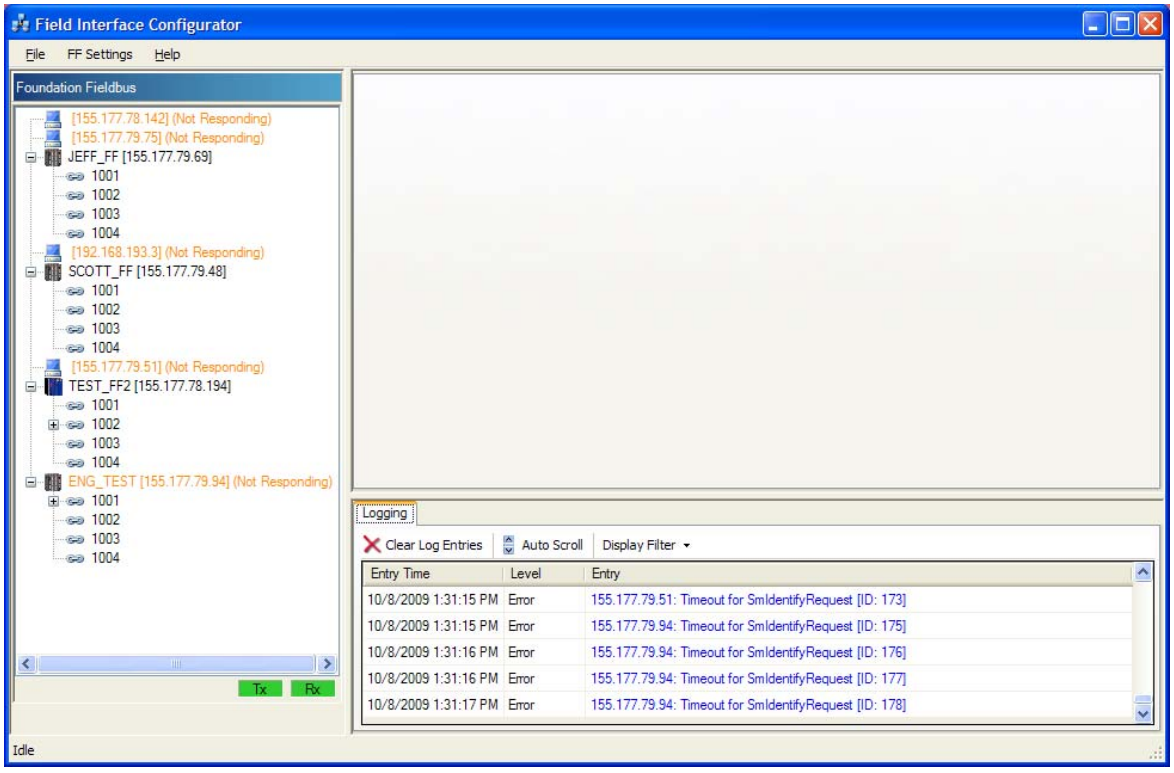
Form Number A6250
Part Number D301575X012
June 2010

Field Interface Configurator User Manual



Remote Automation Solutions

EMERSON.
Process Management

Revision Tracking Sheet

June 2010

This manual may be revised periodically to incorporate new or updated information. The revision date of each page appears at the bottom of the page opposite the page number. A change in revision date to any page also changes the date of the manual that appears on the front cover. Listed below is the revision date of each page (if applicable):

Page	Revision
All pages	June-10
Initial issue	Nov-09

Contents

Chapter 1 – General Information

This manual focuses on the installation and use of the Field Interface Configurator ("Configurator") software. Use this PC-based software (designed for a PC running Windows® XP® [with Service Pack 2] or Windows Vista®) to configure the Foundation Fieldbus (FF) Interface, monitor data, and create and manage "applications" (data relationships) between FF devices and other ROC or ControlWave devices on your network.

This chapter details the structure of this manual, briefly discusses the fieldbus architecture, and provides an overview of the software and its components.

Note: For information about the Interface itself or its component hardware modules, refer to the *FOUNDATION™ Fieldbus Interface Instruction Manual* (Form A6259) for the ROC800-Series or the *FOUNDATION™ Fieldbus Interface Instruction Manual* (Form CI-CWFFI) for the ControlWave.

In This Chapter

The FF Interface is a microprocessor-based device that, when connected to a Remote Automation Solutions ROC827 or ControlWave, enables you to configure and manage up to four segment input/output modules. Each segment module can communicate with up to 16 remote fieldbus devices, enabling you to manage up to 64 remote fieldbus devices for each FF Interface.

1.1 Scope of Manual

This manual contains the following chapters:

Chapter	Description
Chapter 1 General Information	Provides an overview of the Configurator software, fieldbus terminology, and general information about the fieldbus architecture.

Chapter	Description
Chapter 2 Installation	Provides information on installing the Configurator software.
Chapter 3 Configuration	Provides information on configuring the software to your network and devices.
Chapter 4 Use	Provides information on building the data relationships or “applications” you use daily.
Appendix A: Configuring the ControlWave Project	Explains configuration requirements for a ControlWave project.
Appendix B: Glossary	Provides a general listing of general terms and acronyms.
Index	Provides an alphabetic listing of items and topics contained in this manual.

1.2 Fieldbus Terminology

A fieldbus is an entirely digital, distributed control, bi-directional communications network that links multiple field-based measurement and control devices (“fieldbus devices”). Connected into the network using simple twisted pair wire, each fieldbus device (such as sensors, transmitters, or actuators) communicates with a server at 31.25 kb/sec using the H1 protocol. These devices are then known as “H1 devices” and the network that connects them an “H1 network.” If you configure the H1 network in a branching format, each branch (when correctly terminated) is known as a “segment” or an “H1 segment.” Each segment can manage up to 16 H1 devices, depending on power requirements, under normal conditions.

At the other end of the H1 segment is an H1 module, which resides in an interface server. The module and interface server process the communication and I/O signals from the fieldbus devices and send the results via a High-Speed Ethernet (HSE) connection to a host system.

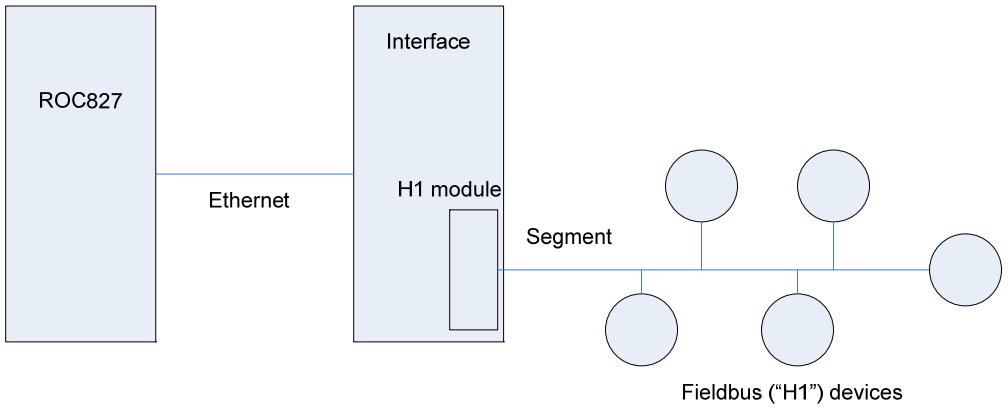


Figure 1-1. Simple Fieldbus Segment

Each H1 device has an associated data definition file. The Configurator uses the Device Description (DD Services) software (included when you installed the Configurator) to access and display information about the devices.

Remote Automation Solution's FOUNDATION Fieldbus Interface is a HSE server that provides power, CPU processing, and up to four H1 modules, each of which manages the input from up to 16 H1 devices in a segment. As an HSE server, the Interface connects into an Ethernet network of other HSE servers (which may also have associated fieldbus devices) to greatly expand your ability to monitor and control devices

Note: For further information, refer to the Fieldbus Foundation's publication *Technical Overview FOUNDATION™ Fieldbus* (FD-043 Rev 3.0), available through the Fieldbus Foundation's website (*www.fieldbus.org*).

1.3 Software

The Field Interface Configurator is a software utility installed on your PC. It displays the fieldbus components (fieldbus devices, segments, Interfaces, and ROCs or ControlWave RTUs) on your organization's Ethernet-based networks and enables you to create and manage data relationships (or "applications") for those components.

Note: The Configurator is designed for a PC running Windows® XP® (with Service Pack 2) or Windows Vista®.

