

Triple-Output Programmable DC Power Supply

NI PXI-4110 **NEW!**

- 3 independent DC power supplies
 - 0 to 6 VDC, 1 A, nonisolated
 - 0 to +20 VDC, 1 A, isolated
 - 0 to -20 VDC, 1 A, isolated
- 16-bit voltage setpoint and current limit
- 16-bit voltage/current readback measurements
- 20 mA and 1 A current modes
- 2 power source options
 - Internal (PXI backplane) – 9 W output
 - Auxiliary – full 46 W output
- Isolated channels can be combined for 0 to +40 VDC operation

Operating Systems

- Windows XP/2000

Recommended Software

- LabVIEW
- LabVIEW Real-Time
- LabWindows™/CVI
- Measurement Studio

Other Compatible Software

- Microsoft Visual Basic
- C/C++

Driver Software (included)

- NI-DCPower



Overview

The National Instruments PXI-4110 is a programmable, triple-output precision DC power supply in a single-slot, 3U PXI module. The NI PXI-4110 has two isolated channels, one from 0 to +20 V and the other from 0 to -20 V, and a single nonisolated 0 to 6 V supply, all capable of sourcing up to 1 A per channel. The PXI-4110 has 16-bit resolution for programming the voltage setpoint and current limit and for using the voltage and current readback measurement functionality. The versatile supply rails and high accuracy make the PXI-4110 an excellent general-purpose, single-quadrant power supply for design validation and manufacturing test applications.

Power Supply with Precision Source Capability

The PXI-4110 has the ability to source both voltage and current from each of its three outputs. As a voltage source, it can be programmed in 120 μ V steps on the +6 V channel and 400 μ V steps on each of the 20 V channels. As a current source, it can be programmed in 20 μ A steps on each channel in the 1 A current range. Additionally, you can set each of the 20 V channels to a 20 mA current range for 400 nA programming resolution. You can use this impressive level of current resolution in traditional power supply applications or in many applications that typically require a separate precision source/measure unit.

Internal/External Supply Options

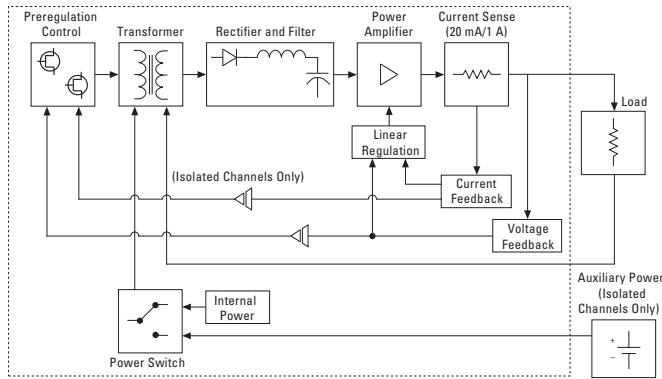
You can power the PXI-4110 either internally from the PXI backplane or externally through the NI APS-4100, a front-panel-connected auxiliary DC supply. Using internal power reduces the number of connections required on the front panel but also limits the available output power because of per-slot PXI power restrictions. When internally powered, the nonisolated, 0 to 6 V channel can be operated at its full 1 A current range, but the isolated channels are limited to 100 mA. When externally powered, all channels can be operated at full power of 1 A per channel for a total maximum output power of 46 W.

Linear Supply with Switching Preregulation

The PXI-4110 uses a combination of switching and linear regulation to provide excellent output power and accuracy in the 3U PXI module. On each channel, input power (coming from either the PXI backplane or the APS-4100) is regulated to within a certain percentage of the desired output power. This preregulation stage is governed by an intelligent PID algorithm implemented on board the module, ensuring the amount of power passed to the second (linear) stage is at the most efficient level, given the desired output.

After additional filtering, you can use traditional linear regulation techniques and amplification to further regulate the signal and source the final voltage or current. Because the output is linearly regulated, it has very quick load response and high precision – even at levels as low as 0 V. Also, because the linear regulation occurs on the preregulated signal, the power dissipation is relatively small and easily cooled in a PXI slot.

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Architecture of Single Isolated Channel on the PXI-4110

Extensive Protection Features

In addition to the standard voltage and current limiting functionality of the PXI-4110, several other features are also included to protect the supply and the load. Each output is protected against a reverse-polarity voltage application as well as excessive voltages – up to 15 V above the maximum channel voltage. Output fuses provide additional protection to prevent catastrophic failure as a last line of defense.

The operating voltage range for the auxiliary power input is 11 to 15.5 V. If voltages outside these limits are detected, the module shuts down until an input voltage within range is applied. If an input in excess of 20 V is applied, the input crowbar protection turns on, protecting the input solid-state switching devices (and preregulator power supply) from overvoltage damage.

The PXI-4110 operates with only nominal temperature increases internally due to the intelligent PID control of the output devices. If an overtemperature condition occurs in the PXI chassis due to fan failure or intake blockage, the output channels are shut down and a warning is issued. This type of condition requires user software intervention to reset, thus preventing the module from damage at excessive temperatures.

Software

NI-DCPower, an IVI-compliant instrument driver, offers complete programmatic control of the PXI-4110. You can use an available test panel to quickly troubleshoot or debug power supply operation and take advantage of the DCPower Express VI for an intuitive, configuration-based method of programming in the National Instruments LabVIEW graphical development environment.

Ordering Information

NI PXI-4110.....	779647-10
Includes NI-DCPower and the DCPower Test Panel.	
NI APS-4100	779671-01
NI PXI-4110, NI APS-4110 Bundle	779647-11

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to ni.com/modularinstruments.

