- Available as PXI or PXIe Modules
- Ideal for 4–20 mA Industrial Current Loop Simulation
- Multiple Modes of Operation: 4-20 mA, 0-24 mA, +/-24 mA, 0-5 V, +/-12 V & +/-5 V
- Self-powered with Sourcing or Sinking
- From 4 up to 16 Channels in One Slot Module
- Ability to Work in Full Isolation to Avoid Ground Loops
- Hardware Interlock Feature
- 16-bit Resolution – Output Control Within 1μA
- Accuracy of ±0.1 % FSR
- Programmable Slew Rate
- Short and Open Simulation
- PXI Versions Supported by PXI or LXI/USB Chassis
- Kernel and VISA Drivers
- 3 Year Warranty
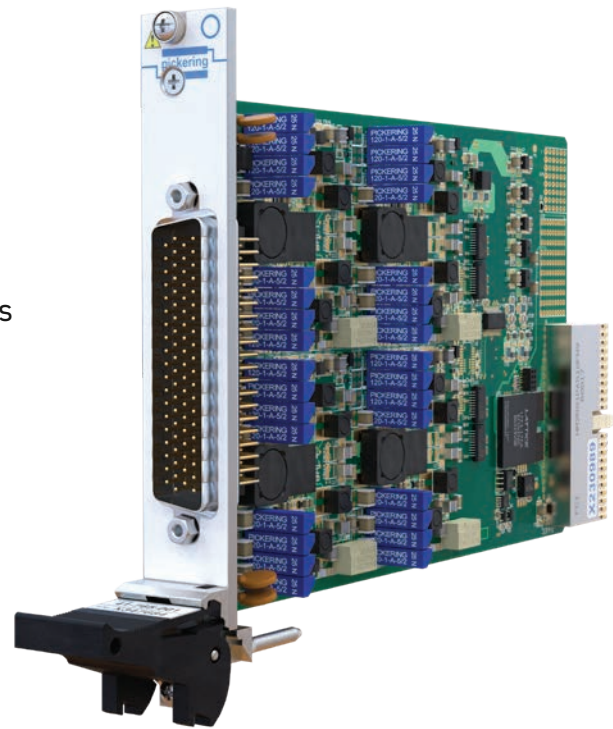
The 41-765 (PXI) and 43-765 (PXIe) are designed to meet the requirements of industrial control applications utilising current loops 4 – 20 mA. It consists of up to four 16-bit, digital-to-analogue converters (DAC), capable of creating four current outputs each. Output current within 0 - 4 mA and 20 mA - 24 mA, give the ability to simulate error or extra signalling conditions. The ±24 mA mode gives the ability to simulate either sourcing or sinking sensor.

Typical applications of this module span across: 4 – 20 mA current loops, analogue output modules, programmable logic controllers (PLCs), industrial automation, sensor transmitters, process control.

The outputs can work in one of several modes of operation: 4-20 mA, 0-24 mA or +/-24 mA. As well as low power voltage modes of operation: 0-5 V, +/-12 V or +/-5 V.

Each DAC of the module can be powered up independently, either from the chassis power supply or can work as fully isolated unit, being powered up from an external source. This approach removes issues of ground looping. The DAC is always actively sourcing or sinking, so no voltage source is required in a current loop, simplifying the test system.

Each channel of the 41/43-765 module is able to simulate the short and open circuit conditions that can be experienced in a system due to faulty wiring or sensors.

