USER GUIDE

NI DAQPad™-6016 OEM

This document provides dimensions, connector pinouts, and information about the LEDs, switches, chassis ground, and connectors of the following NI DAQPad-6016 OEM devices:

- **111 mm × 163 mm Version**—For information about this version of the DAQPad-6016 OEM device, refer to the *DAQPad-6016 OEM (111 mm × 163 mm Version)* section of this document.
- **191 mm × 163 mm Version**—For information about this version of the DAQPad-6016 OEM device, refer to the *DAQPad-6016 OEM (191 mm × 163 mm Version)* section of this document.

Caution There are no product safety, electromagnetic compatibility (EMC), or CE marking compliance claims made for the NI DAQPad-6016 OEM devices. Conformity to any and all compliance requirements rests with the end product supplier.

DAQPad-6016 OEM (111 mm × 163 mm Version)

Figure 1 shows the 111 mm × 163 mm version of the DAQPad-6016 OEM device.

For specifications and more information about the DAQPad-6016 OEM device, refer to the *E Series Help* at `ni.com/manuals`.

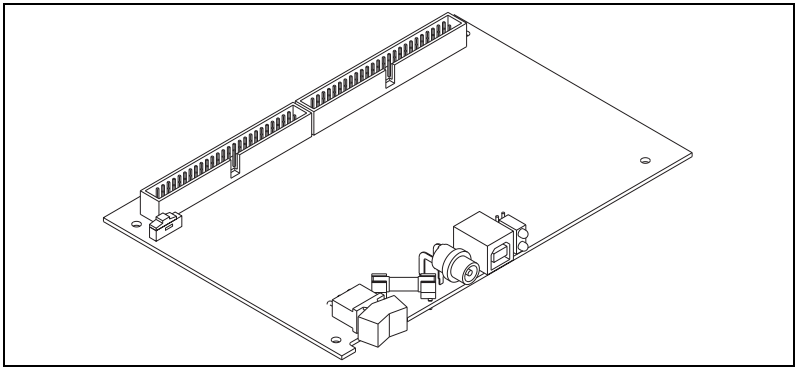


Figure 1. DAQPad-6016 OEM Device (111 mm × 163 mm Version)

NATIONAL INSTRUMENTS

Dimensions

Figure 2 shows the dimensions of the 111 mm × 163 mm version of the DAQPad-6016 OEM device.

