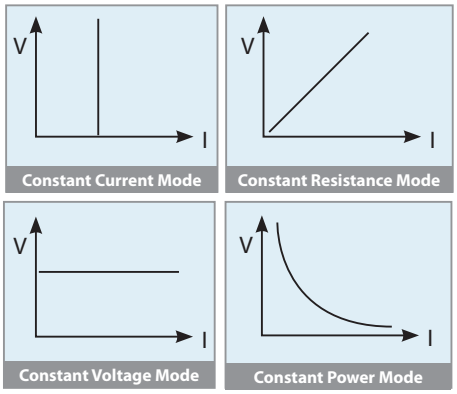
The Timing function can be used in testing battery and super capacitor discharge, or other similar applications.



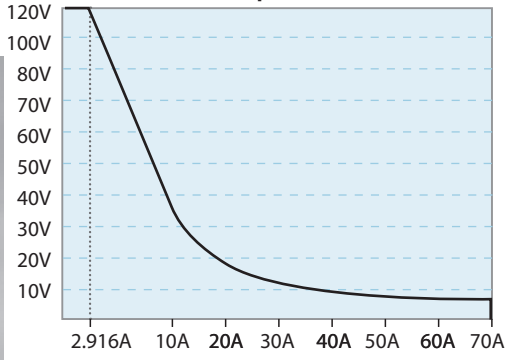
Battery Discharge Testing

Application of Specific Load Simulation

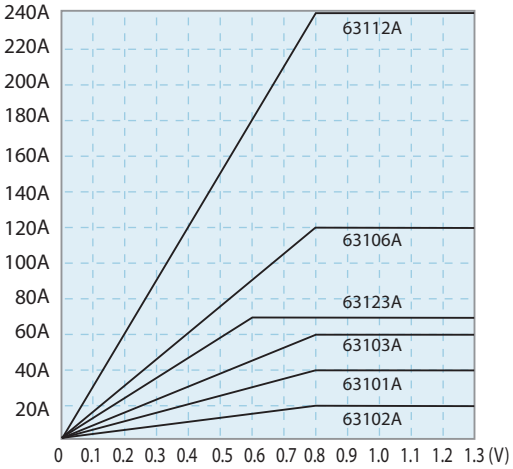
The 6310A load modules operate in constant current, constant voltage, constant power or constant resistance to satisfy a wide range of test requirements. For example, the test of a battery charger can be simulated easily by setting the load to operate in constant voltage.



Model 63123A Input Characteristics



Low Voltage Characteristics (Typical)
Model 63101A/63102A/63103A/
63106A/63112A/63123A

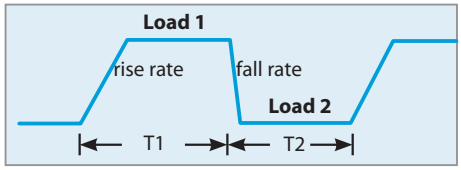


Note: All specifications are measured at load input terminals. (Ambient Temperature of 25˚C)

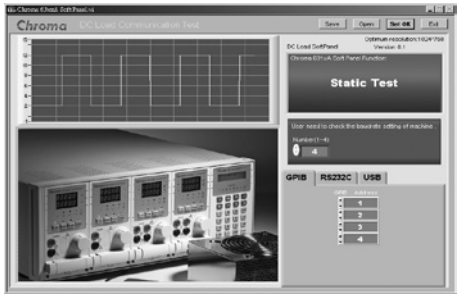
All specifications are subject to change without notice.

Dynamic Loading and Control

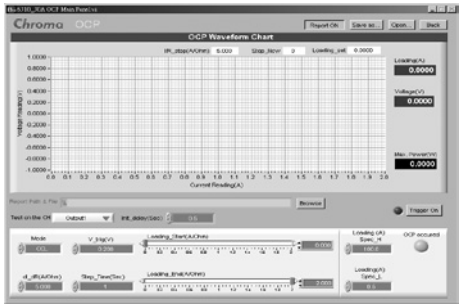
Modern electronic devices operate at very high speeds and require fast dynamic operation of their power providing components. To satisfy these testing applications, the 6310A loads offer high speed, programmable dynamic load simulation and control capability. The figure below shows the programmable parameters of the 6310A modules.



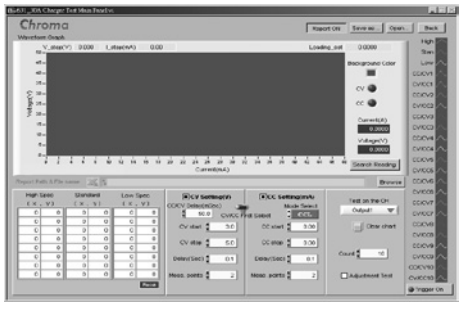
Soft Panel



Main Operation Menu



OCP Test



Charger Test



Battery Discharge Test

6310A Series DC Electronic Load Family





6314A : 4 in 1 Mainframe



6312A : 2 in 1 Mainframe



A631001: Remote Controller

Mainframe Model	6312A	6314A
Number of slots	2	4
Operating Temperature	0~40˚C	0~40˚C
Input Rating	1Ø 100/200Vac ± 10% VLN, 47~63Hz ; 1Ø 115/230Vac ± 10% VLN, 47~63Hz	1Ø 100/200Vac ± 10% VLN, 47~63Hz ; 1Ø 115/230Vac ± 10% VLL, 47~63Hz
Dimensions (HxWxD)	194x275x550mm / 7.6x10.8x21.7inch	194x439x550mm / 7.6x17.3x21.7inch
Weight	15 kg / 33.1 lbs	21.5 kg / 47.4 lbs

ORDERING INFORMATION

6312A : Mainframe for 2 Load Modules
6314A : Mainframe for 4 Load Modules
63101A : Load Module 80V/40A/200W
63102A : Load Module 80V/20A/100W x 2
63103A : Load Module 80V/60A/300W
63105A : Load Module 500V/10A/300W
63106A : Load Module 80V/120A/600W
63107A : Load Module 80V/5A & 40A/30W & 250W
63108A : Load Module 500V/20A/600W
63112A : Load Module 80V/240A/1200W
63123A : Load Module 120V/70A/350W
A631000 : GPIB Interface for Model 6314A/6312A Mainframe
A631001 : Remote Controller
A631003 : USB Interface for Model 6314A/6312A Mainframe
A631005 : Softpanel for 6310A/6330A series
A631006 : Rack Mounting Kit for Model 6312A Mainframe
A631007 : Rack Mounting Kit for Model 6314A Mainframe
A800042 : Test Fixture
LED Load Simulator for LED Driver Test
63110A : Load Module 500V/2A/100W x 2
63113A : Load Module 300V/20A/300W
*** 63115A :** Load Module 600V/10A/300W
* Call for availability

SPECIFICATIONS-1						
Model	**63101A**		**63102A (100Wx2)**		**63103A**	
Power	20W	200W	20W	100W	30W	300W
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Voltage *3	0~80V		0~80V		0~80V	
Typical Min. Operation Voltage (DC)*1	0.4V@2A 0.8V@4A	0.4V@20A 0.8V@40A	0.4V@1A 0.8V@2A	0.4V@10A 0.8V@20A	0.4V@3A 0.8V@6A	0.4V@30A 0.8V@60A
Constant Current Mode						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.0375Ω~150Ω (200W/16V) 1.875Ω~7.5kΩ (200W/80V)		0.075Ω~300Ω (100W/16V) 3.75Ω~15kΩ (100W/80V)		0.025Ω~100Ω (300W/16V) 1.25Ω~5kΩ (300W/80V)	
Resolution*5	6.667mS (200W/16V) 133μS (200W/80V)		3.333mS (100W/16V) 66.667μS (100W/80V)		10mS (300W/16V) 200μS (300W/80V)	
Accuracy	150Ω: 0.1S+ 0.2% 7.5kΩ: 0.01S + 0.1%		300Ω: 0.1S + 0.2% 15kΩ: 0.01S + 0.1%		100Ω: 0.1S+ 0.2% 5kΩ: 0.01S+ 0.1%	
Constant Voltage Mode						
Range	0~80V		0~80V		0~80V	
Resolution	20mV		20mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Resolution	5mW	50mW	5mW	25mW	7.5mW	75mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.64~160mA/μs	6.4~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.64mA/μs	6.4mA/μs	0.32mA/μs	3.2mA/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		10μs (Typical)		10μs (Typical)	
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	0.0625mA	0.625mA	0.03125mA	0.3125mA	0.09375mA	0.9375mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.	
Power Read Back*2						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section						
Over Power Protection	Yes		Yes		Yes	
Over Current Protection	Yes		Yes		Yes	
Over Temperature Protection	Yes		Yes		Yes	
Over Voltage Alarm*3	Yes		Yes		Yes	
General						
Short Circuit						
Current (CC)	-	≒40A	-	≒20A	-	≒60A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.0375Ω	-	≒0.075Ω	-	≒0.025Ω
Power (CP)	-	≒200W	-	≒100W	-	≒300W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe	
Dimensions (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs	
Operating Range	0~40˚C		0~40˚C		0~40˚C	
EMC & Safety	CE		CE		CE	

All specifications are subject to change without notice.

SPECIFICATIONS-2							
Model	**63105A**		**63106A**		**63107A (30W & 250W)**		
Power	30W	300W	60W	600W	30W	30W	250W
Current	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Voltage*3	0~500V		0~80V		0~80V		
Typical Min. Operation Voltage (DC)*1	1.0V@0.5A 2.0V@1A	1.0V@5A 2.0V@10A	0.4V@6A 0.8V@12A	0.4V@60A 0.8V@120A	0.4V@2.5A 0.8V@5A	0.4V@2A 0.8V@4A	0.4V@20A 0.8V@40A
Constant Current Mode							
Range	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.25mA	2.5mA	3mA	30mA	1.25mA	1mA	10mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode							
Range	1.25Ω~5kΩ (300W/125V) 50Ω~200kΩ (300W/500V)		12.5mΩ~50Ω (600W/16V) 0.625Ω~2.5kΩ (600W/80V)		0.3Ω~1.2kΩ (30W/16V) 15Ω~60kΩ (30W/80V)		0.0375Ω~150Ω (250W/16V) 1.875Ω~7.5kΩ (250W/80V)
Resolution*5	200μS (300W/125V) 5μS (300W/500V)		20mS (600W/16V) 400μS (600W/80V)		833μS (30W/16V) 16.67μS (30W/80V)		6.667μS (250W/16V) 133μS (250W/80V)
Accuracy	5kΩ: 20mS+ 0.2% 200kΩ:5mS+ 0.1%		50Ω: 0.4S + 0.5% 2.5kΩ: 0.04S + 0.2%		1.2kΩ: 0.1S + 0.2% 60kΩ: 0.01S + 0.1%		150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%
Constant Voltage Mode							
Range	0~500V		0~80V		0~80V		
Resolution	125mV		20mV		20mV		
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		
Constant Power Mode							
Range	0~30W	0~300W	0~60W	0~600W	0~30W	0~30W	0~250W
Resolution	7.5mW	75mW	15mW	150mW	7.5mW	7.5mW	62.5mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		
Dynamic Mode							
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode		
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm		
Slew Rate	0.16~40mA/μs	1.6~400mA/μs	0.002~0.5A/μs	0.02~5A/μs	0.8~200mA/μs	0.64~160mA/μs	6.4~1600mA/μs
Resolution	0.16mA/μs	1.6mA/μs	0.002A/μs	0.02A/μs	0.8mA/μs	0.64mA/μs	6.4mA/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs		
Min. Rise Time	24μs (Typical)		10μs (Typical)		10μs (Typical)		
Current	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.25mA	2.5mA	3mA	30mA	1.25mA	1mA	10mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.		
Measurement Section							
Voltage Read Back							
Range	0~125V	0~500V	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	2mV	8mV	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		
Current Read Back							
Range	0~1A	0~10A	0~12A	0~120A	0~5A	0~4A	0~40A
Resolution	0.016mA	0.16mA	0.1875mA	1.875mA	0.078125mA	0.0625mA	0.625mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		
Power Read Back*2							
Range	0~30W	0~300W	0~60W	0~600W	0~30W	0~30W	0~250W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		
Protective Section							
Over Power Protection	Yes		Yes		Yes		
Over Current Protection	Yes		Yes		Yes		
Over Temperature Protection	Yes		Yes		Yes		
Over Voltage Alarm*3	Yes		Yes		Yes		
General							
Short Circuit							
Current (CC)	-	≒10A	-	≒120A	-	-	≒40A
Voltage (CV)	-	0V	-	0V	-	-	0V
Resistance (CR)	-	≒1.25Ω	-	≒0.0125Ω	-	-	≒0.0375Ω
Power (CP)	-	≒300W	-	≒600W	-	-	≒250W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)		
Temperature Coefficient	100PPM/°C (Typical)		100PPM/°C (Typical)		100PPM/°C (Typical)		
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe		
Dimensions (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x164x489.5mm / 6.8x6.5x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		
Weight	4.2 kg / 9.3 lbs		7.3 kg / 16.1 lbs		4.5 kg / 9.9 lbs		
Operating Range	0~40°C		0~40°C		0~40°C		
EMC & Safety	CE		CE		CE		

SPECIFICATIONS-3						
Model	**63108A**		**63112A**		**63123A**	
Power	60W	600W	120W	1200W	350W	
Current	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Voltage*3	0~500V		0~80V		0~120V	
Typical Min. Operation Voltage (DC)*1	1.0V@1A	1.0V@10A	0.4V@12A	0.4V@120A	0.05V@3.5A	0.3V@35A
	2.0V@2A	2.0V@20A	0.8V@24A	0.8V@240A	0.1V@7A	0.6V@70A
Constant Current Mode						
Range	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.5mA	5mA	6mA	60mA	0.125mA	1.25mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.625Ω~2.5kΩ (600W/125V) 25Ω~100kΩ (600W/500V)		6.25mΩ~25Ω (1200W/16V) 0.3125Ω~1.25kΩ (1200W/80V)		0.01Ω~150Ω (350W/24V)*4 2Ω~2kΩ (350W/120V)	
Resolution*5	400μS (600W/125V) 10μS (600W/500V)		40mS (1200W/16V) 800μS (1200W/80V)		1.33mS (350W/24V)*4 10μS (350W/120V)	
Accuracy	2.5kΩ: 50mS + 0.2% 100kΩ: 5mS + 0.1%		25Ω: 0.8S + 0.8% 1.25kΩ: 0.08S + 0.2%		150Ω: 67mS + 0.1% 2kΩ: 5mS + 0.2%	
Constant Voltage Mode						
Range	0~500V		0~80V		0~120V	
Resolution	125mV		20mV		2mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~60W	0~600W	0~120W	0~1200W	0~35W	0~350W
Resolution	15mW	150mW	30mW	300mW	2.5mW	25mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. MODE	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms~50ms/Res: 5μs 0.1ms~500ms / Res: 25μs 10ms~50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs /1ms+100ppm	
Slew Rate	0.32~80mA/μs	3.2~800mA/μs	0.004~1A/μs	0.04~10A/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.32mA/μs	3.2mA/μs	0.004A/μs	0.04A/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	24μs (Typical)		10μs (Typical)		25μs (Typical) *6	
Current	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.5mA	5mA	6mA	60mA	0.125mA	1.25mA
Accuracy	0.4%F.S.		0.4%F.S.		0.1% F.S.	
Measurement Section						
Voltage Read Back						
Range	0~125V	0~500V	0~16V	0~80V	0~24V	0~120V
Resolution	2mV	8mV	0.25mV	1.25mV	0.4mV	2mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025%+0.015% F.S.	
Current Read Back						
Range	0~2A	0~20A	0~24A	0~240A	0~7A	0~70A
Resolution	0.03125mA	0.3125mA	0.375mA	3.75mA	0.125mA	1.25mA
Accuracy	0.05% + 0.05%F.S.		0.075% + 0.075%F.S.		0.04%+0.04% F.S.	
Power Read Back*2						
Range	0~60W	0~600W	0~120W	0~1200W	0~35W	0~350W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1%+0.1% F.S.	
Protective Section						
Over Power Protection	Yes		Yes		Yes	
Over Current Protection	Yes		Yes		Yes	
Over Temperature Protection	Yes		Yes		Yes	
Over Voltage Alarm*3	Yes		Yes		Yes	
General						
Short Circuit						
Current (CC)	-	≒20A	-	≒240A	-	≒70A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.625Ω	-	≒0.00625Ω	-	≒ 0.01Ω
Power (CP)	-	≒600W	-	≒1200W	-	≒350W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		800kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6314A Mainframe		Supply from 6314A Mainframe		Supply from 6314A Mainframe	
Dimensions (HxWxD)	172x164x489.5mm / 6.8x6.5x19.3inch		172x329x495mm / 6.8x12.9x19.5inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	7.3 kg / 16.1 lbs		14 kg / 30.8 lbs		4.2kg / 9.3 lbs	
Operating Range	0~40˚C		0~40˚C		0~40˚C	
EMC & Safety	CE		CE		CE	

NOTE*1 : Low voltage operation, under 0.8 volt, is possible at correspondingly reduced current level. Operating temperature range is 0˚C to 40˚C. All specifications apply for 25˚C±5˚C, except as noted
NOTE*2 : Power F.S. = Vrange F.S. x Irange F.S.
NOTE*3 : When the operating voltage exceeds the rated voltage for 1.02 times, a warning will occur and if it exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.
NOTE*4 : Please refer to user's manual for detail specifications.
NOTE*5 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*6 : The loading current should be 0.35A at least.

All specifications are subject to change without notice.



KEY FEATURES

- Unique LED mode for LED power driver test
- Programmable LED dynamic resistance (R_d)
- Programmable internal resistance (Rr) for simulating LED ripple current
- Fast response for PWM dimming test
- Up to eight channels in one mainframe
- 16-bit precision voltage and current measurement with dual-range
- Full Protection: OC, OP, OT protection and OV alarm

As a constant current source, the LED power driver has an output voltage range with a constant output current. LED power drivers are usually tested in one of the following ways :
1. With LEDs
2. Using resistors for loading
3. Using Electronic Loads in Constant Resistance (CR) mode, or Constant Voltage (CV) mode

However, all these testing methods, each of them has their own disadvantages.

As shown on the V-I curve in Figure 1, the LED has a forward voltage V_F and a dynamic resistance (Rd). When using a resistor as loading, the V-I curve of the resistor is not able to simulate the V-I curve of the LED as shown on Figure 1. This may cause the LED power driver to not start up due to the difference in V-I characteristic between the resistors and the LEDs. When using Electronic Loads, the CR and CV mode settings are set for when the LED is under stable operation and therefore, is unable to simulate turn on or PWM brightness control characteristics. This may cause the LED power driver to function improperly or trigger it's protection circuits. These testing requirements can be achieved when using a LEDs as a load; however, issues regarding the LED aging as well as different LED power drivers may require different types of LEDs or a number of LEDs. This makes it inconvenient for mass production testing.



63113A/63115A

Chroma has created the industries first LED Load Simulator for simulating LED loading with our 63110A/63113A/63115A load model from our 6310A series Electronic Loads. By setting the LED power driver's output voltage, and current, the Electronic Load can simulate the LED's loading characteristics. The LED's forward voltage and operating resistance can also be set to further adjust the loading current and ripple current to better simulate LED characteristics. The 63110A design also has increased bandwidth to allow for PWM dimming testing.

Figure 2 shows the dimming current waveform of the LED. Figure 3 shows the dimming current waveform when using 63110A as a load.The 6314A holds up to four 63110A load modules, which will result in an 8-channel 100W/channel load with standard front-panel inputs. This makes it ideal for testing single output and multiple output LED driver. Additionally, the GO/NG output port is useful for UUT's pass/fail testing on an automated production line. All modules on the 6314A/6312A mainframe share a common GPIB address to synchronize and speed up the control of the load modules and the read-back of data.

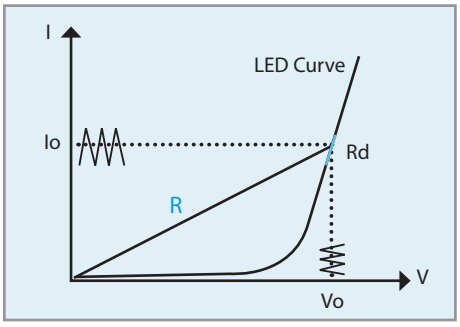


Figure 1 LED V-I Characteristics

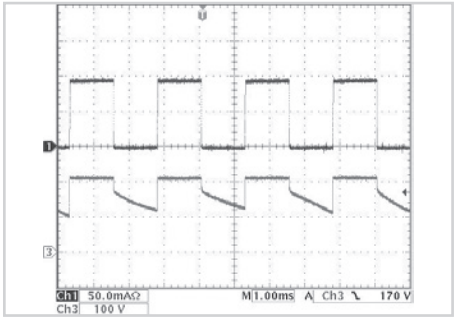


Figure 2 - LED dimming test

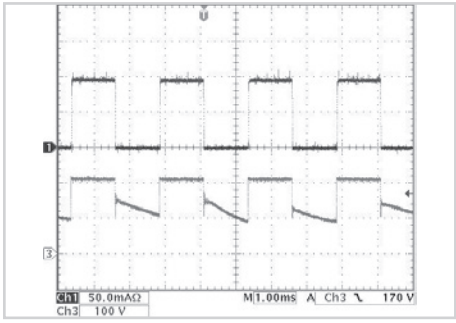


Figure 3 - 63110A dimming test

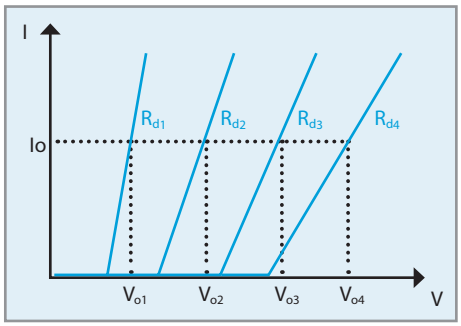


Figure 4 - Simulate different number of LEDs

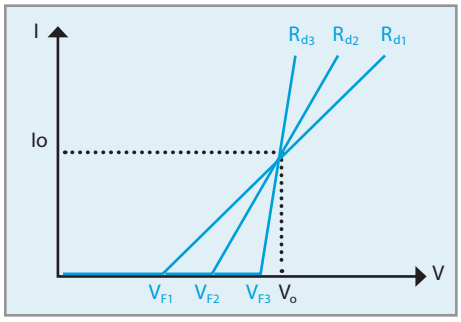


Figure 5 - Simulate different characteristic of LEDs



6312A : 2 in 1 Mainframe



6314A : 4 in 1 Mainframe

SPECIFICATIONS						
Model	**63110A (100Wx2)**		**63113A**		**63115A *3**	
Power	100W		300W		300W	
Current	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Voltage *1	0~500V		0~300V		0~600V	
Min. Operating Voltage	6V@2A		4V@20A		2V@10A	
LED Mode						
Range	Operating Voltage: 0~100V/0~500V R_d Coefficient : 0.001~1 V_F: 0~100V/0~500V Current : 0~2A R_d: 1Ω~1kΩ/10Ω~10kΩ		Operating Voltage : 0~60V/0~300V R_d Coefficient : 0.001~1 V_F : 0~60V/0~300V LEDL @ CH : 0~60V- 0~20A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~5A (R_d: 0.8Ω~800Ω) LEDH @ CL : 0~300V- 0~5A (R_d: 4Ω~4kΩ)		Operating Voltage : 0~60V/0~600V R_d Coefficient : 0.001~1 V_F : 0~60V/0~600V LEDL @ CH : 0~60V- 0~10A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~2A (R_d: 1.6Ω~1.6kΩ) LEDH @ CL : 0~600V- 0~2A (R_d: 8Ω~8kΩ)	
Resolution *2	Vo : 4mV/20mV Io : 0.1mA R_d Coefficient : 0.001 R_d : 62.5μS/6.25μS V_F : 4mV/20mV		Vo : 1.2mV/6mV Io : 100μA/400μA R_d Coefficient : 0.001 R_d : 400μS / 25μS / 5μS V_F : 1.2mV/ 6mV		Vo : 1.2mV/6mV Io : 100μA/400μA R_d : 0.4mS/12.5uS/2.5uS V_F : 6mV/ 30mV	
Constant Resistance Mode						
Range	CRL : 3Ω~1kΩ (100W/100V) CRH : 10Ω~10kΩ (100W/500V)		CRL @ CH : 0.2Ω~200Ω (300W/60V) CRL @ CL : 0.8Ω~800Ω (300W/60V) CRH @ CL : 4Ω~4kΩ (300W/300V)		CRL @ CH : 0.4Ω~400Ω (300W/60V) CRL @ CL : 1.6Ω~1.6kΩ (300W/60V) CRH @ CL : 8Ω~8kΩ (300W/600V)	
Resolution*2	CRL : 62.5μS CRH : 6.25μS		CRL @ CH : 100μS CRL @ CL : 25μS CRH @ CL : 5μS		CRL @ CH : 50μS CRL @ CL : 12.5μS CRH @ CL : 2.5μS	
Accuracy	1kΩ : 4mS+0.2% 10kΩ : 1mS+0.1%		0.2% (setting + range)		0.2% (setting + range)	
Constant Voltage Mode						
Range	0~500V		0~300V		0~600V	
Resolution	20mV		6mV		12mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Current Mode						
Range	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Resolution	12μA	40μA	100μA	400μA	40μA	200μA
Accuracy	0.1%+0.1% F.S.		0.1%+0.1% F.S.	0.1%+0.2% F.S.	0.1%+0.1% F.S.	0.1%+0.2% F.S.
Measurement Section						
Voltage Read Back						
Range	0~100V	0~500V	0~60V	0~300V	0~60V	0~600V
Resolution	2mV	10mV	1.2mV	6mV	1.2mV	12mV
Accuracy	0.025%+0.025% F.S.		0.025%+0.025% F.S.		0.025%+0.025% F.S.	
Current Read Back						
Range	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Resolution	12μA	40μA	100μA	400μA	0.04mA	0.2mA
Accuracy	0.05%+0.05% F.S.		0.05%+0.05% F.S.		0.05%+0.05% F.S.	

NOTE*1 : If the operating voltage exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.
NOTE*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*3 : Call for availability

All specifications are subject to change without notice.



KEY FEATURES

- Power Rating: 2.6kW, 5.2kW, 6.5kW, 10.4kW, 14.5kW, 15.6kW
- Voltage range: 0~80V/0~600V/0~1000V
- Current range: Up to 1000A
- CC, CR, CV, CP load modes
- Master/Slave paralleling control mode, allow synchronous load control under static and dynamic loading mode (Up to 93.6kW)
- Dynamic loading: Up to 20kHz
- Only need 1V to draw rated current
- Programmable slew rate, up to 41A/μs
- Measurement: Voltage / Current / Power/ Resistance
- Large LED/LCD display
- External loading waveform simulation
- Short circuit simulation and short circuit current measurement
- Full protection: OC, OP, OT protection and OV, reverse alarm
- Versatile remote controller
- GPIB & RS-232 interfaces

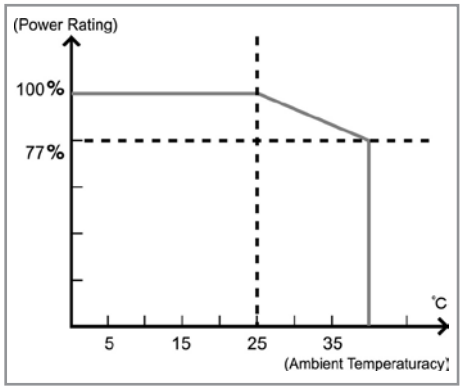
The Chroma Electronic Loads 63200 series are designed for DC power source, power electronic devices and components testing. The high power rating, parallel and synchronization capabilities make them the ideal tool for testing the high power UUT such as SMR,UPS, battery, and fuel cell.

The 63200 series offers 10 different models with power range from 2600 watts to 15600 watts, current from 50A to 1000A and up to 500V input voltage. The 4 load modes setup provide different load simulations for various application occasions. The CC/CR modes are designed to test constant voltage type of power supply. CV mode is used to test battery charger and current source, while CP mode is ideal for battery testing by simulating the real discharge curve.

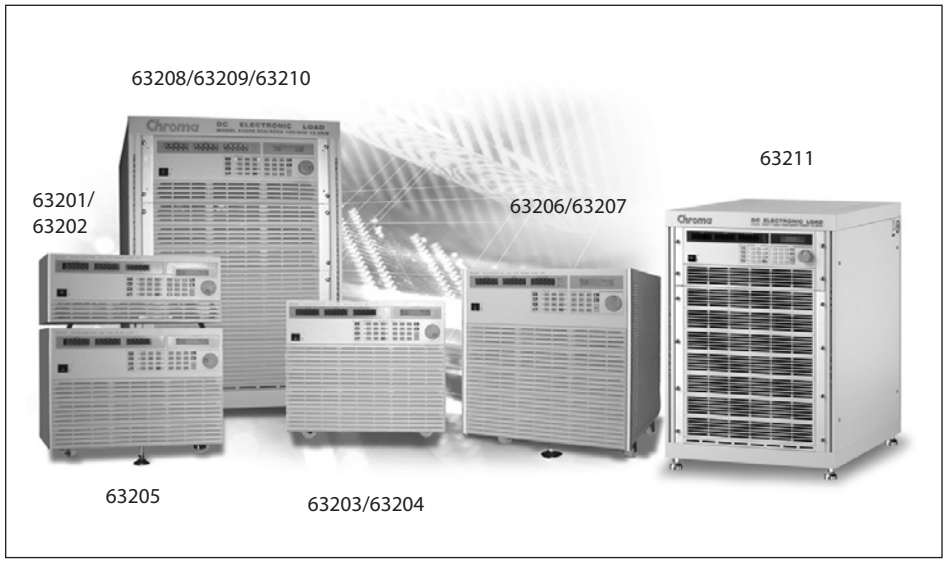
The 63200 series can draw its rated current under very low voltage (1V typical) even under the highest specified slew rate. This unique feature guarantees the best loading performance to a low voltage power supply. With the unique external waveform simulation and Master /Slave control capability, the 63200 series electronic loads allow users to parallel and synchronize more than one load together from an internal or external loading control signal. This feature provides unlimited load simulation and the possibility of power expansion.

The 63200 series also supply necessary measurement functions and short circuit simulation that extend the test capability for even the most demanding engineering tests and ATE applications. With the LCD display and rotary knob, the 63200 electronic loads offer versatile front panel operations. Users are able to control the 63200 family remotely via GPIB, RS-232 or APG (Analog Programming) interface.

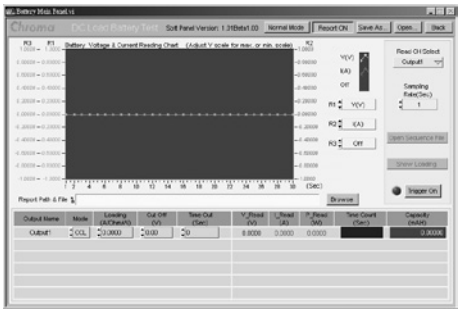
Chroma 63200 series loads are built in fan speed control to minimize the audio noise. The self-diagnosis routine and the full protections against OP, OC, OT and alarm indicating OV, reverse polarity to ensure the best quality and reliability.



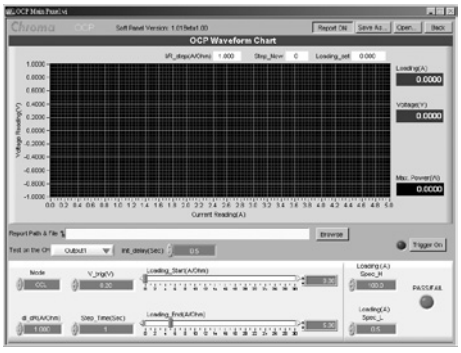
63200 Series DC Electronic Load Family



Soft Panel



Battery Discharge Test



OCP Test

ORDERING INFORMATION

63201 : DC Electronic Load 80V/300A/2.6kW
63202 : DC Electronic Load 600V/50A/2.6kW
63203 : DC Electronic Load 80V/600A/5.2kW
63204 : DC Electronic Load 600V/100A/5.2kW
63205 : DC Electronic Load 80V/180A/6.5kW
63206 : DC Electronic Load 80V/600A/10.4kW
63207 : DC Electronic Load 80V/300A/10.4kW
63208 : DC Electronic Load 80V/600A/15.6kW
63209 : DC Electronic Load 80V/1000A/15.6kW
63210 : DC Electronic Load 600V/150A/14.5kW
63211 : DC Electronic Load 1000V/150A/15.6kW
A632001 : Remote Controller
A632002 : Load Cable 38mm/242A/200cmx2
A632003 : Load Cable 80mm/390A/200cmx2
A632004 : Sync. Link Box for 6330A & 63200 series
A632005 : Softpanel for 63200 series
A632006 : NI USB-6211 Bus-Powered Multifunction DAQ



SPECIFICATIONS-1						
Model	**63201**		**63202**		**63203**	
Power *1	260W	2600W	260W	2600W	520W	5200W
Current *2	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Voltage	0~80V		0~600V		0~80V	
Min. Operating voltage	0.5V @ 15A 1V @ 30A	0.5V @ 150A 1V @ 300A	1.5V @ 2.5A 3V @ 5A	1.5V @ 25A 3V @ 50A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A
Constant Current mode						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	7.7mA	77mA	1.4mA	14mA	16mA	160mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.
Constant Resistance Mode						
Range	0.005~20Ω	0.25~1000Ω	0.25~1000Ω	10~40000Ω	0.0025~10Ω	0.125~500Ω
Resolution*3	52mS	1.04mS	1.2mS	28.8μS	104mS	2.1mS
Accuracy*4	0.104S+0.35%	0.9S+0.1%	0.0046S+0.35%	0.04S+0.1%	0.208S+0.35%*5	1.2S+0.1%
Accuracy*6 (Vin>7V)	0.104S+0.35%	0.0021S+0.35%	0.0046S+0.35%	114μS+0.35%	0.208S+0.35%	0.0042S+0.35%
Constant Voltage mode						
Range	0~16V	0~80V	0~150V	0~600V	0~16V	0~80V
Resolution	4mV	20mV	40mV	162mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	0.6~260W	6~2600W	0.625~260W	6.25~2600W	1.2~520W	12~5200W
Resolution	7.5mW	75mW	3.125mW	31.25mW	22.5mW	225mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	5mA~1.25A/μs	50mA~12.5A/μs	0.8mA~0.2A/μs	8mA~2A/μs	10mA~2.5A/μs	100mA~25A/μs
Resolution	5mA/μs	50mA/μs	0.8mA/μs	8mA/μs	10mA/μs	100mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	24μs (typical)		24μs (typical)		24μs (typical)	
Current						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	7.7mA	77mA	1.4mA	14mA	16mA	160mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~16V	0~80V	0~150V	0~600V	0~16V	0~80V
Resolution	0.6mV	2.6mV	5.1mV	21mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~30A	0~300A	0~5A	0~50A	0~60A	0~600A
Resolution	1mA	10mA	0.18mA	1.8mA	2mA	20mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~260W	0~2600W	0~260W	0~2600W	0~520W	0~5200W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
current	30A	300A	5A	50A	60A	600A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	177 x 440 x 589 mm / 6.9 x 17.3 x 23.2 inch		177 x 440 x 589 mm / 6.9 x 17.3 x 23.2 inch		353 x 440 x 589 mm / 6.9 x 17.3 x 23.2 inch	
Weight	30 kg / 66.13 lbs		30 kg / 66.13 lbs		62 kg / 136.68 lbs	
Safety & EMC	CE		CE		CE	

All specifications are subject to change without notice.

SPECIFICATIONS-2						
Model	**63204**		**63205**		**63206**	
Power*1	520W	5200W	650W	6500W	1040W	10400W
Current	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Voltage*2	0~600V		0~80V		0~80V	
Min. Operating voltage	1.5V @ 5A 3V @ 10A	1.5V @ 50A 3V @ 100A	0.5V @ 9A 1V @ 18A	0.5V @ 90A 1V @ 180A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A
Constant Current mode						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	2.8mA	28mA	5.2mA	52mA	21mA	170mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.125~500Ω	5~20000Ω	0.008~32Ω	0.4~1600Ω	0.0025~10Ω	0.125~500Ω
Resolution*3	2.3mS	57.56μS	35mS	0.7mS	112.5mS	2.25mS
Accuracy*4	0.0046S+0.35%	0.08S+0.1%	0.07S+0.35%	0.75S+0.1%	0.225S+0.35% *5	1.2S+0.1%
Accuracy*6 (Vin>7V)	0.0046S+0.35%	115.51μS+0.35%	0.07S+0.35%	0.0014S+0.35%	0.225S+0.35%	0.0045S+0.35%
Constant Voltage mode						
Range	0~150V	0~600V	0~16V	0~80V	0~16V	0~80V
Resolution	40mV	162mV	4mV	20mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	1.25~520W	12.5~5200W	0.36~650W	3.6~6500W	1.2~1040W	12~10400W
Resolution	6.25mW	62.5mW	4.6mW	46mW	22.5mW	225mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	1.6mA~0.4A/μs	16mA~4A/μs	3mA~0.75A/μs	30mA~7.5A/μs	10mA~3A/μs	100mA~25A/μs
Resolution	1.6mA/μs	16mA/μs	3mA/μs	30mA/μs	12mA/μs	100mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	24μs (typical)		24μs (typical)		20μs (typical)	
Current						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	2.8mA	28mA	5.2mA	52mA	21mA	170mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~150V	0~600V	0~16V	0~80V	0~16V	0~80V
Resolution	5.1mV	21mV	0.6mV	2.6mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~10A	0~100A	0~18A	0~180A	0~60A	0~600A
Resolution	0.35mA	3.5mA	0.7mA	7mA	2.6mA	21mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~520W	0~5200W	0~650W	0~6500W	0~1040W	0~10400W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
current	10A	100A	18A	180A	60A	600A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	353 x 440 x 589 mm / 13.9 x 17.3 x 23.2 inch		310 x 440 x 589 mm / 12.2 x 17.3 x 23.2 inch		443.7 x 440 x 589 mm / 17.5 x 17.3 x 23.2 inch	
Weight	62 kg / 136.68 lbs		62 kg / 136.68 lbs		90 kg / 198.41 lbs	
Safety & EMC	CE		CE		CE	

All specifications are subject to change without notice.

• Continued on next page ➟

SPECIFICATIONS-3						
Model	**63207**		**63208**		**63209**	
Power *1	1040W	10400W	1560W	15600W	1560W	15600W
Current	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Voltage*2	0~80V		0~80V		0~80V	
Min. Operating voltage	0.5V @ 15A 1V @ 30A	0.5V @ 150A 1V @ 300A	0.5V @ 30A 1V @ 60A	0.5V @ 300A 1V @ 600A	0.5V @ 50A 1V @ 100A	0.5V @ 500A 1V @ 1000A
Constant Current mode						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	10.3mA	82mA	21mA	163mA	34.2mA	274mA
Accuracy	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.005~20Ω	0.25~1000Ω	0.0025~10Ω	0.125~500Ω	0.0015~6Ω	0.075~300Ω
Resolution*3	55.7mS	1.1mS	110mS	2.22mS	186.5mS	3.73mS
Accuracy *4	0.111S+0.35%	0.9S+0.1%	0.22S+0.35% *5	1.2S+0.1%	0.373S+0.35% *5	1.2S+0.1%
Accuracy *6 (Vin>7V)	0.111S+0.35%	0.0022S+0.35%	0.22S+0.35%	0.0044S+0.35%	0.373S+0.35%	0.0075S+0.35%
Constant Voltage mode						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	4mV	20mV	4mV	20mV	4mV	20mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode						
Range	0.744~1040W	6~10400W	1.2~1560W	12~15600W	2.5~1560W	20~15600W
Resolution	9.3mW	75mW	22.5mW	225mW	31.255mW	250mW
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode						
Timing						
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	6mA~1.5A/μs	50mA~12.5A/μs	12mA~3A/μs	100mA~25A/μs	20mA~5A/μs	166mA~41.6A/μs
Resolution	6mA/μs	50mA/μs	12mA/μs	100mA/μs	20mA/μs	166mA/μs
Accuracy	10% ± 20μs		10% ± 20μs		10% ± 20μs	
Min. Rise Time	20μs (typical)		20μs (typical)		20μs (typical)	
Current						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	10.3mA	82mA	21mA	163mA	34.2mA	274mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.6mV	2.6mV	0.6mV	2.6mV	0.6mV	2.6mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back						
Range	0~30A	0~300A	0~60A	0~600A	0~100A	0~1000A
Resolution	1.3mA	11mA	2.7mA	21mA	4.5mA	36mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back						
Range	0~1040W	0~10400W	0~1560W	0~15600W	0~1560W	0~15600W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General						
Short Circuit						
Current	30A	300A	60A	600A	100A	1000A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	443.7 x 440 x 589 mm / 17.5 x 17.3 x 23.2 inch		762.8 x 546 x 700 mm / 30 x 21.5 x 27.6 inch		762.8x546x700mm/ 30x21.5x27.6inch(cabinet)	
Weight	90 kg / 198.24 lbs		170 kg / 374.45 lbs		170 kg / 374.45 lbs	
Safety & EMC	CE		CE		CE	

All specifications are subject to change without notice.

SPECIFICATIONS-4				
Model	**63210**		**63211**	
Power *1	1450W	14500W	15600W	15600W
Current	0~15A	0~150A	0~30A	0~150A
Voltage*2	0~600V		10~1000V	
Min. Operating voltage	1.5V @ 7.5A	1.5V @ 75A	5V @ 15A	5V @ 75A
	3V @ 15A	3V @ 150A	10V @ 30A	10V @ 150A
Constant Current mode				
Range	0~15A	0~150A	0~30A	0~150A
Resolution	4.9mA	39mA	7.5mA	37.5mA
Accuracy	0.1%+0.1%F.S.	0.2%+0.1%F.S.	0.1%+0.1%F.S.	0.2%+0.1%F.S.
Constant Resistance Mode				
Range	0.1~400Ω	5~20000Ω	0.2~200Ω	8~8000Ω
Resolution*3	3.21mS	80.1μS	1.25mS	31.25μS
Accuracy *4	0.0128S+0.35%	0.092S+0.1%	1.25mS+0.37231%	31.25μS+0.1%
Accuracy *6 (Vin>7V)	0.0128S+0.35%	317.7μS+0.35%	--	--
Constant Voltage mode				
Range	3~150V	3~600V	0~250V	0~1000V
Resolution	40mV	162mV	62.5mV	250mV
Accuracy	0.05%+0.1%F.S.		0.05%+0.1%F.S.	
Constant Power mode				
Range	5~1450W	50~14500W	2.5~1560W	20~15600W
Resolution	25mW	250mW	390mW	3.9W
Accuracy	0.5%+0.5%F.S.		0.5%+0.5%F.S.	
Dynamic mode				
Timing				
T1&T2	0.025~10ms	1ms~30s	0.025~10ms	1ms~30s
Resolution	1μs	1ms	1μs	1ms
Accuracy	1μs+100ppm	1ms+100ppm	1μs+100ppm	1ms+100ppm
Slew rate	3mA~0.75A/μs	25mA~6A/μs	5mA~1.25A/μs	25mA~6.25A/μs
Resolution	3mA/μs	25mA/μs	5mA/μs	25mA/μs
Accuracy	10% ± 20μs		10% ± 20μs	
Min. Rise Time	150 μs (typical)		24 μs (typical)	
Current				
Range	0~15A	0~150A	0~30A	0~150A
Resolution	4.9mA	39mA	0.6mA	3mA
Accuracy	0.4%F.S.		0.4%F.S.	
Measurement				
Voltage Read Back				
Range	0~150V	0~600V	0~250V	0~1000V
Resolution	5.1mV	21mV	5mV	20mV
Accuracy	0.05%+0.05%F.S.		0.05%+0.05%F.S.	
Current Read Back				
Range	0~15A	0~150A	0~30A	0~150A
Resolution	0.64mA	5.1mA	0.6mA	3mA
Accuracy	0.1%+0.1%F.S.		0.1%+0.1%F.S.	
Power Read Back				
Range	0~1450W	0~14500W	0~1560W	0~15600W
Accuracy*7	0.3%+0.3%F.S.		0.3%+0.3%F.S.	
General				
Short Circuit				
Current	15A	150A	30A	150A
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz		1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	
Dimension (H x W x D)	762.8x546x700mm/ 30x21.5x27.6inch(cabinet)		762.8x546x700mm/ 30x21.5x27.6inch(cabinet)	
Weight	170 kg / 374.45 lbs		170 kg / 374.45 lbs	
Safety & EMC	CE		CE	

NOTE*1 : The power rating specifications at ambient temperature=25˚C and see the diagram below for power derating.
NOTE*2 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*3 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
NOTE*4 : The Vin must be greater than min. operating voltage of each model.
NOTE*5 : Setting error will be 1% for R<0.005Ω at CRL range.
NOTE*6 : The Vin must be greater than 7V of each model.
NOTE*7 : Power F.S. = Vrange x Irange F.S.



KEY FEATURES

- Improve operating speeds of load for auto test system integration
- Synchronous paralleling control mode, allow Synchronous load control under static and dynamic Loading mode up to 7000W
- Up to 8 channels in one mainframe, fit for testing Multiple output SMPS.
- GPIB/RS-232/USB Interface
- Max Power: 200W, 100W x 2(Dual), 30W&250W, 300W, 350W, 600W, 1200W
- Voltage Range: 0~80V / 0~120V / 0~500V
- CC, CR, CV, CP operating modes
- Dynamic loading with speed up to 20kHz
- Programmable slew rate, up to 10A/μs
- Only need 0.6V to draw rated current (63323A)
- Individual panel meters
- Real time power supplies load transient response simulation and output measurement
- 16-bit precision voltage and measurement with dual-range selection
- Remote sensing capability
- Short circuit test
- Self-test at power-on
- CE marking

Chroma Model 6330A series high speed DC electronic improves CPU clock, baud rate, parser and added synchronic parallel function for fast operation, which is ideal for auto test system integration to increase your manufacturing test throughput. Plugging the user selectable load modules into the system mainframe can also provide easy system configuration and future reconfiguration configure the system.

The 6330A family offers 12 types of modular loads with power ranging from 30 watts to 1200 watts, current from 0.5mA to 240A, and voltage measurement from 0.5mV to 500V. Each load is isolated and floating, programmable in dual current range and measuring voltage range, and capable of synchronizing with other modules for control operating. The load can be operated in constant current, constant voltage, and constant resistance.

With Synchronic parallel control capability, 6330A series loads allow users to parallel and synchronize more than one load together from an internal loading control signal. This feature provides synchronic dynamic loading test for multi-output power and high power test solution.

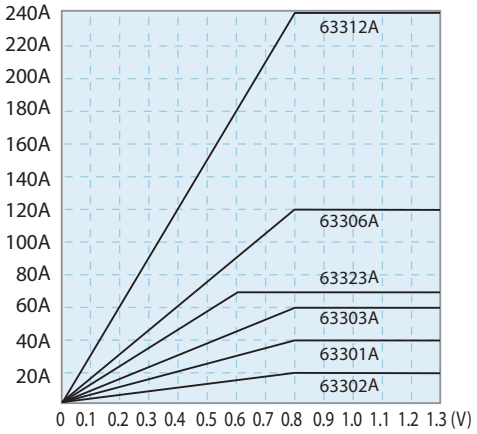
Real time measurement of voltage, current, is integrated into each 6330A load module using a 16-bit precision measurement circuit. The user can perform on line voltage measurement and adjustment, or simulate short circuit test using the simple keypad on the front panel.

The 6330A have self-diagnosis routine to maintain instrumental performance all the time. It is also protected against OP, OC, OT protection, and alarm indicating OV, reverse polarity to guarantee quality and reliability for even the most demanding engineering testing and ATE application.

The FET technology accomplishes minimum input resistance and enables the load to sink high current even at very low voltage. For example, model 63303A is capable of sinking 60A at 1V output, and well-suited for testing the new 3V low voltage power supplies. Low voltage operation, down to zero volt, is possible at correspondingly reduced current level. (see below)

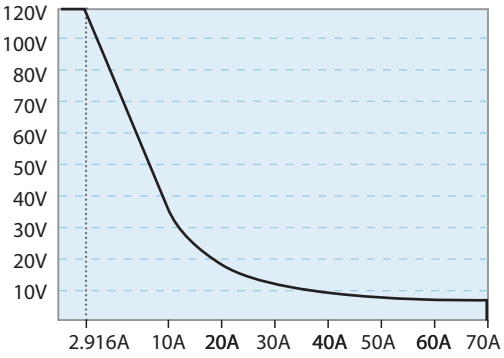
Chroma has created the industries first LED Load Simulator for simulating LED loading with our 63310A load model from our 6330A series Electronic Loads. By setting the LED power driver's output voltage, and current, the Electronic Load can simulate the LED's loading characteristics. The LED's forward voltage and operating resistance can also be set to further adjust the loading current and ripple current to better simulate LED characteristics. The 63310A design also has increased bandwidth to allow for PWM dimming testing.

Low Voltage Characteristics (Typical)
Model 63301A/63302A/63303A/
63306A/63312A/63323A

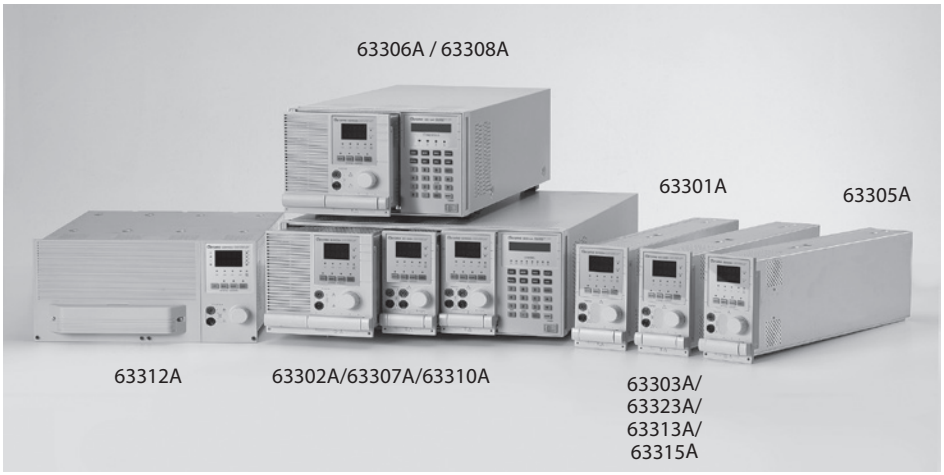


Note: All specifications are measured at load input terminals. (Ambient Temperature of 25˚C)

Model 63323A Input Characteristics



6330A Series High Speed DC Electronic Load Family



All specifications are subject to change without notice.

SPECIFICATIONS-1						
Model	**63301A**		**63302A (100Wx2)**		**63303A**	
Power	20W	200W	20W	100W	30W	300W
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Voltage *3	0~80V		0~80V		0~80V	
Min. Operation Voltage (DC) *1	0.4V@2A	0.4V@20A	0.4V@1A	0.4V@10A	0.4V@3A	0.4V@30A
(Typical)	0.8V@4A	0.8V@40A	0.8V@2A	0.8V@20A	0.8V@6A	0.8V@60A
Constant Current Mode						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.0375Ω~150Ω (200W/16V) 1.875Ω~7.5kΩ (200W/80V)		0.075Ω~300Ω (100W/16V) 3.75Ω~15kΩ (100W/80V)		0.025Ω~100Ω (300W/16V) 1.25Ω~5kΩ (300W/80V)	
Resolution*5	6.667mS (200W/16V) 133μS (200W/80V)		3.333mS (100W/16V) 66.667μS (100W/80V)		10mS (300W/16V) 200μS (300W/80V)	
Accuracy	150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%		300Ω: 0.1S + 0.2% 15kΩ: 0.01S + 0.1%		100Ω: 0.1S+ 0.2% 5kΩ: 0.01S+ 0.1%	
Constant Voltage Mode						
Range	0~80V		0~80V		0~80V	
Resolution	20mV		20mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Resolution	5mW	50mW	5mW	25mW	7.5mW	75mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode		C.C. Mode		C.C. Mode	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.64~160mA/μs	6.4~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.64mA/μs	6.4mA/μs	0.32mA/μs	3.2mA/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		10μs (Typical)		10μs (Typical)	
Current	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	1mA	10mA	0.5mA	5mA	1.5mA	15mA
Accuracy	0.4%F.S.		0.4%F.S.		0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~16V	0~80V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back						
Range	0~4A	0~40A	0~2A	0~20A	0~6A	0~60A
Resolution	0.0625mA	0.625mA	0.03125mA	0.3125mA	0.09375mA	0.9375mA
Accuracy	0.05% + 0.05%F.S.		0.05% + 0.05%F.S.		0.05% + 0.05%F.S.	
Power Read Back*2						
Range	0~20W	0~200W	0~20W	0~100W	0~30W	0~300W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section						
Over Power Protection	Yes		Yes		Yes	
Over Current Protection	Yes		Yes		Yes	
Over Temperature Protection	Yes		Yes		Yes	
Over Voltage Alarm*3	Yes		Yes		Yes	
General						
Short Circuit						
Current (CC)	-	≒40A	-	≒20A	-	≒60A
Voltage (CV)	-	0V	-	0V	-	0V
Resistance (CR)	-	≒0.0375Ω	-	≒0.075Ω	-	≒0.025Ω
Power (CP)	-	≒200W	-	≒100W	-	≒300W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/°C (Typical)		100PPM/°C (Typical)		100PPM/°C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (H x W x D)	172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs		4.2 kg / 9.3 lbs	
Operating Range	0~40°C		0~40°C		0~40°C	
EMC & Safety	CE		CE		CE	

All specifications are subject to change without notice.

• Continued on next page ➟

SPECIFICATIONS-2				
Model	**63305A**		**63306A**	
Power	30W	300W	60W	600W
Current	0~1A	0~10A	0~12A	0~120A
Voltage*3	0~500V		0~80V	
Min. Operation Voltage (DC) *1	1.0V@0.5A	1.0V@5A	0.4V@6A	0.4V@60A
(Typical)	2.0V@1A	2.0V@10A	0.8V@12A	0.8V@120A
Constant Current Mode				
Range	0~1A	0~10A	0~12A	0~120A
Resolution	0.25mA	2.5mA	3mA	30mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode				
Range	1.25Ω~5Ω (300W/125V) 50Ω~200kΩ (300W/500V)		12.5mΩ~50Ω (600W/16V) 0.625Ω~2.5kΩ (600W/80V)	
Resolution*5	200μS (300W/125V) 5μS (300W/500V)		20mS (600W/16V) 400μS (600W/80V)	
Accuracy	5kΩ: 20mS+ 0.2% 200kΩ:5mS+ 0.1%		50Ω: 0.4S + 0.5% 2.5kΩ: 0.04S + 0.2%	
Constant Voltage Mode				
Range	0~500V		0~80V	
Resolution	125mV		20mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode				
Range	0~30W	0~300W	0~60W	0~600W
Resolution	7.5mW	75mW	15mW	150mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode				
Dynamic Mode	C.C. Mode		C.C. Mode	
T1 &T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs/1ms+100ppm	
Slew Rate	0.16~40mA/μs	1.6~400mA/μs	0.002~0.5A/μs	0.02~5A/μs
Resolution	0.16mA/μs	1.6mA/μs	0.002A/μs	0.02A/μs
Accuracy	10% ±20μs		10% ±20μs	
Min. Rise Time	24μs (Typical)		10μs (Typical)	
Current	0~1A	0~10A	0~12A	0~120A
Resolution	0.25mA	2.5mA	3mA	30mA
Accuracy	0.4%F.S.		0.4%F.S.	
Measurement Section				
Voltage Read Back				
Range	0~125V	0~500V	0~16V	0~80V
Resolution	2mV	8mV	0.25mV	1.25mV
Accuracy	0.025% + 0.025%F.S.		0.025% + 0.025%F.S.	
Current Read Back				
Range	0~1A	0~10A	0~12A	0~120A
Resolution	0.016mA	0.16mA	0.1875mA	1.875mA
Accuracy	0.25mA	2.5mA	0.05% + 0.05%F.S.	
Power Read Back*2				
Range	0~30W	0~300W	0~60W	0~600W
Accuracy	0.1% + 0.1%F.S.		0.1% + 0.1%F.S.	
Protective Section				
Over Power Protection	Yes		Yes	
Over Current Protection	Yes		Yes	
Over Temperature Protection	Yes		Yes	
Over Voltage Alarm*3	Yes		Yes	
General				
Short Circuit				
Current (CC)	-	≒10A	-	≒120A
Voltage (CV)	-	0V	-	0V
Resistance (CR)	-	≒1.25Ω	-	≒0.0125Ω
Power (CP)	-	≒300W	-	≒600W
Input Resistance (Load Off)	100kΩ (Typical)		100kΩ (Typical)	
Temperature Coefficient	100PPM/˚C (Typical)		100PPM/˚C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch		172x164x489.5mm / 6.8x6.5x19.3inch	
Weight	4.2 kg / 9.3 lbs		7.3 kg / 16.1 lbs	
Operating Range	0~40˚C		0~40˚C	
EMC & Safety	CE		CE	

All specifications are subject to change without notice.

SPECIFICATIONS-3						
Model	**63307A (30W & 250W)**				**63308A**	
Power	30W	30W		250W	60W	600W
Current	0~5A	0~4A		0~40A	0~2A	0~20A
Voltage*3	0~80V				0~500V	
Min. Operation Voltage (DC) *1	0.4V@2.5A	0.4V@2A		0.4V@20A	1.0V@1A	1.0V@10A
(Typical)	0.8V@5A	0.8V@4A		0.8V@40A	2V@2A	2V@20A
Constant Current Mode						
Range	0~5A	0~4A		0~40A	0~2A	0~20A
Resolution	1.25mA	1mA		10mA	0.5mA	5mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.1%F.S.		0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode						
Range	0.3Ω~1.2kΩ (30W/16V) 15Ω~60kΩ (30W/80V)		0.0375Ω~150Ω (250W/16V) 1.875Ω~7.5kΩ (250W/80V)		0.625Ω~2.5kΩ (600W/125V) 25Ω~100kΩ (600W/500V)	
Resolution*5	833μS (30W/16V) 16.67μS (30W/80V)		6.667μS (250W/16V) 133μS (250W/80V)		400μS (600W/125V) 10μS (600W/500V)	
Accuracy	1.2kΩ: 0.1S + 0.2% 60kΩ: 0.01S + 0.1%		150Ω: 0.1S + 0.2% 7.5kΩ: 0.01S + 0.1%		25kΩ: 50mS+ 0.2% 100kΩ: 5mS+ 0.1%	
Constant Voltage Mode						
Range	0~80V				0~500V	
Resolution	20mV				125mV	
Accuracy	0.05% + 0.1%F.S.				0.05% + 0.1%F.S.	
Constant Power Mode						
Range	0~30W	0~30W		0~250W	0~60W	0~600W
Resolution	7.5mW	7.5mW		62.5mW	15mW	150mW
Accuracy	0.5% + 0.5%F.S.				0.5% + 0.5%F.S.	
Dynamic Mode						
Dynamic Mode	C.C. Mode				C.C. Mode	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms				0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm				1μs/1ms+100ppm	
Slew Rate	0.8~200mA/μs	0.64~160mA/μs		64~1600mA/μs	0.32~80mA/μs	3.2~800mA/μs
Resolution	0.8mA/μs	0.64mA/μs		64mA/μs	0.32mA/μs	3.2mA/μs
Accuracy	10% ±20μs				10% ±20μs	
Min. Rise Time	10μs (Typical)				24μs (Typical)	
Current	0~5A	0~4A		0~40A	0~2A	0~20A
Resolution	1.25mA	1mA		10mA	0.5mA	5mA
Accuracy	0.4%F.S.				0.4%F.S.	
Measurement Section						
Voltage Read Back						
Range	0~16V	0~80V	0~16V	0~80V	0~125V	0~500V
Resolution	0.25mV	1.25mV	0.25mV	1.25mV	2mV	8mV
Accuracy	0.025% + 0.025%F.S.				0.025% + 0.025%F.S.	
Current Read Back						
Range	0~5A	0~4A		0~40A	0~2A	0~20A
Resolution	0.078125mA	0.0625mA		0.625mA	0.03125mA	0.3125mA
Accuracy	0.05% + 0.05%F.S.				0.05% + 0.05%F.S.	
Power Read Back*2						
Range	0~30W	0~30W		0~250W	0~60W	0~600W
Accuracy	0.1% + 0.1%F.S.				0.1% + 0.1%F.S.	
Protective Section						
Over Power Protection	Yes				Yes	
Over Current Protection	Yes				Yes	
Over Temperature Protection	Yes				Yes	
Over Voltage Alarm*3	Yes				Yes	
General						
Short Circuit						
Current (CC)	-	-		≒40A	-	≒20A
Voltage (CV)	-	-		0V	-	0V
Resistance (CR)	-	-		≒0.0375Ω	-	≒0.625Ω
Power (CP)	-	-		≒250W	-	≒600W
Input Resistance (Load Off)	100kΩ (Typical)					
Temperature Coefficient	100PPM/˚C (Typical)					
Power	Supply from 6334A Mainframe					
Dimension (HxWxD)	172x82x489.5mm / 6.8x3.2x19.3inch				172x164x489.5mm / 6.8x6.5x19.3inch	
Weight	4.5 kg / 9.9 lbs				7.3 kg / 16.1 lbs	
Operating Range	0~40˚C					
EMC & Safety	CE					

Battery Test & Automation Solution
Photovoltaic Test & Automation Solution
Semiconductor/ IC Test Solution
Laser Diode Test Solution
LED/ Lighting Test Solution
FPD Test Solution
Video & Color Test Solution
Automated Optical Inspection Solution
Power Electronics Test Solution
Passive Component Test Solution
Electrical Safety Test Solution
General Purpose Test Solution
Thermoelectric Test & Control Solution
PXI Test & Measurement Solution
Manufacturing Execution Systems Solution

SPECIFICATIONS-4				
Model	**63312A**		**63323A**	
Power	120W	1200W	350W	
Current	0~24A	0~240A	0~7A	0~70A
Voltage*3	0~80V		0~120V	
Min. Operation Voltage (DC) *1 (Typical)	0.4V@12A 0.8V@24A	0.4V@120A 0.8V@240A	0.05V @ 3.5A 0.1V @ 7A	0.3V @ 35A 0.6V @ 70A
Constant Current Mode				
Range	0~24A	0~240A	0~7A	0~70A
Resolution	6mA	60mA	0.125mA	1.25mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Mode				
Range	6.25mΩ~25Ω (1200W/16V) 0.3125Ω~1.25kΩ (1200W/80V)		0.01Ω~150Ω (350W/24V)*4 2Ω~2kΩ (350W/120V)	
Resolution*5	40mS (1200W/16V) 80μS (1200W/80V)		1.33mS (350W/24V)*4 10μS (350W/120V)	
Accuracy	25Ω: 0.8S+ 0.8% 1.25kΩ: 0.08S+ 0.2%		150Ω: 67mS + 0.1% 2kΩ: 5mS + 0.2%	
Constant Voltage Mode				
Range	0~80V		0~120V	
Resolution	20mV		2mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Power Mode				
Range	0~120W	0~1200W	0~35W	0~350W
Resolution	30mW	300mW	2.5mW	25mW
Accuracy	0.5% + 0.5%F.S.		0.5% + 0.5%F.S.	
Dynamic Mode				
Dynamic Mode	C.C. Mode		C.C. MODE	
T1 & T2	0.025ms ~ 50ms / Res: 5μs 0.1ms ~ 500ms / Res: 25μs 10ms ~ 50s / Res: 2.5ms		0.025ms~50ms/Res: 5μs 0.1ms~500ms / Res: 25μs 10ms~50s / Res: 2.5ms	
Accuracy	1μs/1ms+100ppm		1μs /1ms+100ppm	
Slew Rate	0.004~1A/μs	0.04~10A/μs	0.001~0.25A/μs	0.01~2.5A/μs
Resolution	0.004A/μs	0.04A/μs	0.001A/μs	0.01A/μs
Accuracy	10% ±20μs		10% ±20μs	
Min. Rise Time	10μs (Typical)		25μs (Typical) *6	
Current	0~24A	0~240A	0~7A	0~70A
Resolution	6mA	60mA	0.125mA	1.25mA
Current Accuracy	0.4%F.S.		0.1% F.S.	
Measurement Section				
Voltage Read Back				
Range	0~16V	0~80V	0~24V	0~120V
Resolution	0.25mV	1.25mV	0.4mV	2mV
Accuracy	0.025% + 0.025%F.S.		0.025%+0.015% F.S.	
Current Read Back				
Range	0~24A	0~240A	0~7A	0~70A
Resolution	0.375mA	3.75mA	0.125mA	1.25mA
Accuracy	0.075% + 0.075%F.S.		0.04%+0.04% F.S.	
Power Read Back*2				
Range	0~120W	0~1200W	0~35W	0~350W
Accuracy	0.1% + 0.1%F.S.		0.1%+0.1% F.S.	
Protective Section				
Over Power Protection	Yes		Yes	
Over Current Protection	Yes		Yes	
Over Temperature Protection	Yes		Yes	
Over Voltage Alarm*3	Yes		Yes	
General				
Short Circuit				
Current (CC)	-	≒240A	-	≒70A
Voltage (CV)	-	0V	-	0V
Resistance (CR)	-	≒0.00625Ω	-	≒ 0.01Ω
Power (CP)	-	≒1200W	-	≒ 350W
Input Resistance (Load Off)	100kΩ (Typical)		800kΩ (Typical)	
Temperature Coefficient	100PPM/°C (Typical)		100PPM/°C (Typical)	
Power	Supply from 6334A Mainframe		Supply from 6334A Mainframe	
Dimension (HxWxD)	172x329x495mm / 6.8x12.9x19.5inch		172x82x489.5mm / 6.8x3.2x19.3inch	
Weight	14 kg / 30.8 lbs		4.2kg / 9.3 lbs	
Operating Range	0~40°C		0~40°C	
EMC & Safety	CE		CE	

NOTE*1 : Low voltage operation, under 0.8 volt, is possible at correspondingly reduced current level. Operating temperature range is 0ºC to 40°C. All specifications apply for 25°C ± 5°C, except as noted

NOTE*2 : Power F.S.=Vrange F.S. x Irange F.S.

NOTE*3 : When the operating voltage exceeds the rated voltage for 1.02 times, a warning will occur and if it exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.

NOTE*4 : Please refer to user's manual for detail specifications.

NOTE *5 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

NOTE *6 : The loading current should be 0.35A at least.

All specifications are subject to change without notice.

SPECIFICATIONS						
Model	**63310A (100Wx2)**		**63313A**		**63315A *3**	
Power	100W		300W		300W	
Current	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Voltage *1	0~500V		0~300V		0~600V	
Min. Operating Voltage	6V@2A		4V@20A		2V@10A	
LED Mode						
Range	Operating Voltage: 0~100V/0~500V R_d Coefficient : 0.001~1 V_F: 0~100V/0~500V Current : 0~2A R_d: 1Ω~1kΩ/10Ω~10kΩ		Operating Voltage : 0~60V/0~300V R_d Coefficient : 0.001~1 V_F : 0~60V/0~300V LEDL @ CH : 0~60V- 0~20A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~5A (R_d: 0.8Ω~800Ω) LEDH @ CL : 0~300V- 0~5A (R_d: 4Ω~4kΩ)		Operating Voltage : 0~60V/0~600V R_d Coefficient : 0.001~1 V_F : 0~60V/0~600V LEDL @ CH : 0~60V- 0~10A (R_d: 0.05Ω~50Ω) LEDL @ CL : 0~60V- 0~2A (R_d: 1.6Ω~1.6kΩ) LEDH @ CL : 0~600V- 0~2A (R_d: 8Ω~8kΩ)	
Resolution *2	Vo : 4mV/20mV Io : 0.1mA R_d Coefficient : 0.001 R_d : 62.5μS/6.25μS V_F : 4mV/20mV		Vo : 1.2mV/6mV Io : 100μA/400μA R_d Coefficient : 0.001 R_d : 400μS / 25μS / 5μS V_F : 1.2mV/ 6mV		Vo : 1.2mV/6mV Io : 100μA/400μA R_d : 0.4mS/12.5uS/2.5uS V_F : 6mV/ 30mV	
Constant Resistance Mode						
Range	CRL : 3Ω~1kΩ (100W/100V) CRH : 10Ω~10kΩ (100W/500V)		CRL @ CH : 0.2Ω~200Ω (300W/60V) CRL @ CL : 0.8Ω~800Ω (300W/60V) CRH @ CL : 4Ω~4kΩ (300W/300V)		CRL @ CH : 0.4Ω~400Ω (300W/60V) CRL @ CL : 1.6Ω~1.6kΩ (300W/60V) CRH @ CL : 8Ω~8kΩ (300W/600V)	
Resolution*2	CRL : 62.5μS CRH : 6.25μS		CRL @ CH : 100μS CRL @ CL : 25μS CRH @ CL : 5μS		CRL @ CH : 50μS CRL @ CL : 12.5μS CRH @ CL : 2.5μS	
Accuracy	1kΩ : 4mS+0.2% 10kΩ : 1mS+0.1%		0.2% (setting + range)		0.2% (setting + range)	
Constant Voltage Mode						
Range	0~500V		0~300V		0~600V	
Resolution	20mV		6mV		12mV	
Accuracy	0.05% + 0.1%F.S.		0.05% + 0.1%F.S.		0.05% + 0.1%F.S.	
Constant Current Mode						
Range	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Resolution	12μA	40μA	100μA	400μA	40μA	200μA
Accuracy	0.1%+0.1% F.S.		0.1%+0.1% F.S.	0.1%+0.2% F.S.	0.1%+0.1% F.S.	0.1%+0.2% F.S.
Measurement Section						
Voltage Read Back						
Range	0~100V	0~500V	0~60V	0~300V	0~60V	0~600V
Resolution	2mV	10mV	1.2mV	6mV	1.2mV	12mV
Accuracy	0.025%+0.025% F.S.		0.025%+0.025% F.S.		0.025%+0.025% F.S.	
Current Read Back						
Range	0~0.6A	0~2A	0~5A	0~20A	0~2A	0~10A
Resolution	12μA	40μA	100μA	400μA	0.04mA	0.2mA
Accuracy	0.05%+0.05% F.S.		0.05%+0.05% F.S.		0.05%+0.05% F.S.	

Note*1 : If the operating voltage exceeds 1.1 times of the rated voltage, it would cause permanent damage to the device.
Note*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.
Note*3 : Call for availability

Mainframe Model	**6332A**	**6334A**
Number of slots	2	4
Operating Temperature	0~40˚C	0~40˚C
Input Rating	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz	1Ø 100/200Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 115/230Vac ± 10% V_{LN}, 47~63Hz
Dimension (HxWxD)	194x275x550mm / 7.6x10.8x21.7inch	194x439x550mm / 7.6x17.3x21.7inch
Weight	15 kg / 33.1 lbs	21.5 kg / 47.4 lbs

ORDERING INFORMATION

6332A: Mainframe for 2 Load Modules
6334A: Mainframe for 4 Load Modules
63301A: Load Module 80V/40A/200W
63302A: Load Module 80V/20A/100W x 2
63303A: Load Module 80V/60A/300W
63305A: Load Module 500V/10A/300W
63306A: Load Module 80V/120A/600W
63307A: Load Module 80V/5A & 40A/30W & 250W
63308A: Load Module 500V/20A/600W
63312A: Load Module 80V/240A/1200W
63323A: Load Module 120V/70A/350W
A631000: GPIB Interface for Model 6334A/6332A Mainframe
A631001: Remote Controller
A631003: USB Interface for Model 6334A/6332A Mainframe
A631005: Softpanel for 6310A/6330A series
A631006: Rack Mounting Kit for Model 6332A Mainframe
A631007: Rack Mounting Kit for Model 6334A Mainframe
A632004: Sync. Link Box for 6330A/63200 Series
A800042: Test Fixture
LED Load Simulator for LED Driver Test
63310A: Load Module 500V/2A/100W x 2
63313A: Load Module 300V/20A/300W
*** 63315A:** Load Module 600V/10A/300W
* Call for availability



KEY FEATURES

- Max. Power : 100W x 2(Dual), 300W & 400W
- Voltage Range : up to 600V
- 5 module mainframe Max. 2000W, load modules up to 400W/ea
- Up to 10 channels in one mainframe, fit for testing multiple output SMPS
- 0.4V @ 80A (Typical) low voltage operating characteristics
- Flexible CC, CR, CV and CP operation modes
- CZ mode for turn on capacitive load simulation
- Parallel mode for high current and power application up to 2kW
- Multi Channel synchronous control
- Auto frequency sweep up to 50kHz
- Real time power supply load transient response simulation and Vpk+/- measurement
- User programmable 100 sequential front panel input status for user-friendly operating
- Precision voltage and current measurement
- Precision high speed digitizing measurement/ data capture
- Voltage, Current and Pmax measurement for OCP/OLP testing
- Timing measurement for batteries
- Short circuit simulation
- Self-test at power-on
- Full Protection : OC, OP, OT protection and OV alarm
- Ethernet, USB and GPIB interfaces

Ethernet GPIB USB CE

Chroma's 63600 Series DC Electronic Loads are designed for testing multi-output AC/DC power supplies, DC/DC converters, chargers, batteries, adapters, and power electronic components. They are excellent for research, development, production, and incoming inspection applications.

The 63600's state of the art design uses DSP technology to simulate non-linear loads using an unique CZ operation mode allowing realistic loading behavior.

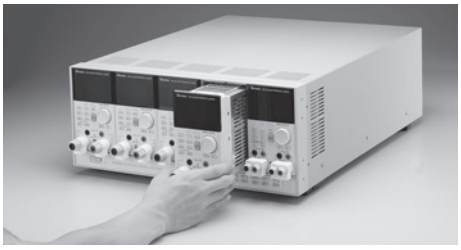
The 63600 series can draw its rated current under very low voltage (0.4V typical). This unique feature guarantees the best loading performance for modern Point-of-Load conditions and fuel cells.

The 63600 series can simulate a wide range of dynamic loading applications, with programmable load levels, slew rates, duration, and conducting voltage. The 63600 also has a dynamic sweep function to meet the test requirements of ATX power supplies. The instrument allows up to 100 sets of system operating status which can be stored in the EEPROM and recalled instantly for automated testing application.

Real time measurement of voltage and current are integrated into each 63600 load module using a 16-bit measurement circuit with three current ranges. The user can perform online voltage measurements and adjustments or simulate short circuit test using the simple keypad on the front panel.

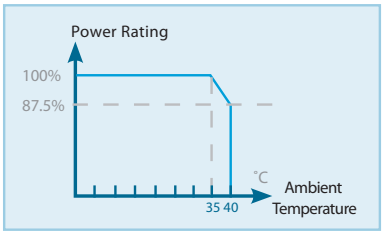
With the VFD display and rotary knob, the 63600 loads offer versatile front panel operation. Users are able to control the 63600 family remotely via Ethernet, USB, or GPIB interface.

Also included in the 63600 are self-diagnostic routines and full protections against OP, OC, OT and alarm indicating OV, reverse polarity. This ensures the quality and reliability of the 63600 and provides protection of units under test.



ORDERING INFORMATION

63600-1 : 63600 Mainframe for Single Module
63600-2 : 63600 Mainframe for 2 Modules
63600-5 : 63600 Mainframe for 5 Modules
63610-80-20 : DC Load Module 80V/ 20A/ 100Wx2
63630-80-60 : DC Load Module 80V/ 60A/ 300W
63630-600-15 : DC Load Module 600V/ 15A/ 300W
63640-80-80 : DC Load Module 80V/ 80A/ 400W
A636000 : GPIB Interface for 63600-2/63600-5 Mainframe
A636001 : Ethernet Interface for 63600-2/63600-5 Mainframe
A636003 : External Signal Board (Test Pin) for 63600-2/63600-5 Mainframe
A636005 : External Signal Board (BNC) for 63600-2/63600-5 Mainframe
A636007 : Rack Mounting Kit for 63600-2 mainframe
A636008 : Rack Mounting Kit for 63600-5 mainframe (for Europe only)
A632006 : NI USB-6211 BUS-Powered Multifunction DAQ



Model	63600-1*	63600-2	63600-5
Number of slots	1 slot	2 slots	5 slots
Operating temperature	0~40°C	0~40°C	0~40°C
Input Rating	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Switchable, 47~63Hz	1Ø 100~115V ± 10% V_{LN}, 1Ø 190~230V ± 10% V_{LN}, Auto Range, 47~63Hz
Mainframe dimension (HxWxD)	177x70.22x554.9mm / 7x2.76x21.8 inch	177x210x554mm / 7.0x8.27x21.8 inch	177x447x554mm / 7.0x17.6x21.8 inch (Full Rack)
Weight	7.5kg / 16.53lbs	11.5kg / 23.35lbs	15.6kg / 34.39lbs

* None digital interface option

All specifications are subject to change without notice.

SPECIFICATIONS-1						
Model	**63610-80-20**			**63630-80-60**		
Configuration	100Wx2			300W		
Voltage *1 *8	0~80V			0~80V		
Current	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Power *2	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Static Mode						
Typical Min. Operating Voltage (DC)	0.5V@0.2A	0.5V@2A	0.5V@20A	0.5V@0.6A	0.5V@6A	0.5V@60A
Constant Current Mode						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.04~80Ω (100W/6V) CRM: 1.44~2.9kΩ (100W/16V) CRH : 5.76~12kΩ (100W/80V)			CRL : 0.015~30Ω (300W/6V) CRM: 0.3~600Ω (300W/16V) CRH : 1.5~3kΩ (300W80V)		
Resolution *9	0.3288mS			0.9864mS		
Accuracy *3	0.1%+0.075S (6V) 0.1%+0.01S (16V) 0.1%+0.00375S (80V)			0.1%+0.2S (6V) 0.1%+0.03S (16V) 0.1%+0.01S (80V)		
Constant Voltage Mode						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1mV	1mV	1mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~2W	0~10W	0~100W	0~6W	0~30W	0~300W
Resolution *9	1mW	10mW	100mW	3.2mW	32mW	320mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	1.5V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew Rate	0.04A/ms~0.02A/μs	0.4A/ms~0.2A/μs	4A/ms~2A/μs	0.12A/ms~0.06A/μs	1.2A/ms~0.6A/μs	12A/ms~6A/μs
Resolution	0.01mA/μs	0.1mA/μs	1mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.01mA	0.1mA	1mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Program mode						
Sequence No.	100/Program			100/Program		
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)			0.1ms ~ 30s (Resolution : 0.1ms)		
Load Setting	Refer to Static mode specifications			Refer to Static mode specifications		
Spec Check	Voltage/Current/Power			Voltage/Current/Power		
Measurement						
Voltage Read Back						
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Resolution	0.1069mV	0.2849mV	1.3537mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.2A	0~2A	0~20A	0~0.6A	0~6A	0~60A
Resolution	0.003349mA	0.034628mA	0.329561mA	0.009942mA	0.101748mA	1.009878mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		

Power Read Back						
Range	0~16W	0~30W	0~100W	0~30W	0~60W	0~300W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~6V	0~16V	0~80V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.2A	0~2A	0~20A	0~0.1A	0~1A	0~10A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Protection						
Over Power	Yes			Yes		
Over Current	Yes			Yes		
Over Voltage Alarm*8	Yes			Yes		
Over Temperature	Yes			Yes		
Reverse	Yes			Yes		
Interface						
USB	Standard			Standard		
Ethernet	Optional			Optional		
GPIB	Optional			Optional		
System BUS	Master/Slave			Master/Slave		
Others						
Dout						
No. of bits	2 bits per mainframe			2 bits per mainframe		
Level - H	1.8V/3.3V/5V switchable			1.8V/3.3V/5V switchable		
Level - L	<0.6V@I_{sink}=10mA			<0.6V@I_{sink}=10mA		
Drive	Pull_up resistor = 4.7kΩ			Pull_up resistor = 4.7kΩ		
Din (TTL Compatible, Rising Edge)						
No. of bits	2 bits per mainframe			2 bits per mainframe		
External Trig. for Digitizing						
No. of bits	1 bit per mainframe			1 bit per mainframe		
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)						
No. of bits	1 bit per mainframe			1 bit per mainframe		
Load ON - O/P						
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short ON - O/P						
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe			2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe		
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
General						
Short circuit						
Current *6	Set to 100% of rated current			Set to 100% of rated current		
Input Resistance (Load Off)	700kΩ (Typical)			700kΩ (Typical)		
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch			142x86x514mm / 5.6x3.4x20.2 inch		
Weight	5kg / 11 lbs			4kg / 8.8 lbs		
Operating Temperature	0~40˚C			0~40˚C		
Storage Temperature	-20~80˚C			-20~80˚C		
Power	Supply from mainframe			Supply from mainframe		
EMC & Safety	CE			CE		

All specifications are subject to change without notice.

