Ethernet/Serial Interfaces for Compact FieldPoint

NI cFP-180x

- Distributed I/O interfaces for Ethernet and RS232 networks
- 4 or 8-slot Compact FieldPoint distributed Ethernet/serial network interfaces
- FieldPoint software for rapid distributed I/O access
- Modbus Support
- OPC server included
- Intelligent diagnostics and maintenance
- Industrial specifications for harsh environments
  - 50 g shock
  - 5 g vibration
  - -40 to 70 °C

Operating Systems
- Windows 2000/XP

Recommended Software
- LabVIEW
- LabVIEW Datalogging and Supervisory Control Module

Other Compatible Software
- LabWindows/CVI
- Measurement Studio
- Lookout
- VI Logger

Driver Software (included)
- Measurement & Automation Explorer
- OPC server (2.0 compliant)

Overview and Distributed Applications

National Instruments cFP-180x interfaces connect four or eight Compact FieldPoint I/O modules to a high-speed Ethernet network or to an RS232 serial port. With up to 100 Mb/s data communication rates and event-driven communications, an NI cFP-180x delivers a high-performance network connection for Compact FieldPoint that is easy to interface with a PC or PAC-like Compact FieldPoint embedded controller. One or more cFP-180x interfaces, connected by standard networking equipment, provide expanded I/O that you can control with a single Compact FieldPoint controller, see Figure 1. You can also build a PC-based distributed I/O and control system by connecting two or more cFP-180x devices to your PC.

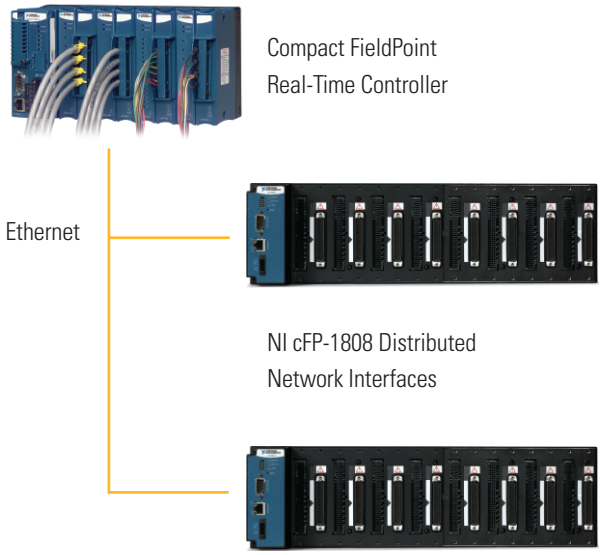

Figure 1. Expansion I/O for Compact FieldPoint Embedded Controller with cFP-1808 Network Interfaces

Hardware Architecture

A cFP-180x provides an integrated network interface (Ethernet or serial) and a 4 or 8-slot backplane, and it works with the same modules and connector blocks used in other Compact FieldPoint systems.

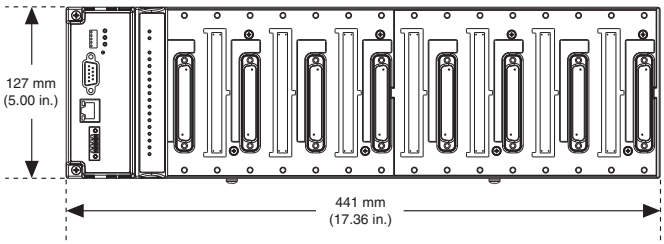

Figure 2. cFP-1808 Mechanical Dimensions

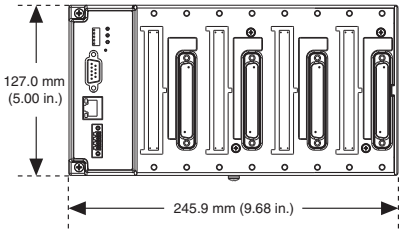

Figure 3. cFP-1804 Mechanical Dimensions

Building Ethernet-Based Distributed I/O Systems

A cFP-180x can communicate with Compact FieldPoint real-time embedded controllers; any Ethernet-based programmable automation controller (PAC); and a Windows computer running LabVIEW, LabWindows/CVI, Measurement Studio, Lookout, or your choice of OPC client application software. Using a cFP-180x, you can rapidly build flexible, modular distributed measurement and automation systems.

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Figure 4. Ethernet-based distributed systems work with Compact FieldPoint embedded controllers, PACs, human-machine interfaces, and Enterprise/SCADA systems.