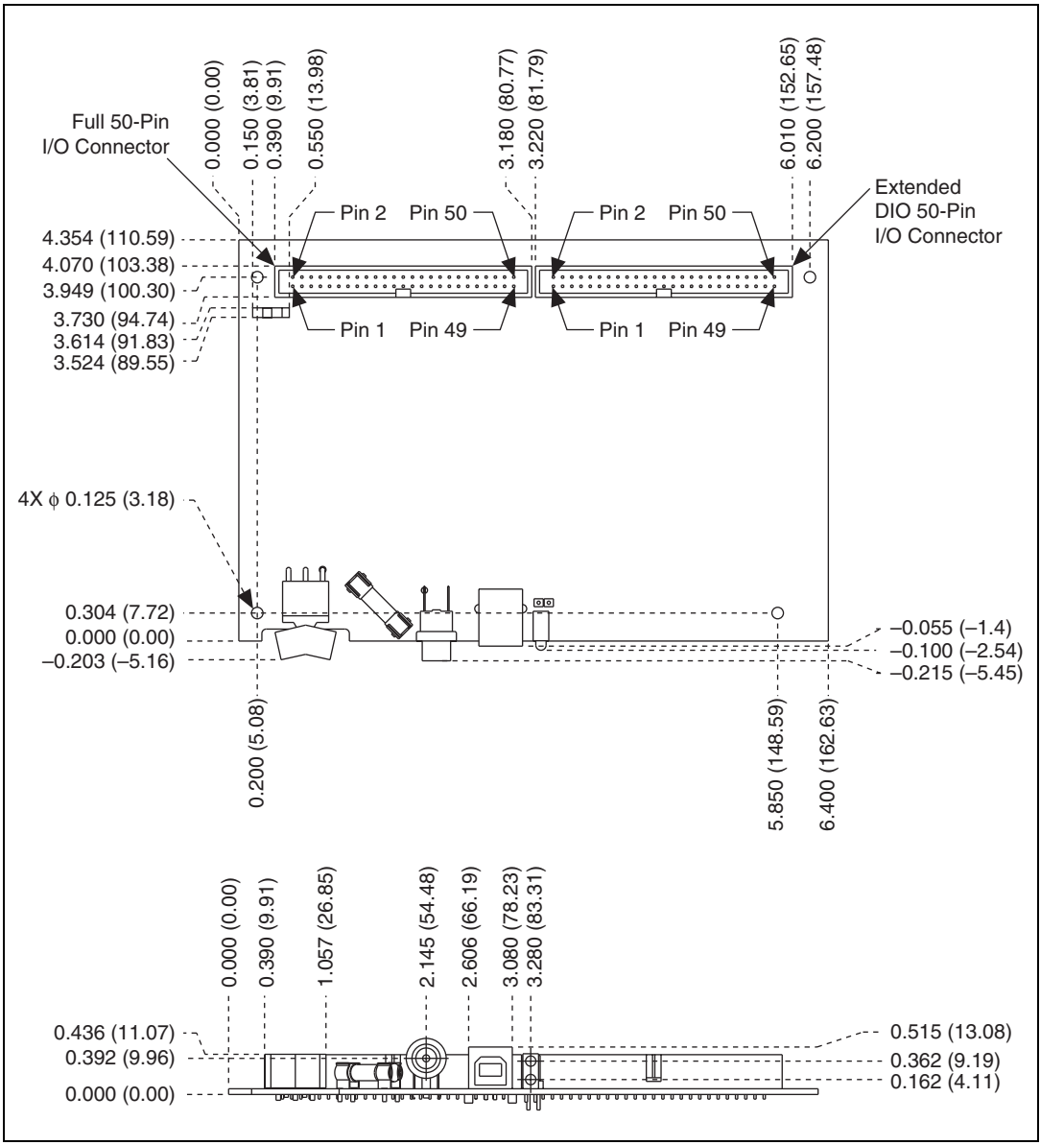


Figure 2. DAQPad-6016 OEM Dimensions in Inches and Millimeters (111 mm × 163 mm Version)

I/O Connector Pinouts

Table 1 shows the two 50-pin I/O connector pinouts on the DAQPad-6016 OEM device.

Table 1. DAQPad-6016 OEM I/O Connector Pinouts

Full 50-Pin I/O Connector				Extended DIO 50-Pin I/O Connector			
AI GND	1	2	AI GND	P3.7	1	2	D GND
AI 0	3	4	AI 8	P3.6	3	4	D GND
AI 1	5	6	AI 9	P3.5	5	6	D GND
AI 2	7	8	AI 10	P3.4	7	8	D GND
AI 3	9	10	AI 11	P3.3	9	10	D GND
AI 4	11	12	AI 12	P3.2	11	12	D GND
AI 5	13	14	AI 13	P3.1	13	14	D GND
AI 6	15	16	AI 14	P3.0	15	16	D GND
AI 7	17	18	AI 15	P2.7	17	18	D GND
AI SENSE	19	20	AO 0	P2.6	19	20	D GND
AO 1	21	22	NC	P2.5	21	22	D GND
AO GND	23	24	D GND	P2.4	23	24	D GND
P0.0	25	26	P0.4	P2.3	25	26	D GND
P0.1	27	28	P0.5	P2.2	27	28	D GND
P0.2	29	30	P0.6	P2.1	29	30	D GND
P0.3	31	32	P0.7	P2.0	31	32	D GND
D GND	33	34	+5 V	P1.7	33	34	D GND
+5 V	35	36	AI HOLD COMP	P1.6	35	36	D GND
EXT STROBE	37	38	PFI 0/AI START TRIG	P1.5	37	38	D GND
PFI 1/AI REF TRIG	39	40	PFI 2/AI CONV CLK	P1.4	39	40	D GND
PFI 3/CTR 1 SRC	41	42	PFI 4/CTR 1 GATE	P1.3	41	42	D GND
CTR 1 OUT	43	44	PFI 5/AI SAMP CLK	P1.2	43	44	D GND
PFI 6/AO START TRIG	45	46	PFI 7/AI SAMP CLK	P1.1	45	46	D GND
PFI 8/CTR 0 SRC	47	48	PFI 9/CTR 0 GATE	P1.0	47	48	D GND
CTR 0 OUT	49	50	FREQ OUT	+5 V	49	50	D GND

For more information about the DAQPad-6016 OEM signals and how to connect them, refer to the *E Series Help* at `ni.com/manuals`.

LEDs

The DAQPad-6016 OEM has two LEDs that reflect the state of the device. The green READY LED indicates whether the device is powered on and configured as a USB device. The yellow ACTIVE LED indicates whether there is activity over the USB bus. Figure 3 shows the pins that connect the LEDs to the device.

