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PXI MICROWAVE
PRESELECTOR MODULE

Model PXI-1410

Quick Start Guide

PXI-1410 CCN 12701
Manual Assy Part Number 5585111-01
Manual Text Part Number 5580111-01 Rev B

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> **CAUTION**

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

> **WARNING**

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Introducing the PXI-1410 Preselector Module

Congratulations on purchasing a
Phase Matrix PXI-1410 Preselector Module!

To get the most out of your purchase, it is recommended that this
Quick Start Guide be read carefully and completely.

In this document...

The scope of this document is to describe the installation process of the
stand-alone hardware and software for the PXI-1410 and to confirm
basic module operation.

This document describes information for the PXI-1410 when used in a
PXI system with an embedded controller or a PXI remote controller.

Step 1. Confirm Module Operating Requirements

Table 1   Module Operating Requirements When Used in a PXI System

Operating System

- Windows 7 (32- and 64-bit versions)
- Windows XP (32-bit version)
- LabVIEW Real-Time (Version 8.2.1 and later)

BIOS - computers manufactured prior to 2008 require *NI MXI-Express BIOS Compatibility Software*.

This BIOS software is available on the Internet at: <u>NI > Support > Drivers and Software > MXI-Express BIOS Compatibility Software - Windows 7 x86/XP</u>

RAM - minimum of 256 MB required by LabVIEW.

CD Drive - used to install PXI device driver software and Soft Front Panel from an optional CD

PXI device driver software and Soft Front Panel are available from an optional CD or from the Phase Matrix web site at: <u>www.phasematrix.com</u>

Screen Resolution - at least 1024 × 768 pixels, recommended.

Adobe Reader - 6.0.1 or later to view or search PDF versions of manuals.

Interface/Controller - select either an embedded controller or a PXI remote controller.

Embedded Controller

NI PXI-8106 2.16 GHz Dual-Core PXI Embedded Controller or NI PXIe-8106 2.16 GHz Dual-Core PXI Express Embedded Controller or equivalent embedded controller running Windows 7/XP

PXI Remote Controller

NI PXI-CardBus8310 Laptop Control of PXI with PCMCIA CardBus or NI PXIe-ExpressCard8360 Laptop Control of PXI Express with ExpressCard or equivalent PXI remote controller running Windows 7/XP

| NOTE | LabVIEW does not support Windows NT/Me/98/95, any of the Windows Server editions, or Windows XP x64. |

LabVIEW does support Windows 7 (64-bit version).

LabVIEW or the LabVIEW Run-Time Engine does support Windows 2000 with Service Pack 3 or later.

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Step 2. Perform Hardware Installation/Configuration

CAUTION

PXI hardware does not support "hot-swap" capabilities!

Before installing the PXI-1410 Preselector Module, the PXI chassis must be powered off and unplugged to prevent damage to PXI modules.

3 The PXI-1410 can be installed in any standard-PXI slot marked with a peripheral slot compatibility image (a circle containing the slot number).

H
7 The PXI-1410 can also be installed in any hybrid-PXI slot marked with a peripheral slot compatibility image (the letter "H" and a solid circle containing the slot number).

Do not install the PXI-1410 into a slot for PXI Express (PXIe) modules.

NOTE

A PXI-1410 can be used in either a PXI or PXIe chassis, with either a PXI or PXIe interface/controller, but the PXI-1410 must only be installed into a standard-PXI slot or a hybrid-PXI slot.

Step 2-1. Unpack Hardware

Each PXI-1410 ships in an antistatic package to prevent damage from electrostatic discharge (ESD). Because ESD can damage several components of a hardware module, store all modules in antistatic envelopes when not in use.
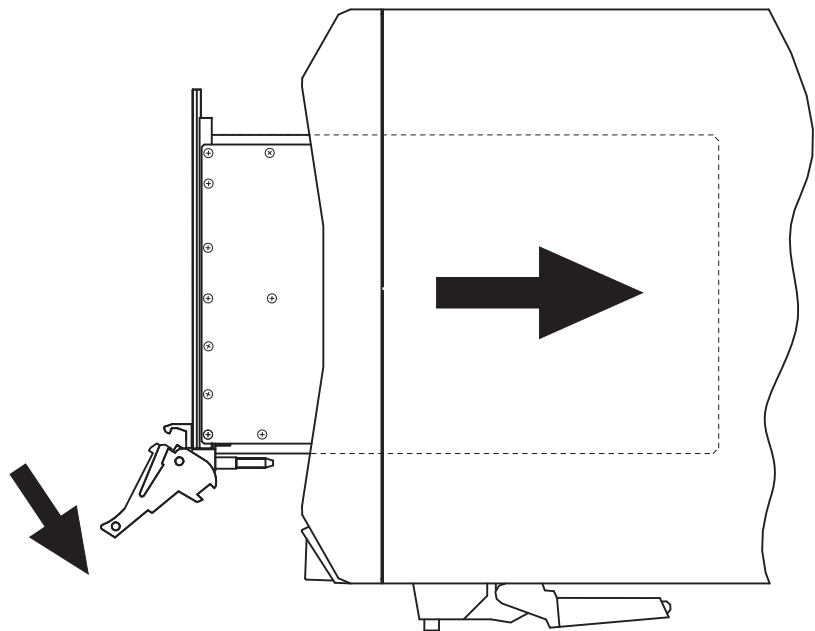
CAUTION

- To avoid damage when handling a module, do not touch exposed connector pins.
- Before touching or handling a module, use a grounding strap or touch a grounded object to ground yourself.
- Before touching or removing a module from its package, touch the antistatic package to a metal part of your computer chassis.
- Remove each module from its package and inspect it for loose components or any signs of damage. Notify Phase Matrix if any module appears damaged in any way.
- Do not install damaged modules into a system.

Unpack the contents of the box and verify that everything is included:

- PXI-1410 Preselector Module

- Optional CD (included if specifically ordered; otherwise PXI device driver software and Soft Front Panels are available from the Phase Matrix web site at: www.phasematrix.com).

Step 2-2. Install PXI Modules into a PXI Chassis

Figure 1   Install PXI Modules into a PXI Chassis

Phase Matrix PXI modules are sensitive instruments that should be handled carefully. Do not expose modules to temperatures or humidity beyond their rated maximums.

CAUTION

- For information about the rated maximums, refer to each module's specifications document available at: www.phasematrix.com

- Keep the module free of dust by cleaning only with compressed air.

- Do not clean the module with any solvents or liquids.

- To prevent damage to the module caused by ESD or contamination, handle the module using the edges or the metal bracket.

1   Assure that the power switch is in the Off (Standby) position and unplug the PXI chassis.

2   If the chassis has multiple fan speed settings, ensure that the fans are set to automatic. Do not set the fan speed to low or turn it off.

3   Position the chassis so that there is ample space between the chassis fan intake and exhaust vents. Blockage by walls or obstructions affects the air flow needed for cooling. (Refer to the chassis documentation for more information about cooling.)