SPECIFICATIONS-2						
Model	**63630-600-15**			**63640-80-80**		
Configuration	300W			400W		
Voltage *1 *8	0~600V			0~80V		
Current	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Power *2	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Static Mode						
Typical Min. Operating Voltage (DC)	2V@0.15A	2V@1.5A	2V@15A	0.4V@0.8A	0.4V@8A	0.4V@80A
Constant Current Mode						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Accuracy	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Constant Resistance Mode						
Range	CRL : 0.133~270Ω (300W/80V) CRM: 1.92~4kΩ (300W/150V) CRH: 208~200kΩ (300W/600V)			CRL : 0.01~20Ω (400W/6V) CRM: 0.36~720Ω (400W/16V) CRH : 1.45~2.9kΩ (400W/80V)		
Resolution *9	0.2435mS			1.322mS		
Accuracy *3	0.1%+0.02S (80V) 0.1%+0.0005S (150V) 0.1%+0.0003S (600V)			0.1%+0.275S (6V) 0.1%+0.036S (16V) 0.1%+0.01375S (80V)		
Constant Voltage Mode						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1mV	10mV	10mV	0.1mV	1mV	1mV
Accuracy	0.05%+0.1%F.S.			0.05%+0.1%F.S.		
Constant Power Mode						
Range	0~6W	0~30W	0~300W	0~8W	0~40W	0~400W
Resolution *9	5.625mW	56.25mW	562.5mW	4mW	40mW	400mW
Accuracy *4	0.3%+0.3%F.S.			0.3%+0.3%F.S.		
Dynamic Mode - CC						
Min. Operating Voltage	3V			1.5V		
Frequency	100Hz~50kHz/0.01Hz~1kHz			100Hz~50kHz/0.01Hz~1kHz		
Duty	1~99% (Min. Rise Time Dominated)			1~99% (Min. Rise Time Dominated)		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew rate	0.03A/ms~0.015A/μs	0.3A/ms~0.15A/μs	3A/ms~1.5A/μs	0.16A/ms~0.08A/μs	1.6A/ms~0.8A/μs	16A/ms~8A/μs
Resolution	0.005mA/μs	0.05mA/μs	0.5mA/μs	0.01mA/μs	0.1mA/μs	1mA/μs
Accuracy	10% ±20μs			10% ±20μs		
Min. Rise Time	10 μs			10 μs		
Current						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.005mA	0.05mA	0.5mA	0.01mA	0.1mA	1mA
Ext Wave Mode(20kHz) : CC						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Level	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Program mode						
Sequence No.	100/Program			100/Program		
Dwell / SEQ	0.1ms ~ 30s (Resolution : 0.1ms)			0.1ms ~ 30s (Resolution : 0.1ms)		
Load Setting	Refer to Static mode specifications			Refer to Static mode specifications		
Spec Check	Voltage/Current/Power			Voltage/Current/Power		
Measurement						
Voltage Read Back						
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Resolution	1.4194mV	2.661mV	10.645mV	0.1069mV	0.2849mV	1.3537mV
Accuracy *5	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.	0.025%+0.01%F.S.		0.01%+ 0.025%F.S.
Current Read Back						
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Resolution	0.00275mA	0.0266mA	0.255mA	0.013695mA	0.138766mA	1.31406mA
Accuracy *5	0.05%+0.05%F.S.			0.05%+0.05%F.S.		

All specifications are subject to change without notice.

• Continued on next page ➟

Power Read Back						
Range	0~90W	0~300W	0~300W	0~60W	0~60W	0~400W
Accuracy *5	0.1%+0.1%F.S.			0.1%+0.1%F.S.		
Voltage Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~80V	0~150V	0~600V	0~6V	0~16V	0~80V
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Current Monitor						
Bandwidth	20 kHz			20 kHz		
Range	0~0.15A	0~1.5A	0~15A	0~0.8A	0~8A	0~80A
Output	0~10V			0~10V		
Accuracy	0.5%F.S.			0.5%F.S.		
Protection						
Over Power	Yes			Yes		
Over Current	Yes			Yes		
Over Voltage Alarm*8	Yes			Yes		
Over Temperature	Yes			Yes		
Reverse	Yes			Yes		
Interface						
USB	Standard			Standard		
Ethernet	Optional			Optional		
GPIB	Optional			Optional		
System BUS	Master/Slave			Master/Slave		
Others						
Dout						
No. of bits	2 bits per mainframe			2 bits per mainframe		
Level - H	1.8V/3.3V/5V switchable			1.8V/3.3V/5V switchable		
Level - L	<0.6V@I_{sink}=10mA			<0.6V@I_{sink}=10mA		
Drive	Pull_up resistor = 4.7kΩ			Pull_up resistor = 4.7kΩ		
Din (TTL Compatible, Rising Edge)						
No. of bits	2 bits per mainframe			2 bits per mainframe		
External Trig. for Digitizing						
No. of bits	1 bit per mainframe			1 bit per mainframe		
External Trig. for Auto Sequences (TTL Compatible, Rising Edge)						
No. of bits	1 bit per mainframe			1 bit per mainframe		
Load ON - O/P						
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
Short ON - O/P						
No. of channels	2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe			2 channels per 63600-1 mainframe 4 channels per 63600-2 mainframe 10 channels per 63600-5 mainframe		
Level	TTL Compatible, Level, Active High			TTL Compatible, Level, Active High		
General						
Short circuit						
Current *6	Set to 100% of rated current			Set to 100% of rated current		
Input Resistance (Load Off)	2MΩ (Typical)			700kΩ (Typical)		
Dimensions (HxWxD)	142x86x514mm / 5.6x3.4x20.2 inch			142x86x514mm / 5.6x3.4x20.2 inch		
Weight	5kg / 11 lbs			4.5kg / 9.9 lbs		
Operating Temperature	0~40˚C			0~40˚C		
Storage Temperature	-20~80˚C			-20~80˚C		
Power	Supply from mainframe			Supply from mainframe		
EMC & Safety	CE			CE		

NOTE*1 : The maximum current loading below the minimum operating voltage (0.5V) will follow a derating curve.
NOTE*2 : The 400W power rating of the 63640-80-80 specified at an ambient temperature of 35˚C, please refer to the power rating curve on the right.
NOTE*3 : Does not apply to setting current < 0.25% full scale current in high range. Does not apply to setting current < 0.05% full scale current in low and middle range.
NOTE*4 : The full scale is Vmax x Imax.
NOTE*5 : The DC level measurements are made over a period of 20ms, and does not measure any transient signals in the DC measurements.
NOTE*6 : Its limits are the maximum power and maximum current of the current ragne.
NOTE*7 : The 63600 is guaranteed to meet specified performance at temperature range of 25±5˚C.
NOTE*8 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*9 : Please refer to user's manual for detail specifications, and S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

All specifications are subject to change without notice.



KEY FEATURES

- Power Rating : 1800W, 3600W, 4500W
- Voltage Range : 50Vrms ~ 350Vrms
- Current Range : Up to 18Arms, 36Arms, 45Arms
- Peak Current : Up to 54A, 108A, 135A
- Parallel / 3-Phase Function (AC mode only)
- Frequency Range : 45 ~ 440Hz, DC
- Crest Factor Range : 1.414 ~ 5.0
- Power Factor Range : 0 ~ 1 lead or lag (Rectified mode)
- CC, CR, CV, CP for DC Loading
- Constant & Rectified Load Modes for AC Loading
- Analog Voltage & Current Monitor
- Timing Measurement for Battery, UPS, Fuse and Breaker tests
- Measurement : V, I, PF, CF, P, Q, S, F, R, Ip+/- and THDv
- Short circuit simulation
- Full Protection : OC, OP, OT protection and OV alarm

Chroma's 63800 Series AC&DC Electronic Loads are designed for testing uninterruptible power supplies(UPS), Off-Grid Inverters, AC sources and other power devices such as switches, circuit breakers, fuses and connectors.

The Chroma 63800 Loads can simulate load conditions under high crest factor and varying power factors with real time compensation even when the voltage waveform is distorted. This special feature provides real world simulation capability and prevents over-stressing thereby giving reliable and unbiased test results.

RS-232 GPIB CE

The 63800's state of the art design uses DSP technology to simulate non-linear rectified loads with its unique RLC operation mode. This mode improves stability by detecting the impedance of the UUT and dynamically adjusting the load's control bandwidth to ensure system stability.

Comprehensive measurements allow users to monitor the output performance of the UUT. Additionally, voltage & current signals can be routed to an oscilloscope through analog outputs. The instrument's GPIB/RS-232 interface options provide remote control & monitor for system integration. Built-in digital outputs may also be used to control external relays for short circuit (crowbar) testing.

Chroma's 63800 Loads feature fan speed control ensuring low acoustic noise. The diagnosis/ protection functions include self-diagnosis routines and protection against over-power, over-current, over-temperature and alarm indicating over-voltage.

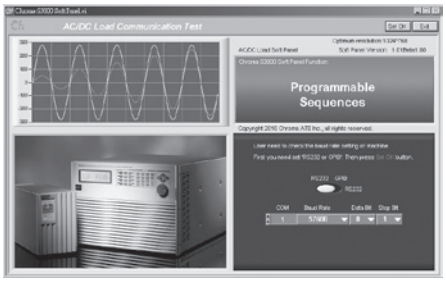
Parallel / 3-Phase Control

The 63800 series provides parallel and 3-phase functions for high power and three phase applications. All the models within the 63800 series can be used together for both parallel and 3-phase functions as well as paralleled AC Load units in a 3-phase configuration, providing excellent flexibility and cost savings for the 63800 series AC load. Parallel and 3-phase controls are made easy by linking the AC Load units together and control of all AC load units is performed through the Master Unit.

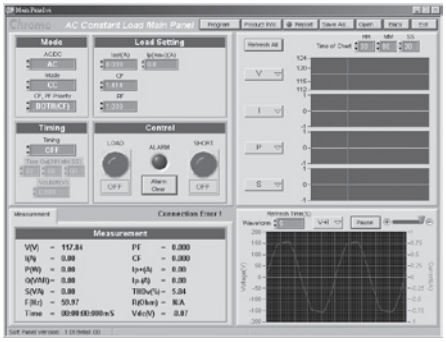


63802

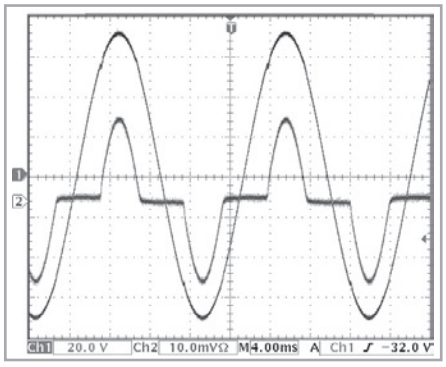
Softpanel

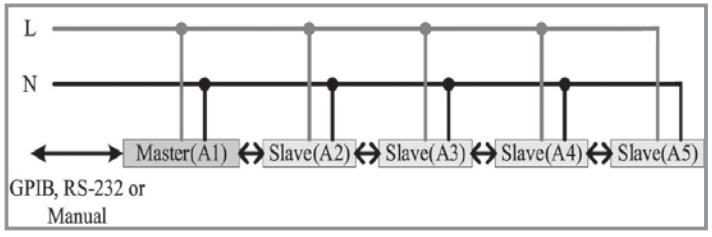


Main Operation Menu



AC Load

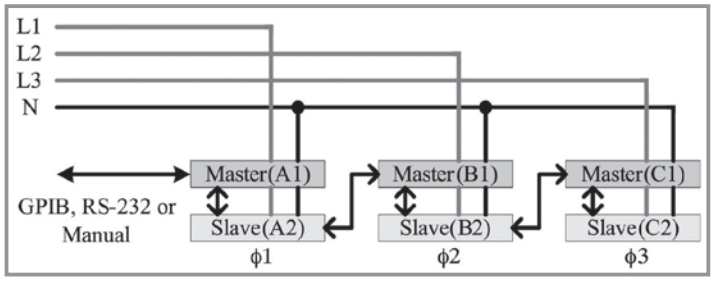




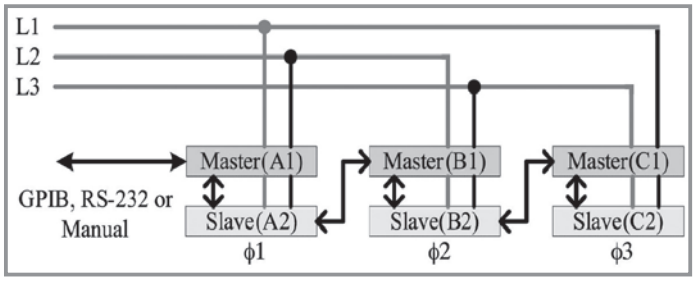
Parallel connection

ORDERING INFORMATION

63802 : Programmable AC & DC Electronic Load 350V/18A/1800W
63803 : Programmable AC & DC Electronic Load 350V/36A/3600W
63804 : Programmable AC & DC Electronic Load 350V/45A/4500W
A638001 : Rack Mounting Kit for Model 63802
A638002 : Rack Mounting Kit for Model 63803/63804



Parallel/3-Phase Y connection



Parallel/3-Phase Delta connection

SPECIFICATIONS			
Model	**63802**	**63803**	**63804**
Power	**1800W**	**3600W**	**4500W**
Current	0 ~ 18Arms (54 Apeak, continue)	0 ~ 36Arms (108 Apeak, continue)	0 ~ 45Arms (135 Apeak, continue)
Voltage*1	50 ~ 350Vrms (500 Vpeak)	50 ~ 350Vrms (500 Vpeak)	50 ~ 350Vrms (500 Vpeak)
Frequency	45 ~ 440Hz, DC	45 ~ 440Hz, DC	45 ~ 440Hz, DC
AC Section			
Constant Current Mode			
Range	0 ~ 18Arms, Programmable	0 ~ 36Arms, Programmable	0 ~ 45Arms, Programmable
Accuracy	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.
Resloution	2mA	5mA	5mA
Constant Resistance Mode			
Range	2.77Ω ~ 2.5kΩ, Programmable	1.39Ω~2.5kΩ, Programmable	1.11Ω~2.5kΩ, Programmable
Accuracy	0.5% + 0.5%F.S.	0.5% + 0.5%F.S.	0.5% + 0.5%F.S.
Resloution*2	20μS	50μS	50μS
Constant Power Mode			
Range	1800W, Programmable	3600W, Programmable	4500W, Programmable
Accuracy	0.5% + 0.5%F.S.	0.2% + 0.3%F.S.	0.2% + 0.3%F.S.
Resloution	0.375W	1.125W	1.125W
Crest Factor (under CC, CP modes)			
Range	1.414 ~ 5.0, Programmable	1.414 ~ 5.0, Programmable	1.414 ~ 5.0, Programmable
Accuracy	(0.5% / Irms) + 1% F.S.	(0.5% / Irms) + 1%F.S.	(0.5% / Irms) + 1%F.S.
Resloution	0.005	0.005	0.005
Power Factor			
Range	0 ~ 1 lead or lag, Programmable	0 ~ 1 lead or lag, Programmable	0 ~ 1 lead or lag, Programmable
Accuracy	1%F.S.	1%F.S.	1%F.S.
Resloution	0.001	0.001	0.001
Rectified Load Mode			
Operating Frequency	45Hz ~ 70Hz		
RLC Mode	Parameter : Ip(max), R_S, L_S, C, R_L		
Constant Power Mode	Parameter : Ip(max), Power setting=200W ~ 1800W, PF=0.4 ~ 0.75	Parameter : Ip(max), Power setting=200W ~ 3600W, PF=0.4 ~ 0.75	Parameter : Ip(max), Power setting=200W ~ 4500W, PF=0.4 ~ 0.75
Inrush Current Mode	Parameter : Ip(max), R_S, L_S, C, R_L, Phase		
	80A (peak current)	160A (peak current)	200A (peak current)
R_S Range	0 ~ 9.999Ω	0 ~ 9.999Ω	0 ~ 9.999Ω
L_S Range	0 ~ 9999μH	0 ~ 9999μH	0 ~ 9999μH
C Range	100 ~ 9999μF	100 ~ 9999μF	100 ~ 9999μF
R_L Range	2.77 ~ 9999.99Ω	1.39 ~ 9999.99Ω	1.11 ~ 9999.99Ω
DC Section			
Voltage Range	7.5V ~ 500V	7.5V ~ 500V	7.5V ~ 500V
Current Range	0A ~ 18A	0A ~ 36A	0A ~ 45A
Min. operating voltage	7.5V	7.5V	7.5V
Rise time	75μs	75μs	75μs
Operating Mode	CC, CV, CR, CP, DC Rectified		
Short Circuit Simulation	Use the CR mode loading under max. power rating		
Measurement Section			
DVM Range	$350V_{rms}$ ($500V_{peak}$)	$350V_{rms}$ ($500V_{peak}$)	$350V_{rms}$ ($500V_{peak}$)
DVM Accuracy	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.
DVM Resloution	10mV	10mV	10mV
DAM Range	$18A_{rms}$ ($80A_{peak}$)	$36A_{rms}$ ($160A_{peak}$)	$45A_{rms}$ ($200A_{peak}$)
DAM Accuracy(<70Hz)	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.
DAM Accuracy(>70Hz)	0.1% (1+CF^2 x kHz)+0.2% F.S.	0.1% (1+CF^2 x kHz)+0.2% F.S.	0.1% (1+CF^2 x kHz)+0.2% F.S.
DAM Resloution	1.0mA	2.5mA	2.5mA
Other Parameter	P(W), S(VA), Q(VAR), CF, PF, Freq, R, Ip-, Ip+, THDv		
Others			
Vmonitor	±500V / ±10V (Isolated)	±500V / ±10V (Isolated)	±500V / ±10V (Isolated)
Imonitor	±80A / ±10V (Isolated)	±200A / ±10V (Isolated)	±200A / ±10V (Isolated)
Protection *1	OCP : 19.2Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 1920W ; OTP	OCP : 38.4Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 3840W ; OTP	OCP : 48Arms ; OV alarm: 360Vrms (DC : 510VDC) OPP : 4800W ; OTP
Remote Interface	GPIB, RS-232		
Input Rating	1Ø 100~115Vac ± 10% V_{LN}, 47~63Hz ; 1Ø 200~230Vac ± 10% V_{LN}, 47~63Hz		
Dimension (H x W x D)	177 x 440 x 595 mm / 7.0 x 17.32 x 23.42 inch	310 x 440 x 595 mm / 12.2 x 17.32 x 23.42 inch	310 x 440 x 595 mm / 12.2 x 17.32 x 23.42 inch
Weight	37kg / 81.57 lbs	66 kg / 145.5 lbs	66 kg / 145.5 lbs

NOTE*1 : If the operating voltage exceeds the rated voltage for 1.1 times, it would cause permanent damage to the device.
NOTE*2 : S (siemens) is the SI unit of conductance, equal to one reciprocal ohm.

All specifications are subject to change without notice.



500VA~90kVA

KEY FEATURES

- Compact size and weight attributable to advance PWM technology
- AC+DC output mode for voltage DC offset simulation
- Programmable output impedance for IEC 61000-3-3
- IEC 61000-4-11, IEC 61000-4-14, IEC 61000-4-28 voltage dips and frequency variation simulation
- Harmonics, interharmonics waveform synthesizer for IEC 61000-4-13 testing
- Power line disturbance simulation capability
- Programmable voltage and current limit settings
- Comprehensive measurement capability, including current harmonics
- High output current crest factor, ideal for inrush current testing
- Turn on, turn off phase angle control
- TTL signal which indicates output transient
- Optional analog programmable interface
- 2 units combined in series for high Voltage source (Model 61501~61505)
- 3 units combined to 3-phase power output (Model 61501~61505)
- Optional GPIB and RS-232 interface (Model 61501~61505)
- Easy use graphic user interface: softpanel (Option)
- Softpanel for IEC regulation test
- Capable of delivering power output up to 90KVA by implementing Master-slave parallel operation

RS-232 GPIB APG Ethernet CE PFC

The 61500 series AC power source defines new standard for high performance AC power source. It equips with all the powerful features. Such as power line disturbance simulation, programmable output impedance, comprehensive measurement function, wave-shape synthesis and regulation test software. Chroma also provides software for aerospace testing, including MIL-STD-704F, RTCA DO-160D, ABD100. These features make Chroma 61500 ideal for commercial, power electronics, avionics, marine, military and regulation test applications from bench-top testing to mass productions.

The 61500 series line up range from 500VA up to 90kVA, with one or three phase output. This allows user to have maximum choices from R/D design verification, quality assurance, to production testing.

Using the state-of-the-art PWM technology, the Chroma 61500 AC source is capable of delivering up to 6 times of peak current (Model 61501~61505) versus to its maximum rated current which makes it ideal for inrush current testing.

By using advanced DSP technology, 61500 AC power source offers precision and high speed power and harmonics measurements such as RMS voltage, RMS current, true power, power factor, current crest factor and up to 40 orders of current harmonics components.

The 61500 AC power source allows users to compose different harmonic components to synthesize your own harmonic distorted wave-shapes. The AC+DC and DC mode also extend the applications to simulate the natural waveform, Chroma 61500 also provides an external analog input, to amplify the analog signal from arbitrary signal generator. Thus, it is capable to simulate the unique waveform observed in the field.

With the versatile programmable output impedance and regulation test software, the 61500 AC power source allows users to perform Pre-compliance test against IEC 61000-4-11 and compliance test against IEC 61000-4-13/-4-14/-4-28 immunity test regulations and IEC 61000-3-2/-3-3 emission test regulations by incorporating Chroma 6630 power analyzer.

ORDERING INFORMATION

61501 : Programmable AC Source 0~300V, 15~1kHz / 500VA, 1Ø
61502 : Programmable AC Source 0~300V, 15~1kHz / 1kVA, 1Ø
61503 : Programmable AC Source 0~300V, 15~1kHz / 1.5kVA, 1Ø
61504 : Programmable AC Source 0~300V, 15~1kHz / 2kVA, 1Ø
61505 : Programmable AC Source 0~300V, 15~1kHz / 4kVA, 1Ø
61511 : Programmable AC Source 0~300V, 15~1.5kHz / 12kVA, 1 or 3Ø
61512 : Programmable AC Source 0~300V, 15~1.5kHz / 18kVA, 1 or 3Ø
A610004 : Universal Socket Center for Model 6512/6520/6530/6560/6415/6420/6430/61500/61600/61700 Series (<15A)
A615001 : Remote Interface for 61501~61505 and 61601~61605 (External V Input, RS-232 Interface, GPIB Interface)
A615003 : AC voltage transform unit for Model 61500/61600 Series
A615007 : Softpanel for Model 61500/61600 Series
A615008 : DC Noise Filter (Max. 16A)
A615103 : Parallelable power stage unit 18kVA, 1 or 3Ø, for 61511/61512/61611/61612
A615104 : Input/Output terminals for parallel connecting 2 units of 61511/61512/61611/61612/A615103
A615105 : Input/Output terminals for parallel connecting 3 units of 61511/61512/61611/61612/A615103
A615106 : Reverse Current Protection unit for 61511/61512/61611/61612

Option for 277VLN/480VLL (5Wires) AC input voltage are available with 61511/61512/ 61611/61612/ A615103 models. Please contact with local sales representative for ordering information.



A615103 Parallelable Power stage Unit 18KVA



Model 61505



Model 61511, 61512

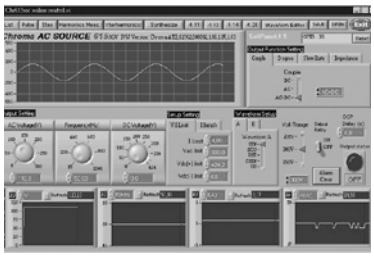
• Continued on next page ➟

SPECIFICATIONS-1			
Model	**61501**	**61502**	**61503**
Output Phase	1	1	1
Output Rating -AC			
Power	500VA	1000VA	1500VA
Voltage			
Range/Phase	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V
Distortion*1	0.3% @ 50/60Hz 1% @ 15-1kHz	0.3% @ 50/60Hz 1% @ 15-1kHz	0.3% @ 50/60Hz 1% @ 15-1kHz
Line Regulation	0.1%	0.1%	0.1%
Load Regulation*2	0.2%	0.2%	0.2%
Max. Current			
RMS	4A/2A (150V/300V)	8A/4A (150V/300V)	12A/6A (150V/300V)
Peak	24A/12A (150V/300V)	48A/24A (150V/300V)	72A/36A (150V/300V)
Frequency			
Range	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz
Accuracy	0.15%	0.15%	0.15%
Resolution	0.01 Hz	0.01 Hz	0.01 Hz
Output Rating-DC			
Power	250W	500W	750W
Voltage	212V/424V	212V/424V	212V/424V
Current	2A/1A (212V/424V)	4A/2A (212V/424V)	6A/3A (212V/424V)
Programmable Output Impedance			
Range	0Ω +200μH ~ 1Ω +1mH		
Harmonics & Interharmonics Simulation			
Bandwidth	2400Hz	2400Hz	2400Hz
Input Rating			
Voltage Operating Range	1Ø 100~240V±10%V_{LN}	1Ø 100~240V±10%V_{LN}	1Ø 100~240V±10%V_{LN}
Frequency Range	47~63Hz	47~63Hz	47~63Hz
Current (per phase)	10A Max. @ 90V	18A Max. @ 90V	22A Max. @ 90V
Power Factor*4	0.97 Min.	0.97 Min.	0.98 Min.
Measurement			
Voltage			
Range	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V
Current			
Range (peak)	24A	48A	72A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power			
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.
Resolution	0.1W	0.1W	0.1W
Harmonics			
Range	2~40 orders	2~40 orders	2~40 orders
Others			
Interface	GPIB, RS-232 (Optional)		
Temperature			
Operating	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)		
Dimension (HxWxD)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs

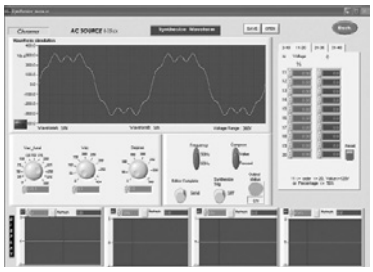
Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Model 61505 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

All specifications are subject to change without notice.

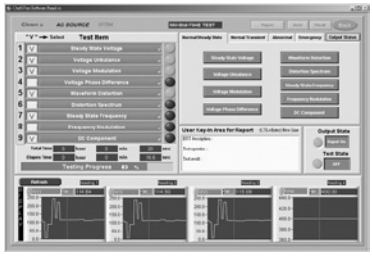
Softpanel



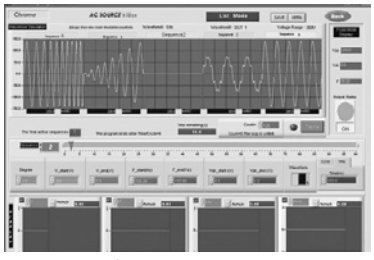
Main Operation Menu



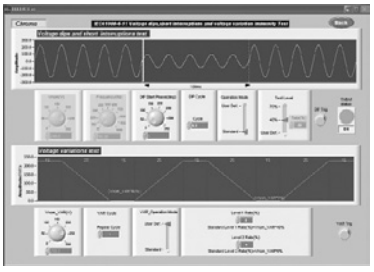
Distorted Waveform Editor



Aerospace Testing : MIL-STD-704F



Transient Voltage Programming



Voltage Dip, Short, Variation Regulation Test



Aerospace Testing : RTCA DO-160D

SPECIFICATIONS-2		
Model	**61504**	**61505**
Output Phase	1	1
Output Rating -AC		
Power	2000VA	4000VA
Voltage		
Range/Phase	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V
Distortion*1	0.3% @ 50/60Hz 1% @ 15-1kHz	0.3% @ 50/60Hz 1% @ 15-1kHz
Line Regulation	0.1%	0.1%
Load Regulation*2	0.2%	0.2%
Max. Current		
RMS	16A/8A (150V/300V)	32A/16A (150V/300V)
Peak	96A/48A (150V/300V)	192A/96A (150V/300V)
Frequency		
Range	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz
Accuracy	0.15%	0.15%
Resolution	0.01 Hz	0.01 Hz
Output Rating-DC		
Power	1000W	2000W
Voltage	212V/424V	212V/424V
Current	8A/4A (212V/424V)	16A/8A (212V/424V)
Programmable Output Impedance		
Range	0Ω +200μH ~ 1Ω +1mH	
Harmonics & Interharmonics Simulation		
Bandwidth	2400Hz	2400Hz
Input Rating		
Voltage Operating Range	1Ø 100~240V ± 10% V_{LN}	3Ø 200~240V ± 10% V_{LN} *3
Frequency Range	47~63Hz	47~63Hz
Current (per phase)	28A Max. @ 90V	14A Max. @ 190V
Power Factor*4	0.98 Min.	0.98 Min.
Measurement		
Voltage		
Range	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V
Current		
Range (peak)	96A	192A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power		
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.
Resolution	0.1W	0.1W
Harmonics		
Range	2~40 orders	2~40 orders
Others		
Interface	GPIB, RS-232 (Optional)	
Temperature		
Operating	0 ~ 40˚C	0 ~ 40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)	
Dimension (HxWxD)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	266.7 x 482.6 x 569.5 mm / 10.5 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs	41 kg / 90.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Model 61505 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

SPECIFICATIONS-3				
Model	**61511**	**61512**	**61511+A615103**	**61512+A615103**
Output Phase	1 or 3 selectable			
Output Rating-AC				
Power	12kVA	18kVA	30kVA	36kVA
Each phase	4kVA	6 kVA	10kVA	12kVA
Voltage				
Range	0~150V/0~300V			
Accuracy	0.2%+0.2%F.S.			
Resolution	0.1 V			
Distortion *1	0.3% @50/60Hz , 1%@15~1kHz , 1.5%@>1kHz			
Line regulation	0.1%			
Load regulation *2	0.2%			
Temp. coefficient	0.02% per degree from 25˚C			
Max Current (1-phase mode)				
RMS	96A / 48A	144A / 72A	240A / 120A	288A / 144A
Peak (CF=4)	384A / 192A	576A / 288A	960A / 480A	1152A / 576A
Max Current (each phase in 3-phase mode)				
RMS	32A / 16A	48A / 24A	80A / 40A	96A / 48A
Peak (CF=4)	128A / 64A	192A / 96A	320A / 160A	384A / 192A
Frequency				
Range	DC, 15-1.5kHz			
Accuracy	0.15%			
Resolution	0.01 Hz			
Phase				
Range	0 ~ 360˚			
Resolution	0.3˚			
Accuracy	<0.8˚@50/60Hz			
DC Output (1-phase mode)				
Power	6kW	9kW	15kW	18kW
Voltage	212V / 424V	212V / 424V	212V / 424V	212V / 424V
Current	48A / 24A	72A / 36A	120A / 60A	144A / 72A
DC Output (3-phase mode)				
Power	2kW	3kW	5kW	6kW
Voltage	212V / 424V	212V / 424V	212V / 424V	212V / 424V
Current	16A / 8A	24A / 12A	40A / 20A	48A / 24A
Input AC Power (each phase)				
AC type	3-phase, Delta or Y connecting			
Voltage Operating Range*3	3Ø 200~240V ± 10%V_{LN} (Delta: L-L, Y: L-N)			
Frequency Range	47-63 Hz			
Max. Current	Delta: 80A Y: 70A	Delta: 120A Y: 90A	Delta: 200A Y: 160A	Delta: 240A Y: 180A
Measurement				
Voltage				
Range	150V / 300V			
Accuracy	0.2%+0.2%F.S.			
Resolution	0.1 V			
Current				
Range	128/32/8 A peak	192/48/12 A peak	320/80/20 A peak	384/96/24 A peak
Accuracy (RMS)	0.4%+0.3%F.S.			
Accuracy (peak)	0.4%+0.6%F.S.			
Resolution	0.1 A			
Power				
Accuracy	0.4%+0.4% F.S			
Resolution	0.1 W			
Others				
Waveform Synthesis	40 orders @ 50/60Hz			
Harmonic Measurement	Voltage / Current 40 orders @ 50/60Hz			
Programmable Impedance	0Ω+200μH ~ 1Ω+1mH			
Efficiency*4	0.75 (Typical)			
Protect	UVP, OCP, OPP, OTP, FAN			
Interface	GPIB, RS-232, USB, Ethernet (standard)			
Temperature				
Operating	0˚C ~40˚C			
Storage	-40˚C~85˚C			
Humidity	30 %~90 %			
Safety & EMC	CE (include EMC & LVD)			
Dimension (H x W x D)	1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch*5		1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch x 2 units*5	
Weight	229.4 kg / 505.29 lbs	242.4 kg / 533.92 lbs	480 kg / 1057.27 lbs	495 kg / 1090.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Models with 277V_{LN}/480V_{LL}(5 Wires) AC input voltage are available upon request.
Note*4 : Efficiency is tested on input voltage 230V.
Note*5 : Dimensions (HxWxD) with wheel sets : 1246 x 546 x 700mm / 49.05 x 21.5 x 27.56 inch.

All specifications are subject to change without notice.



500VA~90kVA

KEY FEATURES

- Built-in PFC, provide input power factor over 0.98 (full load)
- AC+DC output mode for voltage DC offset simulation
- Programmable voltage and current limit setting
- Comprehensive measurement capability, V, Hz, Irms, Ipk, Iinrush, P, VAR, VA, PF, CF of current and etc.
- High output current crest factor, ideal for inrush current testing
- Turn on, turn off phase angle control
- One-key recall for 9 different voltage and frequency
- Programmable slew rate setting for changing voltage and frequency
- Analog input for power amplifier
- Optional Analog programming interface
- Optional GPIB and RS-232 interface (Model 61601~61605)
- Full protection: OP, OC, OV and OT protection
- Easy use graphic user interface: softpanel (option)
- Capable of delivering power output up to 90KVA by implementing Master-Slave operation

RS-232 GPIB APG CE PFC

The Chroma Model 61600 series Programmable AC Power Source delivers pure, instrument grade AC and DC power at very low cost. The 61600 AC power source offers output voltage from 0 to 300VAC, and frequency from 15 to 1.5kHz. A easy-use software can let users edit an auto-run profile and record the measuring data during the test. It is suitable for commercial , avionics, marine, and military applications from bench-top testing to mass productions.

The 61600 AC power source generates very clean AC output with typical distortion less than 0.3%. With power factor correction circuit, the 61600 AC power source yields higher efficiency and deliver more output power .

Using the state-of-the-art PWM technology, the Chroma 61600 AC source is capable of delivering up to 6 times of peak current versus to its maximum rated current which makes it ideal for inrush current testing.

By using advanced DSP technology, 61600 AC power source offers precision and high speed measurements such as RMS voltage, RMS current, true power, power factor, and current crest factor.

The AC+DC and DC mode extend the applications when users need DC voltage component. The 61600 AC power source also provides an external analog input, to amplify the analog signal from arbitrary signal generator. Thus, it is capable to simulate the unique waveform which observed in the field.

With the LCD display and rotary knob, the Chroma 61600 AC power source offers versatile front panel operation. Users may also control the 61600 remotely via GPIB,RS-232 or APG(Analog Programming) interface.

The self-diagnosis routine and the full protections against OPP, OCP, OVP and OTP ensure the quality and reliability for even the most demanding engineering testing and ATE application.

ORDERING INFORMATION

61601 : Programmable AC Source 0~300V, 15~1kHz / 500VA, 1Ø
61602 : Programmable AC Source 0~300V, 15~1kHz / 1kVA, 1Ø
61603 : Programmable AC Source 0~300V, 15~1kHz / 1.5kVA, 1Ø
61604 : Programmable AC Source 0~300V, 15~1kHz / 2kVA, 1Ø
61605 : Programmable AC Source 0~300V, 15~1kHz / 4kVA, 1Ø
61611 : Programmable AC Source 0~300V, 15~1.5kHz / 12kVA, 1 or 3Ø
61612 : Programmable AC Source 0~300V, 15~1.5kHz / 18kVA, 1 or 3Ø
A610004 : Universal Socket Center for Model 6512/6520/6530/6560/6415/6420/6430/61500/61600/61700 Series (<15A)
A615001 : Remote Interface for 61501~61505 and 61601~61605 (External V Input, RS-232 Interface, GPIB Interface)
A615003 : AC voltage transform unit for Model 61500/61600 Series
A615007 : Softpanel for Model 61500/61600/61700 Series
A615008 : DC Noise Filter (Max. 16A)
A615103 : Parallelable power stage unit 18kVA, 1 or 3Ø, for 61511/61512/61611/61612
A615104 : Input/Output terminals for parallel connecting 2 units of 61511/61512/61611/61612/A615103
A615105 : Input/Output terminals for parallel connecting 3 units of 61511/61512/61611/61612/A615103
A615106 : Reverse Current Protection unit for 61511/61512/61611/61612



A615103 Parallelable Power stage Unit 18KVA



Model 61605



Model 61611, 61612

• Continued on next page ➟

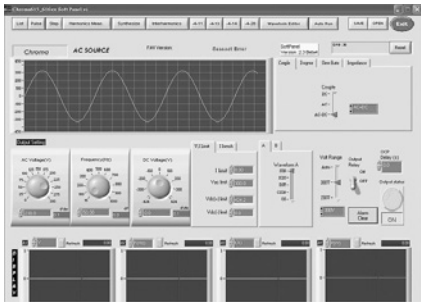
All specifications are subject to change without notice.

SPECIFICATIONS-1			
Model	**61601**	**61602**	**61603**
Output phase	1	1	1
Output Rating - AC			
Power/Phase	500VA	1000VA	1500VA
Voltage			
Range/Phase	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V
Distortion *1	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz
Line Regulation	0.1%	0.1%	0.1%
Load Regulation *2	0.2%	0.2%	0.2%
Max. Current/Phase			
RMS	4A/2A (150V/300V)	8A/4A (150V/300V)	12A/6A (150V/300V)
peak	24A/12A (150V/300V)	48A/24A (150V/300V)	72A/36A (150V/300V)
Frequency			
Range	DC, 15~1kHz	DC, 15~1kHz	DC, 15~1kHz
Accuracy	0.15%	0.15%	0.15%
Resolution	0.01 Hz	0.01 Hz	0.01 Hz
Output Rating - DC			
Power	250W	500W	750W
Voltage	212V/424V	212V/424V	212V/424V
Current	2A/1A (212V/424V)	4A/2A (212V/424V)	6A/3A (212V/424V)
Input Rating			
Voltage Operating Range	1Ø 100~240V ± 10%V_{LN}	1Ø 100~240V ± 10%V_{LN}	1Ø 100~240V ± 10%V_{LN}
Frequency Range	47~63Hz	47~63Hz	47~63Hz
Current	10A Max. @ 90V	18A Max. @ 90V	22A Max. @ 90V
Power Factor *4	0.97 Min.	0.97 Min.	0.98 Min.
Measurement			
Voltage			
Range/Phase	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V
Current			
Range (peak)	24A	48A	72A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power			
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.
Resolution	0.1W	0.1W	0.1W
Others			
Interface	GPIB, RS-232 (Optional)		
Temperature			
Operating	0~40˚C	0~40˚C	0~40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)		
Dimension (H x W x D)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs

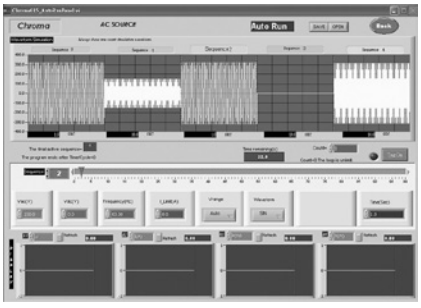
Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sinewave and remote sense.
Note*3 : Model 61605 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

All specifications are subject to change without notice.

Softpanel



Main Operation Menu



Auto Run (for ON/OFF Burn in test)

SPECIFICATIONS-2		
Model	**61604**	**61605**
Output phase	1	1
Output Rating - AC		
Power/Phase	2000VA	4000VA
Voltage		
Range/Phase	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V
Distortion *1	0.3% @ 50/60Hz 1% @ 15~1kHz	0.3% @ 50/60Hz 1% @ 15~1kHz
Line Regulation	0.1%	0.1%
Load Regulation *2	0.2%	0.2%
Max. Current/Phase		
RMS	16A/8A (150V/300V)	32A/16A (150V/300V)
peak	96A/48A (150V/300V)	192A/96A (150V/300V)
Frequency		
Range	DC, 15~1kHz	DC, 15~1kHz
Accuracy	0.15%	0.15%
Resolution	0.01 Hz	0.01 Hz
Output Rating - DC		
Power	1000W	2000W
Voltage	212V/424V	212V/424V
Current	8A/4A (212V/424V)	16A/8A (212V/424V)
Input Rating		
Voltage Operating Range	1Ø 100~240V ± 10%V_{LN}	3Ø 200~240V ± 10%V_{LN} *3
Frequency Range	47~63Hz	47~63Hz
Current	28A Max. @ 90V	14A Max. @ 190V
Power Factor *4	0.98 Min.	0.98 Min.
Measurement		
Voltage		
Range/Phase	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V
Current		
Range (peak)	96A	192A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power		
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S
Resolution	0.1W	0.1W
Others		
Interface	GPIB, RS-232 (Optional)	
Temperature		
Operating	0~40˚C	0~40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	133.35 x 482.6 x 569.5 mm / 5.25 x 19 x 22.42 inch	266.7 x 482.6 x 569.5 mm / 10.5 x 19 x 22.42 inch
Weight	20 kg / 44.05 lbs	41 kg / 90.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sinewave and remote sense.
Note*3 : Model 61605 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

SPECIFICATIONS-3				
Model	**61611**	**61612**	**61611+A615103**	**61612+A615103**
Output Phase	**1 or 3 selectable**			
Output Rating-AC				
Power	12kVA	18kVA	30kVA	36kVA
Each phase	4kVA	6kVA	10kVA	12kVA
Voltage				
Range	0~150V/0~300V			
Accuracy	0.2%+0.2%F.S.			
Resolution	0.1 V			
Distortion *1	0.3% @50/60Hz , 1%@15~1kHz , 1.5%@>1kHz			
Line regulation	0.1%			
Load regulation *2	0.2%			
Temp. coefficient	0.02% per degree from 25˚C			
Max. Current (1-phase mode)				
RMS	96A / 48A	144A / 72A	240A / 120A	288A / 144A
Peak (CF=4)	384A / 192A	576A / 288A	960A / 480A	1152A / 576A
Max. Current (each phase in 3-phase mode)				
RMS	32A / 16A	48A / 24A	80A / 40A	96A / 48A
Peak (CF=4)	128A / 64A	192A / 96A	320A / 160A	384A / 192A
Frequency				
Range	DC, 15-1.5kHz			
Accuracy	0.15%			
Resolution	0.01 Hz			
Phase				
Range	0 ~ 360˚			
Resolution	0.3˚			
Accuracy	<0.8˚@50/60Hz			
DC Output (1-phase mode)				
Power	6kW	9kW	15kW	18kW
Voltage	212V / 424V	212V / 424V	212V / 424V	212V / 424V
Current	48A / 24A	72A / 36A	120A / 60A	144A / 72A
DC Output (3-phase mode)				
Power	2kW	3kW	5kW	6kW
Voltage	212V / 424V	212V / 424V	212V / 424V	212V / 424V
Current	16A / 8A	24A / 12A	40A / 20A	48A / 24A
Input AC Power (each phase)				
AC type	3-phase, Delta or Y connecting			
Voltage Operating Range *3	3Ø, 200~240V ± 10%V_{LN} (Delta: L-L, Y: L-N)			
Frequency Range	47-63 Hz			
Max. Current	Delta: 80A Y: 70A	Delta: 120A Y: 90A	Delta: 200A Y: 160A	Delta: 240A Y: 180A
Measurement				
Voltage				
Range	150V / 300V			
Accuracy	0.2%+0.2%F.S.			
Resolution	0.1 V			
Current				
Range	128/32/8 A peak	192/48/12 A peak	320/80/20 A peak	384/96/24 A peak
Accuracy (RMS)	0.4%+0.3%F.S.			
Accuracy (peak)	0.4%+0.6%F.S.			
Resolution	0.1 A			
Power				
Accuracy	0.4%+0.4% F.S			
Resolution	0.1 W			
Efficiency *4	0.75 (Typical)			
Protect	UVP, OCP, OPP, OTP, FAN			
Interface	GPIB, RS-232, USB, Ethernet (Standard)			
Temperature				
Operating	0˚C~40˚C			
Storage	-40˚C~85˚C			
Humidity	30%~90%			
Safety & EMC	CE (include EMC & LVD)			
Dimension (H x W x D)	1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch*5		1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch x 2 units*5	
Weight	229.4 kg / 505.29 lbs	242.4 kg / 533.92 lbs	480 kg / 1057.27 lbs	495 kg / 1090.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Models with 277V_{LN}/480V_{LL}(5 Wires) AC input voltage are available upon request.
Note*4 : Efficiency is tested on input voltage 230V.
Note*5 : Dimensions (HxWxD) with wheel sets : 1246 x 546 x 700mm / 49.05 x 21.5 x 27.56 inch.

All specifications are subject to change without notice.



1.5kVA~12kVA

KEY FEATURES

- Output Rating: Power: 1.5kVA, 3Ø (61701); 3kVA, 3Ø (61702) ; 4.5KVA, 3Ø (61703) ; 6kVA, 3Ø (61704) ; 12kVA, 3Ø (61705) Voltage: 0-150V/0-300V
- Frequency: 15~1.2kHz
- Phase angle: 0~360˚ Programmable
- Built-in PFC, provides input power factor of over 0.98
- AC+DC output mode
- Comprehensive measurement capability,V, Irms, Ipk, Iinrush, P, PF, CF of current etc.
- Programmable r.m.s. current limit
- Turn on, turn off phase angle control
- Full protection: OP, OC, OV and OT protection
- Optional GPIB and RS-232 interface
- Advanced PWM technology delivers high power density in a compact rack-mountable package
- User-definable power-on status
- Built-in output isolation relays
- Easy use graphic user interface: softpanel (Option)
- Optional function for transient voltage output, including LIST, PULSE, STEP ans INTERHARMONICS mode

The Chroma Programmable AC Power Source model 61700 series delivers pure, 5-wire, 3-phase AC power. Unlike the traditional 3-phase AC power source, it includes low power rating models at very low cost. Users can program voltage and frequency, measure the critical characteristics of the output on its LCD display. It delivers the right solution to simulate all kinds of input condition of UUT to be utilized in R&D and QA. It is also suitable for commercial applications from laboratory testing to mass productions.

The 61700 supplies the output voltage from 0 to 300VAC and it can be set individually for each phase. Users also can set the phase angle from 0˚ to 360˚. These kinds of function make the 61700 series can simulate unbalance 3-phase power. Because of the wide output frequency from 15 to 1200Hz, it is suitable for avionics, marine and military application. The AC+DC mode extends the output function to simulate abnormal situation when power line contains DC offset.

The 61700 series uses the state-of-the-art PWM technology, so it is capable to generate very clean AC output with typical distortion less than 0.3%. With power factor correction circuit, the 61700 series yields higher efficiency and deliver more output power.

By using advanced DSP technology, the 61700 series offers precision and high speed measurements such as RMS voltage, RMS current, true power, power factor, and current crest factor, etc.

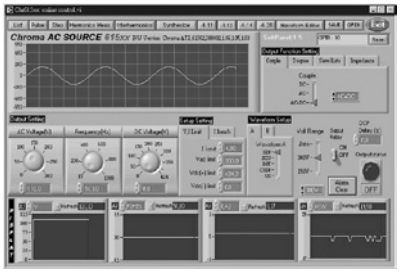
The 61700 series offers an optional function to output transient voltage. The function includes LIST, PULSE, STEP and INTERHARMONICS mode. Users can easily program variant waveform for immunity test. The 61700 series can also be controlled by a powerful and user friendly softpanel through GPIB or RS-232 interface. Besides that, the softpanel includes a waveform editor that can edit up to 40th order harmonic components. By this way, the 61700 series get the ability to output distorted waveform as users like.

The self-diagnosis routine and protections against over power, over current, over voltage, over temperature and fan fail, the 61700 series ensure the quality and reliability for even the most demanding engineering testing and production line application.

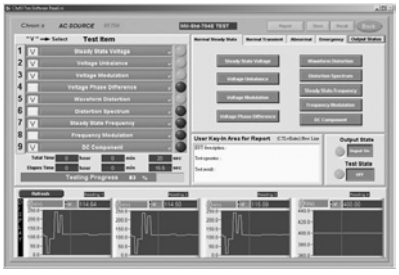
ORDERING INFORMATION

61701 : Programmable AC Source 0~300V/DC, 15~1.2kHz, 3Ø 1.5kVA
61702 : Programmable AC Source 0~300V/DC, 15~1.2kHz, 3Ø 3kVA
61703 : Programmable AC Source 0~300V/DC, 15~1.2kHz, 3Ø 4.5kVA
61704 : Programmable AC Source 0~300V/DC, 15~1.2kHz, 3Ø 6kVA
61705 : Programmable AC Source 0~300V, 15~1.2kHz, 3Ø 12kVA
A615001 : Remote Interface Board for 61500/61600/61700 Series (RS-232 Interface, GPIB Interface)
A617001 : Softpanel for Model 61700 Series
A617002 : Transient voltage output function, including WAVEFORM, LIST, PULSE, STEP and INTERHARMONICS mode

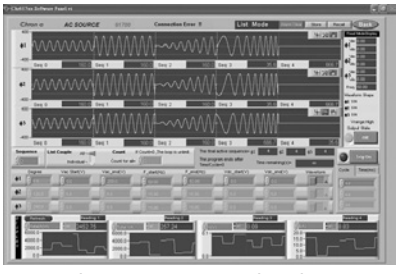
Softpanel



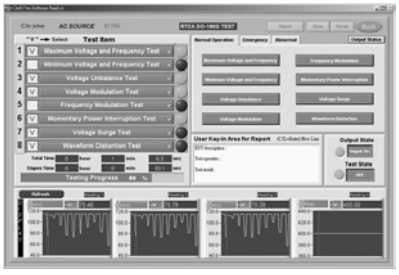
Softpanel of 61700 Series : Main page



Aerospace Testing : MIL-STD-704F



Optional Function : LIST Mode Voltage Transient Output

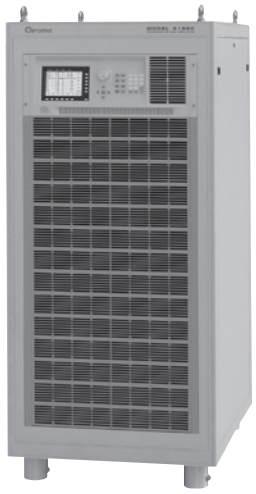


Aerospace Testing : RTCA DO-160D

SPECIFICATIONS					
Model	**61701**	**61702**	**61703**	**61704**	**61705**
AC Output Rating					
Max. Power	1500VA	3000VA	4500VA	6000VA	12000VA
Per Phase	500VA	1000VA	1500VA	2000VA	4000VA
Voltage (per phase)					
Range	150V/ 300V	150V/ 300V	150V/ 300V	150V/ 300V	150V/ 300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion *1	0.3%@50/60Hz 1.5% @ 15~1.2kHz	0.3%@50/60Hz 1.5% @ 15~1.2kHz	0.3%@50/60Hz 1.5% @ 15~1.2kHz	0.3%@50/60Hz 1.5% @ 15~1.2kHz	0.3%@50/60Hz 1.5% @ 15~1.2kHz
Line regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load regulation *2	0.2%	0.2%	0.2%	0.2%	0.2%
Temp. coefficient	0.02% per degree from 25˚C				
Max. Current (per phase)					
RMS	4A/2A	8A/4A	12A/6A	16A/8A	32A/16A
peak	24A/12A	48A/24A	72A/36A	96A/48A	192A/96A
Frequency					
Range	DC, 15~1.2kHz	DC, 15~1.2kHz	DC, 15~1.2kHz	DC, 15~1.2kHz	DC, 15~1.2kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Phase Angle					
Range	0~360˚	0~360˚	0~360˚	0~360˚	0~360˚
Resolution	0.3˚	0.3˚	0.3˚	0.3˚	0.3˚
Accuracy	< 0.8˚@50/60Hz	< 0.8˚@50/60Hz	< 0.8˚@50/60Hz	< 0.8˚@50/60Hz	< 0.8˚@50/60Hz
DC Output Rating (per phase)					
Power	250W	500W	750W	1kW	2kW
Voltage	212V/424V	212V/424V	212V/424V	212V/424V	212V/424V
Current	2A/1A	4A/2A	6A/3A	8A/4A	16A/8A
Input 3-Phase Power (per phase)					
Voltage Operating Range	3Ø 100~240V ± 10%V_{LN}		3Ø 200~240V ± 10%V_{LN}		
Frequency range	47~63Hz	47~63Hz	47~63Hz	47~63Hz	47~63Hz
Current	9A Max.	16A Max.	10A Max.	14A Max.	28A Max.
Power factor *3	0.97 Min.	0.98 Min.	0.98 Min.	0.98 Min.	0.98 Min
Measurement					
Voltage (Line-Neutral)					
Range	150V/300V	150V/300V	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current (per phase)					
Range (peak)	24A	48A	72A	96A	192A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Resolution	0.01A	0.01A	0.01A	0.01A	0.01A
Power (per phase)					
Accuracy	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.	0.4%+0.4% F.S.
Resolution	0.1W	0.1W	0.1W	0.1W	0.1W
Others					
Efficiency *4	68 %	77 %	81 %	82%	82%
Protection	UVP, OCP, OPP, OTP, FAN				
Temperature Range					
Operating	0˚C~40˚C				
Storage	-40˚C~85˚C				
Humidity	30 %~90 %				
Safety & EMC	CE				
Dimension (H x W x D)	400 x 482.6 x 600.5 mm / 15.75 x 19 x 23.64 inch	400 x 482.6 x 600.5 mm / 15.75 x 19 x 23.64 inch	400 x 482.6 x 600.5 mm / 15.75 x 19 x 23.64 inch	400 x 482.6 x 600.5 mm / 15.75 x 19 x 23.64 inch	896.4 x 546 x 699.9 mm / 35.28 x 21.5 x 27.56 inch*5
Weight	75 kg / 165.2 lbs	75 kg / 165.2 lbs	75 kg / 165.2 lbs	75 kg / 165.2 lbs	150 kg / 330.4 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sinewave and remote sense.
Note*3 : Input power factor is tested on input 220V, full load condition
Note*4 : Efficiency is tested on input voltage 110V for 61701 and 61702, 220V for 61703, 61704 and 61705.
Note*5 : For dimension including the wheel set, please add 80mm to overall height.

All specifications are subject to change without notice.



KEY FEATURES

- Power rating
  61845: 45kVA
  61860: 60kVA
- Voltage range: 0-300V
- Frequency: DC, 30Hz-100Hz
- Full regenerative capability based on 100% of output current rating
- Specifically designed for PV inverter, Smart Grid and EV related test applications
- Single phase or three-phase output selectable
- Programmable slew rate settin for changing voltage and frequency
- Programmable voltage and current limit
- Turn on, turn off phase angle control
- TTL signal which indicates Output transient
- LIST, PULSE, STEP mode functions for testing Power Line Disturbance (PLD) simulation
- Voltage dips, short interruption and voltage variation simulation
- Harmonics, inter-harmonics waveform synthesizer
- Comprehensive measurement capability, including current harmonics
- Analog programmable interfaces
- Remote interface: GPIB, RS-232, USB and Ethernet
- Provide parallel feature for meeting high power test applications

RS-232 Ethernet USB GPIB CE

Market demand for alternative energy is steadily on a growing trend, as increasing in number of Distributed Resource (DR) such as PV and wind energy systems call for rigorous regulation and test standard for energy feed into the grid (for instance: IEEE 1547 / IEC 61000-3-15 / IEC 62116). To ensure this, it is mandatory for the manufacturers of such systems to conduct test and to prove the compliance of their equipment. Chroma 61800 series with full 4-quadrant and full regenerative features is the right solution for this application as it is capable of meeting the aforementioned regulation and test standard requirement.

The 61800 regenerative grid simulator allows user to vary all relevant parameters in order to simulate the test criteria required for the EUT testing which include variation of frequency, phase angle and amplitude, voltage drops either three phase or each single phase or unbalance three phase voltage conditions could easily simulated. And most importantly, the regenerative feature with 61800 grid simulator provides an effective energy cost saving solution as energy generated by EUT could feed into the grid through 61800 instead of dissipate as heat during test process.

The 61800 grid simulator could also meet test requirements with smart grid and EV related test applications, such as Vehicle to Grid (V2G) and Energy Storage System (ESS) testing.

The 61800 regenerative grid simulator is not only limited to product development RD stage, the extensive features could also be implemented for design/quality verification and production stages. Using the state of the art full digital control technology, the grid simulator can deliver the maximum output voltage up to 300Vac and output frequency from 30Hz to 100Hz. The AC+DC modes extend the applications not only for providing pure AC voltage, but also DC component for DC offset testing.

The 61800 series is able to provide precision measurements such as RMS voltage, RMS current, true power, power factor, current crest factor and so on. By applying the advanced DSP technology, the 61800 series can easily simulate power line disturbance (PLD) by LIST, PULSE and STEP modes.

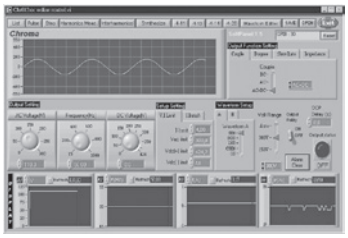
Additional features such as synthesis function allows user to program various harmonic distorted waveforms which are required by certain regulatory standard. GPIB, RS-232, USB and Ethernet interface are available for user with ability to control the grid simulator remotely.

ORDERING INFORMATION

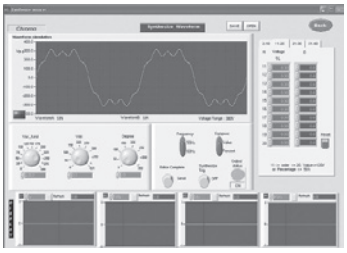
* **61845 :** Regenerative Grid Simulator 45kVA
* **61860 :** Regenerative Grid Simulator 60kVA
* **A618001 :** Softpanel for 61800 Series

* Call for availability

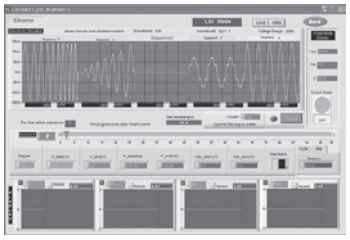
Softpanel



Main Operation Menu



Distorted Waveform Editor



Transient Voltage Programming

SPECIFICATIONS		
Model	**61845 *3**	**61860 *3**
AC Output Rating		
Output Phase	1 or 3 selectable	1 or 3 selectable
Max. Power	45kVA	60kVA
Per Phase	15kVA	20kVA
Voltage		
Range	0~300V_{LN}/0~520V_{LL}	0~300V_{LN}/0~520V_{LL}
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V
Distortion *1	< 0.5%@30Hz~100Hz	< 0.5%@30Hz~100Hz
Line regulation	0.1%	0.1%
Load regulation *2	0.2%	0.2%
Max. Current (1-Phase Mode)		
RMS	225A@200V	300A@200V
Peak (CF=3)	675A	900A
Max. Current (each phase in 3-Phase Mode)		
RMS	75A@200V	100A@200V
Peak (CF=3)	225A@200V	300A@200V
Frequency		
Range	30Hz ~ 100Hz	30Hz ~ 100Hz
Accuracy	0.15%	0.15%
DC Output (1-Phase Mode)		
Power	22.5kVA	30kVA
Voltage	300V	300V
Current	112.5A	150A
DC Output (3-Phase Mode)		
Power	7.5kVA	10kVA
Voltage	300V	300V
Current	37.5A	50A
Harmonics Synthesis Function		
Harmonics range	up to 40 harmonics order @ 50/60Hz fundamental frequency	
Regenerative Function		
Current Harmonic Distortion	5% (Typical)	
Input Rating		
Voltage operating range *4	3Ø 200V_{LL} ± 10%, 47~63Hz 3Ø 380V_{LL} ± 10%, 47~63Hz 3Ø 400V_{LL} ± 10%, 47~63Hz 3Ø 480V_{LL} ± 10%, 47~63Hz	3Ø 200V_{LL} ± 10%, 47~63Hz 3Ø 380V_{LL} ± 10%, 47~63Hz 3Ø 400V_{LL} ± 10%, 47~63Hz 3Ø 480V_{LL} ± 10%, 47~63Hz
Current	97.5A Max./Phase	130A Max./Phase
Power factor	0.9 (Typical)	0.9 (Typical)
Measurement		
Voltage		
Range	0~300V	0~300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Current		
Range (peak)	225A	300A
Accuracy (RMS)	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power		
Accuracy	0.4%+0.4% F.S.	0.4%+0.4% F.S.
Others		
Efficiency	80%(Typical)	
Protection	UVP, OCP, OPP, OTP, FAN	
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	1710 x 760 x 1000 mm	1710 x 760 x 1000 mm

Note*1 : Maximum distortion is tested on output 125V(150V Range) and 250V(300V Range) with maximum current to linear load
Note*2 : Load regulation is tested with sine wave and remote sense
Note*3 : Call for availability
Note*4 : Must be specified at time of order. All inputs are L-L, 3Ø, 3 wire+GND

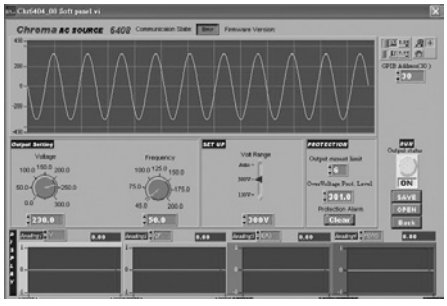
All specifications are subject to change without notice.



375~9000VA

KEY FEATURES

- Output distortion less than 0.3%, and peak repetitive current over 2.5 times of the rms current
- High accuracy measurement of RMS voltage, RMS current, true power, frequency, power factor, and current crest factor
- Built-in power factor correction circuit provides input power factor of over 0.98 to meet IEC regulations
- Programmable current limit
- Built-in output isolation relays
- EEPROM storage of user defined voltage & frequency combination for instant recall at anytime
- Optional GPIB, RS-232, Analog Programming interface
- Over-voltage, under-voltage, over-power, over-current, over-temperature, and short circuit protection
- Temperature controlled fan speed
- Self-test at power-on
- User-definable power-on state
- Easy use graphic user interface: softpanel (Option)



Softpanel of 6400 Series

The Chroma 6400 series Programmable AC Power Source uses state of the art PWM technology to deliver pure, instrument grade AC power at very low cost never achieved before. The 6400 AC power source offers maximum rated power for any output voltage from 0 to 300VAC, at any frequency from 45 to 1kHz. It is not only suitable for commercial applications(47-63Hz), but also for avionics, marine, military applications at 400Hz.

All models generate very clean output with typical distortion less than 0.3%. Incorporating power factor correction circuit, the 6400 AC power source yields higher efficiency and delivers more output power than competitive instruments. Furthermore, it is capable of high peak repetitive current needed to drive most electronic products with high crest factor input design.

The 6400 AC power source uses advanced circuit to offer precision and high speed measurement of true RMS voltage, true RMS current, true power, frequency, power factor, and current crest factor.The 6400 AC power source is very easy to operate from the front panel keypad, or from the remote controller via GPIB, RS-232 or APG (Analog Programming) interface. The optional interface is designed as a plug-in card to change the unit in seconds into a computer controlled system power source.

Designed with self diagnostic routine and protected against over-voltage, under-voltage, over-power, over-current, over-temperature and fan fail, the instrument offers quality and reliability for even the most demanding applications in production testing, R&D design characterization, and QA verification.

6400 Series Programmable AC Source Family



ORDERING INFORMATION

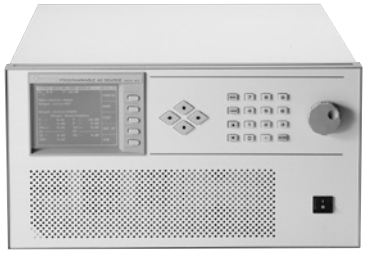
6404 : Programmable AC Source 0~300V/45-500Hz/375VA
6408-1: Programmable AC Source 0~300V/45-500Hz/800VA (input rating 90-132V)
6408-2 : Programmable AC Source 0~300V/45-500Hz/800VA (input rating 180-250V)
6415 : Programmable AC Source 0~300V/45-1000Hz (1500VA)
6420 : Programmable AC Source 0~300V/45-1000Hz (2000VA)
6430 : Programmable AC Source 0~300V/45-1000Hz (3000VA)
6460-2 : Programmable AC Source 0~300V/45-1000Hz (6000VA), output 1Ø, input 3Ø 220V
6460-3 : Programmable AC Source 0~300V/45-1000Hz (6000VA), output 1Ø, input 3Ø 380V
6463-2 : Programmable AC Source 0~300V/45-1000Hz (6000VA), output 1Ø or 3Ø Selectable, input 3Ø 220V
6463-3 : Programmable AC Source 0~300V/45-1000Hz (6000VA), output 1Ø or 3Ø Selectable, input 3Ø 380V
6490-2 : Programmable AC Source 0-300V/45-1000Hz (9000VA), output 1Ø or 3Ø Selectable, input 3Ø 220V
6490-3 : Programmable AC Source 0-300V/45-1000Hz (9000VA), output 1Ø or 3Ø Selectable, input 3Ø 380V
A650001 : Remote Interface for Model 6415/6420/6430/6500 Series (External V Input, RS-232 Interface,GPIB Interface)
A640003 : Remote Interface for Model 6404/6408 Series (External V Input, RS-232 Interface, GPIB Interface)
A640004 : Softpanel for Model 6400 Series
A610004 : Universal Socket Center for Model 6415/6420/ 6430 Series

SPECIFICATIONS - 1				
Model	**6404**	**6408**	**6415**	**6420**
Output / Phase	1	1	1	1
Output Ratings				
Power / Phase	375VA	800VA	1500VA	2000VA
Voltage				
Range / Phase	150V/300V/Auto			
Accuracy	0.2% F.S. for freq. ≦ 200Hz, 0.4% F.S. for freq. > 200Hz		0.2% + 0.2% of F.S.	
Resolution	0.1V	0.1V	0.1V	0.1V
Distortion	typical. 0.3% for freq. ≦ 200Hz, 0.8% for freq.>200Hz		0.5% for (45-500Hz), 1% for (> 500-1kHz)	
Line Regulation	0.1%	0.1%	0.1%	0.1%
Load Regulation	0.1%	0.1%	0.1%	0.1%
Temp. Coefficient	0.02% per ˚C			
Max. current				
RMS	2.5A/1.25A	5.33A/2.67A	15A/7.5A	20A/10A
peak	7A/3.5A ≦100Hz 5.5A/12.75A >100Hz	14.92A/7.47A ≦ 100Hz 7.47A/5.87A >100Hz	45A/22.5A ≦ 100Hz (45-100Hz) 37.5A/18.75A (>100-1kHz)	60A/30A (45-100Hz) 50A/25A (>100-1kHz)
Frequency				
Range	45-500Hz	45-500Hz	45-1000Hz	45-1000Hz
Accuracy	0.1%	0.1%	0.1%	0.1%
Resolution	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Input Ratings				
Voltage Operating Range	90-132V / 180-250V	90-132V (6408-1), 180-250V (6408-2)	1Ø 200~240V ± 10%V_{LN}	1Ø 200~240V ± 10%V_{LN}
Frequency Range	47-63Hz	47-63Hz	47-63Hz	47-63Hz
Current	7.5A max.	12A max.(6408-1), 6A max. (6408-2)	12A max.	15A max.
Power Factor	0.8 typical.	0.98 min.	0.95 min.	0.97 min.
Measurement				
Voltage / Phase				
Range	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V
Accuracy (RMS)	0.1% + 0.1% F.S.		0.25% + 0.1% F.S.	
Resolution	0.1V	0.1V	0.1V	0.1V
Current / Phase				
Range (peak)	0-2A/2-10A	0-4A/4-20A	0-70A	0-100A
Accuracy (RMS)	0.5% + 0.2% F.S.	0.5% + 0.2% F.S.	0.4% + 0.2% F.S.	0.4% + 0.15% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A
Power / Phase				
Range	0-375W	0-800W	0-1500W	0-2000W
Accuracy	0.5% F.S.	0.5% F.S.	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.1 W	0.1 W	0.1 W for P<1000W, 1W for P>1000W	
Frequency				
Range	45-500Hz	45-500Hz	45-1000Hz	45-1000Hz
Accuracy	0.02%	0.02%	0.02%	0.02%
Resolution	0.1Hz	0.1Hz	0.1Hz	0.1Hz
Others				
Efficiency	75% typical	80% typical	80% typical	80% typical
Protection	UVP, OVP, OCP, OPP, OTP, Short			
Safety & EMC	CE (Include LVD and EMC Requirement)			
Dimension (H x W x D)	133.35 x 482.6 x 471.4 mm / 5.25 x 19 x 18.56 inch		221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	
Weight	18 kg / 39.65 lbs	23 kg / 50.66 lbs	23 kg / 50.66 lbs	27 kg / 59.47 lbs

All specifications are subject to change without notice.

SPECIFICATIONS -2				
Model	**6430**	**6460**	**6463**	**6490**
Output / Phase	1	1 (parallel or series)	1 or 3 selectable	1 or 3 selectable
Output Ratings				
Power / Phase	3000VA	6000VA	2000VA	3000VA
Voltage				
Range / Phase	150V/300V/Auto	150V/300V(parallel), 300V/500V(series)	150V/300V	150V/300V
Accuracy	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.	0.2% + 0.2% of F.S.
Resolution	0.1V	0.1V	0.1V	0.1V
Distortion	0.5% for (45-500Hz), 1% for (> 500-1KHz)	1%	1%	1%
Line Regulation	0.1%	0.1%	0.1%	0.1%
Load Regulation	0.1%	0.2%(series), 0.8% (parallel)	0.2%(3 phases), 0.8% (1 phase)	0.2%(3 phases), 0.8% (1 phase)
Temp. Coefficient	0.02% per ˚C	0.02% per ˚C	0.02% per ˚C	0.02% per ˚C
Max. current				
RMS/Phase	30A/15A	60A/30A/15A (150V/300V/500V)	20A/10A (150V/300V)	30A/15A (150V/300V)
Peak Current/ phase-crest-factor	3(45-100Hz), 2.5(>100-1KHz)	180A/90A/45A (45-100Hz), 150A/75A/38A (>100-1kHz)	60A/30A (45-100Hz), 50A/25A (>100-1kHz)	90A/45A (45-100Hz), 75A/38A (>100-1kHz)
Frequency				
Range	45-1000Hz	45-1000Hz	45-1000Hz	45-1000Hz
Accuracy	0.1%	0.15%	0.15%	0.15%
Resolution	0.1Hz	0.01Hz (45-99.9Hz), 0.1Hz (100-999.9Hz)		
Input Ratings				
Voltage Operating Range	1Ø 200~240V ± 10%V_{LN}	3Ø 200~240V ± 10%V_{LN}		
Frequency Range	47-63Hz	47-63Hz	47-63Hz	47-63Hz
Current	23A max.	23A max./phase	15A max./phase	23A max./phase
Power Factor	0.98 min.	0.98 min. under full load	0.97 min. under full load	0.98 min. under full load
Measurement				
Voltage / Phase				
Range	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V	0-150V/0-300V
Accuracy (RMS)	0.25% + 0.1% F.S.	0.25% + 0.1% F.S	0.25% + 0.1% F.S	0.25% + 0.1% F.S
Resolution	0.1V	0.1V	0.1V	0.1V
Current / Phase				
Range (peak)	0-140A	0-280A	0-100A	0-140A
Accuracy (RMS)	0.4% + 0.1% F.S.	0.4% + 0.1% F.S.	0.4% + 0.15% F.S.	0.4% + 0.1% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A
Power / Phase				
Range	0-3000W	0-3000W	0-2000W	0-3000W
Accuracy	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.1 W for P<1000W, 1W for P>1000W	0.01 W	0.01 W	0.01 W
Frequency				
Range	45-1000Hz	45-1000Hz	45-1000Hz	45-1000Hz
Accuracy	0.02%	0.01%+2 count	0.01%+2 count	0.01%+2 count
Resolution	0.1Hz	0.01Hz	0.01Hz	0.01Hz
Others				
Efficiency	80% typical	80% typical	80% typical	80% typical
Protection	UVP, OVP, OCP, OPP, OTP, Short	OPP, OLP, OTP, FAN Fail		
Safety & EMC	CE (Include LVD and EMC Requirement)			
Dimension (H x W x D)	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	765.94 x 546 x 700 mm / 30.16 x 21.5 x 27.56 inch*1	990 x 546 x 700 mm / 38.98 x 21.5 x 27.56 inch*1	990 x 546 x 700 mm / 38.98 x 21.5 x 27.56 inch*1
Weight	27 kg / 59.47 lbs	107 kg / 235.68 lbs	156 kg / 343.61 lbs	156 kg / 343.61 lbs

Note*1 : For dimension including the wheel set, please add 80mm to overall height.



1200VA~9000VA

KEY FEATURES

- Direct Digital Synthesis (DDS) waveform generation
- Programmable Sine, Square, or Clipped Sine waveform output
- Programmable voltage, current limit, frequency, phase, and distortion
- Power line disturbances simulation capability
- 30 factory installed harmonic waveforms in the waveform library
- User programmable harmonic waveforms
- User programmable sequential output waveforms for auto-execution
- Powerful measurement of Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor, power factor, inrush current, VA, VAR, etc.
- Built-in power factor correction circuit provides input power factor of over 0.98 to meet the IEC regulations
- Advanced PWM technology to deliver high power output in a light and compact rackmountable package
- Built-in output isolation relays
- User-definable power-on state
- TTL output to signal any output transition for ATE application
- Analog Programming Interface for external amplitude control
- Optional GPIB, RS-232 interface
- List mode transient power line disturbances simulation for Voltage Dip & Variation to meet IEC 61000-4-11
- Easy use graphic user interface: softpanel (Option)

The global AC power testing requirements demand more sophisticated AC Power Source that is capable of simulating a wide variety of AC line conditions, harmonic waveforms, accurate power measurement and analysis. The Chroma 6500 series Programmable AC Power Source delivers the right solution to simulate all kinds of normal/abnormal input conditions and measure the critical characteristics of the product under test. It can be used for R&D design characterization, production testing, and QA verification of commercial, industrial and aerospace electronic products.

The 6500 series delivers maximum rated power for any output voltage up to 300 Vac, and at any frequency between 15Hz to 2000Hz. It is suitable for commercial applications (47-63Hz); for avionics, marine, military applications at 400Hz or higher frequency; or for electrical motor, air-conditioner test applications at 20Hz. All models generate very clean sine or square waveforms output with typical distortion less than 0.5%.

The 6500 series has built-in Direct Digital Synthesis (DDS) Waveform Generator to provide user programmable high precision waveform. For testing products under AC line distortion conditions, clipped sinewave can be generated with 0% to 43% distortion and amplitude from 0% to 100%. It also can simulate all kinds of power line disturbances such as cycle dropout, transient spike, brown out, phase angle, voltage and frequency ramp up (ramp down), etc.. Up to 30 harmonic waveforms are factory installed, and testing for compliance to AC line harmonic immunity standards can be easily achieved in the field.

The 6500 series has built-in 16-bit precision measurement circuit to offer precision and high speed measurement of Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor, power factor, inrush current, VA, VAR, etc. It is designed as an integral part of the PMS Power Measurement System. By adding the 6630 Power Analyzer it becomes an ATE for testing IEC 61000-3-2 harmonic and IEC 61000-3-3 flicker measurement.

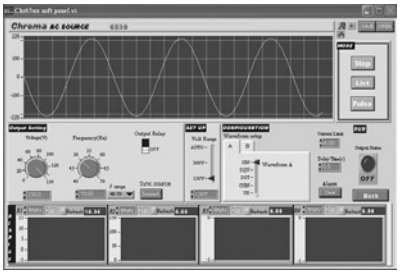
The 6500 series is very easy to operate from the front panel keypad, or from a remote controller via GPIB, RS-232 BUS or APG (Analog Programming) interface. Instrument drivers are available to integrate the AC source into any ATE application operating under Labview control.

Designed with self diagnostic routine and protected against over load, over power, over temperature, over current and fan fail, the instrument offers quality and reliability for even the most demanding production line applications.

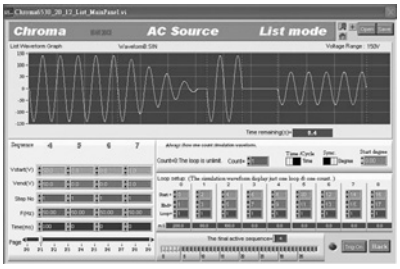
ORDERING INFORMATION

6512 : Programmable AC Source 0~300V/15~2kHz / 1.2kVA
6520 : Programmable AC Source 0~300V/15~2kHz / 2kVA
6530 : Programmable AC Source 0~300V/15~2kHz / 3kVA
6560-2 : Programmable AC Source 0~500V/45~1kHz / 6kVA I/P 3Ø 220V
6560-3 : Programmable AC Source 0~500V/45~1kHz / 6kVA I/P 3Ø 380V
6590-2 : Programmable AC Source 0~300V/45~1kHz / 9kVA 1Ø or 3Ø, 3000VA per phase, I/P 3Ø 220V
6590-3 : AC Power Source 0~300V/45~1kHz / 9kVA 1Ø or 3Ø, 3000VA per phase, I/P 3Ø 380V
A650001 : Remote Interface for Model 6500 Series (External V Reference, RS-232 interface, Printer Interface, GPIB Interface, Special I/O Port , System I/O Port)
A650002 : 19" Rack Mounting Kit for Model 6512/6520/6530
A650003 : Softpanel for Model 6500 Series
A610004 : Universal Socket Center for Model 6512/6520/6530/ 6560 Series

Softpanel



Main operation menu



List Mode: Transient voltage programming

6500 Series Programmable AC Source Family



All specifications are subject to change without notice.

