NATIONAL INSTRUMENTS™

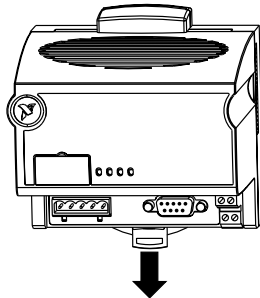# FP-1000/1001 FieldPoint

FieldPoint™

What You Need to Get Set Up

· Network Module
· Mounting Hardware (DIN rail or panel mount accessory)
· Terminal Base(s)
· I/O Module(s)
· Power Supply
· FieldPoint Software CD
· Accessories: serial cable, screwdriver

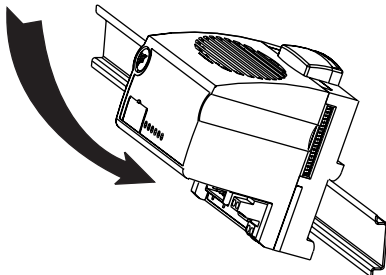# 1 *Install the Network Module*

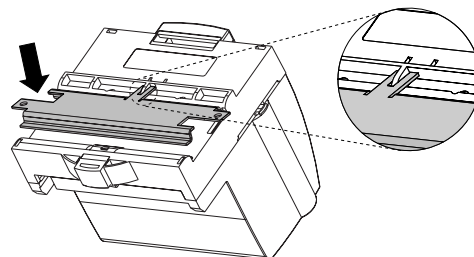A. Unlock rail clip.

DIN Rail Mount

NOTE Do not use spliced DIN rails. Use only a single DIN rail.

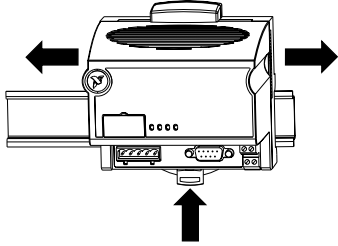B. Hook lip on back of module onto top of DIN rail, press down, and snap into place.

Panel Mount

B. Snap panel mount accessory (which you can order separately) onto module.
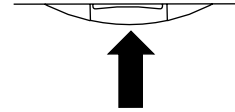
DIN Rail Mount

C. Slide module into position and lock rail clip.
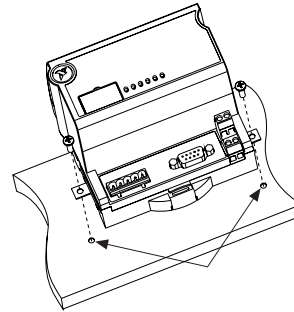

Panel Mount

C. Lock rail clip.

D. Use template that came with your accessory to drill pilot holes and mount module onto panel using accessory.
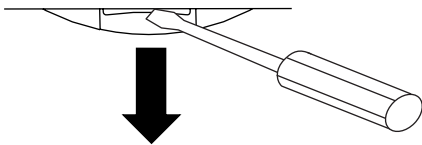

2 Install the Terminal Base(s)

⚠ **CAUTION**   Terminal bases must be connected to the network module before applying power to the module. Do *not* connect or disconnect terminal bases while power is applied to the network module.

DIN Rail Mount

A. Unlock rail clip.

B. Press base onto rail.
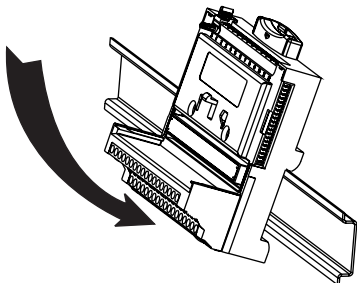
Panel Mount

A. Use template that came with your accessory to drill pilot holes.

B. Connect terminal base to network module connector, being careful not to bend any connector pins.
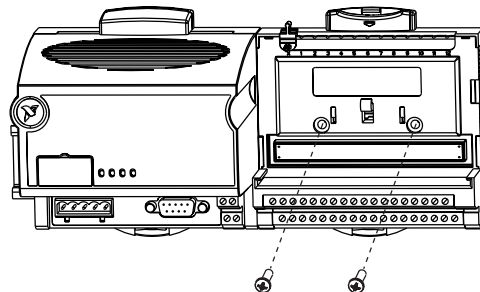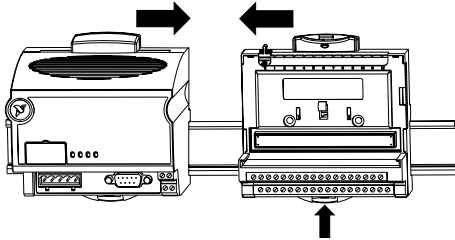
C. Fasten terminal base to panel.

