PXI/PXIe 6 GHz Solid State Attenuators 41/43-182B

- Available as PXI or PXIe Modules
- 10 MHz To 6 GHz Programmable Attenuator
- 0 to 31.75 dB in 0.25 dB Steps For Fine Level Control
- Three or Six Channels Per Module
- Solid State Switching For Long Service Life
- Robust SMA Connectors
- VISA, IVI & Kernel Drivers Supplied for Windows
- PXI Versions Supported in PXI or LXI Chassis
- 3 Year Warranty

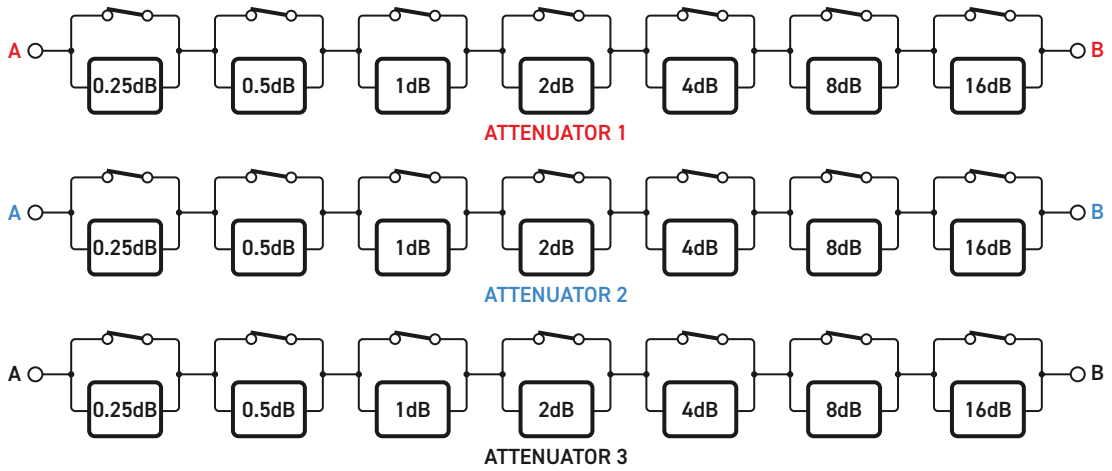
The 41-182B (PXI) and 43-182B (PXIe) are programmable RF attenuator modules with 3 (in one slot) or 6 (in two slots) channels each capable of inserting a signal loss of 0 to 31.75 dB in 0.25 dB steps. The attenuator uses solid state switches for a long service life and fast operation with minimum settling time and no bounce. DC blocking reduces the risk of damage by the accidental application of DC sources from amplifiers or other bias devices.

The 41/43-182B is ideal for conditioning signal levels in RF test systems to ensure equipment is used in its optimal range. Fast operating speed ensures minimal delays in setting up the required attenuation. Long service life independent of the number of operations allows RF test sequences to be arranged to optimize the life of other switching components in the system.

The attenuator channels can be connected in series to increase the attenuation range available and high isolation minimizes signal leakage.

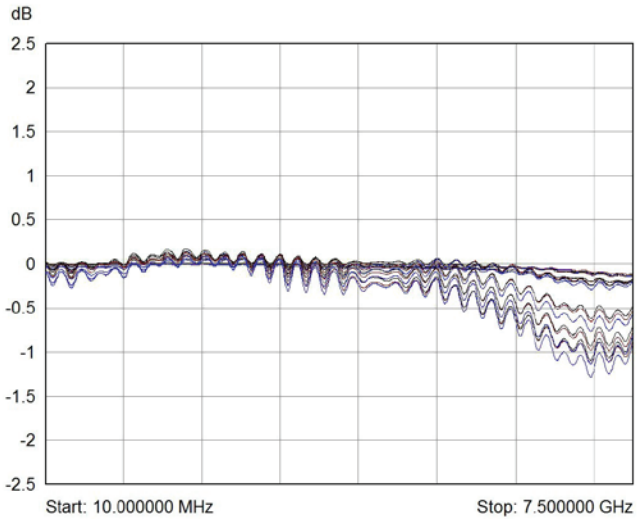
The attenuator can be used for back to back testing, providing the ability to condition the signal level between devices. It is also ideal for the conditioning of special to type signal sources which lack fine level control.