1.3.1 Graphical Interface

The Configurator's graphical user interface (GUI) (see *Figure 1-2*) displays major system components (in the left-hand pane) and a log of all active events (at the bottom of the screen). When you select a component (from the left-hand pane), information and links to other system activities appear in the display area. You can use those links to perform system maintenance, such as creating and maintaining applications.

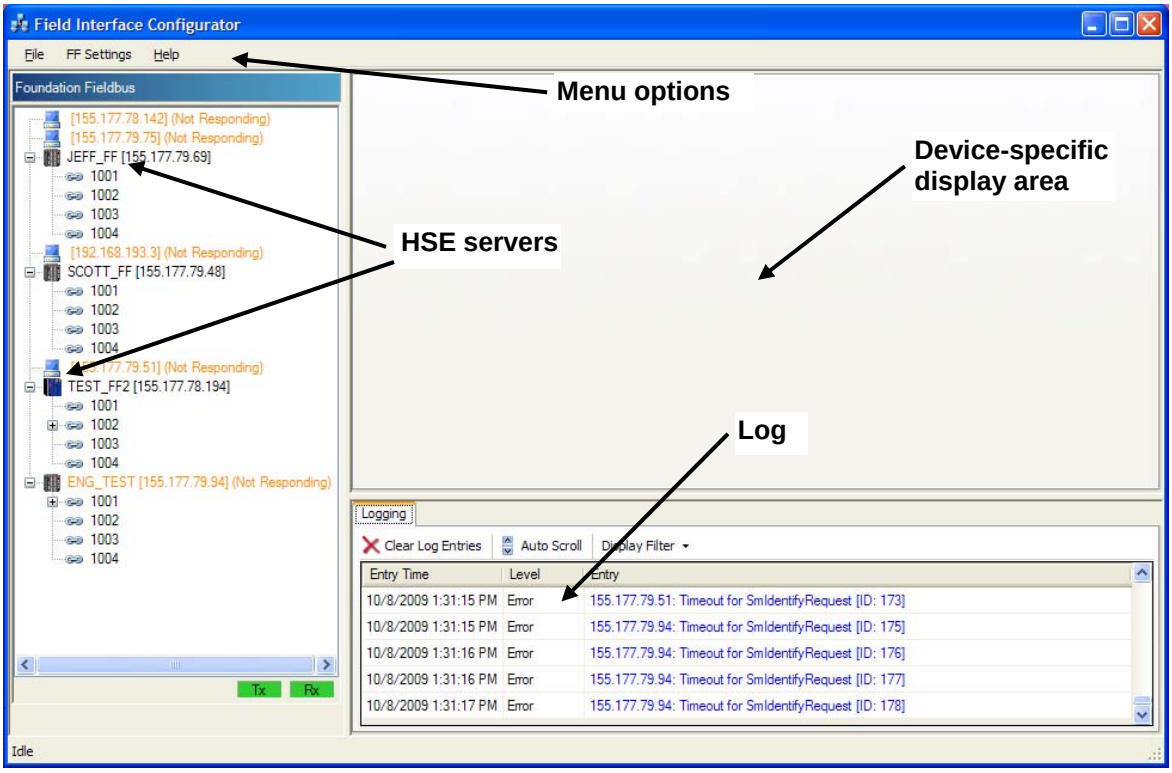


Figure 1-2. Configurator GUI

The Configurator's main menu provides the following options:

Option	Description	
File	Exits the Configurator.	
FF Settings	Manages HSE servers and Device Description Services.	
	Listen for HSE Servers	Enables the FF Interface to "listen" for and automatically add HSE devices.
	Manually Add HSE Servers…	Enables you to manually add HSE devices.
	DD Services Settings…	Identifies and associates a Device Description Services database with Configurator.
Help	Displays component and license information.	
	About Field Interface Configurator	Provides information on installed components, component details, and licenses.

Note: Refer to *Chapter 3, Configuration*, in this manual for detailed information on using these configuration options.

1.3.2 Right-click Menus

The GUI also uses a number of drop-down menus you access by right-clicking on elements of the screen. *Figure 1-3* shows the menu that

displays when you right-click on a HSE device icon in the Foundation Fieldbus module's network explorer display.

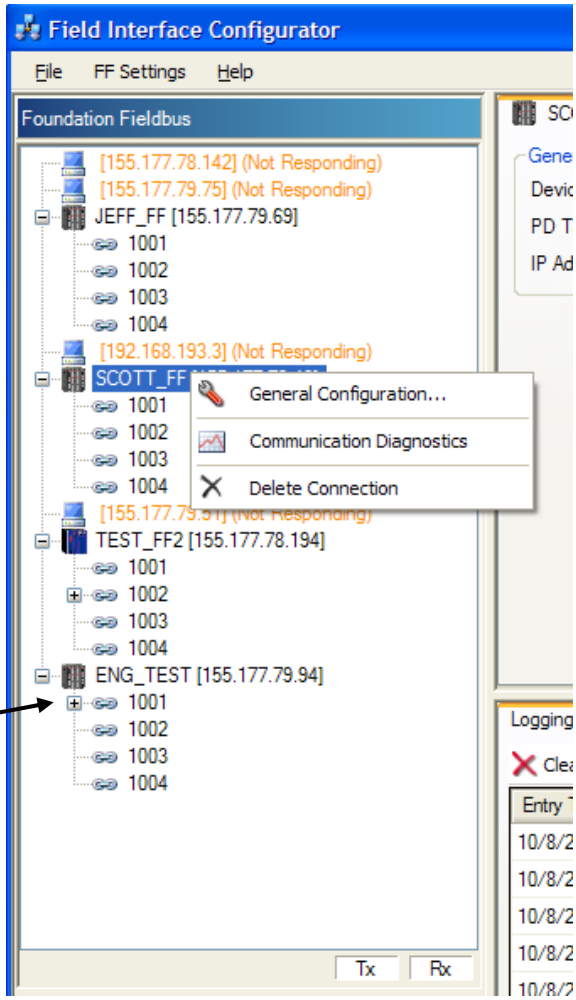


Figure 1-3. Right-click menu

The content of each drop-down menu depends on the selected server.

Note: For information on configuration, refer to *Chapter 3, Configuration*. For information on day-to-day use of these options, refer to *Chapter 4, Use*.

1.3.3 Function Block Application Designer

Right-click on the icon of an H1 segment with devices (see *Figure 1-3*) to display the initial screen for the Function Block Application Designer utility.

Note: You can also access this utility by left-clicking on the segment icon and selecting the Function Block Application Designer link.

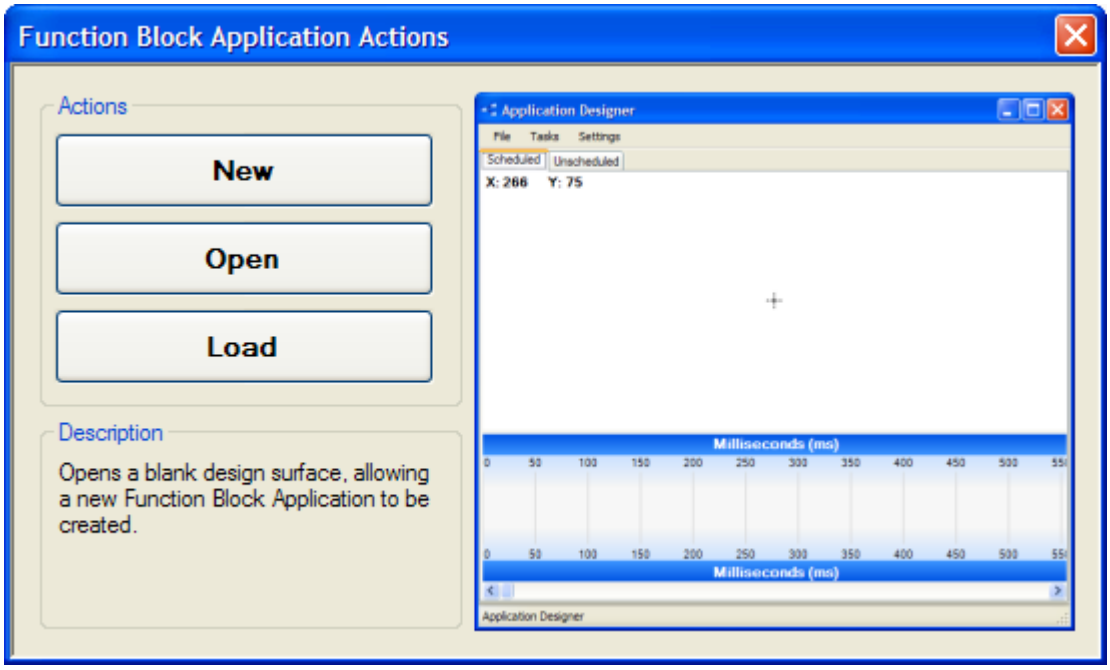


Figure 1-4. Function Block Application Designer

Use this graphical utility to create, maintain, save, and load applications (data relationships) built with function blocks (see *Data Hierarchy* in *Chapter 3*). These applications can be scheduled (occurring automatically on a timeframe you specify) or unscheduled (occurring as permitted by the free time on the segment). Refer to *Building an Application* in *Chapter 4*.