SPECIFICATIONS					
Model	**6512**	**6520**	**6530**	**6560**	**6590**
Output Phase	1	1	1	1 (parallel or series)	1or 3 selectable
Output Ratings					
Power	1200VA	2000VA	3000VA	6000VA	3000VA per phase, 9000VA total
Voltage					
Range/phase	150V / 300V / Auto	150V / 300V / Auto	150V / 300V / Auto	150V / 300V (parallel) 300V / 500V (series)	150V / 300V
Accuracy	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.	0.2% +0.2%of F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion *1	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (15~45Hz) 0.5% (> 45~500Hz) 1% (> 500~1kHz) 2% (> 1K~2kHz)	1% (45~1kHz)	1% (45~1kHz)
Line Regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation *2	0.1%	0.1%	0.1%	0.2% (series), 0.8% (parallel)	0.2%
Temp. Coefficient	0.02% per˚C	0.02% per˚C	0.02% per˚C	0.02% per˚C	0.02% per˚C
Max. Current/Phase					
RMS	12A/6A (150V / 300V)	20A/10A (150V / 300V)	30A/15A (150V / 300V)	60/30/15A (150/300/500V)	30A/15A (150V / 300V) 90A/45A total
peak	36A/18A (15~100Hz) 30A/15A (>100~1KHz) 24A/12A (>1K~2KHz)	60A/30A (15~100Hz) 50A/25A (>100~1KHz) 40A/20A (>1K~2KHz)	90A/45A (15~100Hz) 75A/38A (>100~1KHz) 60A/30A (>1K~2KHz)	180/90/45A (45~100Hz) 150/75/38A (>100~1KHz)	90A/45A (45~100Hz) 75A/38A (>100~1KHz)
Frequency					
Range	15 ~ 2kHz	15 ~ 2kHz	15 ~ 2kHz	45 ~ 1kHz	45 ~ 1kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Resolution	0.01Hz (15 ~ -99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (15 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (15 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz) 0.2Hz (1k ~ 2kHz)	0.01Hz (45 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz)	0.01Hz (45 ~ 99.9Hz) 0.1Hz (100 ~ 999.9Hz)
Input Ratings					
Voltage Operating Range	1Ø 200~240V ± 10%V_{LN}			3Ø 200~240V ± 10%V_{LN}	
Frequency Range	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz	47 ~ 63Hz
Current	10A max.	15A max.	23A max.	23A max./phase	23A max./phase
Power Factor	0.95 min. under full load	0.97 min. under full load	0.98 min. under full load	0.98 min. under full load	0.98 min. under full load
Measurement					
Voltage/Phase					
Range	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V	0 ~ 150V / 0 ~ 300V
Accuracy (RMS)	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.	0.25% + 0.1% F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current/Phase					
Range (peak)	0 ~ 60A	0 ~ 100A	0 ~ 140A	0 ~ 280A	0 ~ 140A
Accuracy (RMS)	0.4% + 0.25%F.S.	0.4% + 0.15%F.S.	0.4% + 0.1%F.S.	0.4% + 0.1%F.S.	0.4% + 0.1%F.S.
Accuracy (peak)	0.4% + 0.5%F.S.	0.4% + 0.3% F.S.	0.4% + 0.2% F.S.	0.4% + 0.2% F.S.	0.4% + 0.2% F.S.
Resolution	0.01A	0.01A	0.01A	0.01A	0.01A
Power/Phase					
Accuracy	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)	1% F.S. (CF<6)
Resolution	0.01W	0.01W	0.01W	0.01W	0.01W
Frequency					
Range	15 ~ 2kHz	15 ~ 2kHz	15 ~ 2kHz	45 ~1kHz	45 ~1kHz
Accuracy	0.01% +2 count	0.01% +2 count	0.01% +2 count	0.01% +2 count	0.01% +2 count
Resolution	0.01Hz	0.01Hz	0.01Hz	0.01Hz	0.01Hz
Others					
Efficiency	80% typical	80% typical	80% typical	80% typical	80% typical
Protection	OPP, OLP, OTP, FAN Fail				
Temperature					
Operating	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C	0 ~ 40˚C
Storage	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C	-40 ~ +85˚C
Safety & EMC	CE (Include LVD and EMC Requirement)				
Dimension (H x W x D)	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch	765.94 x 546 x 700 mm / 30.16 x 21.5 x 27.56 inch*3	888.5 x 546 x 700 mm / 34.98 x 21.5 x 27.56 inch*3
Weight	26.4 kg / 58.15 lbs	26.4 kg / 58.15 lbs	26.4 kg / 58.15 lbs	107 kg / 235.68 lbs	156 kg / 343.61 lbs

Note*1 : Test under output voltage from half to full range.
Note*2 : Test with sinewave & with remote sense.
Note*3 : For dimension including the wheel set, please add 80mm to overall height.

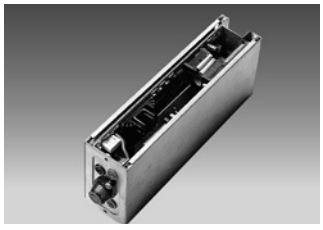


KEY FEATURES

- Test Voltage and Current Harmonics in compliance with IEC61000-3-2, IEC61000-3-2 A14
- Test Flicker (voltage fluctuations) pre-compliance with IEC61000-3-3
- Advanced DFT and DSP technology
- Multi-processor system configuration
- Modular instrument with three measurement modules in DSP type
- 5 unique test function modules with Harmonics, Flickers, Multimeter, Recording, and Waveform for multi-purpose test application requirements
- Harmonic analysis and bar graph / table results display up to 40 harmonics
- 2-channel 18-bit A/D converter in each measurement module
- Simultaneous presentation for voltage and current curves. (1~16 periods)
- Pre-programmed functions against standardized limits
- Wide voltage (6V to 2000Vpk) and current (0.1A to 300Apk) input range
- 3 1/2" floppy driver for software update and result storage (Model 6630 only)



Model 6632



A663010: DSP Measurement Module



A663009: Measurement Fixture

Chroma introduces a completely new concept, Power Measurement System, for fast and accurate power related measurements in compliance with international standards.

The Power Measurement System consisting of an advanced 6630/6632 Power Analyzer and a 6530 Series or other Chroma family AC Power Source is the ATE for Voltage and Current Harmonics test in compliance with IEC61000-3-2, IEC61000-3-2 A14, and for Flicker test (voltage fluctuations) following the IEC 61000-3-3 international standards. Performance testing is pre-programmed limits to specifications against standardized limits. The user-specified limits can be added.

Chroma 6630/6632 Power Analyzer is a modular instrument that is equipped with DSP type measurement module. Each measurement module contains Processor, Memory (ROM, RAM, Flash ROM), and two channels 18 bits A/D converter. As the Discrete Fourier Transform (DFT) technology is implemented in the software with 32-bit floating point mathematical algorithms, it can measure instruments related power at high speed and analyze the measurement parameters (value) accurately. The instrument is also a combination of all standard instruments generally used for power measurements. It provides Voltage (U), Current (I), Active Power (P), Reactive Power (Q), Apparent Power (S), Active Energy (W), Reactive Energy (Wr), Apparent Energy (Wa), Frequency (f), Crest Factor (CF), Power Factor (PF), Phase Angle (Ø).

Chroma 6630/6632 Power Analyzer is a flexible and unique multipurpose instrument designed for using stand-alone and integrated. Harmonics, Flicker, Multimeter, Recording, and Waveform are the five major function modules that can work stand-alone, or be integrated into an ATE environment to facilitate the system for testing and analysis. The built in floppy disk drive gives users a convenient way to save the test parameters and results.

SPECIFICATIONS		
Model	**6630**	**6632**
Display	LCD 640x480 pixels with backlight	- -
Printer output for hardcopy	Parallel (Centronics compatible) or serial (RS-232)	
Floppy drive	1.44MB 3" PC-format. For software updates and result storage	- -
Rack mounting	With optional rack mount kit. Size 19" 3HE	
Dimension (H x W x D)	132.6 x 423 x 331 mm / 5.22 x 16.67 x 13.07 inch	
Weight	Single phase 9 kg / 20 lbs, three phase 11.4 kg / 25 lbs	
Operating environment	0 to +40˚C, < 80 % R.H. non condensing	
Storage environment	-30 to + 60˚C non condensing	
Power supply	100-130V or 200~240V, automatic range selection	
Power line frequency	50/60 Hz	
Power consumption	45 W max.	
Protection	Fuse 2xF1A on rear panel	
Safety	Designed to comply with the Low Voltage Directive 73/23/EEC plus parts of 93/68/EEC. Applied standard, EN61010-1:1993, Installation category II.	
EMC	Designed to comply with the EMC Directive 89/336/EEC and 92/31/EEC Applied standards, EN50081-1:92 and EN50082-1:92	
Warranty	One year from date of delivery for manufacturing and material failures	

ORDERING INFORMATION

6630 : Power Analyzer, 1Ø DSP
6630 : Power Analyzer, 3Ø DSP
6632 : Power Analyzer, 1Ø DSP
6632 : Power Analyzer, 3Ø DSP
A663003 : Measurement Input Cables
A663004 : Rack Mounting Kit for Model 6630/6632
A663008 : Spare Current Measurement Input Fuse
A663009 : Measurement Fixture
A663010 : DSP Measurement Module

All specifications are subject to change without notice.



KEY FEATURES

- Embedded high speed DSP, 16 bits Analog/ Digital converters
- 5mA minimum current range(66203/66204) and 0.1mW power resolution
- Meet ENERGY STAR / IEC 62301 / ErP ecodesign measurement requirement
- Accumulated energy methods for unstable power measurement
- User-define criteria for automatic PASS/FAIL judgment
- Half rack width and small 2U height, suitable for system integration
- Dual shunts for current range selection providing high accuracy over a wide current range (66202)
- THD and user-specify orders distortion measurement (66202)
- Inrush current and Energy measurement (66202)
- Optional remote interface: USB or GPIB+USB
- Voltage/current harmonics measurement up to 50 orders
- Capable of displaying input waveform DC component measurement reading
- Half rack size and 4 input modules design (66204)
- Support different wiring configuration power measurement (1P2W/1P3W/3P3W/3P4W) (66203/66204)
- Support external shunt and CT for higher current measurement application (66204)

Chroma Digital Power Meter 66200 series provide both single and multiple phase power measurement solution designed for measurement of AC or AC+DC power signals and related parameters common to most electronic products. Instead of traditional analog measurement circuits, the Power Meter 66200 uses state-of-the-art DSP digitizing technology. The internal 16 bits analog/digital converters with sampling rates of up to 250kHz provide both high speed and high accuracy measurements. The instrument provides excellent function and stability compared to other power meters of same class currently available on the market. It includes a front panel 4 display area with 5 digits, 7-segment LED readouts as well as optional remote control using USB or GPIB interfaces.

The 66200 series Power Meter is also designed to meet ENERGY STAR / IEC 62301 / EUP ecodesign measurement requirements. The instrument provides 5mA (66203/66204) minimum current range and 0.1mW power resolution providing less than 2% uncertainty for No-Load mode power measurement. Included are not only traditional averaging methods but also accumulated energy approach method used to calculate active power data. In this way, users can achieve accurate readings even if power consumption levels are not stable or operating on in non-linear modes (i.e. hiccup modes). The Model 66202 can even measure Total-Harmonic-Distortion (THD) and to user-specify distortion orders. Thus, the instrument can easily measure distortion values up to and including the 13th harmonic as required by ENERGY STAR requirements. The 66200 Power Meter also includes limit test GO/NG functions. This feature allows users to set pass/fail limits to automatically display PASS/FAIL according to these user-define criteria.

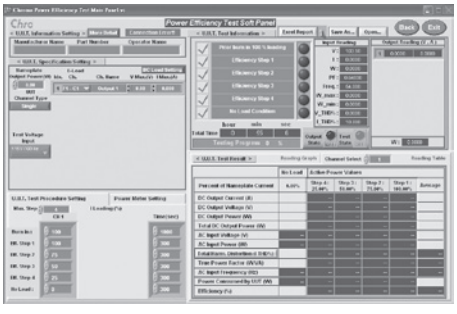
The 66201 includes simple measurement functions designed for testing at low power levels (maximum current 4A). Examples of these devices are AC adapters, battery chargers, LCD monitors and similar devices. Included measurement data is Voltage (Vrms, Vpeak+, Vpeak-), Current (Irms, Ipeak+, Ipeak-), Power (W, Power Factor, Apparent Power VA, Reactive Power VAR), Current Crest Factor and Frequency. The Model 66201 Power meter is competitively priced to be suitable for bench-top testing and automated production line testing.

The 66202 includes a 2-shunt design to get 66202 highly accurate for both low and high current measurements. Besides the parameters measured on Model 66201, it also provides Inrush Current, Total Harmonic Distortion of V/I and Energy measurement. With these practical functions, The Model 66202 is suitable for meeting the demanding tasks of R&D and quality control departments.

The 66204 is a 4 channels power meter which is designed for multiple phase power measurement application. The wiring function allows users to take accurate power measurement based on different wiring configuration selected(1P2W/1P3W/3P3W/3P4W) .



Softpanel for Model 66200 Series



Power Efficiency Test Softpanel



Model 66203/66204

ORDERING INFORMATION

66201 : Digital Power Meter
66202 : Digital Power Meter
* **66203 :** Digital Power Meter (3ch)
* **66204 :** Digital Power Meter (4ch)
A662001 : USB Remote Interface Board for Model 66201/66202
A662002 : GPIB+USB Remote Interface Board for Model 66201/66202
A662003 : Measurement Test Fixture (250V/15A)
A662004 : Rack Mounting Kit for 66200 Series
A662005 : USB Cable (180cm)
A662006 : External CT 50 Arms for Model 66202
A662007 : External CT 100 Arms for Model 66202
A662008 : Power Efficiency Test Softpanel
A662009 : Softpanel for Model 66200 Series
* Call for availability



A662003 : Measurement Test Fixture

• Continued on next page ➟

SPECIFICATIONS-1		
Model	**66201**	**66202**
Channel	1	1
Parameters	V, Vpk, I, Ipk, W, VA, VAR, PF, CF_I, F	V, Vpk, I, Ipk, Is, W, VA, VAR, PF, CF_I, F, THD_V, THD_I, Energy
AC Voltage		
Range	150/300/500Vrms (CF = 1.6)	150/300/500Vrms (CF = 1.6)
Accuracy	15Hz - 1kHz: 0.1% of rdg + 0.08% of rng 1kHz - 10kHz: (0.1+0.05*KHz)% of rdg + 0.08% of rng	15Hz - 1kHz: 0.1% of rdg + 0.08% of rng 1kHz - 10kHz: (0.1+0.05*KHz)% of rdg + 0.08% of rng
Harmonics Accuracy	--	15Hz - 1kHz: 0.1% of rdg + 0.08% of rng 1kHz - 10kHz: (0.1+0.05*KHz)% of rdg + 0.08% of rng
Input Resistance	1MΩ	1MΩ
AC Current		
Range	0.01/0.1/0.4/2 Arms (CF=4) *1	SHUNT H : 0.2/2/8/20Arms (CF=2@0.2/2/8A, CF = 4@ 20A) SHUNT L : 0.01/0.1/0.4/2Arms (CF=4)
Accuracy *2	0.01A Range: 15Hz - 1kHz: 0.1% of rdg + 0.25% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.25% of rng 0.1A/0.4A/2A Range: 15Hz - 1kHz: 0.1% of rdg + 0.1% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.1% of rng	SHUNT H: 0.2A Range: 15Hz - 1kHz: 0.1% of rdg + 0.12% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.12% of rng 2A/8A/20A Range: 15Hz - 1kHz: 0.1% of rdg + 0.1% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.1% of rng SHUNT L: 0.01A Range: 15Hz - 1kHz: 0.1% of rdg + 0.25% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.25% of rng 0.1A/0.4A/2A Range: 15Hz - 1kHz: 0.1% of rdg + 0.1% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.1% of rng
Harmonics Accuracy	--	SHUNT H: 0.2A Range: 15Hz - 1kHz: 0.1% of rdg + 0.12% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.12% of rng 2A/8A/20A Range: 15Hz - 1kHz: 0.1% of rdg + 0.1% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.1% of rng SHUNT L: 0.01A Range: 15Hz - 1kHz: 0.1% of rdg + 0.25% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.25% of rng 0.1A/0.4A/2A Range: 15Hz - 1kHz: 0.1% of rdg + 0.1% of rng 1kHz - 10kHz: (0.1+0.05*kHz)% + 0.1% of rng
Power		
Range	1.5W ~ 1000W, 12 ranges	1.5W ~ 10kW, 24 ranges
Accuracy	47Hz~63Hz : 0.1% of rdg + 0.1% of rng 15Hz~1kHz : (0.1+ 0.2/PF * kHz)% of rdg+0.18% of rng	47Hz~63Hz : 0.1% of rdg + 0.1% of rng 15Hz~1kHz : (0.1+ 0.2/PF * kHz)% of rdg+0.18% of rng
Power Factor accuracy *3	0.006+(0.003/PF) * kHz	0.006+(0.003/PF) * kHz
Frequency		
Range	DC, 15Hz ~ 10kHz	DC, 15Hz ~ 10kHz
Measuring Condition	Voltage (10 ~ 100% of the voltage range)	Voltage (10 ~ 100% of the voltage range)
Others		
Display Resolution	5 Digits	
Display update rate	0.25~2 sec	
Input Voltage	90V ~ 130V /180V ~ 250V, 50Hz/ 60Hz, 30VA	
Interface	Option: USB or GPIB+USB	
Operating Temperature	0˚C ~ 40˚C	
Storage	-40˚C ~ 85˚C	
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	88 x 212 x 348.1 mm / 3.46 x 8.35 x 13.7 inch (excluding projections)	
Weight	Approx. 3.8 kg / 8.37 lbs	

The specifications are valid only after the power meter is turned on more than one hour in a thermally stable environment.

Note*1 : The maximum measurable current of 66201 is 4 Arms.

Note*2 : The current accuracy applies temperature range 23 ± 1˚C for 0.01A & 0.2A(CF=2). For all the other current ranges, the spec. applied under 23 ± 5˚C.

Note*3 : The PF spec. applies only when the signals are higher then 50% of the selected voltage and current ranges.

All specifications are subject to change without notice.

SPECIFICATIONS-2		
Model	**66203 ***	**66204 ***
Channel	3	4
Parameters	V, Vpk, I, Ipk, Is, W, VA, VAR, PF, CF_I, F, THD_V, THD_I, E	V, Vpk, I, Ipk, Is, W, VA, VAR, PF, CF_I, F, THD_V, THD_I, E
AC Voltage		
Range	15V/30V/60V/150V/300V/600Vrms (CF=2), 6 range	
Accuracy	15Hz~1kHz : 0.1% rdg + 0.08% of rng 1kHz~10kHz : (0.1 + 0.05 * kHz)% of rdg + 0.05% of rng	
Harmonics Accuracy	15Hz~1kHz : 0.1% rdg + 0.08% of rng 1kHz~10kHz : (0.1 + 0.05 * kHz)% of rdg + 0.05% of rng	
Input Resistance	2MΩ	2MΩ
AC Current		
Range	5mA/20mA/50mA/200mA/500mA/2A/5A/20Arms (CF=4)	
Accuracy	15Hz~1kHz : 0.1% rdg + 0.12% of rng 1kHz~10kHz : (0.1 + 0.05 * kHz)% of rdg + 0.1% of rng	
Harmonics Accuracy	15Hz~1kHz : 0.1% rdg + 0.12% of rng 1kHz~10kHz : (0.1 + 0.05 * kHz)% of rdg + 0.1% of rng	
Power		
Range	75mW ~ 12kW, 48 ranges	
Accuracy	47Hz~63Hz : 0.1% rdg + 0.1% of rng 1kHz~10kHz : (0.1 + 0.3/PF * kHz)% of rdg + 0.18% of rng	
Power Factor accuracy	0.006+(0.003/PF) * kHz	
Frequency		
Range	DC, 15Hz ~ 10kHz	
Measuring Condition	Voltage (10~100% of the voltage range)	
Others		
Display Resolution	5 Digits	
Display update rate	0.25~2 sec	
Input Voltage	100~240V ± 10%, 50/60Hz	
Interface	Standard: USB+GPIB	
Operating Temperature	0˚C ~ 40˚C	
Storage	-40˚C ~ 85˚C	
Safety & EMC	CE (include EMC & LVD)	
Dimension (H x W x D)	133 x 212 x 420 mm / 5.23 x 8.35 x 16.5 inch	
Weight	Approx. 7 kg / 15.4 lbs	

The specifications are valid only after the power meter is turned on more than one hour in a thermally stable environment.
Note * : Call for availability



600W, 1200W, 2400W, 5000W

KEY FEATURES

- Wide range of voltage & current combinations with constant power
- Voltage range: 0 ~ 600V
  Current range: 0 ~ 120A
  Power range: 600W, 1200W, 2400W, 5000W
- Digital encoder knobs, keypad and function keys
- Power Factor Correction (0.95)
- High-speed Programming
- Precision V&I Measurements
- Current sharing for parallel operation with Master/Slave Control
- Voltage Ramp function : Time Range (10ms~99 hours)
- Auto Sequencing Programming : 10 Programs /100 Sequences / 8 bit TTL
- Voltage & Current Slew Rate Control
- OVP, Current Limit, Thermal protection
- Remote sense, 5V line loss compensation
- APG (Analog Programmable Interface) with Isolated Analog Interface Card
- Optional GPIB control with SCPI
- Optional Ethernet/LXI interface
- Standard RS-232 & USB interface
- LabView and Labwindows
- CE Certified

Chroma's new 62000P Series of programmable DC power supplies offer many unique advantages for ATE integration and testing. These advantage include a constant power operating envelope, precision readback of output current and voltage, output trigger signals as well as the ability to create complex DC transients waveforms to test device behavior to spikes, drops, and other voltage deviations.Designed for automated testing DC-DC converters and similar products, the 62000P sets a new standard for high accuracy programmable DC supplies.

The 62000P Series includes 12 different models ranging from 600W to 5000W, up to 120A and up to 600V. Due to their constant power operating envelope a single instrument can provide both high voltage/low current AND low voltage/ high current thereby reducing the number of supplies needed in typical ATE applications.

The 62000P also includes 16 bit readback capability for accurate voltage and current readings. This means systems no longer need complex shunt/multiplexers to make accurate readings of the UUT's input parameters. The instruments also include I/O ports providing 8 bit TTLs, DC-ON, fault output signal and remote inhibit as well as a output trigger signal for system timing measurements.

RS-232 GPIB USB Ethernet CE PFC

Another unique capability of the 62000P supplies is their ability to create complex DC transient waveforms. This capability allows devices to be tested to DC voltage dropouts, spikes and other voltage variations making them an ideal choice for airborne device testing, inverter testing and other devices which will experience voltage interrupts. Applications include DC/DC Converter & Inverter voltage drop test, engine start-up simulation, battery automated charging, electronic product life cycle test, and etc.

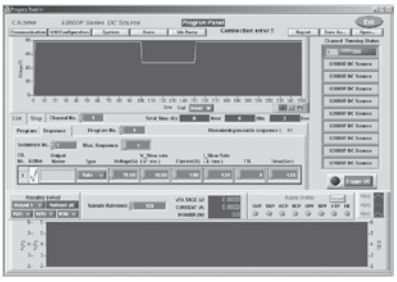
Master/Slave Parallel & Serial Control

When high power is required, it is common to connect two or more power supplies in parallel or series. The 62000P Series supplies have a smart Master / Slave control mode making series/ parallel operation fast and simple. In this mode the master scales values and downloads data to slave units so programming is simple and current sharing automatic.

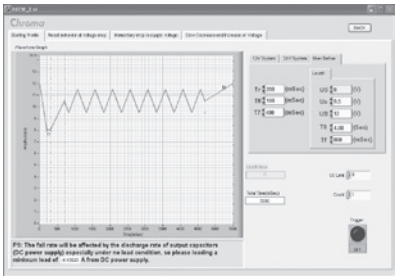


Model 62050P-100-100

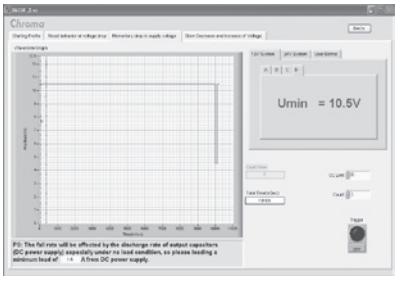
Soft Panel



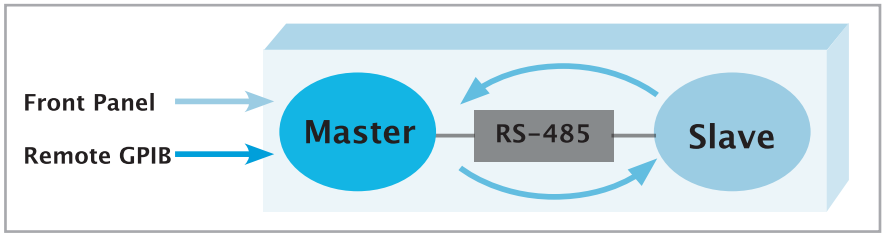
Transient Voltage Programming



ISO 16750-2 4.5.3 Starting Profile



ISO 16750-2 4.5.1 Momentary Drop In Supply Voltage



Master/Slave Parallel & Serial Control

ORDERING INFORMATION

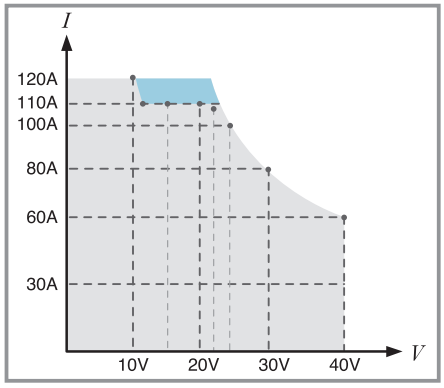
62006P-30-80 : Programmable DC Power Supply 30V/80A/600W
62006P-100-25 : Programmable DC Power Supply 100V/25A/600W
62006P-300-8 : Programmable DC Power Supply 300V/8A/600W
62012P-40-120 : Programmable DC Power Supply 40V/120A/1200W
62012P-80-60 : Programmable DC Power Supply 80V/60A/1200W
62012P-100-50 : Programmable DC Power Supply 100V/50A/1200W
62012P-600-8 : Programmable DC Power Supply 600V/8A/1200W
62024P-40-120 : Programmable DC Power Supply 40V/120A/2400W
62024P-80-60 : Programmable DC Power Supply 80V/60A/2400W
62024P-100-50 : Programmable DC Power Supply 100V/50A/2400W
62024P-600-8 : Programmable DC Power Supply 600V/8A/2400W
62050P-100-100 : Programmable DC Power Supply 100V/100A/5000W
A620004 : GPIB Interface for Model 62000P Series
A620006 : Rack mounting kit for Model 62000P Series (2U model)
A620009 : Softpanel for 62000P Series
A620015 : Rack mounting kit for Model 62050P-100-100
A620023 : Ethernet/LXI Interface for Model 62000P Series

All specifications are subject to change without notice.

ELECTRICAL SPECIFICATIONS-1						
Model	**62006P-30-80**	**62006P-100-25**	**62006P-300-8**	**62012P-40-120**	**62012P-80-60**	**62012P-100-50**
Output Ratings						
Output Voltage	0~30V	0~100V	0~300V	0-40V	0~80V	0~100V
Output Current	0~80A	0~25A	0~8A	0-120A	0~60A	0~50A
Output Power	600W	600W	600W	1200W	1200W	1200W
Line Regulation						
Voltage	0.01%+2mV	0.01%+6mV	0.01%+18mV	0.01%+2mV	0.01%+8mV	0.01%+10mV
Current	0.01%+25mA	0.01%+5mA	0.03%+20mA	0.01%+25mA	0.01%+10mA	0.01%+12mA
Load Regulation						
Voltage	0.01%+3mV	0.01%+10mV	0.01%+50mV	0.01%+3mV	0.01%+12mV	0.01%+18mV
Current	0.01%+10mA	0.01%+5mA	0.03%+40mA	0.01%+10mA	0.01%+20mA	0.01%+28mA
Voltage Measurement						
Range	6V/30V	20V/100V	60V/300V	8V/40V	16V/80V	20V/100V
Accuracy	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.
Current Measurement						
Range	16A/80A	5A/25A	1.6A/8A	24A / 120A	12A/60A	10A/50A
Accuracy	0.1% + 0.2%F.S.	0.1% + 0.2%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S..	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.
Output Noise (0 ~ 20MHz)						
Voltage Ripple (P-P)	60 mV	85 mV	180 mV	90 mV	100 mV	100 mV
Voltage Ripple (rms)	8 mV	10 mV	90 mV	10 mV	10 mV	15 mV
Current Ripple (rms)	60 mA	10 mA	60 mA	120 mA	30 mA	20 mA
OVP Adjustment Range	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax
Slew Rate Range						
Voltage (with USB)	0.001V - 5V/ms	0.001V - 10V/ms	0.01V - 10V/ms	0.001V - 5V/ms	0.001V - 10V/ms	0.001V - 10V/ms
Current (with USB)	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms
Programming Response Time (Typical)						
Rise Time (Full & No Load)	6 ms	10 ms	30 ms	8 ms	8 ms	10 ms
Fall Time	350ms(max)	300 ms(max)	2.5 s(max)	240 ms(max)	240 ms(max)	300 ms(max)
Efficiency	0.75	0.75	0.75	0.8	0.8	0.8
Drift (8 hours)						
Voltage	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax
Current	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax
Temperature Coefficient						
Voltage	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C
Current	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C
Transient Response Time	3 mS	3 mS	3mS	3mS	3 mS	3 mS
10 % step change	150 mV	180 mV	600 mV	150 mV	250 mV	250 mV
Voltage limit @ Series Mode	150V	500V	800V	200V	400V	500V
AC Input Operating Voltage Ranges	1Ø 100~240Vac ± 10% V_{LN}, 47~63 Hz					
Operating Temperature	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C
Dimension (H x W x D)	89 x 430 x 425 mm / 3.5 x 16.93 x 16.73 inch					
Weight	12kg / 26.43 lbs	12.1 kg / 26.65 lbs	11.2 kg / 24.67 lbs	12kg / 26.43 lbs	13 kg / 28.63 lbs	12.1 kg / 26.65 lbs

ELECTRICAL SPECIFICATIONS-2						
Model	**62012P-600-8**	**62024P-40-120**	**62024P-80-60**	**62024P-100-50**	**62024P-600-8**	**62050P-100-100**
Output Ratings						
Output Voltage	0~600V	0-40V	0~80V	0~100V	0-600V	0~100V
Output Current	0~8A	0-120A*1	0~60A	0~50A	0-8A	0~100A
Output Power	1200W	2400W*1	2400W	2400W	2400W	5000W
Line Regulation						
Voltage	0.01%+18mV	0.01%+2mV	0.01%+8mV	0.01%+10mV	0.01%+18mV	0.01%+8mV
Current	0.03%+20mA	0.01%+25mA	0.01%+10mA	0.01%+12mA	0.03%+20mA	0.01%+24mA
Load Regulation						
Voltage	0.01%+50mV	0.01%+3mV	0.01%+12mV	0.01%+18mV	0.01%+50mV	0.01%+12mV
Current	0.03%+40mA	0.01%+10mA	0.01%+20mA	0.01%+28mA	0.03%+40mA	0.01%+56mA
Voltage Measurement						
Range	120V/600V	8V / 40V	16V/80V	20V/100V	120V / 600V	20V/100V
Accuracy	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.	0.05% + 0.05%F.S.
Current Measurement						
Range	1.6A/8A	24A / 120A	12A/60A	10A/50A	1.6A / 8A	20A/100A
Accuracy	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.	0.1% + 0.1%F.S.
Output Noise (0 ~ 20MHz)						
Voltage Ripple (P-P)	180 mV	90 mV	100 mV	100 mV	180 mV	50 mV
Voltage Ripple (rms)	90 mV	10 mV	10 mV	15 mV	90 mV	15 mV
Current Ripple (rms)	60 mA	120 mA	30 mA	20 mA	60 mA	40 mA
OVP Adjustment Range	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax	110% of Vset to 110% of Vmax
Slew Rate Range						
Voltage (with USB)	0.01V - 10V/ms	0.001V - 5V/ms	0.001V - 10V/ms	0.001V - 10V/ms	0.01V - 10V/ms	0.001V - 10V/ms
Current (with USB)	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 1A/ms	0.001A - 2A/ms
Programming Response Time (Typical)						
Rise Time (Full & No Load)	60 ms	8 ms	8 ms	10 ms	60 ms	10 ms
Fall Time	5 s(max)	240ms(max)	240 ms(max)	300 ms(max)	5 s(max)	850 ms(max)
Efficiency	0.8	0.8	0.85	0.85	0.8	0.85
Drift (8 hours)						
Voltage	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax	0.02% of Vmax
Current	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax	0.04% of Imax
Temperature Coefficient						
Voltage	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C	0.02% of Vmax/˚C
Current	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C	0.04% of Imax/˚C
Transient Response Time	3mS	3mS	3mS	3mS	3mS	3mS
10 % step change	600 mV	150 mV	250 mV	250 mV	600mV	250 mV
Voltage limit @ Series Mode	800V	200V	400V	500V	800V	500 V
AC Input Operating Voltage Ranges	1Ø 100~240Vac ± 10% V_{LN}, 47~63 Hz	1Ø 200~240Vac ± 10% V_{LN}, 47~63 Hz				3Ø 200~240Vac ± 10% V_{LL}, or 3Ø 380~400Vac ± 10% V_{LL}, 47~63 Hz
Operating Temperature	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C	0~40˚C
Dimension (H x W x D)	89 x 430 x 425 mm / 3.5 x 16.93 x 16.73 inch					176 x 428 x 566 mm / 6.93 x 16.85 x 22.28 inch
Weight	11.2 kg / 24.67lbs	13 kg / 28.63 lbs	12.2 kg / 26.87 lbs	13 kg / 28.63 lbs	13 kg / 28.63 lbs	28 kg / 61.67 lbs

Note *1 : The Max. power limit of 2400W is under output 22V~40V , and see the diagram below for operating power envelope.



The blue area is over specification due to low voltage (<22V) & high current output(>110A).
The following is operation power envelope :
(10V/120A), (11V/110A), (15V/110A), (20V/110A), (22V/109A), (24V/100A), (30V/80A), (40V/60A).

All specifications are subject to change without notice.

GENERAL SPECIFICATIONS	
Programming &Measurement Resolution	
Voltage (Front Panel)	10 mV
Current (Front Panel)	10 mA
Voltage (Remote Interface))	0.003% of Vmax
Current (Remote Interface))	0.002% of Imax
Voltage (Analog Programming Interface)	0.04% of Imax
Current (Analog Programming Interface)	0.04% of Imax
Programming Accuracy	
Voltage Programming (Front Panel and Remote Interface)	0.1% of Vmax
Voltage Programming (Analog Programming Interface)	0.2% of Vmax
Current Programming (Front Panel and Remote Interface)	0.3% of Imax
Current Programming (Analog Programming Interface)	0.3% of Imax
Programming Response Time	
Rise Time: For a programmed 5 to 95% step in output voltage. (Full & NoLoad)	See Electrical Specification
Fall Time: For a programmed 95% to 5 step in output voltage. (The fall time will be affected by the external loading from UUT.)	See Electrical Specification
Vout setting (USB send command to DC Power Supply receiver)	10ms
Measure Voltage, Current (under USB command using Fetch)	10ms
Measure Voltage, Current (under USB command using Measure)	70ms
Analog Programming Interface	
Voltage and Current Programming inputs	0~10Vdc or 0~5Vdc of F.S.
Voltage and Current monitor	0~10Vdc or 0~5Vdc of F.S.
Isolation: Maximum working voltage of any analog programming signal with respect to chassis potential	70Vdc
Auxiliary Power Supply	
Output Voltage	12Vdc
Maximum current source capability	10mA
Remote Inhibit Function (I/O)	
Use to disable the output of DC Power Supply; Active Low	TTL
DC-ON Output Signal	
Indicate the output status, Active High	TTL
Fault Output Signal	
Indicate if there is a fault/protection occurred, Active Low	TTL
Series & Parallel operation function with Master / Slave control	
Voltage limit @ Series Mode	See Electrical Specification
Number of DC Power Supplies allowed @ master / slave control mode	5
Auto Sequencing Programmable Function	
Number of program	10
Number of sequence	100
Time Range	5ms ~ 15000S
TTL signal out	8 bits
TTL source capability	7 mA
Auto Sequencing Programmable Function (Step Mode)	
Start Voltage Range	0 ~ full scale
End Voltage Range	0 ~ full scale
Total Run Time Range (hhh:mm:ss.sss)	10ms ~ 99 hours
Slew Rate Control Function	
Voltage slew rate range (The fall rate will be affected by the discharge rate of the output capacitors especially under no load condition.)	See Electrical Specification
Current slew rate range of current	See Electrical Specification
Minimum transition time	0.5 ms
Remote Sense	
Line loss compensation	5V



USB GPIB Ethernet RS-232 RS-485 APG CE

Chroma's new 62000H Series of programmable DC power supplies offer many unique advantages for telecom, automated test system & integration, industrial, battery charge & simulation for hybrid cars and solar panel simulation. These advantage include high power density of 15KW in 3U, precision readback of output current and voltage, output trigger signals as well as the ability to create complex DC transients waveforms to test device behavior to spikes, drops, and other voltage deviations.

The 62000H Series includes 12 different models ranging from 5KW to 15KW, with current ranges up to 375A and voltage ranges up to 1000V. The 62000H can easily parallel up to ten units capable of 150KW with current sharing for bulk power applications, for example, battery bank simulation of 450V/150A/67.5KW for electric vehicle and military use.

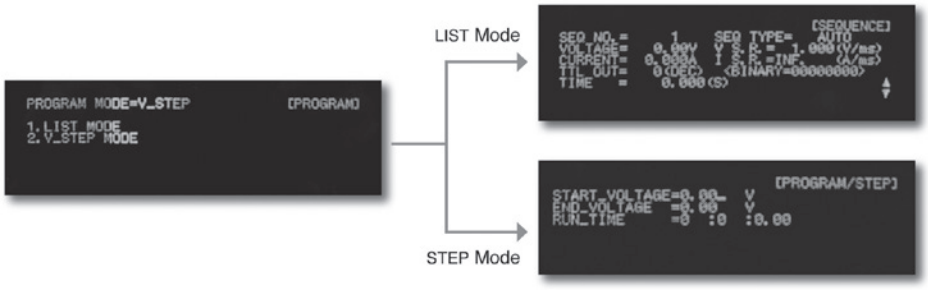
There are 100 user programmable input status on the front panel for automated test application and life cycle ON/OFF test. In addition, the 62000H has a 16 bit digital control with bright vacuum fluorescent display readout.

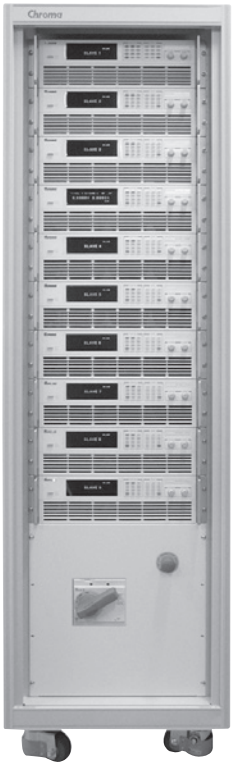
The 62000H series DC power supply are very easy to operate either from the front panel keypad or from the remote controller via USB / RS-232 / RS485 / APG (Standard) and GPIB & Ethernet (optional). Its compact size with 3U only can be stacked on a bench in a standard rack without any difficulties.

Another unique capability of the 62000H supplies is their ability to create complex DC transient waveforms. This capability allows devices to be tested to DC voltage dropouts, spikes and other voltage variations making them an ideal choice for aerospace device testing, inverter testing and other devices which will experience voltage interrupts. Applications include DC/DC Converter & Inverter voltage drop test, engine start-up simulation, battery automated charging, electronic product life cycle test, etc.

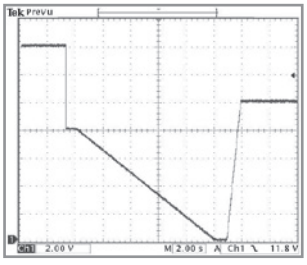
KEY FEATURES

- Power range: 5KW / 10KW / 15KW
- Voltage range: 0 ~ 1000V
- Current range: 0 ~ 375A
- High power density (15KW in 3U)
- Easy Master / Slave parallel & series operation up to 150KW
- Precision V&I Measurements
- High-speed programming
- Voltage & Current Slew Rate Control
- Digital encoder knobs, keypad and function keys
- Current sharing operation
- Voltage ramp function (time range: 10 ms ~ 99 hours)
- Auto Sequencing Programming: 10 Programs / 100 Sequences
- OVP, Current Limit, Thermal protection
- Standard Analog Programming interface
- Standard USB / RS-232 / RS485 interface
- Optional GPIB / Ethernet interface
- Remote output ON / OFF (I / P)
- Remote sense line drop compensation
- LabView and Labwindows
- CE Certified

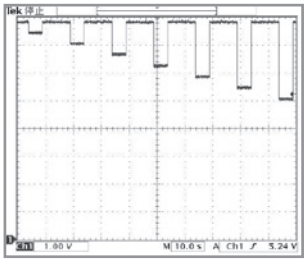




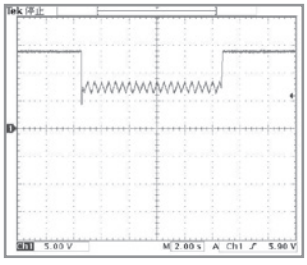
Master/Slave Parallel Operation - 150kW



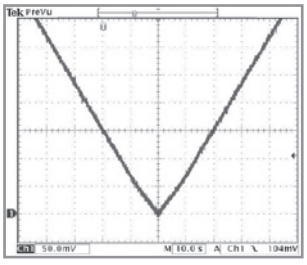
Battery Voltage Dropout



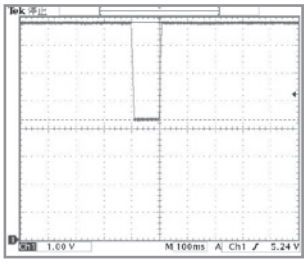
Reset Behavior at Voltage Drop of ISO 16750-2



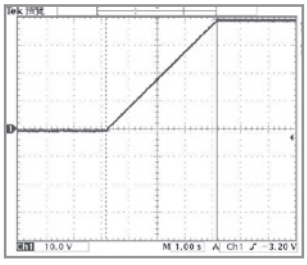
Engine Starting Profile of ISO 16750-2



Battery Voltage Slow Decrease & Decrease profile



Telecom Converter Sag Testing



Output Voltage Slew Rate Control

All specifications are subject to change without notice.

ELECTRICAL SPECIFICATIONS -1							
Model	**62075H-30**	**62050H-40**	**62050H-450**	**62050H-600**	**62100H-30**	**62100H-40**	**62100H-450**
Output Ratings							
Output Voltage	0-30V	0-40V	0-450V	0-600V	0-30V	0-40V	0-450V
Output Current	0-250A	0-125A	0-11.5A	0-8.5A	0-375A	0-250A	0-23A
Output Power	7500W	5000W	5000W	5000W	11250W	10000W	10000W
Line Regulation							
Voltage	±0.01% F.S.						
Current	±0.05% F.S.						
Load Regulation							
Voltage	±0.02% F.S.						
Current	±0.1% F.S.						
Voltage Measurement							
Range	6V / 30V	8V / 40V	90V / 450V	120V / 600V	6V / 30V	8V / 40V	90V/450V
Accuracy	0.05% + 0.05% F.S.						
Current Measurement							
Range	50A / 250A	25A / 125A	2.3A / 11.5A	1.7A / 8.5A	75A / 375A	50A / 250A	4.6A/23A
Accuracy	0.1% + 0.1% F.S.						
Output Noise & Ripple							
Voltage Noise (P-P)	60mV	60mV	300mV	350mV	60mV	60mV	300mV
Voltage Ripple (rms)	15mV	15mV	450mV	600mV	15mV	15mV	450mV
Current Ripple (rms)	100mA	50mA	20mA	15mA	150mA	100mA	40mA
OVP Adjustment Range							
Range	0-110% programmable from front panel, remote digital inputs						
Accuracy	±1% of full-scale output						
Programming Response Time							
Rise Time: Full Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Rise Time: No Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Fall Time: Full Load	6ms	8ms	60ms	60ms	6ms	8ms	60ms
Fall Time: 10% Load	100ms	100ms	250ms	250ms	100ms	100ms	250ms
Fall Time: No Load	1s	1s	2.5s	2.5s	1s	1s	2.5s
Slew Rate Control							
Voltage slew rate range	0.001V/ms ~ 5V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 7.5V/ms	0.001V/ms ~ 10V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 5V/ms	0.001V/ms ~ 7.5V/ms
Current slew rate range	0.001A~1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~0.1A/ms, or INF
Minimum transition time	0.5ms						
Transient Response Time	Recovers within 1ms to +/~0.75% of steady-state output for a 50% to 100% or 100% to 50% load change(1A/μs)						
Efficiency	0.87(Typical)						
Drift (30 minutes)							
Voltage	0.04% of Vmax						
Current	0.06% of Imax						
Drift (8 hours)							
Voltage	0.02% of Vmax						
Current	0.04% of Imax						
Temperature Coefficient							
Voltage	0.04% of Vmax/°C						
Current	0.06% of Imax/°C						

ELECTRICAL SPECIFICATIONS -2						
Model	**62100H-600**	**62100H-1000**	**62150H-40**	**62150H-450**	**62150H-600**	**62150H-1000**
Output Ratings						
Output Voltage	0-600V	0-1000V	0-40V	0-450V	0-600V	0-1000V
Output Current	0-17A	0-10A	0-375A	0-34A	0-25A	0-15A
Output Power	10000W	10000W	15000W	15000W	15000W	15000W
Line Regulation						
Voltage	±0.01% F.S.					
Current	±0.05% F.S.					
Load Regulation						
Voltage	±0.02% F.S.	±0.05% F.S.	±0.02% F.S.	±0.02% F.S.	±0.02% F.S.	±0.05% F.S.
Current	±0.1% F.S.					
Voltage Measurement						
Range	120V/600V	200V/1000V	8V/40V	90V/450V	120V/600V	200V/1000V
Accuracy	0.05% + 0.05%F.S.					
Current Measurement						
Range	3.2A/17A	4A/10A	75A/375A	6.8A/34A	5A/25A	6A/15A
Accuracy	0.1% + 0.1%F.S.					
Output Noise & Ripple						
Voltage Noise(P-P)	350mV	2550mV	60mV	300mV	350mV	2550mV
Voltage Ripple(rms)	600mV	1500mV	15mV	450mV	600mV	1500mV
Current Ripple(rms)	30mA	180mA	150mA	60mA	45mA	270mA
OVP Adjustment Range						
Range	0-110% programmable from front panel, remote digital inputs					
Accuracy	±1% of full-scale output					
Programming Response Time						
Rise Time:Full Load	60ms	25ms(50% F.S. CC Load)	8ms	60ms	60ms	25ms(50% F.S. CC Load)
Rise Time:No Load	60ms	25ms	8ms	60ms	60ms	25ms
Fall Time: Full Load	60ms	25ms(50% F.S. CC Load)	8ms	60ms	60ms	25ms(50% F.S. CC Load)
Fall Time: 10% Load	250ms	80ms(50% F.S. CC Load)	100ms	250ms	250ms	80ms(50% F.S. CC Load)
Fall Time: No Load	2.5s	3s	1s	2.5s	2.5s	3s
Slew Rate Control						
Voltage slew rate range	0.001V/ms~10V/ms	0.001V/ms~40V/ms	0.001V/ms~5V/ms	0.001V/ms~7.5V/ms	0.001V/ms~10V/ms	0.001V/ms~40V/ms
Current slew rate range	0.001A~0.1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A~1A/ms, or INF	0.001A~0.1A/ms, or INF	0.001A ~0.1A/ms, or INF	0.001A~0.1A/ms, or INF
Minimum transition time	0.5ms					
Transient Response Time	Recovers within 1ms to +/- 0.75% of steady-state output for a 50% to 100% or 100% to 50% load change(1A/μs)					
Efficiency	0.87(Typical)					
Drift (30 minutes)						
Voltage	0.04% of Vmax					
Current	0.06% of Imax					
Drift (8 hours)						
Voltage	0.02% of Vmax					
Current	0.04% of Imax					
Temperature Coefficient						
Voltage	0.04% of Vmax/˚C					
Current	0.06% of Imax/˚C					

ORDERING INFORMATION

Power Rating	62000H Series Programmable DC Power Supply
5KW	62050H-40 : Programmable DC Power Supply 40V/125A/5KW
	62050H-450 : Programmable DC Power Supply 450V/11.5A/5KW
	62050H-600 : Programmable DC Power Supply 600V/8.5A/5KW
10KW	62075H-30 : Programmable DC Power Supply 30V/250A/7.5KW
	62100H-30 : Programmable DC Power Supply 30V/375A/11KW
	62100H-40 : Programmable DC Power Supply 40V/250A/10KW
	62100H-450 : Programmable DC Power Supply 450V/23A/10KW
	62100H-600 : Programmable DC Power Supply 600V/17A/10KW
	* 62100H-1000 : Programmable DC Power Supply 1000V/10A/10KW
15KW	62150H-40 : Programmable DC Power Supply 40V/375A/15KW
	62150H-450 : Programmable DC Power Supply 450V/34A/15KW
	62150H-600 : Programmable DC Power Supply 600V/25A/15KW
	* 62150H-1000 : Programmable DC Power Supply 1000V/15A/15KW
Options	A620024 : GPIB Interface for 62000H series (Factory installed)
	A620025 : Ethernet Interface for 62000H series (Factory installed)
	A620026 : Rack Mounting kit for 62000H series

Note 1 : Please specify GPIB or Ethernet Interface (alternative) at time of order.
Note 2 : All models output power are available for 380/400Vac line voltage.
Note 3 : Call for availability for 200/220 Vac line voltage

All specifications are subject to change without notice.

GENERAL SPECIFICATIONS				
Programming & Measurement Resolution				
Voltage (Front Panel)		10mV / 100mV (Model 62000H-1000)		
Current (Front Panel)		10 mA / 1mA (Model 62000H-1000)		
Voltage (Digital Interface)		0.002% of Vmax		
Current (Digital Interface)		0.002% of Imax		
Voltage (Analog Interface)		0.04% of Vmax		
Current (Analog Interface)		0.04% of Imax		
Remote Interface				
Analog programming		Standard		
USB		Standard		
RS-232		Standard		
RS485		Standard		
GPIB		Optional		
Ethernet		Optional		
System BUS(CAN)		Standard for master/slave control		
Programming Accuracy				
Voltage (Front Panel and Digital Interface)		0.1% of Vmax		
Current (Front Panel and Digital Interface)		0.3% of Imax		
Voltage (Analog Interface)		0.2% of Vmax		
Current (Analog Interface)		0.3% of Imax		
GPIB Command Response Time				
Vout setting		GPIB send command to DC source receiver <20ms		
Measure V & I		Under GPIB command using Measure <25ms		
Analog Interface (I/O)				
Voltage and Current Programming inputs (I/P)		0-10Vdc / 0-5Vdc / 0-5k ohm / 4-20 mA of F.S.		
Voltage and Current monitor output (O/P)		0-10Vdc / 0-5Vdc / 4-20mA of F.S.		
External ON/OFF (I/P)		TTL:Active Low or High(Selective)		
DC_ON Signal (O/P)		Level by user define. (Time delay = 1 ms at voltage slew rate of 10V/ms.)		
CV or CC mode Indicator (O/P)		TTL Level High=CV mode ; TTL Level Low= CC mode		
OTP Indicator (O/P)		TTL: Active Low		
System Fault indicator(O/P)		TTL: Active Low		
Auxiliary power supply(O/P)		Nominal supply voltage : 12Vdc / Maximum current sink capability: 10mA		
Safety interlock(I/P)		Time accuracy: <100ms		
Remote inhibit(I/P)		TTL: Active Low		
Series & Parallel Operation		Master / Slave control via CAN for 10 units up to 150KW. (Series: two units / Parallel: ten units)		
Auto Sequencing(List Mode)				
Number of program		10		
Number of sequence		100		
Dwell time Range		5ms - 15000S		
Trig. Source		Manual / Auto / External		
Auto Sequencing (Step Mode)				
Start voltage		0 to Full scale		
End voltage		0 to Full scale		
Run time		10ms - 99hours		
Input Specification				
AC input voltage 3phase , 3 wire + ground		3Ø 200~220Vac ± 10% V_{LL} *1 ; 3Ø 380~400Vac ± 10% V_{LL}		
AC frequency range		47-63 Hz		
Max Current (each phase)	200/220 Vac	5KW Model : 39A	10KW Model : 69A	15KW Model : 93A
	380/400 Vac	5KW Model : 22A	10KW Model : 37A	15KW Model : 50A
General Specification				
Maximum Remote Sense Line Drop Compensation		<100V model: 5% of full scale voltage per line(10% total) >100V model :2% of full scale voltage per line (4% total)		
Operating Temperature Range		0˚C ~ 50˚C *2		
Storage Temperature Range		-40˚C ~ +85˚C		
Dimension (HxWxD)		132.8 x 428 x 610 mm / 5.23 x 16.85 x 24.02 inch		
Weight		5KW Model : Approx. 23 kg / 50.66 lbs 10KW Model : Approx. 29 kg / 63.88 lbs *3 15KW Model : Approx. 35 kg / 77.09 lbs		

Note*1 : Call for availability
Note*2 : The operating temperature range is 0˚C ~ 40˚C for Model 62100H-1000/62150H-1000
Note*3 : The weight is approx. 35kg/77.09 lbs for Model 62100H-1000



Solar Array Simulator

KEY FEATURES

- Voltage range : 0 ~600V&1000V
- 3U/15kW high power density module with easy master/slave parallel operation up to 150kW
- Fast transient response solar array simulation
- Simulation of multiple solar cell material's I-V characteristic (fill factor)
- Simulation of dynamic irradiation intensity and temperature level from clear day to cloud cover conditions
- Shadowed I-V curve output simulation
- Low leakage current (< 3mA)
- Precision V & I measurements
- Auto I-V program: 100 I-V curves & Dwell time 1~15,000s
- Static & dynamic MPPT efficiency test
- Data recorded via softpanel
- Standard USB / RS232 / RS485 interface
- Optional GPIB / Ethernet interface
- Real time analysis of PV inverter's MPPT tracking via softpanel
- Free graphic user interface - softpanel for operation
- Build-in dynamic MPPT test profile of EN50530, Sandia, CGC/GF004

APG RS-485 RS-232 Ethernet GPIB USB CE

The latest programmable solar array simulator power supply 62150H-600S&1000S released by Chroma provides simulation of Voc (open circuit voltage) up to 1000V and Isc (short circuit current) up to 25A. The 62150H provides an industry leading power density in a small 3U high package. The solar array simulator is highly stable and has a fast transient response design, which are both advantageos to MPPT performance evaluation on PV inverter devices.

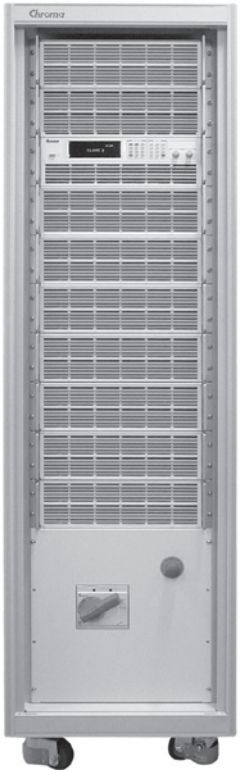
The 62150H-600S/1000S has many unique advantages including high speed & precision digitizing measurement circuits with a 100kHz A/D, 25kHz D/A controlled I-V curve and a digital filter mechanism. It can simulate an I-V curve accurately and response the mains ripple effect from the PV inverter. In addition, the built-in SAS I-V model in the standalone unit can easily program the Voc, Isc, Vmp, and Imp parameters for I-V curve simulation, without a PC controller.

The real solar array is influenced by various weather conditions such as irradiation, temperature, rain and shade by trees or clouds, which will affect the I-V curve output. The 62150H-600S/1000S is capable of storing up to 100 I-V curves into the simulator memory, with a programmed time interval range of 1-15,000 seconds. It can simulate the I-V curve from the early morning to nightfall for PV inverter testing or dynamic I-V curve transient testing.

The 62150H-600S/1000S has a built-in 16 bit digital control and precision voltage & current measurement circuits with a voltage accuracy of 0.05%+0.05%FS and a current accuracy of 0.1%+0.1%F.S. It is ideal for real time MPPT analysis and tracking monitoring for PV inverters through our softpanel. The user can also enable the data recording function on the softpanel during the static MPPT performance test.

When high power solar array simulation is required it is common to connect two or more power modules in parallel. The 62150H-600S/1000S with a current range up to 25A and a voltage range up to 1000V offers a high power density envelope maximum of 15KW in a 3U package. It can easily parallel up to ten units in a Master/Slave configuration to provide 150kW with current sharing and synchronized control signals for commercial PV inverter (10kW – 100kW) testing. The 62000H series supplies have a smart Master/Slave control mode that makes the parallel operation fast and simple. In this mode, the master scales values and downloads data to slave units so that the programming is as simple as using a standalone unit.

The 62000H series DC power supplies are very easy to operate from the front panel keypad or from the remote controller via USB / RS232/ RS485/APG (standard) and GPIB & Ethernet (optional). Its compact size (3U) makes it ideal for both benchtop and standard racking.



Master/Slave Parallel Operation - 150kW

ORDERING INFORMATION

Power Rating	62000H Series Programmable DC Power Supply
2kW	* **62020H-150S** : Programmable DC Power Supply 150V/40A/2kW with Solar Array Simulation
5kW	**62050H-600S** : Programmable DC Power Supply 600V/8.5A/5kW with Solar Array Simulation
10kW	**62100H-600S** : Programmable DC Power Supply 600V/17A/10kW with Solar Array Simulation
15kW	**62150H-600S** : Programmable DC Power Supply 600V/25A/15kW with Solar Array Simulation
	62150H-1000S : Programmable DC Power Supply 1000V/15A/15kW with Solar Array Simulation
Options	**A620024** : GPIB Interface for 62000H series (Factory installed)
	A620025 : Ethernet Interface for 62000H series (Factory installed)
	A620026 : 19" Rack Mounting kit for 62000H series
	A620027 : Parallelable Power Stage 15kW for 62150H-600S
	A620028 : Parallelable Power Stage 15kW for 62150H-1000S
	***A620029** : Control and Supervisor Unit for 150kW~1MW
	***A620030** : 19" Rack (41U) for 62000H series (380Vac input)

Note 1 : GPIB or Ethernet Interface (alternative) , please specified at time of order.
Note 2 : Call for more information regarding the customized solar array simulator of 150kW~1MW.
*Call for availability and more information



Parallelable Power Stage A620027/A620028

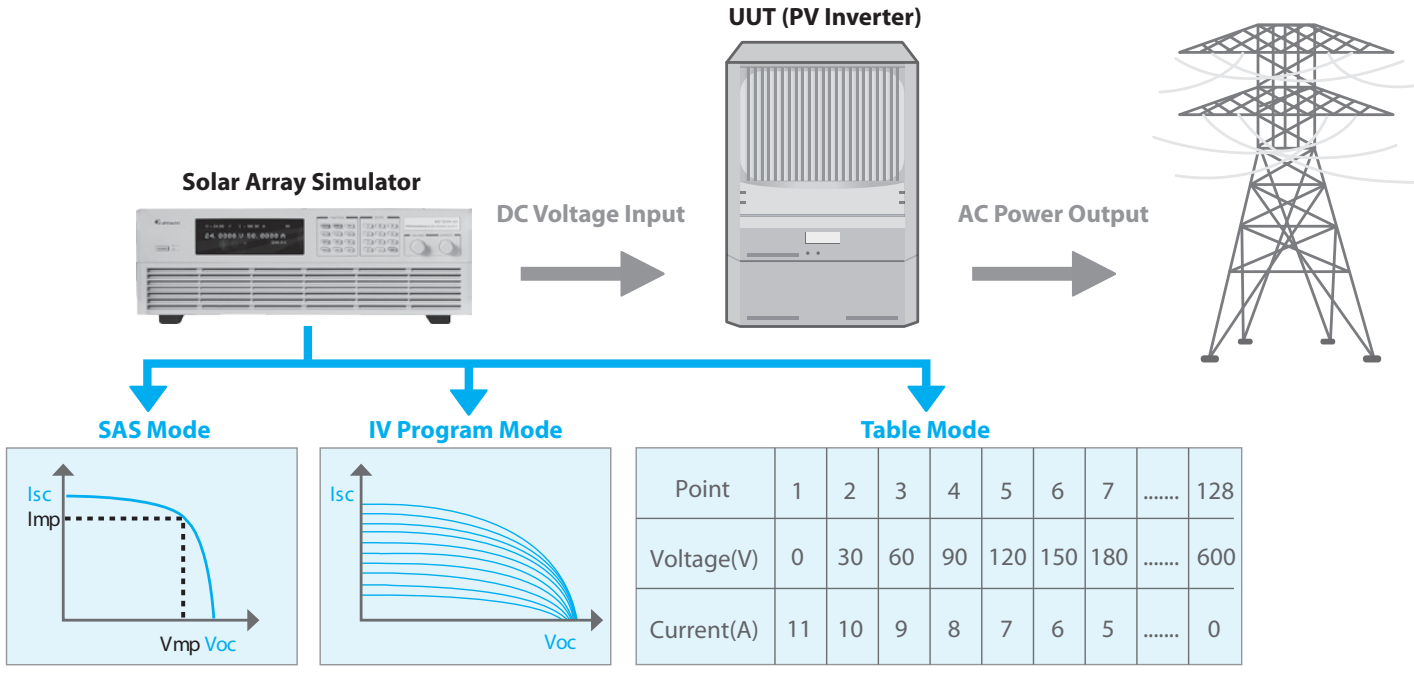
All specifications are subject to change without notice.

Solar Array I-V Curve Simulation Power Supply

The Model 62150H-600S/1000S has a built in SAS model that can easily program the Voc, Isc, Vmp, Imp parameters to simulate different solar cell materials I-V characteristic outputs with fast response time. Moreover, the TABLE mode is capable of saving a 128 point array of user programmed voltages and currents via a remote interface. It can easily create a shadowed I-V curve and the I-V PROGRAM mode can save up to 100 I-V curves and dwell time intervals (1-15,000s) in memory. These advantages provide steady repetitive control conditions required for PV Inverter design as well as for verification testing. The solar array simulator is ideal for the following testing:

- Design and verify the maximum power tracking circuit and algorithm of the PV inverter
- Verify the high/low limit of operating input voltage allowed for the PV inverter.
- Verify the high/low limit of operating input voltage allowed for the inverter’ s maximum power point
- Verify the static maximum power point tracking efficiency of the PV inverter.
- Measure and verify the overall efficiency & conversion efficiency of PV inverter. *
- Verify the maximum power point tracking performance of the inverter for dynamic curves (EN50530, Sandia and CGC/GF004)
- Verify the maximum power point tracking performance of the inverter under different time period conditions spanning from morning to nightfall
- Verify the maximum power point tracking mechanism of the inverter for the I-V curve when the solar array is shaded by clouds or trees
- Simulate the I-V curve under the actual environmental temperatures within burn-in room to do inverter burn-in testing.

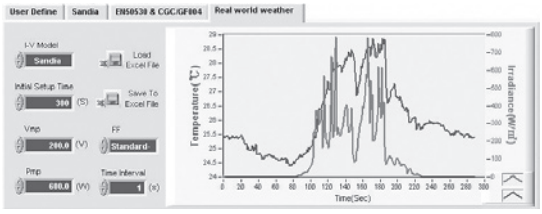
*Requires an extra power meter



Point	1	2	3	4	5	6	7	.....	128
Voltage(V)	0	30	60	90	120	150	180	.....	600
Current(A)	11	10	9	8	7	6	5	.....	0

Real World Waether Simulation

The real world weather simulation function allows the user to import real conditions of irradiation and temperature profiles of a whole day from excel file to Softpanel, in order to simulate the irradiation intensity and temperature level from early morning to nightfall. It can also set the interval time resolution to 1s for I-V curve update rate and enable the user to perform MPPT tracking tests under the simulation of actual weather environments.



Real World Weather Simulation

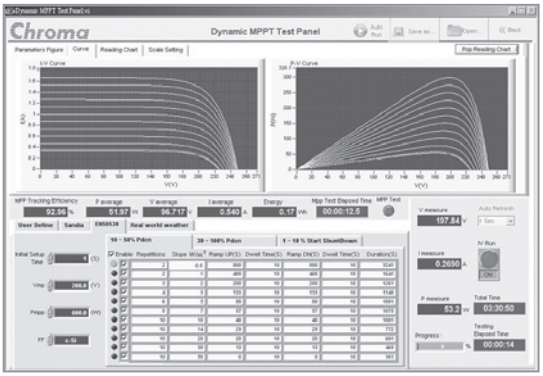
Solar Array I-V Curve Simulation Softpanel

The model 62150H-600S/1000S includes a graphical user Interface software through remote digital interface (USB / GPIB / Ethernet / RS232) control. The user can easily program the I-V curve of the62150H-600S/1000S as well as the I-V & P-V curve for real-time testing. In addition it will display the MPPT status for the PV inverter. Readings and the report function with real-time monitoring using the softpanel are shown below.

Simulates different solar cell materials I-V characteristic (Fill factor)

The purpose of the PV inverter is to convert the dc voltage (from solar array) to the ac power (utility). The better a PV inverter can adapt to the various irradiation & temperature conditions of sun, the more power that can be fed into the utility grid over time. So, the MPPT performance is a very important factor for PV generation system. The model 62150H-600S/1000S is capable of simulating different types of standard crystalline, multi-crystalline and thin-film fill factor* parameters to verify the MPPT tracking algorithm mechanism and efficiency.

*Fill Factor = (Imp*Vmp)/(Isc*Voc)



Solar Array Simulation SoftPanel

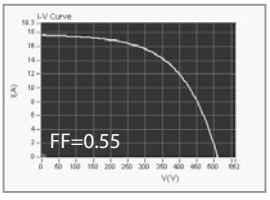
ELECTRICAL SPECIFICATIONS-WITH SOLAR ARRAY SIMULATION					
MODEL	**62020H-150S *1**	**62050H-600S**	**62100H-600S**	**62150H-600S**	**62150H-1000S**
Output Ratings					
Output Voltage	0-150V	0-600V	0-600V	0-600V	0-1000V
Output Current	0-40A	0-8.5A	0-17A	0-25A	0-15A
Output Power	2000W	5000W	10000W	15000W	15000W
Line Regulation					
Voltage	+/- 0.01% F.S.				
Current	+/- 0.05% F.S.				
Load Regulation					
Voltage	+/- 0.05% F.S.				
Current	+/- 0.1% F.S.				
Voltage Measurement					
Range	60V / 150V	120V / 600V	120V / 600V	120V / 600V	200V / 1000V
Accuracy	0.05% + 0.05%F.S.				
Current Measurement					
Range	16A / 40A	3.4A / 8.5A	6.8A / 17A	10A / 25A	6A / 15A
Accuracy	0.1% + 0.1%F.S.				
Output Noise&Ripple					
Voltage Noise(P-P)	150 mV	1500 mV	1500 mV	1500 mV	2550 mV
Voltage Ripple(rms)	15 mV	650 mV	650 mV	650 mV	1950 mV
Current Ripple(rms)	30 mA	150 mA	300 mA	450 mA	270mA
OVP Adjustment Range					
Range	0-110% programmable from front panel, remote digital inputs.				
Accuracy	+/- 1% of full-scale output				
Programming Response Time					
Rise Time: 50%F.S. CC Load	10ms	30ms	30ms	30ms	25ms
Rise Time: No Load	10ms	30ms	30ms	30ms	25ms
Fall Time: 50%F.S. CC Load	10ms	30ms	30ms	30ms	25ms
Fall Time: 10%F.S. CC Load	83ms	100ms	100ms	100ms	80ms
Fall Time: No Load	300ms	1.2s	1.2s	1.2s	3s
Slew Rate Control					
Voltage Slew Rate Range	0.001V/ms - 15V/ms	0.001V/ms - 20V/ms	0.001V/ms - 20V/ms	0.001V/ms - 20V/ms	0.001V/ms - 40V/ms
Current Slew Rate Range	0.001A/ms - 1A/ms, or INF	0.001A/ms - 0.1A/ms, or INF	0.001A/ms - 0.1A/ms, or INF	0.001A/ms - 0.1A/ms, or INF	0.001A/ms - 0.1A/ms, or INF
Minimum Transition Time	0.5ms				
Transient response time	200us	Recovers within 1ms to +/- 0.75% of steady-state output for a 50% to 100% or 100% to 50% load change(1A/us)			
Efficiency	0.87(Typical)				
Programming & Measurement Resolution					
Voltage (Front Panel)	10 mV	10 mV	10 mV	10 mV	100mV
Current (Front Panel)	1mA	1mA	1mA	1mA	1mA
Voltage (Digital Interface)	0.002% of Vmax				
Current (Digital Interface)	0.002% of Imax				
Voltage (Analog Interface)	0.04% of Vmax				
Current (Analog Interface)	0.04% of Imax				
Programming Accuracy					
Voltage (Front Panel and Digital Interface)	0.1% of Vmax				
Current (Front Panel and Digital Interface)	0.3% of Imax				
Voltage (Analog Interface)	0.2% of Vmax				
Current (Analog Interface)	0.3% of Imax				
Parallel Operation*2	Master / Slave control via CAN for 10 units up to 150KW. (Parallel: ten units)				
Auto Sequencing (I-V program)					
Number of program	10				
Number of sequence	100				
Dwell time Range	1s - 15,000S				
Trig. Source	Manual / Auto				

Note*1 : Preliminary specification for 62020H-150S

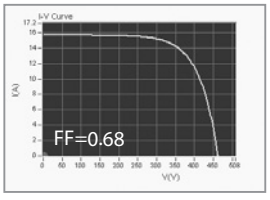
Note*2 : There is parallel mode for DC power supply when the I-V curve function is enabled.

All specifications are subject to change without notice.

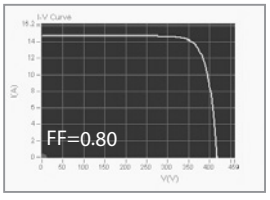
GENERAL SPECIFICATIONS						
MODEL		**62020H-150S**	**62050H-600S**	**62100H-600S**	**62150H-600S**	**62150H-1000S**
Remote Interface						
Analog programming		Standard				
USB		Standard				
RS232		Standard				
RS485		Standard				
GPIB		Optional				
Ethernet		Optional				
System bus(CAN)		Standard for master/slave control				
GPIB Command Response Time						
Vout setting		GPIB send command to DC source receiver <20ms				
Measure V&I		Under GPIB command using Measure <25ms				
Analog Interface (I/O)						
Voltage and Current Programming Inputs (I/P)		0-10Vdc / 0-5Vdc / 0-5k ohm / 4-20 mA of F.S.				
Voltage and Current monitor output (O/P)		0-10Vdc / 0-5Vdc / 4-20mA of F.S.				
External ON/OFF (I/P)		TTL:Active Low or High(Selective)				
DC_ON Signal (O/P)		Level by user define. (Time delay = 1 ms at voltage slew rate of 10V/ms.)				
CV or CC mode Indicator (O/P)		TTL Level High=CV mode ; TTL Level Low= CC mode				
OTP Indicator (O/P)		TTL: Active Low				
System Fault indicator(O/P)		TTL: Active Low				
Auxiliary power supply(O/P)		Nominal supply voltage : 12Vdc / Maximum current sink capability: 10mA				
Safety interlock(I/P)		Time accuracy: <100ms				
Remote inhibit(I/P)		TTL: Active Low				
Auto Sequencing(List Mode)						
Number of program		10				
Number of sequence		100				
Dwell time Range		5ms - 15000S				
Trig. Source		Manual / Auto / External				
Auto Sequencing (Step Mode)						
Start voltage		0 to Full scale				
End voltage		0 to Full scale				
Run time		10ms - 99hours				
Input Specification						
AC Input Volatage 3Phase, 3Wire+Ground		1Ø 200~220Vac ± 10% V_{LN}	3Ø 200~220Vac ± 10% V_{LL} 3Ø 380~400Vac ± 10% V_{LL}			
AC Frequency range		47 ~ 63Hz				
Max Current (each phase)	200/220Vac	14A	39A	69A	93A	93A
	380/400Vac	--	22A	37A	50A	50A
General Specification						
Maximum Remote Sense Line Drop Compensation		2% of full scale voltage per line (4% total)				
Operating Temperature Range		0^0C ~ 40^0C				
Storage Temperature Range		-40^0C ~ $+85^0$C				
Dimension (HxWxD)		89 x 428 x 465 mm/ 3.5 x 16.85 x 16.73 inch	132.8 mm x 428 mm x 610 mm / 5.23 x 16.85 x 24.02 inch			
Weight		Approx. 13 kg / 28.63 lbs	Approx. 23 kg / 55.70 lbs	Approx. 29 kg / 63.88 lbs	Approx. 35 kg / 77.09 lbs	Approx. 35 kg / 77.09 lbs
Approval		CE	CE	CE	CE	CE



Thin-Film



Standard Crystalline Array



High-efficiency Crystalline



CAN USB GPIB APG RS-232 Ethernet CE

KEY FEATURES

- Voltage range: 1 ~ 150V
- Current range: 0 ~ 2000A (System)
- Power range: 1.5kW per module up to 120kW per system
- N+1 Redundancy
- High Power Density (464 mW / cm^3 = 7.13 W/In^3)
- Hot-swappable
- Ideal for Burn-in & Plating
- Remote Sense
- Remote ON / OFF
- CAN BUS Control
- DC OK Signal Output

Chroma's new 62000B series of Modular DC Power Supplies offer many unique features for Burn-in and plating applications. The features include a N+1 redundancy, high power densities, hot-swappable maintenance, remote ON/OFF and programmable control via the CAN BUS.

The 62000B family offers 5 types of power module with ranging from 1V to 150V, current from 10A to 90A, and offers two mainframe type of six and three position. The six position mainframe can envelop in up to six power modules paralleled operation for 9KW power output. The 62000B can easily parallel up to fourteen mainframe to 120KW with current sharing and CAN BUS control for bulk power applications.

The Modular DC Power Supplies of 62000B are very cost effective with high power density and low current ripple. These instruments have be designed for burn-in applications such as the LCD panels, DC-DC converters, power inverters, notebook computers, battery chargers and many other types of electronic devices.

Modern power factor correction circuitry is incorporated in 62000B providing an input power factor above 0.98 to meet the IEC requirements. This PFC correction circuity not only reduces the input current but also raises the operating efficiency to over 80% Optional graphic SoftPanels and CAN BUS control allow for control and monitoring of the power system using an easy to use graphical interface.

Hot-swap Operation

Equipped with the functionality of N+1 redundancy and hot-swap, the 62000B Series of modular DC power supplies are most applicable for 24 hours non-stop applications such as the SMD plating production lines, as well as product life burn-in test for IT products like DC converters, LCD backlight inverters and routers.
For continuous operation applications the modular hot-swap design allows engineers to replace the failure unit on-site without shutting down the entire system.

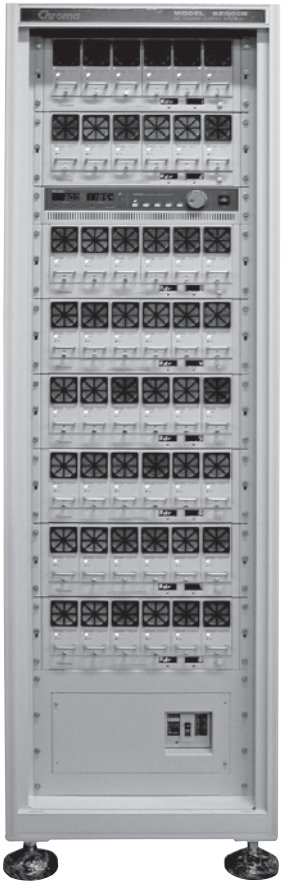


High Power Applications with CSU

The 62000B modular power supplies are capable of providing high power output up to 120KW/2000A with minimum specification degradation via CSU(Control & Supervisor Unit). Each chassis is designed to accommodate a maximum of 9KW and include current sharing capability to ensure system stability. In addition, for convenient control of even large power systems, a Control & Supervisor unit is provided to set and display output and protection circuits via a standard CAN BUS communication protocol.



Control & Supervisor Unit



Customized Power Solution

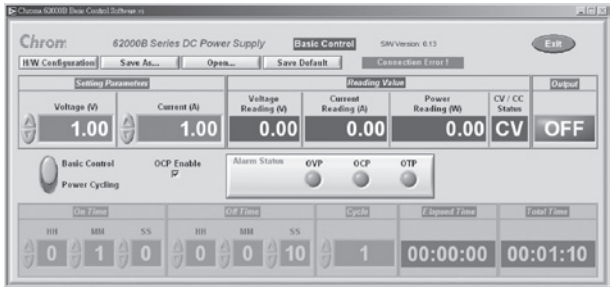
ORDERING INFORMATION

62000B-3-1 : Three Position 62000B Mainframe
62000B-6-1 : Six Position 62000B Mainframe
62015B-15-90 : DC Power Supply Module, 15V/90A/1350W
62015B-30-50 : DC Power Supply Module, 30V/50A/1500W
62015B-60-25 : DC Power Supply Module, 60V/25A/1500W
62015B-80-18 : DC Power Supply Module, 80V/18A/1440W
62015B-150-10 : DC Power Supply Module, 150V/10A/1500W
A620007 : Control & Supervisor Unit
A620008 : CAN BUS Interface for mainframe
A620010 : Rack Mounting Kit for mainframe
A620011 : Ethernet Interface for CSU
A620012 : AD-Link PCI 7841 CAN BUS Card
A620013 : 19" Rack (23U) for 62000B Series
A620014 : 19" Rack (41U) for 62000B Series
A620016 : Rack Mounting Kit for CSU
A620017 : Softpanel for 62000B Series
A620018 : NI USB-8473 high-speed USB to CAN interface
A620019 : USB Interface Control Box for mainframe & CSU
A620020 : GPIB Interface Control Box for mainframe & CSU
A620021 : Analog Interface Control Box for mainframe
A620022 : RS-485 Interface Control Box for mainframe & CSU

AVAILABLE POWER RATINGS

Current Rating / Power Rating / Voltage Rating	9KW	18KW	27KW	36KW	45KW
15V	540A	1080A	1620A	2160A	2700A
30V	300A	600A	900A	1200A	1500A
60V	150A	300A	450A	600A	750A
80V	108A	216A	324A	432A	540A
150V	60A	120A	180A	240A	300A
Paralleled unit of mainframe	1	2	3	4	5

Note : Call for more information on customization of high power system (>2000A)



Softpanel for Model 62000B Series

All specifications are subject to change without notice.