DIN Rail Mount

C. Slide into position and lock the rail clip. Be careful not to bend any pins.

D. Repeat for each terminal base, up to nine for each network module in most cases. You can use one or two extender cables (which you can order separately) if your FieldPoint bank is too long for your available space.

E. Place protective cover on last base, and install rail locks at each end.
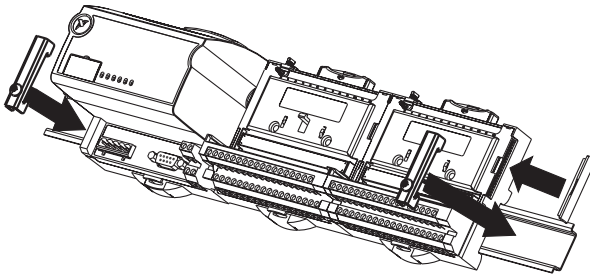
Panel Mount

D. Repeat for each terminal base, up to nine for each network module in most cases. You can use one or two extender cables (which you can order separately) if your FieldPoint bank is too long for your available space.
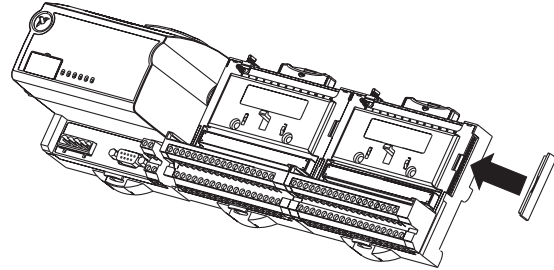
E. Place protective cover on last base.

3 *Install the I/O Module(s)*

It does not matter where you install each I/O module, except for these types of situations:

- If you plan to cascade power between any I/O modules using the V and C terminals, those modules should be grouped together.

- For more accurate measurements, you might want to locate any thermocouple modules away from heat sources, including network modules or relay modules, unless you are mounting them on an FP-TB-3.

A. Align slots on module with guide rails on base, and press onto base until terminal base's latch locks the module in place.

B. Repeat for each I/O module.

Guide Rails

Alignment Slot
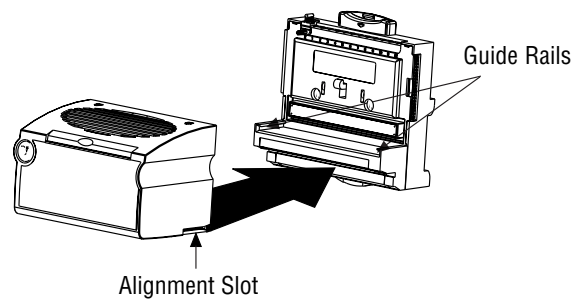
4 *Connect the Network Cables*

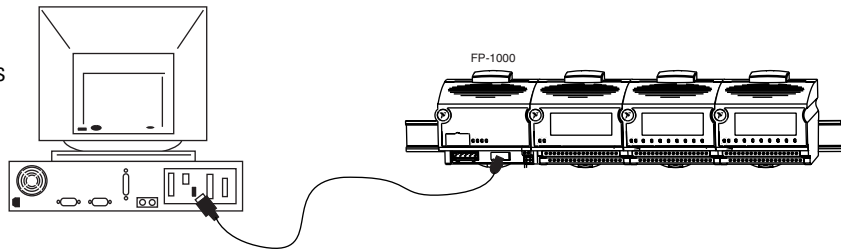You have several network connection options with the FP-1000 and FP-1001, as shown here.

Connecting the FP-1000 to a Computer's RS-232 Serial Port

Use a male-to-female
(straight through) cable
to connect your computer's
RS-232 port to the
9-position DSub RS-232
connector on the FP-1000.

FP-1000

NOTE   You cannot connect the RS-485 port of the FP-1000 directly to an RS-485 port on your computer.

Connecting the FP-1000 to an FP-1001

You can connect up to 24 FP-1001 RS-485
serial network modules to an FP-1000. Use the
RS-485 repeater port of the FP-1000, with the
connection shown in this figure.