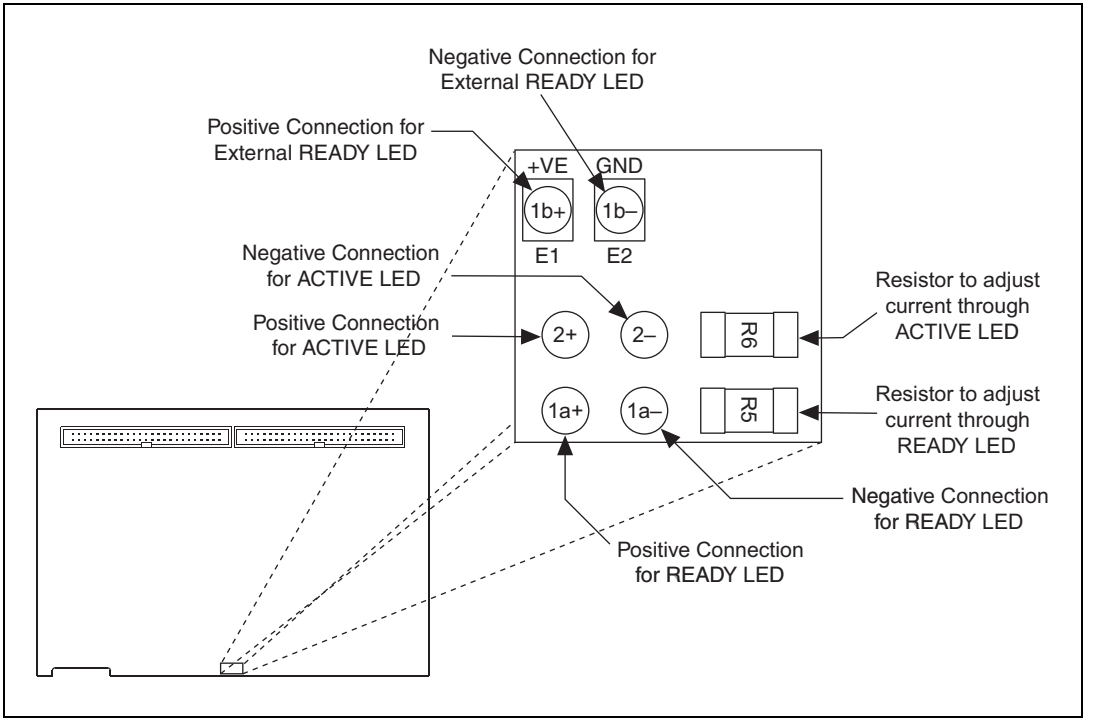


Figure 3. DAQPad-6016 OEM LEDs (111 mm × 163 mm Version)

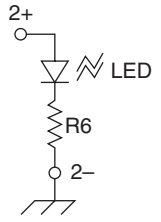
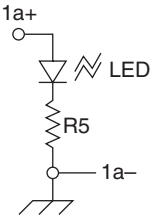
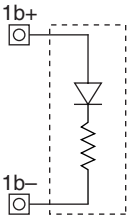
The READY LED has two sets of pins. The first set of pins labeled 1a and the resistor labeled R5 are used to connect to the onboard LED. The 220 Ω R5 resistor drives enough current to power on the LED.

The second set of pins labeled 1b allow you to connect an external LED circuit to the device. You can solder wires to these pins.

The set of pins labeled 2 and the 220 Ω resistor labeled R6 are used for the ACTIVE LED. The ACTIVE LED does not have a separate set of pins to connect to an external LED circuit.

Table 2 shows the schematics of the onboard ACTIVE and READY LEDs, and how to connect an external READY LED circuit to the device.

Table 2. Schematics of the DAQPad-6016 OEM LEDs

Onboard ACTIVE LED	Onboard READY LED	External READY LED Circuit
		

Power Switch (111 mm × 163 mm Version)

The power switch on the DAQPad-6016 OEM powers the device on and off. Figure 4 shows the pins on the power switch.

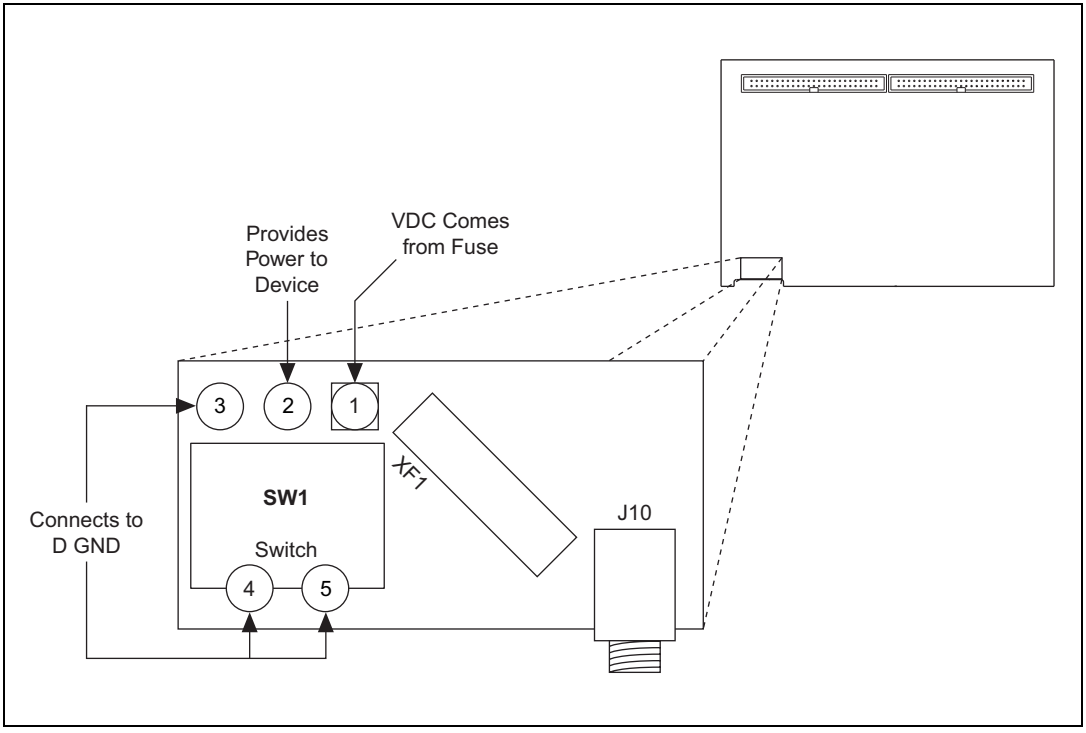


Figure 4. DAQPad-6016 OEM Power Switch (111 mm × 163 mm Version)

Pin 1 is connected to VDC through the fuse (reference designator XF1). The VDC is the voltage provided by the power supply through the power connector (reference designator J10) and must be 9–25 V.

Pin 2 provides power to the circuitry on the DAQPad-6016 OEM. When the switch is in the On position, the VDC power supply from pin 1 is routed to pin 2.