SPECIFICATIONS					
Model	**62015B-15-90**	**62015B-30-50**	**62015B-60-25**	**62015B-80-18**	**62015B-150-10**
Electrical Specifications					
Output Ratings					
Output Power	1350W	1500W	1500W	1440W	1500W
Output Voltage	1~15V	1~30V	1~60V	1~80V	1~150V
Output Current	1~90A	1~50A	1~25A	1~18A	1~10A
Line Regulation	0.1% F.S.				
Load Regulation *1	1% F.S.				
Programming Accuracy	1% F.S.				
Measurement Accuracy	1% F.S.				
Output Noise (20MHz)					
Voltage Noise (P-P)	100mV	100mV	200mV	200mV	400mV
Voltage Ripple (rms)	30mV	30mV	50mV	50mV	100mV
Current Ripple (rms)	0.9A	0.5A	0.25A	0.18A	0.1A
Efficiency	> 87% @ full load	> 88% @ full load			
Turn on over shoot voltage *2	5% of nominal output				
Transient Response Time *3	< 5 ms				
AC Input Voltage					
Six Position Mainframe	3Ø 200~240Vac ±4% V_{LL} or 3Ø 380~400Vac ±9% V_{LL}, 47~63 Hz				
Three Position Mainframe	1Ø 200~240Vac±4% V_{LN}, 47~63 Hz				
Input Power Factor	> 0.98@ full load				
Protection Function					
OVP	Automatically shuts down at 115% of set value				
Adjustment Range	1~16V	1~31V	1~65V	1~83V	1~155V
OCP	Current limit (0 ~ 100%) / OCP Shutdown at 115% of F.S.				
OTP	Automatically shuts down if internal limit is reached				
I/O Signal					
Remote ON/OFF (I/P)	Dry contact (closed = enabled), vice versa				
AUX Voltage	4 ~ 24V / 0.5A at mainframe (by trimmer adjust voltage)				
DC OK Signal Type (O/P)	Dry contact (closed = enabled) (Error : OVP / OCP / OTP / AC Fault)				
Programming Response Time *4 (Typical)					
Rise Time (Full Load)	For a programmed 5% to 95% step in output voltage : 100ms				
Rise Time (No Load)	For a programmed 5% to 95% step in output voltage : 100ms				
Fall Time (Full Load)	For a programmed 95% to 5% step in output voltage : 40ms				
Fall Time (No Load)	For a programmed 95% to 5% step in output voltage : 5s				
Vout Setting	CAN BUS send command to DC module receiver : 1s				
Measurement V & I	Under CAN command using fetch : 100ms				
Delay Time	For output ON/OFF enable and disable (under CAN command) : 5s(Single Mainframe)				
General Specifications					
Remote Sensing	3V max. line loss compensation				
Parallel Operation	Current Sharing (±5%)				
Operating Temperature	0 ~ 50˚C				
Humidity Range	0 ~ 90% RH. Non-condensing				
Remote Interface	CAN BUS (optional)				
Safety & EMC	CE				
Dimension (H x W x D)	Mainframe : 175.6 x 443.9 x 466.2 mm / 6.91 x 17.48 x 18.35 inch (62000B-6-1) Mainframe : 175.6 x 239.9 x 466.2 mm / 6.91 x 9.44 x 18.35 inch (62000B-3-1) Module : 138.5 x 67.5 x 377.5 mm / 5.45 x 2.66 x 14.86 inch				
Weight	Mainframe : 14 Kg / 30.8 lbs (62000B-6-1) Mainframe : 8 Kg / 17.6 lbs (62000B-3-1) Module : 4 Kg / 8.8 lbs				

Note*1 : For 50% step load variation with remote sense at maximum output voltage
Note*2 : based on rise time of 100ms
Note*3 : Time for the output voltage to recover within 1% of its rated for a load changed of 25%
Note*4 : Six Position Mainframe through CAN



KEY FEATURES

- Open architecture software platform
  - Support instrument with GPIB / RS-232 or RS-485 / I²C /CAN BUS interfaces
  - User editable test item
  - User editable test program
  - User editable report format
  - Statistical report
  - On-line control function
  - User authority control
  - Release control
  - Activity log
  - Master / Slave control mode
  - Multi-UUT test capability for single-output PSU
  - Support bar code reader
  - Support Shop-floor control
  - Remote monitoring via internet
- Test command optimizer helps to improve test speed
- Capable of coding for any power supply testing applications
- Comprehensive hardware modules provide high accuracy and repetitive measurements
- High test throughput by system default test items
- Cost effective
- Other hardware expandable upon request
- Windows 98/NT/2000/XP or higher based software

This auto test system uses the unique test command optimization technology to prevent the repeating control commands from sending to the system hardware devices. This improves the system test speed dramatically and makes Chroma 8000, which uses open software architecture, highly efficient as a close or optimized auto test system.

To meet the power supply test requirements, Chroma Power Supply Auto Test System model 8000 has built in 56 ready-made test items. Users may create new test items based on new test requirements using the test item editing function, which gives users the capability to expand the test items unlimitedly.

GPIB RS-232 RS-485 CE W PFC

With the powerful report, statistic and management functions, Chroma Power Supply Auto Test System model 8000 is able to provide complete tools to generate various test documents and perform system administration. Because the test and statistical reports are equally important nowadays for R/D evaluation, QA verification and mass production tests. So these save users a great deal of time for paper work.

Working under Windows 98/NT/2000/XP or higher operation system, Chroma 8000 Power Supply Auto Test System is able to get all the resources provided by Windows; thus, it can easily export the test results to network or to your web-page for remote manufacturing monitoring.

DC to DC Converter Testing

Software: Special Design Test Items (Load Fault Power Dissipation Test, Switching Frequency Test, Synchnization Frequency Test)

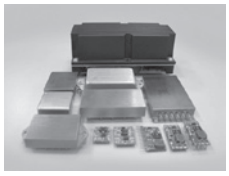
Hardware: Create Standard Test Fixture platform (Receiver)



DC to DC Converter ATS



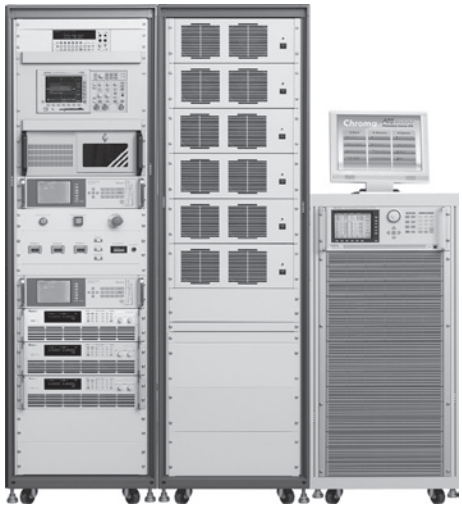
DC to DC Converter Test Fixture



DC to DC Converter

PV Inverter Testing

The Chroma 8000 ATS is equipped with optimized standard test items for PV inverters (the Unit Under Test), It meets IEEE1547, 1547.1, UL1741, GB/T 19939, CGC/GF004 preliminary test requirements. The user is only required to define the test conditions and specifications for the standard test items to perform the test.



EVSE Testing

It is a customized system based on Chroma 8000 ATS specializing in verification of EV Supply Equipment (EVSE) and complying with SAE-J1772 in programming the test items for operation.



EVSE ATS

EV OBC & DC-DC Converter Testing

For EV On-Board Charger and DC-DC Converter of different UUT characteristics, integrated connecting panel and exclusive test items including basic electrical characteristics and communication protocol test items are provided to shorten the test time greatly.



OBC/DC-DC Converter ATS

All specifications are subject to change without notice.

COMPREHENSIVE TEST ITEMS

OUTPUT PERFORMANCES
1. DC output voltage
2. DC output current
3. Peak-Peak noise
4. RMS noise
5. Current ripple*
6. Efficiency
7. In-test adjustment
8. Power good signal
9. Power fail signal
10. P/ S ON signal
11. Extended measure
12. Waveform capture
13. Overshoot voltage

INPUT CHARACTERISTICS
14. Input Inrush current
15. Input RMS current
16. Input peak current
17. Input power
18. Current harmonics against regulations
19. Input power factor
20. Input voltage ramp
21. Input freq. ramp
22. AC cycle drop out
23. PLD simulation

REGULATION TESTS
24. Current regulation
25. Voltage regulation
26. Total regulation

TIMING AND TRANSIENT
27. Power up sequence
28. Power down sequence
29. Transient response time
30. Transient spike
31. Turn ON time
32. Rise time
33. Fall time
34. Hold-up time
35. Extra timing
36. Tracking

PROTECTION TESTS
37. Short circuit
38. OV protection
39. UV protection
40. OL protection
41. OP protection

SPECIAL TESTS
42. Fan speed
43. Correlation test
44. UUT measurement verification test

SPECIAL FEATURE
45. Can BUS read/ write
46. I^2C read/ write*
47. GPIB read/ write
48. RS-232 read/ write
49. RS-485 read/ write*
50. TTL signal control
51. Relay control
52. Bar code scan*
53. DMM measure

* These test items need to be created by users by using test item editor due to the variety of the UUTs, and unlimited customized or user defined test items are allowed.

SPECIFICATIONS-1

Accurate and highly reliable hardware devices:

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Power Analyzer / Power Meter				
Model	**6630**	**6632**	**66201**	**66202**
NO. of input module	1 to 3	1 to 3	1	1
Power measurement range	48 ranges	48 ranges	12 ranges	24 ranges
Voltage measurement range	6 ranges	6 ranges	3 ranges	3 ranges
Current measurement range	8 ranges	8 ranges	4 ranges	8 ranges
Front panel display	Yes	No	Yes	Yes
Front panel editable	Yes	No	Yes	Yes
Harmonics measurement	Yes	Yes	No	Yes
Flicker measurement	Yes	No	No	No
Waveform measurement	Yes	Yes	No	Yes
Build-in regulation limit	Yes	Yes	No	No

* Please refer to respective product catalogs for detail specifications.

Timing/Noise Analyzer		
Model	**6011**	**80611**
NO. of input module	Up to 10	Up to 10
Noise measurement range	2V/0.4V	2V/0.4V
Low Pass Filter	Up to 20MHz	Up to 20MHz
Input circuit	Differential input	Differential input
Timing range	0-64 second	0-64 second
NO. of trigger input	4 sets	6 sets
NO. of comparator	2 Input module	4 Input module
Controllable TTL bits	16 output	16 output / 16 input
Controllable floating relay	6	8
NO. of multiplex input	10	10
NO. of multiplex output	2 for DMM & 2 for DSO	1 for DMM

ON/OFF Controller		
Model	**6013**	**80613**
Input	AC/DC	AC/DC
ON/OFF range - AC	0-360 deg	0-360 deg
Voltage range - AC	250V	277V
Current range - AC	30A	30A
Voltage range - DC	200V	200V
Current range - DC	40A	60A
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

Short Circuit/OVP Tester		
Model	**6012**	**80612**
NO. of input terminal	Up to 6	Up to 6
Short circuit impedance	< 0.1 ohm	< 0.05 ohm
Short current measurement	Yes	Yes
Sync. Signal for short circuit	6 relay signal	6 relay signal
OVP/UVP testing	Internal / External	Internal / External
Internal impedance range	1K-1M ohm	100-1M ohm
External OVP/UVP source	DC source	DC source
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

ORDERING INFORMATION

8000 : Switching Power Supply Auto Test System
6011/80611 : Timing/Noise Analyzer
6011N/80611N : Timing/Noise module
6012/80612 : Short Circuit/OVP Tester
6013/80613 : ON/OFF Controller
5004ATM : System Controller
A800005 : PCI BUS GPIB Card (National Instrument)
A800004 : 19" Rack for Model 8000
A800003 : 8000 software Package
A600011/A800027 : Test Fixture for Model 8000
DC Load Module: Refer to 6310A, 63200, 6330A,63600 Series
Power Analyzer : Refer to Model 6630 , 6632
Digital Power Meter : Refer to Model 66200 Series
AC Source : Refer to Model 6400, 6500, 61500, 61600, 61700 Series
DC Source : Refer to Model 62000H, 62000P Series

All specifications are subject to change without notice.

• Continued on next page ➟

SPECIFICATIONS-2

Electronic Load				
Model	**6310A series**	**6330A series**	**63200 series**	**63600 series**
Load mode	CC/CR/CV	CC/CR/CV	CC/CR/CV/CP	CC/CR/CV/CP/CZ
Power rating	30-1200W	30-1200W	2000-12000W	100-400W
Voltage range	1-500V	1-500V	1-600V	1-600V
Current range	Up to 240A	Up to 240A	Up to 1000A	Up to 80A
Slew rate	Up to 10A/μs	Up to 10A/μs	Up to 41.6A/μs	Up to 8A/μs
Measurements	Voltage/Current/Power	Voltage/Current/Power	Voltage/Current/Power	Voltage/Current/Power
Monitoring output	No	No	Current	Voltage/Current
Current share measurement	No	No	No	No
Noise measurement	No	No	No	No
Voltage sense input	Yes	Yes	Yes	Yes
Sync dynamic	No	Yes	Yes	Yes

* Please refer to respective product catalogs for detail specifications.

DC Source		
Model	**62000P series**	**62000H series**
Power rating	600,1200,2400,5000W	10KW,15KW
Voltage range	0-100V/600V	0-600V/1000V
Programmable current limit	Yes	Yes
Programmable OV point	Yes	Yes
Analog programming	Yes	Yes
Remote sensing	Yes	Yes
Line-drop compensation	5V	10%/4%

* Please refer to respective product catalogs for detail specifications.

AC Source					
Model	**6400 series**	**6500 series**	**61500 series**	**61600 series**	**61700 series**
Power rating	375-9000VA	1200-9000VA	500-18000VA	500-18000VA	1500-12000VA
Voltage range	0-100V/600V	0-300V	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase	1 or 3 phase	3 phase
DC output	No	No	Yes	Yes	Yes
Output measurement	Yes	Yes	Yes	Yes	Yes
Harmonic measurement	No	No	Yes	No	No
Waveform simulation	No	Yes	Yes	No	Yes
Programmable impedance	No	No	Yes	No	No
Harmonic synthesis	No	Yes	Yes	No	Yes
Inter-harmonic synthesis	No	No	Yes	No	Yes

* Please refer to respective product catalogs for detail specifications.

Other hardware devices :

- Digital Multimeter (Agilent-34401A / Keithley 2000), other types or brands of DMM supported upon request
- Digital Storage Oscilloscope (Tektronix TDS-1000/2000/3000/5000/7000 series ,DPO-2000/3000/4000/5000/7000 series), other types or brands of DSO supported upon request

All specifications are subject to change without notice.

Switching Power Supply ATS

Model 8200



TEST ITEMS

1. DC output voltage
2. DC output current
3. Voltage regulation
4. Current regulation
5. Turn ON time
6. Hold-up time
7. Power good signal
8. P/S ON signal
9. Efficiency
10. Input RMS current
11. Input peak current
12. Input power
13. Input power factor
14. Short circuit test
15. Short circuit current
16. OV protection
17. OL protection
18. OP protection
19. In-test adjustment

ORDERING INFORMATION

8200 : Switching Power Supply Auto Test System
8125 : Extended Controller
A820001 : PCI BUS AD Card
A800005 : PCI BUS GPIB Card (National Instrument)
A600002 :19" Rack for Model 8200
A820002 : 8200 software Package
A600011/A800027 : Test Fixture for Model 8200
A600013 : Adapter for A600011/A600012 Test Fixture (PC Standard)
A600014 : Adapter for A600011/A600012 Test Fixture (Terminal Block)
DC Load Module : Refer to Model 6310A, 6330A Series
AC Source : Refer to Model 6400, 6500,61500, 61600 Series

KEY FEATURES

- User editable test program
- User editable report format
- User authority control
- Release control
- Activity log
- Comprehensive hardware modules provide high accuracy repetitive and measurements
- High test throughput by system default test items
- Cost effective
- Windows 98/NT/2000/XP or higher based software

Chroma Power Supply Auto Test System model 8200 provides complete solution for PC ATX power supply, adapter and battery charger testing. The application oriented system structure makes it the most cost effective test equipment for initial test in power supply production line.

To meet the power supply test requirements, Chroma Power Supply Auto Test System model 8200 has built in 20 ready-made test items. Users can simply enter the test conditions and test the power supply features while proceeding.

With the report and management functions, Chroma Power Supply Auto Test System model 8200 is able to provide versatile tools to establish test documents and perform system administration.

Meanwhile, Chroma Power Supply Auto Test System model 8200 can be upgraded to Chroma model 8000, the ultimate power supply auto test system, to fit the future test needs by changing system software and adding new hardware devices.

SPECIFICATIONS

Accurate and highly reliable hardware devices :

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Extended Controller	
Model	**8125**
Input channels for timing	8 differential
Timing accuracy	40 µs
Controllable TTL bits	16
Input circuit	Differential input
Input impedance	10M ohm
Output channels for OVP	3
OVP voltage	8V/4.8V/16V
Maximum current	3A/Channel

Electronic Load	
Model	**6310A/6330A series**
Load mode	CC/CR/CV
Power rating	30-1200W
Voltage range	1-500V
Current range	Up to 240A
Slew rate	Up to 10A/µs
Measurements	Voltage/Current/Power
Monitoring output	No
Current share measurement	No
Noise measurement	No
Voltage sense input	Yes

* Please refer to respective product catalogs for detail specifications.

AC Source				
Model	**6400 series**	**6500 series**	**61500 series**	**61600 series**
Power rating	375-9000VA	1200-9000VA	500-18000VA	500-18000VA
Voltage range	0-300V	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase	1 or 3 phase
DC output	No	No	Yes	Yes
Output measurement	Yes	Yes	Yes	Yes
Harmonic measurement	No	No	Yes	No
Waveform simulation	No	Yes	Yes	No
Programmable impedance	No	No	Yes	No
Harmonic synthesis	No	Yes	Yes	No
Inter-harmonic synthesis	No	No	Yes	No

* Please refer to respective product catalogs for detail specifications.



New test items and expandable hardware allows the Chroma 8010 ATS to meet the new testing requirements in the PC power industry such as voltage monotonic rise test, average efficiency test to comply with EPA requirements and various other tests.

Chroma 8010 ATS software runs under the user friendly Windows 98/2000/NT/XP operating environment, providing the test engineer a dedicated PC power supply testing system with easy access to Windows resources.

ORDERING INFORMATION

8010 : PC Power Supply ATS
6011/80611 : Timing/Noise Analyzer
80611N : Timing/Noise module
8126 : Extended Controller
5004ATM : System Controller
A600011/ A800027 : Test Fixture
A800004 : 19" Rack for Model 8010
A800035 : Monotonic Rise Detector
DC Load Module : Refer to Model 6330A Series
Digital Power Meter : Refer to Model 66200 Series
AC Source : Refer to Model 6500, 61500, 61600 Series
DC Source : Refer to Model 62000P Series

KEY FEATURES

- Equipped with both of the test performance of 6000 ATS and the flexible hardware architecture of 8000 ATS
- Provide optimized standard test items for the Unit Under Test (PC Power Supply) to deliver excellent test performance
- Easy-to-use software function specifically designed to meet the production line needs
- Flexible software platform with the following functions
  - User editable test program
  - User editable test report format
  - Test report generator
  - Statistical report
  - User authority control
  - Release control
  - Activity log
  - Support bar code reader
- New test items and expandable hardware allows the Chroma 8010 ATS to meet the new testing requirements in the PC power industry
  - Output voltage monotonic rise test
  - Average efficiency test that complies with EPA & 80Plus
- Windows 98/2000/NT/XP or higher based software
- Offer the best performance/price ratio

Chroma 8010 PC Power Supply ATS is the test system of choice for PC power testing on the production line. Its test performance not only compares favorably with the Chroma 6000 ATS, but also has the flexibility of the Chroma 8000ATS hardware architecture. Available for selection are a range of hardware devices including AC/DC Power Supply, Electronic Load, Timing/Noise Analyzer, Power Meter and Extended Measurement Controller.

Chroma 8010 ATS was designed specifically with PC power supply characteristics in mind, with customized standard test items providing excellent test performance and optimized for mass production. The software provides a user friendly interface and intuitive controls suited for the production line.

OPTIMIZED TEST ITEMS

OUTPUT PERFORMANCES

1. DC output voltage
2. Peak-to-peak noise
3. RMS noise
4. Efficiency
5. In-test adjustment
6. Power good (PG) signal
7. Power fail (PF) signal
8. PS/ON signal
9. Extended measure
10. Overshoot voltage

INPUT CHARACTERISTICS

11. Input inrush current
12. Input RMS current
13. Input power
14. Input power factor
15. Input voltage ramp
16. Input frequency ramp
17. AC cycle drop out

REGULATION TESTS

18. Line regulation
19. Load regulation
20. Combine regulation
21. Dynamic load regulation
22. Sync.dynamic load regulation

TIMING AND TRANSIENT

23. Transient spike
24. Power up sequence
25. Rise time
26. Fall time
27. Power off time
28. Extended measure

PROTECTION TESTS

29. Short circuit
30. Over voltage protection
31. Over load protection

SPECIAL TESTS

32. Voltage monotonic test
33. Average efficiency test
34. Power on/off cycle test

SPECIAL FEATURE

35. TTL signal control
36. Relay control

All specifications are subject to change without notice.

SPECIFICATIONS

Accurate and highly reliable hardware devices:

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Timing/Noise Analyzer		
Model	**6011**	**80611**
NO. of input module	Up to 10	Up to 10
Noise measurement range	2V/0.4V	2V/0.4V
Low Pass Filter	Up to 20MHz	Up to 20MHz
Input circuit	Differential input	Differential input
Timing range	0-64 second	0-64 second
NO. of trigger input	4 sets	6 sets
NO. of comparator	2 Input module	4 Input module
Controllable TTL bits	16 output	16 output / 16 input
Controllable floating relay	6	8
NO. of multiplex input	10	10
NO. of multiplex output	2 for DMM &. 2 for DSO	1 for DMM

Power Meter		
Model	**66201**	**66202**
NO. of input module	1	1
Power measurement range	12 ranges	24 ranges
Voltage measurement range	3 ranges	3 ranges
Current measurement range	4 ranges	8 ranges
Front panel display	Yes	Yes
Front panel editable	Yes	Yes
Harmonics measurement	No	Yes
Flicker measurement	No	No
Waveform measurement	No	Yes
Build-in regulation limit	No	No

* Please refer to respective product catalogs for detail specifications.

AC Source			
Model	**6500 series**	**61500 series**	**61600 series**
Power rating	1200-9000VA	500-18000VA	500-18000VA
Voltage range	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase
DC output	No	Yes	Yes
Output measurement	Yes	Yes	Yes
Harmonic measurement	No	Yes	No
Waveform simulation	Yes	Yes	No
Programmable impedance	No	Yes	No
Harmonic synthesis	Yes	Yes	No
Inter-harmonic synthesis	No	Yes	No

* Please refer to respective product catalogs for detail specifications.

DC Source	
Model	**62000P series**
Power rating	600, 1200, 2400, 5000W
Voltage range	0-100V/600V
Programmable current limit	Yes
Programmable OV point	Yes
Analog programming	Yes
Remote sensing	Yes
Line-drop compensation	5V

* Please refer to respective product catalogs for detail specifications.

Extended Controller	
Model	**8126**
Short circuit	
Input channel	10
Input Voltage Rating	60Vdc
Input Current Rating	20Adc
Short relay	30A continuous
OVP	
Output channel	10
Dc source input	1
Input Voltage Rating	60Vdc
Input Current Rating	20A continuous
Floating Relay	
Type	SPST
No. of Relay	6
Rating	5A
External Relay	
No. of Relay	1 via rear panel
Rating	5A
Timing (For Power Good / Power Fail Time)	
Input channel	2
Input Voltage Rating	5.5Vdc
Range	0-6.4Sec
Accuracy	1mS
Resolution	100µs
Trigger Reference Voltage	3Vdc / 4.5Vdc Select
Reference Voltage Accuracy	± 0.1V
Input Current Rating	20Adc
Input Voltage Rating	5.5Vdc
Range	0-6.4Sec

Electronic Load	
Model	**6330A series**
Load mode	CC/CR/CV
Power rating	30-1200W
Voltage range	1-500V
Current range	Up to 240A
Slew rate	Up to 10A/µs
Measurements	Voltage/Current/Power
Monitoring output	No
Current share measurement	No
Noise measurement	No
Voltage sense input	Yes
Sync dynamic	Yes

* Please refer to respective product catalogs for detail specifications.

All specifications are subject to change without notice.



20U

KEY FEATURES

- Be able to test multiple UUTs concurrently that improve productivity significantly
- Equipped with both of the test performance of 6000 ATS and the flexible hardware architecture of 8000 ATS
- Provide optimized standard test items for the Unit Under Test (adapter/charger) to deliver excellent test performance
- Easy-to-use software function specially designed to meet the production line needs
- Flexible software platform with the following functions
  - Test Program editor
  - Test Report format editor
  - Test Report Generator
  - Statistics Analysis Report editor
  - User level setting
  - Release control
  - Activity log
  - Supporting bar code reader
- New test items and extended hardware are able to expand to fulfill the new requirements for the PC industry
  - Average efficiency test that complies with Energy Star
- Rack specially designed more meet to the production line
- Windows 98/2000/NT/XP or higher based software

Chroma 8020 Adapter/Charger ATS is the best test system for testing Adapter and Charger in the production line. 8020 is able to test multiple UUTs concurrently that improve productivity significantly, the hardware architecture is also as flexible as Chroma 8000 ATS. There are many hardware devices available for selection such as AC Power Supply, Electronic Load, Timing/Noise Analyzer and Power Meter.

Chroma 8020 has standard test items specially customized and optimized for the features of Adapter and Charger that provides excellent test performance to meet the requirements of mass production. Meanwhile, the software equipped is very friendly and easy to operate that is suitable for production line use.

New test items and extended hardware are expanded to Chroma 8020 ATS for the new test requirements in the Adapter/Charger industry, such as average efficiency to comply with Energy Star requirement, and etc.

Chroma 8020 ATS runs under the easy-to-learn Windows 98/2000/NT/XP environment with a specialized power test system for test engineers so that they can utilize the Windows resources easily.

OPTIMIZED TEST ITEMS

OUTPUT PERFORMANCES

1. DC output voltage
2. DC output current
3. DC output power
4. Peak-to-peak noise
5. RMS noise
6. Efficiency
7. In-test adjustment
8. Overshoot voltage

INPUT CHARACTERISTICS

9. Input inrush current
10. Input RMS current
11. Input power
12. Input power factor
13. AC cycle drop out
14. Input voltage ramp

REGULATION TESTS

15. Line regulation
16. Load regulation
17. Combine regulation
18. Dynamic load regulation
19. Sync. dynamic load regulation

TIMING AND TRANSIENT

20. Power up sequence
21. Rise time
22. Fall time
23. Power off time

PROTECTION TESTS

24. Short circuit
25. Over load protection
26. Over voltage protection

SPECIAL TESTS

27. Average efficiency test

SPECIAL FEATURE

28. TTL signal control
29. Relay control

ORDERING INFORMATION

8020 : Adapter / Charger ATS
80611 : Timing/Noise Analyzer
80611N : Timing/Noise Module
5004ATM : System Controller
A800004 : 19" Rack for Model 8020
A802001 : 4+4 Multi-UUT Test Fixture
A806102 : Digital Output Module
DC Load Module : Refer to Model 6330A, 63600 Series
Digital Power Meter : Refer to Model 66200 Series
AC Source : Refer to Model 6500, 61500, 61600 Series
I/O Card : ADLink 7230



A802001 : 4+4 Multi-UUT Test Fixture

All specifications are subject to change without notice.

SPECIFICATIONS

Accurate and highly reliable hardware devices:

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Timing/Noise Analyzer	
Model	**80611**
NO. of input module	Up to 10
Noise measurement range	2V/0.4V
Low Pass Filter	Up to 20MHz
Input circuit	Differential input
Timing range	0-64 second
NO. of trigger input	6 sets
NO. of comparator	4 Input module
Controllable TTL bits	16 output / 16 input
Controllable floating relay	8
NO. of multiplex input	10
NO. of multiplex output	1 for DMM

Power Meter		
Model	**66201**	**66202**
NO. of input module	1	1
Power measurement range	12 ranges	24 ranges
Voltage measurement range	3 ranges	3 ranges
Current measurement range	4 ranges	8 ranges
Front panel display	Yes	Yes
Front panel editable	Yes	Yes
Harmonics measurement	No	Yes
Flicker measurement	No	No
Waveform measurement	No	Yes
Build-in regulation limit	No	No

* Please refer to respective product catalogs for detail specifications.

Electronic Load		
Model	**6330A series**	**63600 series**
Load mode	CC/CR/CV	CC/CR/CV/CP/CZ
Power rating	30-1200W	100-400W
Voltage range	1-500V	1-600V
Current range	Up to 240A	Up to 80A
Slew rate	Up to 10A/μs	Up to 8A/μs
Measurements	Voltage/Current/Power	Voltage/Current/Power
Monitoring output	No	Voltage/Current
Current share measurement	No	No
Noise measurement	No	No
Voltage sense input	Yes	Yes
Sync dynamic	Yes	Yes

* Please refer to respective product catalogs for detail specifications.

AC Source			
Model	**6500 series**	**61500 series**	**61600 series**
Power rating	1200-9000VA	500-18000VA	500-18000VA
Voltage range	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase
DC output	No	Yes	Yes
Output measurement	Yes	Yes	Yes
Harmonic measurement	No	Yes	No
Waveform simulation	Yes	Yes	No
Programmable impedance	No	Yes	No
Harmonic synthesis	Yes	Yes	No
Inter-harmonic synthesis	No	Yes	No

* Please refer to respective product catalogs for detail specifications.

All specifications are subject to change without notice.



KEY FEATURES

- For both inverter & LIPS testing
- Standard & probe pin test fixture selectable
- Synchronized measurement in multi-channel reduce the test time
- Expandable PCI interface card
  - Measurement Card
  - Control Card
  - DMM Card
- Three brightness control modes
  - DC Voltage, PWM, and SM BUS control
- Built-in timing measurement
- Compensation function to correlate the error caused by fixture
- Burst mode frequency & duty measurement
- Open architecture software
  - Expandable hardware support
  - Support instrument with GPIB/ RS-232/ RS-485/I²C interface
  - User editable test library
  - User editable test programs
  - User editable reports
  - Statistical report
  - On-line Softpanel
  - User authority control
  - Release control
  - Activity log
  - Support Barcode reader
  - Support Web-cam for remote monitoring via internet
- Other hardware expandable upon request
- Windows 98/2000/NT/XP or higher based software

The Chroma LCD Inverter Auto Test System model 8490 is the ultimate solution for LCD inverter. It not only test traditional DC to AC inverter but also the LIPS (LCD Integrated Power Supply) type that combines adapter and inverter in one board.

It has wild variety of choices in hardware, such as AC/DC Source, Power Analyzer, Electronic Load, DMM, Oscilloscope, Timing/ Noise Analyzer , OVP/Short Tester and ON/OFF Controller. And 3 PCI interface cards-Measurement Card, Control Card, DMM Card to measure all of the inverter parameter. Combining with the open architecture system software platform - PowerPro III, it gives users a flexible, powerful and cost effective auto test system for both inverter and LIPS type testing.

Test fixture has been the most critical ingredient for LCD inverter ATS due to the inverter is very easy to be influenced by loading effect that from measurement circuit and cable (See the fixture module equivalent capacitance in test fixture specification). Chroma LCD inverter auto test system model 8490 provides standard and various test fixtures such as probe pin design for those inverters that are keen in reducing loading effect. All fixtures use insulation module design. Two different modules can be selected (standard & high current module) for different types of inverter. The standard module is for CCFl inverter while the high current module for EEFl inverter. Each module built-in 5 high voltage relay to guarantee operating in high voltage environment. Furthermore two different resistors can be added on the fixture for loading selection.

With the powerful report, statistic and management functions, Chroma LCD Inverter Auto Test System model 8490 is able to provide complete tools to generate various test documents and improve system administration. Since the test and statistical reports are equally important nowadays for R/D evaluation, QA verification and mass production tests. So these save users a great deal of time for paper work.

Working under Windows98/2000/NT/XP operation system, Chroma 8490 LCD Inverter Auto Test System is able to get all the resources provided by Windows; thus, it can easily export the test results to network or to your web-page for remote manufacturing monitoring.

THE COMPREHENSIVE TEST ITEMS FOR LIPS TESTING

OUTPUT PERFORMANCES

1. Lamp current
2. Lamp voltage
3. Lamp frequency
4. Kickoff (Vopen) voltage
5. DC output voltage
6. Peak-peak noise
7. Efficiency

INPUT CHARACTERISTICS

8. Input voltage
9. Input current
10. Inrush current
11. DIM frequency
12. DCR
13. Input RMS current
14. Input peck current
15. Input power
16. Input power factor

REGULATION TESTS

17. Voltage regulation
18. Combine regulation

TIMING TESTS

19. Kickoff (Vopen, shut down) delay time
20. Voltage turn on time
21. Current turn on time
22. Voltage turn off time
23. Current turn off time
24. Voltage rise time
25. Current rise time
26. Voltage fall time
27. Current fall time
28. Turn on time
29. Rise time
30. Fall time
31. Hold-up time

PROTECTION TESTS

32. Short circuit test
33. Open circuit test
34. Short circuit
35. OV protection
36. UV protection
37. OL protection
38. OP protection

SPECIAL TESTS

39. Burst Mode frequency & duty measurement
40. Lamp current balance
41. Waveform unbalance rate check
42. Waveform wave height check
43. GPIB read/write
44. RS-232 read/write

THE COMPREHENSIVE TEST ITEMS FOR D/A INVERTER TESTING

OUTPUT PERFORMANCES

1. Lamp current
2. Lamp voltage
3. Lamp frequency
4. Kickoff (Vopen) voltage
5. Efficiency

INPUT CHARACTERISTICS

5. Input voltage
6. Input current
7. Inrush current
8. DIM frequency
9. DCR

TIMING TESTS

10. Kickoff (Vopen, shut down) delay time
11. Voltage turn on time
12. Current turn on time
13. Voltage turn off time
14. Current turn off time
15. Voltage rise time
16. Current rise time
17. Voltage fall time
18. Current fall time

PROTECTION TESTS

19. Short circuit test
20. Open circuit test

SPECIAL TESTS

21. Burst mode frequency & duty measurement
22. Lamp current balance
23. Waveform unbalance rate check
24. Waveform wave height check

All specifications are subject to change without notice.

SPECIFICATIONS-1

Accurate and highly reliable hardware devices:

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

Timing/Noise Analyzer		
Model	**6011**	**80611**
NO. of input module	Up to 10	Up to 10
Noise measurement range	2V/0.4V	2V/0.4V
Low Pass Filter	Up to 20MHz	Up to 20MHz
Input circuit	Differential input	Differential input
Timing range	0-64 second	0-64 second
NO. of trigger input	4 sets	6 sets
NO. of comparator	2 Input module	4 Input module
Controllable TTL bits	16 output	16 output / 16 input
Controllable floating relay	6	8
NO. of multiplex input	10	10
NO. of multiplex output	2 for DMM &. 2 for DSO	1 for DMM

Power Analyzer / Power Meter				
Model	**6630**	**6632**	**66201**	**66202**
NO. of input module	1 to 3	1 to 3	1	1
Power measurement range	48 ranges	48 ranges	12 ranges	24 ranges
Voltage measurement range	6 ranges	6 ranges	3 ranges	3 ranges
Current measurement range	8 ranges	8 ranges	4 ranges	8 ranges
Front panel display	Yes	No	Yes	Yes
Front panel editable	Yes	No	Yes	Yes
Harmonics measurement	Yes	Yes	No	Yes
Flicker measurement	Yes	No	No	No
Waveform measurement	Yes	Yes	No	Yes
Build-in regulation limit	Yes	Yes	No	No

* Please refer to respective product catalogs for detail specifications.

Short Circuit/OVP Tester		
Model	**6012**	**80612**
NO. of input terminal	Up to 6	Up to 6
Short circuit impedance	< 0.1 ohm	< 0.05 ohm
Short current measurement	Yes	Yes
Sync. Signal for short circuit	6 relay signal	6 relay signal
OVP/UVP testing	Internal / External	Internal / External
Internal impedance range	1K-1M ohm	100-1M ohm
External OVP/UVP source	DC source	DC source
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

DC Source		
Model	**62000P series**	**62000H series**
Power rating	600,1200,2400,5000W	10KW,15KW
Voltage range	0-100V/600V	0-600V/1000V
Programmable current limit	Yes	Yes
Programmable OV point	Yes	Yes
Analog programming	Yes	Yes
Remote sensing	Yes	Yes
Line-drop compensation	5V	10%/4%

* Please refer to respective product catalogs for detail specifications.

ON/OFF Controller		
Model	**6013**	**80613**
Input	AC/DC	AC/DC
ON/OFF range - AC	0-360 deg	0-360 deg
Voltage range - AC	250V	277V
Current range - AC	30A	30A
Voltage range - DC	200V	200V
Current range - DC	40A	60A
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

Electronic Load			
Model	**6310A series**	**6330A series**	**63200 series**
Load mode	CC/CR/CV	CC/CR/CV	CC/CR/CV/CP
Power rating	30-1200W	30-1200W	2000-12000W
Voltage range	1-500V	1-500V	1-600V
Current range	Up to 240A	Up to 240A	Up to 1000A
Slew rate	Up to 10A/μs	Up to 10A/μs	Up to 41.6A/μs
Measurements	Voltage/Current/Power	Voltage/Current/Power	Voltage/Current/Power
Monitoring output	No	No	Current
Current share measurement	No	No	No
Noise measurement	No	No	No
Voltage sense input	Yes	Yes	Yes
Sync dynamic	No	Yes	Yes

* Please refer to respective product catalogs for detail specifications.

AC Source				
Model	**6400 series**	**6500 series**	**61500 series**	**61600 series**
Power rating	375-9000VA	1200-9000VA	500-18000VA	500-18000VA
Voltage range	0-300V	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase	1 or 3 phase
DC output	No	No	Yes	Yes
Output measurement	Yes	Yes	Yes	Yes
Harmonic measurement	No	No	Yes	No
Waveform simulation	No	Yes	Yes	No
Programmable impedance	No	No	Yes	No
Harmonic synthesis	No	Yes	Yes	No
Inter-harmonic synthesis	No	No	Yes	No

* Please refer to respective product catalogs for detail specifications.

Other hardware devices :

- Digital Multimeter (Chroma 12061/ Agilent-34401A/Keithley 2000), other types or brands of DMM supported upon request
- Digital Storage Oscilloscope (Tektronix TDS-1000/2000/3000/ 5000/7000 series, DPO-2000/3000/ 4000/5000/7000 series), other types or brands of DSO supported upon request

SPECIFICATIONS-2

Measurement Card	84902
No. of channel	Vx2, Ix2
Vac measurement	
Input Voltage	5Vpk max. (reference to 5000 Vpk)
Vpk+ / Vpk- / Vpp measurement	
Range	5Vpk
Bandwidth	10k ~ 200kHz
Resolution	14 bits
Accuracy	0.5 % + 0.5 % F.S. (10K ~ 100kHz) , 1 % + 0.5 % F.S. (100K ~ 200kHz)
Vrms measurement	
Range	3.5KVrms~2KVrms / 2KVrms~1KVrms / 1KVrms~500Vrms
Bandwidth	10k ~ 200kHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K ~ 100kHz) , 1.5 % + 0.2 % F.S. (100K ~ 200kHz)
Iac measurement	
Input Voltage	5Vpk max. (reference to 50mApk)
Ipk+ / Ipk- / Ipp measurement	
Range	50mApk
Bandwidth	10k ~ 200kHz
Resolution	14 bits
Accuracy	0.5 % + 0.5 % F.S. (10K ~ 100kHz) , 1 % + 0.5 % F.S. (100K ~ 200kHz)
Irms measurement	
Range	35mArms ~ 20mArms / 20mArms ~ 10mArms / 10mAVrms ~ 5mArms 5mArms ~ 2.5mArms / 2.5mArms ~ 1.25mArms / 1.25mA ~ 0.6mArms
Bandwidth	10K ~ 200KHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K ~ 100kHz) , 1.5 % + 0.2 % F.S. (100K ~ 200kHz)
Pac measurement	
Range	V range x I range
Bandwidth	10K ~ 200KHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K ~ 100kHz) , 2 % + 0.3 % F.S. (100K ~ 200kHz)
Frequency measurement	
Range	10K ~ 200KHz
Resolution	1Hz
Accuracy	0.1 % reading
Input	Via voltage / current input
Timing measurement	
Trigger input	External x 1 and V measurement input and I measurement input
Trigger level	
Range	5 % ~ 95 % F.S.
Resolution	10V for voltage / 0.1mA for current
Accuracy	1 % setting
Timing measure	
Resolution	1µS / 1mS
Accuracy	5µS / 5mS
Timing range	65mS / 65sec
Burst Mode measurement	
Frequency	
Range	10Hz ~ 2KHz
Resolution	0.1Hz
Accuracy	0.1 % reading
Duty	
Range	0.05ms ~ 90ms
Resolution	0.001ms
Accuracy	Error Max : 100µS
Measurement speed	< 10mS
Interface	PCI
Dimension	1 Slot width

Control Card	84903
BL control	
DC level control	
Program level	0 ~ 10V
Resolution	11 bits
Level Accuracy	0.5 % setting + 0.1 % F.S.
Sourcing current	20mA
PWM control	
Program level	0 ~ 10V
Resolution	7 bits
Accuracy	2 % + 1 % F.S (No Load) / 5.5% +1% F.S. (20mA output)
Sourcing current	20mA
Frequency	20Hz ~ 10kHz / 10kHz ~ 100kHz
Freq. Resolution	1Hz
Freq. Accuracy	0.1% (10kHz) / 1% (100kHz)
Duty	0 % ~ 100 % (10kHz) / 5% ~ 95% (100kHz)
Duty Resolution	1 %
Duty Accuracy	Error Max : 100nS
SMBUS control	
DC Output	5V
SM DATA	Bidirectional
SM CLK	Bidirectional
BLI measurement (DC)	
Range	0 ~ 20mA
Resolution	15 bits
Accuracy	0.1% reading + 1% F.S.
Analog output (Enable V and Vsave1, 2)	
Channel	
No. of channel	1 for Enable 2 for Vsave
DC level output	
Program level	0 ~ 10V
Resolution	11 bits
Level Accuracy	0.5 % setting + 0.1 % F.S.
Sourcing current	20mA
Analog I measurement (Idc)	
Range	0 ~ 20mA
Resolution	15 bits
Accuracy	0.1% reading + 1% F.S.
Digital I/O	
No. of channel	12 bits For Output 4 bits For Input
Output type	Open collector
Measurement speed	< 30mS
Interface	PCI
Dimension	1 Slot width

All specifications are subject to change without notice.

DMM Card	84904
No. of multiplexer input	20 (1 ch max 200V, others max 60V)
Vdc measurement	
Range	200V/ 60V/ 20V/ 6V/ 2V/ 0.6V/ Auto
Resolution	15 bits
Accuracy	0.05 % + 0.05 % F.S.
Frequency measurement	
Range	10 ~ 10kHz
Resolution	1Hz
Accuracy	0.05 % F.S.
Resistance measurement	
Range	10Ω ~ 2KΩ / 10Ω ~ 20KΩ / Auto
Resolution	1Ω / 0.1Ω
Accuracy	2 % reading + 0.01 % F.S.
Measurement speed	< 50m Sec including relay switching
Measurement type	Single channel and Scan mode
Interface	PCI
Dimension	1 Slot width

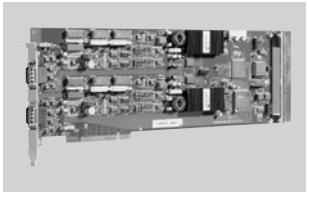
Test Fixture - Standard with HV Relays	
Load Voltage measurement	
Range	100Vpk ~ 5000Vpk
Bandwidth	10k ~ 200kHz
Accuracy	1% + 0.5 % F.S. (10K~200kHz)
Vopen Voltage measurement	
Range	100Vpk ~ 5000Vpk
Bandwidth	10k ~ 200kHz
Accuracy	1.5 % + 0.1 % F.S. (10K~200kHz)
Iac measurement	
Range	0.1mApk ~ 50mApk (Standard Module) , 1mApk ~ 500mApk (High Current Module)
Bandwidth	10k ~ 200kHz
Accuracy	1 % + 0.1 % F.S. (10K~200kHz)
Iin measurement	
Range	0 ~ 0.01A / 0~5A / 0~20A
Accuracy	0.5 % + 0.1 % F.S.
Module Parasitic Capacitance	
H.V.->RTN	Approx. 7.3 pF
Vopen->RTN	Approx. 4.3 pF
Test Fixture - Probe Pin	
Customized Low Parasitic Capacitance (< 2pF/channels) Automatic Tester design upon request.	



Model 8490 for D/A Inverter

ORDERING INFORMATION

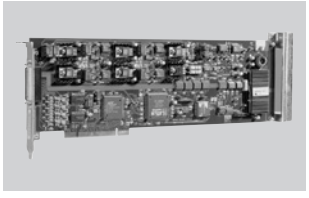
8490 : LCD Inverter ATS
84902 : Measurement Card
84903 : Control Card
84904 : DMM Card
A849005 : 16 Channels Inverter Test Fixture
A849007 : 8 Channels LIPS Test Fixture
A849008 : Control Unit
A849009 : 24 Channels Inverter Test Fixture
A849010 : 8490 software
A849013 : 20 Channels Inverter Automatic Tester
A849015 : PCI Expansion Kit
A849016 : 24 Channels Inverter Automatic Tester
A849018 : AC to DC Interconnecting Box
6011 / 80611 : Timing / Noise Analyzer
6011N / 80611N : Timing / Noise Module
6012 / 80612 : Short Circuit/OVP Tester
6013 / 80613 : ON / OFF Controller
DC Load Module : Refer to Model 6310A, 6330A, 63200 series
Power Analyzer : Refer to Model 6630, 6632
Digital Power Meter : Refer to Model 66200 series
AC Source : Refer to Model 6400, 6500, 61500, 61600 series
DC Source : Refer to Model 62000H, 62000P series



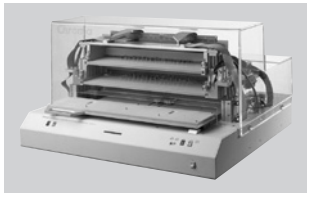
84902 :
Measurement Card



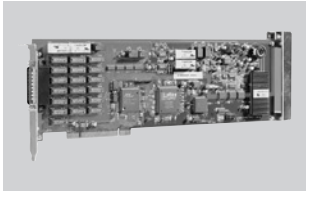
A849005 :
16 Channels Inverter Test Fixture



84903 : Control Card



A849013 : 20 Channels Inverter Automatic Tester
* **Patent Number :** KR PAT. 0425358 (China Patent : 200620112883.6)



84904 : DMM Card



A849016 : 24 Channels Inverter Automatic Tester



A849018 : AC to DC Interconnecting Box



KEY FEATURES

- For LED Power Driver testing
- Capable to test Multi-UUT/Multi-output concurrently that improve productivity
- Provide optimized standard test items for the Unit Under Test (LED Power Driver) to deliver excellent test performance
- Open architecture software
  - Expandable hardware support
  - Support instrument with GPIB/RS-232/RS-485/I²C interface
  - User editable test library
  - User editable test programs
  - User editable reports
  - Statistical report
  - On-line Softpanel
  - User authority control
  - Release control
  - Activity log
  - Support bar code reader
- Windows 98/2000/NT/XP or higher based software

Chroma 8491 LED Power Driver ATS is the ultimate test system for LED Power Driver. It is able to test Multi-UUT/Multi-output concurrently improving productivity significantly. The hardware devices available for selection include AC/DC Power Supply, Power Meter, PCI interface function card, Transducer Unit and the industries first LED Load simulator for simulating LED loading with 6330A series Electronic Loads.

The PCI interface function card - LED Power Driver Measurement Card & Control Card, they measure Dimming Current / Frequency / Duty & provide BL control signal(DC level, PWM, SM BUS), and Enable ON/OFF signal. Furthermore the Timing / Noise Card is using in Ripple Current measurement at 20MHz bandwidth.

USB GPIB RS-232 CE PFC

The Chroma 8491 ATS is equipped with optimized standard test items for LED power driver testing. The user is only required to define the test conditions and specifications for the standard test items to perform the test.

Chroma 8491 ATS software runs under the user friendly Windows 98/2000/NT/XP operating environment, providing the test engineer a dedicated LED Power Driver testing system with easy access to Windows resources.

OPTIMIZED TEST ITEMS

OUTPUT PERFORMANCES

1. Output Voltage
2. Output Current
3. Ripple Current (RMS & p-p)
4. Dimming Current
5. Dimming Frequency
6. Dimming Duty
7. Efficiency
8. In-test adjustment
9. Turn ON Overshoot Current

INPUT CHARACTERISTICS

10. Input Inrush Current
11. Input RMS Current
12. Input Peak Current
13. Input Power
14. Current Harmonics
15. Input Power Factor
16. Input Voltage Ramp
17. Input Freq. Ramp
18. AC Cycle Drop Out
19. PLD Simulation

REGULATION TESTS

20. Current Regulation
21. Voltage Regulation
22. Total Regulation

TIMING & TRANSIENT

23. Turn ON Time
24. Hold Up Time
25. Rise Time
26. Fall Time

PROTECTION TESTS

27. Short Circuit
28. OV Protection
29. OL Protection *
30. OP Protection *

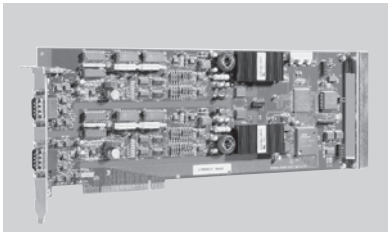
SPECIAL TESTS

31. GPIB Read/Write
32. RS-232 Read/Write

* If UUT is constant voltage output

ORDERING INFORMATION

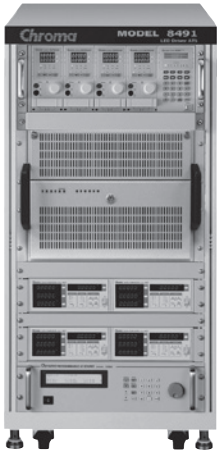
8491 : LED Power Driver ATS
A849008 : Control Unit
84911 : LED Power Driver Measurement Card
84903 : Control Card
A849101 : Transducer Unit
A849102 : Transducer Module 400mA/500V
A849103 : Transducer Module 1600mA/500V
A849104 : Transducer Module 20A/500V
6011 / 80611 : Timing / Noise Analyzer
6011N / 80611N : Timing / Noise Module
6012 / 80612 : Short Circuit/OVP Tester
6013 / 80613 : ON / OFF Controller
DC Load Module : Refer to Model 6310A, 6330A Series
Digital Power Meter : Refer to Model 66200 Series
AC Source : Refer to Model 6500, 61500, 61600 Series
DC Source : Refer to Model 62000P Series



84911 : LED Power Driver Measurement Card



A849101 : Transducer Unit



8491 : LED Power Driver ATS

All specifications are subject to change without notice.

SPECIFICATIONS-1

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	512MB or higher
Hard drive	8.3GB or higher
CD-ROM	40X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
System I/O	DIO Card
GPIB board	NI-PCI GPIB Card

* Please refer to respective product catalogs for detail specifications.

DC Source	
Model	**62000P series**
Power rating	600, 1200, 2400, 5000W
Voltage range	0-100V/600V
Programmable current limit	Yes
Programmable OV point	Yes
Analog programming	Yes
Remote sensing	Yes
Line-drop compensation	5V

Electronic Load	
Model	**6310A/6330A series**
Load mode	CC/CR/CV
Power rating	30-1200W
Voltage range	1-500V
Current range	Up to 240A
Slew rate	Up to 10A/μs
Measurements	Voltage/Current/Power
Monitoring output	No
Current share measurement	No
Noise measurement	No
Voltage sense input	Yes

* Please refer to respective product catalogs for detail specifications.

Timing/Noise Analyzer		
Model	**6011**	**80611**
NO. of input module	Up to 10	Up to 10
Noise measurement range	2V/0.4V	2V/0.4V
Low Pass Filter	Up to 20MHz	Up to 20MHz
Input circuit	Differential input	Differential input
Timing range	0-64 second	0-64 second
NO. of trigger input	4 sets	6 sets
NO. of comparator	2 Input module	4 Input module
Controllable TTL bits	16 output	16 output / 16 input
Controllable floating relay	6	8
NO. of multiplex input	10	10
NO. of multiplex output	2 for DMM &. 2 for DSO	1 for DMM

Short Circuit/OVP Tester		
Model	**6012**	**80612**
NO. of input terminal	Up to 6	Up to 6
Short circuit impedance	< 0.1 ohm	< 0.05 ohm
Short current measurement	Yes	Yes
Sync. Signal for short circuit	6 relay signal	6 relay signal
OVP/UVP testing	Internal / External	Internal / External
Internal impedance range	1K-1M ohm	100-1M ohm
External OVP/UVP source	DC source	DC source
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

ON/OFF Controller		
Model	**6013**	**80613**
Input	AC/DC	AC/DC
ON/OFF range - AC	0-360 deg	0-360 deg
Voltage range - AC	250V	277V
Current range - AC	30A	30A
Voltage range - DC	200V	200V
Current range - DC	40A	60A
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485

Power Meter		
Model	**66201**	**66202**
NO. of input module	1	1
Power measurement range	12 ranges	24 ranges
Voltage measurement range	3 ranges	3 ranges
Current measurement range	4 ranges	8 ranges
Front panel display	Yes	Yes
Front panel editable	Yes	Yes
Harmonics measurement	No	Yes
Flicker measurement	No	No
Waveform measurement	No	Yes
Build-in regulation limit	No	No

* Please refer to respective product catalogs for detail specifications.

AC Source			
Model	**6500 series**	**61500 series**	**61600 series**
Power rating	1200-9000VA	500-18000VA	500-18000VA
Voltage range	0-300V	0-300V	0-300V
Output phase	1 or 3 phase	1 or 3 phase	1 or 3 phase
DC output	No	Yes	Yes
Output measurement	Yes	Yes	Yes
Harmonic measurement	No	Yes	No
Waveform simulation	Yes	Yes	No
Programmable impedance	No	Yes	No
Harmonic synthesis	Yes	Yes	No
Inter-harmonic synthesis	No	Yes	No

* Please refer to respective product catalogs for detail specifications.

All specifications are subject to change without notice.

• Continued on next page ➡

SPECIFICATIONS-2

Transducer Unit		A849101
No. of slot		8
Input Voltage Range		95~240 Vac @ 50 / 60Hz
Dimension (HxWxD)		221.5 x 450 x 500 mm / 8.72 x 17.72 x 19.69 inch

Transducer Module 400mA/500V		A849102
Input		
Vrms	Range	0~80V / 0~500V
	Bandwidth	200 KHz @ -3dB
	Accuracy	0.3%+0.2%F.S.
Irms	Range	0~100mA / 0~200mA / 0~400mA
	Bandwidth	200KHz @ -3dB
	Accuracy	0.5%+0.5%F.S.
Ripple Current(rms & p-p)	Range	0~50mAp-p / 0~100mAp-p / 0~150mAp-p
	Bandwidth	20MHz @ -3dB
	Accuracy	0.5%+0.5%F.S.
Voltage Ripple/Noise (rms & p-p)	Range	2.5Vp-p / 20Vp-p
	Bandwidth	20MHz @ -3dB
	Accuracy	1% F.S.
-3dB Tolerance		±1dB
Output		
9 Pin D-sub(to 84911 M card)	Range	4Vpk
BNC(to 80611N card)	Range	2Vp-p

Transducer Module 1600mA/500V		A849103
Input		
Vrms	Range	0~80V / 0~500V
	Bandwidth	200KHz @ -3dB
	Accuracy	0.3%+0.2%F.S.
Irms	Range	0~400mA / 0~800mA / 0~1600mA
	Bandwidth	200KHz @ -3dB
	Accuracy	0.5%+0.5%F.S.
Ripple Current (rms & p-p)	Range	0~100mAp-p / 0~400mAp-p / 0~800mAp-p
	Bandwidth	20MHz @ -3dB
	Accuracy	0.5%+0.5%F.S.
Voltage Ripple/Noise (rms & p-p)	Range	2.5Vp-p / 20Vp-p
	Bandwidth	20MHz @ -3dB
	Accuracy	1% F.S.
-3dB Tolerance		±1dB
Output		
9 Pin D-sub(to 84911 M card)	Range	4Vpk
BNC(to 80611N card)	Range	2Vp-p

A849104 Transducer Module 20A/500V		A849104
Input		
Vrms	Range	0~80V / 0~500V
	Bandwidth	200KHz @ -3dB
	Accuracy	0.3%+0.2%F.S.
Irms	Range	0~5A / 0~10A / 0~20A
	Bandwidth	200KHz @ -3dB
	Accuracy	0.5%+0.5%F.S.
Ripple Current(rms & p-p)	Range	0~1.25Ap-p / 0~5Ap-p / 0~10Ap-p
	Bandwidth	20MHz @ -3dB
	Accuracy	0.5%+30mA@5A, 0.5%+60mA@10A/20A
Voltage Ripple/Noise(rms & p-p)	Range	2.5Vp-p / 20Vp-p
	Bandwidth	20MHz @ -3dB
	Accuracy	1%F.S.
-3dB Tolerance		±1dB
Output		
9 Pin D-sub(to 84911 M card)	Range	4Vpk
BNC(to 80611N card)	Range	2Vp-p

All specifications are subject to change without notice.

SPECIFICATIONS-3

LED Driver Measurement Card	84911
Vac measurement	
Input Voltage	4Vpk max.
Vpk+ / Vpk- / Vpp measurement	
Range	4Vpk
Bandwidth	10k-200kHz
Resolution	14bits
Accuracy	0.5%+0.5%F.S.(100-100kHz) 1%+0.5%F.S.(100K-200kHz)
Vrms measurement	
Range	4Vrms~2Vrms / 2Vrms~1Vrms / 1Vrms~0.5Vrms
Bandwidth	10k-200kHz
Resolution	14bits
Accuracy	1%+0.2%F.S.(100-100kHz) 1.5%+0.2%F.S.(100K-200kHz)
Iac measurement	
Input Voltage	4Vpk max.
Ipk+ / Ipk- / Ipp measurement	
Range	4Vpk
Bandwidth	10k-200kHz
Resolution	14bits
Accuracy	0.5%+0.5%F.S.(100-100kHz) 1%+0.5%F.S.(100K-200kHz)
Irms measurement	
Range	4Vrms~2Vrms / 2Vrms~1Vrms / 1Vrms~0.5Vrms 0.5Vrms~0.25Vrms / 0.25Vrms~0.125Vrms / 0.125Vrms~0.06Vrms
Bandwidth	10K-200KHz
Resolution	14bits
Accuracy	1%+0.2%F.S.(10K-100kHz) 1.5%+0.2%F.S.(100K-200kHz)
Pac measurement	
Range	V range x I range
Bandwidth	10K-200KHz
Resolution	14bit
Accuracy	1%+0.2%F.S.(10K-100kHz) 2%+0.3%F.S.(100K-200kHz)
Frequency measurement	
Range	10Hz-35KHz
Resolution	1Hz
Accuracy	0.1%reading
Input	Via voltage/current input
Timing measurement	
Trigger input	External x1(AC ON/Enable, A849101) and Vmeasurement input and Imeasurement input
Trigger level	
Range	5% ~ 95%F.S.
Resolution	2mV for voltage / 2mV for current
Accuracy	1%setting
Timing measure	
Resolution	0.01uS / 0.1mS
Accuracy	0.1uS / 1mS
Timing range	65uS / 650msec
Burst Mode measurement	
Frequency	
Range	10Hz-35KHz
Resolution	0.1Hz
Accuracy	0.1%reading
Duty(Ton)	
Range	3us-90ms
Resolution	1us
Accuracy	Error Max : 1us
Measurement speed	<10mS
Interface	PCI
Dimension	1 Slot width

Passive Component Test Solution

Selection Guides 13-1

LCR Meter/Automatic Transformer Test System 13-3

Electrolytic Capacitor Analyzer 13-15

Programmable HF AC Tester 13-19

Milliohm Meter 13-21

Component Test Scanner 13-23

Automatic Test System 13-24

Options of Passive Component Test Instruments 13-31

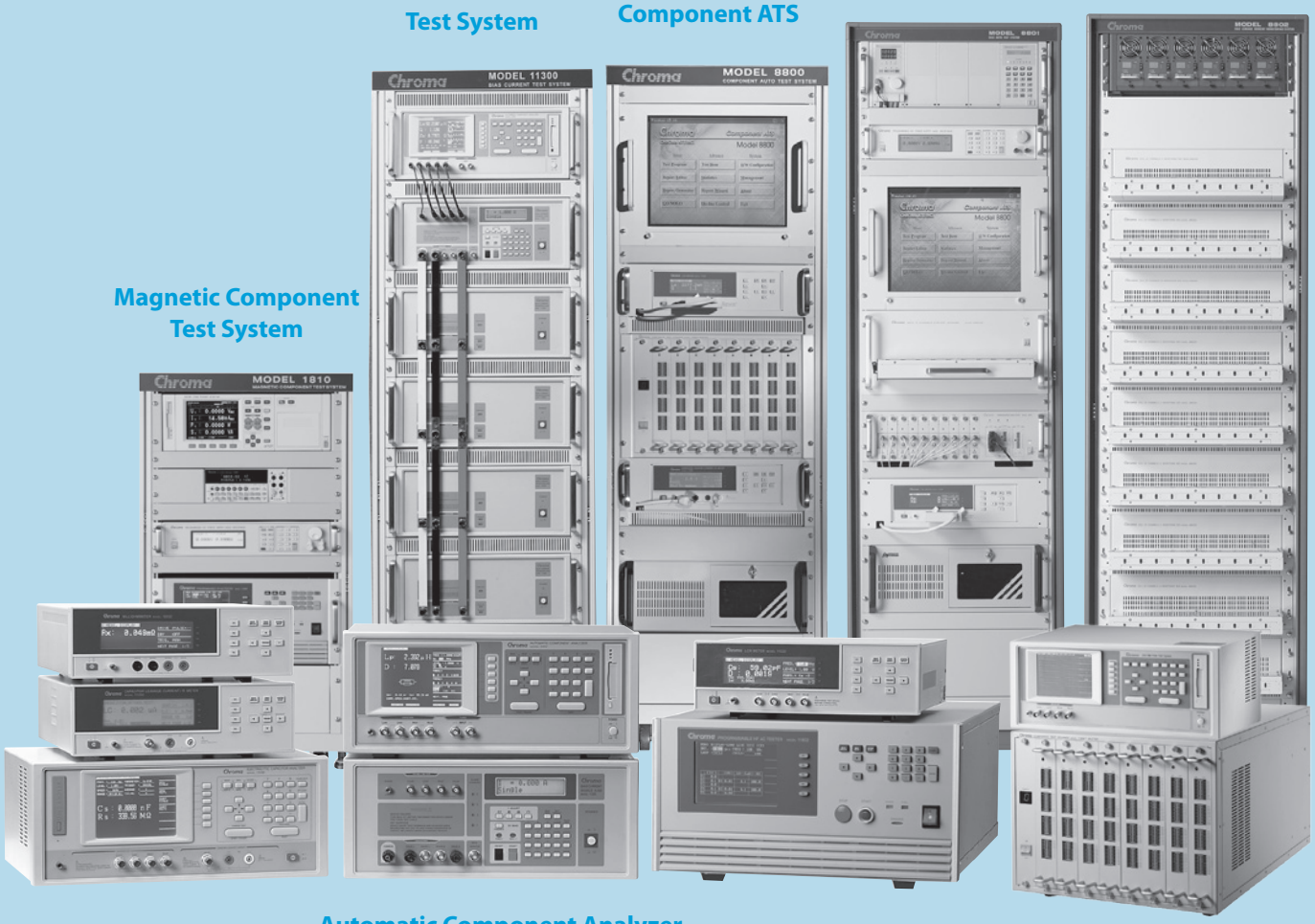
Bias Current Test System

Component ATS

EDLC ATS

EDLC LC Monitoring System

Magnetic Component Test System



Milliohm Meter
Capacitor Leakage Current/IR Meter
Electrolytic Capacitor Analyzer

Automatic Component Analyzer
Bias Current Source

LCR Meter
Programmable HF AC Tester

Component Test Scanner



Automatic Transformer Tester

Selection Guides

LCR Meter Selection Guide

Model	Frequency Range	Impedance Range	Description	Page
11020	100Hz, 120Hz, 1kHz	0.1pF ~ 4.00 F	High speed capacitance inspection	**13-6**
11021	100Hz, 120Hz, 1kHz, 10kHz	0.1mΩ ~ 100MΩ	Digital bin-sorting and comparator functions, up to 1kHz only optional	**13-3**
11021-L	1kHz, 10kHz, 40kHz, 50kHz	0.1mΩ ~ 100MΩ	Digital bin-sorting and comparator functions	**13-3**
11022	50/60/100/120/1k/10k/ 20k/40k/50k/100k Hz	0.01mΩ ~ 100MΩ	Digital high speed measurement in all test frequencies, excellent low-impedance measurement accuracy, bin-sorting and comparator functions	**13-4**
11025	50/60/100/120/1k/10k/ 20k/40k/50k/100k Hz	0.01mΩ ~ 100MΩ	Identical Model 11022, and add transformer testing function	**13-4**
1061A	40Hz~200kHz, 30 points	0.01mΩ ~ 100MΩ	Economical type, medium frequency, excellent low impedance measurement accuracy	**13-5**
1062A	40Hz~200kHz, 30 points	0.01mΩ ~ 100MΩ	Excellent low impedance measurement accuracy and comparator function	**13-5**
1075	20Hz~200kHz	0.01mΩ ~ 100MΩ	Excellent low impedance measurement accuracy and bin-sorting function	**13-5**
3252	20Hz~200kHz	0.1mΩ ~ 100MΩ	LCR + transformer testing and frequency characteristics analysis function Built-in 1A/8mA bias current source optional	**13-9**
3302	20Hz~1MHz	0.1mΩ ~ 100MΩ	Identical Model 3252 1MHz edition	**13-9**

Auto Transformer Test System Selection Guide

Model	Frequency Range	Impedance Range	Description	Page
13350 + A133502 (New)	20Hz ~ 200kHz	0.1mΩ ~ 100MΩ	Transformer L/C/Z/DCR/Turns-ratio/Pin-short/ Balance scanning test function	**13-7**
3250 + A132501	20Hz ~ 200kHz	0.1mΩ ~ 100MΩ	Transformer L/C/Z/DCR/Turns-ratio/Pin-short/ Balance scanning test function	**13-9**
3250 + A132501	20Hz ~ 200kHz	0.1mΩ ~ 100MΩ	Transformer L/C/Z/DCR/Turns-ratio/Pin-short/ Balance scanning test function	**13-9**
3252 + A132501	20Hz ~ 200kHz	0.1mΩ ~ 100MΩ	Identical Model 3250 and add LCR Meter function	**13-9**
3302 + A132501	20Hz ~ 1MHz	0.1mΩ ~ 100MΩ	Identical Model 3252 1MHz edition	**13-9**
3312 + A132501	20Hz ~ 1MHz	0.1mΩ ~ 100MΩ	Identical Model 3302 and add Telecom parameter measurement function	**13-11**

Bias Current Source / Test System Selection Guide

Model	Frequency Range	Impedance Range	Description	Page
1310	20Hz ~ 200kHz	0~10A	Economic type	**13-13**
1320	20Hz ~ 1MHz	0~20A	Programmable, and also can be controlled by Chroma 3252/3302 combined with Chroma 1320 to extend drive current	**13-13**
1320S	20Hz ~ 1MHz	0~20A	Slave (1320)	**13-13**
1320-10A	20Hz ~ 1MHz	0~10A	Identical 1320 10A edition, mainly used in PFC choke testing which higher DC resistance and the DC voltage dropped exceeds 6V	**13-13**
11300	20Hz~1MHz	0~100A	Intergration of 1320S with LCR Meter for large bias current testing of power choke	**13-14**

Electrolytic Capacitor Tester Selection Guide

Model	Primary Function	Test Signal	Description	Page
11800	Ripple current tester	100Hz/120Hz/400Hz/1kHz, 0~30A DC Bias 0.5V~500V	For load life testing of electrolytic capacitor which used in power line rectifier	**13-17**
11801	Ripple current tester	20k~100kHz, 0~10A, DC Bias 0~500V	For load life testing of electrolytic capacitor which used in SMPS output filter	**13-17**
11810 (New)	Ripple current tester	20k~1000kHz, 0~10A, DC Bias 0~500V	For load life testing of high frequency MLCC, OS-CON, polymer capacitor that used by DC to DC converter	**13-17**
11200	Capacitor leakage current / IR meter	1.0~650V/800V, CC 0.5~500mA	For electrolytic capacitor leakage current and aluminum-foil W.V. testing	**13-18**
13100	Electrolytic capacitor analyzer	AC 100Hz/120Hz/1KHz/10kHz/ 20kHz/50kHz/100kHz, 1V/0.25V	For high and low frequency electrolytic capacitor I.Q.C.,F.Q.C. multi-parameter scanning testing (C/D/Z/ESR/LC)	**13-15**

Component Test Scanner Selection Guide

Model	Primary Function	Option	Description	Page
13001	Scanner	A130007 40 channels scan module	For RJ-45 equipment, glass substrate, LCD glass substrate, printed circuit glass, PCB, EMI filter, ICT application. It could combined with Chroma 8800 Component ATE for process control and data collection	**13-23**

All specifications are subject to change without notice.

Milliohm Meter Selection Guide

Model	Primary Function	Test Range	Description	Page
16502	DC, Pulsed	0.001mΩ~2MΩ	Digital milliohm meter with bin-sorting, comparator function, reduce thermal EMF affection	**13-21**

HF AC Tester Selection Guide

Model	Primary Function	Option	Application Description	Page
11802	HF, HV, CV	A118031 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max A118017 HF HV 8kV/100kHz max	LCD inverter transformer (ceramic capacitor, cable, PCB) load life / withstanding voltage / breakdown voltage test	**13-19**
			EEFI, backlight load life / lamp current test	
			SMPS main transformer and active PFC choke load life test and electrical analysis	
			Medical equipment high frequency leakage current safety inspection	
			Automobile motor corona discharge inspection, analysis and production line	
	HF, HV, CV	Step-up current test module + specified resonant inductor/ capacitor	Ballast capacitor / inductor ignition voltage load life test	
	HF, HI, CC, Bias voltage	Ripple Voltage Test Module Chroma 11200 CLC / IR Meter (for DC voltage source with discharge function)	Snubber capacitor load life test	
	HF, CV, Bias current Temperature meter	Step-up current test module + AC/DC coupling test fixture Chroma DC power supply (for DC bias current) Chroma 12061 Digital Multimeter (for temperature measurement)	DC-DC converter SMD power choke temperature rising test (DC Bias current with AC ripple voltage) and electrical analysis	
	HF, HV, CV (or + DC source)	HF HV test module Option Chroma DC source*3	Function as HF HV AC +DC power source for FFI and SED device analysis	
11803 (New)	HF, CV, Bias current Temperature meter	Step-up current test module + AC/DC coupling test fixture Chroma DC power supply (for DC bias current) Chroma 12061 Digital Multimeter (for temperature measurement)	DC-DC converter SMD power choke temperature rising test (DC Bias current with AC ripple voltage) and electrical analysis	**13-19**
11805	HF, HI, Bias voltage	A118015 HF, HI 33V/30A max.	Snubber capacitor load life test	**13-19**
	HF, HV	A118018 HF, HV 1kV/1A max.	High voltage capacitor load life test	
11890	HF, HV, CV	A118031 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max	LCD inverter transformer(ceramic capacitor, cable, PCB) withstanding voltage test for production line	**13-19**
			Medical equipment high frequency leakage current safety inspection	
			Automobile motor corona discharge inspection for production line	
11891	HF, HV, CV	A118031 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max	Passive Component (inverter transformer, ceramic capacitor, cable, PCB etc.)	**13-19**
			High Frequency and High Voltage Load Life Test	

Automatic Test System Selection Guide

Model	Primary Function	Test Signal	Description	Page
1810 (New)	Magnetic Component Test System	DC Bias Current 60A max. HF AC Voltage 20kHZ~1MHZ	Power choke, Low Inductance Inductor	**13-24**
8800	Component ATS	L/C/R/Z/DCR/Turns-ratio/ Insulation Resistance (IR)	For RJ-45 equipment (including LAN Modules, Ethernet IC, PoE IC, etc.), glass substrate, LCD glass substrate, printed circuit glass (including touch panel, etc), PCB, EMI filter and ICT applications	**13-25**
8801	EDLC ATS	C (DC), internal resistance (DC), ESR (AC)	For Electrical Double Layer Capacitor on production lines	**13-27**
8802	EDLC LC Monitoring System	Leakage Current (LC)	For Electrical Double Layer Capacitor on production lines	**13-29**



GPIB HANDLER RS-232 CE

KEY FEATURES

- Test frequencies:
  100Hz, 120Hz, 1kHz and 10kHz (9.6kHz) (11021)
  1kHz, 10kHz, 40kHz, 50kHz (11021-L)
- Basic accuracy: 0.1% (11021), 0.2% (11021-L)
- 0.1mΩ~99.99 MΩ measurement range, 4 1/2 digits resolution
- Lower harmonic-distortion affection
- Fast measurement speed (75ms)
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Programmable trigger delay time is convenient for measurement timing adjustment in automatic production
- Bin-sorting function
- Comparator and pass/fail alarming beeper function
- Text mode 40x4 matrixes LCD display
- Friendly user interface
- Open/short zeroing
- On-line fireware refreshable (via RS-232)
- Input protection (1 Joule)

The Chroma 11021/11021-L LCR Meter are the most cost-effective digital LCR Meter, provides 100Hz, 120Hz, 1kHz, and 10kHz test frequencies for the 11021 and 1kHz, 10kHz, 40kHz, 50kHz test frequencies for the 11021-L. Standard RS-232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the Chroma 11021/11021-L can be used for both component evaluation on the production line and fundamental impedance testing for bench-top applications.

The Chroma 11021/11021-L use lower harmonic-distortion phase-detection technology to reduce affection of measurement accuracy caused by hysteresis distortion in magnetic component or high dielectric-coefficient capacitor measurement, which is not provided in general low-end LCR Meters.

The 11021-L is the ideal selection for high frequency coil, core, choke, and etc. passive components incoming/outgoing material quality inspect and automatic production.

ORDERING INFORMATION

11021 : LCR Meter 1kHz
11021 : LCR Meter 10kHz
11021-L : LCR Meter
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110232 : 4 BNC Test Cable with Clip#18
A110234 : High Frequency Test Cable
A110235 : GPIB & Handler Interface
A110236 : 19" Rack Mounting Kit
A110242 : Battery ESR Test Kit
A133004 : SMD Test Box
A165009 : 4 BNC Test Cable with Probe

SPECIFICATIONS

Model	11021	11021-L
Measurement Parameter		
Primary Display	L, C, R, |Z|	
Secondary Display	Q, D, ESR, Xs, θ	
Test Signals Information		
Test Level	0.25V / 1V , ±(10% + 3 mV)	50mV/ 1V, ±10%+3mV
Test Frequency	100Hz, 120Hz, 1kHz, 10kHz (9.6kHz)	1kHz, 10kHz, 40kHz, 50kHz
Frequency Accuracy	±0.25%	±0.02%
Output Impedance (Typical)	Varies as range resistors 25, 100, 1k, 10k, 100k	
Measurement Display Range		
Primary Parameter	L: 0.01μH ~ 9.999kH, C: 0.01pF ~ 99.99mF, R,|Z|: 0.1m. ~ 99.99MΩ	
Secondary Parameter	Q: 0.1 ~ 9999.9, D: 0.0001 ~ 9999.9, θ : -180.00°~ +180.00°	
Basic Accuracy *1	±0.1%	±0.2%
Measurement Time (1KHz) *2		
Fast	Freq = 1k/10kHz : 75ms Freq = 100/120Hz: 85ms	Freq = 1kHz/10kHz : 75ms Freq = 40kHz : 105ms Freq = 50kHz : 90ms
Medium	145ms	*3
Slow	325ms	*4
Trigger	Internal, Manual, External, BUS	
Display		
L, C, R, |Z|, Q, D, R, θ	40 x 4 (Character Module) LCD Display	
Function		
Correction	Open/Short zeroing	
Equivalent Circuit Mode	Series, Parallel	
Interface & Input/Output		
Interface	RS-232 (Standard), Handler & GPIB (Optional)	
Output Signal	Bin-sorting & HI/GO/LOW judge	
Comparator	Upper/Lower limits in value	
Bin Sorting	8 bin limits in %	
Trigger Delay	0 ~ 9999mS	
General		
Operation Environment	Temperature : 10°C ~ 40°C, Humidity < 90 % R.H.	
Power Consumption	50VA max.	
Power Requirement	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)	100 x 320 x 206.4 mm / 3.94 x 12.6 x 8.13 inch	
Weight	4 kg / 8.81 lbs	

Note*1 : 23±5°C after OPEN and SHORT correction, slow measurement speed. Refer to operation manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge test parameter measurement.
Note*3 : Freq.=1kHz/10kHz 145ms Freq.=40kHz 185ms Freq.=50kHz 150ms
Note*4 : Freq.=1kHz/10kHz 325ms Freq.=40kHz 415ms Freq.=50kHz 400ms

All specifications are subject to change without notice.