4   Holding the PXI-1410 by the injector/ejector handle, slide it into an available PXI (or hybrid) slot, as shown in Figure 1.

   a   Install the PXI-1410 into the PXI (or hybrid) slot of the chassis by placing the module card edges into the front module guides (top and bottom).

   b   Slide the PXI-1410 to the rear of the chassis and assure that the injector/ejector handle is pushed down in the unlatched (downward) position.

   c   Slide the module completely into the chassis. When you begin to feel resistance, push up on the injector/ejector handle to fully inject the module into the chassis frame.

5   Latch the PXI-1410 by pulling up on the injector/ejector handle and secure the module front panel to the chassis using the module front-panel mounting screws.

6   Tighten the screws on the PXI-1410 front panel. Performance may suffer if the screws are not tightened properly.

7   Verify that the PXI chassis fans are operable and free of dust and other contaminants that may restrict airflow.

8   Install all chassis covers and filler panels after installing the PXI-1410. Missing filler panels disrupt necessary air circulation in the chassis.

NOTE	Phase Matrix recommends installing slot blockers in adjacent vacant PXI slots to maximize cooling air flow to the PXI modules.

A PXI Chassis Slot Blocker Kit (National Instruments part number 778678-01) is available for purchase at www.ni.com.

9   Plug-in and power-on the PXI chassis.

Step 2-3. Connect to the Host Computer and Power Source

Embedded Controller

1 Connect the keyboard, mouse, monitor and any other external devices to the PXI embedded controller.

2 Connect the chassis' AC or DC inlet to the power source using an appropriate power cable.

3 When the power switch is in the ON position, observe that fans become operational.

4 If the power outlet does not have an appropriate ground connection, connect the premise safety ground to the chassis grounding screw. Refer to the chassis' user manual at ni.com/manual for instructions.

PXI Remote Controller

PXI systems can be controlled from a PC or laptop computer through a software transparent link using National Instruments' PXI Remote Controllers.

- PC control of PXI consists of a PCI/PCI Express board in the computer and a PXI/PXI Express module in slot 1 of the PXI system, connected by a copper or fiber-optic cable.

- Laptop computer control of PXI consists of an ExpressCard/PCMCIA CardBus card in the laptop and a PXI/PXI Express module in slot 1 of the PXI system, connected by a copper cable.

1 Install the PCI/PCI Express board in a PC or insert the ExpressCard/PCMCIA CardBus card in a laptop computer.

2 Connect the chassis' AC or DC inlet to the power source using an appropriate power cable.

3 When the power switch is in the ON position, observe that fans become operational.

4 If the power outlet does not have an appropriate ground connection, connect the premise safety ground to the chassis grounding screw. Refer to the chassis' user manual at ni.com/manual for instructions.

(Step 2-4. Optional) Uninstall PXI Modules

Before uninstalling PXI modules, power off the PXI chassis!

When removing PXI modules from a chassis, ensure that you are grounded with a grounding strap or are touching a grounded metal surface. To avoid ESD, do not touch the exposed connector pins or any exposed circuitry on the device. When not in use, PXI modules should be stored in the original antistatic envelope to avoid damage.

Step 3. Perform Software Installation/Configuration

Complete the following steps to install the PXI device driver software and Soft Front Panel available from an optional CD or from the Phase Matrix web site at: www.phasematrix.com

| NOTE | Any application development environment (ADE) that is to be used (such as LabVIEW, LabWindows/CVI, or a third-party program) must be installed prior to installing the PXI device driver software or its Soft Front Panel. |

Embedded Controller

1 Install the PXI device driver from an optional CD or from the Phase Matrix web site.
See "Step 3-1. Installing the PXI Device Driver" on page 10.

2 Install the Soft Front Panel from an optional CD or from the Phase Matrix web site.
See "Step 3-2. Installing the Soft Front Panel" on page 13.

PXI Remote Controller

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- Laptop computer control of PXI consists of an ExpressCard/PCMCIA CardBus card in the laptop and a PXI/PXI Express module in slot 1 of the PXI system, connected by a copper cable.

1 If the PXI remote controller (PC or laptop computer) being used is a Windows based operating system and was manufactured prior to 2008, install *NI MXI-Express BIOS Compatibility Software*:
NI MXI-Express BIOS Compatibility Software

2 Install the *NI PXI Platform Services Software* that accompanies the PXI remote controller: NI PXI Platform Services Software

3 Install the PXI device driver from an optional CD or from the Phase Matrix web site.
See "Step 3-1. Installing the PXI Device Driver" on page 10.

4 Install the Soft Front Panel from an optional CD or from the Phase Matrix web site.
See "Step 3-2. Installing the Soft Front Panel" on page 13.

5 Connect the PXI remote controller, using the manufacture's provided cable, to the expansion card in the PXI remote controller.

6 Reboot the PXI remote controller.

Step 3-1. Installing the PXI Device Driver

This procedure is used to install the PXI-1410's device driver using the "Found New Hardware Wizard" on an embedded controller or a PXI remote controller running Windows 7/XP.

NOTE	If the embedded controller or the PXI remote controller being used has previously had a device driver of the same type installed, it must be removed before installing a new PXI-1410 device driver.

Refer to "(Step 3-3. Optional) Uninstalling the PXI Device Driver" on page 17 for further details.

NOTE	Any application development environment (ADE) that is to be used (such as LabVIEW, LabWindows/CVI, or a third-party program) must be installed prior to installing the PXI device driver software or its Soft Front Panel.

NOTE	The following procedure is shown for systems running Windows 7 and may vary slightly for systems running Windows XP

NOTE	Anti-virus software may prevent the PXI device driver installer from executing.

1   Install PXI device drivers using one of the following methods:

   •   Insert an optional CD containing the device driver.

   •   Download the latest available PXI device driver from the Phase Matrix web site and unzip it to a location on the embedded controller or the PXI remote controller.

       Device drivers are available at: www.phasematrix.com

CAUTION	PXI hardware does not support "hot-swap" capabilities!

Before installing the PXI-1410 Preselector Module, the PXI chassis must be powered off and unplugged to prevent damage to PXI modules.

2 Install PXI modules into the PXI chassis and turn on power.

3 Launch the PXI-14XX Series Device Driver Installer, "PXI-14XX Driver (32 bit).exe" or "PXI-14XX Driver (64 bit).exe."
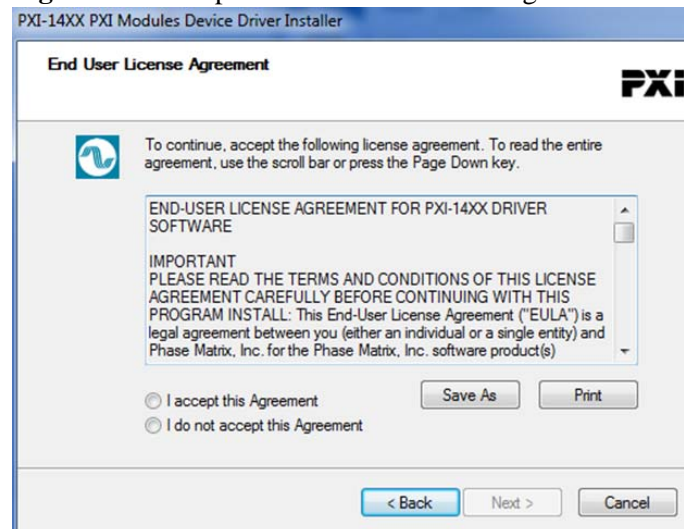
The PXI-14XX Series Device Driver Installer will open with a welcome window like the one shown in Figure 2.