Pin 3 connects pin 2 to ground when the switch is in the Off position. This allows the charge on the DAQPad-6016 OEM to leak to ground when it is powered off.

Figure 5 shows a schematic of the switch.

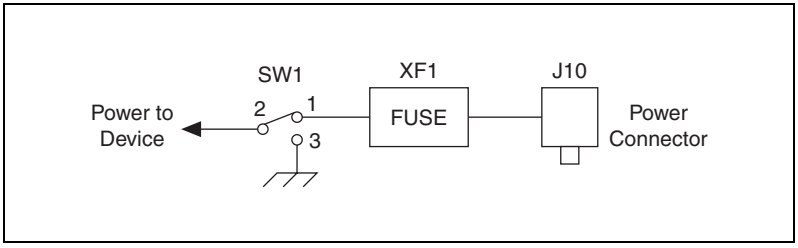


Figure 5. Schematic of the DAQPad-6016 OEM Switch

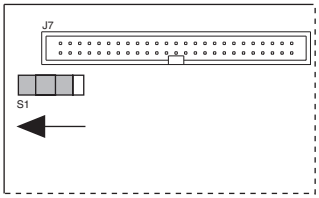
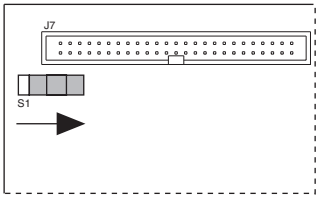
NRSE/RSE Switch (111 mm × 163 mm Version)

The DAQPad-6016 OEM device can make differential or single-ended analog input measurements.

In nonreferenced single-ended (NRSE) mode, the ground reference signal is provided by the user on the AI SENSE pin. In referenced single-ended (RSE) mode, the ground reference signal is AI GND, the ground of the DAQPad-6016 OEM device.

Table 3 shows how to set the NRSE/RSE switch (S1).

Table 3. NRSE/RSE (S1) Settings

Mode	Ground Reference Signal	S1 Position	NI-DAQmx Setting[1]
NRSE (default)	AI SENSE		NRSE
RSE	AI GND		NRSE[2]

[1] In NI-DAQmx, set the Analog Input Terminal Configuration property of your AI Task to this setting. For more information, refer to the *Analog Input Terminal Configuration* topic in the *E Series Help*, available at `ni.com/manuals`.

[2] To make RSE measurements, you must set the Analog Input Terminal Configuration property of your AI Task to NRSE in NI-DAQmx. Even though RSE mode is not exposed in the software, setting S1 to RSE and setting the Analog Input Terminal Configuration property of your AI Task to NRSE will allow you to make RSE measurements.

Chassis Ground

Chassis ground provides a connection between the enclosure and USB ground.

D GND is connected to the chassis ground at the bottom edge of the board through two 0 Ω resistors. The chassis ground directly connects to USB ground, which connects to earth ground. Figure 6 shows where the different grounds are connected.

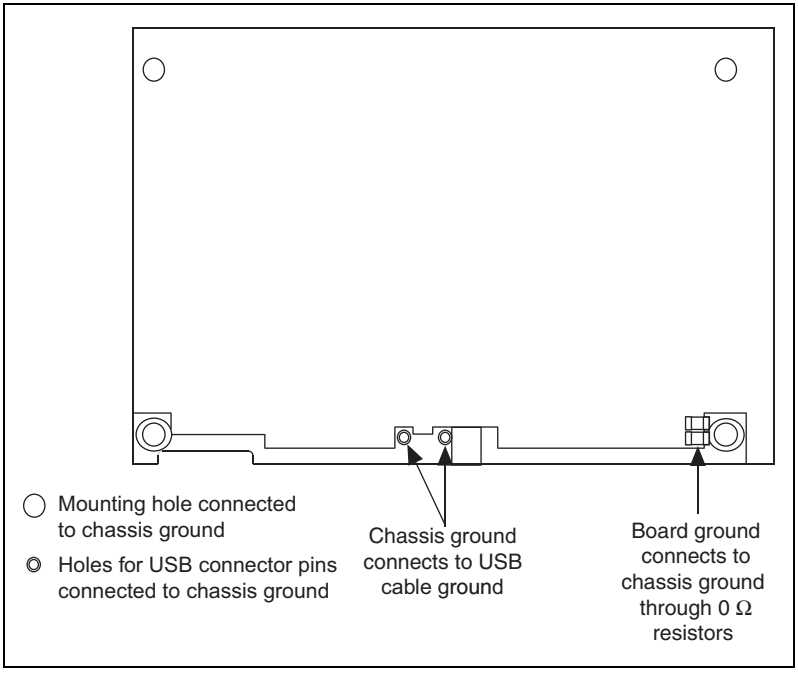


Figure 6. DAQPad-6016 OEM Ground Connections (111 mm × 163 mm Version)

Device Components

Table 4 contains information about the components used for interfacing and interacting with the NI DAQPad-6016 OEM.