KEY FEATURES

- 0.1% basic accuracy
- Transformer test parameters (11025), Turns Ratio, DCR, Mutual Inductance
- 50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz test frequencies
- 21ms measurement time (≧100Hz)
- Agilent 4263B LCR Meter commands compatible
- 4 different output resistance modes selectable for non-linear inductor and capacitor measuring
- High resolution in low impedance(0.01mΩ) and high accuracy 0.3% till 100mΩ range
- Adjustable DC bias current up to 200mA (constant 25Ω) (11025)
- 1320 Bias Current Source directly control capability
- 0.01mΩ ~ 99.99MΩ wide measurement range (4 1/2 digits)
- Dual frequency function (11022 option) for automatic production
- BIAS comparator function
- Comparator function and 8/99 bin-sorting function
- Pass/fail judge result for automatic production
- Handler interface trigger edge (rising/falling) programmable
- Test signal level monitor function
- Standard GPIB, RS-232, and handler interface
- Open/short zeroing, load correction
- LabView® Driver

The Chroma 11022 and 11025 LCR Meters are the measurement instruments for passive components. They are applicable to the automatic manufacturers for passive components in material inspection. With the features of 21ms high-speed measurement and 0.1% accuracy, 11022 LCR Meter fulfills the requirements for fast production. Its functions of 8-level counting, 8/99 Bin-sorting, pass/fail judgment, and 50 sets of internal save and recall settings totally meet the production line requirements for easy operation.

The four impedance output modes can measure the results with the LCR Meters of other brands to get a common measurement standard. Chroma 11025 LCR Meter is compatible with HP 4263B LCR Meter IEEE-488.2 control interface and has three impedance output modes for selection. The measurement results can also be compared with other brand of LCR Meters. Chroma11022/11025 is the ideal selection for passive components quality assurance and automatic production.

GPIB HANDLER RS-232 CE

ORDERING INFORMATION

11022 : LCR Meter
11025 : LCR Meter
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110232 : 4 BNC Test Cable with Clip#18
A110234 : High Frequency Test Cable
A110236 : 19" Rack Mounting Kit
A110239 : 4 Terminals SMD Electrical Capacitor Test Box (Patent)
A110242 : Battery ESR Test Kit
A110244 : High Capacitance Capacitor Test Fixture
A110245 : Ring Core Test Fixture
A113012 : Vacuum Generator for A132574
A113014 : Vacuum Pump for A132574
A132574 : Test Fixture for SMD power choke
A133004 : SMD Test Box
A133019 : BNC Test Lead, 2M (single side open)
A165009 : 4 BNC Test Cable with Probe

SPECIFICATIONS

Model	11022	11025
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ	L,C, R,|Z|, Q, D, ESR, X, θ DCR4, M, Turns Ratio, L2, DCR2
Test Signals		
Level	10 mV~1V , step 10 mV; ±(10% + 3 mV)	
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; ±0.01%	
Output Impedance (Nominal Value)	Constant 107 x : 25Ω ; Constant 320 x : 100Ω Constant 106x: 2Ω ,for Z≧10Ω , 100mA (1V setting) for reactive load≦10Ω Constant 102x: 25Ω , for Z<1Ω , 100Ω for else	
DC Bias Current (Freq. ≧ 1kHz)	--	50mA max. for Constant 100Ω 200mA max for Constant 25Ω (AC level ≦ 100mV)
Measurement Display Range		
C (Capacitance)	0.001pF ~ 1.9999F	
L, M, L2 (Inductance)	0.001μH ~ 99.99k	
Z (Impedance), ESR	0.01mΩ ~99.99MΩ	
Q (Quality Factor) D (Distortion Factor)	0.0001 ~ 9999	
θ (Phase Angle)	-180.00° ~ +180.00°	
Turns Ratio (Np:Ns)	--	0.9~999.99
DCR	--	0.01mΩ~99.99MΩ
Basic Measurement Accuracy *1	±0.1%	
Measurement Time (Fast) *2	21ms	
Interface & I/O		
Interface	handler (50pin), GPIB, RS-232	
Output Signal	Bin-sorting & HI/GO/LOW judge	
Comparator	Upper/Lower limits in value	
Bin Sorting	8/99 bin limits in %, ABS	
Trigger Delay	0~9999ms	
Display	240 x 64 dot-matrix LCD display	
Function		
Correction	Open/ Short zeroing, load correction	
Averaging	1~256 programmable	
Cable Length	0m, 1m, 2m, 4m	
Test Sig. Level Monitor	Voltage, Current	
Equivalent Circuit mode	Series, Parallel	
Memory (Store/ Recall)	50 instrument setups	
Trigger	Internal, Manual, External, BUS	
General		
Operation Environment	Temperature : 10°C~40°C Humidity : < 90 % R.H.	
Power Consumption	65VA max	
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)	100 x 320 x 347.25 mm / 3.94 x 12.6 x 13.67 inch	
Weight	5.5 kg / 12.11 lbs	

Note*1 : 23 ± 5°C after OPEN and SHORT correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge of primary and secondary test parameter measurement.



KEY FEATURES

- Test frequency : 20Hz ~ 200kHz, 0.2% programmable test frequency (1075)
- Test frequency : 40Hz ~ 200kHz, 30 Steps (1061A/1062A)
- Basic accuracy : 0.1%
- 3 different output impedance modes, measurement results are compatible with other well-know LCR meters
- High resolution (0.01mΩ) and high accuracy 0.3% till 400mΩ range are the right tool for low inductance
- Large capacitance, and low impedance component measuring
- Single-function keys, clear LED display, easy to operate
- 0.01mΩ~99.999mΩ wide measurement range with 5 digits resolution
- Optional Handler & GPIB interface (1062A/1075)

GPIB HANDLER

- 8 bin sorting and bin sum count function (1075)
- Primary parameter: HI/GO/LO and secondary parameter: GO/NG judge result (1062A)
- Alarm for GO/NG judge result (1062A/1075)
- L/C/R/Z nominal value, upper limit %, lower limit %, Q/D/R/θ limit setting display (1062A)
- 10 bins sorting and bin sum count function (1075)
- Test signal level monitor function

The 1061A/1062A/1075 LCR Meters are the measurement instruments for passive components. They are applicable to the automatic manufacturers for passive components in material inspection and production line. This series of LCR Meters can fully fulfill the fast and accurate requirements for automatic production. The functions of 8-level counting, pass/fail judgment, and 10 sets of internal save and recall settings meet the production line requirements for speed and quality, thus make this series of LCR Metes the best measurement instruments for material and production line inspection for passive components.

ORDERING INFORMATION

1061A : Precision LCR Meter
1062A : Precision LCR Meter
1075 : LCR Meter
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110232 : 4 BNC Test Cable with Clip#18
A110234 : High Frequency Test Cable
A110239 : 4 Terminals SMD Electrical Capacitor Test Box (Patent)
A110601 : GPIB & handler Interface for Model 1062A/1075
A133004 : SMD Test Box
A165009 : 4 BNC Test Cable with Probe



Model 1062A

Model 1075

SPECIFICATIONS

Model	1061A	1062A	1075
Measurement Parameter			
Primary Display	L, C, R, Z	L,C,R, Z, Δ%	L, C, R, ZΔ, Δ%
Secondary Display	Q, D, ESR, θ		
Test Signals Information			
Test Level	10mV~2.5V(non-106x mode),10mV/step		
Test Frequency	40 Hz~200 kHz, 30 steps		20 Hz~200 kHz, programmable
Frequency Accuracy	±0.01%		
Output Impedance(Typical)	Constant = 0 : Varies as range resistors; Constant = 1 : 25Ω ±5% Constant = 2 : 100Ω ±5% ; Constant = 3 : 2Ω , for impedance ≧ 10Ω ; 100mA (1V setting), for inductive load ≦ 10Ω		
Measurement Display Range			
Primary Parameter	R, |Z| : 0. 01mΩ~9999.9MΩ , L: 0.0001μH~9999.9H, C: 0.0001pF~9999.9mF		
Secondary Parameter	Q,D: 0.0001~9999, θ : -90.00°~+90.00°, ESR: 0.01mΩ~9999kΩ , Δ% : 0.0001%~999.99%		
Basic Accuracy *1	±0.1%		
Measurement Time (Fast) *2			
Frequency ≧ 1kHz	55 ms		
Frequency =120Hz	115 ms		
Frequency =100Hz	130 ms		
Trigger	Internal	Internal, External, Manual	
Display	L, C, R, |Z| : 5 digits Q, D, R, θ : 4 digits Freq./Voltage/Current : 3 digits	L, C, R, |Z| : 5 digits Q, D, R, θ : 4 digits Freq./Voltage/Current : 3 digits D/Q Limit : 5 digits	L, C, R, |Z| : 5 digits Q, D, R, θ : 4 digits Freq./Voltage/Current : 3 digits Bin No./Range : 1 digits
Function			
Correction	Open/Short Zeroing		Open/Short zeroing, Load
Equivalent Circuit Mode	Series, Parallel		
Interface & Input/Output			
Interface	GPIB	GPIB, Handler (24 pin)	GPIB ,Handler (24 pin)
Output Signal	--	Pass/Fail identification	Sorting Signal
Comparator	--	Upper limit/ Lower limit(%) setting	--
Bin Sorting	--	--	8 bin sorting (%)
Memory	1 set	1 set	10 set
General			
Operation Environment	Temperature : 10°C ~ 40°C, Humidity : < 90 % R.H.		
Power Consumption	55VA max.		
Power Requirement	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz		
Dimension (H x W x D)	102 x 272 x 350 mm / 4.02 x 10.71 x 13.78 inch	130 x 410 x 353 mm / 5.12 x 16.14 x 13.9 inch	
Weight	5.5 kg / 12.11 lbs	6.2 kg / 13.66 lbs	

Note*1 : The specification of accuracy is under the following conditions:
1) Warm up time: >10 min. **2)** Environment temperature : 23±5°C **3)** OPEN/SHORT offset modification completed **4)** D < 0.1
Note*2 : Measurement time includes all of the time for UUT measurement, calculation and primary/secondary parameters identification.

All specifications are subject to change without notice.



KEY FEATURES

- Test frequencies: 100Hz, 120Hz, 1kHz
- Basic accuracy: 0.1%
- High measurement speed: 5ms in 1kHz, 15ms in 100Hz/120Hz
- Large LCD display (240x64 dot-matrix)
- Wide measurement range: 0.1pF ~ 3.999F
- Standard Handler interface
- Comparator and pass/fail alarming beeper function
- Setups backup function

HANDLER CE

The Chroma 11020 Capacitance Meter is a high-speed precision Capacitance Meter. Provides 100Hz, 120Hz, and 1kHz test frequencies. Measurement time is only 5 milliseconds in 1kHz, and less than 15 milliseconds in 100Hz and 120Hz test frequencies. Combine with 0.1% basic accuracy and standard Handler interface, enable the Chroma 11020 can be used on high speed production line for various capacitors.

ORDERING INFORMATION

11020 : Capacitance Meter
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110234 : High Frequency Test Cable
A110236 : 19" Rack Mounting Kit
A110239 : 4 Terminals SMD Electrical Capacitor Test Box (Patent)
A110244 : High Capacitance Capacitor Test Fixture
A133004 : SMD Test Box

SPECIFICATIONS	
Model	**11020**
Test Parameter	Capacitance, Dissipation factor
Test Signals	
Test Level	1V(10% + 3mV)
Test Frequency	100Hz, 120Hz, 1kHz
Output Impedance	Varies as range resistors
Measurement Range	
C	0.1pF~3.999F(100Hz, 120Hz), 0.01pF~399.9μF(1kHz)
Basic Accuracy *1	±0.1%
Measurement Speed(Fast) *2	
C, Frequency ≧1kHz	5ms
C, Frequency =100Hz, 120Hz	15ms
D factor measurement	2ms
Trigger	Internal, External
Equivalent Circuit Mode	Series, Parallel
Interface&Input/Output	
Interface	Handler (24pin)
Output Signal	HI/GO/LO judge (Capacitor),GO/NG judge (D factor)
Comparator	Upper/Lower limits(%, ABS)
Display	240x64 dot-matrix LCD display
Correction Function	Zeroing
Averaging	1, 2, 4, 8, 16, 32, 64
Memory	1 instrument setups
General	
Operation Environment	Temperature:10˚C ~ 40˚C, Humidity : < 90 % RH
Power Consumption	65VA max.
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)	100 x 320 x 347.25 mm / 3.94 x 12.6 x 13.67 inch
Weight	5.5 kg / 12.11 lbs

Note*1 : The specification of accuracy is under the following conditions :
1) Warm up time : >10 min. **2)** Environment temperature : 23±5˚C **3)** OPEN/SHORT offset modification completed
Note*2 : Measurement time includes all of the time for UUT measurement, calculation and primary/secondary parameters identification.



KEY FUNCTIONS

- Test frequency 20Hz ~ 200kHz
- Turn Ratio, Phase, L, Q, Lk, ACR, DCR, Cp, Pin short, Balance
- Basic accuracy : 0.1%
- Three different output impedance modes
- Scan unit/box including :
  - 20ch scan test unit
  - 80ch* scan box
  - C.T.* test fixture

KEY FEATURES

- Compensation for individual channel
- *Combine measurement unit with scanbox to reduce measurement errors
- *USB storage interface
- *10-100 LAN/ USB-H interface (option)
- *Built-in programmable 100mA bias current (RJ-45)
- *Test frequency, voltage and speed set separately
- *Fail Lock function
- *Auto Test function
- *Equipped with external standard test on 20ch scan test unit
- *Reduce the short-circuit loss in secondary side for leakage (Lk) test (A133502 20ch scan unit)
- *Short-circuit pin selectable for every test item
- *Multiple language: English & Simplified Chinese
- *RS232 interface compatible SCPI commands

* New features compared to Chroma 3250 Series

RS-232 GPIB CE

Acquired from many years of marketing experiences and cumulative results, Chroma 13350 is the newest generation of Automatic Transformer Tester that not only retains the merits of old 3250 model but also has many new functions including the combination of measurement unit and scan box to reduce measurement error caused by long wire, C.T. test fixture and 80/20 channels scan box support, USB interface for test conditions back-up, LAN communication interface, separate setting of test frequency/voltage/speed, Fail Lock function and Auto Test. It solves the performance and quality problems as well as human errors occurred on production line for the transformer industry today.

For instance: To reduce human errors on production line, the13350 Fail Lock function is able to lock the defect DUT (Device Under Test) when the test is done to prevent it from flowing out accidently. In order to cut down the time for placement, the 13350 Auto Test function can conduct test directly without pressing the trigger key. In addition, the 13350 adopts the design of dual CPU to increase the test speed by processing the measurement and display units simultaneously.

The compensation function of 13350 can do OPEN/SHORT for individual channel to solve the errors due to different layout on various fixtures.

13350 provides 20Hz-200kHz test frequency and scan test items to cover low voltage test parameters for various transformers including Inductance (L), Leakage (Lk) , Turn-Ratio, DC Resistance (DCR), Impedance (Z), Stray Capacity (C), Quality Factor (Q), Equivalent Series Resistance (ESR), Pin Short (PS), Winding Phase (PH) and Balance.

Applicable Test Options for Selection

A133502 20 Channels Scan Box

13350 uses split screen that allows the measurement unit to integrate the 20 channels scan box without using any connecting wires to reduce measurement errors. Furthermore, the 20 channels scan box has external standard test function that can perform verification test directly without any act of disassembly.

A133505 80 Channels Scan Box

13350 along with 80 channels scan box can mainly offer three different applications:

1) RJ-45 & LAN Filter test solution that can test up to 80 pins one time.
2) Transformer automation solution that can place 4 transformers on one carrier for scan test simultaneously.
3) Island-type production line planning that provides a time division multiplexing module to increase the equipment utilization rate.

A133506 C.T. (Current Transformer) Test Fixture

When the 13350 works with A133506 C.T. Test Fixture, it can measure the turns, inductance and DC resistance easily and rapidly by putting in the C.T. directly.

ORDERING INFORMATION

13350D : Automatic Transformer Tester - Display Unit
13350M-200k : Automatic Transformer Tester - Measurement Unit
A133502 : 20CH Scanning Box
A133505 : 80CH Scanning Box
A133507 : Connecting Conversion Unit (I/F of 80CH scan box / provide I/O control interface/1320 DC bias cable link / BNC terminals)
A133509 : GPIB Interface
A133510 : LAN & USB-H Interface



Model 13350 with A133505,A133507

All specifications are subject to change without notice.

SPECIFICATIONS		
Model		**13350**
Main Function		Transformer Scanning Test
Test Parameter		
Transformer Scanning		Turn Ratio, Phase, Turn, L, Q, Leakage L, Balance, ACR, Cp, DCR, Pin Short
Test Signals Information		
Test Level	Turn	10mV~10V, ±10% 10mV/step
	Others	10mV~2V, ±10% 10mV/step
Test Frequency	Turn	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution: 0.01Hz
	Others	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution : 0.001Hz (<1kHz)
Output Impedance	Turn	10Ω, when level≦2V / 50Ω, when level > 2V
	Others	Constant = OFF : Varies as range resistors Constant = 320X : 100Ω ±5% ; Constant = 107X : 25Ω ±5% Constant=106X : 100mA ±5% (1V setting); for inductive load less than 10Ω,10Ω ±10%, for impedance ≧10Ω
Measurement Display Range		
L, LK		0.00001μH~9999.99H
C		0.001pF~999.999mF
Q, D		0.00001~99999
Z, X, R		0.0001Ω~999.999MΩ
θ		-90.00°~ +90.00°
DCR		0.01mΩ~99.999MΩ
Turn,Ratio		0.01~99999.99 turns (Secondary voltage less than 100 Vrms)
Ratio (dB)		-39.99dB~+99.99dB (secondary voltage less than 100 Vrms)
Pin-Short		11 pairs, between pin to pin
Basic Accuracy		
L, LK, C, Z, X, Y, R, DCR		±0.1% (1kHz if AC parameter)
DCR		±0.5%
θ		±0.04°(1kHz)
Turn, Ratio (dB)		±0.5% (1kHz)
Measurement Speed (Fast)		
L, LK, C, Z, X, Y, R, Q, D, θ		50 meas./sec.
DCR		12 meas./sec.
Turn, Ratio (dB)		10meas./sec.
Judge		
Transformer Scanning		PASS/FAIL judge of all test parameters output from Handler interface, 100 bin sorting for Lk
Trigger		Internal, Manual, External
Display		Color 640x480 LCD panel
Equivalent Circuit Mode		Series, Parallel
Correction Function		Open/Short Zeroing, Load correction
Memory		15 instrument setups, expansion is possible via memory card
General		
Operation Environment		Temperature:10°C~40°C, Humidity: 10%~90% RH
Power Consumption		60 VA max.
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz (Auto Switch)
Dimension (H x W x D)		13350M : 58 x 280 x 300 mm / 2.28 x 11.02 x 11.8 inch 13350D : 45 x 140 x 225 mm / 1.77 x 5.51 x 10.03 inch
Weight		13350M : Approx. 3.5 kg / 7.71 lbs 13350D : Approx. 1.3 kg / 2.86 lbs

All specifications are subject to change without notice.



KEY FEATURES

- Test frequency: 20Hz~200kHz/1MHz, 0.02% accuracy
- Basic accuracy: 0.1%
- Different output impedance modes, measurement results are compatible with other well-known LCR meters
- Enhanced Turn Ratio measurement accuracy for low permeability core
- Fast Inductance/ Turn Ratio measurement speed up to 80 meas./sec
- Fast DCR measurement speed up to 50 meas./sec
- Graphical and tabular display of swept frequency, voltage current and bias current measurements (3252/3302)
- Build-in 8mA bias for RJ45 transmission transformer saturation condition (option)
- Leakage inductance 100 bin sorting and balance of leakage inductance for TV inverter transformer
- ALC (Auto Level Compensation) function for MLCC measurement (3252/3302)
- Test fixture residual capacitance compensation for transformer inductance measurement
- 1320 Bias Current Source directly control capability (3252/3302)
- 320x240 dot-matrix LCD display
- Support versatile standard and custom-design test jigs
- Four-terminal test for accurate, stable DCR, inductance and turn ratio measurements
- Built-in comparator; 10 bin sorting with counter capability (3252/3302)
- Lk standard value with Lx measure value
- 4M SRAM memory card, for setup back-up between units
- Standard RS-232, Handler, and Printer Interface, option GPIB Interface for LCR function only
- 15 internal instrument setups for store/recall capability

HANDLER PRINTER RS-232 GPIB CE

The 3250/3252/3302 Transformer Test System are the precision test systems, designed for transformer production line or incoming/ outgoing inspection in quality control process, with high stability and high reliability.

The 3250/3252 provide 20Hz-200kHz test frequencies, and 3302 provides 20Hz-1MHz test frequencies. In addition to transformer scanning test function, the 3252/3302 have LCR Meter function. In test items, The 3250/3252/3302 cover most of transformer's low-voltage test parameters which include primary test parameters as Inductance, Leakage Inductance, Turns-Ratio, DC resistance, Impedance, and Capacitance (between windings) etc.; secondary test parameters as Quality Factor and ESR etc.; and pin-short test function. High-speed digital sampling measurement technology combined with scanning test fixture (A132501) design, improve low-efficiency transformer inspection to be more accurate and faster.

The 3250/3252/3302 even provide several output impedance selection to solve inductance measurement error problem caused by different test current caused by different output impedance provided by different LCR Meters. And, equivalent turns-ratio calculated from measured inductance of windings is also provided to improve turns-ratio measurement error problem caused by large leakage magnetic flux in transformer with low permeability magnetic core.

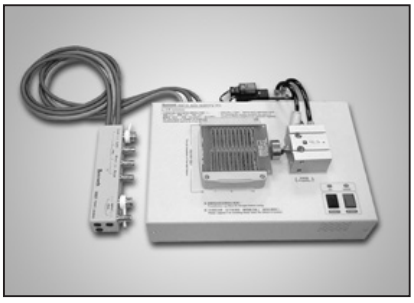
In addition to transformer scanning test function, the 3252/3302 have LCR Meter function, can be used in component incoming/outgoing inspection, analysis and automatic production line.



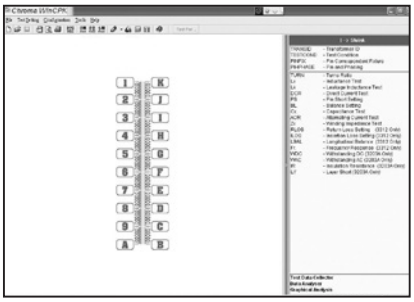
Model 3302

ORDERING INFORMATION

3250 : Automatic Transformer Test System
3250 : Automatic Transformer Test System with 8mA Bias
3252 : Automatic Component Analyzer
3252 : Automatic Component Analyzer with GPIB interface
3302 : Automatic Component Analyzer
3302 : Automatic Component Analyzer with GPIB interface
3302 : Automatic Component Analyzer with 8mA Bias
3302 : Automatic Component Analyzer without Transformer Scan
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110234 : High Frequency Test Cable
A110239 : 4 Terminals SMD Electrical Capacitor Test Box (Patent)
A113012 : Vacuum Generator for A132574
A113014 : Vacuum Pump for A132574
A132501 : Auto Transformer Scanning Box (3001A)
A132563 : WINCPK Transformer Data Statistics & Analysis Software for USB port
A132574 : Test Fixture for SMD power choke
A133004 : SMD Test Box
A133006 : 1A Internal Bias Current Source
A133019 : BNC Test Lead, 2M (singleside open)



A132501 :
Auto Transformer Scanning Box (3001A)



A132563 : WINCPK Transformer Data Statistics & Analysis Software for Model 3250/3252/3302

All specifications are subject to change without notice.

SPECIFICATIONS				
Model		**3250**	**3252**	**3302**
Main Function		Transformer Scanning Test	Transformer Scanning Test + LCR Meter	
Test Parameter				
Transformer Scanning		Turn Ratio, Phase, Turn, L, Q, Leakage L, Balance, ACR, Cp, DCR, Pin Short		
LCR METER		- -	L, C, R, |Z|, Y, DCR, Q, D, R, X, θ , Ratio (dB)	
Test Signals Information				
Test Level	Turn	10mV~10V, ±10% 10mV/step		
	Others	10mV~2V, ±10% 10mV/step		
Test Frequency	Turn	1kHz~200kHz, ± (0.1% + 0.01Hz), Resolution: 0.01 Hz		1kHz~1MHz, ±(0.1%+0.01Hz), Resolution : 0.01 Hz
	Others	20Hz~200kHz, ± (0.1% + 0.01Hz), Resolution : 0.001 Hz (<1kHz)		20Hz~1MHz, ±(0.1%+0.01Hz), Resolution 0.001 Hz (<1kHz)
Output Impedance Display	Turn	10Ω, when level≦2V / 50Ω, when level > 2V		
	Others	Constant = OFF : Varies as range resistors Constant = 320X : 100Ω ±5% ; Constant = 107X : 25Ω ±5% Constant=106X : 100mA ±5% (1V setting); for inductive load less than 10Ω,10Ω ±10%, for impedance ≧10Ω		
Measurement Display Range				
L, LK		0.00001μH~9999.99H		
C		0.00001pF~999.999mF		
Q, D		0.00001~99999		
Z, X, R		0.00001Ω~99.9999MΩ		
Y		0.01nS~99.9999S		
θ		-90.00°~ +90.00°		
DCR		0.01mΩ~99.999MΩ		
Turn,Ratio		0.01~99999.99 turns (Secondary voltage less than 100 Vrms)		
Ratio (dB)		-39.99dB~+99.99dB (seconding voltage less than 100 Vrms)		
Pin-Short		11 pairs, between pin to pin		
Basic Accuracy				
L, LK, C, Z, X, Y, R, DCR		0.1% (1kHz if AC parameter)		
Q, D		0.0005(1kHz)		
θ		0.03°(1kHz)		
Turn, Ratio (dB)		0.5% (1kHz)		
Measurement Speed (Fast)				
L, LK, C, Z, X, Y, R, Q, D, θ		80meas./sec.		
DCR		50meas./sec.		
Turn, Ratio (dB)		10meas./sec.		
Judge				
Transformer Scanning		PASS/FAIL judge of all test parameters output from Handler interface, 100 bin sorting for LK		
LCR METER		--	10 bins for sorting & bin sum count output from Handler interface/PASS/FAIL judge output from Handler interface	
Trigger		Internal, Manual, External		
Display		320x240 dot-matrix LCD display		
Equivalent Circuit Mode		Series, Parallel		
Correction Function		Open/Short Zeroing, Load correction		
Memory		15 instrument setups, expansion is possible via memory card		
General				
Operation Environment		Temperature:10°C~40°C, Humidity: 10%~90% RH		
Power Consumption		140 VA max.		
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz		
Dimension (H x W x D)		177 x 430 x 300 mm / 6.97 x 16.93 x 11.81 inch		
Weight		9.2 kg / 20.26 lbs		

Model	**A132501**
Standard Jig	20 pins
Test Contact pin	Four terminals contact
Control	
Button	START, RESET
Indicators	GO, NG
Solenoid Valve	
Pressure	0.15~0.7Mpa(1.5~7.1kgf/cm^2)
General	
Operation Environment	Temperature: 10°C~40°C, Humidity: 10%~90% RH
Power Consumption	40 VA max.
Power Requirement	90~264Vac, 47~63Hz
Dimension (H x W x D)	90 x 270 x 220 mm / 3.54 x 10.63 x 8.66 inch
Weight	3.2 kg / 7.05 lbs

All specifications are subject to change without notice.

Telecom Transformer Test System

Model 3312



HANDLER PRINTER RS-232 GPIB CE

KEY FEATURES

- Includes most test items in telecommunication transformer inspection.
- Programmable frequency : 20Hz~1MHz, 0.02% accuracy
- Basic accuracy : 0.1%
- 3 different output impedance modes, measurement results are compatible with other well-known LCR meters
- Enhanced Turn Ratio measurement accuracy for low permeability core
- ast Inductance/ Turn Ratio measurement speed up to 80 meas./sec
- Fast DCR measurement speed up to 50 meas./sec
- 1320 Bias Current Source directly control capability
- 320x240 dot-matrix LCD display
- Support versatile standard and custom-design test jigs
- Four-terminal test for accurate, stable DCR, inductance and turn ratio measurements
- Built-in comparator; 10 bin sorting with counter capability
- 4M SRAM memory card, for setup back-up between units
- Standard RS-232, Handler and Printer interface, option GPIB Interface for LCR function only
- 15 internal instrument setups for store/recall capability

The 3312 Telecom Transformer Test System is a precision test system, designed for telecom transformer production line or incoming/ outgoing inspection in quality control process, with high stability and high reliability.

The 3312 provides 20Hz-1MHz test frequencies. In addition to transformer scanning test function, the 3312 has LCR Meter function. In test items, The 3312 covers most of telecom transformer's low-voltage test parameters which include telecom test parameters as Return Loss (RLOS), Reflected Impedance (Zr), Insertion Loss (ILOS), Frequency response (FR), and Longitudinal Balance (LBAL) etc.; primary test parameters of general transformer as Inductance, Leakage Inductance, Turns-Ratio, DC resistance, Impedance, and Capacitance (between windings) etc.; secondary test parameters of general transformer as Quality Factor and ESR etc.; and pin-short test function. High-speed digital sampling measurement technology combined with scanning test fixture (A132501) design, improve low-efficiency telecom transformer inspection to be more accurate and faster.

The 3312 even provides several output impedance selection to solve inductance measurement error problem caused by different test current caused by different output impedance provided by different LCR Meters.

ORDERING INFORMATION

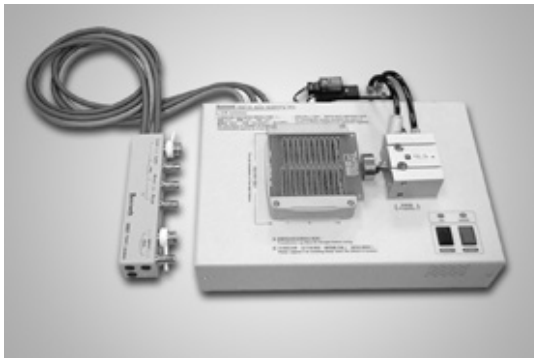
3312 : Telecom Transformer Test System
A110104 : SMD Test Cable #17
A110211 : Component Test Fixture
A110212 : Component Remote Test Fixture
A110234 : High Frequency Test Cable
A110239 : 4 Terminals SMD Electrical Capacitor Test Box (Patent)
A132501 : Auto Transformer Scanning Box
A133004 : SMD Test Box
A133006 : 1A Internal Bias Current Source

SPECIFICATIONS

Model		**3312**
Main Function		Transformer Scanning Test + LCR Meter
Test Parameter		
Transformer Scanning		Turn Ratio (TR), Phase, Turn Inductance (L), Quality Factor (Q), Leakage Inductance (LK), Inductance Balance (BL), ACR, Capacitance, DCR, Pin Short, Return Loss (RLOS), Insertion Loss (ILOS), Frequency Response (FR), Longitudinal balance (LBAL)
LCR Meter		L, C, R, IZI, Y, DCR, Q, D, R, X, θ
Test Signals Information		
Test Level	Turn, ILOS, Fr,LBAL	10mV ~ 10V, ±10% 10mV/step
	Others	10mV ~ 2V, ±10% 10mV/step
Test Frequency	Turn	1kHz ~ 1MHz, ± (0.1% + 0.01Hz), Resolution : 0.01 Hz
	Others	20Hz ~ 1MHz, ± (0.1% + 0.01Hz), Resolution: 0.001 Hz (<1kHz)
Output Impedance	Turn, ILOS, Fr,LBAL	10Ω, when level ≦ 2V; 50Ω, when level > 2V
	Others	Constant = OFF : Varies as range resistors Constant = 320X : 100Ω ±5% Constant = 107X : 25Ω ±5% Constant = 106X : 100mA ±5% (1V setting), for inductive load less than 10Ω, 10Ω ±10%, for impedance ≧ 10Ω
Measurement Range		
Lx, x		0.00001μH ~ 9999.99H
C		0.00001pF ~ 999.999mF
Q, D		0.00001 ~ 99999
Z, X, R		0.00001Ω ~ 99.9999MΩ
Y		0.01nS ~ 99.9999S
θ		-90.00° ~ +90.00°
DCR		0.01mΩ ~ 99.999MΩ
Turn		0.01 ~ 99999.99 turns (Secondary voltage less than 100 Vrms)
Pin-Short		11 pairs, between pin to pin
RLOS, ILOS, FR		-100dB ~ +100dB
LBAL		0dB ~ +100dB
Basic Accuracy		
L, LK, C, Z, X, Y, R, DCR		±0.1% (1kHz if AC parameter)
Q, D		±0.0005 (1kHz)
θ		±0.03% (1kHz)
Turn		±0.5% (1kHz)
RLOS		N/A (Zr : ±0.1%)
ILOS, FR, LBAL		±0.5dB
Measurement Speed (Fastest)		
L, LK, C, Z, X, Y, R, Q, D, θ		80meas./sec.
DCR		50meas./sec.
Turn, RLOS, ILOS, LBAL		10meas./sec.
Judge		
Transformer Scanning		PASS/FAIL judge of all test parameters output from Handler interface
LCR Meter		10 bins for sorting & Bin sum count output from optional Handler interface PASS/FAIL judgement output from standard Handler interface
Trigger		Internal, Manual, External
Display		320x240 dot-matrix LCD display
Equivalent Circuit Mode		Series, Parallel
Correction Function		Open/Short Zeroing, Load correction
Memory		15 instrument setups, expansion is possible via memory card
General		
Operation Environment		Temperature: 10°C ~ 40°C,Humidity: 10%~90% RH
Power Consumption		140 VA max.
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)		177 x 430 x 300 mm / 6.97 x 16.93 x 11.81 inch
Weight		9.2 kg / 20.26 lbs

All specifications are subject to change without notice.

Test Fixture of Auto Transformer Scanning Box Model A132501



Test Fixture / Model		3250	3252	3302	3312
A132547	4-4mm Test Fixture	●	●	●	●
A132572	3.5/4mm Test Fixture	●	●	●	●
A132573	3.2/3.5mm Test Fixture	●	●	●	●
A132579	7.5-5mm Test Fixture	●	●	●	●
A132583	3.0-3.0mm Test Fixture	●	●	●	●
A132584	3.5-3.5mm Test Fixture	●	●	●	●
A132585	3.8-3.8 mm Test Fixture	●	●	●	●
A132586	3.0-4.0 mm Test Fixture	●	●	●	●

All specifications are subject to change without notice.



KEY FEATURES
Model 1310

- Frequency response : 20Hz~200kHz
- 0.001A~10.00A, 90W output capability
- Forward / Reverse current switching capability
- Bias current sweep (2~11points), automatic or manual trigger, for core characteristics analysis
- 16x2 LCD text display
- 0.001Ω~199.99Ω DCR measurement capability
- Long term continued maximum power output capability
- Excellent protection circuit, keep L Meter from damage as bias current was broken abnormally

KEY FEATURES
Model 1320

- Frequency response : 20Hz~1MHz
- 0.001A~20.00A, 150W output capability, maximum 100Adc extendable with 1320S
- Forward / Reverse current switching capability
- Standard GPIB, Handler interface
- Bias current sweep (2~21points), automatic or manual trigger, for core characteristics analysis
- Direct controlled by LCR Meter 3302/3252/11022/11025
- 16x2 LCD text display
- 0.01mΩ~199.99Ω DCR measurement capability
- 50 internal instruments setups for store/recall capability
- Single bias current output timer capability (24 hours)
- Long term continued maximum power output capability
- Excellent protection circuit, keep L Meter from damage as bias current was broken abnormally

The 1320 Bias Current Source output can be controlled by LCR Meter Model 3302/3252/11022/11025 directly. The 1320S connected externally can output current up to 100A. The bias current scan frequency triggered automatically or manually can analyze the iron core characteristics in inductor for quality inspection and product feature analysis. They are the best measurement instruments combination for inductor test.

ORDERING INFORMATION

1310 : Bias Current Source 0~10A
1320 : Bias Current Source 0~20A
1320-10A : Bias Current Source 0~10A
1320S : Bias Current Source (Slave)
A113011 : 4 Terminals Test Cable with Clip
A115001 : Foot Switch #10

Model 1320/1320-10A



Model 1320S

SPECIFICATIONS					
Model		**1310**	**1320**	**1320S**	**1320-10A**
Bias Current Source					
Output Current		0.00~10.00Adc Forward/Reverse	0.00~ 20.00Adc Forward/Reverse 100A extendable when linked with 1320S	0.00~20.00Adc(Slave) Forward/Reverse *2	0.00~10.00Adc Forward/Reverse
Accuracy		0.000A~1.000:1%+3mA 1.01A~10.00A:2%	0.000A~1.000A : 1% +3mA 1.001A~5.00A:2% 5.01A~20.00A:2% 20.1A~20.0(1+X)A:3% *1	3%	0.000A~1.000A:1%+3mA 1.001A~5.00A:2% 5.01A~10.00A:2%
Scan Test		Manual or Auto, 2~11 steps	Manual or Auto, 2~21 steps	---	Manual or Auto, 2~21 steps
Frequency Response		20Hz~200kHz	20Hz~1MHz	20Hz~1MHz	20Hz~1MHz
Maximum Power Continued Output Allowable Time		> 24 hours (below 40˚C)			
Timer		---	0~24 hours	---	0~24 hours
Delay time		---	0.0~100.0 sec/step, adjustable	---	0.0~100.0 sec/step, adjustable
DCR Meter Accuracy & Resolution					
DCR Range	20mΩ	---	2% + 0.07mΩ, 0.01mΩ	---	2%+ 0.07mΩ,0.01mΩ
	200mΩ	---	2% + 0.2mΩ, 0.1mΩ	---	2% + 0.2mΩ,0.1mΩ
	2Ω	3% + 0.002Ω,0.001Ω	3% + 0.002Ω,0.001Ω	---	3%+ 0.002Ω,0.001Ω
	20Ω	3% + 0.03Ω, 0.01Ω	3% + 0.02Ω, 0.01Ω	---	3%+0.02Ω, 0.01Ω
	200Ω	3% + 0.3Ω, 0.1Ω	3% + 0.2Ω, 0.1Ω	---	3% + 0.2Ω, 0.1Ω
DCV Display					
Display Range		---	0.00V~10.00Vdc	---	0.00V~20.00Vdc
Accuracy		---	2% + 0.05Vdc	---	2% + 0.05Vdc
Display		16 x 2 text dot matrix LCD		---	16 x 2 text dot matrix LCD
General					
Operation Environment		Temperature : 10˚C~40˚C, Humidity : 10%~90 % RH			
Power Consumption		250VA max.	650VA max.	600VA max.	650VA max
Power Requirements		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz			
Dimension (H x W x D)		132 x 410 x 351 mm / 5.2 x 16.14 x 13.82 inch	177 x 430 x 450 mm / 6.97 x 16.93 x 17.72 inch		
Weight		8.8 kg / 19.38 lbs	17.5 kg / 38.55 lbs	15.5 kg / 34.14 lbs	17.5 kg / 38.55 lbs

Note*1 : X is the number of linked 1320S
Note*2 : 1320S is a slave current source of 1320

All specifications are subject to change without notice.



300A

KEY FEATURES

- High efficiency, forward / reverse current switching capability and sweep function
- High stability, frequency response from 20Hz to 1MHz
- High accuracy, 3% output current accuracy
- Expansion capabilities, up to 100A
- Vertical design, easy to maintain
- Flexible modular test system
- Multi-channel intakes in the front panel of rack and multi-fans exhausts in the back of rack
- Multi-function four terminal test fixture
- Low ESR (< 10m ohm) design for connecters between bias current sources
- Windows® based software
- Up to 300A by customization



19" Rack 20U for Model 11300

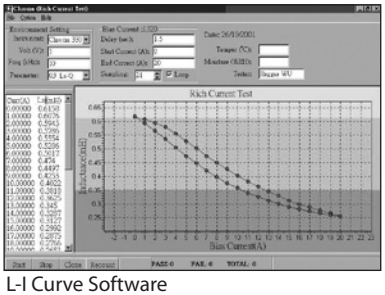
RS-232 CE

Chroma 11300 bias current test system is an integration test system of LCR Meter and Bias Current Source.

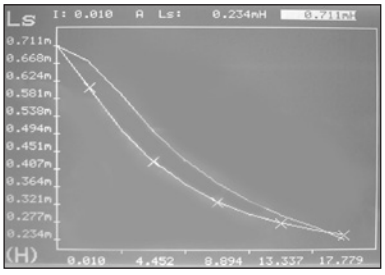
It consists of Chroma 3252/3302 series Automatic Component Analyzer and Chroma 1320 series Bias Current Source. The Chroma 1320 series bias current source output can be controlled by Chroma 3252/3302 LCR meter directly. The bias current output capacity can be selected up to 100A to satisfy various testing in R&D, QC, QA, and production applications.

This system is designed for large DC current testing, up to 300A. The connector between bias current sources is low ESR (<10m ohm) design to reduce heat effect and get more accurate measurement result. The multi-function four terminal test fixture supports various DUT, include SMD DUT and DIP ring core DUT.

This system provides power choke characteristic sweep graph analysis through Windows® base software or sweep function of the meter. The bias current scan triggered automatically or manually can analyze the iron core characteristics in inductor for quality inspection and product feature analysis. The Chroma 11300 is a just right test solution for magnetic choke and core used in various power supply.



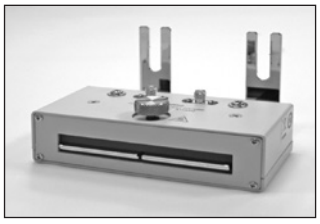
L-I Curve Software



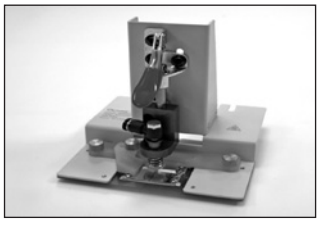
Graphical Bias Current Characteristic Analysis

ORDERING INFORMATION

11300 : Bias Current Test System
A113006 : 19" Rack 35U for Model 11300
A113007 : 19" Rack 20U for Model 11300
A113008 : Four terminal test fixture for DIP 100A
A113009 : Four terminal test fixture for SMD 60A (combined with A113008)
A113010 : Four terminal PCB for SMD 100A (combined with A113008)
A113012 : Vacuum Generator for A113009
A113014 : Vacuum Pump for A113009
LCR Meter : Refer to 3252, 3302
Bias Current Source : Refer to 1320, 1320S



A113008 :
Four terminal test fixture for DIP 100A



A113009 :
Four terminal test fixture for SMD 60A (combined with A113008)

SPECIFICATIONS						
Model	**11300**					
Output Bias Current	20A	40A	60A	80A	100A	100A~300A
LCR Meter						
Model 3252/3302	•	•	•	•	•	*
Bias Current Source						
Model 1320	•	•	•	•	•	*
Model 1320S		1 Set	2 Sets	3 Sets	4 Sets	*
General						
19"Rack	20U			35U		*
Power Requirements	180~264Vac, 47~63Hz					*

* Call for availability



KEY FEATURES

- C meter provides Z/C/D/Q/ESR parameters for test
- Available 7 test frequencies from 100~100kHz for selection
- 0.1% basic measurement accuracy
- The thin-film withstand voltage results can be displayed in graph by converting them to an actual rising curve
- CPK calculation function for 1000 capacitor test results that is convenient for analyzing the production capability
- 320 x 240 dot-matrix LCD display
- 200 sets of internal memories and 4M SRAM interface card for saving and recalling the parameter settings
- Designed for100mΩ range with accuracy measurement up to 0.1mΩ
- Non-Relay switch is built in. It is safe and reliable as the discharge circuit is close to the fixed power
- Perform electric polarity test before charge to avoid the danger of explosion
- Softpanel for leakage current data statistics analysis
- Equipped with RS-232, printer and scanner controller interfaces
- Meet the test regulation of EIAJ RC-2364A
- A131001 scan box has four terminals designed for measuring accurate high frequency and low impedance (200 Vmax)

PRINTER RS-232

The Chroma 13100 Electrolytic Capacitor Analyzer is a general measurement instrument designed for analyzing the features of electrolytic capacitors. It has multiple functions that can be programmed based on the capacitor features by altering the settings to test metal oxidization thin-film withstand voltage, capacitor leakage current, capacitance, dissipation factor, impedance and equivalent serial resistance, etc.

Used with the special designed sequential switch test box A131001, it can complete the test for multiple capacitors or aluminum foil rapidly, accurately and simultaneously in a short time without changing any test wire.

The report printing function is capable of printing the test results correctly and completely; and the built-in data calculation function can compute the test data of the product instantly for CPK analysis. To avoid the inefficient calculation process done manually, a test software application is also available for you to create a quality report easily. It meets the EIAJ RC-2364A regulations for electrolytic capacitor test and is a test instrument of choice.

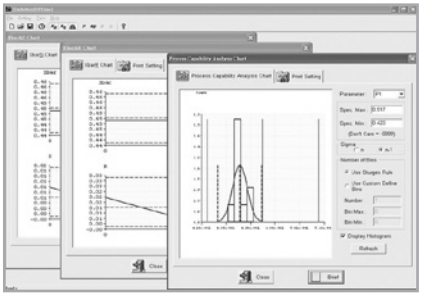
Chroma A131001 is a sequential switch test box of ten channels specially designed for Chroma 13100. Each test socket on the test box is implemented with Kelvin measurement, which is suitable for the precise measurement requirement for low impedance and low leakage current. With the SCAN function in 13100 it is able to control the C, D, Q, Z, ESR and LC tests for electrolytic capacitor to be done consecutively without switching the capacitor manually. This increases the test efficiency significantly as it costs only 1/10 of the original test time.

ORDERING INFORMATION

13100 : Electrolytic Capacitor Analyzer
A131001 : 10 Channels Switching Test Fixture



A131001 : 10 Channels Switching Test Fixture (200 Vmax)



13100 Softpanel

All specifications are subject to change without notice.

SPECIFICATIONS	
Model	**13100**
Main Function	C Meter/Leakage Current Tester/Foil WV Tester/Scanner Controller
C Meter	
Test Parameter	Cs-D, Cs-Q, Cs-ESR, Cp-D, Cp-Q, |Z|-ESR, |Z|-θ
Test Signals	
Level	1.0V/0.25V, ±10%
Frequency	100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 50kHz, 100kHz; ±0.01%
Source Ro	25Ω, 100Ω, 25Ω/C.C, 100Ω/25Ω four mode selectable
Measurement Display Range/ Basic Accuracy *1	
C	0.001pF ~ 1.9999F / ±0.1%
Z, ESR	0.01mΩ ~ 99.99MΩ / ±0.1%
D, Q	0.0001 ~ 9999 / ±0.0005
θ	-90.00° ~ +90.00° / ±0.03°
Measurement Speed *2	
Fast/Medium/Slow	Freq. = 100Hz 120Hz : 55ms / 120ms/ 750ms; Freq 1kHz : 35ms / 60ms / 370ms
Function	
Correction	Open / Short zeroing
Averaging	1~99 times
Test Signal Monitor	Vm, Im
Leakage Current Tester	
Test Parameter	LC, IR
Test Signals	
Voltage	1.0 V ~ 100 V, step 0.1 V;101V~650 V, step 1V; (0.5% + 0.2V)
Charge Current Limit	V ≦ 100V: 0.5mA~500mA; V>100V: 0.5mA~150mA; step 0.5mA; (3% + 0.05mA)
Measurement Display Range/ Basic Accuracy *3	
LC (Leakage Current)	0.001μA ~ 99.9mA/ ±(0.3% +0.005μA)
Measurement Speed	45ms
Function	
Correction	Null zeroing
Averaging	1 ~ 99 times
Test Voltage Monitor	Vm: 0.0 V ~ 660.0V; (0.2%+0.1V)
Charge/ Dwell Timer	0 ~ 999 sec.
Foil WV Tester	
Test Parameter	Tr (Rise Time), Vt (Foil Withstand Voltage), Plot [logT, Vm]
Test Signals	
Voltage Limit	650 V typical
Constant Charge Current	0.5mA~100mA, step 0.5mA; (3% +0.05mA)
Test Display Range	
Tr (Rise Time)	0.05 ~ 120.00 sec.
Charge Voltage	0.1V ~ 660.0V
Plot [logT, Vm]	220 plots; Vm: 1.5~10 x Vf
Test Time	30 ~ 600 sec.
Scanner Controller	
Controllable Fixture	Chroma A131001
Test Parameter	C parameter pair x 2, LC parameter x 1
Sample Number	1~1000 pcs.
Function	
Correction	Fixture Open/ Short/ Null zeroing
Comparison Limit	Upper, Lower
Statistics	Maximum, Minimum, Average (X bar), Cpk
Interface	RS-232, Printer, Scanner Control Interface
Display	320 x 240 dot-matrix LCD display
Memory (Store/Recall)	
Internal	200 instrument setups
4M SRAM card (Option)	200 instrument setups (for copy and backup)
Trigger	Internal, Manual, BUS, Scanner
General	
Operation Environment	Temperature 0°C~40°C, Humidity < 90 % RH
Power Consumption	400 VA max.
Power Requirement	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)	177 x 430 x 301.4 mm / 6.97 x 16.93 x 11.87 inch
Weight	14 kg / 30.84 lbs

Note*1 : 23±5°C after Open and Short correction, slow measurement speed, refer to Operation Manual for detail measurement accuracy descriptions
Note*2 : 23±5°C after Null correction, average exceeds 10 times, refer to Operation Manual for detail measurement accuracy descriptions
Note*3 : C/D meter in range >1Ω, refer to Operation Manual for detail

All specifications are subject to change without notice.



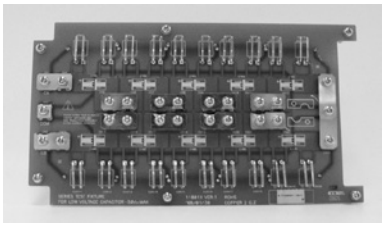
KEY FEATURES

- Digital constant current output and constant peak voltage output control function
- Four terminal contact test jig design, ensure accurate monitoring of voltage dropped on capacitors under test (patent pending)
- Paired cooper-foil wiring test cable to reduce voltage drop on the current driving loop and to ensure accurate monitoring of ac level dropped on capacitors under test (patent pending)
- 0-500 V DC bias voltage source, 0.3% basic accuracy
- 0.01~30A, 100Hz/120Hz/400Hz/1kHz AC ripple current source, (±0.5% reading+0.1% of range) basic accuracy (Model 11800)
- 0.01~10A, 20kHz~100kHz AC ripple current source, 2% basic accuracy (Model 11801)
- 0.03~10A, 20kHz~1MHz AC ripple current source (Model 11810)
- Monitoring software (option) for multiple Ripple Current Testers
- Lower power consumption and lower electricity cost
- Large LCD display (320 x 240 dot-matrix)
- Alarm for indicating of normal or abnormal test termination, Tested time will be recorded if the test is terminated abnormally. An automatic discharge is always performed after test termination
- Standard RS485 interface is provided for computer monitoring
- Optional 20-fixtures Series or Parallel test jigs
- Digital timer inside
- CE marking (Model 11800/11801)

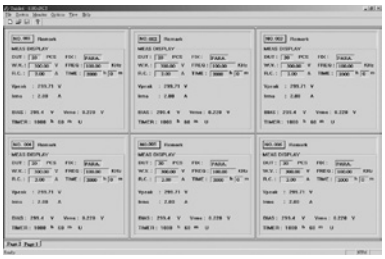
The Chroma 11800/11801/11810 Ripple Current Tester is a precision tester designed for electrolytic capacitors load life testing. Provides constant ripple current output and constant peak voltage (Vpeak = Vdc + Vac_peak) output digital control function. Let load life testing for electrolytic capacitors becomes easier and more reliable. And, The Chroma 11800/11801/11810 use excellent output amplifier design technology to reduce power consumption and internal temperature rising. For long time testing requirement, it can reduce electricity cost and perform high stability. The Chroma 11800/11801/11810 is a just right test solution for electrolytic quality evaluation.



Model 11801



A118029 : SMD Series Test Fixture for Low Voltage



A118010 : Monitoring Software for 11801/11800

ORDERING INFORMATION

11800 : Ripple Current Tester 1kHz
11801 : Ripple Current Tester 100kHz
11810 : Ripple Current Tester 1MHz
A118004 : Series Test Fixture
A118005 : Parallel Test Fixture
A118010 : Monitoring Software for Model 11800/11801
A118028 : Series Test Fixture for Low Voltage
A118029 : SMD Series Test Fixture for Low Voltage
A118030 : PCB for SMD Capacitor

SPECIFICATIONS

Model		11800	11801	11810
Ripple Current Source				
Current Output Range		0.01~30A	0.01~10A	0.03~10A, *3
Frequency		100Hz/120Hz/400Hz/ 1kHz ±0.1%	20kHz~100kHz	20kHz~1MHz
Accuracy *1	0.030A~0.199A	± (0.5% of reading + 0.1% of range)	± (3% + 0.005 A)	0.03~0.30A, ±(3% + 0.01 A), *2
	0.20A~1.99A		± (2.5% + 0.05 A)	
	2.0A~10A		± (2% + 0.2 A)	0.40~10.0A, ±(2% + 0.05 A), *2
	10.0A~30A		--	
Ripple Voltage Output Range		90Vrms / 10Arms, 30Vrms / 30Arms	15Vrms maximum	
DC Bias Voltage Source				
Voltage Output Range		DC 0 ~ 500V, ± (0.3% + 0.05V)		
Charge Current		200mA, 40W Maximum		
Signal Monitor Parameter Accuracy				
Irms (Ripple Current)	0.001A~0.199A	± (0.5% of reading + 0.1% of range)	± (2% + 0.005 A)	0.030A~0.399A: ±(3% +0.01A),*2, *3
	0.20A~1.99A		± (2% + 0.05 A)	
	2.0A~10A		± (2% + 0.2 A)	0.400A~10.00A: ±(2% +0.05A),*2, *3
	10.0A~30A		--	
Vpeak (Normally, set to capacitor rated voltage)		Vpeak =Vdc + Vac_peak		
Vdc (DC Bias Voltage)		± (0.3% + 0.05V)		
Vrms (Ripple Voltage)		0~1.99V, ± (0.3% of reading + 0.5% of range) 2.00~19.99V, ± (0.3% of reading + 0.1%of range) 20.00V~200.0V, ± (0.3% of reading + 0.1%of range)	± (1% + 0.005V)	± (1% + 0.01V) *2
Control Function				
Timer		1 min~10000 hour, 30min error per year		
Interface		RS-485 (Standard)		
Display		320 x 240 dot-matrix LCD display		
Operation		Start, Stop, Continue		
Protection		OCP, OTP, Over Load		
General				
Operation Environment		Temperature : 10°C~40°C, Humidity : < 90 % RH		
Power Consumption		3000 VA max.	700 VA max.	1000VA max.
Power Requirement		180 ~ 264Vac, 47 ~ 63Hz		
Dimension (H x W x D)		221.5 x 440 x 609.8 mm / 8.72 x 17.32 x 24.01 inch	353.6 x 440 x 609.8 mm / 13.92 x 17.32 x 24.01 inch	221.5 x 440 x 609.8 mm / 8.72 x 17.32 x 24.01 inch
Weight		54 kg / 118.94 lbs	60 kg / 132.16 lbs	40 kg / 88 lbs

Note*1 : 23 ± 5°C
Note*2 : Multiple accuracy for test frequency 20~100kHz (x 1), 101~500kHz (x 2.5), 501kHz~1MHz (x 5)
Note*3 : Frequency > 500kHz : 0.10~10.0A only **Note*4 :** Frequency > 500kHz : 0.100~10.00A only

All specifications are subject to change without notice.



KEY FEATURES

- Electrolytic capacitor leakage current test function
- Insulation Resistance (IR) test function
- Constant current DC power source with discharge function
- Forward voltage function for Diode, LED, Zener Diode and Varistor
- Surge voltage test function for electrolytic capacitor (JIS C5101/5102/5140/5141)
- Option contact check function to improve test reliability
- Basic accuracy: 0.3%
- Aluminum-foil withstand voltage and rise-time test function (For EIAJ RC-2364A)
- Precision low constant current charge capability (0.5mA ± 0.05mA, meet EIAJ RC-2364A requirement for withstand voltage testing of lower WV aluminum-foil)
- Large charge current (500mA) capability to fasten charge speed
- 1.0V ~ 650V / 800V DC voltage source

GPIB HANDLER RS-232 CE

- 0.001uA - 20.00mA leakage current test range with 4 digits resolution
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Digital timer inside
- Comparator and pass/fail alarming beeper function
- Large LCD display (240 x 64 dot-matrix)
- Friendly user interface
- Easy use graphic user interface : softpanel (Option)

The Chroma 11200 Capacitor Leakage Current/IR Meter is Chroma's newest digital leakage current meter. Provides DC 1~650 V, 0.5mA~500mA (150mA for V>100V) DC power source or DC 1~800V, 0.5mA~500mA (50mA for V>100V) DC power source. Mainly used for electrolytic capacitor leakage current testing, and aluminum-foil withstand voltage testing (EIAJ RC-2364A). And also can be used for active voltage checking or leakage current testing of absorber, Zener diode, and Neon lamp etc.

Contact failure between a DUT and the measurement plane of an automatic component handler is a factor for compare error in production line testing. Contact check using the built-in measurement function (option) improves the accuracy and efficiency of comparing.

Standard RS-232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the Chroma 11200 can be used for both component evaluation on the production line and fundamental leakage current testing for bench-top applications.

ORDERING INFORMATION

11200 : Capacitor Leakage Current / IR Meter 650V
11200 : Capacitor Leakage Current / IR Meter 800V
11200 : Capacitor Leakage Current / IR Meter with contact check function 650V
A110235 : GPIB & Handler Interface
A110236 : 19" Rack Mounting Kit
A112001 : Triangle Test Fixture
A112004 : Softpanel for Model 11200



A112004 : Softpanel of Model 11200

SPECIFICATIONS

Model		11200 (650V)	11200 (800V)
Main Function		Capacitor Leakage Current / IR Meter	
Test Parameter		LC, IR	
Test Signals Information			
Voltage		1.0 V~100 V, step 0.1 V; 101V~650 V,step 1V; ±(0.5% + 0.2V)	1.0 V~100 V, step 0.1 V; 101V~800V,step 1V; ±(0.5% + 0.2V)
Charge Current Limit		V ≦ 100V: 0.5mA~500mA, 50W max. V > 100V: 0.5mA~150mA, 97.5W max. step 0.5mA; ±(3% + 0.05mA)	V ≦ 100V: 0.5mA~500mA, 50W max. V > 100V: 0.5mA~50mA, 40W max. step 0.5mA; ±(3% + 0.05mA)
Measurement Display Range		LC : 0.001μA~20.00mA	
Basic Measurement Accuracy *1		LC Reading : ±(0.3% + 0.005μA)	
Measurement speed (Ext. Trigger, Hold Range, Line Frequency 60Hz)	Fast	77 ms	
	Medium	143 ms	
	Slow	420 ms	
Function			
Correction		Null zeroing	
Test Voltage Monitor		Vm: 0.0 V~660.0V; ±(0.2% of reading + 0.1V)	Vm: 0.0 V~900.0V; ±(0.2% of reading + 0.1V)
Charge Timer		0~999 sec.	
Dwell Timer		0.2~999 sec.	
Foil WV Tester			
Test Parameter		Tr (Rise Time), Vt (Foil Withstand Voltage)	
Test Signals	Voltage Limit	650 V typical	800V typical
	Constant Charge Current	0.5mA~150mA, step 0.5mA; ±(3% of reading + 0.05mA)	0.5mA~50mA, step 0.5mA; ±(3% of reading + 0.05mA)
Test Display Range	Tr (Rise Time)	0.05~600.0 sec.	
	Charge Voltage	0.1V~660.0V	0.1V~900.0V
Test Time		30~600 sec.	
Interface		RS-232(Standard), Handler, GPIB (Optional)	
Display		240 x 64 dot-matrix LCD display	
Trigger		Internal, External, Manual, BUS	
General			
Operation Environment		Temperature : 10°C~40°C Humidity : < 90 % RH	
Power Consumption		400 VA max.	
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)		100 x 320 x 346.1 mm / 3.94 x 12.6 x 13.63 inch	
Weight		8 kg / 17.62 lbs	

Note*1 : 23 ± 5°C after null correction. Refer to Operation Manual for detail measurement accuracy descriptions.

All specifications are subject to change without notice.



Programmable HF AC Tester
Model 11802/11803/11805
HF Hipot Tester
Model 11890
HF HV Load Life Tester
Model 11891

KEY FEATURES

- HF HV Load Life Test (CV and CC mode)
- HF Withstand Voltage Test (CV and CC mode)
- HF Breakdown Voltage Test (CV mode)
- Test frequency: 20kHz ~1MHz
- Wide output voltage and current range while combine with different module (Module is customized and based on the tester's power)
- Output voltage and current monitor
- Programmable output voltage waveform control
- Cycle count mode or time count mode for load life test timer
- Lower power consumption and lower temperature rising design
- Large LCD display (320 x 240 dot-matrix)
- Built-in digital timer

RS-485 HANDLER CE

Chroma 11802 Series Programmable High Frequency AC Tester is a digital controlled high frequency AC source platform, can be combined with high frequency voltage/current step-up module to provide high voltage/high current. Chroma 11802 Series output test frequency is 20kHz~200kHz, which cover application frequency range for various SMPS, LCD inverter and etc.

Chroma 11802 Series provides digital functions, like programmable sine-wave output voltage controller to simulate the operation condition for DUT, and cycle count mode or timer mode for load life test, etc. Chroma 11802 Series uses tracking DC source inside for output amplifier to reduce power consumption and lower temperature rising. It reduces electricity cost and improves stability for long time testing. It is the best choice to perform quality verification for various electronic components which used under high frequency, like LCD Inverter and module, high voltage capacitors, primary of SMPS main power, CCFl, HCFl, and EEFl etc.

Chroma 11890 is the best tester for production line of HF HV electronic components withstanding voltage test, like LCD inverter transformer, ceramic capacitor, cable, PCB, automatic motor corona discharge inspection and medical equipment high frequency leakage current safety inspection.
Chroma 11891 is a tester with only function HF HV Load Life Test (CV and CC mode). It is suitable for passive component load life test.

ORDERING INFORMATION

11802 : Programmable HF AC Tester 500VA
11803 : Programmable HF AC Tester 800VA
11805 : Programmable HF AC Tester 1000VA
11890 : HF Hipot Tester 500VA
11891 : HF HV Load Life Tester 500VA

H.F. Current Step-up Module
- **A118011 :** 10V/50A max.
- **A118015 :** 33V/30A max.
- **A118019 :** 16V/30A max.
- **A118037 :** 30V/25A max.

H.F. Voltage Step-up Module
- **A118014 :** 2.5kV/200mA max.
- **A118016 :** 250V/2A max.
- **A118017 :** 8kV/60mA max.
- **A118018 :** 1kV/1A max.
- **A118031 :** 5kV/100mA max. (with shielding)
- **A118032 :** 1kV/500mA max.
- **A118034 :** 2.5kV/400mA max.

APPLICATION LIST

Model	Primary Function	Option	Application Description
11802	HF, HV, CV	A118013 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max A118017 HF HV 8kV/100kHz max A118031 HF HV 5kV/100mA max + shielding	LCD inverter transformer (ceramic capacitor, cable, PCB) load life / withstanding voltage / breakdown voltage test
			EEFl, backlight load life / lamp current test
			SMPS main transformer and active PFC choke load life test and electrical analysis
			Medical equipment high frequency leakage current safety inspection
			Automobile motor corona discharge inspection, analysis and production line
	HF, HV, CV	Step-up current test module + specified resonant inductor/ capacitor	Ballast capacitor / inductor ignition voltage load life test
	HF, HI, CC, Bias voltage	Ripple Current Test Module Chroma 11200 CLC / IR Meter (for DC voltage source with discharge function)	Snubber capacitor load life test
	HF, CV, Bias current Temperature meter	Step-up current test module + AC/DC coupling test fixture Chroma DC power supply (for DC bias current) Chroma 12061 Digital Multimeter (for temperature measurement)	DC-DC converter SMD power choke temperature rising test (DC Bias current with AC ripple voltage) and electrical analysis
	HF, HV, CV (or + DC source)	HF HV test module Option Chroma DC source	Function as HF HV AC +DC power source for FFI and SED device analysis
11803	HF, CV, Bias current Temperature meter	Step-up current test module + AC/DC coupling test fixture Chroma DC power supply (for DC bias current) Chroma 12061 Digital Multimeter (for temperature measurement)	DC-DC converter SMD power choke temperature rising test (DC Bias current with AC ripple voltage) and electrical analysis
11890	HF, HV, CV	A118013 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max A118031 HF HV 5kV/100mA max + shielding	LCD inverter transformer(ceramic capacitor, cable, PCB) withstanding voltage test for production line
			Medical equipment high frequency leakage current safety inspection
			Automobile motor corona discharge inspection for production line
11805	HF, HI, Bias voltage	A118015 HF, HI 33V/30A max.	Snubber capacitor load life test
	HF, HV	A118018 HF, HV 1kV/1A max.	High voltage capacitor load life test
11891	HF, HV, CV	A118013 HF HV 5kV/100mA max A118014 HF HV 2.5kV/200mA max	Passive Component (inverter transformer, ceramic capacitor, cable, PCB etc.)
			High Frequency and High Voltage Load Life Test

All specifications are subject to change without notice.

SPECIFICATIONS						
Model		**11802**	**11890**	**11891**	**11805**	**11803**
AC Output						
Frequency	Range (rms)	20kHz~200kHz, step 1kHz			10kHz~200kHz, step 1kHz	20kHz~1MHz, step 1kHz
Frequency accuracy	accuracy	±0.02%				
Output Voltage	Range (rms)	167V maximum, step 1 V				1~143V, step 1 V
	accuracy	±(5% of setting + 0. 5V)				
	reading	±(4% of reading + 0. 5V)				
Output Current	Range (rms)	0.01A ~ 3.00A,			0.05A ~ 6.00A,	5.6A maximum
	accuracy	±(5% of setting + 0.5A)				
	reading	±(4% of reading + 0.5A)				
Maximum Output Power		500VA			1kVA	800VA
Output mode	HF HV Load Life Test (CV)	●		●	●	●
	HF HV Load Life Test (CC)	●		●	●	●
	HF WV Test (CV)	●	●		●	●
	HF WV Test (CC)	●			●	●
	HF Breakdown Voltage Test	●			●	●
Control Function						
Timer	Load Life Test	1 min ~ 10000 hour, 30min error per year				
	WV Test	0.1 sec ~ 999.9 sec				
General						
Operation Environment		Temperature : 10˚C~ 40˚C, Humidity : < 90% RH				
Power Consumption		2700 VA max.			3000 VA max.	2700 VA max.
Power Requirement		180 ~ 264Vac, 47 ~ 63Hz				
Dimension (H x W x D)		241.5 x 440 x 609.8 mm / 8.72 x 17.32 x 24.01 inch				
Weight		32 kg /70.48 lbs				

Modules						
	Tester			**Specification of Modules**		
	11802/ 11890/ 11891	**11805**	**11803**	**Voltage Output**	**Max. Current Output**	**Frequency (kHz)**
H.F. Current Step-up Modules						
A118011	●			0.1V~10V, ±(5% of setting + 0.05V) *2	2.5A~50A, ±(4% of setting + 0.05A) *2	200 kHz
A118015		●		0.5V~33V, ±(5% of setting + 0.15V) *2	0.2A~30A, ±(4% of setting + 0.1A) *2	200 kHz
A118019	●			0.2V~16V, ±(5% of setting + 0.1V) *2	0.2A~30A, ±(4% of setting + 0.1A) *2	200 kHz
A118037			●	0.50V~30V, ±(4% of reading + 0.3V)	0.5A~25.0A (500kHz), 0.5A~15.0A (1MHz), ±(3% of setting + 0.2A)	1 MHz
H.F. Voltage Step-up Modules						
A118014	●			0.05kV~2.50kV, ±(5% of setting + 0.01kV) *2	1mA~200mA, ±(4% of setting + 0.3mA) *2	200 kHz
A118016	●			5V~250V, ±(5% of setting + 1V) *2	0.01A~2A, ±(4% of setting + 5mA) *2	200 kHz
A118017	●			0.05kV~8.00kV, ±(5% of setting + 0.02kV) *2	60mA (100kHz)	200 kHz
A118018		●		0.05kV~1.00kV, ±(5% of setting + 0.01kV) *2	0.01A~1A, ±(4% of setting + 3mA) *2	200 kHz
A118031	●			0.05kV~5.00kV, ±(5% of setting + 0.01kV) *2	0.5mA~100mA, ±(4% of setting + 0.3mA) *2	200 kHz
A118032	●			0.05kV~1.00kV, ±(5% of setting + 0.01kV) *2	2.5mA~500mA, ±(4% of setting + 1mA) *2	200 kHz
A118034		●		0.01kV~2.5kV, ±(5% of setting + 0.01kV) *2	1.5mA~400mA, ±(4% of setting + 0.2mA) *2	200 kHz

Note*1 : Under rated load and voltage correction is well performed
Note*2 : For test frequency above 100kHz, multiply the accuracy error by 2 times



KEY FEATURES

- Basic accuracy : 0.05%
- Pulsed test current output mode is used to reduce thermal EMFs affection on milliohm measurement
- DC test current output mode is used to fasten measurement speed for inductive DUT
- Dry-circuit test current output mode (limited Max. 20mV) is used to measure such contact resistances where the maximum open-circuit voltage must be limited to 50mV
- Temperature correction (TC function) regardless of material or temperature
- Useful temperature conversion function for motor/ coil evaluation
- 4 channels R scan with balance check function for fan motor (combined with A165017 option)
- 0.001mΩ~1.9999MΩ wide measurement range with 4½ digits resolution
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Bin-sorting function
- Comparator and pass/fail alarming beeper function
- Large LCD display (240 x 64 dot-matrix)
- Friendly user interface
- LabView® Driver

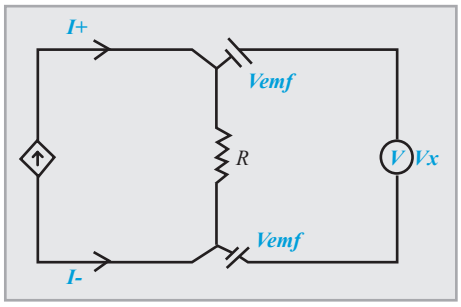
GPIB HANDLER RS-232 CE

The Chroma 16502 Milliohm Meter is Chroma's newest digital Milliohm Meter. 0.001mΩ~1.9999MΩ wide measurement range. DC, Pulsed, and Dry-circuit test current driving modes, enable the Chroma 16502 can be properly used in DC resistance measurement for various inductive components (coil, choke, and transformer winding etc.), cable, metallic contact (connector, relay switch etc.) and conduction materials.

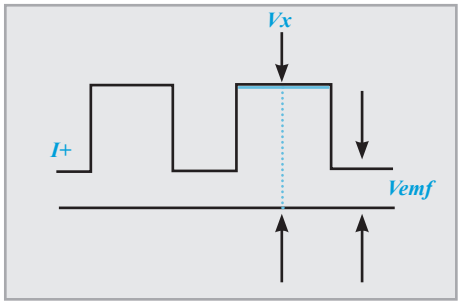
Using the A165014 Temperature Compensation Card with A165015 PT100 Temperature Probe, resistance values measured at ambient temperature can be corrected by applying a thermal coefficient so that the display shows the corresponding resistance values at any other temperature with temperature correction function. Temperature increase (△t) is obtained and displayed by converting resistance measurements and ambient temperature with convenient temperature conversion function. This function is especially useful for verifying motor windings or coils, where the maximum temperature increase needs to be determined when current is applied.

Pulsed ± function application includes power choke, switch/Relay contract, multi-braided twisted wires, metallic foil or conductive material, thermo-sensitive material (fuse, thermistor sensor) etc. Dry Circuit function application includes switch /relay contract, thermo-sensitive material (fuse, thermistor sensor) etc. DC+ function application includes high inductance DUT, like primary of transformer (multi-turn) measurement with Measurement Delay Function to avoid the test current not produced that effect by high inductance DUT during test period.

Standard RS-232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the Chroma 16502 can be used for both component evaluation on the production line and milliohm measurement for bench-top applications.



Vemf = Thermoelectric EMFs



Vx - Vemf = IR Vemf = Thermoelectric EMFs

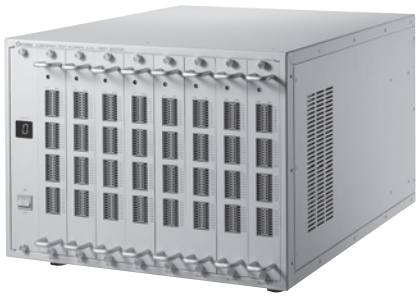
ORDERING INFORMATION

16502 : Milliohm Meter
A110235 : GPIB & Handler Interface
A110236 : 19" Rack Mounting Kit
A113012 : Vacuum Generator for A165018
A113014 : Vacuum Pump for A165018
A165013 : GPIB and Handler Interface with Temperature Compensation
A165014 : Temperature Compensation Card
A165015 : PT100 Temperature Probe
A165016 : Pin Type Leads (flat)
A165017 : 4 Channels R Scanner
A165018 : Test Fixture for SMD Power Choke
A165019 : Pin Type Leads (taper)
A165022 : Four Terminal Test Cable

All specifications are subject to change without notice.

SPECIFICATIONS		
Model		**16502**
Range Basic Measurement Accuracy *1;Test Current		
20mΩ		±(0.1% of reading + 0.03 % of range) ; 1A typical
200mΩ		±(0.05% of reading + 0.03 % of range) ; 100mA typical
2Ω		±(0.05% of reading + 0.03 % of range) ; 10mA typical
20Ω		±(0.05% of reading + 0.03 % of range) ; 1mA typical
200Ω		±(0.05% of reading + 0.02 % of range) ; 1mA typical
2kΩ		±(0.05% of reading + 0.01 % of range) ; 1mA typical
20kΩ		±(0.1% of reading + 0.01% of range) ; 100μA typical
200kΩ		±(0.2% of reading + 0.01 % of range) ; 10μA typical
2MΩ		±(0.3% of reading + 0.01 % of range) ; 1μA typical
Test Signal		
Drive Mode		DC+, DC-,Pulsed+, Pulsed -, Pulsed ±, Stand by
Dry Circuit		Open Circuit Voltage less than 20mV; for 200mΩ, 2Ω, 20Ω ranges only
Measurement Time *2		
Fast		65ms
Medium		150ms
Slow		650ms
Temp. Correction / Conversion Function		
Temp. Measurement Accuracy (Option)	-10.0˚C ~ 39.9˚C	±(0.3% of reading+0.5˚C) *3
	40.0˚C ~99.9˚C	±(0.3% of reading+1.0˚C) *3
Temp. Sensor Type (Option)		PT100/ PT500
Interface & I/O		
Interface		RS-232(Standard) , GPIB, Handler (Optional)
Output Signal		Bin-sorting & Pass/Fail judge
Comparator		Upper/Lower limits in value
Bin Sorting		8 bin limits in %, ABS
Trigger Delay		0~9999ms
Trigger		Internal, Manual, External, BUS
Display		240 x 64 dot-matrix LCD display
Correction Function		Zeroing
General		
Operation Environment		Temperature : 10˚C~40˚C,Humidity : < 90 % R.H.
Power Consumption		80 VA max.
Power Requirement		90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)		100 x 320 x 346 mm / 3.94 x 12.6 x 13.62 inch
Weight		4.2 kg / 9.25 lbs

Note*1 : 23 ± 5˚C after Zeroing correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge test parameter measurement.
Note*3 : Not include temp. sensor accuracy



KEY FEATURES

- Support component test scanning
- Support 8 slots for plug-in (removable), up to 320 channels for one unit
- Option A130007 40 channels scan module, input up to 500VDC for IR test without switching
- Max. 8 salve units for multiple scanner (master/slave interface)
- Support Chroma LCR meter
- Support Chroma 3302/3252/11025 turn ration function
- Support 11200 CLC/IR meter for IR test
- Standard RS-232, GPIB and USB interface
- 13001 can be installed in Chroma Component ATE model 8800
- Support ICT applications

GPIB RS-232 USB CE

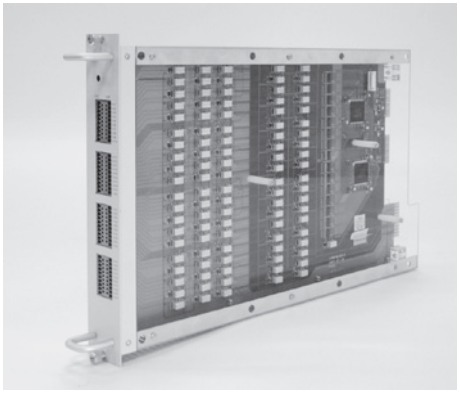
In the recent years, component is more complicated and more multiple. It makes all tests be performed which are very complicated and different. The problem is not only the course is complicated and apt to make mistakes, but also the manpower cost more.

Chroma 13001 can perform switch and scan test for L, C, R etc measurement combine with LCR Meter (Chroma model 3302/3252/11022/11025) include turn ration if the model has and IR test combine with Chroma 11200 CLC/IR Meter. It also offers short function for leakage inductance measurement. One unit could plug-in modules up to 8 slots. It is up to 320 channels for one unit if combined with 8 of option A1130007 40 channels module. It provides master and slave designed and up to 8 salve units for multiple scanner. User can control the output test circuit through RS-232, GPIB or USB interface.

Chroma 13001 can be installed in Chroma 8800 Component ATE for DUT which a lot of procedures to test like RJ-45 equipment, glass substrate, LCD glass substrate, printed circuit glass, PCB, EMI filter ICT application. The 8800 ATS can save the manpower cost, reduce the mistake, data management to improve quality and efficiency.

ORDERING INFORMATION

13001 : Component Test Scanner
13001 : Component Test Scanner (Slave)
A130000 : 6 BNC Test Lead
A130001 : 4 BNC Test Lead
A130002 : IR Test Lead
A130005 : Long Test Lead
A130007 : 40 Channels Scan Module



A130007 : 40 Channels Scan Module

SPECIFICATIONS	
Model	**13001 (MASTER & SLAVE)**
Mode	SCAN
Interface (Master only)	RS-232 , USB , GPIB
General	
Operation Environment	Temperature: 0˚C ~ 45˚C, Humidity: 15% to 80% R.H@≦ 40˚C
Power Consumption	150VA Max. (with rated load)
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)	310 x 440 x 573 mm / 12.2 x 17.32 x 22.56 inch
Weight	21 kg / 46.26 lbs (13001 main frame only, without module)

MODULE SPECIFICATIONS	
Module	**A130007**
Channel	40
Port	80
Max. voltage without switch	DC 500V
	AC 10V
Max. Current without switch	DC 1000mA
	AC 100mA

All specifications are subject to change without notice.



GPIB RS-232 RS-485

Magnetic component's heat comes from copper loss and iron loss. The copper loss caused by flowing current and wire resistance. The iron loss including Hysteresis Loss and Eddy Current Loss, mainly comes out from AC current. The inductance of magnetic component will drop unexpectedly if the temperature gets too high.

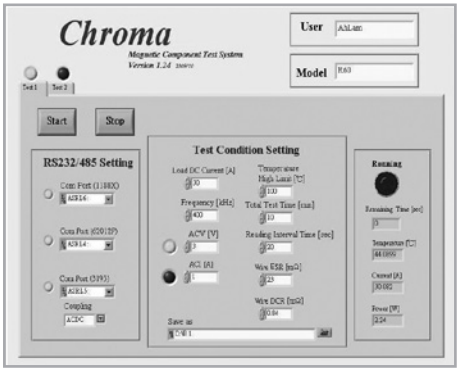
Chroma 1810 is a test system for detecting the power loss of magnetic component. It provides DC current and AC voltage to the component, and it has a temperature sensor detects the temperature on component. The analysis reports will record the result in computer by using test program. These statistic analysis reports are important for researching and quality control department.