A. Connect the TX outputs of the FP-1001 to the RX
   inputs of the FP-1000, and the RX inputs of the
   FP-1001 to the TX outputs of the FP-1000.

B. Install the termination resistors. Terminate each
   end of your RS-485 network using the 120 Ω
   termination resistors included with the FP-1001.
   Install them between the RX and TX pair of the
   FP-1000's RS-485 port, and between the RX and
   TX pair on the last FP-1001's RS-485 port, as
   shown. Twist the resistor leads with the RS-485
   signal wires and insert them into the RS-485 port
   terminals.
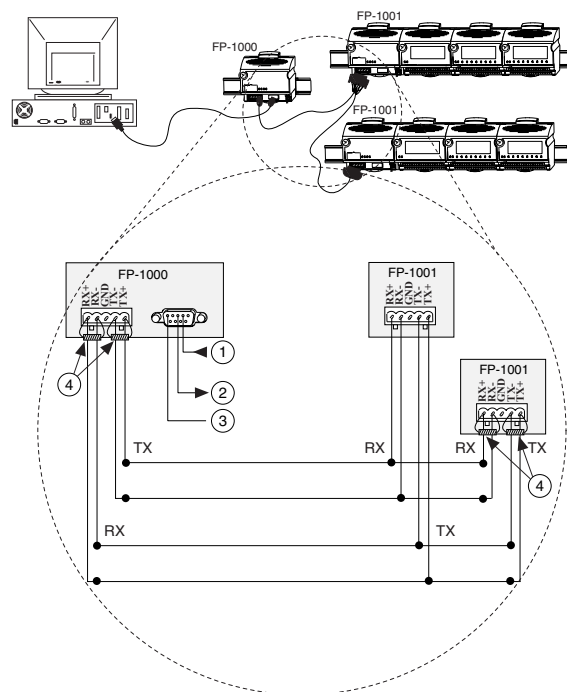
① From the Computer's RS-232 Transmit Output
② To Host Computer's RS-232 Receive Input
③ Ground
④ 120 Ω Termination Resistors

Connecting the FP-1001 to a Computer's RS-485 Serial Port

You may connect up to 25 FP-1001 network modules to a single RS-485 port of a host computer. Use the connection shown in this figure.

A. Connect the FP-1001 to a host computer using the 5-position Combicon screw terminal adapter of the RS-485 connector on the FP-1001.

B. Install the termination resistors. Terminate each end of your RS-485 network using the 120 Ω termination resistors included with the FP-1001. Install them between the RX and TX pair of the host computer's RS-485 port, and between the RX and TX pair on the RS-485 port of the last FP-1001 in the system, as shown. Twist the resistor leads with the RS-485 signal wires and insert them into the RS-485 port terminals.

C. Check the biasing feature. The host computer's RS-485 interface usually provides for biasing resistors, which are required on an RS-485 network. You should use this biasing feature for better reliability and noise immunity.
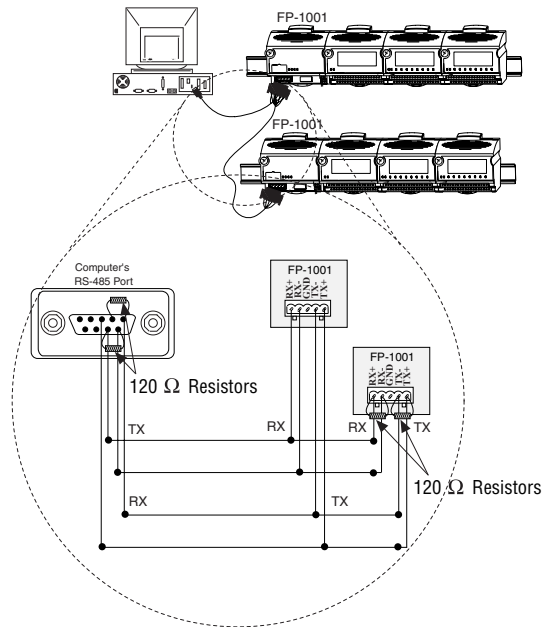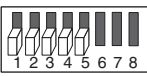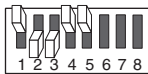
5 *Set the Network Address and Baud Rate*

If the default values will not work for you, remove the switch cover from the 8-position switch on the front of the FP-1000/1001 to set the network address and baud rate.