Block Diagram for 4-20 mA Current Loop Example
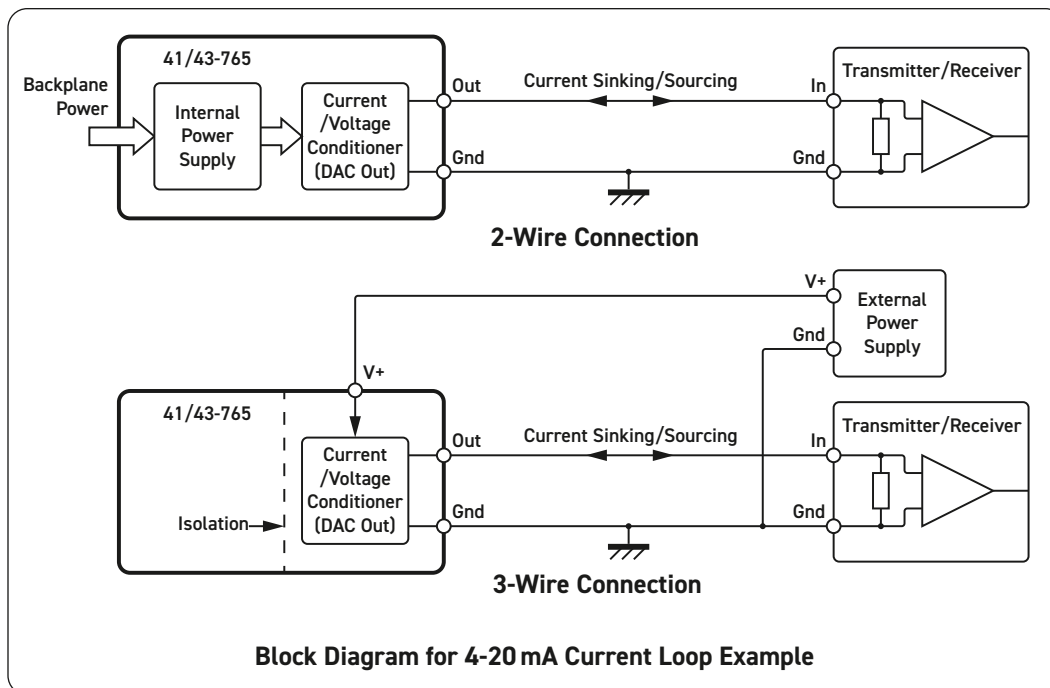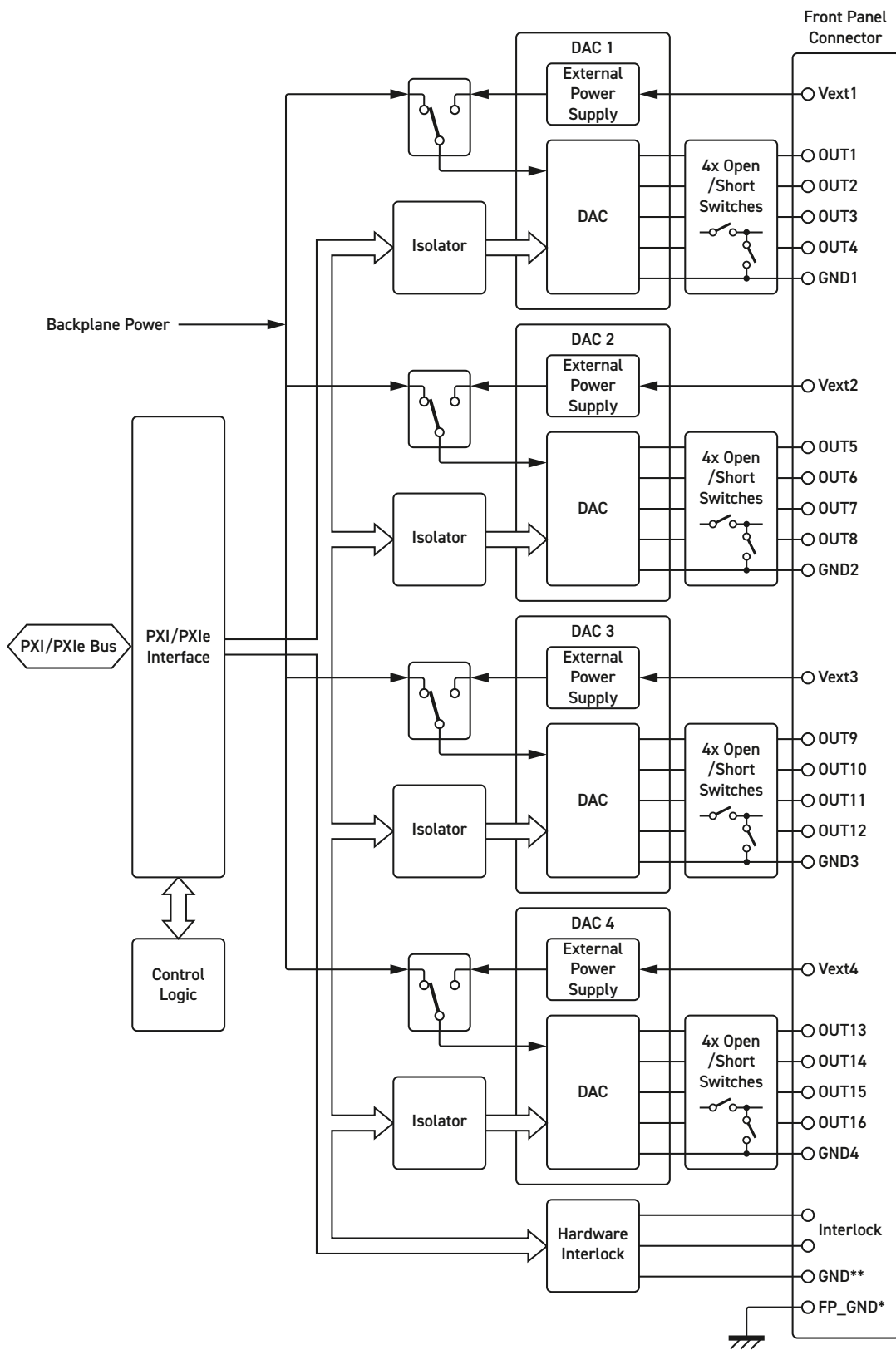
Functional Diagram for the 41/43-765 Analog Output Module

