

FieldPoint Modular Distributed I/O System

FieldPoint

Modular architecture
Isolated I/O modules
Analog inputs
Analog outputs
Discrete I/O
Modular network interfaces
RS-232/RS-485
Ethernet TCP/IP
FOUNDATION Fieldbus H1
Easy installation and maintenance
HotPnP hot-swappable, plug and play operation
Watchdog timer
Configurable power-up states
DIN rail mounting links power and communications to every module
Rugged, industrial packaging
-40 to 70 °C operating range

Software
Configuration utilities for Windows NT/98/95
OPC server
Servers/drivers for BridgeVIEW
Lookout
LabVIEW
LabWindows/CVI



Overview

FieldPoint is a modular distributed I/O system that provides economical solutions for industrial monitoring and control applications. The FieldPoint system includes a variety of analog and digital I/O modules, terminal bases,

network modules that connect I/O modules to industrial networks, and high-level software tools.

FieldPoint simplifies installation and maintenance with HotPnP hot-swappable autoconfiguration, extensive fault and error detection, watchdog timers, and programmable power-up and failure-mode states. In addition, the rugged packaging of FieldPoint and its adherence to extreme environmental specifications and certifications ensure that FieldPoint is ideal for use in industrial environments.

The FieldPoint system includes a number of software options. In addition to the FieldPoint OPC Server, which delivers standardized connectivity to any OPC-compliant software package, we include specific driver and software libraries for use with National Instruments software packages, including BridgeVIEW, Lookout, LabVIEW, and LabWindows/CVI.

Modular System

FieldPoint features an innovative architecture that modularizes the communications, I/O functions, and signal termination. Therefore, you can independently choose which I/O modules, industrial network, and signal termination style best fit your particular application. With the modular architecture of

FieldPoint, you can easily adapt the system to different industrial networks as additional network modules become available.

FieldPoint includes three classes of components that make this flexibility possible:

- I/O modules
- Terminal bases
- Network modules

I/O Modules

I/O modules include a variety of analog and discrete I/O modules that interface to numerous signal types, including analog voltage inputs, thermocouples, RTDs, 4-20 mA inputs and outputs, and discrete (AC/DC) inputs and outputs. Each FieldPoint I/O module includes an electronic data sheet that is automatically uploaded to the network module for autoconfiguration. I/O modules are installed on a base that contains terminals for field wiring connections. You can plug and unplug I/O modules from the terminal bases without powering down the system and without disconnecting your field wiring.

Terminal Bases

Terminal bases are universal bases that can accept any FieldPoint I/O modules. They clip onto a standard DIN rail or can be panel mounted. As multiple bases are installed, the bases together construct the high-speed local bus that efficiently transfers data between the I/O modules and the network module. The bus also links power to the I/O modules, so you do not need to wire power to every module.