Network Communications Interface

A cFP-180x connects directly to Ethernet networks, autonegotiating on the network for 10 Mb/s or 100 Mb/s communication rates. It includes an RJ-45 connector for connection to 10BaseT and 100BaseTX networks, using a protocol based on standard TCP/IP to maintain full compatibility with existing networks. FieldPoint builds on standard TCP/IP network protocols and adds a number of key enhancements, including event-driven communications and publisher-subscriber networking. In a publisher-subscriber architecture, one or more client PCs subscribe to I/O data from Compact FieldPoint banks. The network interface monitors connected I/O modules and publishes I/O data only when the value changes. Analog signals can change value within selectable ranges, called deadbands, without causing the system to report data. This event-driven method, along with data compression, helps you avoid unnecessary Ethernet traffic and maximizes communication efficiency. A cFP-180x also includes a standard DB-9 connector for RS232 serial communication. Through direct connectivity, you can read and write data directly from a program running on your PC or embedded controller. You access I/O through the serial interface using a serial protocol called Optomux, in the same way you would access data through classic FieldPoint network interfaces such as the FP-1000.

Configuring and Accessing Tags on a Compact FieldPoint System with LabVIEW 8

National Instruments LabVIEW 8 and Compact FieldPoint create a flexible PAC system that offers easy-to-access I/O through the FieldPoint programming environment. Accessing data from multiple cFP-180x distributed nodes with LabVIEW is as easy as three simple steps:

1. Configure IP address using NI Measurement & Automation Explorer (MAX)
2. Import a FieldPoint configuration file or add a new Compact FieldPoint system
3. Expand I/O in the LabVIEW Project and drag and drop I/O tags to VIs

After configuring the IP address for a FieldPoint bank in MAX, either import the configuration file created from MAX, or simply add a new target to a LabVIEW Project as shown in Figure 5.

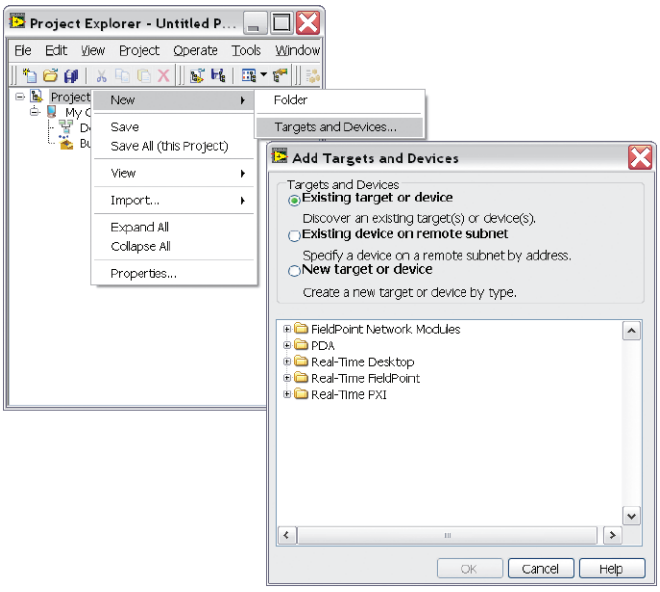

Figure 5. Add a new FieldPoint target to your LabVIEW 8 Project.

After adding all FieldPoint networks available on the network, you can expand each FieldPoint bank and see the I/O modules and tags available from the LabVIEW Project Explorer. Using these tags in an application is as easy as dragging the tag from the Project Explorer to the VI where the data is needed. LabVIEW automatically creates the correct FieldPoint read/write VI and associated tag.

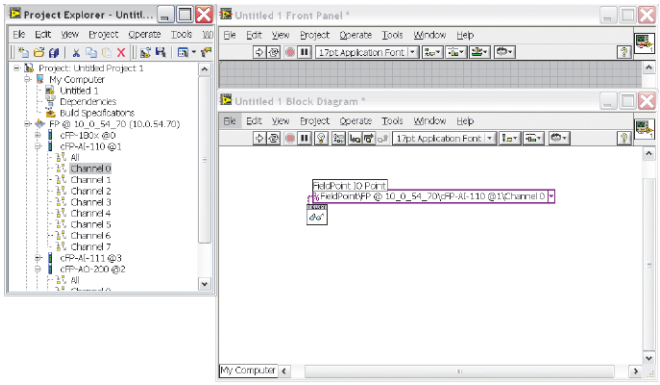

Figure 6. Drag and drop an I/O tag from a LabVIEW Project to any VI.

Accessing Network I/O Data on a cFP-180x Using Shared Variables

You can create a shared variable for any tag that is available on a cFP-180x bank connected to the network. You then can use this shared variable in multiple LabVIEW applications either targeted to Windows OS or running embedded on a Compact FieldPoint real-time controller such as the NI cFP-2120. To create a shared variable to be hosted on a Windows system, simply right-click on My Computer in the LabVIEW Project and select New Variable; select the option to bind this shared variable to a source, and then you can either select IO from your local LabVIEW Project or any I/O available on the network, as shown in Figure 7.