1.4 Hardware

The FOUNDATION Fieldbus (FF) Configurator software is a PC-based utility that enables you to configure FF Interfaces (both ROC800-based and ControlWave) and associated FF devices.

1.4.1 ROC800-based FF Interface

Remote Automation Solutions' FF Interface provides an integrated power, processor, and communications platform on one module that inserts into a ROC800 Series 2 I/O backplane. With up to four FF I/O modules inserted in the same backplane, the Interface becomes a communication and management tool, handling up to 64 fieldbus devices.

Figure 1-5 shows a stand-alone FF Interface, consisting of an FF Interface with four FF I/O H1 modules installed in the Acrylonitrile Butadiene Styrene (ABS) housing. The patented ABS plastic housing has wire covers to protect the wiring terminals, covers to protect unused module slots, and includes DIN rail mounts for mounting the Interface on a panel or in a user-supplied enclosure.

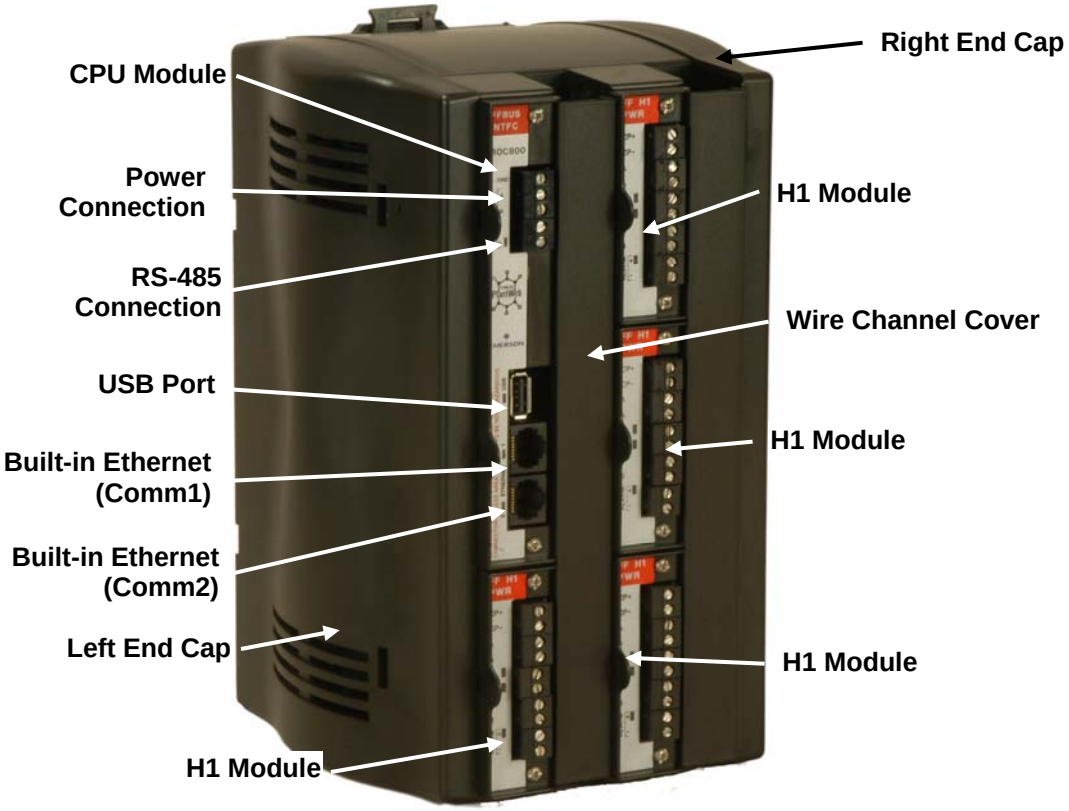


Figure 1-5. ROC800-based FF Interface

The FF Interface can stand physically alone or be part of a ROC827. In either circumstance, it must be connected to an Ethernet network, since the ROC827 provides the data processing functionality you need to manage the input from fieldbus devices.

Note: If you include the FF Interface as part of a ROC827, it **replaces** one of the four expansion I/O racks in the ROC827.

For further information, refer to the technical specifications *FOUNDATION™ Fieldbus Interface* (ROC800:FFI) or the *FOUNDATION™ Fieldbus Interface Instruction Manual* (Form A6259).

1.4.2 ControlWave–based FF Interface

The ControlWave FOUNDATION Fieldbus Interface allows a ControlWave to support bi-directional multi-drop communication between Foundation fieldbus H1 devices over a high-speed Ethernet (HSE) network. *Figure 1-6* shows a stand-alone FFI Interface module, which consists of a three-slot chassis, the FFbus Interface module (FFI CPU module) and up to two FFbus H1 carrier modules, each of which can hold up to two H1 modules.

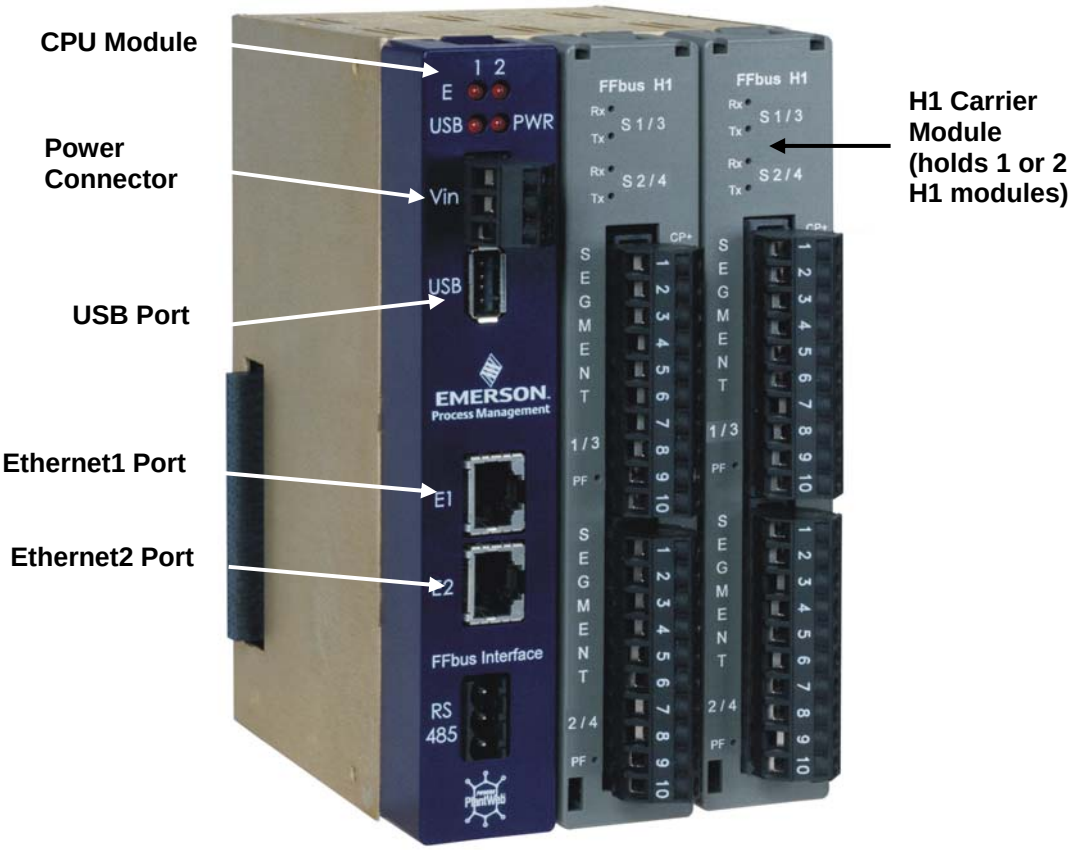


Figure 1-6. ControlWave-based FF Interface

The three-slot chassis can function either as a stand-alone device that communicates to any ControlWave device through an Ethernet connection and receives power independently or be directly connected to a ControlWave Micro, where it receives power through the backplane.