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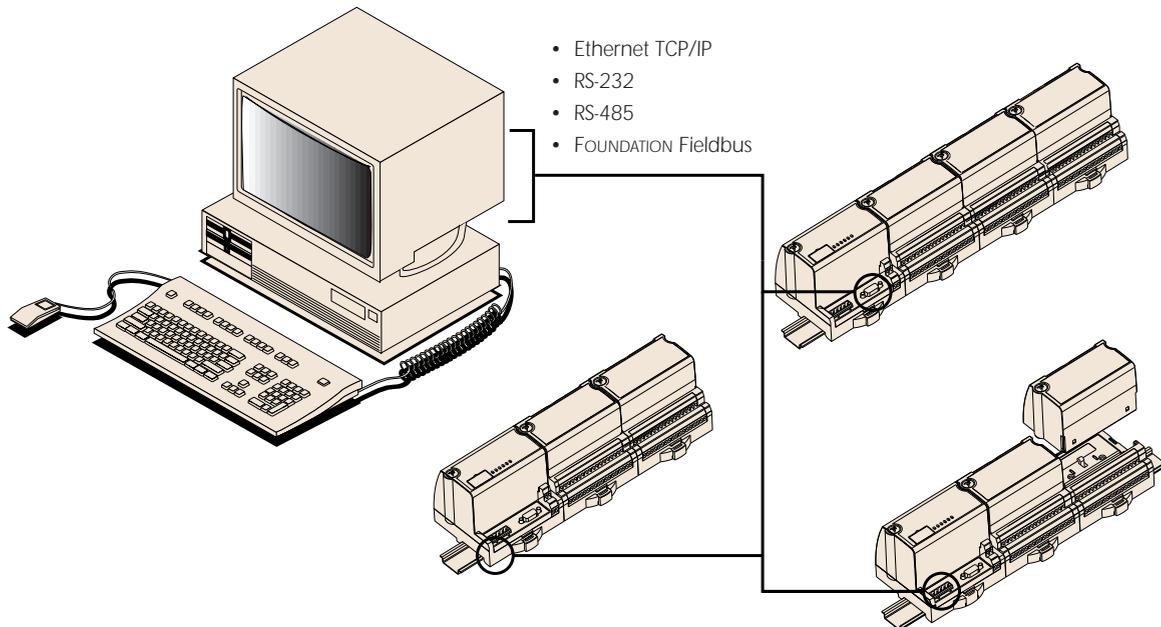


Figure 1. A FieldPoint system distributes I/O and control using standard networks.

Network Modules

Network modules provide connectivity between the industrial network and your I/O modules. The network module communicates with the local I/O modules via the high-speed local bus formed by linked bases. The intelligent network communication module provides features, such as plug and play module operation, SnapShot, watchdog timer, and self-tests, that make system installation, configuration, and maintenance extremely simple.

Current options for network modules include RS-232/RS-485, 10 Mb/s and 100 Mb/s Ethernet, and FOUNDATION Fieldbus H1. The FOUNDATION Fieldbus network module, the FP-3000, is a distributed controller that executes fieldbus function blocks, including PID, to form the building block of a distributed control system.

Easy Installation and Maintenance

FieldPoint includes a number of mechanical and electronic features that make installation and maintenance as easy and trouble free as possible.

HotPnP Hot-Swappable, Plug and Play

With the FieldPoint system, you can perform hot insertion of I/O modules into the bases under system power. In addition, each I/O module includes an electronic data sheet that is automatically uploaded to the network module when installed.



FieldPoint offers rugged, modular solutions with distributed I/O for industrial monitoring and control.