Figure 2 Example Welcome Window.

**4** Select **Next** to continue.

Figure 3 Example of Software License Agreement

5 Carfully read through the End User License Agreement (EULA).

- If you accept the terms of the EULA, select "I accept this Agreement" and select **Next** to continue.

- If you do not accept the agreement, you will not be able to install the software.
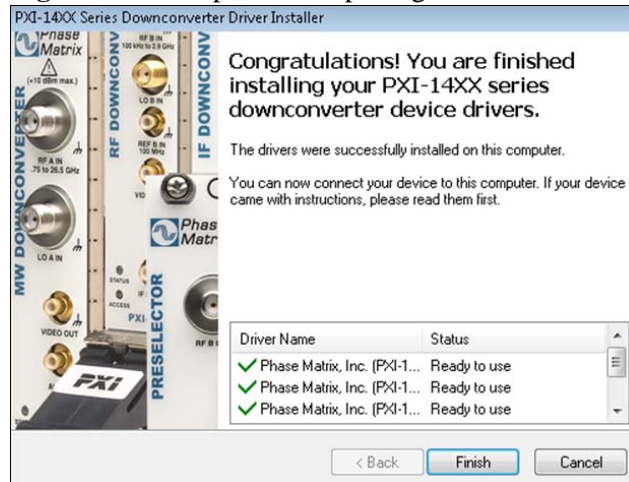
6 Select **Next** to continue.

Figure 4   Example of Windows Security Window
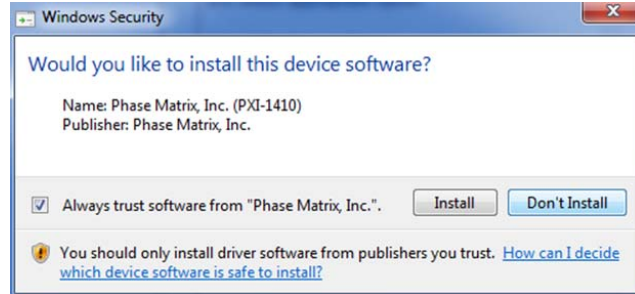
A Windows security window similar to the one shown shown in
Figure 4 will appear.

7 Select **Install** to continue.

Figure 5   Example of Completing the Installer

Windows should display a message indicating that the installation was
successful.

8 Select **Finish** to complete the device driver installation.

Step 3-2. Installing the Soft Front Panel

This procedure is used to install the PXI-1410's soft front panel graphical user interface on an embedded controller or a PXI remote controller running Windows 7/XP.

| NOTE | The device driver software must be installed before this Soft Front Panel can be used to control the PXI-1410. |

Refer to "Step 3-1. Installing the PXI Device Driver" on page 10 for further details.

| NOTE | Any application development environment (ADE) that is to be used (such as LabVIEW, LabWindows/CVI, or a third-party program) must be installed prior to installing the PXI device driver software or its Soft Front Panel. |

| NOTE | The following procedure is shown for systems running Windows XP and may vary slightly for systems running Windows Vista. |

1 Install the Soft Front Panel using one of the following methods:

- Insert the optional CD containing the Soft Front Panel.

- Download the latest available Soft Front Panel from the Phase Matrix web site and unzip it to a location on the embedded controller or the PXI remote controller.

  Soft Front Panels are available at: www.phasematrix.com

2 Start the installation process by selecting **Start** > **Run** > **Browse**, navigate to the "setup.exe" file and select **Open** to start the installation wizard.

After a small delay, a screen similar to Figure 6 is displayed. The actual screen that appears will have the label of the module Soft Front Panel being installed, so instead of "PXI-14XX," the label is displayed as either "PXI-1410," "PXI-1420," "PXI-1430B," "PXI-1440B," or "PXI-1450B."

Figure 6   Example of Starting the Soft Front Panel Installation Wizard
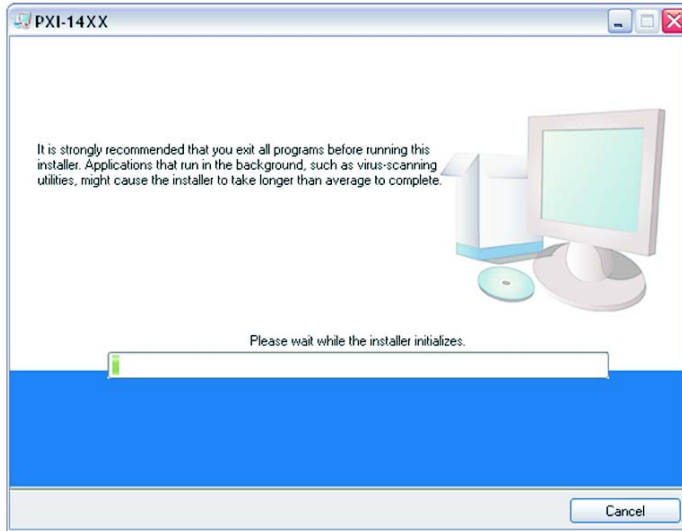

**3**   Continue to the next screen.

Figure 7   Example of Selecting Destination Directory for Executables
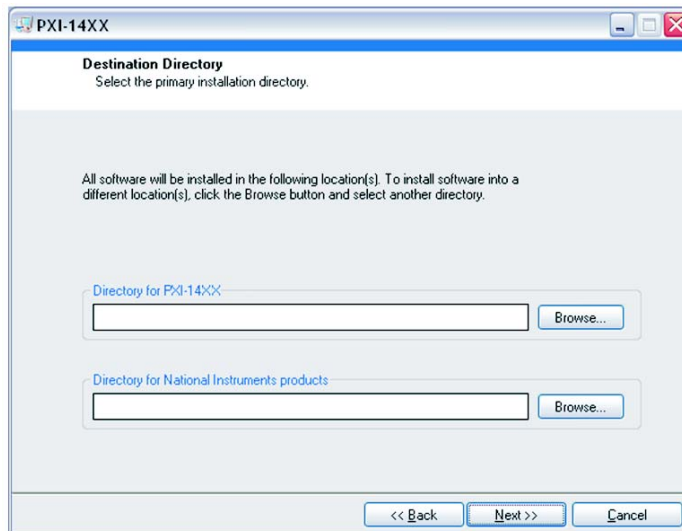
4   Enter the destination directory for the PXI-1410's Soft Front Panel executables or browse to a destination directory by selecting the **Browse** button.