* Front panel ground (FP_GND) is internally connected to chassis GND, however the grounds of the consecutive DACs may become isolated and should not be externally connected to FP_GND.

** This pin (GND) is used for special interlock configurations only.

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Specification

Number of Channels:	16, 12, 8 or 4
Output Current (each Channel):	4-20 mA, 0-24 mA, +/-24 mA, 0-5 V, +/-12 V or +/-5 V
Resolution:	16 bit – less than 1 uA per 1 LSB
Error (typical*):	±0.1 FSR Total Unadjusted Error
DNL	±1 LSB
Fault Simulation:	Open or Short Circuit
Channel Isolation:	Full isolation mode in banks of 4 channels (per DAC)
External PSU input:	16.5 VDC to 60 VDC, 500 mA

* The extreme top and bottom ends of ranges may reach ±0.2% of FSR ±Resolution.

Power Requirements - 41-765

+3.3 V	+5 V	+12 V	-12 V
0.25 A	0.55 A	0.8 A	0

Power Requirements - 43-765

+3.3 V	+12 V
0.5 A	1 A

Mechanical Characteristics

41-765 - Single slot 3 U PXI (CompactPCI card).
43-765 - Single slot 3 U PXIe, compatible with PXIe hybrid slot.
3D models for all versions in a variety of popular file formats are available on request.

Connectors

41-765 - PXI bus via 32-bit P1/J1 backplane connector.
43-765 - PXIe bus via XJ3 and XJ4 backplane connectors.
Signals via front panel 78-pin male D-type connector, for pin outs please refer to the operating manual.

Operating/Storage Conditions

Operating Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m

Storage and Transport Conditions

Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives: Low-voltage safety EN61010-1:2010, EMC Immunity EN61326-1:2013, Emissions EN55011:2009+A1:2010.

Product Order Codes

PXI Analog Output / Current Loop Simulator Module

16 Channel	41-765-001
12 Channel	41-765-002
8 Channel	41-765-003
4 Channel	41-765-004

PXIe Analog Output / Current Loop Simulator Module

16 Channel	43-765-001
12 Channel	43-765-002
8 Channel	43-765-003
4 Channel	43-765-004

Product Customization

Pickering modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Mating Connectors & Cabling

For other connection accessories for the 41/43-765 please refer to the 90-006D 78-pin D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Note: If acceptance of the HART signaling is required please contact the sales office.

PXI & CompactPCI Compliance - 41-765

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus & Star Trigger are not implemented. Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 43-765

The module is compliant with the PXIe Specification 1.0. Local Bus, Trigger Bus & Star Trigger are not implemented.

43-765 Module in PXIe Format

Chassis Compatibility

The PXI versions of this module must be used in a suitable chassis. They are compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system
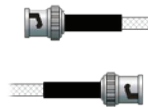
Connectivity Solutions

We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.

Connectors & Backshells   **Multiway Cable Assemblies**   **RF Cable Assemblies**   **Connector Blocks**

We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications. Visit: pickeringtest.com/cdt to start your design.

Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for a PXI or LXI based test system. Our modules are fully supported by both Virginia Panel and MacPanel.

Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our Relay Division. These instrument grade reed relays feature *SoftCenter™* technology, ensuring long service life and repeatable contact performance. To learn more, please go to: pickeringrelay.com

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Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions. For a list of all supporting operating systems, please see: pickeringtest.com/os

The VISA driver is also compatible with Real-Time Operating Systems such as LabVIEW RT. For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE and OpenTAP
- **Mathworks** Matlab
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments, please go to: pickeringtest.com/software

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development. To learn more, please go to: pickeringtest.com/spm
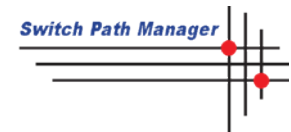
Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available for all our modules and systems with various levels to suit your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years. To learn more, please go to: pickeringtest.com/support

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection solutions you need. We have also published handy reference books on Switching Technology and for the PXI and LXI standards.

To view, download or request any of our product resources, please visit: pickeringtest.com/resources

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