SMA connectors ensure that the attenuators can be used with standard cabling and the input and output ports are fully interchangeable.

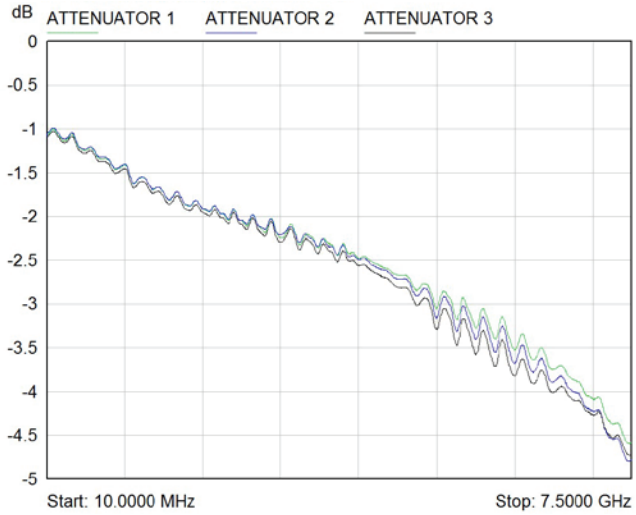


41/43-182B Triple 6 GHz Solid State Attenuator Functional Diagram
(Default Condition Shown - All Channels Set To 0 dB Attenuation)

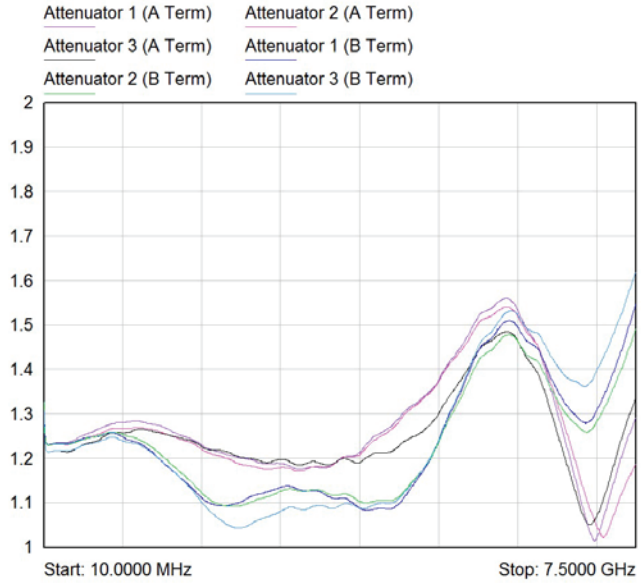
ISSUE 1.1 OCT 2022



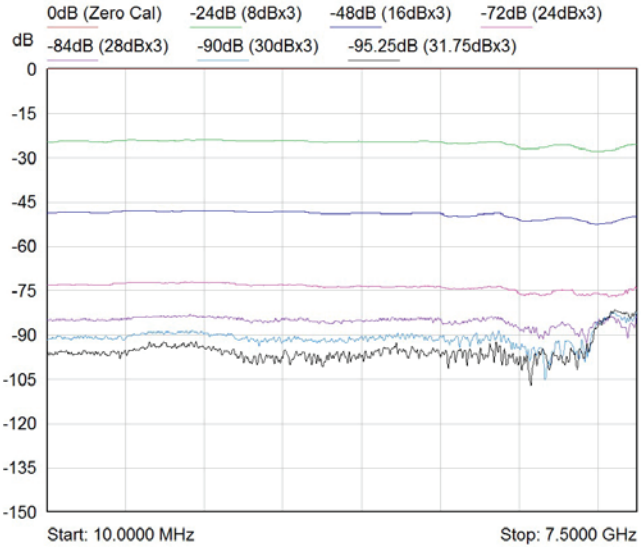
Insertion loss for every discrete attenuator setting for all channels of 41/43-182B-003 (normalized to 0 dB)