5   Once the file path has been entered, select **Next** to continue to the Software License Agreement.

Figure 8   Example Software License Agreement
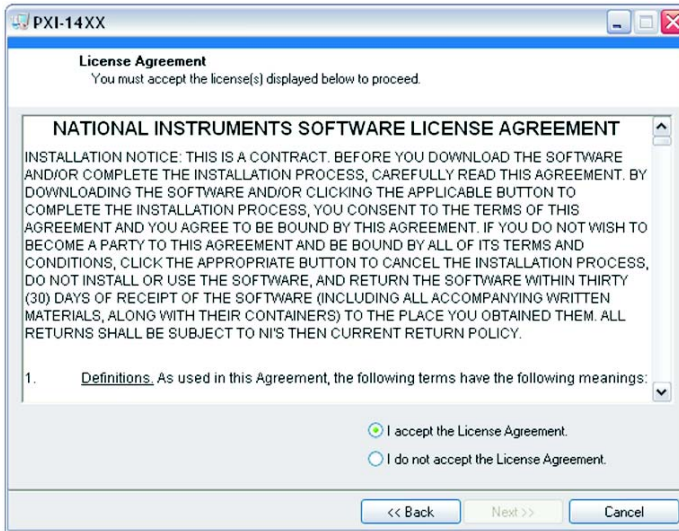
6 Carefully read through the Software License Agreement.

- If you agree to the terms of the software license agreement, select "I accept the License Agreement" and select **Next** to continue.

- If you do not agree, you will not be able to install the software.

Figure 9   Example Summary of Files Being Installed
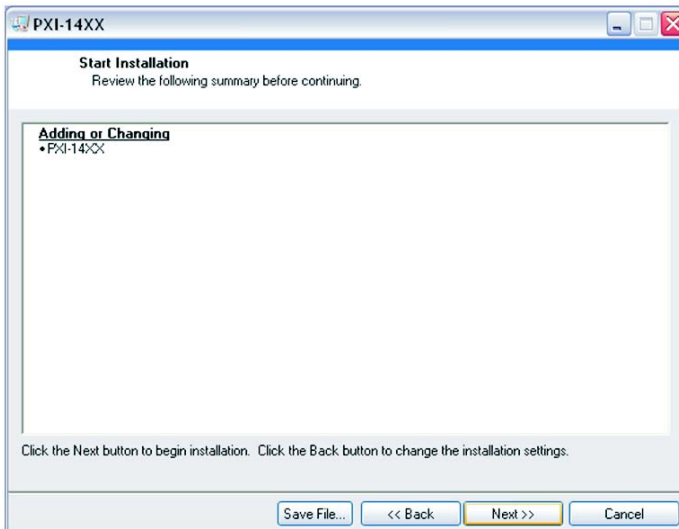
7 Review the list of files to be installed and select **Next** to begin the installation.

Figure 10 Example of Completing Soft Front Panel Installation Wizard
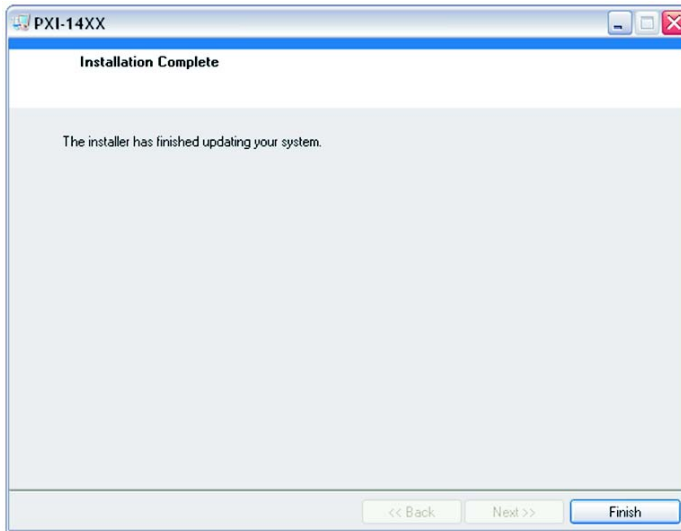
8   Select **Finish** to complete the Soft Front Panel installation.

(Step 3-3. Optional) Uninstalling the PXI Device Driver

This procedure is used to uninstall previous versions of the PXI-1410 device driver from an embedded controller or a PXI remote controller running Windows 7/XP.

NOTE
- If this is the first time that a PXI-1410 device driver is being installed, this procedure is optional and can be skipped.
- If the embedded controller or the PXI remote controller has previously had a device driver of the same type installed, it must be removed before installing a new PXI-1410 device driver.

NOTE
The following procedure is shown for systems running Windows XP and may vary slightly for systems running Windows Vista.

Figure 11 Example of Device PX14XX Under "NI-VISA PXI Devices"
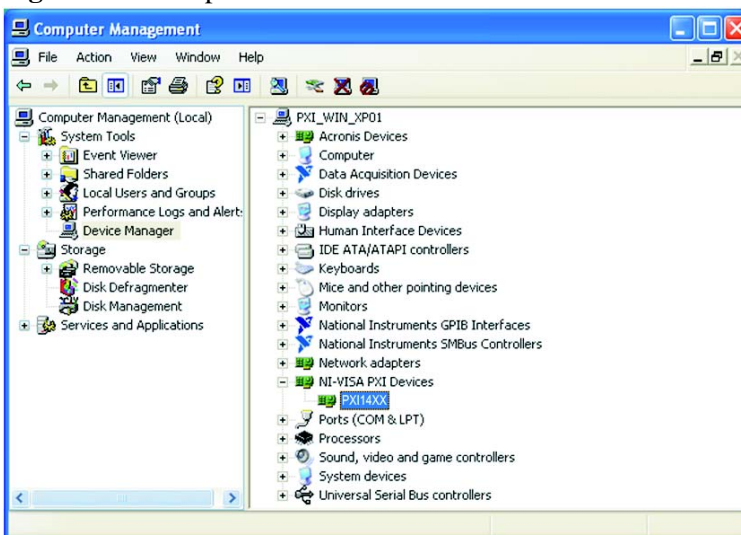
1 Open the Device Manager by selecting **Start** > **Control Panel** > **Performance and Maintenance** > **System**.

2 Select the **Hardware** tab and select **Device Manger**.

3 Select the **View** pull-down menu.

4 Select **Devices by connection** and the device should appear under "NI-VISA PXI Devices" with the label as "PM14XX."[*]

* PM14XX will actually display as PXI-1410 Preselector Module.

5 To uninstall the device driver for a selected module, right-click on the selected device and a popup menu is displayed with five selectable choices.

