PXI DC to 3GHz Programmable Attenuator 41-180

- DC to 3GHz Attenuator
- 1dB Attenuation Resolution Ideal for Optimizing Signal Levels in Measuring Systems
- Maximum Attenuation 63dB
- Single or Dual Version in One PXI Slot
- Use of Switched Resistive Attenuator Pads Ensures High Linearity and True DC Coupled Operation
- Input and Output Connector Savers Easily Replaced if Damaged
- VISA, IVI & Kernel Drivers Supplied for Windows
- 3 Year Warranty

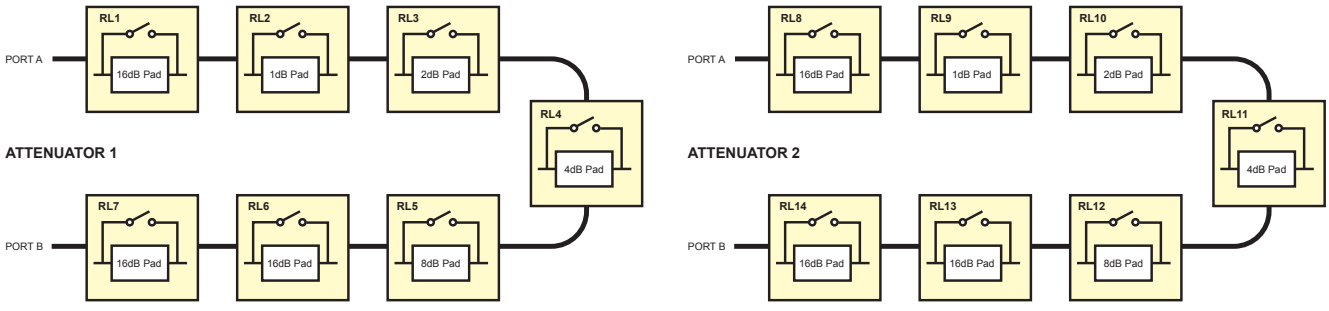
The 41-180 Programmable Attenuator Module is available with either one or two independently programmable attenuators in a single width 3U PXI module. The attenuators use high reliability mechanical switches to operate binary weight attenuator pads, providing attenuation values from 0 to 63dB in 1dB steps. Operating time is typically just 5ms, ensuring fast setting.

The module is ideal for conditioning the signal levels from devices under test and ensuring that measuring instruments are operating close to their optimum operating point for noise and linearity. The use of mechanically switched attenuators ensures broad operating bandwidth and freedom from non-linear behavior that might degrade the signals being measured.

The attenuator can be used for back-to-back testing of RF products, allowing the signal levels to be adjusted to quantify the path loss that can be inserted before the communication efficiency degrades, providing a quick indication of receiver sensitivity.

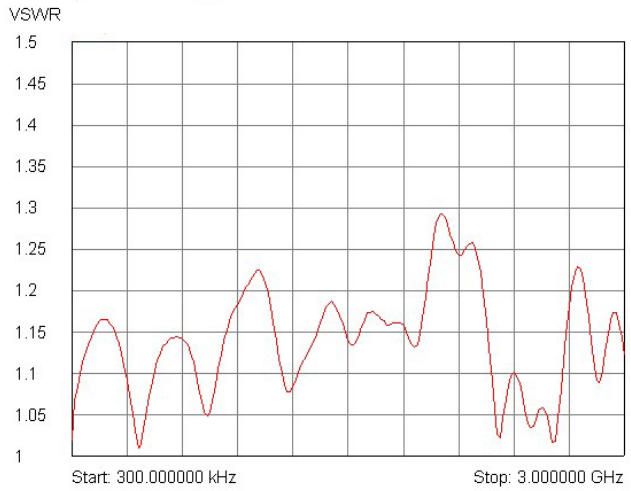
The use of a PXI solution for variable attenuation minimizes the need for components and cables located outside the PXI chassis, saving time and development costs for the systems integrator.

The design allows the user to change the front panel connectors quickly and easily in the event of damage. Attenuators can be connected in series to increase the total available attenuation.