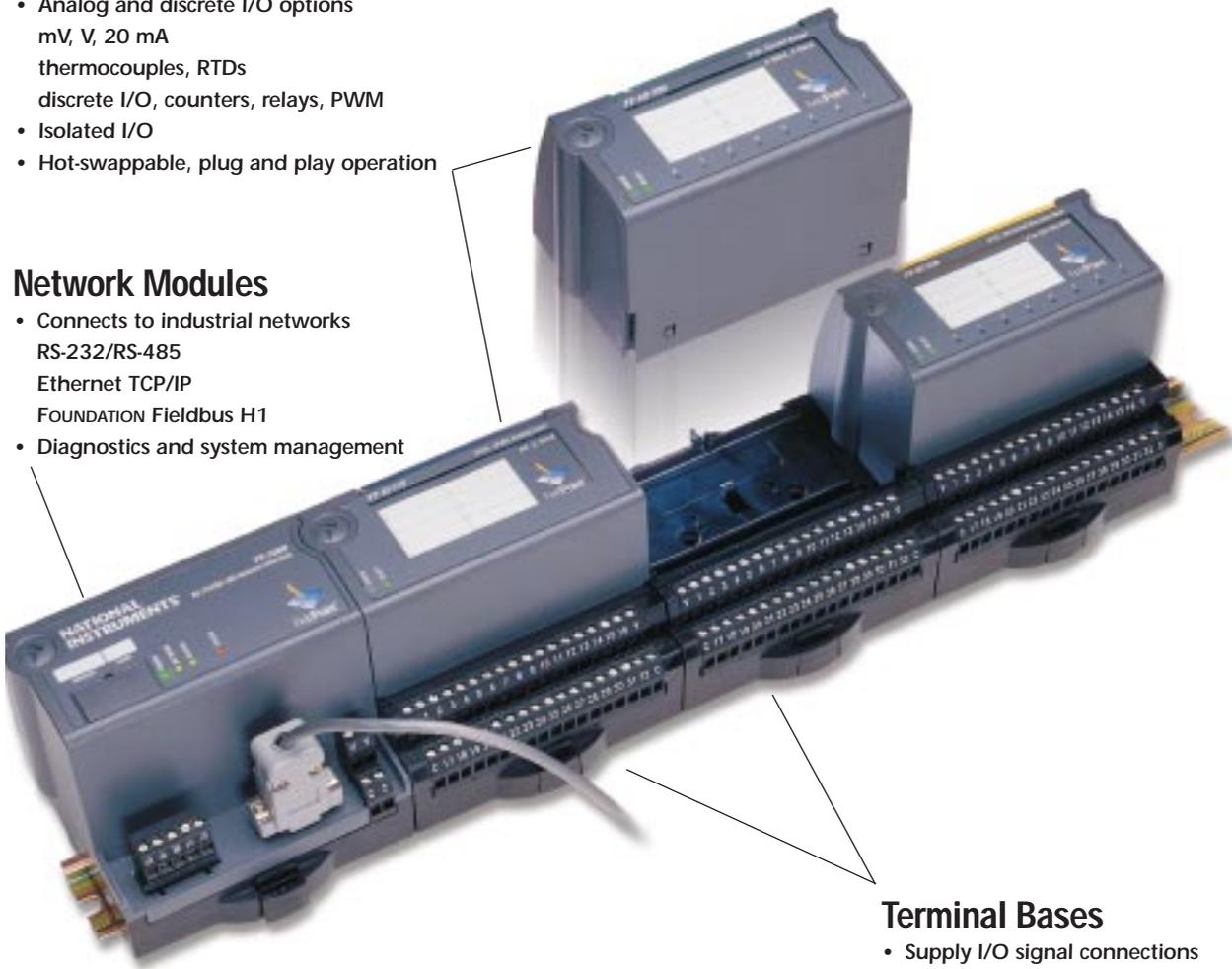
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I/O Modules

- Analog and discrete I/O options
mV, V, 20 mA
thermocouples, RTDs
discrete I/O, counters, relays, PWM
- Isolated I/O
- Hot-swappable, plug and play operation

Network Modules

- Connects to industrial networks
RS-232/RS-485
Ethernet TCP/IP
FOUNDATION Fieldbus H1
- Diagnostics and system management



Terminal Bases

- Supply I/O signal connections
- Form high-speed backplane bus
- Bus power to I/O modules
- Easy DIN rail or panel mounting

This plug and play operation simplifies system installation, configuration, and maintenance. When you replace an I/O module, the network module automatically verifies that the replacement I/O module is compatible with the one that was removed and configures the replacement module with the predecessor's configuration, including status of output channels and power-up states.

SnapShot Command

With the SnapShot feature, you can very easily and dynamically set the default power-up states and configurations of your I/O modules. After interactively configuring the I/O modules to the desired settings (configuration and/or output values), you issue the SnapShot command. This causes the network module to memorize the entire configuration and states of all the I/O

modules in the node, storing the settings in nonvolatile memory. On subsequent power-ups, the network module automatically restores these settings to each I/O module in the node.

Diagnostics

The network module includes a watchdog timer to detect long periods of network inactivity. In a time-out condition, the network module sets all the outputs in the I/O modules in its node to user-defined failure-mode states. In addition, the network modules perform a self-test suite on power-up to verify its own operational status; each I/O command to a FieldPoint module returns status and error conditions. I/O modules include I/O diagnostics, such as open thermocouple detection and open current loop detection.