Table 4. NI DAQPad-6016 OEM Components

Component	Reference Designator(s) on PCB	Manufacturer	Manufacturer Part Number
LEDs	DS1	Dialight	553-0332
50-pin connectors	J7, J8	3M	2550-6002UB
USB connector	J9	AMP	787780-1
Power connector	J10	Switchcraft	722RA
On/off switch	SW1	ITT Industries, Cannon	E101J1A3QE2
F 2A L 250V fuse	XF1	Littelfuse	217.002
NRSE/RSE switch	S1	EAO/SECME	09-03201-02

DAQPad-6016 OEM (191 mm × 163 mm Version)

Figure 7 shows the 191 mm × 163 mm version of the DAQPad-6016 OEM device.

For specifications and more information about the DAQPad-6016 OEM device, refer to the *E Series Help* at `ni.com/manuals`.

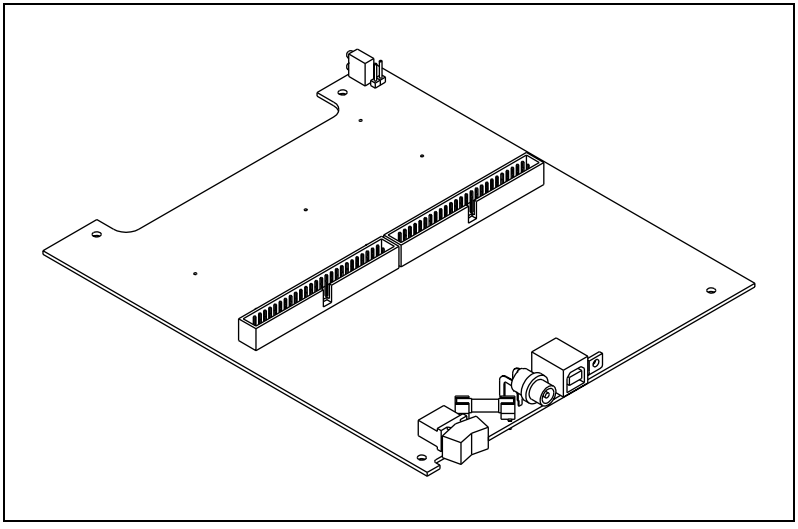


Figure 7. DAQPad-6016 OEM Device (191 mm × 163 mm Version)

Dimensions

Figure 8 shows the dimensions of the 191 mm × 163 mm version of the DAQPad-6016 OEM device.

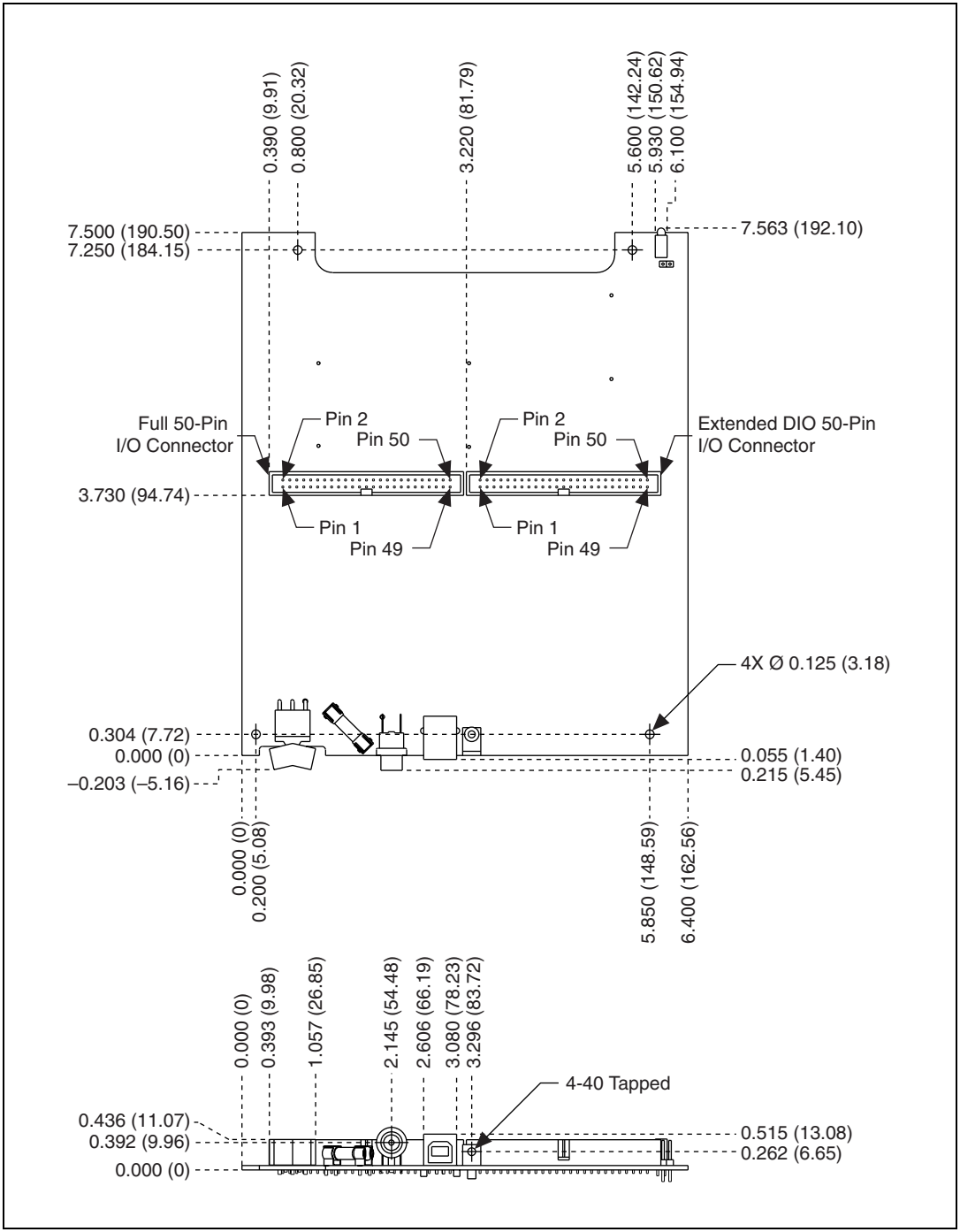


Figure 8. DAQPad-6016 OEM Dimensions in Inches and Millimeters (191 mm × 163 mm Version)