For further information, refer to the technical specifications *FOUNDATION Fieldbus Interface* (ControlWave:FFI) or the *FOUNDATION Fieldbus Interface Instruction Manual* (Form CI-CWFFI).

1.5 Additional Technical Information

Refer to the following documents for additional technical information.

Note: The most current versions of these technical publications are available at *www.EmersonProcess.com/Remote*.

Table 1-1. Additional Technical Information

Name	Form Number	Part Number
FOUNDATION™ Fieldbus Interface Instruction Manual	A6259	D301461X012
FOUNDATION™ Fieldbus Interface Software (for the ROC800-Series) User Manual	A6268	D301653X012
FOUNDATION™ Fieldbus HSE Field Conversion Guide	A6285	D301694X012
FOUNDATION™ Fieldbus Interface Instruction Manual	CI-CWFFI	D301634X012
FOUNDATION™ Fieldbus Interface (ControlWave)	ControlWave:FFI	D301651X012
FOUNDATION™ Fieldbus Interface (ROC800-Series)	ROC800:FFI	D301650X012

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Chapter 2 – Installation

This chapter describes how to install the Configurator software on your PC. You install the program (which is delivered on a CD-ROM) on your PC's hard drive. The program has been tested on a PC running Windows® XP Professional (with Service Pack 2) and Windows Vista®.

CD-ROM Structure

The Field Interface Configurator CD-ROM contains the following folders and files:

File/folder Name	Description
Acrobat_Reader	Contains files you use to install the Adobe Acrobat reader on your PC.
FieldInterfaceConfigurator	Contains the Field Interface Configurator and DD Services software and related files.
ROC800 Series2 FF User Program	Contains a user program you must install on a Series 2 ROC800 to use the Field Interface Configurator program.
Documentation	Contains the following application-related documents:
A6250.pdf	File for *Field Interface Configurator User Manual* (this manual).
A6259.pdf	File for *FOUNDATION Fieldbus Interface Instruction Manual* (for ROC800-Series)
A6268.pdf	File for *FOUNDATION Fieldbus Interface Software (for ROC800-Series) User Manual*
A6285.pdf	File for *FOUNDATION Fieldbus HSE Field Conversion Guide* (for ROC800-Series)
CI-CWFFI.pdf	File for *FOUNDATION Fieldbus Interface Instruction Manual* (for ControlWave)
CW_FFI.pdf	File for technical specifications for ControlWave FOUNDATION Fieldbus Interface
ROC800_FFI.pdf	File for technical specifications for ROC800-Series FOUNDATION Fieldbus Interface
Licenses	Contains open source software licenses.
Autorun.inf	Controls the actions of the PC when you place the CD-ROM in the CD tray. **Note**: If you have disabled AutoRun on your PC, you must open the FieldInterfaceConfigurator folder and click **setup.exe**.

Note: You use an installation wizard to install the Configurator software. The wizard also installs the Device Description (DD) Services software. For any reason, if you need to re-install the Configurator software, you **must** first **uninstall** the DD Services software using the Add/Remove Programs utility on Windows' Control Panel (**Start** > **Settings** > **Control Panel**).

ControlWave Project

Before you begin to install the Configurator on a ControlWave FFbus Interface, you must first configure a ControlWave project file. See *Appendix A, Configuring the ControlWave Project*.

2.1 Installation Process

Note: The setup program should start automatically when you insert the CD-ROM in your PC. If it does not, access the CD, open the FieldInterfaceConfigurator folder, and click **setup.exe**.

1. Place the CD-ROM in your PC's CD drive. The first screen in the installation wizard displays.

Figure 2-1. Setup Wizard Opening Screen

Note: If you **do not** have the DD Services software already installed on your PC, the following screen sequence may precede the Setup Wizard's opening screen.

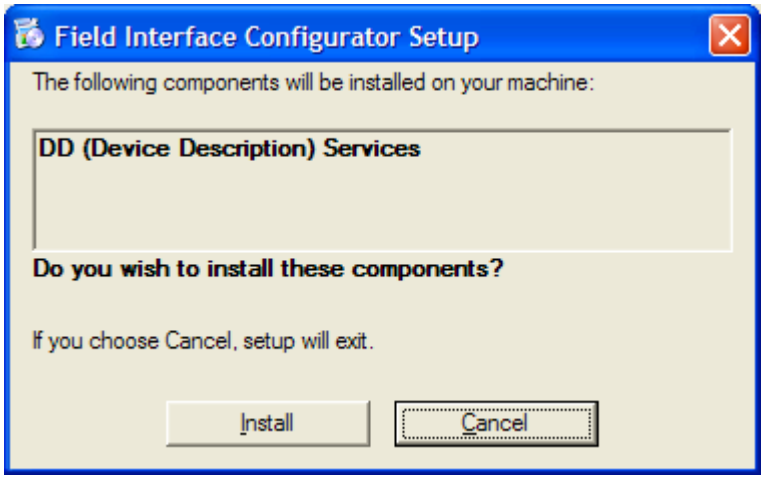

Figure 2-2. DD Services Installation Dialog

Note: Click **Install** to continue.

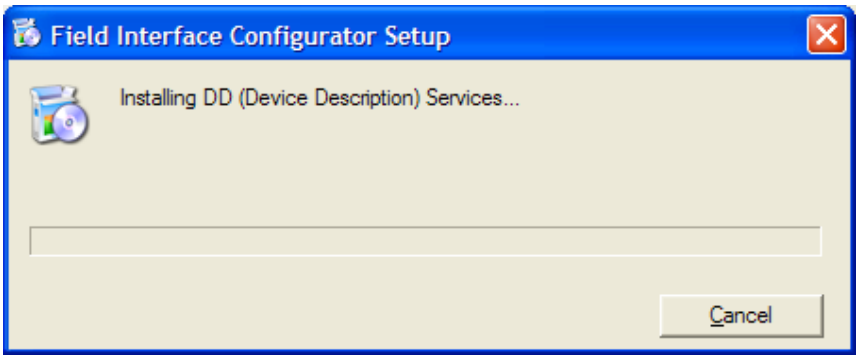

Figure 2-3. DD Services Installation Screen

2. Click **Next** on the Setup Wizard's opening screen (see *Figure 2-1*). The End-User License Agreement (EULA) screen displays.

Figure 2-4. EULA

3. Read the EULA, click the **I accept the terms…** option, and click **Next**. The Setup Type screen displays.

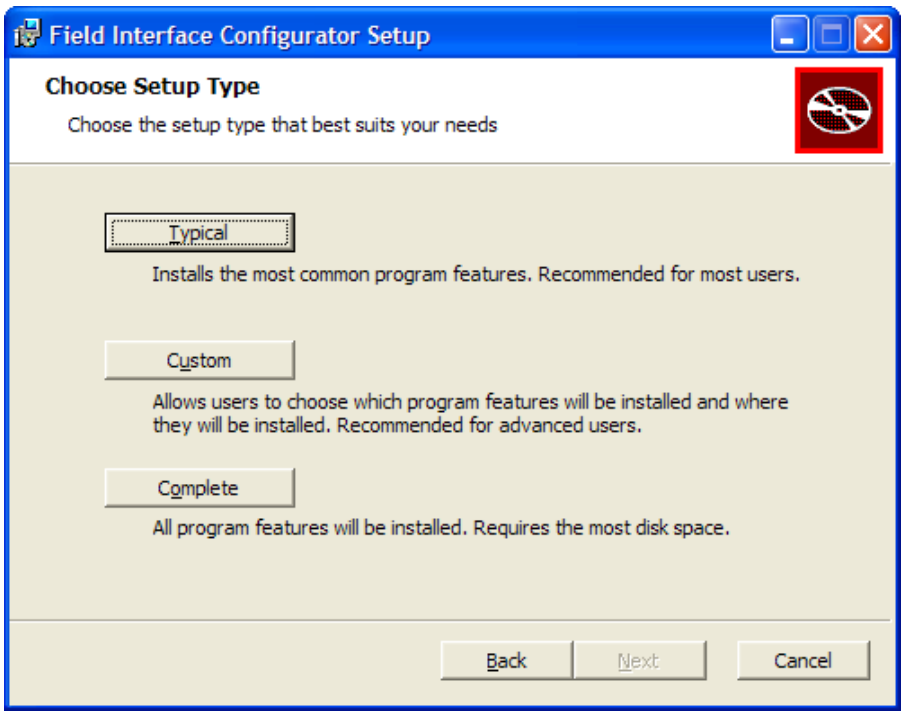

Figure 2-5. Setup Selection

4. Click either **Typical** (to install the most common options) or **Complete** (to install all program features). The Install screen displays.