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Specifications

Supply Characteristics

Number of channels..... 3

DC Specifications

Channel	DC Voltage	Isolation ¹	DC Current (Power)			
			Auxiliary Power		Internal Power	
			20 mA Range	1 A Range	20 mA Range	1 A Range
0	0 to +6 V	N/A	N/A	1 A (6 W)	N/A	1 A (6 W)
1	0 to +20 V	60 VDC, CAT I	20 mA	1 A (20 W)	20 mA	100 mA (2 W) ²
2	0 to -20 V	60 VDC, CAT I	20 mA	1 A (20 W)	20 mA	100 mA (2 W) ²

¹Channels 1 and 2 are isolated from ground but not from each other.

²Combined total power for channels 1 and 2 using internal power cannot exceed 3 W.

Voltage Programming Accuracy/Resolution

Channels	Range (V)	Resolution (mV)	Accuracy ±(% of output + offset)	
			1 Year 13 to 33 °C	Tempco/°C 0 to 55 °C
0	+6	0.12	0.05 + 4 mV	0.005 + 0.3 mV
1	+20	0.40	0.05 + 10 mV	0.005 + 1 mV
2	-20	0.40	0.05 + 10 mV	0.005 + 1 mV

Tempco = temperature coefficient

Current Programming Accuracy/Resolution³

Channels	Range ⁴	Resolution	Accuracy ±(% of output + offset)	
			1 Year 13 to 33 °C	Tempco/°C 0 to 55 °C
0	1 A	0.02 mA	0.15 + 4 mA	0.02 + 0.2 mA
1 and 2	20 mA	0.40 µA	0.15 + 35 µA	0.01 + 3 µA
	1 A	0.02 mA	0.15 + 4 mA	0.02 + 0.2 mA

Tempco = temperature coefficient

³Applies for current settings greater than 2% of range.

⁴Minimum programmable current limit is 1% of range.

Voltage Readback Accuracy/Resolution

Channels	Range (V)	Resolution (mV)	Accuracy ±(% of output + offset)	
			1 Year 13 to 33 °C	Tempco/°C 0 to 55 °C
0	+6	0.06	0.05 + 4 mV	0.005 + 0.2 mV
1	+20	0.20	0.05 + 5 mV	0.005 + 0.5 mV
2	-20	0.20	0.05 + 5 mV	0.005 + 0.5 mV

Tempco = temperature coefficient

Current Readback Accuracy/Resolution⁵

Channels	Range	Resolution	Accuracy ±(% of output + offset)	
			1 Year 13 to 33 °C	Tempco/°C 0 to 55 °C
0	1 A	0.01 mA	0.10 + 2 mA	0.010 + 0.2 mA
1 and 2	20 mA	0.20 µA	0.05 + 15 µA	0.005 + 1.5 µA
	1 A	0.01 mA	0.10 + 2 mA	0.010 + 0.2 mA

Tempco = temperature coefficient

⁵Applies for current outputs up to 500 mA.

Ripple and Noise⁶

Channels	RMS Normal-Mode Voltage	RMS Normal-Mode Current (20 mA into 500 Ω load)
0	<1.5 mV	<8 µA
1 and 2	<1.0 mV	<8 µA (<3 µA for 20 mA range)

⁶From 20 Hz to 20 MHz.

Voltage Output Speed⁷

Channels	Auxiliary Power				Internal Power			
	Full Load	No Load	Full Load	No Load	Full Load	No Load	Full Load	No Load
0	<1 ms	<1 ms	<1 ms	<25 ms	Same as auxiliary power			
1 and 2	<1 ms	<1 ms	<2 ms	<56 ms	<20 ms	<10 ms	<15 ms	<56 ms

⁷Current limit set to 1 A for auxiliary power or 100 mA for internal power. For 20 mA range, all voltage output speeds are <80 ms.

⁸Rise time is from 10 to 90% of programmed voltage change at maximum current.

⁹Fall time is from 90 to 10% of programmed voltage change at maximum current.

Line and Load Regulation

Channels	Line Regulation ¹⁰ ±(% of output + offset)		Load Regulation ±(% of range selected)	
	Voltage	Current	Voltage (per A of output load)	Current (per V of output load)
0	N/A	N/A	0.42	0.02
1 and 2	0.01 + 1 mV	0.01 + 0.02% of range	0.1	0.007 (0.003 for 20 mA range)

¹⁰Per volt change in auxiliary input.

General Specifications

Sampling rate	Default	300 S/s (10 samples averaged)
	Maximum	3000 S/s
Warm-up		15 minutes
I/O connectors		
	Supply channels.....	6-pos COMBICON (3.81 mm)
	External power.....	2-pos COMBICON (3.5 mm)
Dimensions.....		10 by 16 cm (3.9 by 6.3 in.)
		Single PXI slot, 3U
Auxiliary power (optional).....		11 to 15.5 VDC, 5 A max

Environment

Operating temperature	0 to 55 °C
Storage temperature.....	-20 to 70 °C
Relative humidity	5 to 85% noncondensing
Pollution degree	2
Approved altitude	up to 2000 m

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1
- CSA 61010-1

Electromagnetic Compatibility

CE, C-Tick, and FCC Part 15 (Class A) Compliant	
Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity.....	EN 61326:1997 +A2:2001, Table 1

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE Marking, as follows:

Low-Voltage Directive (safety)	73/23/EEC
Electromagnetic Compatibility Directive (EMC)	89/336/EEC