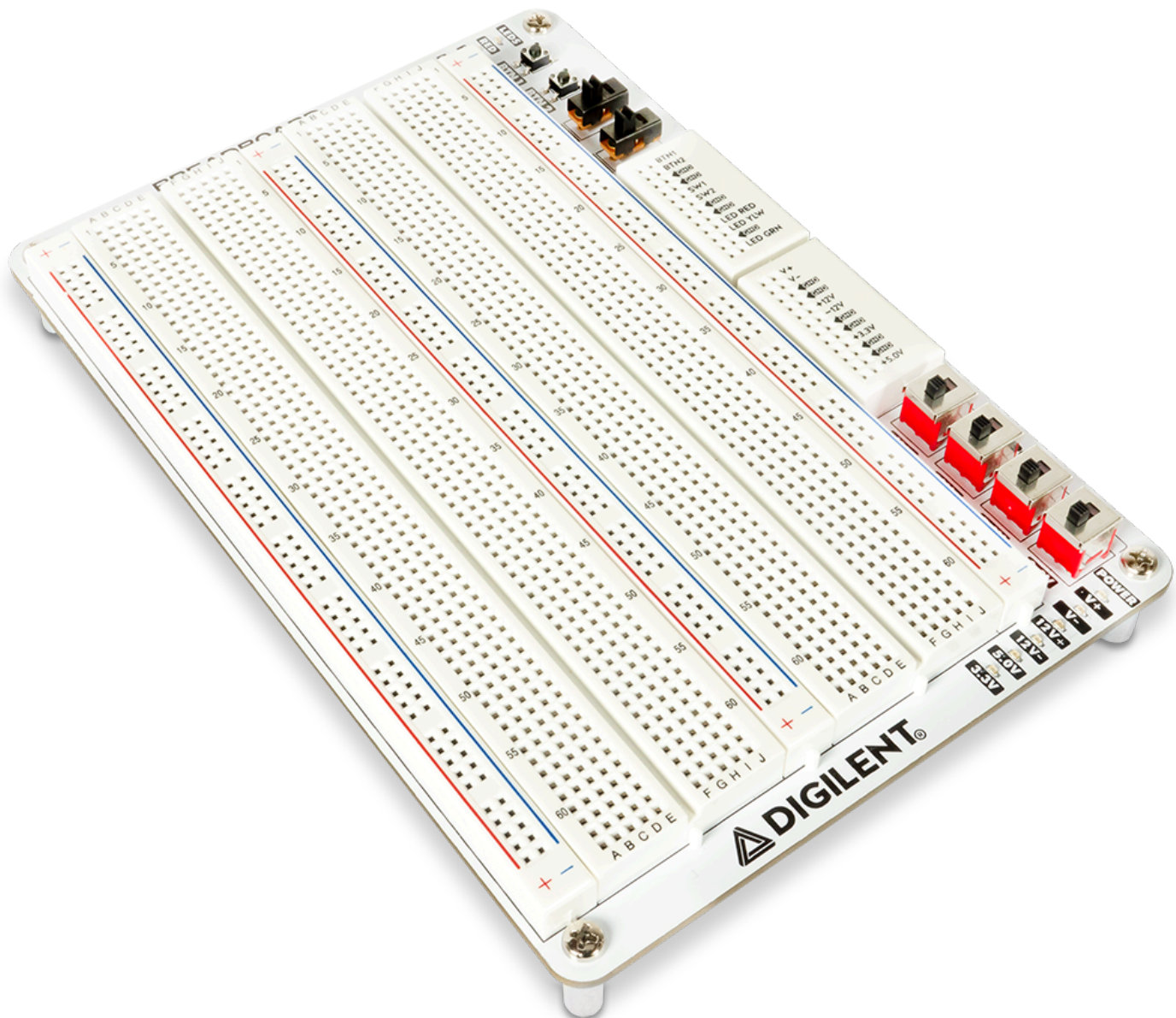


Breadboard Canvas Reference Manual

The Breadboard Canvas is a replaceable and removable prototyping surface for the Analog Discovery Studio. The bulk of the Breadboard Canvas consists of 2 regular sized breadboards and three power rails. At the top of the board, two small breadboards contain the power access pins for the power supplies, and pin breakouts for the included I/O. Two switches, LEDs, and buttons are integrated into the Breadboard Canvas for convenience. The power supply access pins can be switched on and off via the power supply switches, and the status is indicated by the power indicator LEDs. The Breadboard Canvas is included with the Analog Discovery Studio.



Mechanical Design

The Breadboard Canvas is designed to connect to the Analog Discovery Studio via standoffs. Magnets are located within each of the holes that the standoffs slot into in order to hold the Canvas in place. The Breadboard Canvas can be removed from the Analog Discovery Studio and swapped out with other canvases.

Warning! Do not swap out Canvases while the Analog Discovery Studio is turned on.