Default address 0 shown

Default Baud Rate 115200 shown
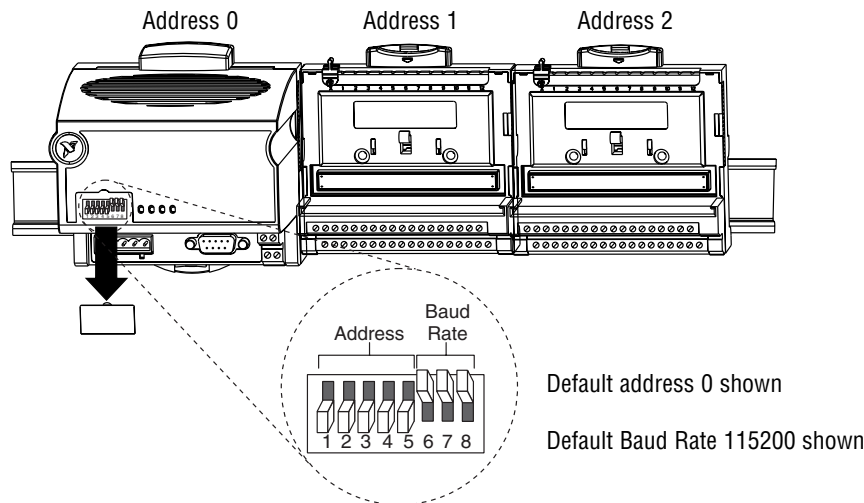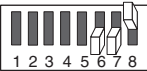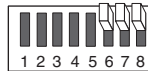
A. Check/Set the Network Address

Give every network module connected to one serial port of the host computer a unique address, but modules on different serial ports may have the same address. The addresses of the terminal bases connected to the network module are automatically configured to be sequentially higher than the network module's address, moving out from the network module. The default network address for the FP-1000/1001 is 0.

Switch Positions 1-5	Network Module Address (Decimal)	Switch Positions 1-5	Network Module Address (Decimal)	Switch Positions 1-5	Network Module Address (Decimal)
	0 Default		90		180
	10		100		190
	20		110		200
	30		120		210
	40		130		220
	50		140		230
	60		150		240
	70		160	Other Settings	Not Allowed
	80		170		

B. Check/Set the Baud Rate

Every module on one serial port of the host computer must have the same baud rate, which must be less than or equal to the computer's serial port baud rate. The default baud rate for the FP-1000/1001 is 115200, which should provide the fastest performance. You should not need to change this setting unless you experience communication problems.

Switch Positions 6-8	Network Module Baud Rate	Switch Positions 6-8	Network Module Baud Rate	Switch Positions 6-8	Network Module Baud Rate
1 2 3 4 5 6 7 8	300	1 2 3 4 5 6 7 8	9600	1 2 3 4 5 6 7 8	57600
1 2 3 4 5 6 7 8	1200	1 2 3 4 5 6 7 8	19200	1 2 3 4 5 6 7 8	115200 (Default)
1 2 3 4 5 6 7 8	2400	1 2 3 4 5 6 7 8	38400		

C. Apply the New Settings

1. Note the new settings on the FP-1000/1001 label so that you can refer to them when you configure your software.

2. If power was supplied to the network module, cycle it off and back on again to enable the new settings.

6 *Wire Power to Your FieldPoint System*

A. Connect 11-30 VDC power supply leads to V and C terminals of the network module. If you want to verify that your power supply is sufficient for your modules and devices, refer to your FieldPoint hardware documents for instructions on calculating power requirements.

B. Connect power to the FieldPoint modules that require external power for outputs (output modules, counter modules, PWM, PG). Refer to the I/O module's operating instructions for power consumption details. You can power a module by connecting the V and C inputs on its terminal base to a separate power supply, connecting the V and C outputs of a neighboring terminal base or network module, or using a combination of both methods. If you want to power field I/O devices from a terminal base, supply power to the terminal base, and then connect the terminal base V and C output terminals to the field device.

⚠ **CAUTION**   Cascading power from neighboring bases or network modules defeats isolation between cascaded modules.

