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Find the *National Instruments cFP-2120* at our website: *Click HERE*

Compact FieldPoint LabVIEW Real-Time Controllers with Ethernet

NI cFP-21xx *NEW!*

- Rugged LabVIEW Real-Time controller
  - 188 MHz processor and up to 128 MB of SDRAM
  - Up to 128 MB of nonvolatile storage and 512 MB removable CompactFlash
- Ethernet communication for distributed real-time systems
- Dual redundant 11 to 30 VDC power supply inputs, low power
- Up to 4 serial ports (3 RS232 and 1 RS485) for communication
- Industrial certifications, Class I, Div 2, and -40 to 70 °C

Operating Systems

- Windows XP/2000/NT
- LabVIEW Real-Time

Recommended Software

- LabVIEW
- LabVIEW Real-Time Module
- LabVIEW Datalogging and Supervisory Control Module

Driver Software (included)

- Measurement & Automation Explorer
- OPC server (2.0 compliant)



Controller	SDRAM Memory (MB)	Internal Nonvolatile Storage (MB)	Removable CompactFlash	Ethernet Ports	RS232 Ports	RS485 Ports
cFP-2120	128	128	✓	1	3	1
cFP-2110	128	64	–	1	2	0
cFP-2100	64	64	–	1	1	0

Table 1. cFP-21xx Selection Guide

Overview

National Instruments Compact FieldPoint is a programmable automation controller (PAC) designed for industrial control applications performing advanced embedded control, data logging, and network connectivity. It combines the packaging, specifications, and reliability of a PLC with the software, flexibility, connectivity, and functionality of a PC. Compact FieldPoint is a reliable platform designed for rugged industrial environments with shock, vibration, and temperature extremes.

National Instruments cFP-21xx controllers run LabVIEW Real-Time, providing the functionality, connectivity, and flexibility of NI LabVIEW software on a small industrial platform. The modular I/O architecture with built-in signal conditioning and isolation provides direct connectivity to industrial sensors such as analog voltage, 4 to 20 mA current, thermocouples, RTDs, pressure, strain, flow, pulse-width modulation (PWM), and 24 V digital I/O. You can use NI cFP-21xx controllers in intelligent distributed applications requiring industrial-grade reliability – such as process and discrete control systems – to open and close valves, run control loops, log data on a centralized or local level, perform real-time simulation and analysis, and communicate over serial and Ethernet networks.

System Basics

A single cFP-21xx controller manages a bank of up to eight Compact FieldPoint I/O modules. The controller mounts securely on a metal backplane that provides the communication bus as well as a solid surface for the Compact FieldPoint I/O modules and controller. The system is modular; select the I/O modules and connector blocks or cabling options best suited for your application. Compact FieldPoint I/O banks have a number of features for industrial operation, including 2,300 V transient overvoltage protection, a wide temperature range for operation in extreme environments, backup power supply connections to protect against primary power failure, and hot-swappable modules to simplify maintenance and minimize downtime. cFP-21xx controllers feature an industrial 188 MHz x86 processor that reliably and deterministically executes your LabVIEW Real-Time applications.

Choose from thousands of built-in LabVIEW functions to build your multithreaded embedded system for real-time control, analysis, data logging, and communication. cFP-21xx controllers also offer up to 128 MB of 100 MHz SDRAM and 128 MB of internal nonvolatile storage and a removable CompactFlash slot. All cFP-21xx controllers feature a 10/100 Mb/s Ethernet port for communication over the network (including e-mail) and built-in Web (HTTP) and file servers (FTP). Using the LabVIEW Remote Panel feature, you can automatically publish the front panel graphical user interface (GUI) for your embedded application so that multiple clients can monitor or control it remotely using a Web browser.

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Software

NI LabVIEW is a graphical development environment that delivers unparalleled flexibility and ease of use in demanding industrial measurement, automation, and control applications. With LabVIEW, you quickly create user interfaces for interactive software system control. LabVIEW makes it easy to construct simple or complex applications using an extensive palette of functions and tools – from simple analog PID process control loops to high-channel-count hybrid control systems. Each LabVIEW Real-Time hardware target, including Compact FieldPoint embedded controllers, has a dedicated processor running a real-time OS for reliability, stability, and determinism. Use the LabVIEW platform for your industrial measurement, automation, and control applications by following these three steps:

- Choose your I/O – LabVIEW delivers access to the widest selection of I/O, from data acquisition, motion control, and vision integration to machine vision and custom-designed I/O from a single environment.
- Choose your analysis or control methods – With more than 450 LabVIEW analysis and control functions, you define your system to meet your specific requirements.
- Choose your real-time deployment platform – Once you create your LabVIEW application, deploy it to run deterministically on the hardware platform you choose.