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Installation and Mounting

Terminal bases and network modules mount securely onto standard DIN rails with rugged, easy-to-operate clips. You can also mount FieldPoint systems onto a panel.

Power (11 to 30 VDC) is connected to the network module, which in turn filters, regulates, and buses this power to all of the I/O modules in the node. Therefore, you do not need to physically wire power to each I/O module. Each connection between the I/O module and terminal base is keyed to prevent incorrect installation of an I/O module onto a base with incompatible wiring. Each I/O module is self-documented with convenient wiring diagrams on the module label. The label also provides usable space for custom labeling.



Environmental Ruggedness

The FieldPoint system is designed to operate in the harsh environments of industrial applications. Most components can operate over a wide temperature range of -40 to 70 °C and are specified to withstand a high degree of vibration and shock. Modules are optically isolated to 3,000 Vrms between the field wiring and the local bus and power supply, with double insulation for a safety working voltage of 250 Vrms.

I/O modules include removable label cards and wiring documentation information printed on the module.

Software

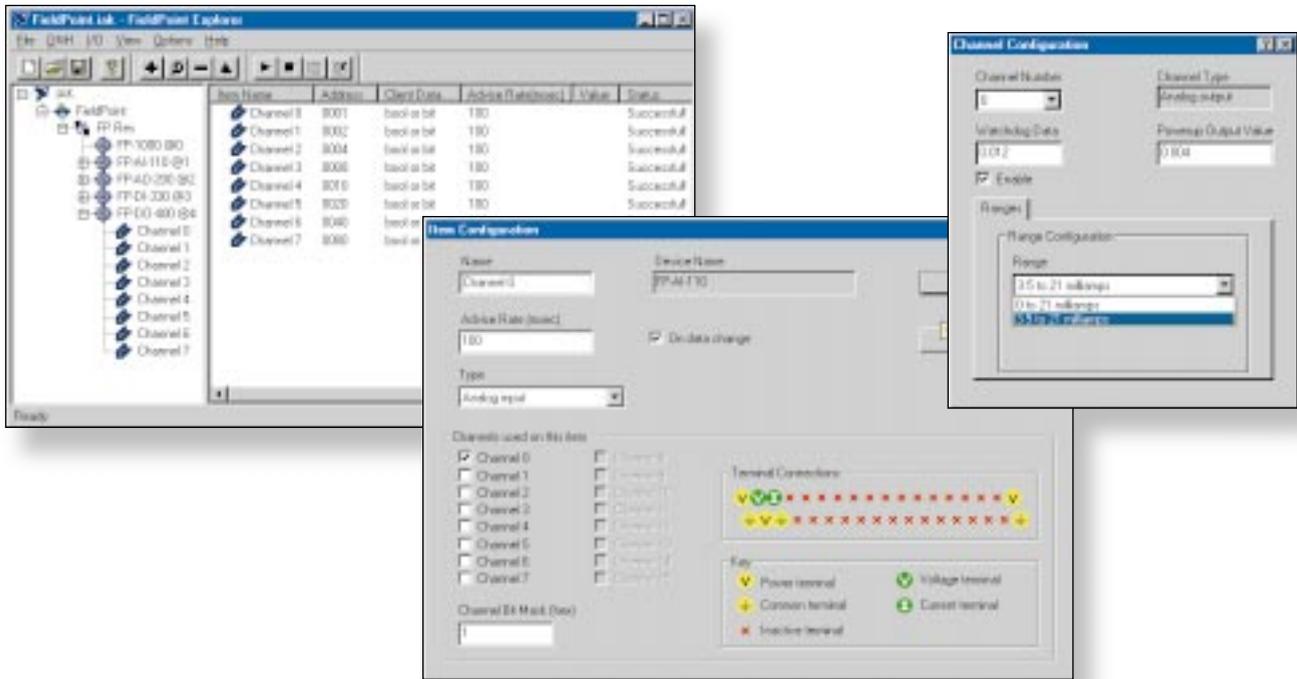
The FieldPoint system includes software tools that simplify integration of the FieldPoint system into a variety of software applications for Windows NT and Windows 95.