Separate Power Supply
(Recommended)

No External
Power Required

Cascaded Power
(Reduces Isolation)

FP-1000   FP-AI-110   FP-AO-200   FP-RLY-420   FP-TC-120

Power Supply

Power Supply

15 16 V   V 1 2

31 32 C   C 17 18

CAUTION: Cascading
power reduces isolation.

Shades of gray indicate
different voltage potentials.
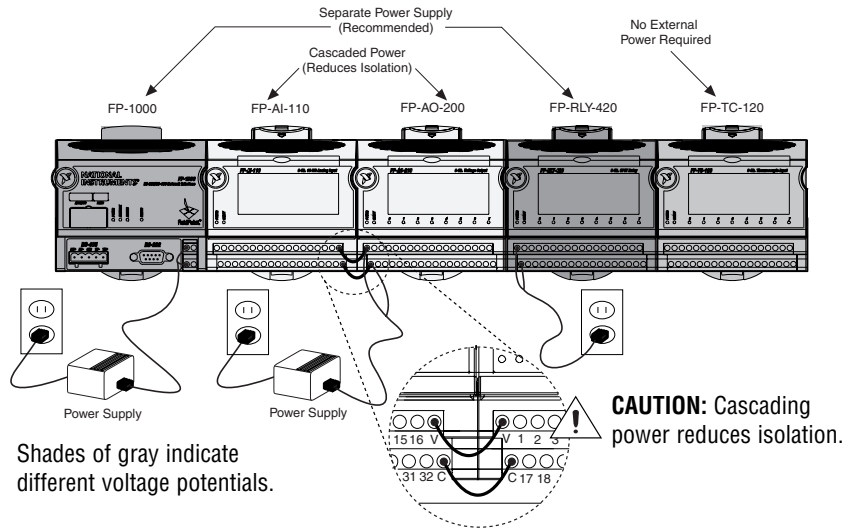
7 *Connect to Field Devices*

Use each I/O module's operating instructions, or the diagram under its removable label, to help you
connect your field devices.

FP-AI-110
8 Channel, 16-Bit Analog Input Module

FieldPoint

Highlights

- Eight analog voltage or current input channels.
- 11 input ranges: ±10 V, ±5 V, ±1 V, ±300 mV, ±60 mV, 0-10 V, 0-5 V, 0-1 V, ±20 mA, 4-20 mA.
- Three filter settings: 50 Hz, 60 Hz, and 500 Hz.
- 16-bit resolution.
- 3,000 V input to output isolation.
- Double insulated for 250 V safe working voltage.
- -40° to +70° C operation

Overview

The FP-AI-110 is a FieldPoint analog input module with eight analog input channels. The FP-AI-110 can be used with voltage or current input signals. The FP-AI-110 is ideal for low frequency signals, and has three configurable filter settings to reject noise. Hot plug and play operation, safety isolation, and the 11 input ranges ensure that installation and maintenance are as trouble free as possible.

These operating instructions describe the installation, features, characteristics of the FP-AI-110. For details on configuring and accessing the FP-AI-110 over a network, refer to the documentation for the particular FieldPoint network module you are using with the FP-AI-110.

TEMP_1
TEMP_2
TEMP_3

FP-AI-110

8-Ch. 16-Bit Analog Input
mV, V, 20 mA

FieldPoint

FP-AI-110

FP-AI-110   8-Ch. 16-Bit Analog Input

	I_{IN}	V_{SUP}	COM
CH0	1	2	17	18
CH1	3	4	19	20
CH2	5	6	21	22
CH3	7	8	23	24
CH4	9	10	25	26
CH5	11	12	27	28
CH6	13	14	29	30
CH7	15	16	31	32

POWER
READY

FP-AI-110

To Power
Supply

17   2   15   32

Loop-Powered
Sensor

Self-Powered
Floating Sensor

I_{Sensor}
Channel 0

V_{Sensor}
Channel 7

NOTE Either the self-powered sensor or
power supply should be floating (not tied
to earth ground).

8 *Power Up Your FieldPoint System*

⚠ **CAUTION**   Terminal bases must be connected to the FP-1000/1001, and the baud rate switch must be set, before power is applied to the FP-1000/1001.