ORDERING INFORMATION

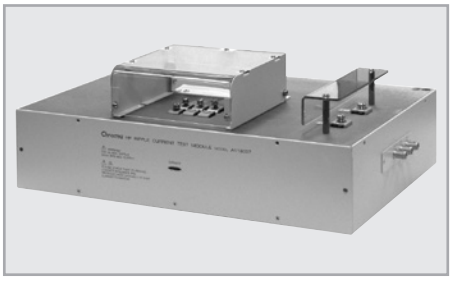
1810 : Magnetic Component Test System
A118016 : H.F. Voltage Step-up Module - 250V/2A max.
A118019 : H.F. Current Step-up Module - 16V/30A max.
A118037 : H.F. Current Step-up Module - 30V/25A max.
HF AC Tester : Refer to Model 11803
DC Source : Refer to Model 62012P-80-60
Power Meter : HIOKI 3193

KEY FEATURES

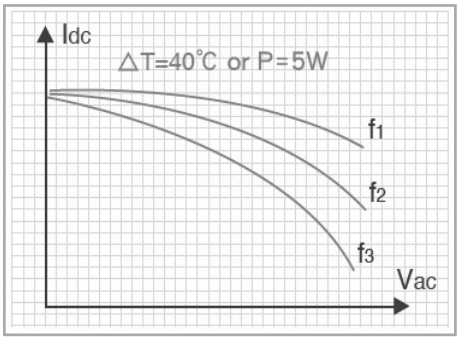
- Sine Wave Voltage : 20kHz~1MHz
- 60A max DC Bias Current
- Power Loss Detection
- Temperature Detection
- Statistic Report with Software Control
- Customized test module



Test program



A118037 : H.F. Current Step-up Module



Load Current (Idc) and AC Voltage (Vac) Curve



GPIB RS-232 RS-485 CE

In recent years, as components become more complicated and multi-channel along with other complex problems, the cost of tests has skyrocketed for manufacturers. Chroma 8800 component automatic test system (ATS) is developed to effectively help manufacturers reduce the test cost and product risk. This system is able to complete all measurements and tests in one single test program. This powerful feature save time and reduce human operation errors that decrease the enterprise risk due to improper tests. The employment of open architecture software provides users a flexible, powerful and cost-effective automated test system that is deemed the best solution for component tests.

Chroma 8800 component automatic test system integrates different test instruments in the system based on test requirements. The open architecture software offers corresponding solutions by various test programs and products that give customers highly flexible test combinations. In addition, user expandable test items are provided for editing if new requirements arise.

This automatic test system uses a unique test command optimization technology to prevent the repetitive control commands from sending to the system hardware devices. This technology improves the system test speed dramatically. Users create new test items based on their requirements using the test item editor. The users can expand the test items as needed.

The system's integrated statistical and management functions generate various test statistical reports and performing system administration. Statistical reports are very important in factories for research and design (R/D) evaluation, quality assurance (QA) verification and production tests. Chroma 8800's Window 2000/XP environments provide test engineers with a dedicated components automatic test system in a familiar Windows environment and allows accesses to resources provided by Windows.

Chroma 8800 component automatic test system can combine different testers and hardware according to the test requirements. For instance, Chroma 13001 performs multi-channel scan test for inductance, capacitance and resistance along with turn ration (if applicable) measurements when combining with the LCR Meters like Chroma 3302/3252/11022/11025. The 8800 can do IR test as well as leakage inductance measurement that is designed specially for short-circuit when combining with Chroma 11200 CLC/IR Meter. Chroma 13001 Component Test Scanner supports up to 320 channels per unit when 8 optional A1130007 40-channel scan modules are installed. Up to 8 slaves of Chroma 13001 can be expanded externally for an 8800 component ATS and up to 2880 channels (1 master plus 8 slaves) can be tested to fulfill the requirements for multi-channel tests.

KEY FEATURES

- Open architecture software
  - Expandable hardware support
  - Support instruments equipped with GPIB/RS-232 or RS485 interface
  - User editable test library (test Items)
  - User editable test programs
  - Statistical report
  - User privilege control
  - Test item/ program release control
  - Activity log
  - Support barcode reader
- Test command editor helps to improve test speed
- Comprehensive hardware modules provide highly accurate, repetitive measurements
- High test throughput by system test items
- High test throughput generated by system test items
- Cost effective
- Hardware expandable upon request
- Windows ® 2000/ XP based software

* Test items can be customized or created via the test item editor based on the requirements of various UUTs.

APPLICATIONS

- RJ-45 equipment (including LAN modules, Ethernet IC, PoE IC) test
- Glass substrate test (including solar panel)
- LCD glass substrate test
- Printed circuit glass (including touch panel) test
- PCB test
- EMI filter test
- Rechargeable battery test
- ICT applications

ORDERING INFORMATION

8800: Component Automatic Test System
LCR Meter : Refer to Model 11022 / 11025 / 3302 / 3252 series
Scanner : Refer to Model 13001 series
Scan Module : Refer to Model A130007 series
IR Meter : Refer to Model 11200 series
A800005 : PCI BUS GPIB Card (National Instrument)

All specifications are subject to change without notice.

SPECIFICATIONS

Accurate and highly reliable hardware devices :

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256KB
DRAM	128MB or higher
Hard drive	2.1GB or higher
CD-ROM	24X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
GPIB board	NI-PCI GPIB Card

Capacitor Leakage Current/ IR Meter		
Model		**11200 (650V)**
Main Function		Capacitor Leakage Current / IR Meter
Test Parameter		LC, IR
Test Signals Information		
Voltage		1.0 V~100 V, step 0.1 V; 101V~650 V, step 1V; ±(0.5% + 0.2V)
Charge Current Limit		V ≤ 100V: 0.5mA~500mA V > 100V: 0.5mA~150mA, 65W max. step 0.5mA; ±(3% + 0.05mA)
Measurement Display Range		LC : 0.001μA~20.00mA
Basic Measurement Accuracy *1		LC Reading : ±(0.3% + 0.005μA)
Measurement speed (Ext. Trigger, Hold Range, Line Frequency 60Hz)	Fast	77 ms
	Medium	143 ms
	Slow	420 ms
Function		
Correction		Null zeroing
Test Voltage Monitor		Vm: 0.0 V~660.0V; ±(0.2% of reading + 0.1V)
Charge Timer		0~999 sec.
Dwell Timer		0.2~999 sec.

Note*1 : 23 ± 5˚C after Null correction. Refer to Operation Manual for detail measurement accuracy descriptions.

LCR Meter	
Model	**11022**
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ
Test Signals	
Level	10 mV~1V, step 10 mV; ±(10% + 3 mV)
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; 0.01%
Measurement Display Range	
C (Capacitance)	0.001pF~1.9999F
L, M, L2 (Inductance)	0.001μH~99.99kH
Z (Impedance), ESR	0.01m~99.99MΩ
Q (Quality Factor) D (Distortion Factor)	0.0001~9999
θ (Phase Angle)	-180.00˚~ +180.00˚
Measurement Accuracy *1	±0.1%
Measurement Time (Fast) *2	21ms

Note*1 : 23 ± 5˚C after OPEN and SHORT correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions.

Note*2 : Measurement time includes sampling, calculation and judge of primary and secondary test parameter measurement

Component Test Scanner	
Model	**13001 (MASTER & SLAVE)**
Mode	SCAN
Interface (Master only)	RS-232 , USB , GPIB
General	
Operation Environment	Temperature: 0˚C ~ 45˚C, Humidity: 15% to 80% R.H@≦ 40˚C
Power Consumption	150VA Max. (with rated load)
Power Requirements	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz
Weight	Approx.20Kg (13001 main frame only, without module)
Size(WxHxD)	About 430mm x 311mm x 570mm

Module	A130007
Channel	40
Port	80
Max. voltage without switch	DC 500V
	AC 10V
Max. Current without switch	DC 1000mA
	AC 100mA

Other hardware devices :

■ Digital Multimeter (Chroma 12061 / Agilent-34401A / Keithley 2000), other types or brands of DMM supported upon request

■ Digital Storage Oscilloscope (TDS-3000 / 5000 / 7000 series), other types or brands of DSO supported upon request



KEY FEATURES

- Suit for electrical double layer capacitor production line automatic test, test parameter includes Static Capacitance and Internal Resistance (IR and ESR) (for EIAJ RC-2377 Test Method of Electrical Double Layer Capacitor)
- Open architecture software
  - Expandable hardware support
  - Support GPIB instruments&RS-232/RS485 interface
  - User editable test library
  - User editable test programs
  - Statistic report
  - User authority control
  - Release control
  - Activity log
  - Multi-UUT test capability for single-output PSU
  - Support barcode reader
- Measurement function: C/ IR / ESR (For EIAJ RC-2377)
- High test throughput
- Synchronized measurement in multi-channel reduce the test time
- One DC source and one DC load design
- Hardware protect circuit
- Microsoft® Word based evaluation report or UUT characterization
- Cost effective
- Other hardware expandable upon request
- Windows® 2000/ XP based software

GPIB

The Chroma Electrical Double Layer Capacitor Automatic Test System model 8801 is the ultimate solution for EDLC (electrical double layer capacitor) testing. The system includes a various range of hardware choice such as DC Sources, Electronic Loads, Timing Analyzer and LCR Meter. This flexibility combined with its open architecture software platform gives users a flexible, powerful and cost effective test system for almost all range of EDLC.

The Chroma 8801 EDLC ATS uses a unique test command optimization technology to prevent repetitive control commands from being sent to the system hardware devices. This improve test speed dramatically and makes the Chroma 8801 an ideal choice for both high speed production applications as well as design verification.
The Chroma 8801 EDLC ATS includes a sophisticated test executive which includes pre-written test items for standard EIAJ RC-2377 EDLC tests. User may also create new test items by using a special test item editing function, which users the capability to expand the test library unlimitedly.

This open architecture software also includes statistic and management functions, making the system capable to generate various test documents and performing system administration. Because the statistical reports are critically important in modern factories for R/D evaluation, QA verification and production tests, these functions are an integral part of the system.

Working under Window 2000/XP the model 8801 provides test engineers with a dedicated EDLC test system in an easy-to-learn Windows environment and allow access to resources provided by Windows.

This auto test system uses the unique test command optimization technology to prevent the repeating control commands from sending to the system hardware devices. This improves the system test speed dramatically and makes Chroma 8801, which uses open software architecture, but still highly efficient as optimized auto test system.

ORDERING INFORMATION

8801 : EDLC Automatic Test System
6011 : Timing/Noise Analyzer
80611N : Timing/Noise module
5004ATM : System Controller
A880100 : EDLC 10 Channels C/IR Scanner
A800005 : PCI BUS GPIB Card (National Instrument)
DC Load Module : Refer to Model 6330A Series
DC Source : Refer to Model 62000P Series
LCR Meter : Refer to Model 11022

All specifications are subject to change without notice.

SPECIFICATIONS

Accurate and highly reliable hardware devices :

System Controller	
MODEL	**PC/IPC**
CPU	Pentium III 600 or faster
SRAM	256kB
DRAM	128MB or higher
Hard drive	2.1GB or higher
CD-ROM	24X or faster
Monitor	15"
Keyboard	101 keys
I/O	Mouse/Print port
System Interface	GPIB/RS-232
GPIB board	NI-PCI GPIB Card

LCR Meter	
Model	**11022**
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ
Test Signals	
Level	10 mV~1V, step 10 mV; ±(10% + 3 mV)
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; 0.01%
Measurement Display Range	
C (Capacitance)	0.001pF~1.9999F
L, M, L2 (Inductance)	0.001μH~99.99kH
Z (Impedance), ESR	0.01m~99.99MΩ
Q (Quality Factor) D (Distortion Factor)	0.0001~9999
θ (Phase Angle)	-180.00°~ +180.00°
Measurement Accuracy *1	±0.1%
Measurement Time (Fast) *2	21ms

DC Source	
MODEL	**62000P Series**
Power rating	600, 1200W
Voltage range	0-100V/600V
Programmable current limit	Yes
Programmable OV point	Yes
Analog programming	Yes
Remote sensing	Yes
Line-drop compensation	5V

* Please refer to respective product catalogs for detail specifications.

Timing/Noise Analyzer	
MODEL	**6011**
NO. of input module	Up to 10
Noise measurement range	2V/0.4V
Low Pass Filter	Up to 20MHz
Input circuit	Differential input
Timing range	0~16/0~64 second/up to 8365 second
NO. of trigger input	4 sets
NO. of comparator	2 Input module
Controllable TTL bits	16 output
Controllable floating relay	6
NO. of multiplex input	10
NO. of multiplex output	2 for DMM & 2 for DSO

Electronic Load	
MODEL	**6330A Series**
Load mode	CC/CR/CV
Power rating	30-1200W
Voltage range	1-500V
Current range	Up to 240A
Slew rate	Up to 10A/μs
Measurements	Voltage/Current
Monitoring output	No
Current share measurement	No
Noise measurement	No
Voltage sense input	Yes
Sync dynamic	Yes

* Please refer to respective product catalogs for detail specifications.

Note*1 : 23 ± 5°C after OPEN and SHORT correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions.
Note*2 : Measurement time includes sampling, calculation and judge of primary and secondary test parameter measurement

Other hardware devices :

■ Digital Multimeter (Chroma 12061/Agilent-34401A/Keithley 2000), other types or brands of DMM supported upon request
■ Digital Storage Oscilloscope (TDS-3000/5000/7000 series), other types or brands of DSO supported upon request

All specifications are subject to change without notice.



KEY FEATURES

- Suit for electrical double layer capacitor leakage current long time test
- Test parameter includes leakage current
- Charge / discharge current limit function
- Voltage programmable, 0.9A maximum charge/ discharge per-channel
- 1μA ~ 100mA, 0 ohm input resistance leakage current meter
- Multi-tank control capability
- Up to 200 channels per-tank
- Sequence timing control
- Windows base control soft-panel
- Leakage Current, charge current and discharge current limit value programmable
- Leakage current GO/NG indication on fixtures

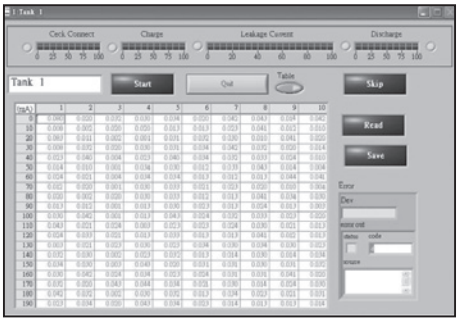
* Detail specification could be depended by customer requirement

The Chroma Electrical Double Layer Capacitor Leakage Current Monitoring System model 8802 is the ultimate solution for EDLC (electrical double layer capacitor) leakage current testing. The system includes modular monitoring boxes, and a control software to offer friend and flexible setup and multi-tank control, and a high power switching-mode rectifier (SMR) power supply. The design is adaptable for long time of EDLC leakage current test and huge amount of EDLC.

The System includes modular monitoring boxes. The monitoring box offers various range of leakage current meter from 1μA – 100mA. Each channel has individual 0 ohm input resistance leakage current meter. It suits the EDLC's low internal resistance characteristic and avoid that the meter existent effect inaccuracy leakage current measured. The box offers three circuits, charge, discharge and leakage current measurement circuit. Operators can finish the whole process in one system. Charge and leakage current circuit have design for reducing the charge voltage alterable affection and increasing charge full voltage time. It offers 1A maximum charge / discharge per channel. The box offers leakage current GO/NG indications in front panel for each channel. The leakage current GO/NG indications will be automatic latched before enter discharge mode. Operators are easy to see every DUT test result for picking up pass or fail.

The System includes Windows® base control soft-panel. The soft-panel has multi-tank control capability. It offers sequence timing control base on one tank with setup time for charge, measurement leakage current, and discharge. The process bar is easy for operators to see the test process. Operators can set current limit values of leakage current, charge current, and discharge current through the soft-panel. The system has 2.5V – 5.0V charge voltage programmable capability.

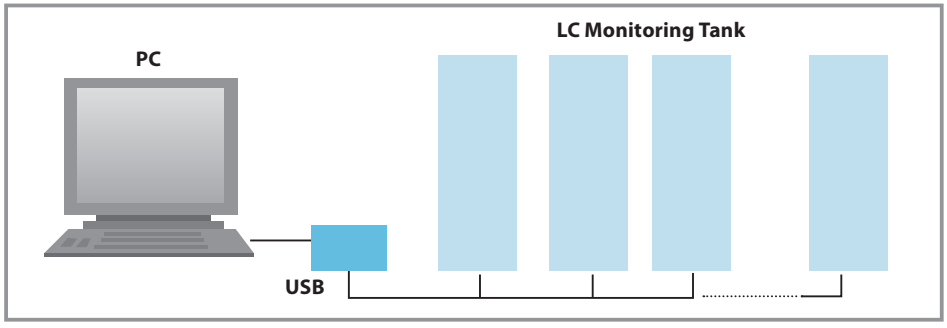
The system includes a high power switching-mode rectifier (SMR) power supply. It offers a static state charge voltage to reduce the tiny voltage variation to speed up the leakage current result arrive and increate the leakage current accuracy.



Monitoring Soft-Panel

*Leakage Current Reading Value from Software only for Reference

Chroma 8802 EDLC LC Monitoring System



All specifications are subject to change without notice.

SPECIFICATIONS

Leakage Current Monitoring Box*

Model		**A880200**
Main Function		EDLC Charge / Leakage Current / Discharge Monitoring Box
Charge Information		
Charge Voltage (from DC Power Supply 67300 Series)		2.5 ~ 6.0V, Step 0.1V, ±(1%)
Charge Current Limit		0.1A ~ 0.9A Per Channel, Step 0.1A; ±(10% +0.05A); 18A max Per Box
Leakage Current Judgment		
Accuracy *1		
Range	Normal Mode	
0.11mA	0.001mA~0.109mA	±(8% of reading +3% of range), Step 0.001mA;
1.1mA	0.11mA~1.09mA	±(8% of reading +3% of range), Step 0.01mA;
11mA	1.1mA~10.9mA	±(8% of reading +3% of range), Step 0.1mA;
110mA	11mA~110mA	±(8% of reading +3% of range), Step 1mA;
Indication		LED (Red Light for Fail)
Discharge Information		
Current Limit		0.1A ~ 0.9A Per Channel, Step 0.1A; ±(10%+0.05A); 18A max Per Box
General		
Operation Environment		Temperature: 10˚C ~ 40˚C Humidity: < 90%RH
Power Consumption		1000VA max
Power Requirement		180 ~ 264Vac, 47 ~ 63Hz
Dimension (H x W x D)		131 x 428 x 613 mm / 5.16 x 16.85 x 24.13 inch

Note*1 : 23±5˚C after Null correction. Refer to the Operation Manual for detail measurement accuracy description

*Detail specification could be depend by customer requirement

ORDERING INFORMATION

8802 : EDLC Leakage Current Monitoring System
A880200 : EDLC 20CH LC Monitoring Box
DC Power Supply : Refer to Model 67300 Series*

* Please refer detailed information to Model 67300 Series

Options of Passive Component Test Instruments

OPTIONS / MODEL		11021	11022	11025	1061A	1062A	1075	11020	3250	3252	3302	3312
A110104	SMD Test Cable	●	●	●	●	●	●	●	●	●	●	●
A110211	ComponentTest Fixture	●	●	●	●	●	●	●	●	●	●	●
A110212	Component Remote Test Fixture	●	●	●	●	●	●	●	●	●	●	●
A110232	4 BNC Test Cable with Clip #18	●	●	●	●	●	●					
A110234	High Frequency Test Cable	●	●	●	●	●	●	●	●	●	●	●
A110235	GPIB & Handler Card	●										
A110236	19" Rack Mounting Kit	●	●	●				●				
A110239	4 Terminals SMD Electrical CapacitorTest Box (Patent)		●	●	●	●	●	●		●	●	●
A110242	Battery ESR Test Kit	●	●	●								
A110244	High Capacitance Capacitor Test Fixture		●	●				●				
A110245	Ring Core Test Fixture		●	●								
A118030	PCB for SMD Capacitor		●	●	●	●	●	●		●	●	●
A132501	Auto Transformer Scanning Box (7.5~5mm Test Fixture)								●	●	●	●
A132574	Test Fixture for SMD Power Choke		●	●						●	●	
A133004	SMD Test Box	●	●	●	●	●	●	●	●	●	●	●
A133019	BNC Test Lead, 2M (single side open)	●	●	●	●	●	●	●		●	●	●
A165009	4 BNC Test Cable with Probe	●			●	●	●					

OPTIONS / MODEL		1310	1320	11300	13100	11800	11801	11810	11200	16502
A110235	GPIB & Handler Card								●	●
A110236	19" Rack Mounting Kit								●	●
A113008	4 Terminals Test Fixture for DIP 100A		●	●						
A113009	4 Terminals Test Fixture for SMD 60A		●	●						
A113010	4 Terminals PCB for SMD 100A		●	●						
A113011	4 Terminals Test Cable with Clip	●	●							
A115001	Foot Switch #10	●	●							
A118004	Series Test Fixture					●	●	●		
A118005	Parallel Test Fixture					●	●	●		
A118028	Series Test Fixture for Low Voltage						●	●		
A118029	Series Test Fixture for Low Voltage						●	●		
A118030	PCB for SMD Capacitor						●	●		
A131001	10 Channels Switching Test Fixture				●					
A165013	GPIB and Handler Interface with Temperature Compensation									●
A165014	Temperature Compensation Card									●
A165015	PT100 Temperature Probe									●
A165016	Pin Type Leads (flat)									●
A165017	4 Channels R Scanners									●
A165018	Test Fixture for SMD Power Choke									●
A165019	Pin Type Leads (taper)									●
A165022	4 Terminals Test Cable									●

All specifications are subject to change without notice.

Options of Passive Component Test Instruments


A110104

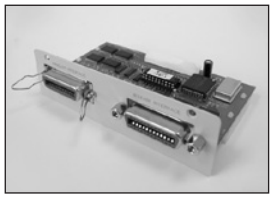


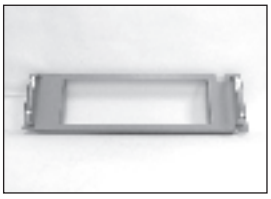
A110211

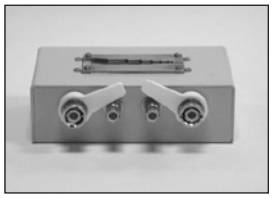

A110212


A110232


A110234

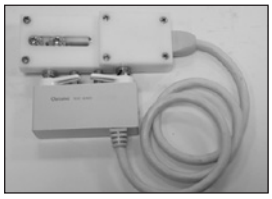

A110235

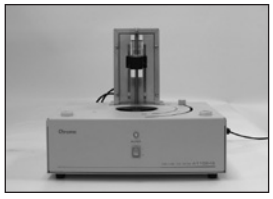

A110236

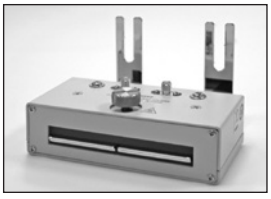

A110239

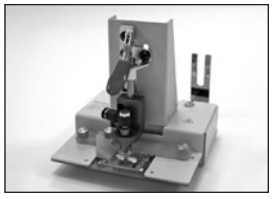


A110242


A110244

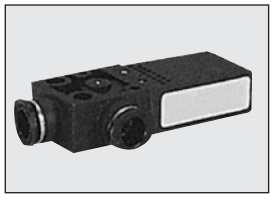

A110245

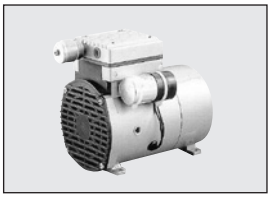

A113008


A113009 (with 113008)

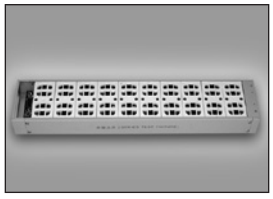

A113010


A113011

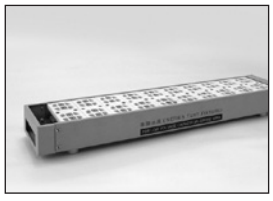

A113012

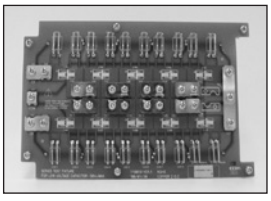

A113014

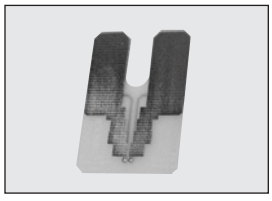

A115001


A118004

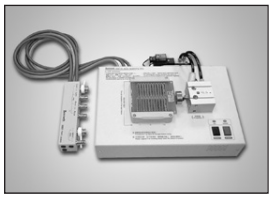

A118005

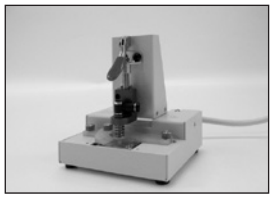

A118028


A118029


A118030

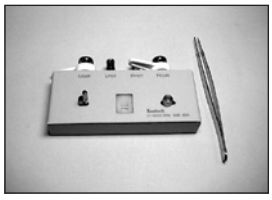

A131001

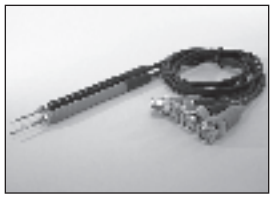

A132501

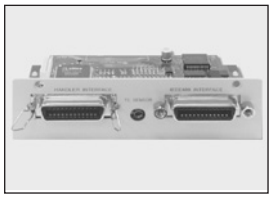

A132574

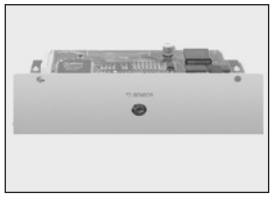


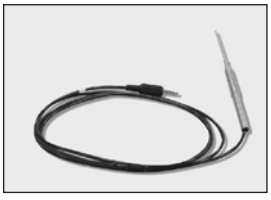
A133019

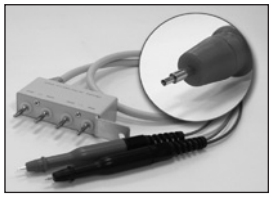

A133004


A165009

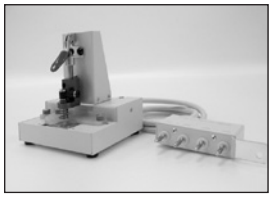

A165013

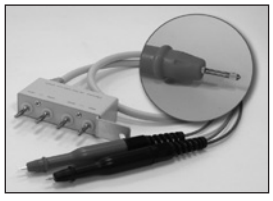

A165014

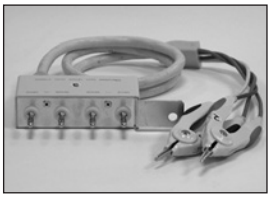

A165015


A165016


A165017


A165018


A165019


A165022

All specifications are subject to change without notice.

Electrical Safety Test Solution

Selection Guides 14-1
Multi-function Electrical Analyzer 14-3
Hipot Tester 14-9
Electrical Safety Test Scanner 14-14
Ground Bond Tester 14-16
Calibrator 14-17
Automatic Test System 14-18
Options of Electrical Safety Test Instruments 14-21

Electrical Equipment ATS

High Capacitance Electrolytic Capacitor ATS



Multi-function Electrical Analyzer

Hipot Tester

Electrical Safety Test Scannerr



Calibrator

Ground Bond Tester

Electrical Safety Tester Selection Guide – Main Function

Model	AC/DC HIPOT			Insulation Resistance		Ground Bond		Leakage Current Test *1	Impulse Winding Test	Others	Page
	AC/DC output	Cutoff current	Flashover Detection	DC output	Range	Current	Range	Power Capacity			
19020 (CE)	5kVac 6kVdc	AC:10mA DC:5mA	AC:20mA DC:10mA	1kV	50GΩ	-	-	-		10/4 channels	**14-9**
19032 (CE,TUV)	5kVac 6kVdc	AC:40mA DC:12mA	AC:20mA DC:10mA	1kV	50GΩ	30A 60A*2	510mΩ*3	300V / 20A max.*2			**14-3**
19032-P (CE)	5kVac 6kVdc	AC:100mA DC:25mA	AC:20mA DC:10mA	1kV	50GΩ	40A	510mΩ*3	300V / 20A max.*2		500VA Floating Output	**14-3**
19035 (CE)	5kVac 6kVdc	AC:30mA DC:10mA	AC:15mA DC:10mA	5kV	50GΩ	-	-	-		DCR 8 ports scanner	**14-5**
19036 (CE)	5kVac 6kVdc	AC:100mA DC:25mA	AC:20mA DC:10mA	5kV	50GΩ	-	-	-	6kV	10 channels	**14-7**
19052 (CE,TUV, UL)	5kVac 6kVdc	AC:30mA DC:10mA	AC:15mA DC:10mA	1kV	50GΩ	-	-	-			**14-10**
19053 (CE)	5kVac 6kVdc	AC:30mA DC:10mA	AC:15mA DC:10mA	1kV	10GΩ	-	-	-		8 ports scanner	**14-10**
19054 (CE,TUV, UL)	5kVac 6kVdc	AC:30mA DC:10mA	AC:15mA DC:10mA	1kV	10GΩ	-	-	-		4 ports scanner	**14-10**
19055 (CE)	5kVac 6kVdc	AC:100mA DC:25mA	AC:20mA DC:10mA	5kV	50GΩ	-	-	-		500VA Floating Output, corona detection	**14-11**
19056 (CE)	10kVac	AC:20mA	20mA	-	-	-	-	-			**14-12**
19057 (CE)	12kVdc	DC:10mA	10mA	5kV	50GΩ	-	-	-			**14-12**
19057-20 (CE)	20kVdc	DC:5mA	10mA	5kV	50GΩ	-	-	-			**14-12**
19071 (CE,TUV, UL)	5kVac	AC:20mA	AC:15mA	-	-	-	-	-			**14-13**
19073 (CE,TUV, UL)	5kVac 6kVdc	AC:20mA DC:5mA	AC:15mA DC:5mA	1kV	50GΩ	-	-	-			**14-13**
19572 (CE)	-	-	-	-	-	45A	510mΩ*3				**14-16**

Note *1 : Leakage current Test is required by standard of Electrical Appliance, Medical Equipment, IT product and Video/Audio Appliance etc. (IEC 60065, 60335, 60601, 60950 etc.)

Note *2 : Options

Note *3 : Depend on current output

All specifications are subject to change without notice.

Electrical Safety Tester Selection Guide - Sub-Function and Remote

Model	Sub-Function										Remote							Page
	OSC	GFI	PA	GC	Smart Start	Scan	HFCC	HVCC	HSCC	Sub-Step	RS-232	RS485 RS422	GPIB	9 pin D-SUB	Handler	USB	LAN	
19020	●		●								●		●		●			**14-9**
19032	●		●		●	●					●		●	●				**14-3**
19032-P	●	●	●		●	●					●		●		●	●		**14-3**
19035	●	●	●			●				●	●		●		●			**14-5**
19036	●	●	●			●	●		●	●	●		●		●	●	●	**14-7**
19052	●	●	●	●	●						●		●	●	●			**14-10**
19053	●	●	●	●	●	●					●		●	●				**14-10**
19054	●	●	●	●	●	●					●		●	●				**14-10**
19055	●	●	●			●	●				●		●	●	●	●		**14-11**
19056	●	●	●				●	●			●		●	●				**14-12**
19057			●				●	●			●		●	●				**14-12**
19057-20			●				●	●			●		●	●				**14-12**
19071	●	●	●	●	●									●				**14-13**
19073	●	●	●	●	●						●	●		●				**14-13**

Calibrator Selection Guide

Model	Primary	Function Calibrator Level	Description	Page
9102	Hipot Calibrator	AC 6Kv / DC 10kV / ACI/DCI 200mA / GB 32A, 100mΩ / IR 1000MΩ	For Hipot testing equipment calibration and verification	**14-17**



KEY FEATURES

- Floating Output Design meet EN50191 (19032-P)
- 500VA Power Rating (19032-P)
- Five instruments in one: AC Hipot, DC Hipot, Insulation Resistance, Ground Bond and Leakage Current (Option)
- Twin-Port™ function (Patent)
- Programmable output voltage to 5kV AC and 6kV DC
- Insulation resistance to 50GΩ/1000V DC
- Ground bond up to 30A (Option up to 40A / 60A)
- Open/Short check(OSC)
- ARC detection (Flashover)
- Password Protected front panel lockout
- Storage of 50 Tests Setups with 100 Steps per setup
- Optional dynamic leakage current auto scanning (A190305/A190306/A190307/ A190308)
- Standard RS-232 Interface
- Standard GB Offset KIT, SCANNER Interface
- Optional GPIB Interface
- Optional Bar-code Scanner
- Optional EST software for test programming, data mining, statistic
- UL, TüV ,CE mark (Model 19032)
- CE mark (Model 19032-P)

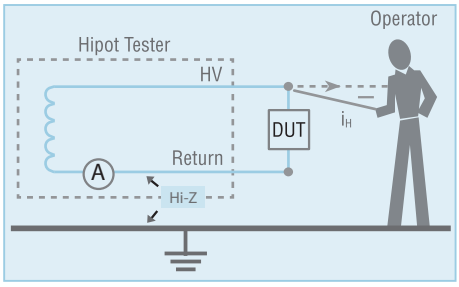
GPIB RS-232 CE

KEY FEATURES - A190308

- Plug in to 19032 for Hipot, Line Leakage Auto Scan
- Five Different Kinds Human Body RC Network
- Four measurements mode : Normal, Reverse, Single Fault Normal, Single Fault Reverse
- Up to 20A Line Input Current Capability
- Build in A/D and Calibration Data Memory Easy to Install
- Multiple Display Mode Voltage-LC, Amp-LC, VA-LC
- Earth LC, Enclosure LC, Patient LC and Patient Auxiliary LC Test

The 19032/19032-P are 5 in 1 Production Safety Analyzer. It can perform AC/DC Hipot, insulation resistance, grounding resistance and dynamic leakage current 5 safety test functions for electronic products. The dynamic leakage current scan device (A190305/A190307) can be connected externally or built in to 19032 Series. It is capable of measuring the complicate safety requirements with easy installation and operation, and is the finest auto safety tester to increase production test efficiency.

Model 19032/19032-P have Twin-Port™ and OSC function to minimize the test time greatly; along with the super large screen display and intelligent operation mode, 19032 is the most powerful single unit for auto safety tester.



Floating output

ORDERING INFORMATION

19032-P : Electrical Safety Analyzer 500VA
19032 : Electrical Safety Analyzer
A190301 : 8HV Scanning Box
A190302 : 5HV/3GC Scanner
A190303 : 3HV/5GC Scanner
A190304 : 8HV Scanner
A190305 : Line Leakage Current Scanner (generally)
A190306 : Hipot/Line Leakage/Probe Scanner (10A)
A190307 : L-N Scanner & Leakage Current Scanner
A190308 : Hipot/Line Leakage/Probe Scanner (20A)
A190313 : 500VA Isolation Transformer
A190314 : 1000VA Isolation Transformer
A190316 : Dummy Load
A190317 : Bar Code Scanner
A190334 : Ground Bond 40A (19032)
A190336 : 8HV/8GB Scanning Box
A190337 : Ground Bond 60A (19032)
A190338 : 19001 EST Software
A190343 : 19" Rack Mounting Kit (19032)
A190344 : HV Gun
A190349 : Universal Corded Product Adapter
A190350 : HV/LC/LAC/DC Probe Scanner (20A)
A190353 : 4HV/4GC Scanner
A190355 : 19" Rack Mounting Kit (19032-P)
A190356 : GPIB Interface (19032-P)
A190508 : GPIB Interface (19032)
A190708 : ARC Verification Fixture



19032

INTERNAL SCANNER FUNCTION FOR MODEL 19032/19032-P

Option		Hipot		GB		LC						
No.	Name	Ports	Voltage Max.	Ports	Current Max.	Power output	Reading	LC probe	Earth LC	Touch LC	Patient LC	Patient Aux LC
A190301	9030A (Ext.)	8 ports	5KVac 6KVdc	-	-	-	-	-	-	-	-	-
A190336	9030AG	8 ports		8 ports	40A	-	-	-	-	-	-	-
A190302	6000-01	5 ports		3 ports	30A	-	-	-	-	-	-	-
A190303	6000-02	3 ports		5 ports	30A	-	-	-	-	-	-	-
A190304	6000-03	8 ports		-	-	-	-	-	-	-	-	-
A190353	6000-11	4 ports		4 ports	40A *1	-	-	-	-	-	-	-
A190305	6000-04	L+N to E P to S		-	-	300V 10A	RMS	-	●	-	-	-
A190306	6000-05			-	-	300V 10A	RMS	P1&P2	●	●	●	●
A190308	6000-07			-	-	300V 20A	RMS	P1&P2	●	●	●	●
A190350	6000-08			-	-	300V 20A	RMS & Peak	P1&P2	●	●	●	●

Note*1 : GB Max Current 40A for Model 19032-P, and 30A for Model 19032

All specifications are subject to change without notice.

SPECIFICATIONS

Model	19032	19032-P
Mode	**AC/DC/IR/GB/LC**	
Withstanding Voltage Test		
Output Voltage	DC : 0.05 ~ 6kV, AC : 0.05 ~ 5kV	
Load Regulation	±(1% of reading +0.1% of range)	±(2% of reading +0.1% of range)
Voltage Regulation	2V	
Voltage Accuracy	±(1% of reading+0.1% of full scale)	±(2% of reading +0.1% of ull scale)
Cutoff Current	DC : 12mA , AC : 40mA	DC : 25mA , AC : 100mA
Current Resolution	0.1 μA DC ; 1 μA AC	
Current Accuracy	±(1% of reading +0.1% of range)	±(2% of reading +0.5% of range)
Output Frequency	50Hz / 60Hz	
Test Time	0.3 ~ 999 sec , continue	
Ramp Time	0.1 ~ 999 sec, Off	
Fall Time	0.1 ~ 999 sec, Off	
Waveform	Sine wave	
Insulation Resistance Test		
Output Voltage	DC : 0.05 ~ 1kV	
Voltage Resolution	2V	
Voltage Accuracy	±(2% of reading + 0.5% of range)	±(2% of reading + 0.5% of range)
IR Range	0.1MΩ ~ 50GΩ	
Resistance Resolution	0.1MΩ	
Resistance Accuracy	5% typical	
Ground Bond Test		
Output Current	AC : 1 ~ 30A	AC : 3 ~ 40A
Current Accuracy	±(1% of reading + 0.2% of range)	±(1% of reading + 0.2% of range)
GR Range	10mΩ ~ 510mΩ	
Resistance Resolution	0.1mΩ	
Resistance Accuracy	± (1% of reading + 0.1% of full scale)	± (1% of reading + 0.1% of full scale)
Test Method	4 wires	
Flashover Detection		
Setting Mode	Programmable setting	
Detection Current	AC : 20mA, DC : 10mA	
Secure Protection Function		
Ground Fault Interrupt	-	0.5mA ±0.25mA AC
Floating Output to ground	-	<3mA, front output only (meet EN50191)
Panel Operation Lock	Present password	
Interlock	YES	
GO/NG Judgment Window		
Indication,Alarm	GO : Short sound,Green LED NG : Long sound, Red LED	
Data Hold	Least tests data memories	
Memory Storage	50 setups with up to 100 groups recall	
Interface		
Interface	9pin D-sub I/O control / RS-232 / GPIB (Optional)	
General		
Operation Environment	Temperature : 0˚C ~ 40˚C, Humidity : 20 % ~ 80 % RH	
Power Consumption	No load : < 100 W With rated load : 800 W	No load : < 100W Rated load : 1000W Maximum load : 1200W
Power Requirements	90~132Vac or 180~264Vac, 47~63Hz	
Dimension (H x W x D)	133 x 430 x 470 mm / 5.24 x 16.93 x 18.66 inch	133 x 428 x 500 mm / 5.22 x 16.85 x 19.69 inch
Weight	25.5 kg / 56.17 lbs	24 kg / 52.86 lbs
Cetification	CE, TüV	CE

Model	A190305~A190350 * (6000-04~08)
Support Mode	**AC/DC/IR/LC**
DUT Input Power Capacity	AC : 300V / 10A / 20A max.
Short Protection	20A, 250V fuse for DUT shorted.
Measurement Mode	
Input Characteristic	DC ~ 1MHz Input Impedance : 1M//20pF
Measurement Mode	Normal, Reverse, Single Fault Normal, Single Fault Reverse
Measurement Devices (Five measure device)	UL 544 NP, UL 544 P, UL 1563, UL 60601-1, IEC60601-1, UL 3101-1, UL/IEC 60950, UL 1950-U1*, UL 2601-U1*, IEC60990
Probe Connection	Line to Ground, Line to P2, P1 to P2
HI-LO Limit	
LC HI-LO Limit	0 ~ 9.99mA, 1 μA resolution
Current HI-LO Limit	0 ~ 19.99Amp*
VA HI-LO Limit	0 ~ 4400VA
VA Resolution	0.1VA

*Different options have different specification

Model	A190350 (6000-08)
Special Functions	LC DC Measurement U1, U2 (UL-1950) Hot Swap



Model 19035
19035-M
19035-S

FUNCTIONS

- 5KVAC & 6KV DC Hipot Test
- 0.1MΩ~50GΩ /5kV IR Test
- 50mΩ~100kΩ DCR Test
- 8 Channel Scanner

KEY FEATURES

- SUB-STEP Function
- Open / Short Check (OSC)
- GFI Human Protection
- Flashover Detection
- Key Lock Function
- RS-232 Interface (standard*1)
- GPIB & HANDLER (optional)
- Friendly Interface
- CE Mark



GPIB RS-232 HANDLER CE

Wound Component Testing Solution

The quality verification test items for Wound Component consist of AC/DC Hipot tests, Insulation Resistance (IR) test and Impulse Winding test. Chroma integrates above tests into 19035 Wound Component EST Scanner series performing safety tests for motor, transformer, heater related wound products. The wound component manufacturers in quality verification testing not only have reliable quality but also control product quality efficiently.

The 19035 Series support 5kVac/6kVdc high voltage output to conform with withstand test requirement for Wound Component, its maximum output current can up to 30mA. Insulation Resistance (IR) test measurement range is 1MΩ to 50GΩ and voltage output can up to 5kV. DCR can measure basic specification for Wound Component and also check the connection before testing safety withstand.

The 19035 Series also include powerful functions in Flashover detection and Open/ Short Check (OSC) as well as programmable voltage, time parameters, etc. for various DUTs features to promote testing reliability and product quality.

Applications

The 19035 is a comprehensive safety tester designed for motor, transformer, heater related wound component requirements. Most of wound components are equipped with multiple winding such as 3-phase motor, dual winding transformer, and etc.. The 19035 can be used to reach multiple points completion in one test by 8-channels scanning instead of switching test point manually. It saves test time and human cost.

The 19035 provides OSC and DCR functions to verify if bad contact or short circuit happened during test procedure. It solves the Wound Components of motor, transformer, etc occurred contact problems, so that test quality greatly enhanced and the life of test device prolonged.

ORDERING INFORMATION

19035 : Wound Component EST Scanner
19035-M : Wound Component EST Scanner
19035-S : Wound Component EST Scanner
A190345 : High Voltage cable for Impulse Winding Tester Connection.
A190346 : RS-232 cable for Impulse Winding Tester Connection.
A190347 : GPIB & Handler & Temperature Interface
A190348 : RS-232 Interface
A190351 : 8ch-16ch HV box for 19035
A190358 : Handler Indicator
A190359 : 16ch HV External Scanning Box (H,L,X)
A190702 : 40KV HV Test Probe



A190351 : 8CH-16CH Scan Box



A190359 : 16ch HV External Scanning Box (H,L,X)

All specifications are subject to change without notice.

SPECIFICATIONS			
Model	**19035**	**19035-M**	**19035-S**
Mode	**ACV / DCV / IR / DCR -8CH**	**ACV / DCV / IR / DCR -8CH / IWT**	**ACV / DCR -8CH**
Channel Programming	H/L/X in 8CHs	H/X in CH 1,2,3,5,6,7 L/X in CH 4,8	H/L/X in 8CHs
Withstanding Voltage Test			
Output Voltage	AC:0.05 ~ 5KV, DC : 0.05 ~ 6kV		AC:0.05 ~ 5KV
Load Regulation	1% of setting + 0.1% of full scale.		
Voltage Resolution	2V		
Voltage Accuracy	1% of setting + 0.1% of full scale.		
Cutoff Current	AC : 30mA, DC : 10mA		
Current Resolution	AC : 1 μA, DC : 0.1 μA		
Current Accuracy	1% of reading + 0.5% of range. (1% of reading + 5% of total current)		
Output Frequency	50Hz / 60Hz		
Test / Ramp / Fall / Dwell Time	0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off		
Waveform	Sine wave		
Insulation Resistance Test			
Output Voltage	DC : 0.05 ~ 5kV		--
Voltage Resolution	2V		--
Voltage Accuracy	1% of setting + 0.1% of full range		--
IR Range	0.1MΩ ~ 50GΩ		--
Resistance Resolution	0.1MΩ		--
Resistance Accuracy	≧1000V 1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range) 1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range) 10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)		--
	500V~1000V 0.1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range) 1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range) 10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)		--
	< 500V 0.1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% of full scale		--
Scanner Unit	8 ports, ±phase (4W DCR only 4 ports)		
DC Resistance Measurement			
Test Signal	<DC 10V. < DC 140mA		
Measurement mode	2 terminals (2W) / 4 terminals(4W) measurement selectable ; Range : 50mΩ~500KΩ		
Measurement Accuracy (2W/ 4W)	1Ω (4W only)		
	10Ω		
	100Ω		
	1kΩ		
	10kΩ		
	100kΩ		
Flashover Detection			
Setting Mode	Programmable setting		
Detection Current	AC : 1mA ~ 15mA, DC : 1mA ~ 10mA		
Secure Protection Function			
Fast Output Cut-off	0.4ms after NG happen		
Ground Fault Interrupt	0.5mA ±0.25mA AC, ON/OFF		
Panel Operation Lock	Present password		
Interlock	YES		
GO/NG Judgment Window			
Indication, Alarm	GO : Short sound, Green LED; NG : Long sound, Red LED		
Data Hold	Least tests data memories		
Memory Storage	50 instrument setups with up to 20 test steps		
Interface			
Interface	RS-232*1 (Standard), RS-232*1 or GPIB & Handler & Temperature interface (Optional)		
General			
Operation Environment	Temperature: 0˚C ~ 45˚C, Humidity: 15% to 95% R.H@≦40˚C		
Power Consumption	500VA		
Power Requirements	90~132Vac or 180~264Vac, 47~63Hz		
Dimension (H x W x D)	133x430x470mm/ 5.24x16.93x18.50 inch	133x430x470mm/ 5.24x16.93x18.50 inch	133x430x470mm/ 5.24x16.93x18.50 inch
Weight	Approx.20 kg/44.09 lbs		

All specifications are subject to change without notice.



KEY FEATURES

- 5 in 1 composite analyzer scanner (AC / DC/ IR / IWT / DCR)
- 5kV AC/6kV DC Hi-pot test
- 5kV Insulation Resistance test
- Impulse Winding Tester (IWT)
- IWT high sampling rate(200MHz)
- 10 channels 4-wire DCR test
- △ /Y motor DCR calculation
- HSCC (High Speed Contact Check)
- Support max. 40 channels scanning test
- English, Traditional Chinese and Simplified Chinese User Interface
- USB waveform storage& Hand copy function
- Graphic color display
- Standard LAN,USB,RS232 interface
- GFI (Ground Fault Interrupter) for bod protection

Chroma 19036 is the industry’ s first test device that combines the functions of impulse tester and hipot analyzer for testing the impulse of wound components. The tester has 5kVac/6kVdc high voltage output and 6kV impulse voltage that can comply with the wound components test demands by providing maximum 10 channels output for multichannel scanning tests to save time and labor costs.

The quality verifications of wound components include AC/DC hipot test, IR test and impulse winding test. Chroma integrates the above tests into 19036 Wound Component EST Analyzer that can perform safety tests on wound products like motors, transformers and heaters to verify their quality with efficiency.

Since the poor insulation of coil often causes layer short, cross-line short and pin short, layer short circuit test is required for coils as the reason could be initial design error, poor fabrication process or bad insulation material. Moreover, the wound components for safety tester need to be tested with Impulse Winding Tester (IWT) to check the insulation ability of windings. It can measure multiple test points in one test instead of switching test points manually.

Combining with impulse winding test function the 19036 has 6kV impulse voltage, AREA SIZE COMPARISON, DIFFERENTIAL AREA COMPARISON, FLUTTER DETECTION and LAPLACIAN DETECTION judgment that are effective methods for detecting poor coil insulation.

19036 is equipped with a patented 4-wire test port that has both Drive and Sense in compliance with hipot specification to provide 10 channels of 4-wire test functions. Up to 40ch of scanning test can be conducted when 19036 is configured with 16ch scan box.

LAN USB RS-232 CE

19036 also has HSCC functions to check for any bad contact prior test. It can solve the test fail problems caused by motor or transformer bad contact and improve the test quality as well as prolong the test equipment life。

The motor test standard such as UL 1004-1 requires high power safety tester. For the user that needs to test large leakage current or perform large equipment electrical safety tests, Chroma 19036 that has the capability of outputting and measuring AC 100mA/ DC 20mA with high power hipot tests and other safety tests integrated into one is the most suitable device to bring the maximum benefit to production line and quality assurance. The 500VA design is also compliant with IEC/UL for output power requirements.

Product Applications

Rotating Motor Component: △/Y-type Motor, Fan , Rotor/Stator

The application of motors from EV motor, server motor to actuator motor and fan, impulse test, hipot tests and DC resistance tests need to be performed in the fabrication process to ensure the product quality. The JB/T 7080 GB mechanical industry standards and regulations are followed for tests.

The DCR measurement on the 19036 can perform four-wire test and each single endpoint can cover Drive and Sense for 10 independent channels to test 3 DUTs in one scan. It improves the production capacity. Each channel can be set to high voltage output / reference port / close separately.

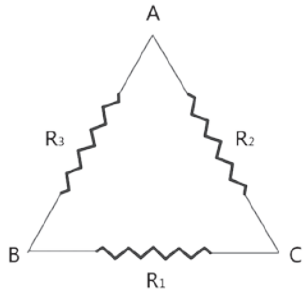
Test Items for Y-type Motor

- HSCC / OSC
- DCR Test
- Impulse Test
- Hi-pot –Sub step test



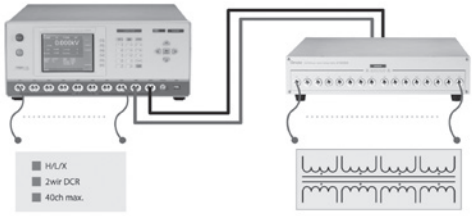
Winding of △-type and Y-type Motor

To solve the problem of unable doing DCR measurement on the △-type and Y-type motor winding (no center-tapped), Chroma 19036 adds △-type and Y-type motor winding DCR calculation function to get the value of R1,R2 and R3 directly.



40 Channels Scanning Test

A190359 scanner has 16 test channels and each of them can set to H (high voltage output), L (reference point) or Off . The combination of 19036 and A190359 can apply to in small amount but diversified DUTs or with multiple PINs as well as cell type production line to complete all test within one station.



ORDERING INFORMATION

19036 : Wound Component EST Analyzer
A190359 : 16ch HV External Scanning BOX

All specifications are subject to change without notice.

SPECIFICATIONS		
Model		**19036**
AC/DC Withstanding Test		
Output Voltage		AC: 0.05~5.0kV / DC : 0.05~6.0kV
Load Regulation		≦(1% of output + 0.1% of full scale)
Voltage Accuracy		± (1% of setting + 0.1% of full scale)
Voltage Resolution		2V
Cutoff Current		AC: 0.001mA~120mA (Voltage ≦4kV)
		AC: 0.001mA~100mA (Voltage >4kV)
		DC: 0.0001mA~20mA
Current Accuracy		± (1% of reading + 0.5% of range)
Test Timer		Test time:0.3 ~ 999 sec., and continue
		Ramp / Fall / Dwell time:0.1 ~ 999 sec., and off
Output Frequency		50Hz / 60Hz
Waveform		Sine wave
Insulation Resistance Test		
Output Voltage		DC : 0.050 ~ 5.000kV, Steps:0.002kV
Load Regulation		≦(1% of output + 0.1% of full scale)
Voltage Accuracy		± (1% of setting + 0.1% of full scale)
IR Range		0.1MΩ ~ 50GΩ
Resistance Accuracy	>1kV	1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range)
		1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range)
		10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)
	≧0.5kV and ≦1kV	0.1MΩ ~ 1GΩ : ± (3% of reading + 0.1% of full range)
		1GΩ ~ 10GΩ : ± (7% of reading + 2% of full range)
		10GΩ ~ 50GΩ : ± (10% of reading + 1% of full range)
	<0.5kV	1MΩ ~ 1GΩ : ± (5% of reading + (0.2*500/Vs)% of full scale)
Impulse Winding Test		
Applied Voltage, Step, and Energy		0.5 ~ 6kV ,10V Step ,Max 0.21 Joules
Inductance Test Range		More than 10uH
Sampling Speed		10bit / 5ns (200MHz)
Sampling Range		11 Range
Pulse Number		Pulse Number: 1~32, Dummy Pulse Number: 0~9
Detection Mode		Area / Differential Area ； Flutter/ Laplacian Detection
DC Resistance Measurement		
Test Signal		<DC 10V , <DC 200mA
Measurement Range		0.1mΩ ~ 500kΩ
Measurement Accuracy	100mΩ	± (0.5% of reading + 1% of full range)
	1Ω	± (0.5% of reading + 0.2% of full range)
	10Ω	± (0.5% of reading + 0.05% of full range)
	100Ω	± (0.5% of reading + 0.05 % of full range)
	1kΩ	± (0.5% of reading + 0.05 % of full range)
	10kΩ	± (0.5% of reading + 0.05 % of full range)
	100kΩ	± (0.5% of reading + 0.05 % of full range)
Flashover Detection		
Detection Current		Programmable setting AC : 20mA ； DC : 10mA
Contact Check Function		
Contact Check		OSC (open/short check)
		HFCC (High Frequency Contact Check)
		HSCC (High Speed Contact Check)
Electrical Hazard Protection Function		
Ground Fault Interrupt		0.5mA ±0.25mA AC, ON/OFF
Key Lock		Yes (password control)
Interlock		YES
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED
Memory Storage		200 sets, max. 20 steps per set
Interface		
Standard : RS232, Handler ,USB , LAN interface		
General		
Operation Environment		Temperature: 0˚C ~ 45˚C, Humidity: 15% to 95% R.H@≦ 40˚C
Power Consumption		No Load: <150W ; Rated Load: <1000W
Power Requirements		90 ~ 264Vac, 47 ~ 63Hz
Dimension (W ×H ×D)		428 × 177 × 500mm / 16.850 x 6.969 x 19.685 inch
Weight		26kg / 57.32 lbs



KEY FEATURES

- 10/4 channels in one design
- 10 sets of sync output and measurement
- AC/DC/IR 3 in 1 EST test
- Master/Slave link - 10 units max.
- Programmable V-output and limits
- OSC (Open/Short Check)
- Flashover detection
- 1MΩ~50GΩ insulation resistance test
- Standard RS-232 / Handler interface
- Optional GPIB interface
- Large LCD panel
- Panel lockup function
- Easy operating interface
- CE Mark
- High Efficiency Hipot Test Solution

High Efficiency Hipot Test Solution

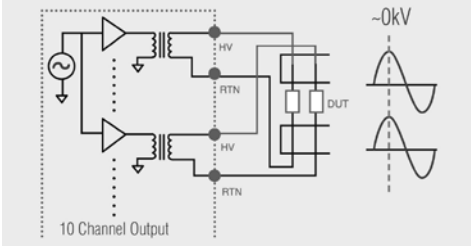
Hipot test is one of the major test items in electrical safety test. All electrical components and products including transformers, capacitors, power supplies, chargers and home appliances all require hipot test.

With more than 20 years experience in developing the instruments for test and measurement, Chroma creates the 19020 multi-channel hipot tester with a brand new architecture. It can measure the hipot leakage current of all channels at the same time and conduct tests on 100 DUTs at most simultaneously.

There is no need to purchase various Hipot testers to save the production line space if Chroma 19020 is in use. Its one time multi-channel test can increase the efficiency of electrical regulatory test. It improves the productivity and reduces the risk of test for the products that require hipot test only.

Chroma 19020 also has powerful functions in Flashover detection and Open/Short Check. It contains several international patents and is the best tool for electrical regulatory hipot test as not only reliable quality can be obtained, highly efficient test platform can be created.





19020-synchronized output

GPIB RS-232 HANDLER CE

World's First Sync Hipot Test (Patent Registered)

Chroma 19020 has equipped with the world's first sync hipot test function that one single unit can perform 10 channels sync output and measurements simultaneously. Maximum 10 units (master & slave) can be controlled to have 100 channels in total. They can be grouped for output to avoid creating voltage difference due to adjacent tests as well as to improve the productivity.

ORDERING INFORMATION

19020 : Multi-Channel Hipot Tester
19020-4 : Multi-Channel Hipot Tester (4CH)
19021 : Multi-Channel Hipot Tester (AC)
19022 : Multi-Channel Hipot Tester (DC/IR)
19022-4 : Multi-Channel Hipot Tester (DC/IR/4CH)
A190200 : 19" Rack Mounting Kit for 19020 Series
A190508 : GPIB Interface
* HV cable is option for customize requirement

SPECIFICATIONS

Model	19020	19021	19022
Mode	**ACV/DCV/IR/ Multi-Channel**	**ACV/Multi-Channel**	**DCV/IR/Multi-Channel**
Withstanding Voltage Test			
Output Voltage	AC : 0.05 ~ 5kV, DC : 0.05 ~ 6kV	AC : 0.05 ~ 6kV	DC : 0.05 ~ 8kV
Load Regulation	2% of setting + 0.1% of full scale		
Voltage Resolution	2V		
Voltage Accuracy	2% of setting + 0.1% of full scale		
Cutoff Current	AC : 0.01~10mA, DC : 0.001~5mA	AC : 0.01 ~ 8mA	DC : 0.001 ~ 3.5mA
Current Resolution	AC : 1 μA, DC : 0.1 μA		
Current Accuracy	1% of setting +0.5% of full scale		
Output Frequency	50Hz / 60Hz		
Flashover Detection	AC : 1mA ~ 15mA, DC : 1mA ~ 5mA , step 0.1mA		
Test Time	0.03 ~ 999.9 sec, continue		
Ramp Time	0.1 ~ 999.9 sec, off		
Fall Time	0.1 ~ 999.9 sec, off		
Dwell Time	0.1 ~ 999.9 sec, off		
Waveform	Sine wave		
Insulation Resistance Test			
Output Voltage	DC : 0.05 ~ 1kV	-	DC : 0.05 ~ 1kV
Voltage Resolution	2V		
Voltage Accuracy	2% of setting + 0.1% of full range		
IR Range	1MΩ ~ 50GΩ		
Resistance Accuracy	≥ 500V	1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range 1GΩ ~ 10GΩ : ± 7% of reading + 0.2% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range	
	< 500V	1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% of full scale	
Test Time	0.3 ~ 999.9 sec, continue		
Memory Storage			
Save/Recall	30 instrument setups with up to 10 test steps can be stored into and recalled from the internal memory		
Secure Protection Function			
Fast Output Cut-off	0.4ms after NG happen		
Panel Operation Lock	Present password		
Interlock	YES		
GO/NG Judgment Window			
Indication, Alarm	GO : Short sound, Green LED NG : Long sound, Red LED		
Data Hold	Least tests data memories		
Memory Storage	30 instrument setups with up to 10 test steps		
Interface			
RS-232 & Handler (Standard), GPIB (Optional)			
CANBus & data control interface are used for Max. 10 units of master & slaves connection			
General			
Operation Environment	18 to 28°C (64 to 82°F), 70% RH. Maximum relative humidity 80% for temperature up to 31°C (88°F) Decreasing linearly to 50% relative humidity at 40°C (104°F)		
Power Consumption	Standby : < 250W ; With rated load : <1000W		
Power Requirements	90~264Vac ; 47~63Hz		
Dimension (H x W x D)	364x430x607 mm/14.33x16.93x23.90 inch		
Weight	Approx.40 kg/88.18lbs		

All specifications are subject to change without notice.

AC/DC/IR/SCAN Hipot Tester

Model 19052/19053/19054



KEY FEATURES

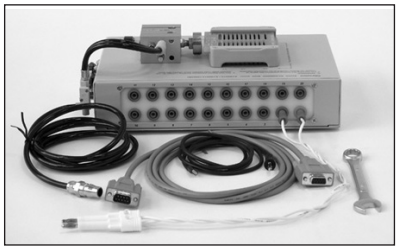
- 3 in 1 Tester : AC, DC, IR
- Programmable output voltage to 5kV AC and 6kV DC
- Trip current programmable to 30mA AC and 10mA DC
- Insulation resistance to 50GΩ/1000V DC
- Built-in 8 channel SCANNER (19053 only)
- Built-in 4 channel SCANNER (19054 only)
- Open/Short Check (OSC)
- Ground Fault Interrupt (GFI)
- ARC detection (Flashover)
- Storage of 50 Tests Setups with 100 Steps per setup

- Optional transformer test fixture (19053 only)
- Standard RS-232 Interface
- Optional GPIB Interface

The Chroma Hipot Tester 19052/19053/19054 provide 3 models for choice. The 19052 for AC/DC/IR Hipot testing and insulation resistance (IR) measurements, the 19053 which combines both AC and DC Hipot tests and IR measurements with 8HV scan channel capability into a single compact unit, and the 19054 which combines both AC and DC Hipot tests and IR measurements with 4HV scan channel capability into a single compact unit. The front panels of the fevers make them easy to operate. Digital display and user friendly control allows test parameters and limits to be set easily without the high voltage activating.

ORDERING INFORMATION

19052 : Hipot Tester (AC/DC/IR)
19053 : Hipot Tester (AC/DC/IR/8CH SCAN)
19054 : Hipot Tester (AC/DC/IR/4CH SCAN)
A190344 : HV Gun
A190512 : Auto Control TR. Scan Box (3002B)
A190508 : GPIB Interface
A190517 : 19" Rack Mounting Kit for Model 19052/19053/19054
A190702 : 40kV HV Test Probe
A190704 : Start Switch
A190708 : ARC Verification Fixture



A190512 : Auto Control TR. Scan Box (3002B)

SPECIFICATIONS

Model	19052	19053	19054
Mode	ACV/DCV/IR	ACV/DCV/IR/SCAN	
Withstanding Voltage Test			
Output Voltage	AC : 0.05 ~ 5kV, DC : 0.05 ~ 6kV		
Load Regulation	1% + 5V		
Voltage Resolution	2V		
Voltage Accuracy	±(1% of reading+0.1%of full scale)		
Cutoff Current	AC : 30mA, DC : 10mA		
Current Resolution	AC : 1μA, DC : 0.1μA		
Current Accuracy	±(1% of reading+0.2% of range)		
Current Frequency	50Hz/ 60Hz		
Test Time	0.3 ~ 999 sec, continue		
Ramp up Time	0.1 ~ 999sec, off		
Waveform	Sine wave		
Insulation Resistance Test			
Output Voltage	DC : 0.05 ~ 1kV	DC : 0.05 ~ 1kV	
Voltage Resolution	2V	2V	
Voltage Accuracy	1.5% + 5V	1.5% + 5V	
IR Range	1MΩ~ 50 GΩ	1MΩ~ 10 GΩ	
Resistance Resolution	0.1MΩ	0.1MΩ	
Resistance Accuracy	≧ 500V : 1MΩ~2.5GΩ : ±(5% of reading + 2% of full scale) 2.2GΩ~50GΩ : ±(15% of reading + 1% of full scale) < 500V : 0.1MΩ~250MΩ : ±(10% of reading + 2% of full scale) 0.22GΩ~50GΩ : ±(15% of reading + 1% of full scale)		
Scanner Unit	--	8 ports, ±phase	4 ports, ±phase
ARC Detection (Flashover)			
Setting Mode	Programmable setting		
Detection Current	AC : 1mA ~ 15mA, DC : 1mA ~ 10mA		
Secure Protection Function			
Fast Output Cut-Off	0.4 ms after NG happen		
Fast DC discharge	0.2 sec		
Ground Fault Interrupt (GFi)	0.5mA ± 0.25mA AC, Close		
Panel Operation Lock	Present password		
Continuity Check	1Ω± 0.2Ω, Off		
GO/NG Judgment Window			
Indication, Alarm	GO: Short sound, Green LED; NG: Long sound, RED LED		
Data Hold	Least tests data memories		
Memory Storage	99 steps or 99 groups for total 500 memory locations		
Remote Connector			
Real Panel connector	Input : Start, Stop, Interlock (at 11 pin terminal block only) ; Output : Under test, Pass, Fail		
General			
Operation Environment	Temperature: 0˚C ~ 40 ˚C, Humidity: ≦ 80 % RH		
Power Consumption	No load: <100 W, With rated load: ≦ 500 W max.		
Power Requirement	100V / 120V / 220V(AC ± 10%) / 240V(AC + 5% ˜ -10%), 50 / 60 Hz		
Dimension (H x W x D)	105 x 320 x 400 mm / 4.13 x 12.6 x 15.75 inch		
Weight	15 kg / 33.4 lbs	15.4 kg / 33.92 lbs	16.5 kg / 36.34 lbs
Certification	UL, TUV, CE	CE	UL, TUV, CE



FUNCTIONS

- Hipot
  - AC 5kV/100mA
  - DC 6kV/25mA
- Insulation
  - 5kVmax
  - 1MΩ~50GΩ

KEY FEATURES

- 500VA output rating
- Floating output complies with EN50191
- Corona Discharge Detection (CDD, 19055-C)
- Flashover Detection
- Discharge Level Analysis (DLA)
- Open Short Check (OSC)
- High Frequency Contact Check (HFCC)
- Ground Fault Interrupt
- Standard RS-232 interface
- Option GPIB & HANDLER interface
- Key lock when fail
- Programmable voltage & test limit
- Support A190301 8HV Scanning Box

APPLICATIONS

Motor : The 19055 Series Hipot Analyzers with 500VA output rating can be used to test and analyze the withstand voltage of high power and leakage current for the products like motor stators and rotors with high parasitic capacitance. Corona detection can be used for turn-to-turn or turn-to-ground test to avoid winding insulation failure from corona discharge.

Transformer : When using a power transformer under the normal voltage, a primary side corona discharge could cause the adjacent components to be damaged if occurred. Thus, the function of Corona Discharge Detection (CDD) of 19055-C can be used to detect if there is any corona discharge occurred to improve the product quality.

High Voltage Capacitor, Photocoupler & Insulation Material : If any gaps, voids or impurities appeared when doing molding in the manufacturing process, the insulation capability may be affected. The Corona Discharge Detection (CDD) equipped by 19055-C is able to defect if there is any corona discharge occurred to enhance the product quality.

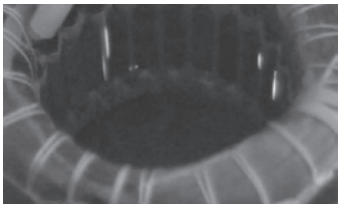
Chroma 19055 Series Hipot Analyzers are designed for hipot tests and analysis. The tests of AC/DC/IR can be programmed in 5kV/100mA with 500VA output rating which complies with the EN50191 requirements. (Please refer to the application notes for more detail information.)

The 19055-C has not only the AC/DC/IR tests but also a new measurement technology - Corona Discharge Detection (CDD) that can detect the following via the Discharge Level Analysis (DLA).
- Corona discharge Start Voltage (CSV)
- Flashover Start Voltage (FSV)
- BreakDown Voltage (BDV)

GPIB RS-232 USB HANDLER SCANNER CE

As to the Contact Check during Hipot test, Chroma 19055 Series is equipped with a new function of High Frequency Contact Check (HFCC) besides the Open Short Check (OSC). By conducting the Contact Check during Hipot test, it can increase the test reliability and efficiency significantly.

For convenience use, Chroma 19055 has large LCD screen for operation and judgment. In addition, the GFi human protection circuit and Floating safety output prevent the operators from electrical hazard.



Chrona Discharge in motor

ORDERING INFORMATION

19055 : Hipot Analyzer (AC/DC/IR)
19055-C : Hipot Analyzer (AC/DC/IR with Corona discharge detection)
A190301 : 8HV Scanning Box
A190355 : 19" Rack Mounting Kit
A190356 : GPIB Interface
A190708 : ARC (Flashover) Verification Fixture

SPECIFICATIONS		
Model		**19055/19055-C**
Mode		**ACV / DCV / IR**
Withstanding Voltage Test		
Output Voltage		AC : 0.05 ~ 5KV, DC : 0.05 ~ 6KV
Load Regulation		1% of setting + 0.1% full range
Voltage Accuracy		1% of setting + 0.1% full range
Voltage Resolution		2V
Cutoff Current		AC : 100mA ; DC : 25mA
Current Accuracy		1% of setting + 0.5% full range
Current Resolution		AC : 1μA, DC : 0.1μA
Output Frequency		50Hz / 60Hz
Test/Ramp/Fall/Dwell Time		0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off
Waveform		Sine wave
Insulation Resistance Test		
Output Voltage		DC : 0.05 ~ 5kV
Voltage Resolution		2V
Voltage Accuracy		1% of setting + 0.5% full range
IR Range		0.1MΩ ~ 50GΩ
Resistance Resolution		0.1MΩ
Resistance Accuracy	>1kV	1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range 1GΩ ~ 10GΩ : ± 7% of reading + 2% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range
	≧500V ≦1kV	1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range 1GΩ ~ 10GΩ : ± 7% of reading + 2% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range
	<500V	0.1MΩ ~ 1GΩ : ± 3% of reading + (0.2*500/Vs)% full range
Flashover Detection		
Setting Mode		Programmable setting
Detection Current		AC: 20mA;DC: 10mA
Contact Check Function		
HFCC		High frequency contact check
OSC (open/short check)		600Hz, 0.1s
Electrical Hazard Protection Function		
Floating output design		Leakage current <3 mA
Fast Output Cut-off		0.4ms after NG happen
Ground Fault Interrupt		0.5mA ±0.25mA AC, ON/OFF
Panel Operation Lock		Present password
Interlock		YES
GO/NG Judgment Window		
Indication, Alarm		GO : Short sound, Green LED ; NG : Long sound, Red LED
Memory Storage		100 sets, max. 50 steps per set
Interface		
Interface		RS-232, Handler interface (Standard), GPIB interface (Optional)
General		
Operation Environment		Temperature: 0°C ~ 45°C, Humidity: 15% to 95% R.H@≦ 40°C
Power Consumption		500VA
Power Requirements		90~132Vac or 180~264Vac, 47~63Hz
Dimension (H x W x D)		130 x 430 x 500 mm / 5.12 x 16.93 x 19.69 inch
Weight		Approx. 20kg / 44.09 lbs

All specifications are subject to change without notice.



GPIB RS-232 USB HANDLER CE

Chroma 19056/19057 Hipot Analyzer is an equipment specially designed for testing and analyzing ultra-high withstand voltage. The series of models include 10kVac/12kVdc/20kVdc with maximum AC20mA/DC10mA output can perform AC/DC withstand voltage and insulation resistance tests with contact check during production line test. In addition to the patented OSC (Open Short Check), High Voltage Contact Check is added to test the components with high insulation capability when high voltage outputs to improve the testing reliability and efficiency.

The Hipot Analyzer provides high withstand voltage analysis for optical couplers, HV relays, HV switches and PV modules, which have better insulation capability.

Charge and discharge are required for capacitive components when doing DC withstand voltage test. The Hipot Analyzers have fast charge function that can increase the production test efficiency .

KEY FEATURES

- 10kV AC & 20kV DC withstand voltage test
- 0.1MΩ~50GΩ insulation impedance test
- BDV (BreakDown Voltage test)
- HVCC (High Voltage Contact Check)
- OSC (Open Short Check)
- GFI (Ground Fault Interrupt) human protection circuit
- Fast charge/discharge function
- Programmable output & test limit
- Standard RS232 & HANDLER interface
- Optional GPIB interface
- Key lock function

ORDERING INFORMATION

19056 : Hipot Analyzer AC10kV
19057 : Hipot Analyzer DC12kV/IR
19057-20 : Hipot Analyzer DC20kV/IR
A190316 : Dummy Load
A190356 : GPIB Interface
A190702 : 40kV HV Test Probe
A190708 : ARC Verification Fixture

SPECIFICATIONS

Model		19056	19057	19057-20
Mode		ACV	DCV / IR	DCV / IR
Withstanding Voltage Test				
Output Voltage		AC: 0.1~10kV	DC: 0.1~12kV	DC : 0.1 ~ 20kV
Load Regulation		± (1% of output + 10V), Rated load		
Voltage Accuracy		± (1% of reading + 0.1% of full scale), 10V resolution		± (1.5% of reading + 0.1% of full scale), 10V resolution
Voltage Regulation		2V		
Cutoff Current		0.01~20mA	0.001~10mA	0.001~5 mA
Current Accuracy		0.100mA~2.999mA : ±(1% of reading + 0.3% of full range) 3.00mA~20.00mA : ±(1.5% of reading + 0.3% of full range)	±(1% of reading + 0.5% of full range)	
Current Resolution		AC : 1 μA, DC : 0.1 μA		
Output Frequency		50Hz / 60Hz		
Test/Ramp/Fall/Dwell Time		0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off		
Waveform		Sine wave		
Insulation Resistance Test				
Output Voltage		-	DC : 0.1 ~ 5kV	
Voltage Resolution		-	2V	
Voltage Accuracy		-	1% of setting + 0.5% of full scale	1.5% of setting + 0.5% of full scale
IR Range		-	0.1MΩ ~ 50GΩ	
Resistance Resolution		-	0.1MΩ	
Resistance Accuracy	≧0.5kV	-	1MΩ ~ 1GΩ : ± 3% of reading + 0.1% of full range 1GΩ ~ 10GΩ : ± 5% of reading + 1% of full range 10GΩ ~ 50GΩ : ± 10% of reading + 1% of full range	
	<0.5kV	-	1MΩ ~ 1GΩ : ± 5% of reading + (0.5*300/Vs)% of full scale	
Flashover Detection				
Setting Mode		Programmable setting		
Detection Current		AC : 20mA	DC : 10mA	DC : 5mA
Contact Check Function				
Contact Check		OSC (open/short check) HVCC(High Voltage contact check)	HVCC(High Voltage contact check)	HVCC(High Voltage contact check)
Electrical Hazard Protection Function				
Ground Fault Interrupt		0.5mA±0.25mA AC, ON/OFF	-	-
Key Lock		Yes (password control)		
Interlock		YES		
GO/NG Judgment Window				
Indication, Alarm		GO : Short sound, Green LED; NG : Long sound, Red LED		
Memory Storage		100 sets ,max. 50 steps per set		
Interface		Standard-RS232, Handler interface ,USB , SCAN ; Optional - GPIB interface		
General				
Operation Environment		Temperature: 0˚C ~ 45˚C ; Humidity: 15% to 95% R.H@≦ 40˚C		
Power Consumption		500VA		
Power Requirements		90~132Vac or 180~264Vac, 47~63Hz		
Dimension (HxWxD)		130x430x500 mm/5.12x16.93x19.69 inch		
Weight		28kg / 61.7 lbs		



KEY FEATURES

- Compact size Hipot tester
- Three instruments in one: AC Hipot, DC Hipot, Insulation Resistance (19073)
- Open/Short Check (OSC)
- ARC detection (Flashover)
- Provide reliable and stable test results
- Storage of 10 Tests Setups with 60 Steps per setup
- Ground Fault Interrupt (GFI)

Chroma 19070 series are the smallest Hipot Testers currently available in the world. Its super mini size is easy to carry and the large LCD display is suitable for viewing measurement results. These sophisticate Hipot Testers are most applicable to safety test for electronic components.

ORDERING INFORMATION

19071 : Hipot Tester (AC)
19073 : Hipot Tester (AC/DC/IR)
A190344 : HV Gun
A190701 : Remote Control Box
A190702 : 40kV HV Test Probe
A190704 : Start Switch
A190706 : 19" Rack Mounting Kit for Model 19070 series
A190708 : ARC Verification Fixture



A190701 : Remote Control Box



A190702 : 40kV HV Test Probe

SPECIFICATIONS		
Model	**19071**	**19073**
Mode	ACV	ACV/DCV/IR
Withstanding Voltage Test		
Output Voltage	AC : 0.05 ~ 5kV	AC : 0.05~ 5kV, DC : 0.05 ~ 6kV
Load Regulation	1% + 5V	
Voltage Resolution	2 V	
Voltage Accuracy	±(1% of reading+0.1%of full scale)	
Cutoff Current	AC : 0.1mA ~ 20mA	AC : 0.1mA ~ 20mA, DC : 0.01mA ~ 5mA
Current Resolution	AC : 1μA, DC : 0.1μA	
Current Accuracy	±(1% of reading+0.2% of range)	
Current Frequency	50Hz/ 60Hz	
Test Time	0.1 ~ 999 sec, continue	
Ramp up Time	0.1 ~ 999 sec, off	
Waveform	Sine wave	
Insulation Resistance Test		
Output Voltage	-	DC : 50 ~ 1000 V
Voltage Resolution	-	2V
Voltage Accuracy	-	5% + 5counts
Resistance Accuracy	-	≧ 500V : 1MΩ~2.5GΩ : ±(5%of reading + 2% of full scale) 2.2GΩ~50GΩ : ±(15%of reading + 1% of full scale) < 500V : 0.1MΩ~250MΩ : ±(10%of reading + 2% of full scale) 0.22GΩ~50GΩ : ±(15%of reading + 1% of full scale)
ARC Detection		
Setting Mode	Programmable setting	
Detection Current	AC : 1mA ~ 15mA, DC : 1mA ~ 5mA	
Secure Protection Function		
Fast Output Cut-off	Approx. 0.4mS, after NG happen	
Fast Discharge	Approx. 0.2S, Typical	
Ground Fault Interrupt	0.5mA ± 0.25mAac (ON), OFF	
Continuity Check	0.1Ω ~ 5.0Ω ± 0.2Ω, GC MODE	
Panel Operation Lock	Yes	
GO/NG Judgment Window		
Indication, Alarm	GO: Short sound; NG: Long sound	
Data Hold	Least tests data memories	
Step Hold	Step signal trigger ON / OFF	
Memory Storage	10 tests setups with 60 steps pre setup	
General		
Operation Environment	Temperature: 0°C ~ 40 °C, Humidity: ≦ 80 % RH	
Power Consumption	No load : < 60 W, With rated load : ≦ 300 W	
Power Requirement	100V / 120V / 220V / 240V, 50 / 60 Hz	
Dimension (H x W x D)	105 x 272.8 x350 mm / 4.13 x 10.74 x 13.78 inch	105 x 270 x350 mm / 4.13 x 10.63 x 13.78 inch
Weight	11 kg / 24.23 lbs	
Certification	UL, TUV, CE	

All specifications are subject to change without notice.