I/O Modules				
Module	Type	Channels	Signal Ranges	Page
FP-AI-100	12-bit analog inputs	8	±1 V to 36 V, 0-20 mA, 4-20 mA	468
FP-AI-110	16-bit analog inputs	8	mV, V, 0-20 mA, 4-20 mA	470
FP-AI-111	16-bit analog inputs	16	0-20 mA, 4-20 mA	472
FP-TC-120	thermocouple inputs	8	thermocouples, mV	474
FP-RTD-122	RTD inputs	8	100 Ω Pt, 1,000 Ω Pt, resistance	476
FP-AO-200	analog outputs	8	0-20 mA, 4-20 mA	478
FP-DI-330	discrete inputs, universal	8	5 to 240 VAC/VDC	482
FP-DI-300	discrete inputs	8	24 VDC	480
FP-DI-301	discrete inputs	16	24 VDC	480
FP-DO-400	discrete outputs	8	24 VDC (10 to 30 VDC)	484
FP-DO-401	discrete outputs	16	24 VDC (10 to 30 VDC)	484
FP-RLY-420	relays, SPST	8	3A at 35 VDC or 250 VAC	486
FP-CTR-500	counter inputs	8	24 VDC, 50 khz	488
FP-PWM-520	PWM outputs	8	5, 12, or 24 VDC, 1 A	490

Terminal Bases		
Base	Description	Page
FP-TB-1	screw terminal base (36 terminals)	502
FP-TB-2	spring terminal base (36 terminals)	502

Network Modules			
Module	Network	Configuration Software	Page
FP-1000	RS-232	FieldPoint Explorer	492
FP-1001	RS-485	FieldPoint Explorer	492
FP-3000	FOUNDATION Fieldbus H1	NI-FBUS Configurator	496
FP-1600	Ethernet, 10BaseT, and 100BaseTX	FieldPoint Explorer	500

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FieldPoint Explorer is a configuration utility for both FieldPoint hardware and server software.

FieldPoint Explorer for RS-232/RS-485 and Ethernet

FieldPoint Explorer is a Windows-based program that you can use to quickly configure your RS-232/RS-485 or Ethernet FieldPoint I/O system and verify operation. You can interactively set every configurable parameter of FieldPoint modules, including ranges, power-up status, and watchdog settings with the FieldPoint Explorer through easy-to-use graphical windows. You can also read and write data from I/O modules to test and verify proper operation. You can use the FieldPoint Explorer to configure your server software for use with BridgeVIEW, Lookout, LabVIEW, and LabWindows/CVI.

FOUNDATION Fieldbus Configurator

NI-FBUS Configurator is a 32-bit Windows application for complete configuration of FOUNDATION Fieldbus segments, including FieldPoint I/O nodes. NI-FBUS Configurator includes an easy-to-use, multiwindow interface that guides you through all aspects of fieldbus and FieldPoint configuration, including device configuration, function block configuration, and project and schedule management.

OPC Servers and Software Interfaces

FieldPoint systems include an OPC Server free of charge. Therefore, you can easily integrate FieldPoint systems with any software that has OPC client capability. OPC is an industry-

standard interface based on ActiveX and OLE technology. Because OPC uses DCOM technology, client applications can access data from remote OPC servers over the network.

The FieldPoint system also includes an integrated BridgeVIEW server, Lookout driver, VIs for directly accessing the FieldPoint server from LabVIEW and a LabWindows/CVI instrument driver.

OEM Capabilities

The FieldPoint system is suitable for a wide range of applications for original equipment manufacturers (OEMs). Contact National Instruments for more information on OEM opportunities and pricing.