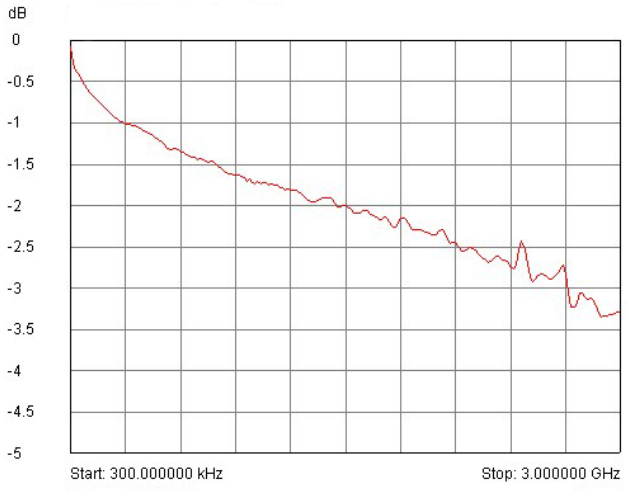


41-180 Dual DC to 3GHz Attenuator Block Diagram

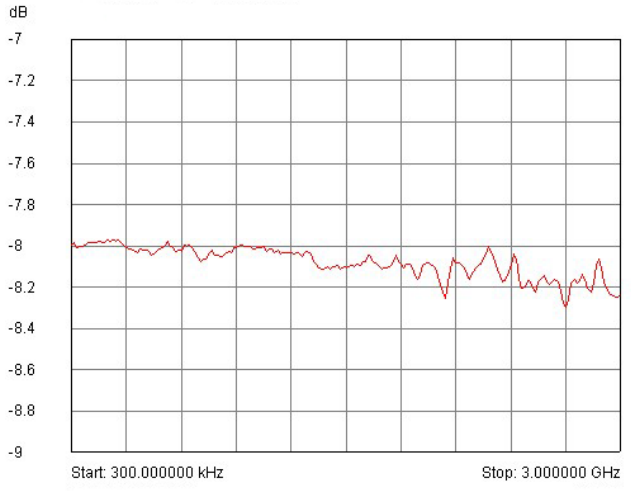
ISSUE 7.2 APR 2018



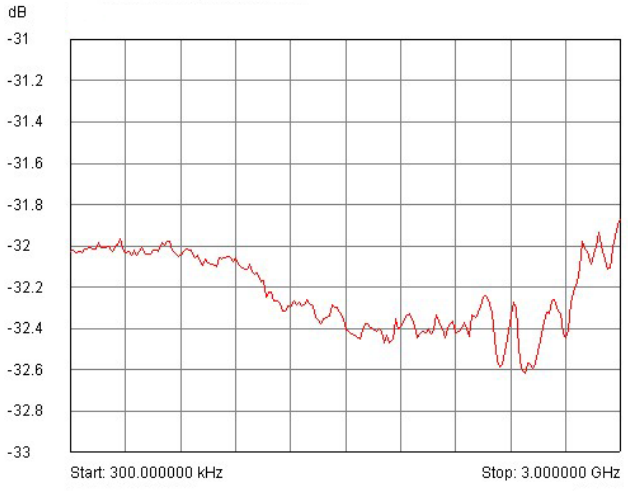
Typical VSWR Versus Frequency With No Attenuation Set



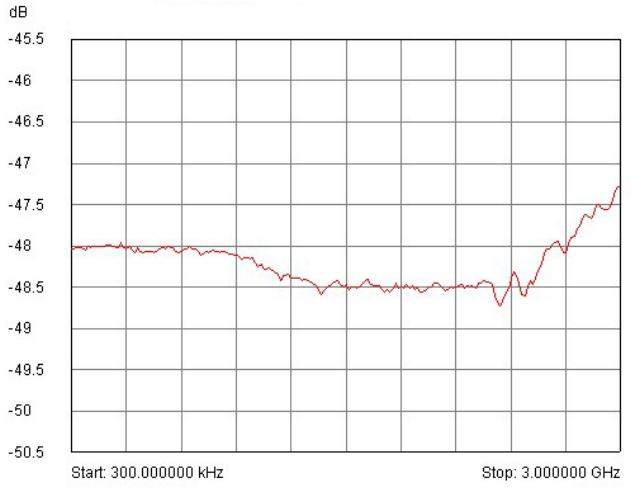
Typical Insertion Loss Versus Frequency With No Attenuation Set