I/O Connector Pinouts

Table 5 shows the two 50-pin I/O connector pinouts on the DAQPad-6016 OEM device.

Table 5. DAQPad-6016 OEM I/O Connector Pinouts

Full 50-Pin I/O Connector				Extended DIO 50-Pin I/O Connector			
AI GND	1	2	AI GND	P3.7	1	2	D GND
AI 0	3	4	AI 8	P3.6	3	4	D GND
AI 1	5	6	AI 9	P3.5	5	6	D GND
AI 2	7	8	AI 10	P3.4	7	8	D GND
AI 3	9	10	AI 11	P3.3	9	10	D GND
AI 4	11	12	AI 12	P3.2	11	12	D GND
AI 5	13	14	AI 13	P3.1	13	14	D GND
AI 6	15	16	AI 14	P3.0	15	16	D GND
AI 7	17	18	AI 15	P2.7	17	18	D GND
AI SENSE	19	20	AO 0	P2.6	19	20	D GND
AO 1	21	22	NC	P2.5	21	22	D GND
AO GND	23	24	D GND	P2.4	23	24	D GND
P0.0	25	26	P0.4	P2.3	25	26	D GND
P0.1	27	28	P0.5	P2.2	27	28	D GND
P0.2	29	30	P0.6	P2.1	29	30	D GND
P0.3	31	32	P0.7	P2.0	31	32	D GND
D GND	33	34	+5 V	P1.7	33	34	D GND
+5 V	35	36	AI HOLD COMP	P1.6	35	36	D GND
EXT STROBE	37	38	PFI 0/AI START TRIG	P1.5	37	38	D GND
PFI 1/AI REF TRIG	39	40	PFI 2/AI CONV CLK	P1.4	39	40	D GND
PFI 3/CTR 1 SRC	41	42	PFI 4/CTR 1 GATE	P1.3	41	42	D GND
CTR 1 OUT	43	44	PFI 5/AI SAMP CLK	P1.2	43	44	D GND
PFI 6/AO START TRIG	45	46	PFI 7/AI SAMP CLK	P1.1	45	46	D GND
PFI 8/CTR 0 SRC	47	48	PFI 9/CTR 0 GATE	P1.0	47	48	D GND
CTR 0 OUT	49	50	FREQ OUT	+5 V	49	50	D GND

For more information about the DAQPad-6016 OEM signals and how to connect them, refer to the *E Series Help* at `ni.com/manuals`.

LEDs

The DAQPad-6016 OEM has two LEDs that reflect the state of the device. The green READY LED indicates whether the device is powered on and configured as a USB device. The yellow ACTIVE LED indicates whether there is activity over the USB bus. Figure 9 shows the pins that connect the LEDs to the device.