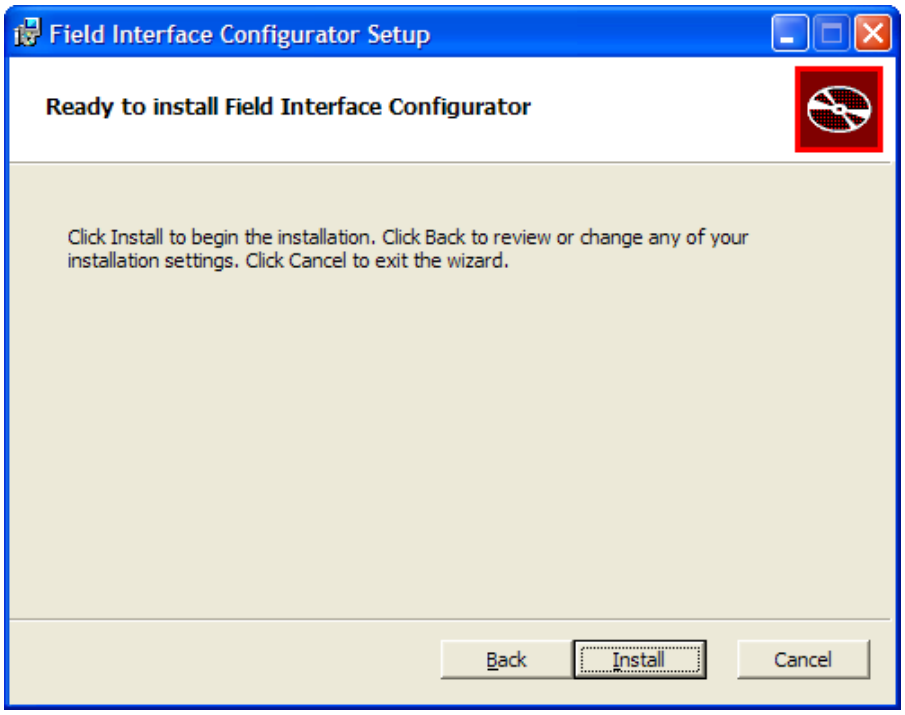

Figure 2-6. Installation (Start)

5. Click **Install** to begin the installation. The wizard displays a progress screen that monitors the progress of the installation.

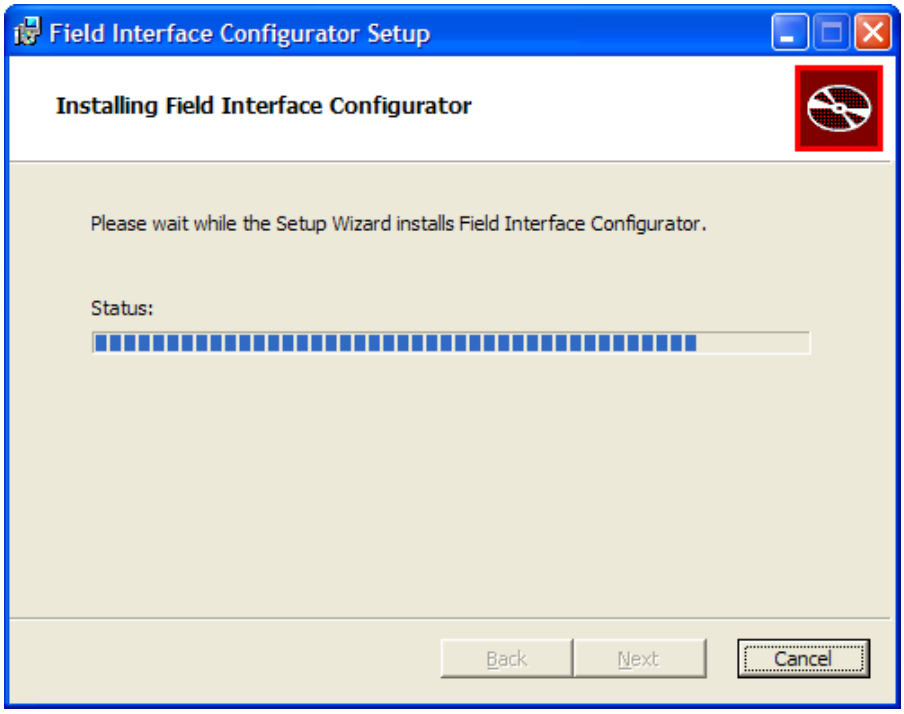

Figure 2-7. Installation (In Process)

6. When the installation completes successfully, the wizard displays a completion screen.

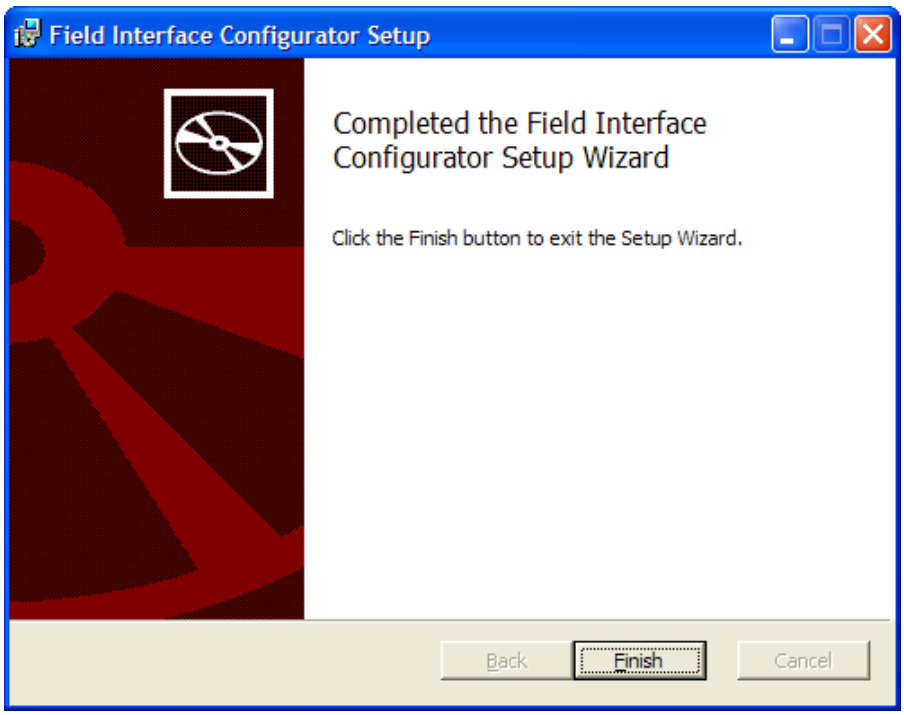

Figure 2-8. Wizard Completion

7. Click **Finish** to close the wizard. Proceed to *Chapter 3, Configuration and Use*.

2.1.1 Software on a ROC827

If you intend to use a ROC827 to collect data from a FFbus Interface, the ROC827 requires a special user program. Refer to the *FOUNDATION™ Fieldbus Interface Software (for the ROC800-Series) User Manual* (Form A6268).

Note: This user program and related documentation are both provided on the Field Interface Configurator CD-ROM (part number FSFIC-1/FIC1)

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Chapter 3 – Configuration

This chapter discusses how to configure the system components: the HSE servers, segments, and fieldbus devices.

In This Chapter

3.1 Overview

Once you've successfully installed the Field Interface Configurator and DD Services software on your PC (see *Chapter 2*), you can begin to configure your HSE servers and segments.

Note: Only after you configure your servers and segments should you begin to create applications for download to the particular segments (see *Chapter 4*).

3.1.1 Configuring HSE Servers and Segments

HSE servers automatically announce their presence on an Ethernet connection when you open the Configurator. Occasionally, you may have to manually add an HSE server if the PC running the Configurator cannot "hear" the server. You can also configure various server components (communications, port forwarding, etc.).