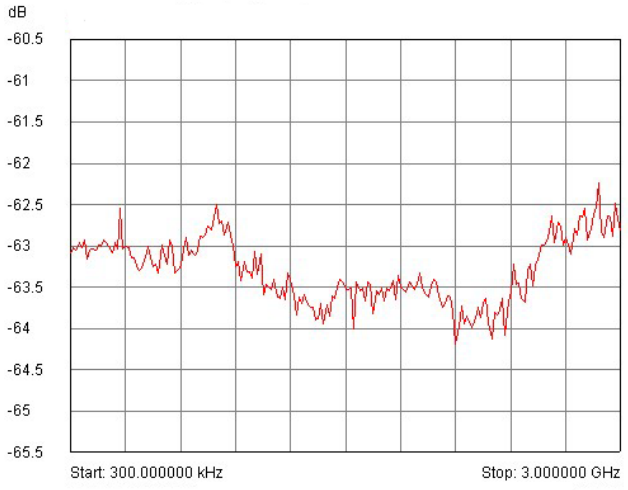
Attenuation Accuracy Versus Frequency With 8dB of Attenuation Set



Attenuation Accuracy Versus Frequency With 32dB of Attenuation Set



Attenuation Accuracy Versus Frequency With 48dB of Attenuation Set



Attenuation Accuracy Versus Frequency With 63dB Set

General Specification

Frequency range:	DC to 3GHz
Maximum Input Power:	1 Watt continuous
Input Impedance:	50Ω, DC coupled
VSWR (SMA connector):	Less than 1.5, typically less than 1.3
RF Connectors:	SMA, input and output connections are interchangeable. Versions with SMB connectors can be made available.
Contact Life (each pad):	Typically $1x10^7$ operations, At max power $1x10^6$ operations.
Switching Time (each pad):	Typically 2ms Maximum 4ms

Attenuation

The attenuator is made up of 1, 2, 4, 8 and 16dB (3 off) switched pads, attenuation is set to 0dB with no power applied.	
Insertion Loss (0dB set):	Typically 3.6dB at 3GHz
Attenuation Range:	0 to 63dB in 1dB steps relative to 0dB condition.

Attenuation Accuracy (individual pads measured in 50Ω system referenced to 0dB condition):

Attenuator Pad	DC to 1GHz		1GHz to 3GHz	
	Maximum	Typical	Maximum	Typical
1dB	±0.05dB	±0.05dB	±0.3dB	±0.12dB
2dB	±0.1dB	±0.08dB	±0.35dB	±0.2dB
4dB	±0.2dB	±0.15dB	±0.5dB	±0.4dB
8dB	±0.2dB	±0.15dB	±0.48dB	±0.4dB
16dB	±0.24dB	±0.24dB	±0.96dB	±0.5dB

Power Requirements

+3.3V	+5V	+12V	-12V
0	100mA	200mA	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI) instrument module.
3D models for all versions in a variety of popular file formats are available on request.

Connectors

PXI bus via 32-bit P1/J1 backplane connector.
Signals via front panel SMA connectors. SMB connectors can be made available.

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

PXI & CompactPCI Compliance

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

Uses a 33MHz 32-bit backplane interface.

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

Single DC to 3GHz Attenuator	41-180-021
Dual DC to 3GHz Attenuator	41-180-022

Latest Details

Please refer to pickeringtest.com for latest product details.

Product Customization

Pickering PXI 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 connection accessories for the 41-180 module please refer to the 90-011D RF Cable Assemblies data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Dual DC to 3GHz Programmable Attenuator
41-180-022

Chassis Compatibility

This PXI module must be used in a suitable chassis. It is 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

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

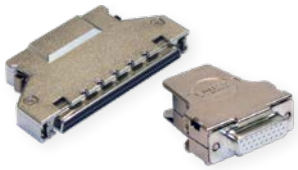
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

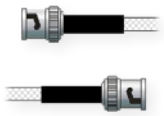
Connectivity Solutions

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.

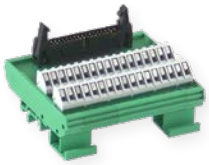


Connectors & Backshells

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 sister company, Pickering Electronics. These instrument grade reed relays feature ***SoftCenter***® technology, ensuring long service life and repeatable contact performance

To learn more, please go to: pickeringrelay.com

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
- **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.

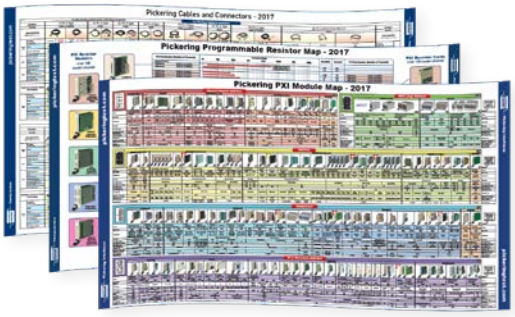
To learn more, please go to: pickeringtest.com/ebirst

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, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector solutions you need. We have also published handy reference books for the PXI and LXI standards.



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