LabVIEW 8 Project and FieldPoint Programming

Drag-and-Drop Programming

With the new LabVIEW 8 Project, programming is simplified with drag-and-drop functionality. You can add local or distributed I/O from any Compact FieldPoint bank simply by dragging I/O from a LabVIEW Project to the VI where you want to read/write to that FieldPoint tag. Figure 1 shows I/O from a cFP-AI-102 module on a cFP-2120 bank being added to a new VI. LabVIEW automatically creates the FieldPoint tag and appropriate FieldPoint Read/Write VI when you drag an item from the LabVIEW Project Explorer.

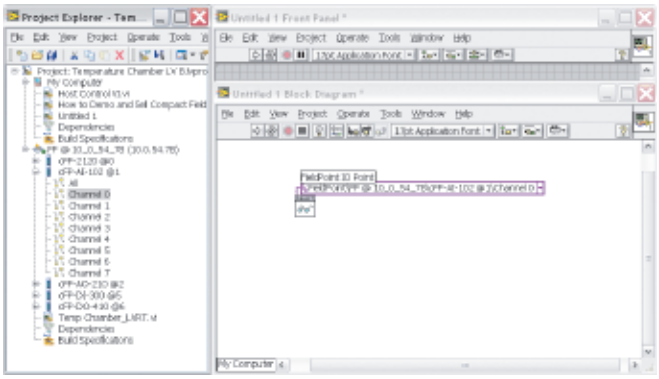


Figure 1. A LabVIEW Project provides easy access to Compact FieldPoint I/O.

LabVIEW Shared Variable

cFP-21xx controllers are compatible with the new LabVIEW shared variable that simplifies communication between distributed PAC systems. To create a shared variable within a LabVIEW Project, right-click on the location that will host the shared variable, either the Windows system or a cFP-21xx real-time controller. Then create a shared variable, or choose to bind the variable to an I/O source such as a FieldPoint I/O tag on a FieldPoint controller on the network. Figure 2 shows a LabVIEW Project with a cFP-2120 target that is hosting shared variables for the PID Setpoint, dt, and Process Variable. When this code is deployed to the cFP-2120 real-time controller, the shared variable configuration is deployed. The cFP-2120 real-time controller updates values for these shared variables independently from the Windows system.

Note: cFP-21xx controllers are recommended if you want to host shared variables on the real-time controller. Hosting shared variables requires the shared variable engine to be installed to the embedded target.

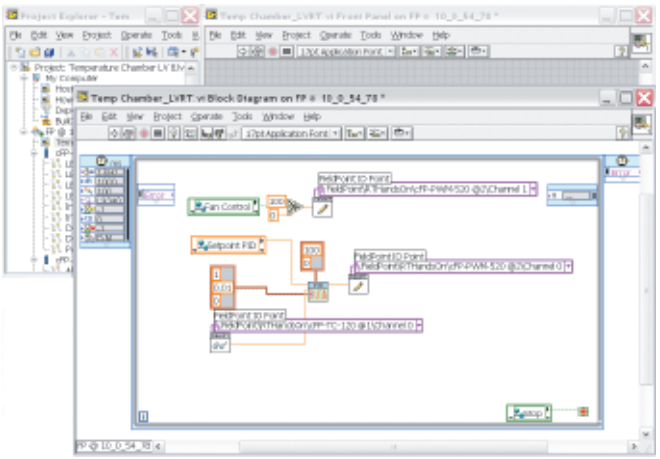


Figure 2. The cFP-2120 real-time controller hosts LabVIEW shared variables.

Expansion I/O with NI cFP-1808

For systems that require more than eight Compact FieldPoint modules, the new National Instruments cFP-1808 network interface provides an easy way to add expansion I/O over Ethernet or serial. A single cFP-21xx controller can connect to as many additional NI cFP-1808 network interface systems as the Ethernet network allows. With LabVIEW 8, the I/O from an expansion system appears in the LabVIEW Project and is easy to program using the FieldPoint API by simply dragging a tag from the cFP-1808 bank to a VI.

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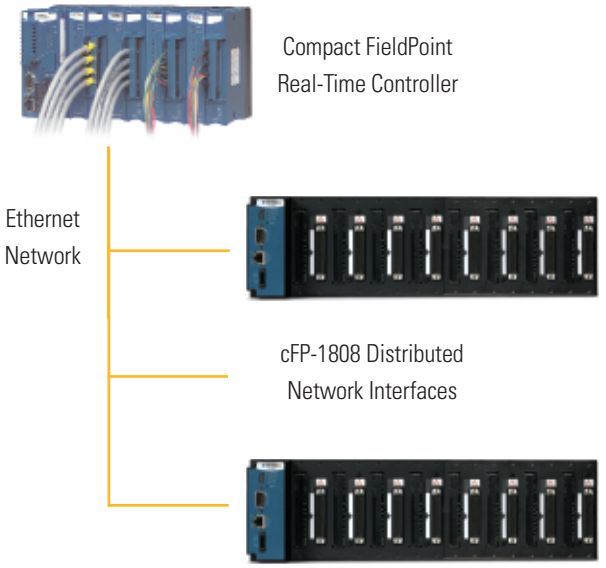