GPIB RS-232 USB CE UL

Removable and Master/Slave design

Because different products have different requirements and test procedures, Chroma 19200 offers different scanning modules for combinations. These modules are: AC LINE module, GENERAL module, AC LINE2 module. EARTH module, GB&GBF module and SWITCH module. Due to different modules have different functions, users are able to combine different modules for your needs.

High / Low voltage circuit insulation

Most of products have to perform Electrical Safety Test (high voltage) and Function Test (low voltage). Chroma 19200 supports high and low voltage isolation by SWITCH module. User can combine high and low voltage tests like LCR measurement, power performance and function test for one sequence in one station and data collecting. That improves test efficiency and reduces occurred test risk.

KEY FEATURES

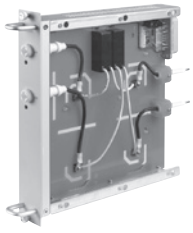
- Support Electrical Safety Test Scanning
- Support High / Low voltage circuit insulation (Switch module)
- Support 8 slots for plug-in (removable)
- Max. 9 slaves for multiple scanners (master/slave interface)
- Standard RS-232 and USB interface
- Optional GPIB interface
- CE Mark
- 19200 can be installed in Chroma Electrical Equipment ATS model 8900

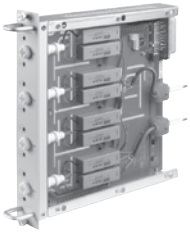
In recent years, International Electrotechnical Commission (IEC) in order to make consumers safer while using the electrical products, join more requirements to test in the standard. It makes electric to fit requirements by all tests be performed which are very complicated and different. The problem not only the course is complicated and apt to make mistakes, but also the manpower costs more.

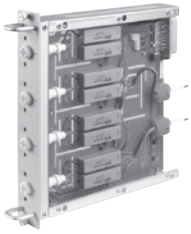
Chroma 19200 can perform high / low voltage switch and scan all safety tests by EST Analyzer (Chroma 19032) inputs such as withstanding test; Some modules support 20A for Leakage Current test and Function Test; GB & GBF modules support 40A and Ground Floating.

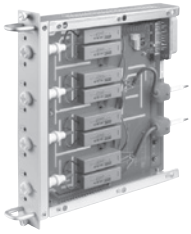
Chroma 19200 can be installed in Chroma 8900 electrical equipment ATS for DUT which needs a lot of procedures to test like medical equipment, medical power, UPS, motor, etc., ATS can save the manpower cost , reduce the mistake, data management to improve quality and efficiency.

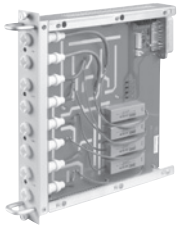
MODULE DESCRIPTION

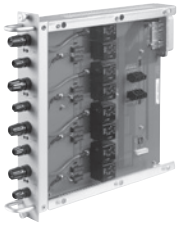

AC LINE MODULE

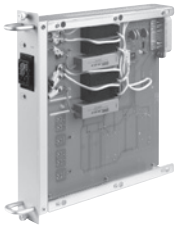

AC LINE2 MODULE


GENERAL MODULE


EARTH MODULE


SWITCH MODULE


GB MODULE


GBF-1 MODULE


GBF-2 MODULE

SPECIFICATION (MASTER & SLAVE)	
Model	**19200**
Mode	SCAN
Withstanding Voltage Test Scan	
Max. Voltage	AC : 5kV, DC : 6kV
Insulation Resistance Test Scan	
Max. Voltage	DC : 5kV
Ground Bond Test Scan	
Max. Current	40A
Leakage Current Test Scan	
Max. Voltage	AC 300V
Max. Current	20A
Interface	RS-232 , USB (Standard), GPIB (Optional)
General	
Operation Environment	Temperature: 0˚C ~ 45˚C ; Humidity: 15% to 95% R.H@≦ 40˚C
Power Consumption	500VA
Power Requirements	90~132Vac or 180~264Vac, 47~63Hz
Dimension (H x W x D)	310.8 x 438 x 495 mm / 12.24 x 17.24 x 19.49 inch
Weight	35 kg / 77.09 lbs
Certification	CE

MODULE SPECIFICATION									
Module Name		**AC LINE**	**GENERAL**	**AC LINE2**	**EARTH**	**GB**	**GBF-1**	**GBF-2**	**SWITCH**
Port No.		2	4	4	4	4	2	4	8
HIGH/LOW switch		●	●	●	●	●			
Max. Voltage		5KVac 6KVdc	5KVac 6KVdc	5KVac 6KVdc	5KVac 6KVdc	15V peak	5KVac 6KVdc	5KVac 6KVdc	5KVac 6KVdc
Max. current		20A	100mA	100mA	100mA	40A	40A	40A	100mA
Test Item	**Function Type**								
WVAC/WVDC/IR Test	HIGH	●	●	●					
	LOW	●	●	●	●				
GB Test	Drive ±, Sense ±					Earthed 4 channels set + or -	Floating 1 channels	Floating 2 channels	
LC Test	LINE	●							
	NEUTRAL	●							
	SENSE HIGH		●	●					
	SENSE LOW		●		●				
	EARTH		●	●	●				
	LINE2			●					

Note*1 : GB, GBF-1 and GBF-2 only can be used on frame #0
Note*2 : GBF-1 and GBF-2 have GB floating function
Note*3 : The GENERAL, ACLINE2, EARTH modules have flexible design which can be exchanged flexibly by terminals for different tests

ORDERING INFORMATION

19200 : Electrical Safety Test Scanner (Master)
19200 : Electrical Safety Test Scanner (Slave)
A190349 : Universal corded product adapter
A190508 : GPIB Interface
A192000 : AC LINE module
A192002 : AC LINE2 module
A192003 : GENERAL module
A192004 : EARTH module
A192005 : GB module
A192006 : GBF-1 module
A192007 : GBF-2 module
A192008 : SWITCH module
A192010 : Power entry adapter of GBF module
A192011 : Blank Plate

All specifications are subject to change without notice.



The 19572 are instrument dedicated to measure the grounding resistance within the range of 0.1~510m Ω. Its compact and easy to operate feature is most suitable for the grounding test in production line. By supplying high reliability and stability test results with built-in resistance compensate function; it is an economical and useful grounding tester.

KEY FEATURES

- Wide resistance measurement range : 0.1 ~ 510 mΩ
- High performance AC current output : 45 A
- Compact size ground bond tester
- Provide reliable and stable test results
- Built-in resistance compensation function
- Standard RS-232 interface
- Optional GPIB Interface
- Compatible with the model 19070 series Hipot Tester

ORDERING INFORMATION

19572 : Ground Bond Tester
A190701 : Remote Control Box
A195720 : GPIB Interface

SPECIFICATIONS	
Model	**19572**
Mode	Ground Bond
Grounding Resistance Test	
Output Current	AC : 3 ~ 45A
Load Regulation	1 % + 0.3 A
Resolution	3 ~ 30A, 0.01A / 30.1 ~ 45A, 0.1A
Current Accuracy	±(1.5% of setting + 0.5% of full scale)
Output Frequency	50Hz / 60Hz
Resistance Range	0.1 ~ 510 mΩ
Resistance Resolution	(R display counts/ I display counts) ≧ 0.2, Resolution: 1mΩ (R display counts/ I display counts) < 0.2, Resolution: 0.1mΩ
Resistance Accuracy	±(2% of reading + 0.5% of full scale)
Offset	A predetermined value can be subtracted from the measured value and the result of subtraction can be display The result of subtraction can be compared with a Good/NO Good judgment reference value, and the result of comparison can be use for the Good/NO Good judgment
Offset Range	0 ~ 100mΩ
Test Time	0.5 ~ 999 sec., continue
Waveform	Sine wave
GO/NG Judgment	A no-good judgment is made when a resistance greater than the high limit value Is detected. A no-good judgment is made when the output current is cutout and a no-good Alarm signal is delivered. If no abnormal state is detected during the test time, a good judgment is made and a good signal is deliver.
Limit	Hi-Limit : 0.1 ~ 510mΩ; Low-Limit : off, 0.1mΩ ~ Hi-Limit Value, 510mΩ max.
General	
Operation Environment	Temperature : 0˚C ~ 40 ˚C, Humidity : ≦ 80 % RH
Power Consumption	No load(Ready state) : < 100 W, With rated load : ≦ 880W max.
Power Requirement	100V / 120V / 220V (AC ± 10%) / 240V (AC -10% ~ +5%), 50 / 60 Hz
Dimension (H x W x D)	105 x 320 x 400 mm / 4.13 x 12.60 x 15.75 inch
Weight	16 kg / 35.24 lbs
Certification	UL, CE

All specifications are subject to change without notice.



GPIB RS-232 CE

KEY FEATURES

- Adequate for versatile testers
- Precise designed standard calibration kit
- Stable & accurate calibration equipment
- Standard GPIB Interface and RS-232 Interface

The 9102 Hipot Calibrators is specially designed standard devices for instrument calibration lab. The 9102 can simulate multiple loads and apply to various Hipot testers. These calibration equipment can save manufacturers a great deal of regular calibration fee.

ORDERING INFORMATION

9102 : Hipot Calibrator

SPECIFICATIONS		
Model	**9102**	
Withstanding Voltage Test		
Voltage Meter		
Range	AC : 2kV / 6kV, DC : 2kV / 10kV	
Accuracy	AC : 0.3 % + 6 counts, DC : 0.2% + 2 counts	
Resolution	0.1V / 1V	
Current Meter		
Range	200 μ A / 2mA / 20mA / 200mA	
Accuracy	AC : 0.3% + 6counts, DC : 0.2% +2 counts	
Resolution	10 nA/ 100nA/ 1 μ A/ 10 μ A	
Dummy Load (1.2kV max.)	36mA : 33.3kΩ, 100W ; 24mA : 50kΩ, 80W 12mA : 100kΩ, 30W ; 4.8mA : 250kΩ, 10W 2.4mA : 500kΩ, 7W ; 0.12mA : 10MΩ, 1W	
Grounding Resistance Test		
Voltage Meter		
Range	AC : 6V (0.050V ~ 6.000V)	
Accuracy	AC : 0.3% + 6 counts	
Resolution	1 mV	
Current Meter		
Range	AC : 45A (0.500A ~ 45.000A)	
Accuracy	AC : 0.3% + 6 counts	
Resolution	10 mA	
Dummy Load	45A Max. : 100 mΩ, 250W	
Insulation Resistance Test		
Standard Resistance(1.2kV max.)	Value	Accuracy
	1000 MΩ	2%
	90.9 MΩ	1%
	9.9 MΩ	1%
General		
Operation Environment	Temperature: 0˚C ~ 40˚C, Humidity : ≦ 80% RH	
Power Requirement	100V / 120V / 220V / 240V, 50 / 60 Hz	
Dimension (H X W X D)	89 x 430 x 400 mm / 3.5 x 16.93 x 15.75 inch	
Weight	8 kg / 17.62 lbs	

All specifications are subject to change without notice.



Because the requirement in standard of the electric product increase day by day,, the testing cost then increasing . In order to help the manufacturer Reduce testing cost and products risk effectively, Chroma provide 8900 electrical equipment auto test system (ATS) be the best solution by program the test of the complicated procedure like the medical equipment safety and function test and instrument safety and function test.

8900 electrical equipment ATS can completion that amount measurement and test procedure in once automatically.This strong function not only can be report formatted simply, but reduce the careless mistake of the artificial writing and improper test. Chroma 8900 electrical equipment ATS is suitable for all electrical equipment test solution within Electrical Safety Test.

Chroma 8900 electrical equipment ATS solve the Electrical Safety Test and special FUNCTION test solution. The system can combine different testers in the system accordding with different test request what your need. The software is all open architecture structure which can offer the corresponding program and the most flexible test item in accordance with special test procedure to the customer for special products.

The all open architecture software of 8900 systems includes the strong report editor and generator, statistical analysis and functions of management. Management of various types of different test reports and operation that these functions make the system have the ability to control quality and reduce risk. These statistical analysis and report function are indispensable for quality control and product line testing in a modern electrical manufacturer.

FUNCTIONS

- Support electrical safety test and function test scanning :
  - AC/DC WV Test
  - IR Test
  - GB Test
  - LC Test (all types)
  - Function test
- Expandable Measurement function
  - LCR Meter
  - AC/DC Source
  - DC Load
  - Power Analyzer
  - Timing/Noise Analyzer
  - DMM
  - Oscilloscope
  - Other with GPIB or RS-232 device

KEY FEATURES

- Open architecture software
- Expandable hardware
- Editable test library
- Editable test programs
- Editable and Test Item
- Editable reports
- Statistic report
- User authority control
- Activity log
- Support Barcode reader

APPLICATIONS

- House Appliance
- SMPS/Charger/UPS
- Motor Function Test
- Large EL Capacitor
- PCB
- Medical Device
- Line Transformer

ORDERING INFORMATION

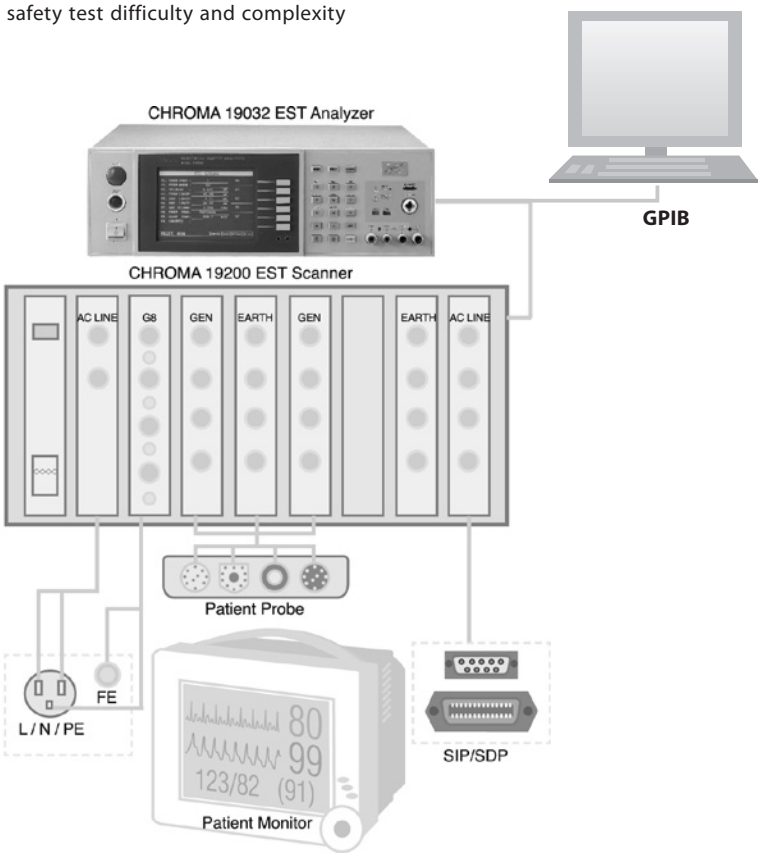
System		
8900	Electrical Equipment ATS	
Instrument		
Electrical Safety Analyzer	Refer to Model 19032-P	
Leakage Current Test Module	6000-05(10A) and 6000-08(20A) for 19032-P	
Multi Channel Module	6000-01 (3GC/5HV), 6000-02 (5GC/3HV), 6000-03 (8HV), for 19032	
Isolation Transformer	500VA (A190313)/ 1000VA(A190314)	
Electrical Safety Test Scanner	Refer to Model 19200	
Scan Modules for 19200	AC Line Module(A192000)	General Module (A192003)
	AC Line2 Module(A192002)	Earth Module (A192004)
	GB Module(A192005)	GBF-1 Module (A192006)
	GBF-2Module(A192007)	Switch Module (A192008)
LCR Meter	Refer to Model 11022, 11025	
AC Source	Refer to Model 6400, 6500, 61500, 61600, 61700 series	
DC Source	Refer to Model 62000P Series	
Power Analyzer	Refer to Model 6630, 6632 series	
Power Meter	Refer to Model 66200 series	
DC Load	Refer to Model 6310A, 63200, 6330A series	
Timing/Noise Analyzer	6011/80611	
Timing/Noise module	6011N/80611N	
Cable and Accessory		
A600009	GPIB Cable (200 cm)	
A600010	GPIB Cable (60cm)	
A800005	PCI BUS GPIB Card (National Instrument)	



The safety standard of medical equipment is very strict. Because the medical equipment keeps in touch with the health of the doctor and patient frequently, make several Electrical safety tests can't be ignored especially leakage current test which has already become the most important test in electrical safety test.

The leakage current test of medical equipment includes four kinds - ELC, ECLC, PLC, PALC - to test besides AC/DC/IR/GB test. Additionally, normal / reverse / single fault normal / single fault reverse four powers and earth switch, let medical equipment safety test difficulty and complexity further.

Chroma 19200 can allocate different modules for special medical equipment test reach flexible and time saving. Chroma 19200 with 8900/8910 test system can store test procedure and result via computer for data mining and researching of line manager and Quality control department.



KEY FEATURES

- Support electrical safety test and function test scanning :
  - AC/DC WV Test
  - IR Test
  - GB Test
  - Earth Leakage Current
  - Enclosure Leakage Current
  - Patient Leakage Current
  - Patient Auxiliary Leakage Current
- Support customize function test (option)
- Open architecture software

ORDERING INFORMATION

System		
8910	Medical Electrical Safety ATS base on 8900	
Main Instrument		
Electrical Safety Tester	Refer to Model 19032	
Leakage Current Test Module	6000-05(10A) and 6000-07(20A) for 19032	
Multi Channel Module	6000-01 (3GC/5HV), 6000-02 (5GC/3HV), 6000-03 (8HV), for 19032	
Isolation Transformer	500VA (A190313)/ 1000VA(A190314)	
Electrical Safety Test Scanner	Refer to Model 19200	
Scan Modules for 19200	AC Line Module(A192000)	General Module (A192003)
	AC Line2 Module(A192002)	Earth Module (A192004)
	GB Module(A192005)	GBF-1 Module (A192006)
	GBF-2Module(A192007)	Switch Module (A192008)
AC Source	Refer to Model 6400, 6500, 61500, 61600, 61700 series	

All specifications are subject to change without notice.

High Capacitance Electrolytic Capacitor ATS Model 1911

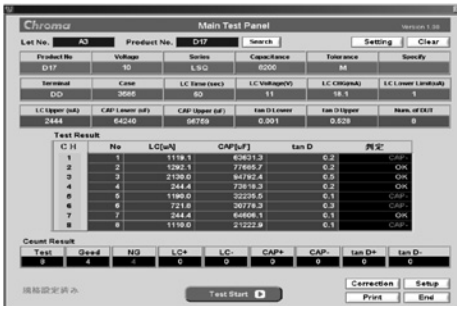


The system is a aluminum electrolytic capacitor with high capacitance designed for measuring LC and C/D. It provides the best test solution to high capacity electrolytic capacitor with data record function. The general users spend longer time to wait LC test in testing high capacitance electrolytic capacitor. The system can install 8 electrolytic capacitors maximum at a time to enhance 8 times of productivity. It will sound an alarm after the test is completed. The operating personnel process other operations to increase the time efficiency in testing.

The screen consists of DUT model number and lot number information. The software will automatically bring out DUT test specifications which includes LC test voltage, Dwell time, current limit and C/D value. Count Pass/Fail ratio at the lowermost of main program for analysis convenience of production line engineer.







KEY FEATURES

- Test parameter LC/C/D
- Test 8 electrolytic capacitors
- Constant current for test leakage current
- Special test clip fix DUT
- Testing specification from program management
- Test report auto generate
- Statistic analysis
- Software interface easy to operate

ORDERING INFORMATION

1911 : High Capacitance Electrolytic Capacitor ATS

SPECIFICATIONS

Accurate and highly reliable hardware devices :

Capacitor Leakage Current/ IR Meter		
Model		**11200 (650V)**
Main Function		Capacitor Leakage Current / IR Meter
Test Parameter		LC, IR
Test Signals Information		
Voltage		1.0 V~100 V, step 0.1 V; 101V~650 V, step 1V; ±(0.5% + 0.2V)
Charge Current Limit		V ≤ 100V: 0.5mA~500mA V > 100V: 0.5mA~150mA, 65W max. step 0.5mA; ±(3% + 0.05mA)
Measurement Display Range		LC : 0.001 μ A~20.00mA
Basic Measurement Accuracy *1		LC Reading : ±(0.3% + 0.005 μ A)
Measurement speed (Ext. Trigger, Hold Range, Line Frequency 60Hz)	Fast	77 ms
	Medium	143 ms
	Slow	420 ms
Function		
Correction		Null zeroing
Test Voltage Monitor		Vm: 0.0 V~660.0V; ±(0.2% of reading + 0.1V)
Charge Timer		0~999 Sec.
Dwell Timer		0.2~999 Sec

Scanner	
Model	**19200**
Swith Module *1	
Channels	8ports, 4HV relays
Isolation Voltage	max up to DC 6KV / AC 5KV
Max Current	40A
GB Module *2	
Channels	4 Channels Driver & Sense
Max Current	40A

System Controller	
Model	**PC/IPC**
CPU	Pentium III 600 or faster
DRAM	128MB or higher
Hard drive	2.1GB or higher
Monitor	15"
Keyboard	101 keys
System Interface	GPIB/RS-232
GPIB board	NI-PCI GPIB Card

LCR Meter	
Model	**11022**
Test Parameter	L,C, R,|Z|, Q, D, ESR, X, θ
Test Signals	
Level	10 mV~1V, step 10 mV; ±(10% + 3 mV)
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; 0.01%
Measurement Display Range	
C (Capacitance)	0.001pF~1.9999F
L, M, L2 (Inductance)	0.001 μ H~99.99kH
Z (Impedance), ESR	0.01m~99.99MΩ
Q (Quality Factor) D (Distortion Factor)	0.0001~9999
θ (Phase Angle)	-180.00°~ +180.00°

Note*1 : Swith module for leakage current measure
Note*2 : GB module for C/D measure

FIXTURES AND ACCESSORIES												
No.	**Description**	**19020**	**19032**	**19032-P**	**19035**	**19036**	**19052**	**19053 19054**	**19055**	**19071 19073**	**19572**	**19056 19057 19057-20**
* **A190301**	8HV Scanning box (5KV max) (9030A)		●	●					●			
* **A190313**	500VA Isolation Transformer		●	●								
* **A190314**	1000VA Isolation Transformer		●	●								
* **A190316**	Dummy Load (3KV/25A)	●	●	●	●	●	●	●	●	●	●	●
A190317	Barcode Scanner		●	●								
A190321	GPIB Interface		●	●								
* **A190334**	Ground Bond 40A		●									
* **A190336**	8HV/8GB Scanning Box (9030AG)		●	●								
* **A190337**	Ground Bond 60A		●									
A190338	19001 EST Software		●	●								
A190343	19" Rack Mounting Kit for 19032		●		●							
* **A190344**	10kV HV Gun		●	●	●		●	●		●		●
A190346	RS-232 Cable for Impulse Winding Tester Connection				●							
A190347	GPIB & Handler Interface				●							
A190348	RS-232 Interface for 19035				●							
* **A190349**	Universal Corded Product Adapter		●	●								
* **A190351**	8ch-16ch HV box for 19035				●							
A190355	19" Rack Mounting Kit for 19032-P			●					●			
A190356	GPIB Interface for 19032-P			●					●			
A190359	16 channel HV External Scanning Box (H, L, X)				●	●						
A190506	RS422 Interface											
A190507	Scanner Interface		●	●								
A190508	GPIB Interface	●					●	●			●	
* **A190512**	Auto Transformer Scan Box (3002B)				●			●				
A190517	19" Rack Mounting Kit						●	●				
* **A190701**	Remote Control Box									●	●	
* **A190702**	40KV HV Probe		●	●	●		●	●	●	●		●
* **A190704**	Start Switch		●	●	●		●	●	●	●	●	●
A190706	19" Rack Mounting Kit									●		
* **A190708**	ARC Verification Fixture	●	●	●	●	●	●	●	●	●		●

(*) see pictures below


A190301


A190313


A190314

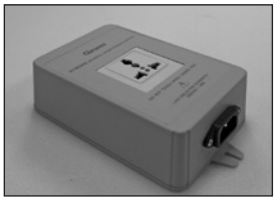

A190316


A190334


A190336

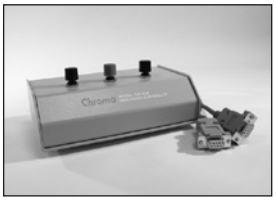

A190337


A190344


A190349


A190351


A190512


A190701


A190702


A190704


A190708

All specifications are subject to change without notice.

6½ Digital Multimeter 15-1
GNSS Signal Simulator 15-3



6½ Digital Multimeter



GNSS Signal Simulator



KEY FEATURES

- 6½ digits resolution
- 11 types of measurement characteristics
  - DC voltage/current (1000V/3A max)
  - AC voltage/current (750V/3A max)
  - Resistance 2 or 4-wire ohms measurement
  - Period & frequency
  - Diode & continuity
  - Temperature (RTD)
- Various math functions
  - NULL
  - Max/Min/Avg
  - High/Low limit
  - Percentage/Ratio/ MX+B
  - dB/dBm
- DC voltage accuracy : 0.0015%
- AC voltage accuracy : 0.04%
- Optional Multi-point TC Scanner Card (10ch), multi-point scanner card (10/20ch)
- Measurement and data transmission up to 2000 readings/sec (4½)
- Up to 2000 readings memory storage
- Standard SCPI control
- Standard USB interface, support USBTMC
- Optional GPIB interface
- Software control support
  - Chroma 12061 software
  - LabView® Driver

Fast & High Performance

The 12061 6½ Digital Multimeter has assorted settings of resolution, integration time and ranges that allow users to optimize the configuration of measurement speed, resolution and accuracy when in individual measurement test mode.

The 12061 has built-in a high speed, low interference A/D converter with a maximum speed of 2000 rdgs/s it is the best solution for high speed measurement.

Individual Application

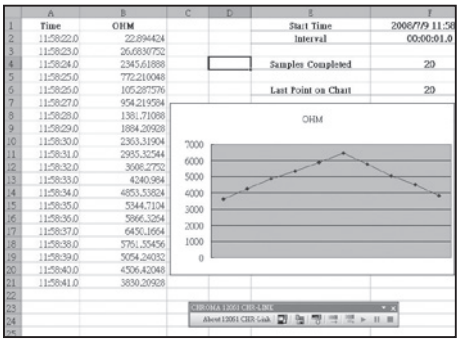
Chroma 12061 equipped with 11 types of measurement functions containing DC voltage/ current, AC voltage/current, resistance 2/4-wire ohms, period, frequency, diode, continuity and temperature as well as diverse math functions of NULL, Max/Min/Avg, High/Low limit, High/Low limit, Percentage/Ratio/MX+B, dB/dBm and etc. Along with trigger and memory function, Chroma 12061 is the right tool for you to perform the basic measurement.

Test System Application

For user's convenience Chroma supports various software and hardware for different control platforms.

- Chroma 12061 TOOL : It is a real-time display interface for value monitoring. It can log data and output in CSV format for analysis.

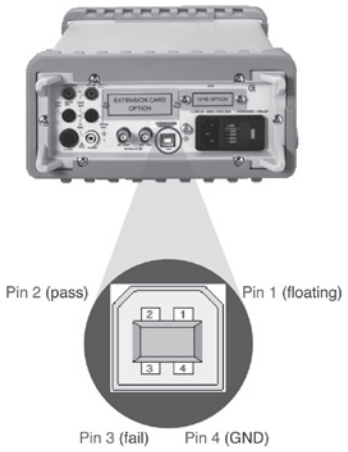
- Chroma 12061 LINK : It can send the data to PC directly in real time and save it to EXCEL or WORD format file as well as create the data pattern. Test engineers can use ActiveX components to control the 12061 using SCPI commands.



Application Softpanel - CHROMA 12061 LINK

PASS/FAIL signal output

Chroma 12061 can provide PASS/FAIL signal to system by USB port (either communication or PASS/FAIL signal) with high/low limit set. USB type B female connect to system with signal (1 floating/ 2 PSS/ 3 FAIL/ 4 GND) in 2ms low and please disable USB interface. If result over the high/low limit, the beeper will alarm and signal output. (Beeper can be off)



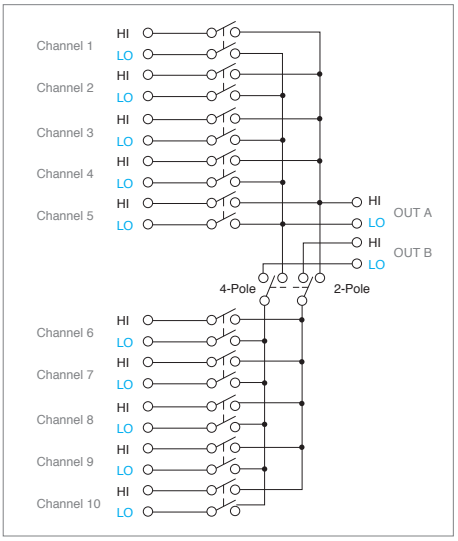
Multi-Point Scanner Card

Chroma 6½ Digital Multimeter supports Multi-point Scanner Card which is a scanning measurement tool not supported by most of the 6½ Digital Multimeters in the field.

Multi-point Scanner Card offers multiplexing ten two poles (ACV, ACI, DCV, DCI, Resistance, Period, Frequency) that can be installed to the extension card option directly on the rear panel.



Scanner Card Configuration



Multi-Point TC Scanner Card (10ch)

The multi-point temperature scanning card has multiple functions including 2-wire/4-wire resistance, AC/DC voltage/current, frequency, period and temperature measurements. As cold junction compensation is equipped for temperature measurement, it increases the measurement accuracy greatly. In addition, it can scan the temperature of 10 different channels that can be applied extensively to electronic devices and industrial studies for temperature measurement

ORDERING INFORMATION

12061 : 6½ Digital Multimeter
12061 : 6½ Digital Multimeter with GPIB
A120000 : Multi-point Scanner Card (10ch)
A120001 : Thermal-measurement Adapter
A120002 : Multi-point Scanner Card (20ch)
A120003 : HV Probe (1000:1)
A120004 : Multi-point TC Scanner Card (10ch)

All specifications are subject to change without notice.

SPECIFICATIONS

Model	12061		
DC Voltage			
Range	Resolution	Input Resistance	1 year accuracy ±(reading%+range%) (23°C±5°C)
100.000mV	0.1μV	>10GΩ	0.0050 + 0.0035
1.000000V	1.0 μV		0.0040 + 0.0007
10.00000V	10 μV		0.0035 + 0.0005
100.0000V	100 μV	10MΩ	0.0045 + 0.0006
1000.000V	1mV		0.0045 + 0.0010
DC Current			
Range	Resolution	Shunt Resistance	1 year accuracy ±(reading%+range%) (23°C±5°C)
10.00000mA	10nA	5.1Ω	0.050 + 0.020
100.0000mA	100nA		0.050 + 0.005
1.000000A	1μA	0.1Ω	0.100 + 0.010
3.00000A	10μA		0.120 + 0.020
AC RMS Voltage			
Range	Resolution	Frequency (Hz)	1 year accuracy ±(reading%+range%) (23°C±5°C)
100.0000mV	0.1μV	3 ~ 5	1.00 + 0.04
		5 ~ 10	0.35 + 0.04
		10 ~ 20K	0.06 + 0.04
		20K ~ 50K	0.12 + 0.05
		50K ~ 100K	0.60 + 0.08
		100K ~ 300K	4.00 + 0.50
1.000000V ~ 750.000V	1.0μV ~ 1mV	3 ~ 5	1.00 + 0.03
		5 ~ 10	0.35 + 0.03
		10 ~ 20K	0.06 + 0.03
		20K ~ 50K	0.12 + 0.05
		50K ~ 100K	0.60 + 0.08
		100K ~ 300K	4.00 + 0.50
AC RMS Current			
Range	Resolution	Frequency (Hz)	1 year accuracy ±(reading%+range%) (23°C±5°C)
1.000000A	1μA	3 ~ 5	1.00 + 0.04
		5 ~ 10	0.30 + 0.04
		10 ~ 5K	0.10 + 0.04
3.000000A	1.0μA	3 ~ 5	1.10 + 0.06
		5 ~ 10	0.35 + 0.06
		10 ~ 5K	0.15 + 0.06
Resistance (4W Measurement)			
Range	Resolution	Test Current	1 year accuracy ±(reading%+range%) (23°C±5°C)
100.0000Ω	100μΩ	1mA	0.010 + 0.004
1.000000kΩ	1mΩ	1mA	0.010 + 0.001
10.00000kΩ	10mΩ	100 μA	0.010 + 0.001
100.0000kΩ	100mΩ	10 μA	0.010 + 0.001
1.000000MΩ	1Ω	5 μA	0.010 + 0.001
10.00000MΩ	10Ω	500nA	0.040 + 0.001
100.0000MΩ	100Ω	500nA	0.800 + 0.010
Diode Test			
Range	Resolution	Test Current	1 year accuracy ±(reading%+range%) (23°C±5°C)
1.00000V	10 μV	1mA	0.010 + 0.020

Continuity Test			
Range	Resolution	Shunt Resistance	1 year accuracy ±(reading%+range%) (23°C±5°C)
1000.00Ω	100mΩ	1mA	0.010 + 0.030
Frequency and Period			
Range	Frequency (Hz)		1 year accuracy ±(reading%+range%) (23°C±5°C)
100mV ~ 750V	3 ~ 5		0.1
	5 ~ 10		0.05
	10 ~ 40		0.03
	40 ~ 300K		0.01

Measurement Characteristics	
Math Functions	NULL, min / max / average, dBm, dB, MX+B, RATIO, %, limit test (with TTL output)
Measurement Noise Rejection 60Hz(50Hz)	DC CMRR : 140 dB: AC CMRR : 70 dB
Integration Time & Normal Mode Rejection NMRR	10 plc/167 ms (200 ms) : 60 dB 1 plc/16.7 ms (20 ms) : 60 dB
DC Voltage	Input bias current : 25°C < 30pA Input protection : 1000V
DC Current	Input protection: External 3 A 250V fuse
AC Voltage	Input impedance: 1 MΩ parallel with 100 pF Input protection: 750Vrms all ranges
AC Current	Input protection: External 3 A 250V fuse
Resistance	Maximum lead resistance (4-wire): 10% of range per lead for 100Ω and 1kΩ ranges. 1kΩ per lead on all other ranges. Input protection: 1000 V all ranges
Continuity/Diode	With audible tone Continuity threshold: Selectable from1Ω to 1000Ω
Temperature	RTD: 2-wire, 3-wire and 4-wire measurement Temperature Conversion: IEC751, Callendar-Van Dusen
External Control	
Samples/Trigger	1 ~ 50,000
Trigger Delay	0 ~ 3600 sec.
Memory	2000 readings
Standard Complier	SCPI (IEEE-488.2), Agilent 34401
Interface	USB (standard), GPIB (option)
General	
Power Consumption	25VA max.
Power Requirements	100 V/120 V/220 V/240 V, 45 Hz ~ 440 Hz
Dimensions (HxWxD)	88.6 x 213.6 x 346.9 mm
Operating Temperature	0°C to 50°C
Weight	Approx. 4.36 kgs

Multi-point TC Scanner Card A120004	
Maximum AC Voltage	110V rms or 155V peak, 100kHz, 1A switched, 30VA (resistive load)
Maximum DC Voltage	110V, 1A switched, 30VA (resistive load)
Connector Type	Screw terminal, #22 AWG wire size
Common Mode Voltage	200V peak btw any terminal and earth
Max. Voltage btw Any Two Terminals	160V peak
Thermocouple	K type (-200°C ~ 1372°) ± 1.5°C (Other type refer to the detailed specifications)



KEY FEATURES

- Selectable GPS/GLONASS Satellite Vehicle and Navigation Data
- Adjustable RF levels from -85dBm to -145dBm in 0.1dB steps
- Provided calibration output level from -25dBm to -85dBm
- Embedded OCXO for accurate clock
- Embedded Doppler function
- Industry-leading stability, quality and reliability
- Verify operational integrity of GPS/GLONASS receivers quickly
- Small size, easy to operation

APPLICATIONS

- Evaluation of GPS products quality / accuracy
- Evaluation of GPS receiver sensitivity
- Mobile phone GPS function test
- Performance evaluation of receiver and module design
- Verify operational integrity of GPS receivers and module

Chroma 49003 Satellite Signal Simulator is a new generation of test instruments, the advantages of combining traditional instruments and new architecture designed in full compliance with the standards of the GPS and GLONASS testing will subvert the traditional concept of the test system.

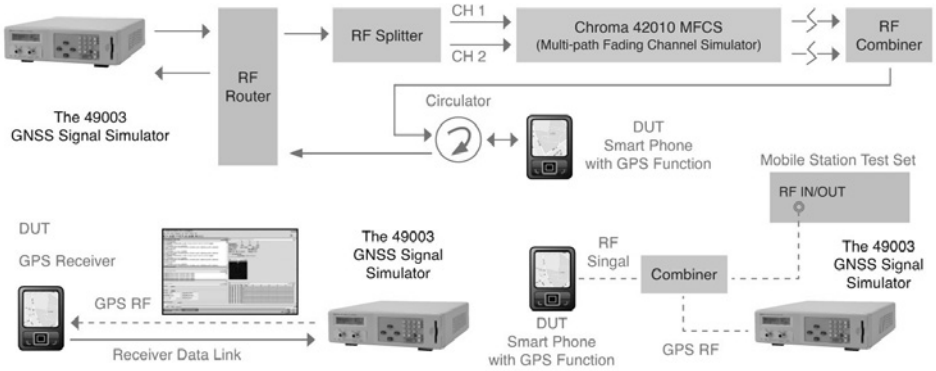
The Chroma 49003 power output with high accuracy (resolution 0.1dB), built-in high-stability 10.22MHz OCXO (GLONASS) and 10.23 MHz OCXO (GPS) to provide the best signal quality, on-demand single channel type satellite navigation data output and humanized operation interface, in full compliance with the testing requirements of the production line. The light volume and scalable satellite series design concept, with the contact and non-contact fixtures can be a variety of test environments, such as miniaturized test system, portable test system, as well as a small amount of diverse testing requirements, it can meet your any testing requirements.

The Chroma 49003 retains the advantages of traditional instruments to facilitate the operation and the high stability of the system, multi-functional, high-quality and economical price, will be the best choice of the measurement works.

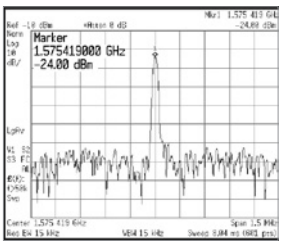
ORDERING INFORMATION

49003 : GNSS Signal Simulator Platform
Additional Options and Accessories
A490030 : GPS Flat Antenna
A490031 : RF Coaxial Cable
A490032 : GPS / GLONASS Dual Mode Flat Antenna
A490033 : 50 ohm Terminator (N Type)
A490034 : GPS Signal Module
A490035 : GLONASS Signal Module

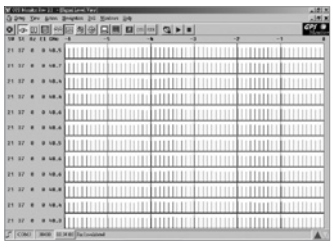
Application-Configuration Proposed for Multi-mode Handset Measurement

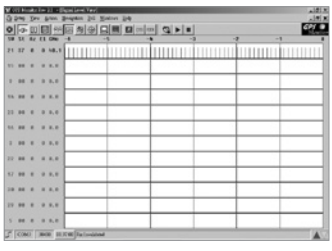


SPECIFICATIONS	
Model	**49003**
RF Signal	
Output Center Frequency	GPS Signal Module : 1575.42MHz (L1 band), optional GLONASS Signal Module : 1598.0625MHz-1605.375MHz (L1 band), optional
RF output level	-85 to -145dBm
Calibration RF output level	-25 to -85dBm
Resolution	0.1dB
Power Accuracy	±1dB
RF Output impedance	50Ω
Spurious (in GPS/GLONASS band)	Less than -30dBc
Carrier phase noise	0.1 rad RMS@10 to 10KHz
Baseband Signal	
Modulation method	BPSK
Oven crystal oscillator frequency accuracy	Less than $5X10^{-10}$ per day
OCXO Stability	Less than $5X10^{-9}$ -20 to +70˚C
C/A Code	GPS Signal Module : 1.023 MHz (1023 bit gold code), optional GLONASS Signal Module : 0.511MHz (3135.029354 cycles/chip), optional
Channels	GPS Signal Module : SV1~SV32, optional GLONASS Signal Module : SV1~SV24, optional
Navigation Data	50BPS
RF Output Connectors	N-Type female RF out & Cal. out
Other signals available	LCD keypad RS-232
General	
Power supply	AC Input Voltage: 90V to 265V, 47 to 63 Hz Input line Current: 0.2A Max. Max. Output Rating: 250W
Weight	5.5 Kg
Dimensions	318mm (W) x 320mm (D) x 100mm (H)
Operating Temperature	0 to 55˚C
Operating Humidity	20 to 90%



RF Carrier


GPS Monitor


C/N Testing


A490031


A490030/A490032


A490033

All specifications are subject to change without notice.

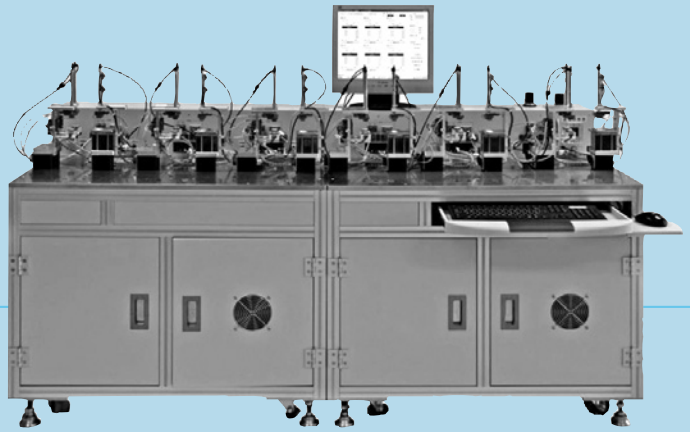
Thermal/Multi-function Data Logger 16-1
TEC Controller 16-4
Heat Pipe Test System 16-7



Thermal/Multi-function Data Logger



TEC Controller



Heat Pipe Test System



1/8/64 channels

KEY FEATURES

- Models with 1, 8, and 64 channels on-line data recording. Multi-sets linked to a PC for hundreds of channels are doable
- Support B, E, J, K, N, R, S, and T type thermocouple with ITS-90 defined temperature range
- Individual channel cold junction compensation with < ±0.3˚C accuracy
- Temperature resolution up to 0.01˚C, error down to (0.01% of reading+0.3˚C)
- Voltage full range ±480VDC, ±10VDC; resolution 1mV, 100uV; error down to (0.1% of reading+1mV), (0.015% of reading+100uV)
- 1000VDC channel to channel isolation, full protection for testing points with charge and guarantee for accurate measurements
- Thermocouple open circuit detection
- PC-based operation with powerful software for recording and analyzing data
- 1 and 8 channel models are USB powered. No battery or external power supply is required

It is a general requirement to record temperatures, voltages, currents, and many physics quantities during research, product development, productions, and quality assurance processes. The number of record channels can be a simple one to several complicated set of hundreds. Thermal/multi-function data loggers are prefect solutions to serve for these measurement and tracking needs.

There are several measurement products in the market to perform such a large-scale and extensive time varying recording. Some are expensive, some are limited in accuracy or resolution, and some have low immunity to interference. Chroma thermal/multi-function data loggers are by far the most cost-effective solutions for versatility, accuracy, stability, and interference immunity among this category.

Chroma thermal/multi-function data loggers measure temperatures, voltages, and currents with high accuracy and resolutions. For example, they support 8 types of thermocouple measurement with ITS-90 defined temperature range at 0.3˚C accuracy and 0.01˚C resolution*, while most data loggers in the market are at 1 ˚C accuracy and 0.1˚C resolution*. Chroma loggers are with 1000VDC channel to channel isolation, which means they can attach thermocouple to objects with high electricity, such as batteries, solar cells, working PCB, etc., and still get correct data. Many competitors are just malfunctioned or even damaged in those cases. Data retrieve in Chroma loggers are in a parallel architecture, while most of competitors use a sequential multiplexing method. This means data rate per channel is quick and constant for Chroma loggers, while others become much slower when number of channels is bigger.



8 channels 1 channel

Using Chroma thermal/multi-function data loggers, customers get confidence in measured data and high Performance/Cost ratio. Most of all, we can help in certain cases that our competitors fail, and only Chroma succeeds.

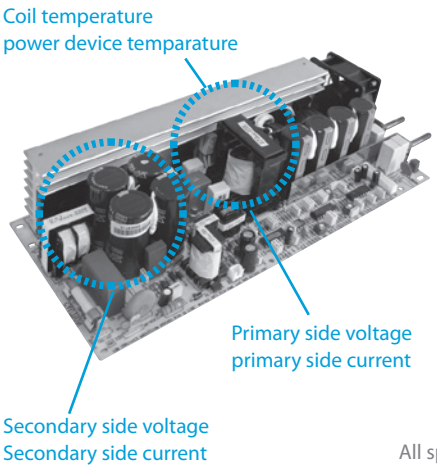
* Thermocouple error excluded. Please see specification list for detail.

1000VDC channel to channel isolation

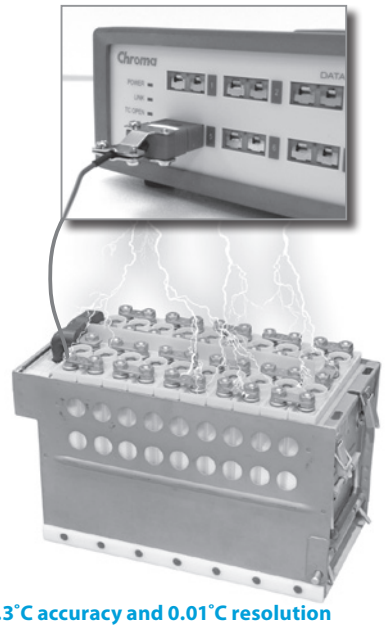
In developing or qualifying some electronic devices, tracking records of temperatures/voltages/currents are required. Many cases there can be high voltage difference between measured points. A switching power supply, for example, is required to measure the primary side voltage/current, secondary side voltage/current, and key component temperatures. Unfortunately, many data loggers including some leading brands are incapable to handle such a high voltage difference between both sides. Few hundred voltage difference can mess up their measurement totally, or even kills their loggers.

Chroma thermal/multifunction data loggers are perfect for the measurements in a situation with charge and high voltage difference. The feature of 1000VDC channel to channel isolation makes them immune to voltage difference between any two channels. One just attaches thermocouple or wires on the device or conducting pads and gets accurate data.

Another case can be battery system tests. One needs to know the voltage and temperature of each cell. For other data loggers, often the voltages cannot be measured properly in the cascade configuration. The thermocouple attachment is another issue needing special care. All these problems are easily solved using Chroma thermal/multi-function data loggers for the high channel to channel isolation.



Multi-channel Data Logger



0.3˚C accuracy and 0.01˚C resolution

For the same or even lower prices, Chroma thermal/multi-function data logger offers higher accuracy and better resolution than our competitors do. While most of data loggers are at 1˚C accuracy and 0.1˚C resolution, Chroma data loggers are 1 order better than theirs. It is always true the more accurate and seeing more details, the better for measurements.

In order to achieve such high accuracy and resolution, Chroma implements individual CJC for each channel. High bit-count A-to-D converters and advanced noise suppression circuit makes outstanding performance for these data loggers. The best of all is that customers can enjoy better specifications without paying more.

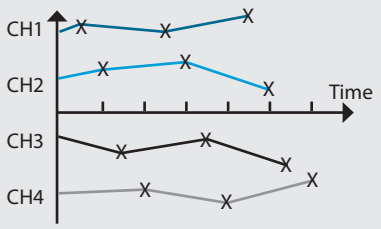
Precise temperatures can be critical in thermal conductivity measurements, chemical processes, and biologic experiments. Testing a heat pipe, for example, often requires resolving <1˚C temperature difference between evaporation and condensing zones. Some liquid crystals can change their properties drastically with a very small temperature variation at critical temperatures.

Constant data rate per channel

Most of data loggers in the market use a multiplexing circuit structure. All channels share a bandwidth which means the more active channels, the slower data rate per channel will be. Chroma data loggers use a parallel data retrieving circuit structure. No matter how many channels are active, the data rate can be as fast as 5 samples per second per channel.

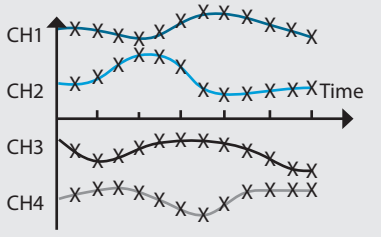
The benefit of constant data rate can be profound for recording large number of channels. For tens of channels, total data bandwidth of Chroma data logger can be several times larger than that of other data loggers. Some other data loggers can become too slow and lose details. They can miss recording critical changes happen in a short time. Chroma data loggers greatly reduce this possibility.

All specifications are subject to change without notice.



What other data loggers see,
more channels, slower rate each channel

$$\text{Sample rate per channel} = \frac{\text{bandwidth}}{\text{number of channels}}$$



What CHROMA data loggers see
constant rate each channel.

Sample rate per channel = constant

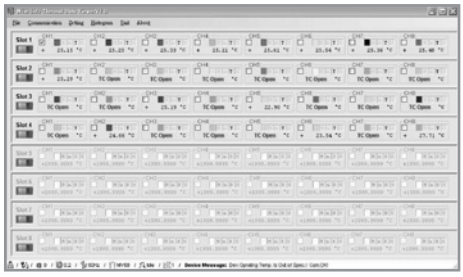
Powerful data recording and analyzing through a PC

Personal computers and Notebooks are powerful for their fast calculation and data processing capability, friendly graphic user interface, and huge hard disk storage. While operation of many other data loggers are limited by their small display and memory, Chroma data loggers link to PCs or Notebooks for direct display, analyses, and storage.

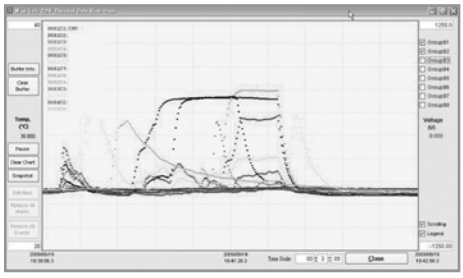
Using the PC software, one can see the detail of all the curves, change drawing time and range scales, create marks, zoom in selected sections, and perform difference calculations, all in few simple steps. The PC RAM is used as buffer to store every data since the logger is powered on, making data tracking back possible without opening the record file. Size of data recording is determined by hard disk free space, which is almost unlimited.



Main panel



Data panel



Data Histogram

Applications

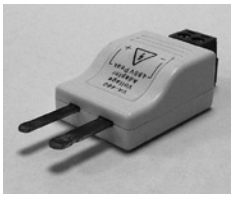
- Automotive & Aircraft
- Electrical & Electonics
- Solar Energy
- Power
- Machinery
- Iron & Steel
- Metals & Mining
- Oil & Gas
- Water & Waste
- Chemical
- Pharmaceutical & Food
- Others

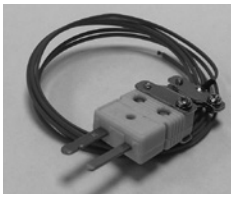
SPECIFICATIONS				
Model		**51101-1 51101C-1**	**51101-8 51101C-8**	**51101-64 51101C-64**
Thermocouple				
Thermocouple T-type	-200 to 400˚C	51101 Series : ±(0.01% of reading +0.3) ˚C *1 51101C Series : ±(0.01% of reading +0.8) ˚C *1		
Thermocouple K-type	-200 to 1372˚C			
Thermocouple B-type	250 to 1820˚C			
Thermocouple E-type	-200 to 1000˚C			
Thermocouple J-type	-210 to 1200˚C			
Thermocouple N-type	-200 to 1300˚C			
Thermocouple S-type	-50 to 1760˚C			
Thermocouple R-type	-50 to 1760˚C			
Thermocouple Jacks		T, K, B, E, J, N, S, or R mini-type		
Thermocouple Connector		T, K, B, E, J, N, S, or R mini-type		
Temperature Reading				
Number of Inputs		1	8	8, 16, 24, 32, 40, 48, 56, 64 channel
Temperature Sensor Type		Thermocouple : B, E, J, K, N, R, S, T		
Temperature Scale		ITS-90		
Temperature Resolution		±0.01 ˚C		
Temperature Accuracy *1*2		±(0.01% of reading +0.3)˚C		
CJC Error		±0.3 ˚C		
Maximum Sample Rate		5 sample/sec.		
Channel to Channel Isolation		1000VDC/750 Vrms		
Input Resistance		5MΩ		
Thermocouple break detection current		100 nA		

Model	51101-1 51101C-1	51101-8 51101C-8	51101-64 51101C-64
Digital I/O			
Number of Digital I/O	--	--	4 differential digital inputs and outputs
Digital Input	--	--	1 trigger input(DI0) and 3 general purpose inputs
Digital Input- High Input Voltage	--	--	3 ~ 30 V
Digital Input- Low Input Voltage	--	--	< 0.8 V
Digital Input- High Input Current	--	--	0.8 ~ 13.1 mA
Digital Input- Low Input Current	--	--	<10 μA
Digital Input- Terminal Resistor	--	--	2.2KΩ
Digital Output Configuration	--	--	transistor switch
Digital Output- External Supply Voltage	--	--	<30 V
Digital Output- ON-state Voltage	--	--	<1.5 V
Digital Output- ON-state Current	--	--	<400 mA
Digital Output- OFF-state Current	--	--	<2.1 μA
Digital Output- Power Dissipation per Output	--	--	<0.6 W
Isolation Voltage			±250 V
Communication			
RS-232	--	--	Half Duplex, DB-9 female connector
USB	USB2.0 (full speed device) ; USB A-type connector	USB2.0 (full speed device) ; USB B-type connector	
LAN (Option)	--	--	Ethernet (10BASE-T/100BASE-TX) ; RJ-45 connector
Power Specifications			
Power Requirement	4.5~5.5 V		11.4~12.6 V
Maximum Power Consumption	0.22W	1.2W	18 W
Physical Specifications			
Dimensions (WxDxH)	96 x 29 x 14.5mm	135.3 x 186 x 51.7 mm	277 x 200.7 x 233 mm
Weight for Main Frame	30g	1.2 Kg	2.4 Kg
Weight per Sensor Card	--	--	0.15 Kg
Weight (Main Frame + 8 Sensor Card)	--	--	3.6 Kg
Environmental specifications			
Operating Temperature *1*2	0~50˚C		
Humidity	< 80 %RH		
Power Adaptor Input Voltage	--	--	90 to 260 VAC
Power Adaptor Input Frequency	--	--	47 to 63 Hz
Main Frame DC Input	--	--	12.6 V/1.5 A
Thermocouple Differential Input Voltage	±2.5 V	±2.5 V	±5 V
External Digital Input/Output Voltage	--	--	30 V
External Digital Output Current	--	--	400 mA
Operating Temperature	0~50˚C		
Storage Temperature	20~60˚C		
Storage Humidity	80 %RH		

Voltage Reading		
Voltage Input Type	VA-480 Voltage Adaptor	VA-10 Voltage Adaptor
Voltage Resolution	1mV	100uV
Voltage Input Range	±480VDC	±10VDC
Voltage Input Accuracy	±(0.1% of reading + 1mV)*3	±(0.015% of reading + 100uV)*3
Input Resistance	1MΩ	300kΩ

Current Reading	
Current Input Type	IA-3 Current Adaptor
Current Resolution	1mA
Current Input Range	±3A
Current Input Accuracy	±(1% of reading + 1mA)


Voltage/Current Adaptor


Thermocouple

Note *1 : The accuracy spec is defined as the operating temperature range from 20˚C to 30˚C, the uncertainty of thermocouple itself is not included
Note *2 : For operating temperature out of range from 20˚C to 30˚C, additional error (0.01% of reading + 0.03˚C) / ˚C for that out of operating temperate should be added
Note *3 : Under MV_8 filtering mode

ORDERING INFORMATION

51101-1 : Thermal/Multi-Function Data Logger - 1 channel
51101C-1 : Thermal/Multi-Function Data Logger - 1 channel
51101-8 : Thermal/Multi-Function Data Logger - 8 channel
51101C-8 : Thermal/Multi-Function Data Logger - 8 channel
51101-64 : Thermal/Multi-Function Data Logger - 64 channel
51101C-64 : Thermal/Multi-Function Data Logger - 64 channel
A511000 : VA-480 Voltage Adaptor (option)
A511001 : IA-3 Current Adaptor (option)
A511002 : VA-10 Voltage Adaptor (option)

All specifications are subject to change without notice.



150W/300W/800W

KEY FEATURES

- Bidirectional driving with 150W (24V/8A), 300W (24V/13A) or 800W (40V/20A) output
- Filtered PWM output with > 90% driving power efficiency while maintaining linear driving with current ripples < 20 mA
- Temperature reading and setting range -70 to 250˚C with 0.01˚C resolution and 0.3˚C absolute accuracy
- Short term stability (1 hour) ±0.01˚C and long term stability ±0.05˚C with optimal PID control
- Feature true TEC large signal PID auto tune for best control performance
- 2 T-type thermocouple inputs, one for control feedback and the other for monitor and offset, providing versatile control modes
- RS232, USB2.0, LAN communication port for PC remote operation and thermal data recording
- Powerful and user-friendly PC program available
- Perfect matching all Chroma designed temperature controlled platforms

A thermoelectric cooler (TEC) module is a solid state device which can control heat flux using current. It is very useful in small scale temperature control, providing fast temperature response and ultra-high temperature stability. TEC temperature control equipment can also be very compact and green. No mechanical moving or hot/cold material consumption is needed.

Chroma's Advanced TEC Controllers have an excellent temperature monitoring engine, which allows 2 T-type thermocouple inputs. The cold junction of the engine is internally stabilized up to 0.001˚C, for that 0.01˚C temperature resolution and control stability can be achieved. The TEC driver uses a filtered PWM architecture, which obtains high driving power efficiency as ordinary PWM drivers have, but smoothens the current modulation to a DC-like output. It's very important for electro-magnetic sensitive measurements.

Another important feature of Chroma's Advanced TEC Controllers is the true TEC PID auto tune function. Chroma's Advanced TEC Controllers have unique auto tune algorithm to guarantee the best control and temperature response. Stability down to the temperature resolution, which is 0.01˚C, is regularly achieved regardless the size and geometry of thermal platforms.

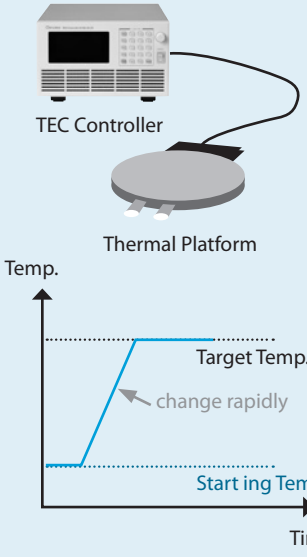
High TEC driving capability is another merit of Chroma's Advanced TEC Controllers. Chroma's Advanced TEC Controllers deliver 150W, 300W, 800W for high power TEC driving. More TEC driving power means wider temperature range, faster temperature response, and larger platform applications. For comparable accuracy and stability, Chroma offers one of the best TEC driving power to price ratio in the market.

Excellent Thermal response, temperature precision, and control stability

TEC module is a bi-directional heat pump controlled by current. So a temperature control system with TEC modules can reach temperatures higher or lower than ambient. Compared with traditional temperature control methods, this is compact, fast responding, and using only one controller.

Though there are many special features for TEC modules, users still need good TEC controllers to get all the benefit. Chroma's Advanced TEC Controller is specially designed for optimal performance of TEC temperature control. Changing temperature from one to another can be very fast. There is no overshoot or minimal overshoot approaching the target temperature. When thermal perturbation happens, even for a 100W on/off perturbation, Chroma's Advanced TEC Controllers can often reduce the temperature variation to less than 1˚C within few seconds. As temperature stability is concerned, Chroma's Advanced TEC Controllers offer 0.01˚C stability in most cases.

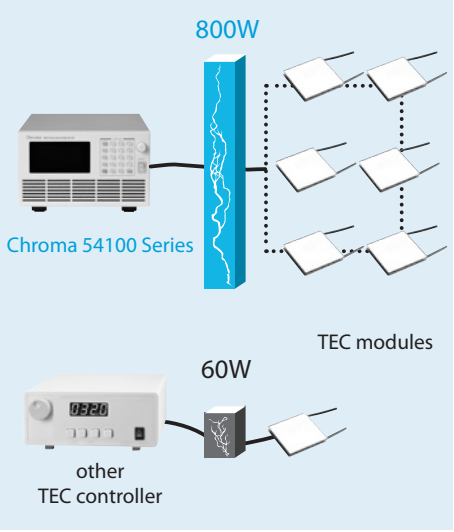
Using Chroma's TEC methord, rising and falling of temperature is about 5~60˚C per minute.



High Driving Capability

There were many small output power TEC controllers in the market mainly for small devices and small scale lab tests. As technologies grow, higher TEC driving power than before is demanded in many new applications. For example, testing solar cells larger than 4 inch squares from -20˚C to 85˚C requires more than 100W TEC driving power, not to mention the thermal load of sunlight can be 30W or more. High power-LEDs for lighting have great concerns about their thermal property. 30 W-LED module testing from -20˚C to 150˚C also demands high TEC driving power.

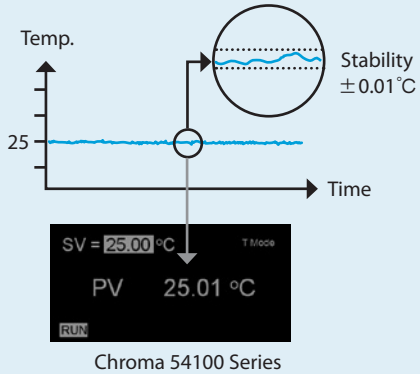
Chroma's Advanced TEC Controllers can deliver 150W/300W/800W TEC driving power, satisfying needs from small to large platforms. In typical applications, many pieces of high power TEC modules can be driven by a controller output. For the cost of every driving power, Chroma offers very competitive solutions.



High temperature accuracy and resolution

TEC controllers using thermocouple in market usually have accuracy about 1˚C and resolution 0.1˚C. This is not good enough for many applications. For example, rating solar cell power efficiency needs temperature accuracy much less than 1˚C. Phase change of some material can happen within 0.1˚C or less. Some biochemical process can be very sensitive to a critical temperature. Thermal resistance measurement of heat pipes often results in a temperature deviation much less than 1˚C. Some high resolution TEC controllers are using different types of temperature sensors, such as RTD, temperature IC, or thermistors. Unfortunately, these temperature sensors can have trouble for metal contact, or too bulky to measure the point of interest.

Chroma's Advanced TEC Controllers are thermocouple based and with temperature accuracy* 0.3˚C and resolution down to 0.01˚C. Users can take advantage of thermocouple for easy measurement setup, while maintain high accuracy and resolution. This means users can achieve test results with high repeatability, high accuracy, and therefore high confidence.

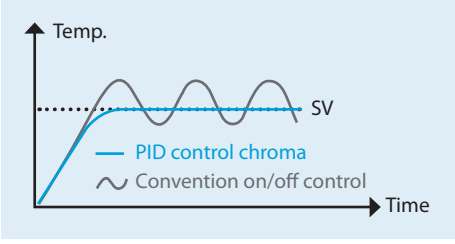


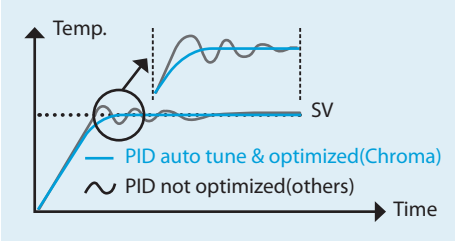
Chroma 54100 Series

True large-signal PID / auto tune for TEC control

PID control is an important feature for a good controller. The PID parameters basically describe the dynamic response of a system and can be very different from one to another. It does not guarantee a successful control unless proper PID parameters are set. It is very painful and time consuming to search for PID parameters manually. So an advanced controller should feature PID auto tune function.

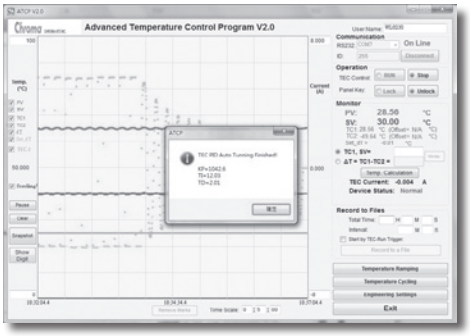
Many other TEC controllers use a small signal and one-directional temperature transient to find PID parameters. This auto tune method is OK for heater only temperature control, but not always successful for TEC control. In order to truly match the thermal response of a TEC control system, Chroma's Advanced TEC Controllers use a large-signal and bi-directional driving method for PID auto tune. This proprietary method results in the superb temperature control behavior, which is fast, precise, and very stable. While some other TEC controllers require a set of PID parameters for every 20˚C interval, Chroma's Advanced TEC Controllers need only a set of optimal PID parameters (usually auto tuned at 40~50˚C) to cover all operation from -70 to 250˚C.

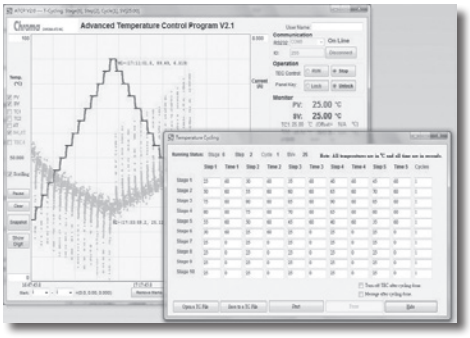


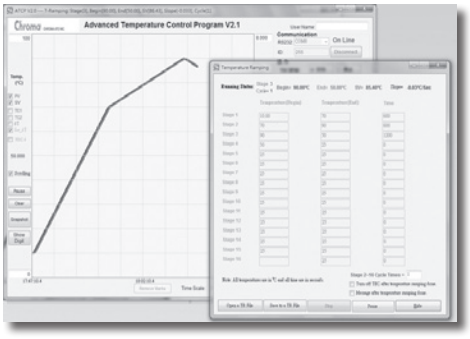


Soft Panel

Chroma's Advanced TEC Controller Program provides a GUI which can set and read temperatures, viewing TEC current and temperature v.s. time curves, recording data to a file, and running temperature cycling and ramping sub-programs. PID parameters, current limit, and important settings can also be read and set from a pop-up engineering setup window.





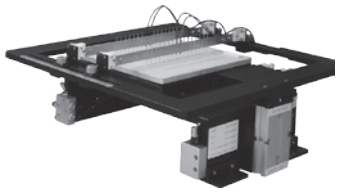


Applications

- Semiconductor
- Bio Tech & Life Science
- Optical Sensor
- LED/ Laser Diode
- Material Analysis
- Solar Cell
- Panel Display
- Chemical Process

High Efficiency Standard Platforms

There are numerous TEC platforms worked with Chroma Advanced TEC Controllers, including standard platforms for LEDs, solar cells, e-paper, burn-in, and so on. Each one shown below can reach wide temperature range with typical stability 0.01˚C.



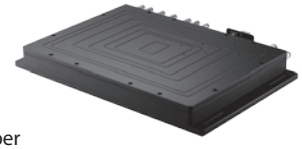
Solar Cell



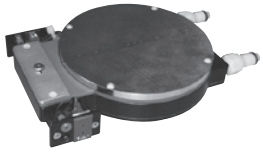
LED Integrated Sphere



Micro Projector



E-paper



Wafer Chuck



General Platform

All specifications are subject to change without notice.

SPECIFICATIONS				
Model		**54115-24-8**	**54130-24-13**	**54180-40-20**
TEC Output Voltage		24VDC	24VDC	40VDC
TEC Output Current		8A	13A	20A
TEC Driving Output Power		150W	300W	800W
Temperature Control				
Setting Temperature Range		- 70 to 250˚C		
Setting Temperature Resolution		0.01˚C		
Temperature Control Stability	Short Term	≦0.01˚C		
	Long Term	≦0.05˚C		
Temperature Monitoring				
Monitoring Temperature Range		- 70 to 250˚C		
Temperature Sensor Type		Standard : T-type thermocouple Optional : K-type thermocouple		
Monitoring Temperature Resolution		0.01˚C		
Monitoring Temperature Relative Accuracy		<±0.3˚C		
Monitoring Temperature Absolute Accuracy		< ±(0.3+0.002×|T-25|) ˚C		
Environmental				
Working Temperature		5~45˚C		
Humidity		< 80 % RH		
Power Requirement		90 to 240 VAC, 50/60 Hz		
Maximum Power Consumption		200W	480W	1000W
Fuse 150 W		3/2 A for 110/220 VAC	5/3 A for 110/220 VAC	12/6 A for 110/220 VAC
PC Communication Port		RS-232 Half Duplex ; USB2.0 ; LAN 10/100Mbps		
Dimensions (WidthxDepthxHeight)		241mm x 405mm x 90mm		241mm x 405mm x 135mm
Storage Temperature		-20~60˚C		
Storage Humidity		80%R H		
Weight		6.2 Kg		7.5 Kg

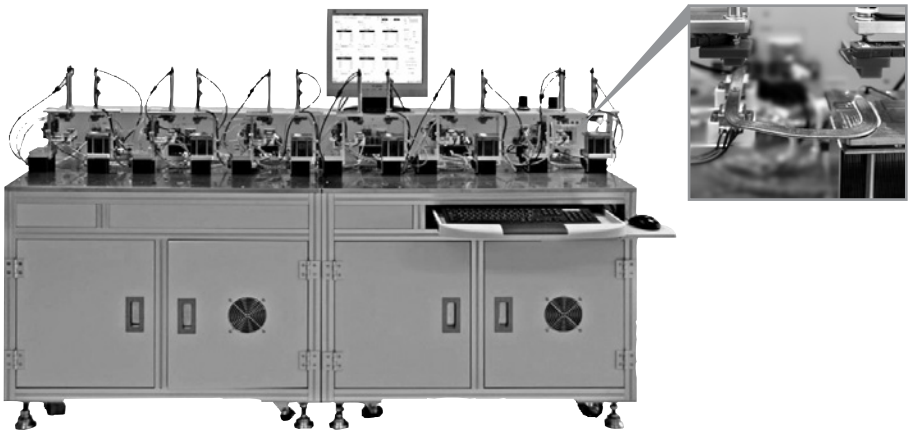
Note *1 : In applications, the temperature range can be reached strongly depends on the platform structure and environment. It is a portion of the controller setting range and less than the controller setting range.

Note *2 : The temperature control stability depends on not only the controller but also platform and environment. The PID parameters must be optimized for the platform. Avoid any liquid or air turbulence around the platform. Attach the temperature feedback thermocouple firmly with good thermal conductivity. Shield for electromagnetic interference if necessary. Extremely high control temperature stability can be achieved with all these issue taken care.

Note *3 : Monitoring Temperature Relative Accuracy is defined as the temperature difference between the two thermocouples reading the same thermal point. It is the working ambient temperature, which must be thermal balance within 20~30˚C, and exclude thermocouples error for controller specifications to be guaranteed. If the operation temperature is out of 20~30˚C, the specification will be modified to < ±(0.3+0.002×|T-25|), where T here is the working ambient temperature.

ORDERING INFORMATION

54115-24-8 : TEC Controller 150W
54130-24-13 : TEC Controller 300W
54180-40-20 : TEC Controller 800W
A541151 : TEC Thermal Platform for LED integrated sphere
A541152 : TEC Thermal Platform for LED burn-in
A541153 : TEC Thermal Platform for LED wafer
A541154 : TEC Thermal Platform for e-paper
A541155 : TEC Thermal Platform for solar cell



KEY FEATURES

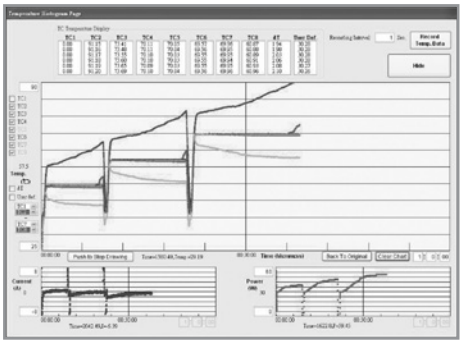
- Using TEC technology to control heat pipe working temperature precisely
- No water circulation
- Production tests with single or dual heat sources
- Fitting almost all shapes of heat pipes used in PCs or Notebooks
- Containing 6 test ports for high throughput
- Main heater up to 80 W and secondary heater up to 40W
- Temperature deviation measured at thermal equilibrium for reliable data, not at transient
- 40 to 90 seconds per test per port, much faster than other systems
- Test repeatability < ± 0.3˚C typically with 0.01˚C resolution, 1 order better than many other systems
- Dimension 200cm W x 70 cm D x 101 cm H (table height at 82 cm), weight about 240 Kg
- Power requirement 90~230 VAC, typical running at about 700W
- Much lower electricity and maintaining costs than other systems

40W/150W Heat Source Controller

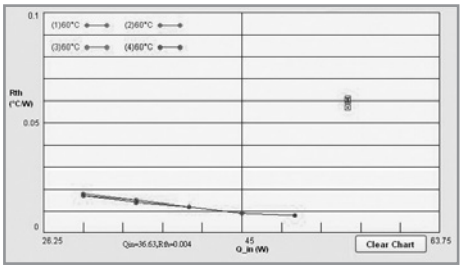
- Precise control heating power or temperature
- In heating power mode, heat source with 4-wire VxI power control, accuracy 1% full range
- In temperature control mode, 0 to 300˚C setting range with 0.01˚C resolution and controlled stability < 0.05˚C typically
- Maximum output 11V/4A(40W), 22V/7A(150W)
- 2 T-type thermocouple inputs
- 3 or 4 wired fan speed control (150W HSC only)
- Settable over temperature shutdown for safety by PC program
- Addressable RS485 link to PC. Can be integrated to thermocouple or heat pipe test systems
- 90~230 VAC power input with external power supply



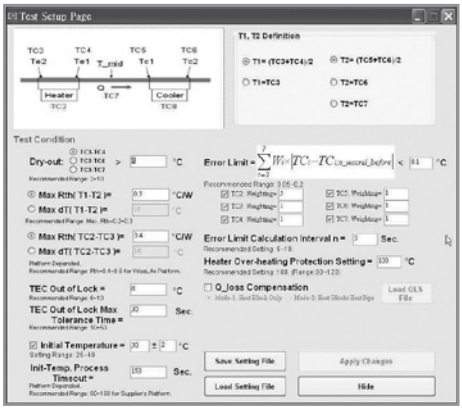
SOFTWARE



All Temperature Record



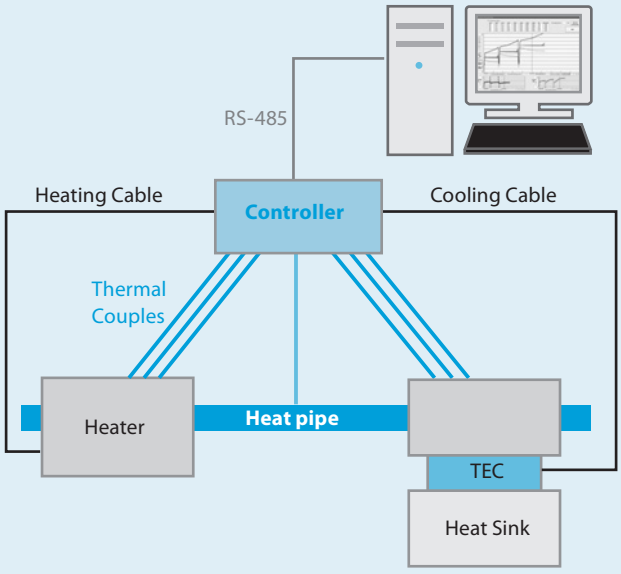
High Repeatability Result



Customized Parameters

All specifications are subject to change without notice.

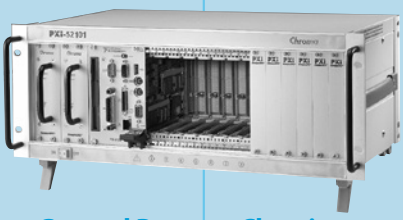
HEAT PIPE TEC CONTROL ARCHITECTURE



ORDERING INFORMATION

51201 : Heat Pipe Test System for Production Line
54204 : Heat Source Controller 40W
54215 : Heat Source Controller 150W

PXI General-purpose Chassis 17-1
PXI Mini Chassis 17-2
PXI Backplane 17-3
Dual Independent & Isolated Source Measure Unit 17-4
PXI Programmable DC Power Supply 17-5
PXI Function Cards 17-6
PXI Extension Card 17-9
CompactPCI Power Supply 17-10



General Purpose Chassis



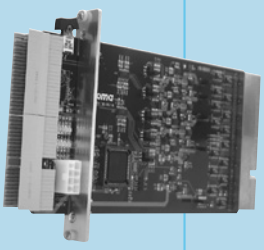
Programmable DC Power Supply



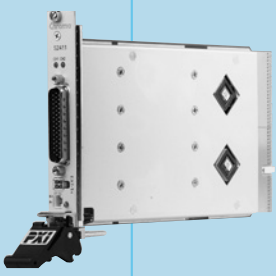
Mini Chassis



Function Cards



Extension Card



Dual Independent &
Isolated Source Measure Unit



cPCI Power Supply



8-Slot/ 14-Slot/ 18-Slot

KEY FEATURES

- High-Capacity 8-slot/14-slot/18-slot PXI/cPCI Backplane
- Low-Profile 4U Rugged Design
- Easily Convertible For Rack or Bench Used
- 55 cfm for each, High Pressure Tube-Axial Fans
- 175W/ea plug-in power supply
- Removable fans and air filter
- Optional DC (24V) input configuration available
- Comprehensive EMC shielding

CE PXI Systems Alliance

The PXI-52100 platform features the industry-standard, 8-slot/14-slot/18-slot PXI/ CompactPCI backplane integrated into a 3U Eurorack enclosure with a bay for removable power supplies.

With hot pluggable power supplies and optional battery packs, 52100 offers the widest application range of all chassis on the market.

Mounting attachment locations allow the PXI-52100 to be mounted against a wall or bulkhead, with the card cage extended in front for easy access to adapter card. The rear of the card cage is enclosed to protect the backplane from contamination as well as provide shielding for RFi/ EMI.