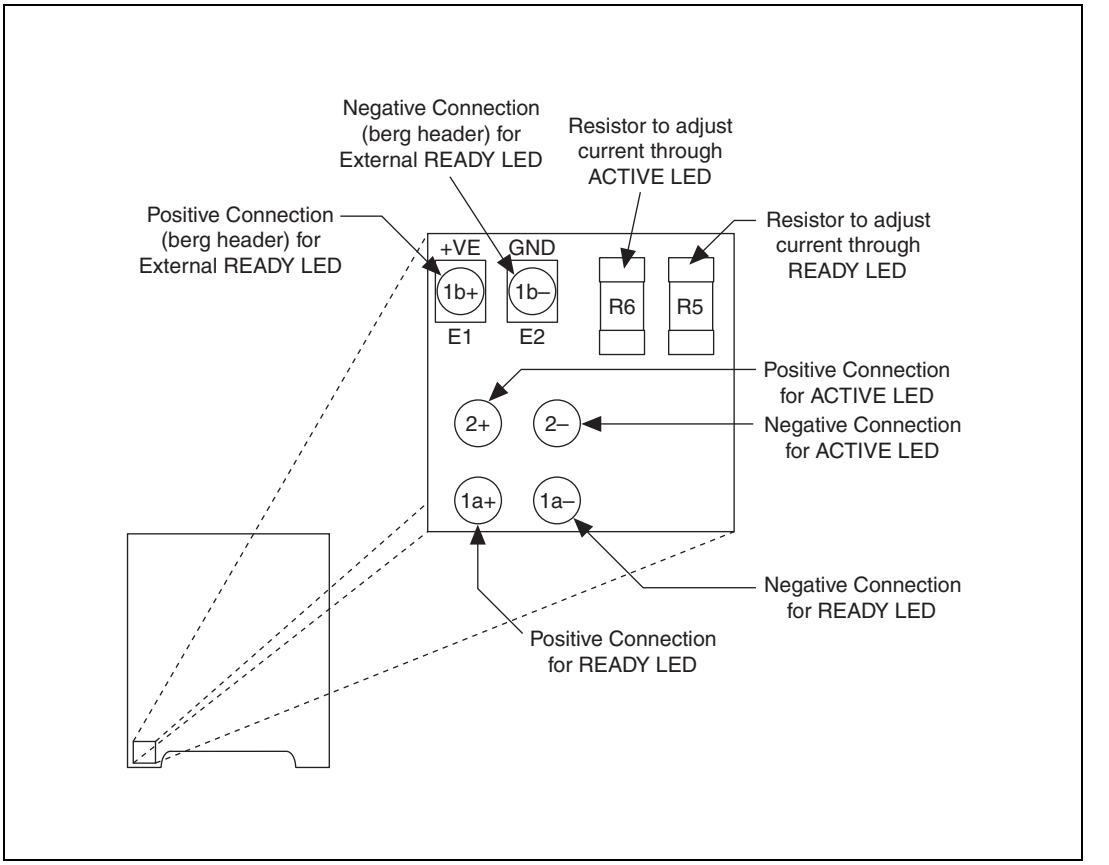


Figure 9. DAQPad-6016 OEM LEDs (191 mm × 163 mm Version)

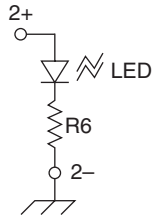
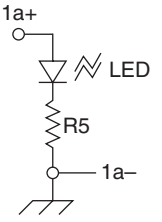
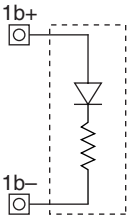
The READY LED has two sets of pins. The first set of pins labeled 1a and the resistor labeled R5 are used to connect to the onboard LED. The 220 Ω R5 resistor drives enough current to power on the LED.

The second set of pins labeled 1b has berg headers. These pins allow you to connect an external LED circuit to the device.

The set of pins labeled 2 and the 220 Ω resistor labeled R6 are used for the ACTIVE LED. The ACTIVE LED does not have a separate pair of berg headers to connect to an external LED circuit.

Table 6 shows the schematics of the onboard ACTIVE and READY LEDs, and how to connect an external READY LED circuit to the device.

Table 6. Schematics of the DAQPad-6016 OEM LEDs

Onboard ACTIVE LED	Onboard READY LED	External READY LED Circuit
		

Power Switch

The power switch on the DAQPad-6016 OEM powers the device on and off. Figure 10 shows the pins on the power switch.

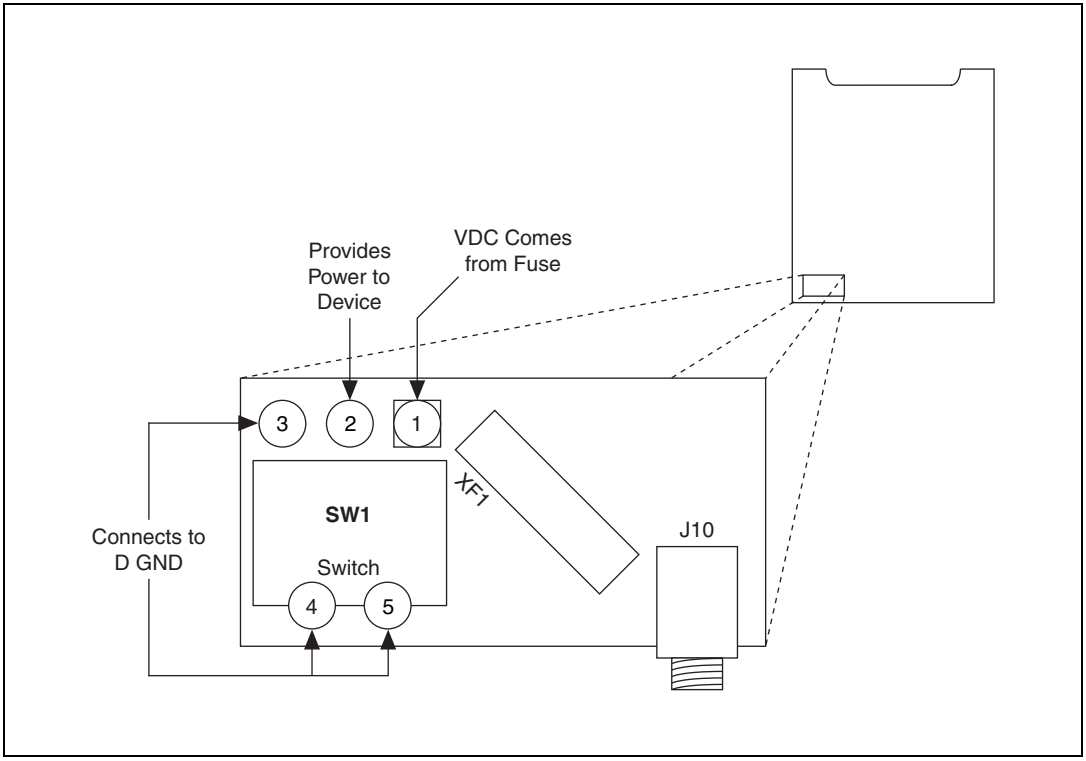


Figure 10. DAQPad-6016 OEM Power Switch (191 mm × 163 mm Version)

Pin 1 is connected to VDC through the fuse (reference designator XF1). The VDC is the voltage provided by the power supply through the power connector (reference designator J10) and must be 9–25 V.