Insertion loss for 41/43-182B-003 with each attenuator channel set to 0 dB



VSWR for 41/43-182B-003 with all attenuator channels set to 0 dB



Attenuation values for 41/43-182B-003 with three attenuator channels in series (set to major step values)

General Specification

Frequency range:	10 MHz to 6 GHz, usable to 7 GHz
Maximum Input Power ≥48 MHz: 10 MHz to <48 MHz:	 +23 dBm CW +28 dBm Pulsed +19 dBm
Input Impedance:	50 Ω, AC coupled
VSWR at 0 dB:	<1.4:1 to 4 GHz <1.6:1 to 5 GHz <1.7:1 to 6 GHz
RF Connectors:	SMA
Number of Attenuation Channels:	3 or 6
Switch Lifetime:	Indefinite when used within range
Operating Time:	50 µs

Attenuation Characteristics

Each attenuator is made from 0.25 dB, 0.5 dB, 1 dB, 2 dB, 4 dB, 8 dB and 16 dB pads controlled by solid state switches to give an attenuation range of 0 to 31.75 dB relative to the straight thru path.	
Insertion Loss (0 dB set):	<1.5 dB @ 10 MHz, <2.5 dB @ 3 GHz, <4.0 dB @ 6 GHz
Monotonicity:	0.25 dB monotonic to 4 GHz, 0.5 dB monotonic to 5 GHz, 1 dB monotonic to 6 GHz
Usable attenuation range (3 in series):	84 dB to 6 GHz
Attenuator Change Characteristics:	Rise/fall time <10 µs, bounce and positive transient free.

Linearity

Two Tone Intermodulation:	+57 dBm @ 4 GHz +56 dBm @ 6 GHz (20 MHz tone separation, third order intercept point).
1dB Compression:	Typically +31dBm 48MHz to 6GHz (pulsed operation type test, not a usable user power).

Power Requirements - 41-182B

+3.3 V	+5 V	+12 V	-12 V
0.03 A	0.02 A	0	0

Power Requirements - 43-182B

+3.3 V	+12 V
0.03 A	0.01 A

Mechanical Characteristics

- 41-182B-003 - 1 slot 3U PXI (CompactPCI card)
- 41-182B-006 - 2 slot 3U PXI (CompactPCI card)
- 43-182B-003 - 1 slot 3U PXIe, compatible with PXIe hybrid slot
- 43-182B-006 - 2 slot 3U PXIe, compatible with PXIe hybrid slot

3D models for all versions in a variety of popular file formats are available on request.

Connectors

41-182B - PXI bus via 32-bit P1/J1 backplane connector.

43-182B - PXIe bus via XJ3 and XJ4 backplane connectors.

Signals via front panel SMA connectors.

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

PXI & CompactPCI Compliance - 41-182B

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 - 43-182B

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

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.

Ordering Information

Product Order Codes

PXI Triple 6 GHz Solid State Attenuator	41-182B-003
PXI Hex 6 GHz Solid State Attenuator	41-182B-006
PXIe Triple 6 GHz Solid State Attenuator	43-182B-003
PXIe Hex 6 GHz Solid State Attenuator	43-182B-006

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 connection accessories for the 41/43-182A 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.

43-182B-003 PXIe Triple 6 GHz Solid State Attenuator

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:

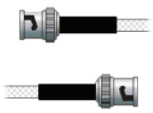
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating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

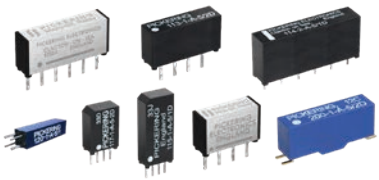
We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications. Visit: pickeringtest.com/cdt to start your design.

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



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

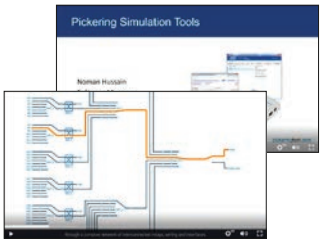
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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