BREADBOARD CANVAS

LEDS
RED
YLW
GRN

The breadboard features a central grid of 60 rows and 10 columns (A-J). On the left side, there are two vertical power rails: a red one labeled '+' and a blue one labeled '-'. On the right side, there are two vertical power rails: a red one labeled '+' and a blue one labeled '-'. The grid is divided into four 5-column sections (A-E, F-J, A-E, F-J).

BTN1
BTN2
SW 1
SW 2

Two push-buttons (BTN1, BTN2) and two toggle switches (SW 1, SW 2) are mounted on the right side of the breadboard.

- BTN1
- BTN2
- ◀ GND
- ◀ GND
- SW1
- SW2
- ◀ GND
- ◀ GND
- LED RED
- LED YLW
- ◀ GND
- LED GRN

- V+
- V-
- ◀ GND
- ◀ GND
- +12V
- -12V
- ◀ GND
- ◀ GND
- +3.3V
- ◀ GND
- ◀ GND
- +5.0V

POWER

V+
12V+
5.0V
3.3V

Four power connectors are mounted on the right side, labeled V+, 12V+, 5.0V, and 3.3V. A 'POWER' label is placed to the right of these connectors.

DIGILENT®

3.3V
5.0V
12V-
12V+
V-
V+POWER

2 SIM5
94V-0
38.8

CE

REV B
P8200-385
DAAYFEE

R1
R2
R3
Q1
Q2
Q3

R11
R7

R17
R16

R4

R5

R6

R8

R9

R10

R11

R12

R13

R14

R15

R16

R17

R18

R19

R20

R21

R22

R23

R24

R25

R26

R27

R28

R29

D10
D11
R21
R22
R23

Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
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Q18
Q19
Q20
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Q49
Q50

Breadboards

The Analog Discovery Studio Breadboard Canvas has two regular-size breadboards and three power rails mounted to the canvas surface.

Power Supplies

Each of the Analog Discovery Studio's power supplies, both variable and fixed, are connected to the canvas, accessible via the power supplies breadboard.

The power access pins for the variable supplies, labeled V+ and V-, are connected to the Analog Discovery Studio's programmable power supplies. They can be programmed to voltage levels from 1 to 5V (V+) and -1 to -5V (V-) through the use of WaveForms' *Power Supplies* instrument.

Four fixed supplies are available, +12V, -12V, 5.0V, and 3.3V.

The power access pins can be enabled or disabled via the set of four switches adjacent to the power supplies breadboard.

Green status LEDs, associated with each supply, turn on when power is available on that pin (when the supply is enabled, and the ADS is turned on).

Since each power supply is sourced directly from the Analog Discovery Studio, the minimum and maximum current and power available for each supply depends on the Analog Discovery Studio's specifications. See the Analog Discovery Studio Specifications (https://digilent.com/reference/test-and-measurement/analog-discovery-studio/specifications#power_supplies) for more information.

Built-in Components

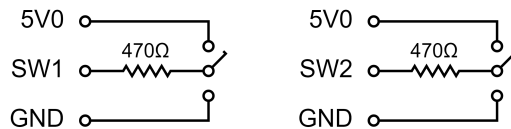
The Analog Discovery Studio Breadboard Canvas features a variety of common components which can be used within a circuit under test.

Each of the components described in this section is accessed via pins on the small breadboard adjacent to SW2, referred to as the **Built-in IO Breadboard**.

User Switches

Two switches are available on the Breadboard Canvas. When switched to the "On" position (switched away from the breadboard surface), they provide a connection between the 5.0V power rail and the corresponding pins (SW1, SW2) on the Built-in I/O Breadboard. The 5.0V power rail must be enabled to use the buttons.

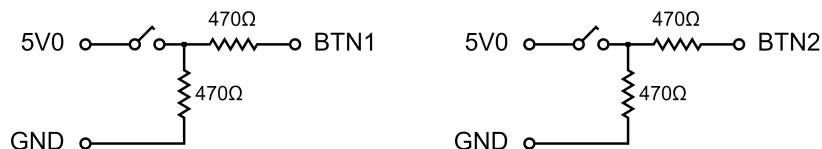
A circuit diagram detailing how the switches are connected to the Built-in I/O Breadboard can be seen below.



User Buttons

Two user buttons are also available. When pressed, they provide a connection between the 5.0V power rail and the corresponding pins (BTN1, BTN2) on the Built-in I/O Breadboard. The 5.0V power rail must be enabled to use the buttons.

A circuit diagram detailing how the buttons are connected to the Built-in I/O Breadboard can be seen below.



User LEDs

Three light emitting diodes, each of a different color, red, green, and yellow, are available on the Breadboard Canvas. These LEDs can be controlled by providing power to the corresponding pin on the Built-in I/O Breadboard.

A circuit diagram detailing how the LEDs are connected to the Built-in I/O Breadboard can be seen below.