Plug in each power supply to your FieldPoint bank. You should see the FP-1000/1001 **ACCESS** and **STATUS** LEDs flash once, and its **POWER** LED come on and stay on. After a few seconds, the **POWER** and **READY** LEDs should be lit on each I/O module. If this is not the case, refer to your FP-1000/1001 user manual for troubleshooting instructions.
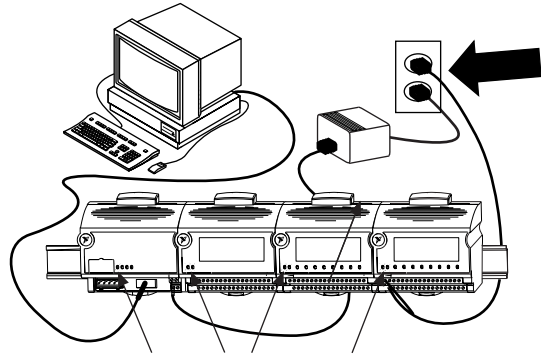
After the hardware is installed, you should verify communication, configure the modules, configure your power-up states and watchdog settings. If you are using National Instruments FieldPoint software for these tasks, continue to the following section.

POWER and READY LEDs Stay Lit

9 *Install the FieldPoint Software*

A. Close all other applications. If you plan to install National Instruments development software such as Lookout, BridgeVIEW, LabVIEW, LabWindows/CVI, or Measurement Studio, install them before you install the FieldPoint software.

B. Insert the FieldPoint software CD and follow the onscreen instructions.
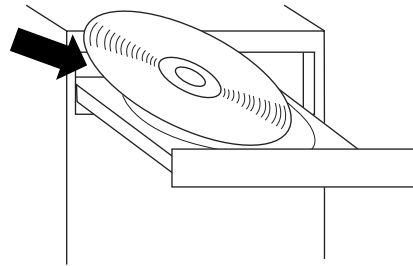
10 *Verify the Installation*

A. Select **Start»Programs»National Instruments FieldPoint»FieldPoint Explorer**.

B. Expand the + directory tree in the left side of the window.
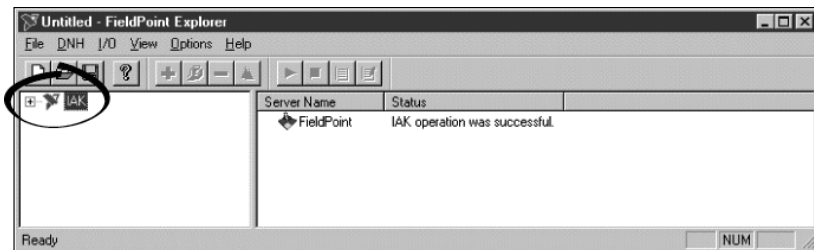
C. Right-click on the FieldPoint icon and select **Add a comm resource to this server**.

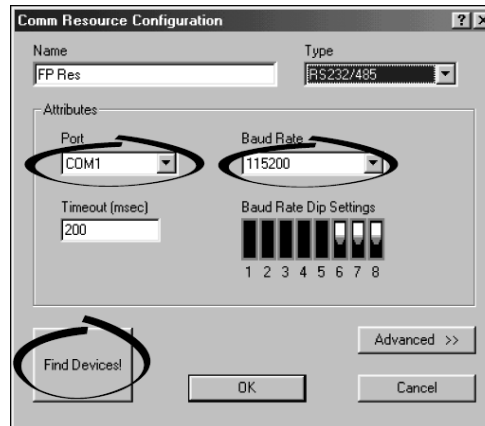D. In the Comm Resource configuration dialog box, select the port to which your FieldPoint system is connected, make sure the baud rate matches what the network module is set to use, and click on **Find Devices!**. If you have trouble finding devices, try changing the selections in this dialog box to make sure they match your hardware configuration.

E. Expand the +FP Res item on the left side of the Explorer window to see the devices found on the network.

If your modules are not listed check the cable and connections, making sure no connector pins are bent, and make sure the modules are all powered on. If you still have problems, refer to your FP-1000/1001 user manual for troubleshooting information.
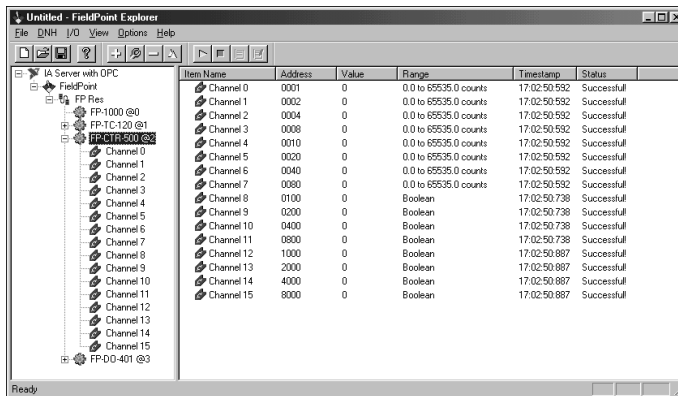
F. Select an input module and click the play button to view live data.