6 Select **Uninstall** and a popup window is displayed with a conformation to continue with the uninstall process.

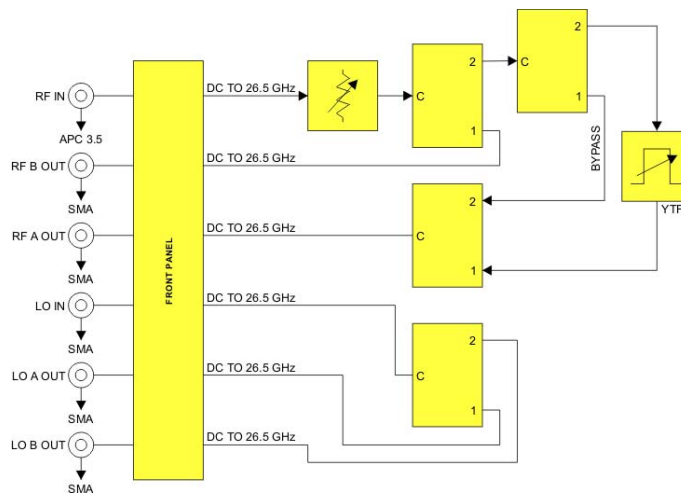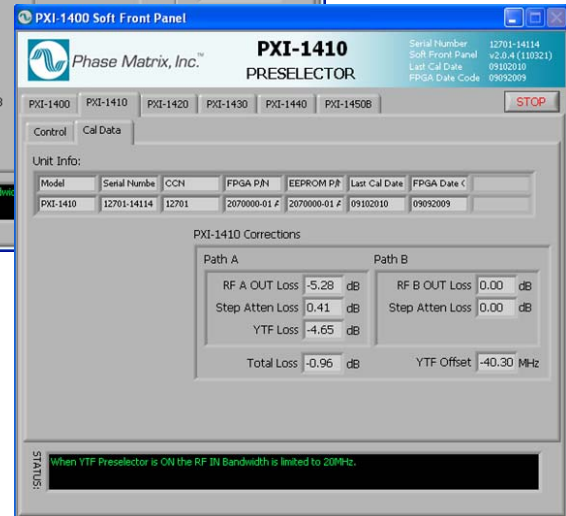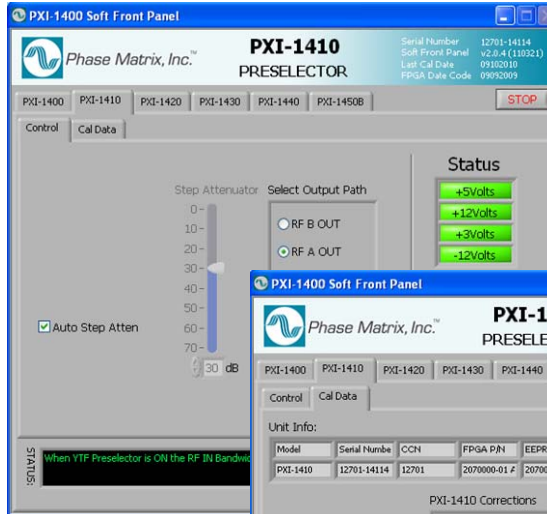**Figure 12** Example of Confirming Device Driver Removal

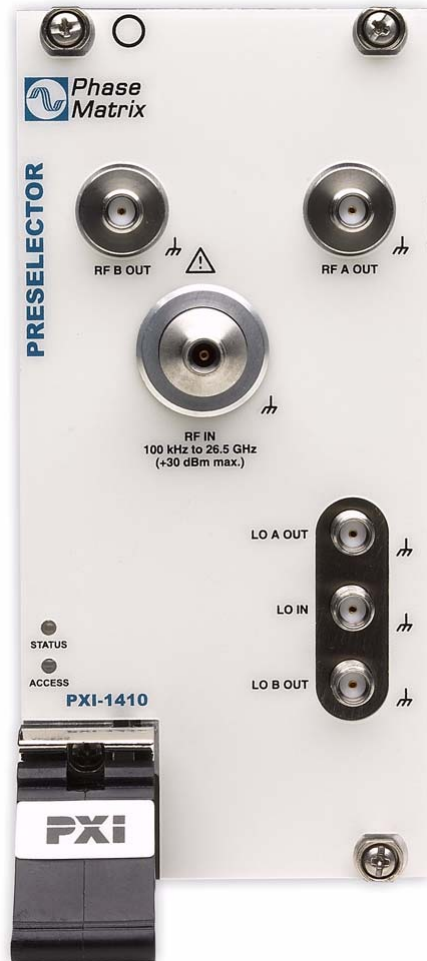**7** Select **OK** to confirm the prompt and uninstall the device driver.

Step 4. Review Hardware and Software Front Panels

Hardware Front Panel

Figure 13 Hardware Front Panel of the
PXI-1410 Preselector Module

	The maximum power input to the RF input connector (RF IN 100 kHz to 26.5 GHz)
CAUTION	must not exceed +30 dBm!

STATUS LED   This LED indicates the overall health of the PXI-1410. This includes the power supplies and other hardware.

The PXI-1410 has extensive built-in-test (BIT). Additional insight can be learned by reading the status section of the Soft Front Panel.

The STATUS LED can have four possible conditions:

- **Green** indicates that all power supplies are functioning within their tolerances and all hardware is functioning.

- **Amber** indicates that all power supplies are functioning within their tolerances, but there is other hardware failures.

- **Red** indicates a failure in the power supplies and module hardware. This can be a catastrophic failure.

- **Off** indicates a failure in the power supplies, but module hardware seems to be functioning. Module hardware functioning indication can be erroneous in this mode since this circuitry can be compromised by a power supply failure.

ACCESS LED   This Solid AMBER LED blinks to indicate each time the module is written to or read from.

NOTE   All output/input ports are rated from DC to 26.5 GHz. The frequency ranges indicated reflect use in a Phase Matrix downconverter application.

RF IN   APC 3.5 (f) connector is used to supply an input signal of 100 kHz to 26.5 GHz. This input signal can be optionally attenuated and directed to either the RF B OUT connector or the RF A OUT connector.

RF B OUT   SMA (f) connector is used to supply the output signal of 100 kHz to 2.9 GHz for the RF B IN connector of the PXI-1430 RF Downconverter Module.

RF A OUT   SMA (f) connector is used to supply the output signal of 2.75 GHz to 26.5 GHz for the RF A IN connector of the PXI-1420 MW Downconverter Module.