Note: The Configurator maintains a database of fieldbus device description (DD) files. If you add a new fieldbus device to a segment, the Configurator may already have the DD file for that device in its database. If not, you can download DD files from the manufacturer and add them to the database. See *Missing Device Descriptors* in *Section 3.3, Configuring Servers.*

Starting the Configurator

When you start the Configurator, it automatically scans all networks into which it is connected via Ethernet and opens the Foundation Fieldbus module, displaying all identified servers (see *Figure 3-1*).

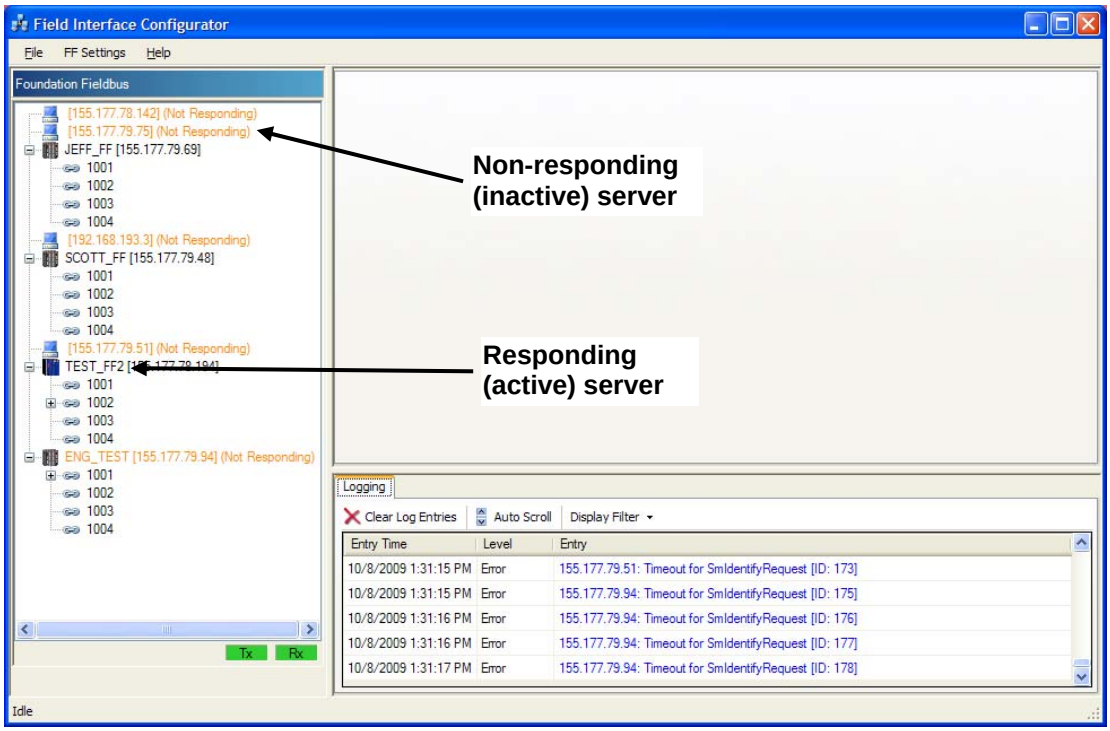


Figure 3-1. Foundation Fieldbus Module

Note: The Foundation Fieldbus display includes both active and inactive (or non-responding) servers.

The following section describes the Foundation Fieldbus module.

3.2 Foundation Fieldbus Module

When you start the Configurator, it opens the Foundation Fieldbus module, which provides a comprehensive real-time view of all the active and inactive HSE servers on your Ethernet network (see *Figure 3-2*).

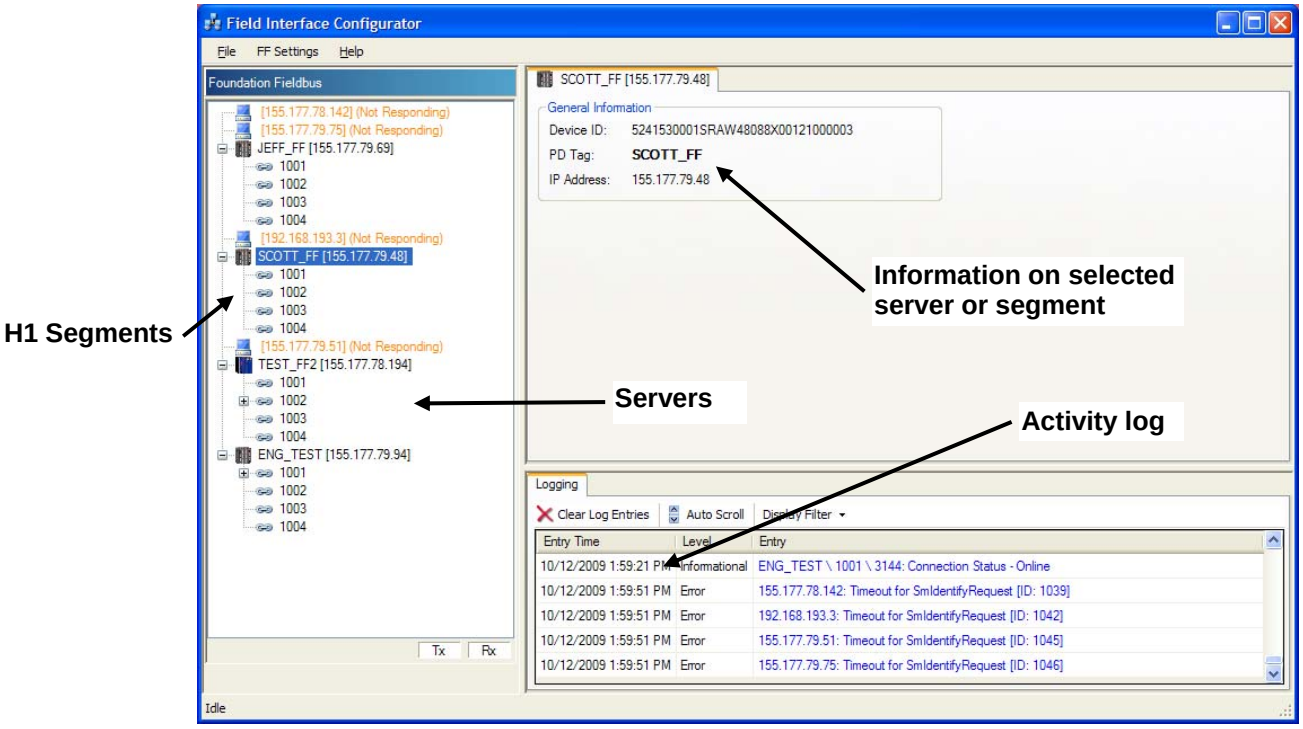


Figure 3-2. Foundation Fieldbus Module

The left-hand side of the screen shows all servers on the Ethernet network and, if applicable, the number of H1 segments (identified by a chain icon) defined for each server. Different icons indicate the specific kind of server.

Table 3-1. Server Icons

Icon	Meaning
	Default server (type unknown)
	ControlWave server
	ROC800-based server
	Rosemount 3420 server

The tab in the upper right portion of the screen provides general information (Device ID, PD tag, and IP address) for any server you select.

3.2.1 Data Hierarchy

Note in the directory on the left-hand side of the screen that some of the HSE servers have defined segments (identified by the chain icon) and that a plus sign appears to the left of some of those segments (see *Figure 3-3*).

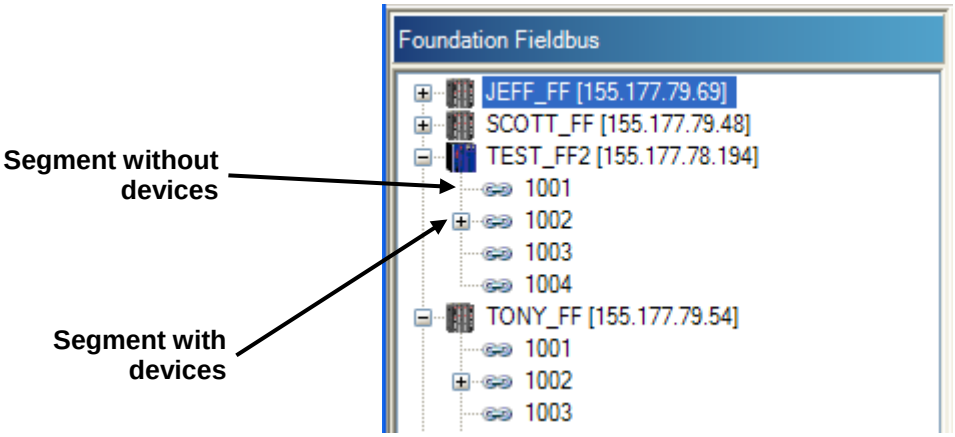


Figure 3-3. Segment with Devices

Click the plus sign to expand that directory and display specific devices attached to that segment. Note also that the tab on the right-hand side of the screen changes to display information about that device and may include links to the Device Assignment Configuration screen (see *Figure 3-4*) and the Function Block Application Designer (see *Section 3.4, Building Applications*).