G. Select an output module channel and click the write button to change outputs.

H. Select **File»Save** when you are done.
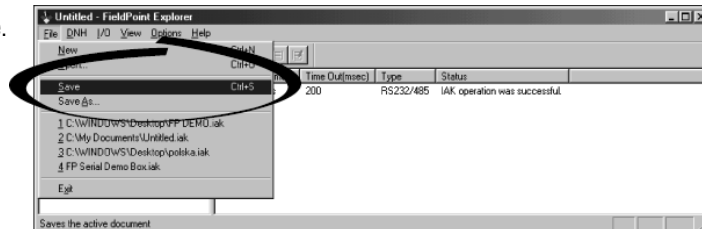
11 *Where to Go from Here*

After you get your hardware up and running, you might want to implement features such as power-up defaults or network watchdog settings. Refer to your FP-1000/1001 user manual or online help for information about features, configuration, application development, and troubleshooting.

Specifications

Network ports

    FP-1000 ....1 RS-232 port, 1 RS-485 repeater port

    FP-1001 ....1 RS-485 port

Baud rates ....300, 1200, 2400, 9600, 19200, 38400, 57600, 115200 (switch selectable)

Communication parameters ....1 start bit, 8 data bits, 1 stop bit, No parity

RS-485 isolation .... 2500 Vrms breakdown, 250 Vrms operational

Power consumption ....1 W + 1.15 x Σ (I/O module power requirements)

Operating temperature ....–40 to +70 °C

Storage temperature ....–55 to +100 °C

Relative humidity ....5% to 90% non-condensing

Weight

    FP-1000 ....250 g (8.7 oz.)

    FP-1001 ....240 g (8.4 oz.)

CE Mark Compliance

This product meets applicable EU directive(s) as follows:

Safety isolation ....EN 61010 (double insulation for 250 Vrms working isolation, installation category II)

EMC directive

    Immunity ....EN 50082-1:1994

    Emissions ....EN 55011:1991 Group I Class A at 10 meters

Mechanical Dimensions

Dimensions are given in inches [millimeters].

NATIONAL INSTRUMENTS™
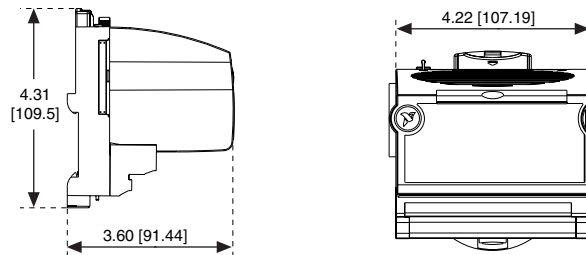
www.ni.com/support/

United States 512 795 8248
Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20,
Brazil 011 284 5011, Canada (Calgary) 403 274 9391, Canada (Ontario) 905 785 0085,
Canada (Québec) 514 694 8521, China 0755 3904939, Denmark 45 76 26 00,
Finland 09 725 725 11, France 01 48 14 24 24, Germany 089 741 31 30,
Greece 30 1 42 96 427, Hong Kong 2645 3186, India 91805275406, Israel 03 6120092,
Italy 02 413091, Japan 03 5472 2970, Korea 02 596 7456, Mexico (D.F.) 5 280 7625,
Mexico (Monterrey) 8 357 7695, Netherlands 0348 433466, New Zealand 09 914 0488,
Norway 32 27 73 00, Poland 0 22 528 94 06, Portugal 351 1 726 9011,
Singapore 2265886, Spain 91 640 0085, Sweden 08 587 895 00, Switzerland 056 200 51 51,
Taiwan 02 2528 7227, United Kingdom 01635 523545

322731A-01   May00