

ELECTRONIC COUNTERS

CW Microwave Frequency Counters

HP 5350B, 5351B, 5352B

- 10 Hz to 46 GHz without an external mixer
- Exceptional sensitivity to -40 dBm
- 1 GHz/s tracking speed
- 60 ms acquisition time
- 100 measurements/s (HP-IB) in automatic mode
- Three years of hardware support with Option W30



HP 5352B



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HP 5350B, 5351B, 5352B Microwave Counters

The HP 5350B/5351B/5352B are automatic CW microwave frequency counters that measure to 20, 26.5, and 40 GHz (46 GHz with Option 005), respectively. With resolution as fine as 1 Hz, these counters provide fast and precise frequency measurements.

By integrating all microwave components onto a single hybrid GaAs circuit, these counters offer high performance at low prices. Wide frequency coverage, exceptional sensitivity, fast tracking speed, high-measurement throughput, and wide FM tolerance are a few of the high-performance features of these counters.

With a built-in microprocessor, the HP 5350B/5351B/5352B have math capabilities such as measurement scaling and offset. These functions are useful for indirect measurements. Automatic amplitude discrimination automatically measures the frequency of the highest-amplitude signal in a multi-signal environment. Other convenience features include diagnostic routines that perform tests on the counter for general information and troubleshooting.

With high measurement throughput, the HP 5350B/5351B/5352B are ideal components for test systems. Their English-like commands simplify systems integration by reducing programming time and effort. In automatic test systems, the programmable alphanumeric liquid-crystal display (LCD) can serve as a message center; if operational security is a concern, keyboard and display lockout can be activated. In noise-sensitive environments, you can put these counters in SLEEP mode to reduce kickback noise to as low as -70 dBm.

Direct Inputs to 46 GHz: Low-Cost, Versatile Solutions

The HP 5350B/5351B/5352B can meet expanding measurement needs. The HP 5350B/5351B measure frequency from 10 Hz to 20 GHz and 26.5 GHz, respectively. The HP 5352B, which extends input capability to 40 GHz (46 GHz with Option 005), measures in the millimeter-wave range directly—without expensive mixers.

Exceptional Sensitivity: Direct Measurement of Low-Level Signals

Because these counters have input sensitivity to -40 dBm (-30 dBm for HP 5352B), accurately measuring your low-energy signals becomes a simple task. For example, you no longer need expensive microwave amplifiers to make low-level measurements. Also, you no longer have to worry about signal attenuation by the probe when you make frequency measurements at different nodes within your circuit. These conveniences simplify measurements in applications such as receiver front end testing.

Low Acquisition Time: High Throughput

With acquisition time reduced to 60 ms in automatic, fast-acquisition tracking mode (20 ms in manual mode), these high-speed counters can significantly improve your measurement throughput.

In bench-top applications, this high-speed throughput gives you fast measurement response. The LCD will update measurements rapidly to shorten evaluation time. For applications that require fast response to source tuning, these counters are ideal solutions.

In systems environments, fast measurement throughput contributes to overall system efficiency. Delivering more than 100 measurements/s over HP-IB in automatic mode, these counters save money by reducing test time.

1 GHz/s Tracking: Measuring Fast-Moving Signals

Fast acquisition offers fast tracking speed. With acquisition time below 60 ms, these counters can track source drift to 1 GHz/s effortlessly. For example, when measuring the response of a voltage-controlled oscillator (VCO) to voltage-source tuning, these counters track the changing frequency rapidly to measure transfer characteristics.

HP 5350B/5351B/5352B Specifications

Input 1

Frequency Range: HP 5350B: 500 MHz to 20 GHz
 HP 5351B: 500 MHz to 26.5 GHz
 HP 5352B: 500 MHz to 40 GHz
 Option 005: 500 MHz to 46 GHz

Sensitivity: See Graph 1, Sensitivity

Maximum Input: +7 dBm

Damage Level: +25 dBm; HP 5350B/5351B Option 006: +39 dBm (500 MHz to 6 GHz), +36 dBm (6 GHz to 18 GHz), +34.8 dBm (18 GHz to 26.5 GHz)

SWR (typical): 500 MHz to 10 GHz: 2:1; Option 002/006, 2.5:1
 10 GHz to 26.5 GHz: 3:1; Option 002/006, 3.5:1
 26.5 GHz to 46 GHz: 3.5:1

Coupling: DC to 50 Ω termination, ac to instrument

Connector: Precision type-N (female) (HP 5350B)
 APC-3.5 (male) with collar (HP 5351B/HP 5352B)
 APC-2.4 (male) with collar (Option 005)

Accuracy: ± 1 LSD \pm Timebase Error \times Frequency. High-stability timebase (Option 010) has timebase uncertainties that are 1/10 of the values for the oven timebase (Option 001). LSD = least significant digit.

Residual Stability: Counter and source using common 10 MHz timebase or counter using external higher-stability timebase: .3 LSD rms typical for resolution 1 Hz to 1 kHz at 25° C; HP 5352B: .7 LSD typical 26.5 to 40 GHz.

Resolution: Selectable, 1 Hz to 1 MHz

FM Tolerance: See Graph 2, FM Rate Tolerance

Maximum Deviation: Auto: 20 MHz p-p (HP 5350B/51B),
 12 MHz p-p (HP 5352B),
 9 MHz p-p (Option 005)
 Manual: 60 MHz p-p (HP 5350/51B),
 55 MHz p-p (HP 5352B),
 55 MHz p-p (Option 005)

Maximum FM Rate: 10 MHz

Tracking Speed

Fast-acquisition Track: 1 GHz/s

Normal FM Rate: 1 MHz/s

Low FM Rate: 80 kHz/s

AM Tolerance: Any modulation index, provided the minimum signal level is not less than the sensitivity specification.

Modes of Operation

Automatic: Counter automatically acquires and displays highest-level signal within sensitivity range

Manual: Center frequency must be entered to within ± 20 MHz or input frequency; ± 3 MHz worst case below 1 GHz

Automatic Amplitude Discrimination: Measures largest signal present, providing that signal is 6 dB (typical) above any signal within 500 MHz; >20 dB (typical) above any signal within 500 MHz to 20 (46) GHz

Acquisition Time

Automatic Mode: Fast-acquisition track: <60 ms
 Normal FM rate: <125 ms
 Low FM rate: <1.25 s

Manual Mode: <20 ms