LO IN   SMA (f) connector is used to deliver the LO signal from the PXI-1450 Local Oscillator Module, into the front panel of the PXI-1410 Preselector Module. This LO signal is distributed to the LO A OUT and LO B OUT connectors.
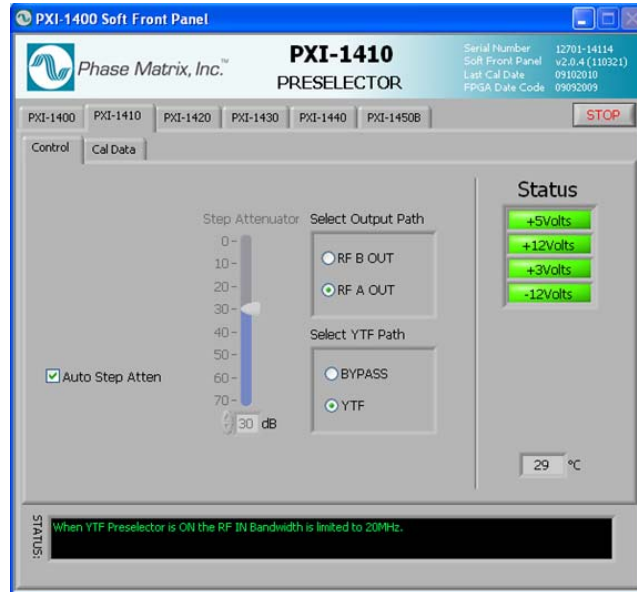
LO A OUT   SMB (f) connector is used to deliver the LO signal from the PXI-1450 Local Oscillator Module to the PXI-1420 MW Downconverter Module.

LO B OUT   SMB (f) connector is used to deliver the LO signal from the PXI-1450 Local Oscillator Module to the PXI-1430 RF Downconverter Module.

Soft Front Panel

Control Tab

Figure 14 Control Tab

Serial Number, Soft Front Panel, Last Cal Date, and FPGA Date Code shown in the top-right corner of the Soft Front Panel is information about the PXI module that is being controlled by this Soft Front Panel. This information cannot be changed through the Soft Front Panel.

Stop Button This button is used to stop the Soft Front Panel from reading and writing to the PXI module; it halts the program and is the preferred way to exit the program.

Auto Step Atten This check box is used to enable/disable the coupling between the RF IN Power control and the Step Attenuator control.

- When the Auto Step Atten check box is enabled (checked), the Step Attenuator value is selected automatically and its value is based on the power level set with the RF IN Power entry box.

- When the Auto Step Atten check box is disabled (unchecked), the PXI-1410 is placed in manual step attenuator mode which allows the two controls (RF IN Power and Step Attenuator) to be changed to values independent of each other.

Step Attenuator (dB)   This control is only available when the Auto Step Atten check box is disabled (unchecked).

The Step Attenuator slider control (along with an entry box) is used to select the level of step attenuation and may be changed by pointing to the slider control and dragging it up or down to select different levels of step attenuation; the corresponding selected value of step attenuation is displayed in the entry box below the slider control.

The step attenuator entry box value may be changed by highlighting the numbers and entering the change or by using the up/down buttons to the left of the entry box. Values can be entered from 0 dB to 70 dB in 10 dB steps.

Select Output Path   The RF B OUT and RF A OUT selection buttons are used to control the signal paths for both RF IN and LO IN:

- When RF B OUT is selected, the signal at RF IN is directed to the RF B OUT connector, and the LO signal at LO IN is directed to the LO B OUT connector.

- When RF A OUT is selected, the signal at RF IN is directed to the RF A OUT connector, and the LO signal at LO IN is directed to the LO A OUT connector.

Select YTF Path   These selection buttons are used to route the input signal through the Yig Tuned Filter (YTF) or bypass the YTF.
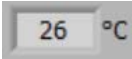
- When BYPASS is selected, the signal from RF IN (0 Hz to 26,500 MHz) is bypassed around the YTF and the YTF is tuned to the low frequency limit in order to conserve power.

- When YTF is selected, the signal from RF IN (2,750 MHz to 26,500 MHz) is routed through the YTF.

Apply YTF Correction   This check box is only available when the "Select YTF Path" control is set to YTF. This check box is used to automatically apply the frequency correction shown for YTF Offset on the Cal Data tab; this correction value is stored in the hardware.

- When the Apply YTF Correction check box is enabled (checked), a frequency correction is automatically applied to the value entered in the RF IN Frequency to improve YTF tracking.

- When the Apply YTF Correction check box is disabled (unchecked), the value entered in the RF IN Frequency entry box is directly written (uncorrected) to the YTF.

Status　The Status LEDs described in Table 2 display green when the module is functioning properly. A red LED indicated the module is not communicating with the PXI bus.

Table 2　Soft Front Panel, Status LEDs

Indicator	Description
+5Volts	+5 V power supply displays green when functioning and is within tolerance.
+12Volts	+12 V power supply displays green when functioning and is within tolerance.
+3Volts	+3 V power supply displays green when functioning and is within tolerance.
-12Volts	-12 V power supply displays green when functioning and is within tolerance.
26 °C	This number indicates the internal real-time ambient temperature of the module in degrees Celsius.

Status Indicator　The Status Indicator displays messages related to system configuration. Messages may be errors or warnings.

Cal Data Tab

Figure 15 Cal Data Tab
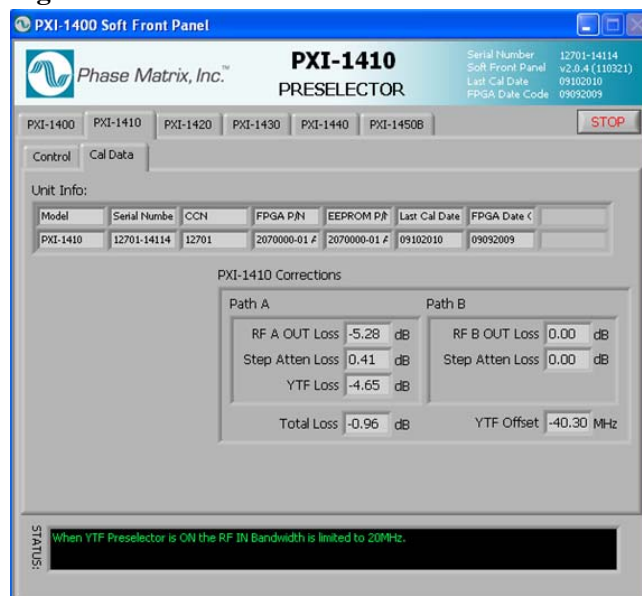
The Cal Data tab displays data that is stored in the module hardware. This data is loaded at the factory during initialization and calibration.

The upper portion of this tab displays unit information such as model number, serial number, configuration-control number, FPGA part number, EEPROM part number, and last calibration date.

The bottom portion of this tab displays correction values from the on-board memory of the unit for Path A and Path B. Although data values can be viewed from this tab, the Soft Front Panel cannot be used to modify or overwrite the data values. These stored data values are normally utilized by the driver in real-time correction applications.

Unit Info:

Each PXI module is identified by three sets of numbers:
the model number, serial number (S/N), and a configuration-control
number (CCN). See "PXI Module Identification" on page 34 for an
example.

Model   displays the model along with any special configuration
identifiers. These model and special configuration identifiers are
assigned by the factory.