Pin 2 provides power to the circuitry on the DAQPad-6016 OEM. When the switch is in the On position, the VDC power supply from pin 1 is routed to pin 2.

Pin 3 connects pin 2 to ground when the switch is in the Off position. This allows the charge on the DAQPad-6016 OEM to leak to ground when it is powered off.

Figure 11 shows a schematic of the switch.

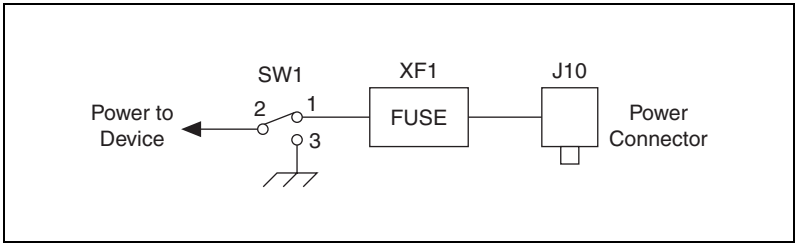


Figure 11. Schematic of the DAQPad-6016 OEM Switch

Chassis Ground

Chassis ground provides a connection between the enclosure and USB ground.

You can connect D GND to the chassis ground at three locations on the device. By default, D GND is connected to the chassis ground at the bottom edge of the board through two 0 Ω resistors. The chassis ground directly connects to USB ground, which connects to earth ground. Figure 12 shows where the different grounds are and can be connected.

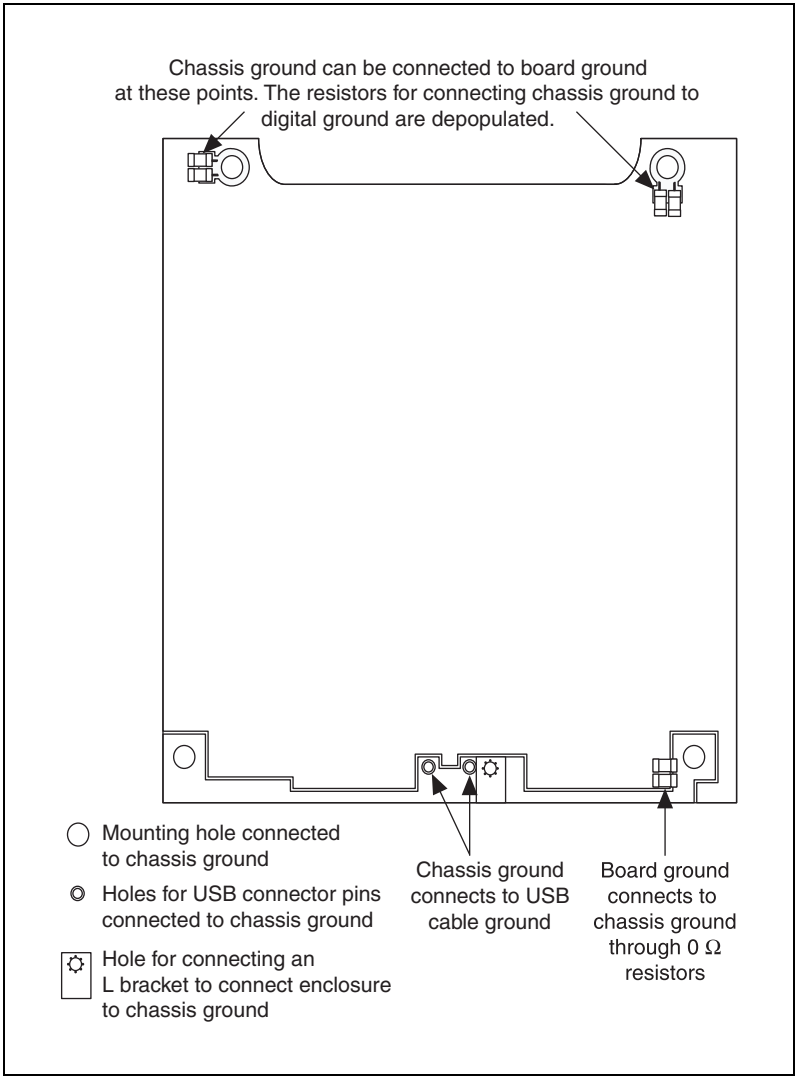


Figure 12. DAQPad-6016 OEM Ground Connections (191 mm × 163 mm Version)

Device Components

Table 7 contains information about the components used for interfacing and interacting with the NI DAQPad-6016 OEM.

Table 7. NI DAQPad-6016 OEM Components

Component	Reference Designator(s) on PCB	Manufacturer	Manufacturer Part Number
LEDs	DS1	Dialight	553-0332
Screw terminal connectors†	J1–J6	Phoenix Contact	1708084
50-pin connectors	J7, J8	3M	2550-6002UB
USB connector	J9	AMP	787780-1
Power connector	J10	Switchcraft	722RA
On/off switch	SW1	ITT Industries, Cannon	E101J1A3QE2
F 2A L 250V fuse	XF1	Littelfuse	217.002

† The screw terminals can be purchased as a set of six directly from National Instruments. The part number is 779442-01.