Power Supplies

The PXI-52100 chassis accepts removable power supply modules of the cPWR series. The power connector is a PCI 47M 400A1 connector, compliant with PICMG 2.11 Power Interface Specification standard, a mechanically and electrically roBust connector.

ORDERING INFORMATION

	Chassis (w/Backplane)	AC Power Supply (Input 110/220Vac)	DC Power Supply (Input 24Vdc)
52101-1 / 52102-1	1	2	
52101-2 / 52102-2	1		2
52105-1	1	4	
52105-2	1		4

SPECIFICATIONS

Model	**52101**	**52102**	**52105**
Backplane	• 3U-sized; PXI backplane • Compliant with PXI Specification R2.0 • PXI and CompactPCI (PICMG 2.0 R3.0) 3U modules		
Accessible Slots	8 slots	14 slots	18 slots
Power Supply	Output: 175W max. x 2 sets		Output: 175W max. x 4 sets
	• AC Input: 90V to 264V • DC Input: 18V to 36V		
BUS Width	64-bit		
Rack Mounting	4U, 19" EIA format		
Cooling Capacity	Slot cooling capacity in worst-case slot is 50W		
Module Cooling	Forced air circulation (positive pressurization)	Forced air circulation (positive pressurization)	Forced air circulation (positive pressurization)
	via 51 cfm (x3)	via 51 cfm (x4)	via 51 cfm (x6)
Slot Airflow Direction	P1 to P2, bottom of module to top of module		
Module Cooling Fan MTBF	75,000+hr		
Weight	8.5kg	9.5kg	13.5kg
Dimensions (WxDxH) mm	• Desktop: 442.2 x 257.8 x 192.1		• Desktop: 442.2 x 481.2 x 192.1
	• Rack-mount: 482.6 x 257.8 x 177.0		• Rack-mount: 482.6 x 481.2 x 177.0
Operating Temp.	0˚C ~ 55˚C		
Storage Temp.	-20˚C ~ 570˚C		
Humidity	10 ~ 95% @ 40˚C, non-condensing		
Packaged Vibration	5 ~ 100Hz: 0.015G2/Hz; 100 ~ 200Hz: -6 dB/Oct; 200 Hz: 0.0038 G2/Hz		
Unpackaged Vibration	5 ~ 55 ~ 5Hz 0.38mm Peak to Peak		
Drop Test	Falling Height: 76 cm; Falling: 1 corner/3 edges/6 faces		
Shock Test (Operating)	Acceleration: 10G; Pulse width: 11ms; Pulse shape: half sine wave; No. of shock: 3 shocks for bottom side		

All specifications are subject to change without notice.



KEY FEATURES

- 4 or 5 slots for 3U PXI modules
- Built-in 6.4 inch LCD display
- Build-in keypad
- 1/2 19" metal housing
- Easily convertible for rack or bench used
- Complies with PXI Specifications
- Touch panel

Compact Size is Ideal for Applications

- Test and Measurement
- Instrumentation
- Military
- Less quantity but multiple varieties test requirment
- Portable Systems

Chroma 52131 PXI MINI Chassis combines the strength of traditional instrument and PXI structure is the newest generation chassis of today. It complies with the PXI standard regulation that overturns the existing traditional test concepts.

Chroma 52131 has 4 or 5 standard PXI slots and a 6.4 inch high resolution TFT-LCD touch panel display that can be operated without connecting other devices. Its front panel push button design is same as traditional instrument, which makes it easy-to-use for engineers. In addition, several standard USB ports are supplied on the front panel to connect various USB devices. With the chassis designed in 1/2 Rack width, two sets of PXI MINI chassis can be put in at the same time.

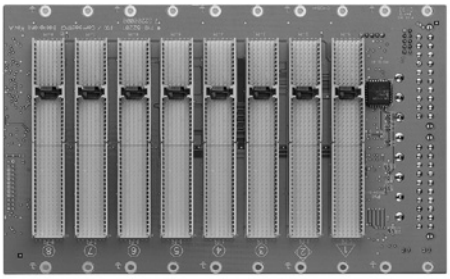
The PXI slot is located at rear of chassis that makes it easy to watch screen from the front and neatens the test environment. The light weight and small size ALL-IN-ONE design is suitable for various test environments such as small test systems, less quantity but multiple varieties test requirements, portable test systems,and etc. PXI MINI chassis can also be used as a traditional chassis type instrument that can switch functions at anytime. It not only preserves the convenient operation of traditional instrument but also incorporates the system advantages of PXI structure, which is the state-of-the-art choice for measurement.

ORDERING INFORMATION

52131-4 : PXI MINI Chassis W/Touch Panel (4-slot)
52131-5 : PXI MINI Chassis W/Touch Panel (5-slot)
A521301 : Rack-mount kit

SPECIFICATIONS	
Model	**52131**
Backplane	3U-sized ; 4-slot PXI backplane (1 system slot & 3 peripheral slots), 5-slot PXI backplane (1 system slot & 4 peripheral slots) Compliant with PXI Specification R2.2 Accepts both PXI and CompactPCI (PICMG 2.0 R3.0) 3U modules
Accessible Slots	4 or 5 Slots
LCD Display	VGA (640x480)TFT LCD Display 6.4" 262,144 colors,250cd/m2
Front Panel	27-Key Keypad (USB Compatible) USB Hub (4 x USB Ports) 1x Ethernet RJ45 (External)
Power Supply	AC Input Voltage: 100V~240V Input Frequency: 50~60Hz Input Line Current: 115V 5.0A-rms maximum, 230V 3.0A-rms maximum Output Rating: 250W(25˚C).220W(50˚C)
BUS Width	32-bit
Cooling Capacity	Slot cooling capacity in worst-case is 20W
Slot Airflow Direction	P1 to P2, bottom of module to top of module
Weight	5.5 kg
Dimensions	215mm(W) x 322mm(D) x 177mm(H)
Operating Temperature	0~40˚C
Operating Humidity	20~90%

All specifications are subject to change without notice.



PXI Systems Alliance

PXI (PCI eXtensions for Instrumentation) defines a rugged PC platform for measurement and instrumentation. PXI products are compatible with the CompactPCI industrial computer standard but offer additional features, such as environmental specifications, software requirements, and built-in timing and triggering. Moreover, PXI backplane provides configuration control and longer product lifetimes than those typical of the desktop world.

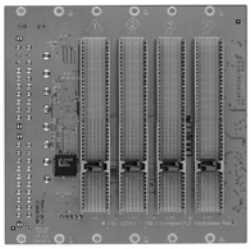
PXI backplane is designed for instrumentation computer. Its architecture makes rapid repair by board substitution possible and system upgrades and changes are greatly simplified, with minimum resulting system downtime.

ORDERING INFORMATION

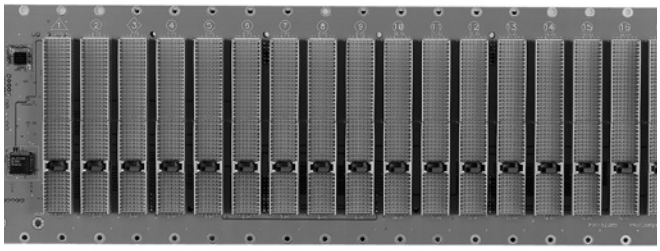
52201 : 8-Slot, 3U 64-Bit PXI Backplane
52205 : 18-Slot, 3U 64-Bit PXI Backplane
52207 : 14-Slot, 3U 64-Bit PXI Backplane

KEY FEATURES

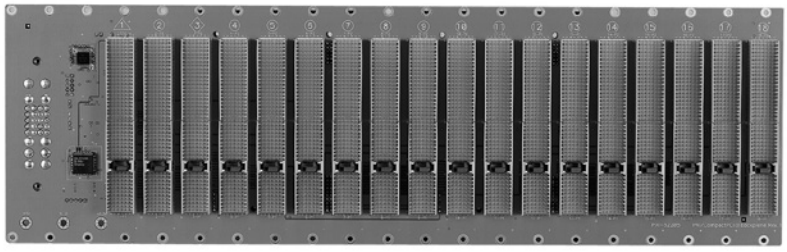
- Compliant With PXI Specification R2.0
- Accepts Both PXI and CompactPCI (PICMG 2.0 R3.0) 3U Modules
- Standard 3U Form Factor
- Two ATX Sockets and Screw Terminals for +3.3V, +5V, +12V & -12V DC Output Connection
- 64-Bit PCI BUS On P1 & P2, Supports N-1 BUS-Mastering I/O Slots. (N : Slots)
- System Controller Slot Is Located In Slot 1
- Trigger Controller Slot Is Located In Slot 2, Providing Individual Triggers To All Other Peripherals
- Dimension :
  - 8-slot / 212.2mm x 128.7 mm x 3.2 mm
  - ·4-slot / 130.9mm x 128.7mm x 3.2mm
  - 14-slot / 337.5mm x 128.7mm x 3.2mm
  - 18-slot / 420.6mm x 128.7mm x 3.2mm



52203 Backplane



52207 Backplane



52205 Backplane

All specifications are subject to change without notice.



KEY FEATURES & FUNCTIONS

- Power Rating (per slot) :
  < 200W (source) ; < 20W (load)
  - High & programmable voltage / current slew rate
  - Low output noise
  - High programming / measurement speed
- High programming / measurement resolution (by multiple ranges)
  - Remote sensing capability
  - Voltage/Current limiting
  - Simultaneous voltage, current & high accuracy measurement
  - Optional measurement log
  - DIO bits
  - Output profiling by hardware sequencer
  - Calibration data stored on-board NV-Ram
  - Floating output
  - Hot-swappable
  - Low discharge voltage

PXI Systems Alliance

- LabView/LabWindows drivers
- Softpanel GUI

APPLICATIONS

- Semiconductor Test
- LED Test
- Battery Test (before multi-channel stand-alone box available)

The Chroma 52400 series is a single (dual) slot 3U PXI card that can host up to 2 programmable source/measure SMU modules. Each SMU is independent and isolated to supplies full four-quadrant which voltage has maxima range to 100V, current range to 4A. Each SMU has it own output connection through 6 wires, ±force, ±sense and ±guards, maximizing precise measurement. Each SMU can force voltage or current and measure either voltage or current, FVMI or FIMV. Both force and measurement circuitry utilize 18 bit DAC/ADC.

The 52400 series has multi-range which apply in current and voltage. For example, 52401-25-200m has 7 current force/measure ranges, from 200mA to 200nA; 6 voltage forcing ranges from ±25V to ±0.5V. The 52400 series has a built in patented hardware sequence engine that uses deterministic timing to control each SMU. This allows for cross module/card synchronization.

ORDERING INFORMATION

52401-25-200m: Dual Independent & Isolated SMU, 25V/200mA
52405-25-1: Dual Independent & Isolated SMU, 25V/1A
52420-100-4: Single Independent & Isolated SMU, 100V/4A
A524001 : 52401 External AC-DC Power Adaptor for Single Card
A524002 : External AC-DC Power Adaptor for Multi-Card
A524003 : 52401 Output Coaxial Cable
A524004 : 52401 Trigger Cable
A524005 : 52401 External DC Power Cable



SPECIFICATIONS

Model Name	52401-25-200m	52405-25-1	52420-100-4
Slot	1	1	2
Output Channels	2	2	1
Source	5W x 2	25W x 2	200W
Load	5W x 2	10W x 2	20W
External Input Voltage	48VDC		
External Input Current	0.5A Max	1.5A Max	6A Max
Bits Resolution	18 bits	18 bits	20 bits DAC, 18 bits ADC
Programmable Loop Bandwidth	16 steps		
Number of Force Voltage Ranges	6	9	10
Number of Force Current Ranges	7	8	10
Number of Measure Voltage Ranges	12	9	10
Number of Measure Current Ranges	7	8	10
Force Voltage Ranges	±25V, ±10V, ±5V, ±2.5V, ±1V, ±500mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±100V, ±50V, ±20V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV
Force Current Ranges	±200mA, ±20mA, ±2mA, ±200uA, ±20uA, ±2uA, ±200nA	±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA, ±100nA	±4A(<50V), ±2A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA, ±100nA
Measure Voltage Ranges	±25V, ±10V, ±5V, ±2.5V, ±1V, ±500mV, ±250mV, ±100mV, ±50mV, ±25mV, ±10mV, ±4mV	±25V, ±12.5V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV	±100V, ±50V, ±20V, ±10V, ±5V, ±2V, ±1V, ±500mV, ±200mV, ±100mV
Measure Current Ranges	±200mA, ±20mA, ±2mA, ±200uA, ±20uA, ±2uA, ±200nA	±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA, ±100nA	±4A(<50V), ±2A, ±1A, ±100mA, ±10mA, ±1mA, ±100uA, ±10uA, ±1uA, ±100nA
Force Voltage Accuracy	0.05% reading + 0.0076% F.S. (≧500mV Range) 0.05% reading + 25uV (＜500mV Range)	0.05% reading + 0.0076% F.S. (≧500mV Range) 0.05% reading + 25uV (＜500mV Range)	0.02% reading + 0.002% F.S. (≧1V Range) 0.02% reading + 20uV (＜1V Range)
Force Current Accuracy	0.05% reading + 0.05% F.S. (≧2uA Range) 0.05% reading + 200pA (＜2uA Range)	0.1% reading + 0.1% F.S. (≧1A Range) 0.05% reading + 0.05% F.S. (＜1A Range)	0.1% reading + 0.025% F.S. (＞1A Range) 0.05% reading + 0.025% F.S. (≦1A Range)
Measure Voltage Accuracy	0.05% reading + 0.0076% F.S. (≧500mV Range) 0.05% reading + 25uV (＜500mV Range)	0.05% reading + 0.0076% F.S. (≧500mV Range) 0.05% reading + 25uV (＜500mV Range)	0.02% reading + 0.0077% F.S. (≧500mV Range) 0.02% reading + 20uV (＜500mV Range)
Measure Current Accuracy	0.05% reading + 0.05% F.S. (≧2uA Range) 0.05% reading + 200pA (＜2uA Range)	0.1% reading + 0.1% F.S. (≧1A Range) 0.05% reading + 0.05% F.S. (＜1A Range)	0.1% reading + 0.1% F.S. (＞1A Range) 0.05% reading + 0.1% F.S. (1A Range) 0.05% reading + 0.05% F.S. (＜1A Range)



0~48VDC/2AMP/60W

KEY FEATURES

- Dual Isolated outputs; 0-48VDC/ 2A MAX./ 60W, programmable
- Direct Universal AC input via front panel (Model 52914)
- External Trigger function
- Programmable current limit
- Over voltage, over current and short circuit protection
- Remote Voltage Sense
- 16 Bit read back voltage and current at output
- Supplies can be connected in series

Chroma 52912/52914 programmable DC power supplies are designed specifically for test applications that demand precision output voltage/current and tightly coupled measurement capabilities. Chroma 52912/52914 provides you a good return on investment. The versatile design and world-class performance of Chroma 52912/52914 make them ideal for a broad range of design and production applications in markets as diverse as communications, semiconductor, and components manufacturing.

Measurement Function

In operation, the measurement capabilities include quickly setting I/V and then measuring I/V automatically without processor intervention. 52912/52914 has hardware built sequence list that can execute command and store data in FIFO without processor action. With the tight integration of a Chroma 52912/52914, you'll get high speeds for high throughput and high measurement accuracy and repeatability for yield integrity.

Power Levels

The 52912/52914 Programmable power supplies provide two independent and isolated 60W(MAX) supplies, and each channel is programmable from 0-48VDC to a maximum of 2.0 Amps. The 52912/52914 include programmable current limit to protect critical UUT's from excessive current, output will automatically switch into constant current mode when limit is reached. For greater power or voltage applications, channels can be connected in series.

Input Power

To avoid excess power draw from the PXI backplane, the 52912 draws input power (+56VDC) via front panel connections. This approach not only minimizes power required from the backplane but also maintains complete isolation between backplane logic and power conversion circuitry for noise immunity. For applications where +56VDC is not available, Chroma 52912 provides an optional AC-DC adapter which allows the instrument to be operate from 100~240VAC mains. Chroma 52914 incorporates the AC-DC converter circuit on board. Universal power (100~240VAC) is applied to the front panel directly in order to produce the dual isolated programmable outputs.

Compliant to PXI and cPCI Standards

The 52912/52914 Programmable power supplies comply with the latest PXI Revision 2.0 specifications of the PXI System Alliance (PXISA) as well as the CompactPCI specifications as defined by the PCI Industrial Computer Manufacturing Group (PICMG). Thus, the 52912/52914 may be used in either PXI or CompactPCI mainframes.

ORDERING INFORMATION

52912 : PXI/cPCI Programmable DC Power Supply (DC Input)
52914 : PXI/cPCI Programmable DC Power Supply (AC Input)
A529102 : AC/DC Adapter (for Model 52912)



A529102

SPECIFICATIONS		
Model	**52912**	**52914**
Dimensions	1-Slot, 10x16cm	3-Slot, 10x16cm
Output		
Voltage/Current/Power	Channel #1 : 0 ~ 48VDC, 2A MAX., 60W Channel #2 : 0 ~ 48VDC, 2A MAX, 60W	
Voltage Accuracy	0.5% of programmed value ±50mV	
Voltage setting resolution	12 Bits	
Line Regulation	0.1%	
Load Regulation	0.1% (10% to 90% load change)	
Transient Response (20MHz)	Peak transient less than 150mV and return to within 5% less than 2ms following 20% load change. (Test Condition: 24V@1.44A~1.8A, 48V@0.8A~ 1A) at 25˚C	
Current Limit Accuracy	0.5% ± 50mA (12 Bits Resolution)	
Read back	Voltage: ±0.2% of Reading + 60mV Current: ±0.5% of Reading + 10mA	
Rise Time	< 50 ms (10% ~ 90%)	
Efficiency	84% typical	
Measurement Function		
Maximum sampling rate	5K S/s of each channel	
Input Impedance	5kΩ	
Trigger sources	Software, external	
Buffer size	2K samples per channel	
Data transfers	Polling	
Sequence Function		
Trigger sources	Software, external	
Input Impedance	3.78kΩ	
Buffer size	256 command words per channel	
Input		
DC Input	Isolated + 56VDC (dual)	--
AC Input	100V ~ 240VAC, 50 or 60 Hz (Optional A529102)	100 ~ 240VAC, 50 or 60 Hz
Software API	• VISA compatible via National Instrument's VISA 2.5 or above • 20 Windows DLL's API	
PCI Data BUS	PCI V2.2 compliant, 33MHz, 32 Bits	
Operating Temperature	0˚C ~ 55˚C	
Operating Humidity	10% ~ 90 % relative	
Storage Temperature	-30˚C ~ 70˚C	
Isolation		
Channel to Channel	500V	
Channel to Chassis	500V	
Standards	• PXISA PXI 2.0 • PICMG 2.0 R3.0 CompactPCI	

All specifications are subject to change without notice.



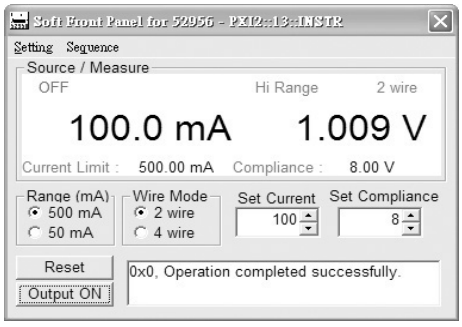
PXI Systems Alliance

The 52953 is a high performance programmable constant current source and voltage measurement unit compatible with the PXI format. A compliance voltage can be programmed to prevent voltage excursions outside programmed limits. It includes patented Sequence Engine technology and on board memory thus allowing it to independently synchronise and communicate with other modules in Chroma's Photonic range.

The 52953 can be used in conjunction with other Chroma photonics modules such as the 52961 Dual NANO-AMP Meter for the test and characterisation of tuneable laser diodes or higher brightness LED diodes.

ORDERING INFORMATION

52953 : Current Source Measure Module

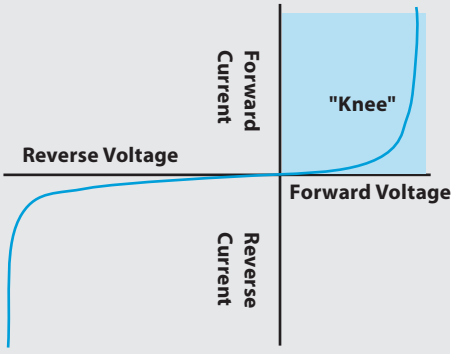


KEY FEATURES

- Integrated on a master slave basis with other 52953's or other Chroma Photonics Cards
- Fully floating output allowing star ground connections for multiple units
- Voltage measurement with Kelvin connection
- 15-bit stimulus and measure
- Compliance voltage programmable from 0 to 8V
- PXI Modular Architecture
- Calibration data stored in on-board NV Ram

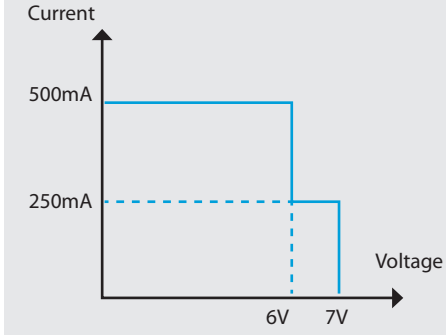
Softwrae for Windows 2000 & XP

- **Soft Front Panel**
  Soft Front Panel allows control of switch functions for "bench-top instrument" use.
- **Drivers**
  Drivers based on NI-VISA®, Visual C++, Visual Basic®, LabVIEW®, LabWindows/CVI® drivers are supported
- **Install Wizard**
  Our install wizard gets you up and running in minutes!



TYPICAL APPLICATIONS

- Laser Diode Test (LIV) of DFB's and VCSEL's
- Tuneable Laser Test using multiple cards
- Light Emitting Diodes
- Signal Diode DC Test



SPECIFICATIONS								
Model	**52953**							
Voltage Accuracy Range	1 ~7 V							
Programming Resolution	15 bit							
Compliance Accuracy ± (% reading. + Volts)	0.6%+8mV							
Programming Voltage	1 ~ 7 V							
Default Measurement Resolution	15 bit							
Measure Accuracy ±(% reading. + Volts)	0.5%+2mV							
Source Limit	+7V@+250mA							
Current Accuracy								
Range	10uA		2mA		20mA		500mA	
Programming Resolution	15 bit							
Programming Current	0~0.5uA	>0.5uA~10uA	0~0.3mA	>0.3mA~2mA	0~3mA	>3mA~20mA	0~50mA	>50mA~500mA
Source Accuracy ±(% reading. + Amp)	0.5%+30nA	0.1%+30nA	0.45%+2uA	0.45%+2uA	0.66%+20uA	0.66%+20uA	0.3%+900uA	0.3%+900uA
Measure Accuracy ±(% reading. + Amp)	0.5%+300nA	0.2%+20nA	0.6%+1uA	0.35%+600nA	0.7%+60uA	0.5%+60uA	0.6%+600uA	0.3%+600uA
Max. Output Power	3W							
Thermal Drift	If over temperature from 15˚C to 35˚C, it would exit measure drift <200ppm/˚C and program drift <50ppm/˚C							
Remote Sense	Up to 0.5 V drops per load lead.							
Operation Environment	Temperature : 10˚C ~40˚C Humidity: 10%~70%RH							
Warm-up Duration	30 minutes							



PXI Systems Alliance

The 52958 is a Leakage test module compatible with the PXI format. It provides a programmable voltage source and current measurement. The unit also has programmable "current limit" and voltage "read-back" functions allowing "breakdown" voltage to be measured. It is optimised for speed for use in high throughput applications.

It is typically deployed in conjunction with the 52956 Module (Source Current / Measure Voltage).

ORDERING INFORMATION

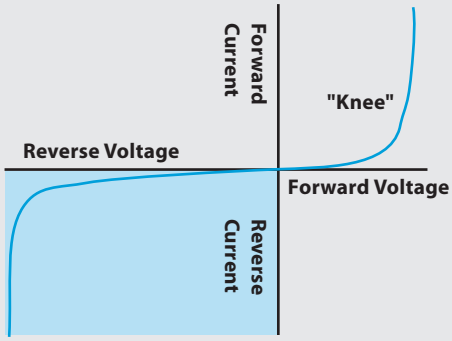
52958 : Leakage Test Module (Mercury Relay)

KEY FEATURES

- Long life time-mercury Relay
- Sensitive current ranges for accurate leakage measurements
- Up to 200V source for accurate breakdown measurements
- Fully compatible with Chroma Current Source/Measure module
- Internal switching for fast sequencing of forward, reverse and breakdown test modes
- Small footprint

Softwrae for Windows 2000 & XP

- **Soft Front Panel**
  Soft Front Panel allows control of switch functions for "bench-top instrument" use.
- **Drivers**
  Drivers based on NI-VISA®, Visual C++, Visual Basic®, LabVIEW®, LabWindows/CVI® drivers are supported
- **Install Wizard**
  Our install wizard gets you up and running in minutes!



APPLICATIONS

- Leakage and breakdown testing of semiconductor diode junctions including LEDs and Lasers
- High speed wafer test
- Low Current Constant Voltage Source Applications

SPECIFICATIONS	
Module	**52958**
Parameter	Value
Output Polarity	Unipolar output with switching to allow inversion of the output stimulus/measurement. All input/output signals are fully floating with respect to chassis ground.
Voltage Stimulus (2-wire)	
Ranges	10V / 200V
Accuracy	±0.3% ±0.1% F.S.
Maximum Current	5mA
Voltage Measurement (for stimulus verification only)	
Ranges	10V / 200V
Accuracy	±0.3% ±0.1% F.S.
Current Measurement	
Ranges	100 μA / 5mA
Accuracy	±0.3% , ±0.2% all ±0.1% F.S.
Ranges	1 μA (Note1)
Accuracy	±2% ±0.1% F.S.
Current Compliance	
Ranges	100 μA / 5mA
Accuracy	±5% ±0.1% F.S.
Dimensions	3U PXI (2 slots)
Current Accuracy	12 bits resolution
Voltage Accuracy	12 bits resolution
Operation Environment	Temperature : 10~40°C Humidity : 10%~70%
PCI Data BUS	PCI V2.2 compliant, 33MHz, 32 Bits
Standards	PXISA PXI® 2.0 PICMG 2.0 R3.0 CompactPCI®

Note1 : test condition > 30nA and under resistor load.

All specifications are subject to change without notice.



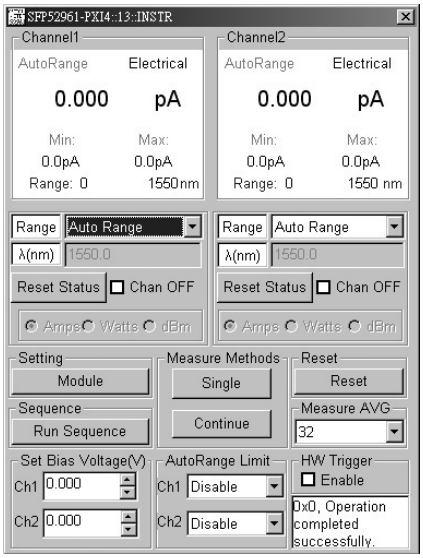
PXI Systems Alliance

The 52961 NANO-AMP Meter is a single slot PXI module designed to make fast Optical Power measurements and store the results of a sequence of Measurements. The unit has 2 channels for power measurement. Each channel is provided an electrical input connection to allow external photodiodes to be used.

The user can generate a table for result values and step rapidly through the table using the High Speed Instrument Sequencer (HSIS#) functionality. It can be used in conjunction with the 52956 Source / Measure module to provide a comprehensive test solution to the testing of optical devices such as laser diodes. The resultant table can be uploaded from the module to the test system database for analysis and is ideal for optical component test and characterization. Multiple units can be used in combination with other Chroma Photonics Instruments.

ORDERING INFORMATION

52961 : Dual Channel NANO-AMP Meter



KEY FEATURES

- Typical Applications
  - Any measurement of nA current within the specifications
  - Optical power measurement with external photodiode
- Dual Independent Channels

Softwrae for Windows 2000 & XP

- **Soft Front Panel**
  Soft Front Panel allows control of switch functions for "bench-top instrument" use.
- **Drivers**
  Drivers based on NI-VISA®, Visual C++, Visual Basic®, LabVIEW®, LabWindows/CVI® drivers are supported
- **Install Wizard**
  Our install wizard gets you up and running in minutes!

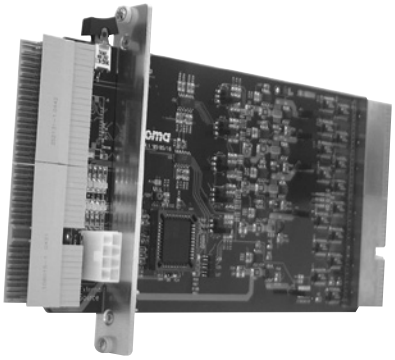
Input Type

- Si Photo Diode
- InGaAs Photo Diode
- Electrical input (ext photodiode)

SPECIFICATIONS

Model	52961
Parameter	**Electrical Input**
Minimum Input Current	15 nA
Maximum Input Current	9.5 mA
Resolution	15 bit
Accuracy	10mA : ±1% ± 2 μA
	1mA : ±1% ± 0.2 μA
	100 μA : ±1% ± 0.1 μA
	10 μA : ±3% ± 30nA
	1 μA : ±3% ± 10nA
	100nA : ±3% ± 5nA
Connector Interface	BNC
Form Factor	3U PXI
Maximum Power Consumption	10W
Channel	2 Channels
Operation Environment	Temperature : 0~40°C Humidity : 10%~70%
Range	10mA / 1mA / 100 μA / 10 μA / 1 μA / 100nA

All specifications are subject to change without notice.



KEY FEATURES

- Extend PXI backplane signals
- 3U 64-bit PXI extension card available for hot swapping PXI card
- Extend PXI BUS to outside of chassis, easy for inspection
- Able to use voltage meter to measure the power consumption of +5V, +3.3V, +12V,-12V and VIO
- Use Jumper to control the cutoff current
- Power is controlled by mechanical switches
- Provide external power device
- Provide short circuit protection

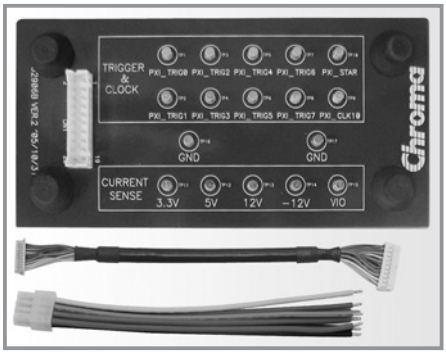
PXI Systems Alliance

The function of PXI extension card is to extend the PXI backplane signal outside of the chassis. Inserting the PXI card to extension card can easily check or measure the PXI card's signal under power on condition, which resolves the problems of inconvenient inspection due to the PXI card inside the chassis for RD or maintenance personnel. PXI extension card is able to isolate the voltage and signals sent to the PXI card for hot swap when the system is powered on. Every time the extension card activates it can supply the power required for PXI initialization. It eliminates the need for rebooting PC when users read and re-write the configuration files.

PXI extension card allows users to measure the voltage consumption power of PXI standard 5 sets voltage easily using the voltage meter. The extension card has over current protection circuit that can prevent the system backplane and other related components from damage once the PXI card malfunctions. Jumpers on the extension card are available for users to define the current range for protection; in addition an outward power connector is attached to supply the power externally instead of using the backplane power.

ORDERING INFORMATION

52906 : Extension Card



Test Board

SPECIFICATIONS	
Model	**52906**
BUS	PXI / Compact PCI 32 or 64 bit
Input Requirement	5V at 250 mA, 12V at 100 mA, -12V at 100 mA
Input for UUT	From chassis or the external power, configurable by jumpers for each power source
Output Current Limit Protection	5V, up to 5 Amps, 3 limitations jumper selectable 3.3V, up to 3 Amps, 3 limitations jumper selectable VIO, up to 2 Amps, 3 limitations jumper selectable 12V, up to 1.25 Amps, 3 limitations jumper selectable -12V, up to 1 Amp, 3 limitations jumper selectable
Output Voltage Drop	0.07 volts drop for every 1 Amp drawn for 5V, 3.3V; 0.1 volts drop for every 1 Amp drawn for VIO; 0.25 volts drop for every 1 Amp drawn for 12V; 0.15 volts drop for every 1 Amp drawn for -12V
Propagation Delay	Less than 500 pico-seconds from the PC BUS to the UUT. (Switch propagation delay is rated at 250 Pico-seconds)
UUT ON-OFF Controls	Via SPDT switch on-board
Outputs	Current draw by the UUT can be measured at connector J5 for 5V, 3.3V, 12V, -12V and VIO. Each volt represents 1 Amp.
Current Sense Accuracy	Typical below 10% for 5V, 3.3V, 12V, and VIO; below 15% for -12V
Mechanical Dimensions	100 x 220 mm (3U high)

All specifications are subject to change without notice.



175W/180W

KEY FEATURES

- Eurorack-compatible module design
- Input: 100V ~ 240Vac, 18V ~ 36Vdc
- Hot-swappable
- N+1 redundant
- Remote sense on main output (+5V, +3.3V)
- Efficiency 73%
- Build-in EMI protection
- EMI Meets EN55022/FCC Class A
- Overvoltage protection
- Short circuit protection on all outputs
- Over temperature output
- Compliant with PICMG 2.11 (47-pin)
- Status LEDs indicate power OK or fault
- Current sharing on main output (+5V and +3.3V)
- Worldwide Safety Approval including UL, CSA, CE Marking

The cPWR-59100 series features models of hot swappable, front access power supplies for 3U CompactPCI platform. It utilizes switching technology and high power density design as well to achieve its small size and large power output. Optionally, two or more power supplies can be used to implement current sharing, N+1 redundancy, and fault-tolerance systems.

ORDERING INFORMATION

cPWR-59102 : 3U cPCI Power Supply, AC 110/220V input, 175W
cPWR-59104 : 3U cPCI Power Supply, DC 24V input, 175W
cPWR-59105 : 3U cPCI Power Supply, AC 110/220V input, 180W

SPECIFICATIONS			
Model	**59102**	**59104**	**59105**
Power Capacity	175W	175W	180W
Input Range			
Voltage	100 ~ 240 Vac	18 ~ 36 Vdc	100 ~ 240 Vac
Frequency	50 ~ 60 Hz	--	50 ~ 60 Hz
Max. Inrush Current	20A (110Vac)	20A	20A (110Vac)
P.F.C.	20.97	--	20.97
Protections	Over Voltage, Low Voltage, Surge		
Output Range			
Efficiency	73% (typical)		74% (typical)
Voltage	V1(+5V) / V2(+3.3V) / V3(+12V) / V4(-12V)		
Max. Current	25A/25A/3A/1A		25A/25A/5A/1A
Hold-up Time	20 ms	5 ms	15 ms
Voltage Regulation	±1% (V1, V2), ±3% (V3, V4)		
Line Regulation	±0.3%		
Current Sharing	±5%		
Noise and Ripple	1% peak-peak or 50mV whichever is greater		
Over Load Capacity	≦120% continuous and Shutdown when over current occur		
Transient Response	Peak transient less than 200mV and returns to within 1% less than 300 μS following 25% load change (V1, V2, V3)		
Remote Sense	Total voltage compensation for cable losses with 150mV respect to output.		
Voltage Drop	<5% @ Hot-swap (V1, V2, V3), Load > 20%		
Protections	Over Voltage(V1, V2), Low Voltage, Over Current, Over Temperature, Hot-swap, Short		
Minimum Load	V1 (2A), V2 (1A)		--
I/O Interface			
Display and Status	Normal Indication (Green LED) / Fault Indication (Red LED)		
Power Connector	47 pins: Positronic PC147M400A1 or PCIH47M400A1		
Safety and EMS			
Safety	UL 1950 / cUL 1950 / EN 60950		
EMI	EN 55022 ClassA		
EMS	EN55024: 1998 IEC 61000-4-2: 1995 ESP IEC 61000-4-3: 1995 RS IEC 61000-4-4: 1995 EFT/B IEC 61000-4-5: 1995 Surge IEC 61000-4-6: 1995 1996 CS IEC 61000-4-8: 1993 Power Frequency Magnetic Field IEC 61000-4-11: 1994 Volge and Interruption Measurement		
CE Mark	Yes		
Others			
Operating Temperature	0˚C ~ 40˚C (Full-load)		
Storage Temperature	-40˚C ~ 85˚C		
Operating Humidity	0 ~ 95% (non-condensing)		
Cooling	At least 12 C.F.M. air flow is required		
Audible Noise	< 40 dBA		
Dimensions	H (3U) x W (8HP) x D (172.8 mm)		
Weight	0.85 Kg		



175W/180W

KEY FEATURES

- Eurorack-compatible Module Design
- Input: 100V ~ 240Vac, 36V ~ 72Vdc
- Hot-swappable
- N+1 Redundant
- Remote Sense on Main Output (+5V, +3.3V, +12V)
- Efficiency 74%
- Build-in EMI Filter
- EMI Meets EN55022/FCC Class A
- Overvoltage Protection
- Short Circuit Protection on all Outputs
- Over Temperature Protection
- Compliant with PICMG 2.11
- Status LEDs Indicate Power OK or Fault
- No Minimal Load Required
- Current Sharing on Main Output (+5V, +3.3V, +12V)
- Worldwide Safety Approval including UL, CSA, CE Marking

The cPWR-59400 series features models of hot swappable, front access power supplies for 6U CompactPCI platform. It utilizes switching technology and high power density design as well to achieve its small size and large power output. Optionally, two or more power supplies can be used to implement current sharing, N+1 redundancy, and fault-tolerance systems.

ORDERING INFORMATION

cPWR-59401 : 6U cPCI Power Supply, AC 110/220V input, 400W
cPWR-59402 : 6U cPCI Power Supply, DC -48 input, 400W

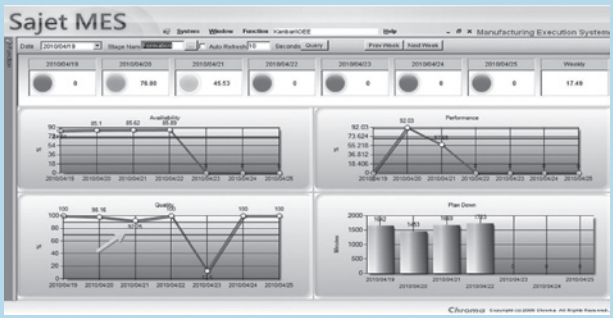
SPECIFICATIONS		
Model	**59401**	**59402**
Power Capacity	400W	400W
Input Range		
Voltage	100 ~ 240 Vac	36 ~ 72 Vdc
Frequency	50 ~ 60 Hz	--
Max. Inrush Current	< 20A (110Vac)	20A
P.F.C.	> 0.97	--
Protections	Over Voltage, Low Voltage, Over Current, Surge	
Output Range		
Efficiency	73% (typical)	
Voltage	V1 (+5V) / V2 (+3.3V) / V3 (+12V) / V4 (-12V)	
Max. Current	50A/50A/12A/2A	
Hold-up Time	15 ms	16 ms
Voltage Regulation	±2%	
Line Regulation	±0.3%	
Current Sharing	±5%	
Noise and Ripple	1% peak-peak or 50mV whichever is greater	
Over Load Capacity	≦120% continuous and Shutdown when over current occur	
Transient Response	Peak transient less than 200mV and returns to within 1% less than 300 μS following 25% load change	
Remote Sense	Total voltage compensation for cable losses with 150mV respect to output (V1, V2, V3)	
Voltage Drop	<5% @ Hot-swap (V1, V2, V3)	
Protections	Over Voltage, Low Voltage, Over Current, Over Temperature, Hot-swap, Short	
I/O Interface		
Display and Status	Normal Indication (Green LED) / Fault Indication (Red LED)	
Power Connector	47 pins: Positronic PC147M400A1 or PCIH47M400A1	
Safety and EMI		
Safety	UL 1950 / cUL 1950 / EN 60950	
EMI	EN 55022 ClassA	
EMS	EN55024: 1998 IEC 61000-4-2: 1995 ESP IEC 61000-4-3: 1995 RS IEC 61000-4-4: 1995 EFT/B IEC 61000-4-5: 1995 Surge IEC 61000-4-6: 1995 1996 CS IEC 61000-4-8: 1993 Power Frequency Magnetic Field IEC 61000-4-11: 1994 Volge and Interruption Measurement	
CE Mark	Yes	
Others		
Operating Temperature	0˚C ~ 40˚C	
Storage Temperature	-40˚C ~ 85˚C	
Operating Humidity	0 ~ 95% (non-condensing)	
Cooling	At least 12 C.F.M. air flow is required	
Audible Noise	< 40 dBA	
Dimensions	H (6U) x W (8HP) x D (267 mm)	
Weight	1.35 Kg	

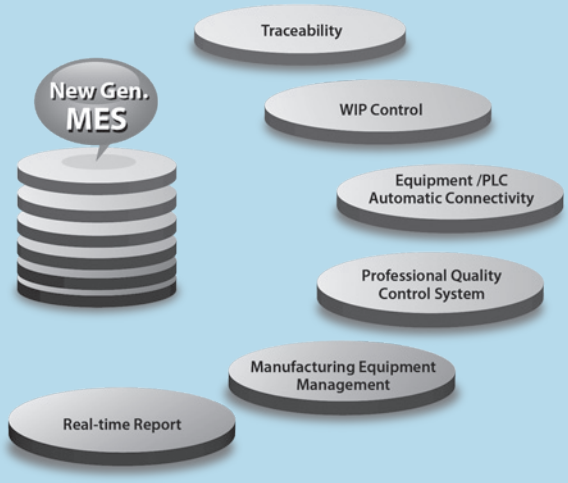
All specifications are subject to change without notice.

Manufacturing Execution Systems (MES) Solution

Manufacturing Execution System 18-1

Data Collection Station 18-3

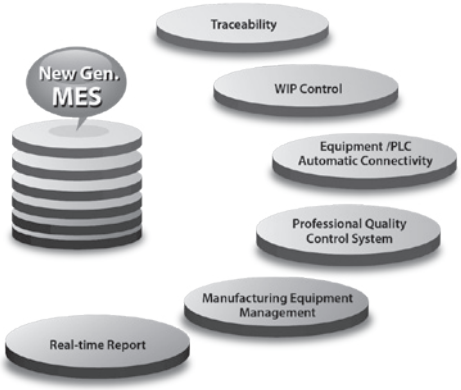




Manufacturing Execution System



Data Collection Station

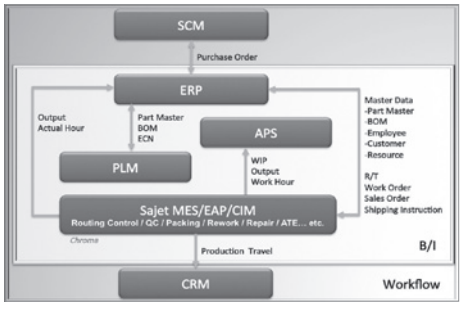


KEY FEATURES

- Complete Production Process Trace
  - Traceability
- Full Production Information Monitoring
  - WIP Control
- Equipment /PLC Automatic Connectivity
  - Computer Integrated Manufacturing: CIM
  - Equipment Automation Program: EAP
- Professional Quality Control System
  - Statistical Process Control: SPC
  - Corrective Action Report: CAR
  - Out of Control Action Plan: OCAP
- Manufacturing Equipment Management
  - Equipment Management System: EMS
  - Overall Equipment Effectiveness: OEE
- Real-time Report
  - Yield Rate Report
  - WIP Report

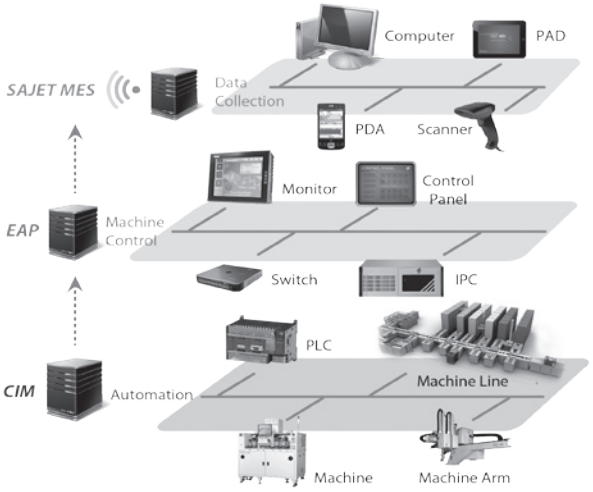
The New Generation of MES - The Core System for Automatic Factories

The trend of modern factory is heading towards automated production as the development goes. A traditional Manufacturing Execution System (MES), which focuses on only gathering data and report analysis, cannot meet the requirements of this fast changing era. The new generation of MES is the core system of automatic factories that not only retains the existing service range but also covers the functions of CIM, EAP, equipment connectivity and integrating robotic arms to meet the objective factory automated control by gaining massive data analysis in real time to improve the product quality and customer satisfaction as well as to reduce the production cost and maximize the benefit of enterprise.



Sajet MES - The Best Choice of New Generation Manufacturing Information System

Chroma, not only the professional MES system provider but also the world-class test & measurement equipment and automated production line manufacturer, has abundant technology and experiences in MES and automated equipment integration that can provide you the best manufacturing execution system solution of new generation.



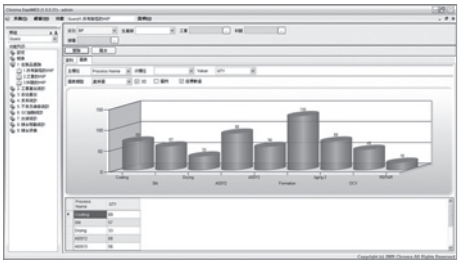
Complete Production Process Trace - Traceability

The manufacturing process information contained in Sajet MES can assist the factory to process work orders, monitor workstations, track and manage inventory as well as to conduct quality inspection and exception conditions management. The precision allows users to find out the lot number, delivery date and quantity of passive components used in a product from the supplier. It can also use the lot number to trace back the shipped products for locations and quantities to reduce the loss caused by defect components. The traceability feature can solve the problems rapidly is the best helper for factory management.



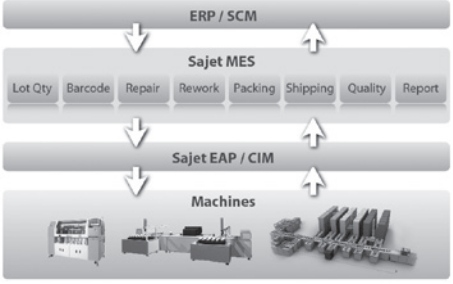
Full Production Information Monitoring - WIP Control

Sajet MES provides flexible routing management that allows users to plan different routes based on the products, control the quantity of yield and defective goods, manage reworked products and calculate the pass-through rate. The complete traceability data collection and production line information are fully controlled by Sajet MES to increase the production efficiency and reduce production costs.



Equipment/PLC Automatic Connectivity - CIM, EAP

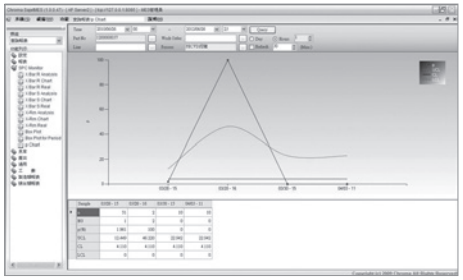
Besides offering the professional MES solution, Chroma as the world leading manufacturer of test & measurement instruments and system integration is able to combine the R&D resources with the ability of connecting various devices to provide an automated turnkey solution that includes both software and hardware. To cope with the trend of automation for manufacturing factories and to give customers a complete solution, Sajet MES will upgrade continuously to assure sustainable development and service.

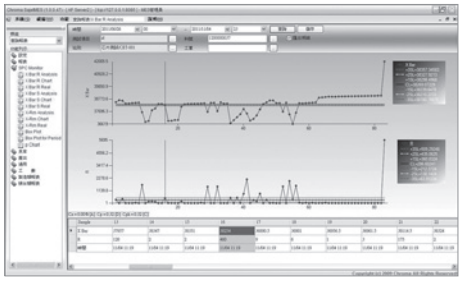


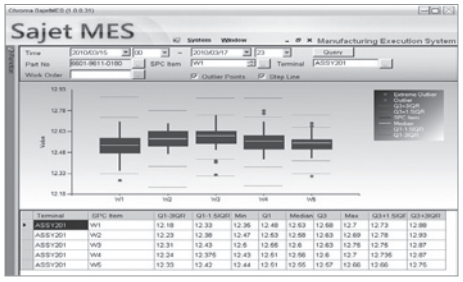
All specifications are subject to change without notice.

Professional Quality Control System - SPC, CAR, OCAP

Sajet MES is not just a professional factory manufacturing management solution but also has specialized quality control system and on-line SPC control that allow users to check the data collected on-line. It can perform measurements, control chart analysis (ex: CPK, X-R, X-S Chart etc.), defect analysis and exception handling by setting up the channel for error notification via Email to supervisors and sending alerts in voice or chart colors to improve the quality of production as well as reduce the risks.







Manufacturing Equipment Management - EMS, OEE

Sajet MES is capable of collecting the workstation status to give the supervisor and on-site personnel to monitor the workstation status in real time, log its maintenance status and query the information of device, including:
- Device failure analysis
- Device utilization rate
- Failure frequency analysis
- Device maintenance time analysis...etc.

Users can use PCs or display board to manage the processing workstation easily.



Real-time Report - Yield Rate Report,WIP Report

Sajet MES has powerful MES database technology in the industry that can be online in real time to administer every work item precisely. The report generator developed by Chroma is applicable for complete report query and real time report generation. Various mobile devices like smart phone, PDA and Pad can be used to query the report and get the factory status immediately. It can integrate into BI (Business Intelligence) in the enterprise so that the manager can view the report of production line thoroughly.



Complete Hardware Integrated Solution Satisfies Various Needs

■ Integration of Various Devices
- Various test equipment of Chroma
- Manufacturing database online control program development and implementation

■ Barcode Printing Device and Sensor Switch
- Long/short range optical switching system
- Various industrial barcode printer

■ Mobile Application Management Device
- PDA, Tablet Computer
- Wireless Scanner, wireless terminal, and etc.

■ Other Electromechanics and Factory Devices
- Temperature controller, electronic scale
- PLC, connectable device (Scanner), and etc.

■ Optical Scanning
- Various handheld 1 & 2 dimension gun type barcode scanner
- RFID Reader, fixed barcode scanner system

■ Industrial Network Peripherals
- Data collector, IPC
- TCP/IP, RS232, USB signal converter, and etc.

■ Display Device Management
- Various production efficiency kanban
- Factory notice kanban, Pick To Ligh, and etc.

■ Automatic Equipment
- Automatic labeling machine, laser engraving machine, and etc.
- Fully automatic test equipment solution

ORDERING INFORMATION

List of Systems and Functional Modules

Basic Modules
Data Center
Work Order Manager
Barcode Center
TGS Server (Data Collection)
Repair
Rework
Quality Control (IPQC/FQC/OQC)
Packing
Run Card Manager
WIP IN/OUT Tracking
Report

Optional Modules
ERP/MES Interface
Shipping
Alarm System
Incoming Quality Control (IQC)
Material Warehouse Manager (FIFO)
Tooling Manager
e-SOP
e-Kanban (Real-time Display Board)

Other Systems
Equipment Automation Program (EAP)/ ATE
SMT Feeding System (Reduce Feeding Error)
CIM/PHC for PLC
Real-time SPC
Global RMA System
Equipment Management System (EMS)/ OEE
Work Hour System
Outsourcing System
Computer Numerical Control System (CNC)
Warehouse Management System (WMS)
Pick to Light System

All specifications are subject to change without notice.



In complying with requirements for automatic factory data collection, Chroma has developed a data collector, DCN98020. It can be installed on the data collection point to gather all of the production data to the database of manufacturing execution system for utilization. Its industrial grade quality not only gives the factory best assurance but also brings greater convenience for data collection.

ORDERING INFORMATION

98020 : Data Collection Station

KEY FEATURES

- Compact Size: Length x Width x Thickness (incl. back rack) =207 mm x 96 mm x 62 mm.
- Low Cost: Reduce the factory building cost and improve efficiency of overall
- Easy Maintenance: No hard drive and no need for installation. Once set, it can be operated directly after turning on the power.
- Security Upgrade: No need to worry about virus affection as the device is unable to be carried out outside the factory for use
- Built in 2 USB interface and 1 PS2 keyboard connector
- Built in Digital I/O interface to combine the digital control signal.
- Built in network that can communicate with PC directly

SPECIFICATIONS	
Model	**98020**
Network	IEEE802.3 Baseband
	10/100 Base-T RJ - 45 Connector
	N-Way (10/100 Mbps，Helf/Full Duplex)
	1.5KV Magnetic Isolation Protect.
COM port	RS-232：Full Duplex，D-Sub 9pin，Female
	Baud-rate：1200 bps ~115200 bps
	Parity：None，Even，Odd
	Data bits：7，8；Stop bits：1，2
	Delimiter：None，0x0D，0x0A
Keyboard Interface	Mini-DIN PS2 Connector
	Working rate：12 Mhz (max.)
	Support 104 Key
USB Interface	Two USB 1.1/2.0 Host Port
	Support HS,FS & LS
	400 mA current support (each channel)
	USB Keyboard support
Digital I/O	2 Channel Digital Input (Max. 20 mA)
	2 Channel Digital Output (Max.12 Vdc，200 mA)
	Terminal block 3.81 mm pitch connector
	2 pin Power Output +12 Vdc (current max defined by input adaptor)
LCD Display	Low power consumption Graphic LCM
	240 x 64 dots
	Build-in 16x16 Character Font
	(English/Traditional Chinese/Simplified Chinese)
	Build in LED Backlight.
	VR Contrast adjust.
LED Display	PWR(Power On Indicator) x 1
	RUN(Device RUN Indicator) x 1
	COM1 (Communication Indicator) x1
	LAN Indicator x1
Power Requirement	12 Vdc +/-10%@1.5A
	(Current require depends on user connect total devices)
	Power Connector：2 Pin DC-JACK(core 2.1 mm)
	Maximum to 2.5 A Current Protection.

All specifications are subject to change without notice.

Customer Support & Service



Chroma offers total solutions in selling the highest quality instrumentation available and service. That begins with the first call to Chroma and continues after the sale through long-term product support. Our sales and service personnel work closely to help you make the best selections for your applications. Then we help you maximize your investment by ensuring optimum equipment performance. All this is accomplished through customer support programs ranging from training to product installations and a variety of maintenance plans.

WARRANTY SERVICE

CHROMA ATE INC. warrants its instruments against all defects in workmanship and material. If you should experience a problem with your instrument, our technicians are available to help you over the phone, or find the nearest service support for timely repair.

CALIBRATION AND REPAIR SERVICE

Whatever your test and measurement hardware support needs, Chroma can provide a reliable, cost-effective support selection that you can trust to reduce downtime and get you back to Business swiftly.



HALT & HASS System

• Instrument Calibration

Keep your equipment operating with maximum precision: Chroma's calibration services are all traceable to national and international standards.

- On-site Calibration for All Major Instrument Brands
- Service Center Instrument Calibration

• Instrument Repair

Chroma offers a variety of flexible choices to maximize instrument uptime, with just the coverage you need for repair.

- Instrument Repair Agreements
- Instrument Standard Repair

• Test System Calibration and Repair

Maximize test system uptime. Chroma has flexible, custom-configurable service and support package, available on select solutions for your specific needs.

- On-site System Calibration
- On-site System Repair



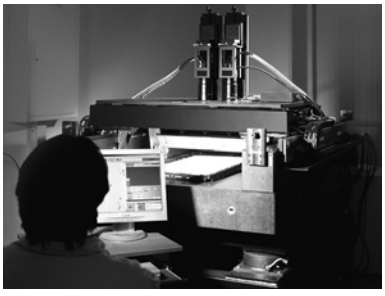
Radiation Test



Conduction Test



ESD Test



Optical Laboratory



Programmable Temperature & Humidity Chamber

• Service Warranty

Chroma's service is unconditionally warranted for 90 days, except for disposables such as batteries and lamps, abuse and damage. All calibrations are traceable to National Standards like CNLA.

CUSTOMER-SITE INSTALLATIONS

Chroma provides on-site installations for most Chroma-configured systems. Your Chroma service person will set up your product to meet all operating specifications. Contact your local sales and service office or sales agency for more information.



PRODUCT UPGRADE

Older instruments may be upgraded in order to extend the life of the product on your bench or in your system. Upgrades include adding options or new functions, and/or updating firmware.

REPLACEMENT PARTS

Reduce your inventory and free up your technical staff by taking advantage of our repair exchange modules and board assemblies. Simply call or FAX in your purchase order and Chroma will send you a replacement part.

TRAINING

Chroma provides formal training courses to help you get up to speed and make the most of our products.





TECHNICAL SUPPORT

Chroma provides high quality technical support on applications, operation, measurement specification, hardware, and software, by expert Application engineers. Contact us for more information.

LONG TERM PRODUCT SUPPORT

Chroma supports its instruments for a period of five to ten years beyond the end of production (depending upon the instrument), and wherever possible, we make an effort to support our instruments for much longer time.

CUSTOMIZED SERVICES

In addition to Taiwan headquarters, we not only distribute oversea branch offices but also supply customized serviecs to meet various customs and cultures. In Europe, our customers can inspect instruments' demonstrations easily on the CBC (Chroma Business Coach) which works as a dynamic show-room instead of taking long Business trips. If you are interested in this service, please contact our Europe branch office directly.







Global Service Network

The areas and distributors are listed in alphabetical order.

HEADQUARTERS

CHROMA ATE INC.
66 Hwaya 1st Rd., Kueishan
Hwaya Technology Park,
Taoyuan County 33383, Taiwan
Tel: +886-3-327-9999
Fax: +886-3-327-8898
E-mail: info@chromaate.com
www.chromaate.com

HSINCHU

6F, No. 5, Technology Rd.,
Science Park, Hsinchu City
30078, Taiwan
Tel: +886-3-563-5788
Fax: +886-3-563-5758

KAOHSIUNG

No.1, Beineihuan E. Rd., Nanzi Dist.,
Kaohsiung City 81170, Taiwan
Tel:+886-7-365-6188
Fax:+886-7-364-9500

OVERSEAS BRANCH OFFICES

U.S.A.

CHROMA ATE INC. (U.S.A.)
7 Chrysler Irvine CA 92618
Tel: +1-949-421-0355
Fax: +1-949-421-0353
Toll Free: +1-800-478-2026
E-mail: info@chromaus.com
www.chromaus.com

CHROMA SYSTEMS SOLUTIONS, INC.
19772 Pauling, Foothill Ranch,
CA 92610
Tel: +1-949-600-6400
Fax: +1-949-600-6401
E-mail: sales@Chromausa.com
www.chromausa.com

EUROPE

Chroma ATE Europe B.V.
Morsestraat 32, 6716 AH EDE,
The Netherlands
Tel: +31-318-648282
Fax: +31-318-648288
E-mail: sales@chromaeu.com
www.chromaeu.com

Finland Office
P.O.Box 17, FiN-15241 Lahti,
Finland
Tel: +358-3-7811-333
Fax: +358 -3-7811-333
E-mail: info@chromaate.fi
www.chromaate.fi

JAPAN

Chroma Japan Corp.
472 Nippa-cho, Kouhoku-ku,
Yokohama-shi, Kanagawa,
223-0057 Japan
Tel: +81-45-542-1118
Fax: +81-45-542-1080
E-mail: info@chromaate.com
www.chroma.co.jp

HONG KONG

Neworld Electronics Ltd.
Unit 6, 6F, Shui Hing Centre,
No. 13, Sheung Yuet Rd., Kowloon Bay,
Kowloon, H.K.
Tel: +852-2331-9350
Fax: +852-2331-9406
E-mail: neworld_nwd94@neworld.com.hk

CHINA

BEIJING
4/F,E. Building, Kaixuan Building, Jia 143,
Xizhimenwai Street, Xicheng District,
Beijing, China
Tel: +86-10-6803-9350; 6803-9361
Fax: +86-10-6803-9852

NANJING
Wei Kuang Autotech Equipment Co., Ltd.
No.811, Hushan Road, Jiangning
District Nanjing City, China
Tel: +86-25-5217-8501
Fax: +86-25-5217-8502

SHANGHAI
Chroma Electronics (Shanghai) Co., Ltd.
3F Building 40, No. 333, Qin Jiang Rd.,
Shanghai, China
Tel: +86-21-6495-9900
Fax: +86-21-6495-3964

SUZHOU
Chroma ATE (Suzhou) Co., Ltd.
Building 6, No. 9-1, Zhuyuan Rd.,
Suzhou New District, JiangSu, China
Tel: +86-512-6824-5425
Fax: +86-512-6824-0732

Sajet System Technology (Suzhou) Co., Ltd.
503-1, 4th Floor Genway LOHASTOWN,
88 Building, 999 Xinghu Road, SIP Suzhou
Tel: +86-512-6807-1889
Fax: +86-512-6807-1886

CHONGQING
Building 4 Longfor MOCO, No. 13-8, No.166,
XinNan Rd, YuBei District, ChongQing, China
Tel: +86-23-6703-4924 / 6764-4839
Fax: +86-23-6311-5376

XIAMEN
Unit 705-706, No.55 Building B, Wanghai
Road, Software Park, Xiamen, Fujian, China
Tel: +86-592-8262-055
Fax: +86-592-5182-152

Wei Kuang Autotech Equipment Co.,Ltd
1F, A4 Building, No.20, Hou Shi Jin Hui Rd.,
Ji Mei District, Xiamen City, China
Tel: +86-592-636-2950
Fax: +86-592-636-2960

SHENZHEN

Chroma Electronics (Shenzhen) Co., Ltd.
8F, No.4, Nanyou Tian An Industrial Estate,
Shenzhen, China
Tel: +86-755-2664-4598
Fax: +86-755-2641-9620
www.chroma.com.cn

DONGGUAN
3F,Building YD3-4 ,Guancheng Technology
Park,Shi Long Road,Guancheng District,
Dongguan City, Guangdong, China
Tel: +86-769-8663-9376
Fax: +86-769-8631-0896

DISTRIBUTORS

AUSTRALIA

Power Parameters Pty Ltd.
(Test & Measurement Instruments)
83 Northern Road, Heidelberg West 3081
Victoria, Australia
Tel: +61-3-9450-1500
Fax: +61-4-1932-3068
E-mail: davidmillard@parameters.com.au
www.parameters.com.au

AUSTRIA

Power Control Electronic GmbH
(Test & Measurement Instruments)
Bahnhofstrasse 22, D-87463 Dietmannsried,
Germany
Tel: +49-8374-232-600
Fax: +49-8374-232-6099
E-mail: pce@powercontrol.de
www.powercontrol.de

BENELUX

TT&MS BV.
(Test & Measurement Instruments)
Frankweg 25, 2153 PD Nieuw - Vennep,
The Netherlands
Tel: +31-252-621080
Fax: +31-252-620702
E-mail: info@ttms.nl
www.ttms.nl

BRAZIL

T&M Instruments Repres. Ltda
(Test & Measurement Instruments)
Rua Princesa Isabel, 1750-Brooklin-CEP
04601-003, Sao Paulo-SP-Brazil
Tel: +55-11-5092-5229
Fax: +55-11-5044-2414
E-mail: info@tminstruments.com.br
www.tminstruments.com.br

CZECH REPUBLIC & SLOVAKIA

Meatest s.r.o
(Test & Measurement Instruments)
Ksirova 118A, CZ-619 00 Brno, Czech Republic
Tel: +420-5-4325-0886
Fax: +420-5-4325-0890
E-mail: vomela@meatest.cz
www.meatest.cz

DENMARK

Atimco AS
(Test & Measurement Instruments)
BØgekildevej 7B DK-8361 Hasselager, Denmark
Tel: +45-86-258899
Fax: +45-86-255889
E-mail: mj@atimco.dk
www.atimco.dk

EGYPT

Technical Solution Engineering Co. (TSEC)
(Test & Measurement Instruments)
57 Hosny Ahmed Khalaf St., Aprt. 3,
Nasr City, Egypt
Tel: +202-670-6599
Fax: +202-670-6183
E-mail: tsec@tsec.com.eg
www.tsec.com.eg

FRANCE

Qualitysource SA
(Test & Measurement Instruments)
ZAC du Moulin a Vent , 28 Chemin du Moulin
a Vent, Guyancourt F-78280, France
Tel: +33-130-489-966
Fax: +33-130-432-846
E-mail: contact@qualitysource.fr
www.qualitysource.fr

GERMANY

Power Control Electronic GmbH
(Test & Measurement Instruments)
Bahnhofstrasse 22, D-87463
Dietmannsried, Germany
Tel: +49-8374-232-600
Fax: +49-8374-232-6099
E-mail: pce@powercontrol.de
www.powercontrol.de

PXIdirect GmbH
(PXI Instruments)
Florastrasse 1a D-30900 Wedemark, Germany
Tel: +49-5130-58888-0
Fax: +49-5130-58888-22
E-mail: info@PXIdirect.com
www.PXIdirect.com

Schubert Technologies
(Semiconductor ATE & Handler)
Saentisstrasse 43, D-81825 Munich,
Germany
Tel: +49 89-4513-9633
Fax: +49 89-4513-9628
E-mail: info@schubert-technologies.eu
www.schubert-technologies.eu

GREECE

NetScope Solutions S.A.
(Test & Measurement Instruments)
4, Lachana St., New Filadelfia
143 42 Athens, Greece
Tel: +30-210-272-4107
Fax: +30-210-271-1999
E-mail: info@netscope.gr
www.netscope.ge

HUNGARY

Eltest Ltd.
(Test & Measurement Instruments)
H-1015 Budapest, Hattyu u. 16, Hungary
Tel: +36-1-202-1873
Fax: +36-1-225-0031
E-mail: redai@eltest.hu
www.eltest.hu

Kora BT.
(Test & Measurement Instruments)
Torokor st. 31 H-1145 Budapest, Hungary
Tel: +36-1-223-1045
Fax: +36-1-221-2541
E-mail: mkovacs@kora.hu
www.kora.hu

INDIA

MEL Systems & Services Ltd.
(Test & Measurement Instruments)
Plot No.173, Developed Plots, Estate for
Electronics and Instrument Industries
Perungudi, Chennai-600 096, India
Tel: +91-44-2496-1902
Fax: +91-44-2496-0488
E-mail: sales@melss.com
www.melss.com

Quantel Electronics (India) Private Limited
(Bangalore)
(Test & Measurement Instruments)
No. 301, #130 Prestige Infantry Court
Infantry Rd., Bangalore-560001
Tel: +91-8-4094-1520/1507
Fax: +91-8-4093-6673
E-mail: sales@quantel.com.sg

Quantel Electronics (India) Private Limited
(Mumbai)
(Test & Measurement Instruments)
Unit No. 3134/3135, D Wing, 3rd Floor,
Oberoi Garden Estate, Off Chandivali Farms
Road, Chandivali, Andheri(East), Mumbai-
400072
Tel: +91-22-285-1440/4229-1002
Fax: +91-22-4015-6221
E-mail: sales@quantel.com.sg

Quantel Electronics (India) Private Limited
(New Delhi)
(Test & Measurement Instruments)
Unit 414, RG Trade Tower, Plot No. B7, Netaji
Subhash Place, Pitampura,
New Delhi-110034
Tel: +91-11-4704-9250
Fax: +91-11-4704-9240
E-mail: sales@quantel.com.sg

INDONESIA

P T Quantel
(Test & Measurement Instruments)
Ruko Easton Block B/08, Lippo Cikarang,
Bekasi 17550, Indonesia
Tel: +62-21-2909-3227, +62-8190-8732233
E-mail: sales@quantel.com.sg

IRAN

Arvin Afzar Co.
(Test & Measurement Instruments)
Unit 11, Devonshire Business Centre,
Works Road, Letchworth, Herts, SG6 1GJ, UK
Tel: +98-21-873-5143, 874-5982~3
Fax: +98-21-874-5984
E-mail: sales@afranet.com

IRELAND
MDL Technologies Ltd.
(Test & Measurement Instruments)
Unit 11 Devonshire Business Centre Works Road Letchworth Herts SG61GJ,
United Kingdom
Tel: +44-146-243-1981
Fax: +44-560-315-2515
E-mail: sales@mdltechnologies.co.uk
www.mdltechnologies.co.uk

ISRAEL
RDT Equipment and Systems Ltd.
(Test & Measurement Instruments)
14 Yocheved St, Haifa, Israel
Tel: +972-3-645-0750
Fax: +972-3-647-8908
E-mail: victord@rdt.co.il
www.rdtest.co.il

ITALY
Barletta Apparecchi Scientifici
(Test & Measurement Instruments)
VIA Prestinari 2-20158 Milano, Italy
Tel: +39-02-3931-2000
Fax: +39-02-3931-1616
E-mail: barlett@tin.it
www.barletta-as.com

JAPAN
Kei Tech Corp.
(PXI Instruments)
3F, Iwata Bldg., 11, Kanda-Konyaccho, Chiyoda-Ku, Tokyo, 101-0035, Japan
Tel: +81-3-3526-4880
Fax: +81-3-3526-4882
E-mail: sales@kei-tech.com
www.kei-tech.com

Nihon Binary Co., Ltd.
(Video Testing Equipment)
Shiba 2-Chome Daimon Building, 2-3-3, Shiba, Minato-ku, Tokyo 105-0014, Japan
Tel: +81-3-5427-7111
Fax: +81-3-5427-7123
E-mail: ikeda@nihonbinary.co.jp
www.nihonbinary.co.jp

TOYO Corporation
(Power Testing Equipment)
1-6, Yaesu 1-chome, Chuo-ku, Tokyo, 103-8284, Japan
Tel: +81-3-3279-0771
Fax: +81-3-3246-0645
E-mail: psst@toyo.co.jp
www.toyo.co.jp

Nihon Denkei Co., Ltd.
(Test & Measurement Instruments)
Seikoukai kanda Building 5-12, 3-chome, sotokanda, chiyoda-ku, Tokyo, 101-0021 Japan
Tel: +81-3-3251-5731
Fax: +81-3-3251-5730
www.n-denkei.co.jp

KOREA
JEILMI Co., Ltd.
(Test & Measurement Instruments)
9th FL, daeryung Technotown 15th, 224-5, Gwanyang 2-dong, Dongan-gu, Anyang-si, Kyeonggi-do, Korea, Zip:431-062
Tel: +82-31-463-3700, 822-587-6311
Fax: +82-31-463-3701
E-mail: jeil@jeilmi.com
honeykim@jeilmi.com
www.jeilmi.com

LEEBESTECH
(PV Test & Automation Equipment)
Room #520, Shinhan Deview Officetel 1132-19, Guwol-dong, Namdong-gu, Incheon, South Korea #405-220
Tel: +82-32-437-0367
Fax: +82-32-437-0368
E-mail: leebestech@kornet.net
bhlee6011@hanafos.com

NOISE Technology Co., Ltd.
(AC Source, Load, Power Analyzer)
Science Bldg, #149-9, Yatap-dong, Bundang-gu, Seongnam-si, Kyunggi-do, 463-816, Korea
Tel: +82-31-781-7816
Fax: +82-31-703-7151
E-mail: kslee@noisetech.co.kr
www.noisetech.co.kr

TF EastPost Technologies Inc.
(Semiconductor ATE & Handler)
Science Bldg, #149-9, Yatap-dong, Bundang-gu, Seongnam-si, Kyunggi-do, 463-816, Korea
Tel: +82-31-206-0541
Fax: +82-31-206-0543
E-mail: kevin@eastpost.co.kr

WE Corporation
(Test & Measurement Instruments)
1487-52, Seocho 3-Dong, Seocho-Gu, Seoul 137-869, Korea
Tel: +82-2-585-8253
Fax: +82-2-585-8254
E-mail: sales@weco.co.kr
www.weco.co.kr

MALAYSIA
QTEC Technologies Sdn Bhd (Head Office)
(PV/LED/Semiconductor ATE & Handler)
3637, Jalan Angkasa Nuri 1,Taman Angkasa Nuri, 76100 Durian Tunggal, Melaka, Malaysia
Tel: +60-6-334-2918/2919
Fax: +60-6-334-2920
E-mail: tlteh@qtec.com.my
jesphertay@qtec.com.my
www.qtec.com.my

Quantel Sdn Bhd.
(Test & Measurement Instruments)
Kuala Lumpur / Penang
Unit 802, 8th Floor, Blk A Damansara Intan, No. 1, Jalan SS20/27, 47400 Petaling Jaya, Selangor, Malaysia
Tel: +60-3-7726-7435 (KL)
+60-4-646-5110/0780 (Penang)
Fax: +60-3-7726-1961 (KL)
+60-4-644-2878 (Penang)
E-mail:sales@quantel.com.sg

NEW ZEALAND
Electrotest Ltd.
(Test & Measurement Instruments)
PO Box 300 475 , 12A Te Kea Place Albany, Auckland, New Zealand
Tel: +64-9-448-2600
Fax: +64-9-448-2611
E-mail: info@electrotest.co.nz
www.electrotest.co.nz

NORWAY
IKM Instrutek AS
(Test & Measurement Instruments)
Elveveien 28, N-3262 Larvik, Norway
Tel: +47-33-165700
Fax: +47-33-165701
E-mail: post@instrutek.no
www.instrutek.com

PHILIPPINES
QTEC Technologies Sdn Bhd (Baguio)
(PV/LED/Semiconductor Handler)
Camp 7, Kennon Road, Baguio City, Philippines 2600
Tel:+63-9175920411
E-mail: gilbert@qtec.com.my
sales@qtec.com.my
www.qtec.com.my

Quantel Philippines Inc. (Manila & Cebu)
(Test & Measurement Instruments)
Unit 2803 Discovery Centre
25 ADB Avenue, Ortigas Centre
Pasig City 1600, Philippines
Tel: +63-2638-6942/6918
Fax: +63-2638-6946
Tel: +63-32-406-6995 (Cebu)
Fax: +63-32-511-0071 (Cebu)
E-mail: sales@quantel.com.sg

POLAND
NDN Test & Measurement instruments
(Test & Measurement Instruments)
Janowskiego Str. 15 PL 02-784 Warsaw, Poland
Tel: +48-22-641-1547
Fax: +48-22-644-4250
E-mail: ndn@ndn.com.pl
www.ndn.com.pl

PORTUGAL
Instrumentos de Medida, S.L.
(Test & Measurement Instruments)
Septiembre 31, E28022 Madrid
Tel: +34-91-300-0191
Fax: +34-91-388-5433
E-mail: jvaca@idm-instrumentos.es
www.idm-instrumentos.es

Lenave Lda
(Test & Measurement Instruments)
R. de S. Paulo 228-232
1200-430 Lisboa, Portugal
Tel: +351-213-223-190
Fax: +351-213-420-968
E-mail: ppedro@lenave.pt
www.lenave.pt

ROMANIA
EE TEST S.A.
(Test & Measurement Instruments)
Blvd. Industriilor no. 4 ROM-300 714 Timisoara, Romania
Tel: +40-256-491-154
Fax: +40-256-493-468
E-mail:eetest@eetest.ro
www.eee.ro

RUSSIA
TESTPRIBOR, JSC
(Test & Measurement Instruments)
Office 718 24 Geroev Panfilovtsev Street, Moscow 125480, Russian Federation
Tel: +7-495-225-67-37
Fax: +7-495-496-95-55
E-mail: vetoshkina@escltd.ru
www.test-expert.ru/en

SINGAPORE
QTEC Technologies Pte. Ltd.
(PV/LED/Semiconductor ATE & Handler)
Blk 2, Joo Chiat Road Suite 9, #03-1121 Joo Chiat Complex, Singapore 420002
Tel: +65-8186-7381
www.qtec.com.my

Quantel Pte Ltd.
(Test & Measurement Instruments)
46 Lorong 17 Geylang # 05-02 Enterprise Industrial Building, Singapore 388568
Tel: +65-6745-3200
Fax: +65-6745-9764
E-mail: sales@quantel.com.sg
www.quantel.com.sg

SOUTH AFRICA
Intercal cc
(Test & Measurement Instruments)
Labotec Park 21 Bavaria Road Randjespark Midrand, South Africa
Tel: +27-11-315-4321
Fax: +27-11-312-1322
E-mail: intercal@intercal.co.za
www.intercal.co.za

SPAIN
Enelec S.L.
(Test & Measurement Instruments)
Avda. Francesc Macià, 39, 6˚ 2a
08206 Sabadell (Barcelona), Spain
Tel: +34-93-723-0270
Fax: +34-93-723-4717
E-mail: enelec@enelec.com
www.enelec.com

Instrumentos de Medida, S.L.
(Medical & Military Industries)
Septiembre 31, E28022 Madrid,Spain
Tel: +34-91-300-0191
Fax: +34-91-388-5433
E-mail: jvaca@idm-instrumentos.es
www.idm-instrumentos.es

SWEDEN
Combinova AB
(Test & Measurement Instruments)
Domkraftsv. 1 , SE-197 40 Bro, Sweden
Tel: +46-8-627-9310
Fax: +46-8-295-985
E-mail: sales@combinova.se
www.combinova.se

SWITZERLAND
MESATEC technische Produkte AG
(Test & Measurement Instruments)
Sumpfstrasse 3, CH-6300 Zug, Switzerland
Tel: +41-41-740-5833
Fax: +41-41-740-5834
E-mail: info@mesatec.ch
www.mesatec.ch

THAILAND
Quantel Co., Ltd.
(Test & Measurement Instruments)
22 Flr., Oriflame Tower 253 Sukhumvit 21, Klongtoey Nua, Wattana Bangkok 10110, Thailand
Tel: +66-2-261-4050/51
Fax:+66-2-261-4052
E-mail: sales@quantel.com.sg

TURKEY
Yildirim Elektronik
(Test & Measurement Instruments)
Besevler, Ankara, Turkey
Tel: +90-312-2211-000
Fax: +90-312-2123-535
E-mail: eren@yildirimelektronik.com
www.yildirimelektronik.com

UNITED KINGDOM
MDL Technologies Ltd.
(Test & Measurement Instruments)
Unit 11 Devonshire Business Centre Works Road Letchworth Herts SG61GJ,
United Kingdom
Tel: +44-146-243-1981
Fax: +44-560-315-2515
E-mail: sales@mdltechnologies.co.uk
www.mdltechnologies.co.uk

VIETNAM
Quan Sieu Co. Ltd. (HCMC)
(Test & Measurement Instruments)
L11-L12 Mieu Noi, Ward 3, Binh Thanh District - Ho Chi Minh City, Vietnam
Tel: +84-8-3517-1894
Fax: +84-8-3517-1893
E-mail: sales@quantel.com.sg

Quantel Vietnam (Hanoi Branch)
(Test & Measurement Instruments)
Floor 4, No 242H, Mink Khai Street
Hai Ba Trung District
Ha Noi City - Vietnam
Tel: +84 4 6257 5555
Fax: +84 4 6257 9999
Email: sales@quantel.com.sg

www.chromaate.com

Distributed by:

Worldwide Distribution and Service Network

201302-4200