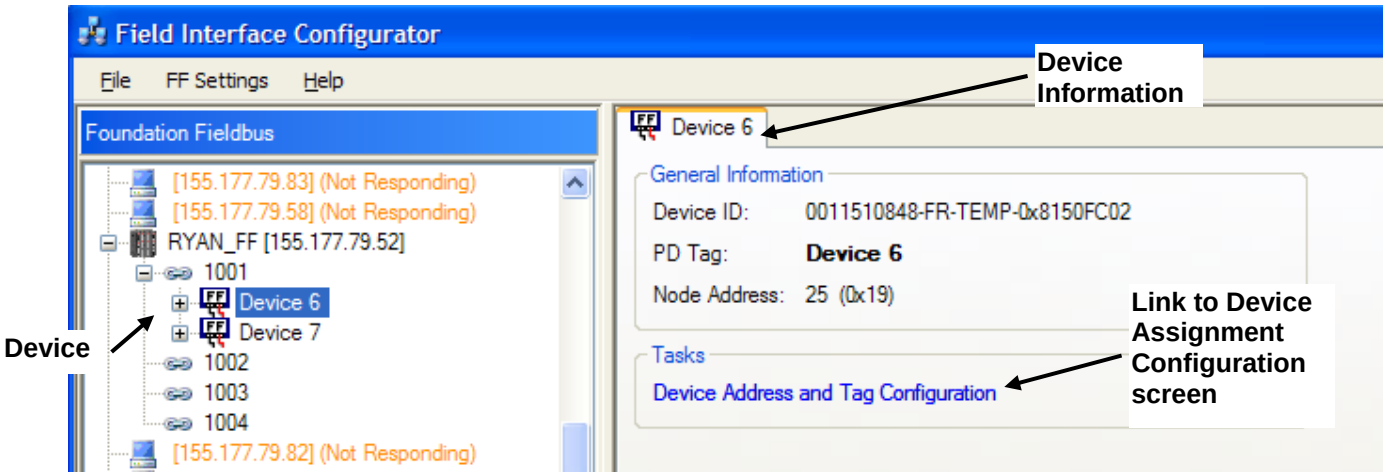


Figure 3-4. Segment with Devices

If you click **Device Address and Tag Configuration**, the FF Device Assignment Configuration screen displays (see *Figure 3-5*).

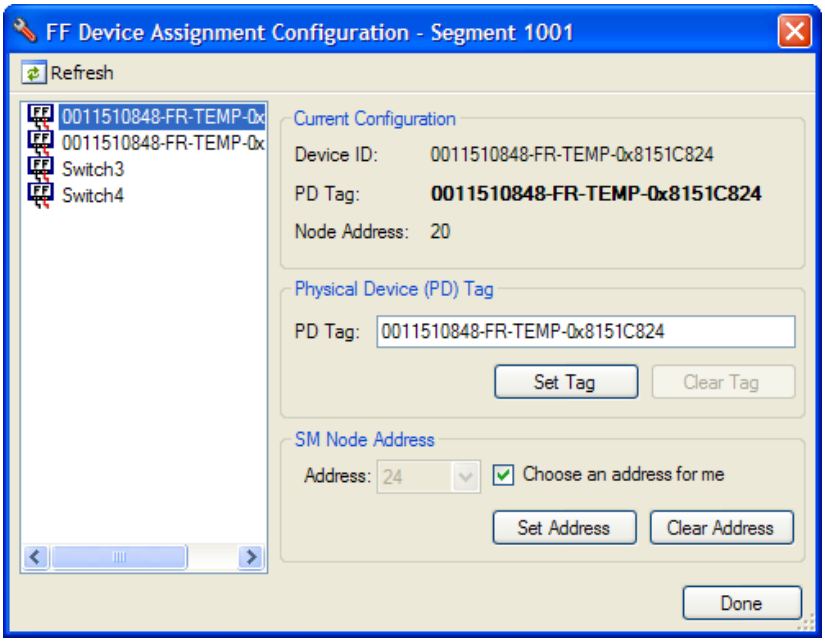


Figure 3-5. Device Assignment Configuration

Use this screen to view current configuration information about the device, to change the physical device tag (label) associated with the device, or to manually assign a system management (SM) node address to the device. The system uses these node addresses when polling individual devices. By default, the system checks **Choose an address for me**, assigning the first available SM node address to the device. If you uncheck **Choose address…**, the Address drop-down box opens and you can select one of the available addresses. Click **Set Tag** to save a new PD tag or **Set Address** to save a new node address assignment. Then click **Done** to close this screen and return to the Foundation Fieldbus screen.

Application Blocks

In the Foundation Fieldbus directory tree, a plus sign may appear to the left of the device icon. If you click that plus sign, the software opens the device to show all the defined application blocks (see *Figure 3-6*).

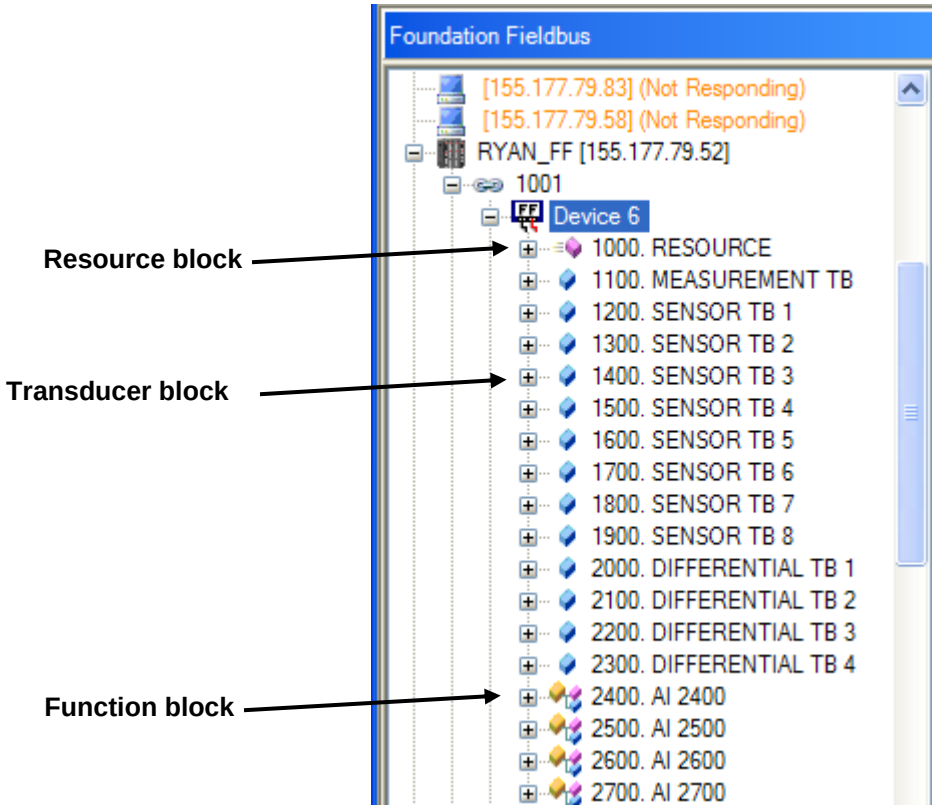


Figure 3-6. Expanded Device

The icons under the device represent the three categories (resource, transducer, or function) of "blocks" in the device.

Table 3-2. Block Icons

Icon	Meaning
	Resource block; provides device characteristics (device name, manufacturer, serial number, etc.). **Note**: Each device has only **one** resource block.
	Transducer block; represents physical hardware (such as actuators or transducers) in the device.
	Function block; provides system control behavior which you can schedule.

Note the plus sign to the left of each block icon. As you select each kind of block, the tab on the right-hand side of the Configurator screen changes to provide additional information (see *Figure 3-7*).