Serial Number   displays the serial number that has been assigned
by the factory.

CCN   displays the configuration control number that has been
assigned by the factory.

As Phase Matrix, Inc. continually improves and updates its products,
changes to materials occur. When a part or assembly in a Phase Matrix
instrument is changed to the extent that it is no longer interchangeable
with an earlier part, the configuration control number (CCN) of the
instrument is changed.

FPGA P/N   displays the Phase Matrix part number associated with
the Field Programmable Gate Array (FPGA). This FPGA controls all of
the I/O functions of the PXI module.

EEPROM P/N   displays the Phase Matrix part number associated
with the Electrically Erasable Programmable Read Only Memory
(EEPROM). This EEPROM controls the PXI related configuration such
as the manufacture ID, etc.

Last Cal Date   displays the date that the last calibration was run
and that the calibration file was created.

FPGA Date   Displays the applicable FPGA version date.

PXI-1410 Corrections

The following corrections would need to be applied to adjust the signal level loss that occurs through the RF path for a particular frequency and power level. Using this Soft Front Panel, the user can only change the RF IN Frequency or RF IN Power and view calibration data associated with that frequency and power level. This Soft Front Panel cannot be used to compensate for the actual loss; it is only used to view the values that would correct for any such losses.

RF A/B OUT Loss   represents the correction value that needs to be set for a particular RF IN frequency that follows either Path A or Path B.

Step Atten Loss   represents the correction value that needs to be set to correct for losses in the step attenuator that are not already included in either Path A or Path B corrections.

YTF Loss   represents the correction value that needs to be set to correct for losses in the YTF.

Total Loss   represents the total correction value that needs to be set to correct for losses in Path A or Path B. These correction values cannot be set from the Control tab or this Cal Data tab; it can only be mathematically applied externally.

The values displayed here (RF A OUT Loss, Step Atten Loss, and YTF Loss) can be used to compensate for the actual losses that occur for a given RF IN Frequency and power that uses Path A.

The values displayed here (RF B OUT Loss and Step Atten Loss) can be used to compensate for the actual losses that occur for a given RF IN Frequency and power that uses Path B.

YTF Offset   represents the correction value that needs to be set to correct the YTF center frequency.

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Step 5. Confirm Basic Module Operation

Purpose of Confirmation

The purpose of this process is to confirm the basic module operation of the PXI-1410.

Confirmation Requirements

The PXI-1410 is confirmed by checking the signal paths from RF IN to RF A OUT and RF B OUT as well as LO IN to LO A OUT and LO B OUT. This process confirms that all connectors, switches, cables, and related circuitry used in these signal paths are functional.

Equipment Requirements

Figure 16 shows a block diagram of the equipment setup with the type of equipment (or equivalent performance) required to confirm basic module operation.

Table 3   Equipment Requirements to Confirm Basic Module Operation

Qty	Equipment	Description
1	Agilent 83650A	Signal Generator, 26.5 GHz
1	Agilent E4418B	Power Meter
1	Agilent E4413A	Power Sensor
1	Agilent 11730A	Power Sensor Cable
1	NI PXIe-1065	PXI chassis
1	NI PXI-8106	PXI Embedded Controller with Windows 7/XP
1		Display

Equipment Settings

Signal Generator		
	CW	Frequency of Interest
	Modulation	OFF
	Level	0 dBm

Power Meters		
	Calibrated	
	Zeroed	
	Frequency Correction OFF (50 MHz)	
	Offset OFF	(0)
	Auto Range	

PXI-1410 Preselector Module	
	Refer to the "RF IN to RF A OUT Check" on page 31.

Equipment Setup to Confirm Basic Module Operation

Figure 16 Equipment Setup to Confirm Basic Module Operation
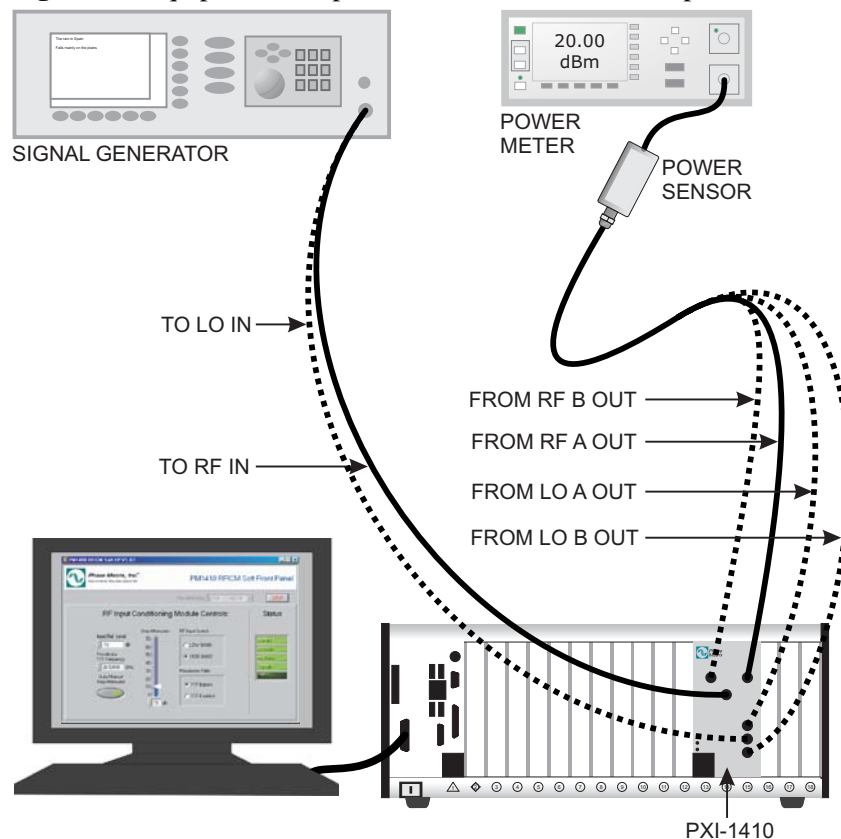
RF IN to RF A OUT Check

1 Connect the equipment as shown in Figure 16.

2 Set the Signal Generator output to 0 dBm.

3 Using the Soft Front Panel of the PXI-1410 Preselector Module:

- Set the Output Path to RF A OUT.
- Set the Preselector Path to Bypass.
- Set the Step Attenuator to 0 dB.

4 Connect the Power Meter to RF A OUT.

5 Set the Signal Generator to 10 GHz and 0 dBm.

6 Verify that the RF signal is present at RF A OUT using the Power Meter.

7 Repeat the above steps as desired up to 26 GHz.

Insertion Loss should be < 10 dB.

RF IN to RF B OUT Check

1   Using the Soft Front Panel of the PXI-1410 Preselector Module:

   • Set the Output Path to RF B OUT.

   • Set the Preselector Path to Bypass.

   • Set the Step Attenuator to 0 dB.