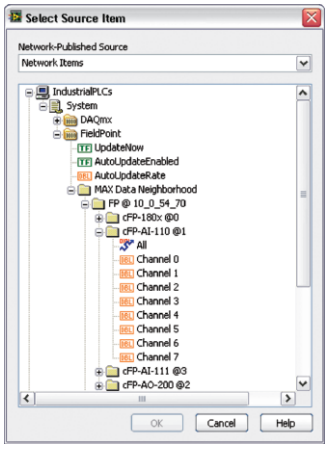

Figure 7. Compact FieldPoint distributed I/O channels are accessible as network items from LabVIEW.

After you create a shared variable, it appears in LabVIEW Project Manager and is available for use in your LabVIEW applications simply by dragging the variable from the Project Explorer to an existing VI (see Figure 8). From a PC, PAC, or embedded Compact FieldPoint controller, you can use MAX with LabVIEW 8 to configure I/O settings for the cFP-180x to access data on distributed Compact FieldPoint banks. Accessing distributed I/O is now easier than ever with LabVIEW 8 and a cFP-180x.

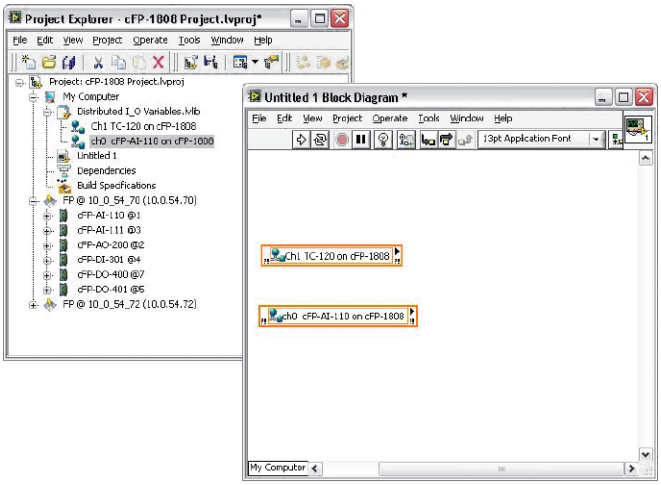

Figure 8. Use a shared variable to access distributed I/O for all channels.

Ordering Information

NI cFP-1808	779463-01
NI cFP-1804	779490-01
PS-5 (power supply 24 VDC, 5 A, universal power input)	778805-90

BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813 3693 (U.S.) or go to **ni.com/fieldpoint**.

Specifications

Network

Network interface	10BaseT and 100BaseTX Ethernet
Compatibility	IEEE802.3
Communication rates	10 or 100 Mb/s, autonegotiated
Maximum cabling distance	100 m/segment
Maximum power to I/O modules	9 W
Maximum number of banks	Determined by network topology

Serial Port

One RS232 (DCE) serial port	
Baud rate	300 to 115,200 b/s
Data bits	8
Stop bits	1
Parity	None
Flow control	None

Power Requirement

Power supply range	11 to 30 VDC
Recommended power supply	20 W
Power consumption	6.1 W + 1.1 (I/O module)

Safety Isolation Voltage

Isolation voltage is verified by a dielectric withstand test between module and backplane.

Continuous	250 V_{rms}, Measurement Category II
Withstand	2,300 V_{rms}, 5 s max

Physical Characteristics

Screw-terminal wiring	14 to 22 AWG copper wire with 7 mm (0.28 in.) of insulation stripped from the end
Torque for screw terminals	0.5 to 0.6 N • m (4.4 to 5.3 lb • in.)
Weight	
cFP-1804	935 g (2 lb 1 oz)
cFP-1808	1,595 g (3 lb 8 oz)

Environmental

FieldPoint modules are intended for indoor use only. For outdoor use, they must be installed in a suitable sealed enclosure.

Operating temperature	-40 to 70 °C
Storage temperature	-55 to 85 °C
Relative humidity	10 to 90%, noncondensing
Maximum altitude	2,000 m; at higher altitudes the isolation voltage ratings must be lowered
Pollution Degree	2

Shock and Vibration

Operating vibration	
Random (IEC 60068-2-64)	10 to 500 Hz, 5 g_{rms}
Sinusoidal (IEC 60068-2-6)	10 to 500 Hz, 5 g
Operating shock	
(IEC 60068-2-27)	50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1
- CAN/CSA-C22.2 No. 61010-1

Note: *For UL, hazardous location, and other safety certifications, refer to the product label or visit* **ni.com/certification**, *search by model number or product line, and click the appropriate link in the Certification column.*

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2002, Table 1 CE, C-Tick, and FCC Part 15 (Class A) Compliant

Note: *For EMC compliance, operate this device with shielded cabling.*

CE Compliance

This product meets the essential requirements of applicable European directives, as amended for CE marking, as follows:

Low-voltage directive (safety)	73/23/EEC
Electromagnetic compatibility directive (EMC)	89/336/EEC

Note: *Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit* **ni.com/certification**, *search by model number or product line, and click the appropriate link in the Certification column.*

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