Figure 3. Expansion I/O for cFP-21xx Controllers with NI cFP-1808 Network Interface

Embedded Data Logging

The cFP-2120 features 128 MB of nonvolatile removable CompactFlash storage for data logging or additional storage capacity. You can store the data in standard format, including CSV and XML. Once you store the data, you can easily transfer it to a PC using the embedded FTP server on the cFP-21xx. LabVIEW Real-Time expands the functionality beyond the typical data logger because you can make additional calculations and decisions to eliminate logging unneeded data and to perform onboard real-time calculations. Compact FieldPoint combines data logging, data reduction, control algorithms, a Web-based human machine interface (HMI), and the ability to communicate with other nodes on the network.

Communication

A cFP-21xx controller connects directly to your network through the built-in Ethernet port. The Ethernet port serves as a high-speed link for downloading application code, performing run-time debugging and probing, and transmitting control and indicator values with a GUI running on a networked PC. You also can use the Ethernet port for programmatic network communication using standard protocols such as TCP, UDP, FTP, HTTP, and DataSocket. Once deployed, the controller can communicate with any Ethernet-enabled device on the network. In addition, a cFP-21xx can communicate with a Windows computer running LabVIEW or any third-party HMI/SCADA software compatible with OPC. By using LabVIEW libraries and industrial gateways, you can add a Compact FieldPoint bank to any existing setup and communicate with industrial devices through standard communication protocols such as Modbus TCP and PROFIBUS.

Serial Connectivity

cFP-21xx controllers have up to three RS232 serial ports and one RS485 port (cFP-2120) to communicate programmatically with other serial devices such as remote FieldPoint banks, LCD display/keypad units, bar code readers, or phone and radio modems.

Power Supply Backup and Regulation

cFP-21xx controllers require an 11 to 30 VDC power supply. An extra set of screw terminals is available on the network controllers for a backup UPS or battery. The controller filters and regulates the power input, redistributing power to all the I/O modules in the node through the backplane bus. Refer to Ordering Information for suitable power supplies.

Ordering Information

NI cFP-2120 777317-2120
NI cFP-2110 777317-2110
NI cFP-2100 777317-2100

Recommended Compact FieldPoint System Products

NI cFP-BP-4 (4-slot backplane).....778617-04
NI cFP-BP-8 (8-slot backplane).....778617-08
NI cFP-CB-1 (internal connecter block) 778618-01
NI cFP-CB-3 (isothermal connector block) 778618-03
NI PS-5 Power Supply 778805-90

BUY NOW!

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

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Specifications

Network

Network interface	10BaseT and 100BaseTX Ethernet
Compatibility	IEEE802.3
Communication rates	10 Mb/s, 100 Mb/s, autonegotiated
Maximum cabling distance	100 m/segment
Maximum number of banks	Determined by network topology

Memory

cFP-2100	64 MB nonvolatile; 64 MB DRAM
cFP-2110	64 MB nonvolatile; 128 MB DRAM
cFP-2120	128 MB nonvolatile; 128 MB DRAM
Memory lifetime (nonvolatile)	300,000 writes per sector

For information about the memory used by the LabVIEW Real-Time Module and the OS, go to **ni.com/info** *and enter* **rdfpec**.

Serial Ports

cFP-2100	1 RS232
cFP-2110	2 RS232
cFP-2120	3 RS232; 1 RS485

RS232 (DTE) Ports

Baud rate	110 to 115,200 b/s
Data bits	5, 6, 7, 8
Stop bits	1, 1.5, 2
Parity	Odd, even, mark, space
Flow control	RTS/CTS, XON/XOFF, DTR/DSR

RS485 (DTE) Port

Baud rate	110 to 115,200 b/s
Data bits	5, 6, 7, 8
Stop bits	1, 1.5, 2
Parity	Odd, even, mark, space
Flow control	XON/XOFF
Mode	4-wire
Maximum continuous	
Isolation voltage	100 V_{rms}
Dielectric withstand	740 V_{rms}, 1 minute

Power Requirement

Power supply range	11 to 30 VDC
Recommended power supply	
cFP-BP-4 system	15 W
cFP-BP-8 system	20 W
Power consumption	6.1 W + 1.1(I/O module power requirements)
Maximum power to connected I/O modules	9 W

Physical Characteristics

Screw-terminal wiring	16 to 26 AWG copper conductor 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	278 g (9.8 oz)

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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, CSA 61010-1

Note: *For UL 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

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

- EN 61326 EMC requirements; Industrial Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: *For EMC compliance, operate this device according to product documentation.*

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; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)

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.*

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit **ni.com/calibration**.

Repair and Extended Warranty

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit **ni.com/services**.

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