2   Connect the Power Meter to RF B OUT.

3   Set the Signal Generator to 1 GHz and 0 dBm.

4   Verify that the RF signal is present at RF B OUT using the Power Meter.

5   Repeat the above steps as desired up to 2.9 GHz.

   Insertion Loss should be < 5 dB.

LO IN to LO A OUT Check

1   Using the Soft Front Panel of the PXI-1410 Preselector Module:

   • Set the Output Path to RF A OUT.

2   Connect the Signal Generator to LO IN.

3   Connect the Power Meter to LO A OUT.

4   Set the Signal Generator to 6 GHz and 0 dBm.

5   Verify that the RF signal is present at LO A OUT using the Power Meter.

6   Repeat the above steps as desired up to 10 GHz.

   Insertion Loss should be < 4 dB.

LO IN to LO B OUT Check

1   Using the Soft Front Panel of the PXI-1410 Preselector Module:

   • Set the Output Path to RF B OUT.

2   Connect the Power Meter to LO B OUT.

3   Set the Signal Generator to 6 GHz and 0 dBm.

4   Verify that the RF signal is present at LO B OUT using the Power Meter.

5   Repeat the above steps as desired up to 10 GHz.

   Insertion Loss should be < 4 dB.

SMA Connector Care

Follow these recommendations to ensure the PXI module's SMA connectors remain stable and provide optimal conductivity.

Connecting SMAs

Always inspect connectors for crooked or bent pins and other visible damage. Also, check to ensure that connectors are clean before attaching mating connectors.

To attach mating connector, align both connectors and lightly tighten nut by hand. Do not over tighten connection. Use an 8 inch-pound torque wrench to complete the connection.

Cleaning SMAs

Keep connectors clean. Use compressed air to remove debris of any type. After applying compressed air, use isopropyl alcohol on a cotton swab to wipe the connector's cavity, and use a dry cotton swab to absorb remaining alcohol. Never use abrasives to clean connectors.

Storing PXI units that have SMAs

Place a protective cap on connectors when not in use. Never set a PXI module connector-side down or forcibly next to another object such that the connectors contact the object.

If a Problem Occurs

If a problem occurs, perform the following checks before returning a PXI module for repair:

1   Check that all system components are powered on.
   - PXI mainframe
   - PXI-1410 Preselector Module
   - Signal Generator
   - Power Meters

2   Check that the PXI-1410 paths are correctly set from the Soft Front Panel, the Signal Generator is set to the proper frequency/power, and that all cable connections are properly made. (Refer to Figure 16 and the RF IN/OUT and LO IN/OUT checks.)

3   Check that the STATUS LED is Green. (Refer to page 21.)

4   Check that the ACCESS LED switches each time that a path is selected. (Refer to page 21.)

5   Contact Phase Matrix Customer Support for additional help.

Service Information

Periodic Maintenance

No periodic preventive maintenance is required. There are no hardware adjustments within the PXI-1410.

Phase Matrix recommends the PXI module be calibrated every 12 months from the time the module is initially powered on. The specific calibration interval depends on the accuracy required by the end user's application. Accuracy of the module is not affected by non-operation when the module is properly stored in its original packaging or equivalent.

PXI Module Identification

Each PXI module is identified by three sets of numbers: the model number (PXI-1450 is shown in this example), a configuration-control number (CCN), and a serial number (S/N).

These numbers are located on a label affixed to the frame on the side of the PXI-1410 (some units may have separate CCN and serial-number labels). The model number, CCN, serial number, and the numbers of any options must be included in correspondence regarding your PXI module. A typical serial-number label is shown in Figure 16.

Figure 16 Example of a Label Affixed to the Side of the PXI Module

```
MODEL: PXI-1450        ◄——— Model Number
    CCN: 13101         ◄——— Configuration Control Number
     S/N: 13101-14106  ◄——— Serial Number
```
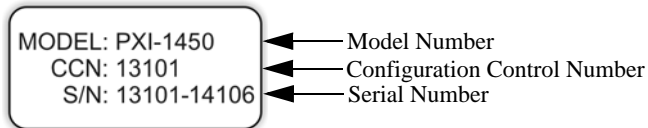
Factory Service

If you are returning a PXI module to Phase Matrix for service or repair, be sure to include the following information with the shipment:

• Name and address of owner.

• Model, complete serial number, and CCN of the PXI module.

• A complete description of the problem. Be sure to provide enough information so that the problem can be verified:

  • Under what conditions did the problem occur?

  • Did the unit work and then fail?

  • What other equipment was connected to the PXI module when the problem occurred?

- The name and telephone number of someone familiar with the problem who can be contacted by Phase Matrix if any further information is required.

- The shipping address to which the PXI module is to be returned. Include any special shipping instructions.

Shipping Instructions

1 Place the PXI module in an antistatic bag or enclosure.

2 Wrap the PXI module in heavy plastic or kraft paper.

3 Repack the PXI module in the original container, if available.

   If the original container cannot be used, pack the PXI module in a heavy (275 pound test) double-walled carton with approximately four inches of packing material between the PXI module and the inner carton.

4 Seal the carton with strong filament tape or strapping.

5 Mark the carton to indicate that it contains a fragile electronic instrument.

6 Ship the PXI module to Phase Matrix at the following address:

Phase Matrix, Inc.
4600 Patrick Henry Dr.
Santa Clara CA 95054
Tel: 1-408-610-6810
www.phasematrix.com

Phase Matrix, Inc.™

DECLARATION OF CONFORMITY

Manufacturer's Name: Phase Matrix, Inc.

Manufacturer's Address: 109 Bonvaventura Drive
San Jose CA 95134-2106
USA
Tel: +1-408-428-1000

Product Name: Preselector, MW Downconverter, RF Downconverter, IF Downconverter,
Local Oscillator

Model Number: PXI-1410, PXI-1420, PXI-1430, PXI-1440, PXI-1450

Statement: Phase Matrix, Inc. declares that the aforementioned product(s) conform(s) to the following
Council Directives of the European Union: **C E**

Low Voltage Directive 2006/95/EC for CE Mark

Test method(s) used[*]:

EN/ IEC 61010-1:2001—Safety requirements for electrical equipment for measurement,
control, and laboratory use.

Electromagentic Compatibility (EMC) Directive 2004/108/CE

Test method(s) used[*]:

EN 55011:2007—Industrial, scientific, and medical (ISM) radio-frequency Equipment.
Electromagnetic disturbance characteristics. Limits and methods of measurement

IEC 61326-1:2006—Electrical Equipment for Measurement, Control, and Laboratory use.

Related data[*]:

MIL-STD-461E (RE102 & RS103)—DoD Interface.Standard: Requirements for the
Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
(10 kHz to 40 GHz).

[*]Independently audited by BACL Labs. Test reports on file for review. Contact the sales
department of Phase Matrix, Inc. for more information.

Authorized Signature:

_____   12/13/2010
Mark Espinosa   Date
Quality Assurance Manager