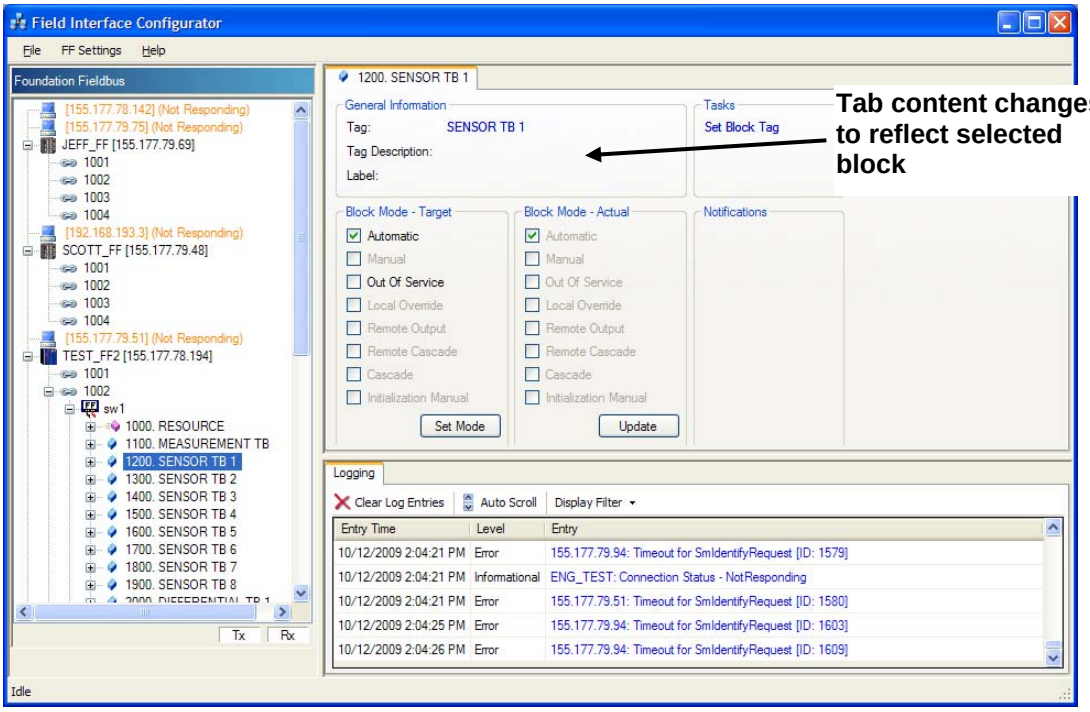


Figure 3-7. Transducer Block tab

The format and content of this tab remains the same for each kind of resource block:

- **General Information**: displays a tag, description, and label for the selected block type.
- **Tasks**: provides link to tasks you can perform with the selected block. **Set Block Tag** is an option for every block type.
- **Block Mode - Target**: sets the intended operational mode for the block. The system activates only those modes applicable for the selected block type. Click **Set Mode** if you change any of these values.
- **Block Mode - Actual**: shows the actual block mode. The system activates only those modes applicable for the selected block type. Click **Update** to refresh the listing of actual modes.
- **Notifications**: displays any notices or warning messages about the selected block.

Note: For further technical information on FOUNDATION™ Fieldbus specifications, contact the Fieldbus Foundation (*www.fieldbus.org*).

3.3 Configuring Servers

To configure server components, you use a combination of options from the main menu and drop-down menus.

3.3.1 Default HSE Server Values

Table 3-2 shows the default factory-set values for servers.

Table 3-2. Default HSE Server Values

Part Number	
ROC:	W48088X0012
ControlWave	396917-01-1

NETWORKING	
Eth0 (Primary Ethernet port, #1)	
IP:	192.168.1.5
Netmask:	255.255.255.0
Gateway:	192.168.1.1
Eth1 (Secondary Ethernet port #2)	
IP:	10.0.0.1
Netmask:	255.255.255.0
Alternate Eth0 (alias on Eth0)	
IP:	172.16.0.1
Netmask:	255.255.255.0
Port Forwarding	
	No default port forwarding rules
Port Blocking (HSE Annunciation)	
Port:	1089
Type:	UDP
	Disabled by default; cannot delete rule, but only enable or disable.

HSE Server	
	All four segments enabled by default

3.3.2 Main Menu Options

The main menu for configuring server options is located at the top of the Configurator screen:

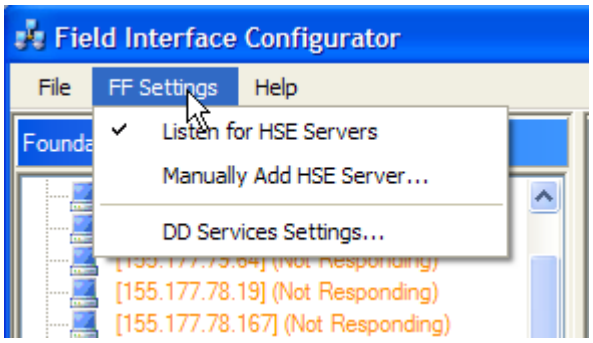


Figure 3-8. FF Settings

FF Settings

The **FF Settings** option on the Configurator menu bar enables you to manage HSE servers on the network and indicate where the DD Services software (the database of device description files) resides.

Option	Description
Listen for HSE Servers	Enables the Configurator to listen for and automatically add HSE servers to the display. This is the **default**.
Manually Add HSE Server…	Enables you to add an HSE server to the network. Normally, HSE servers periodically signal (or "announce") their presence on the network so that other HSE servers can locate them. However, some HSE servers may be on distant or complex networks where the "annunciation" signal is not heard. Click this option to open a dialog box you use to indicate the IP address for a specific server:  Enter a valid IP address for your network and click **Add**. The Configurator adds the server to the directory.

DD Services Settings

Select **DD Services Settings…** from the FF Settings menu bar to display the DD Services Configuration screen (see *Figure 3-9*).

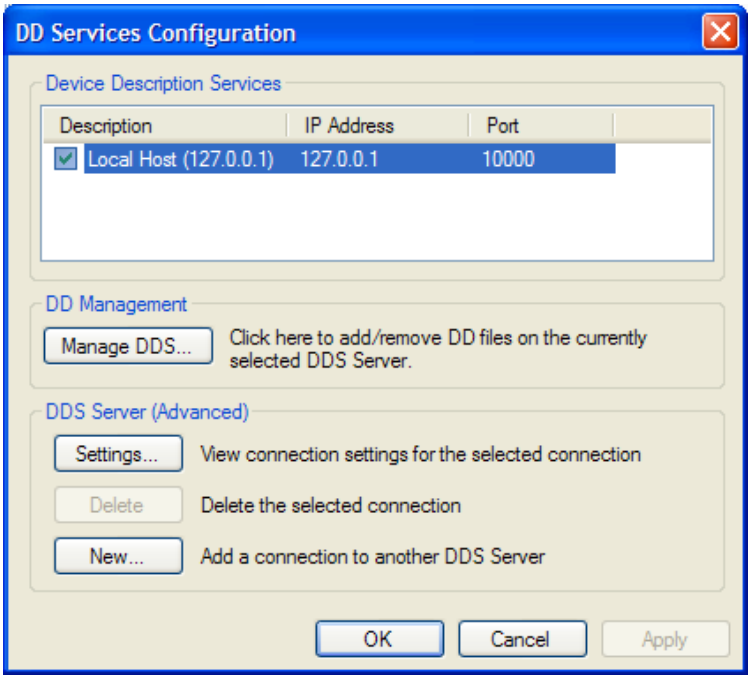


Figure 3-9. DD Services Configuration

Use this screen to verify or change the IP address for the host computer on which the DD Services software is installed, add or remove device description files, and perform advanced DDS functions.

Note: 127.0.0.1 is the "local" host computer.

Device Description Services

This portion of the screen indicates the IP address for the host server on which the DD Services software resides. By default, the host server is the server on which you've installed the DD Services software.

To change this location, select another host from those displayed on this screen and click **Apply**.

DD Management

Click **Manage DDS…** to display the DD Services Advanced Configuration screen (see *Figure 3-10*). The DD Explorer tab lists (by device manufacturer) all device descriptions in the currently installed DD Services software.

Note: The first time you click **Manage DDS** the Configurator builds a list of all device definitions stored in the database. Depending on the number of devices, several minutes may pass.

This screen provides a view into the DD Service database. Each wrench icon indicates a device manufacturer. Click the plus sign next to an icon to display devices and their associated revisions and revision files (see *Figure 3-11*). When you select a specific set of data definition files, the Configurator activates the **Add New**, **Delete**, and **Download** buttons:

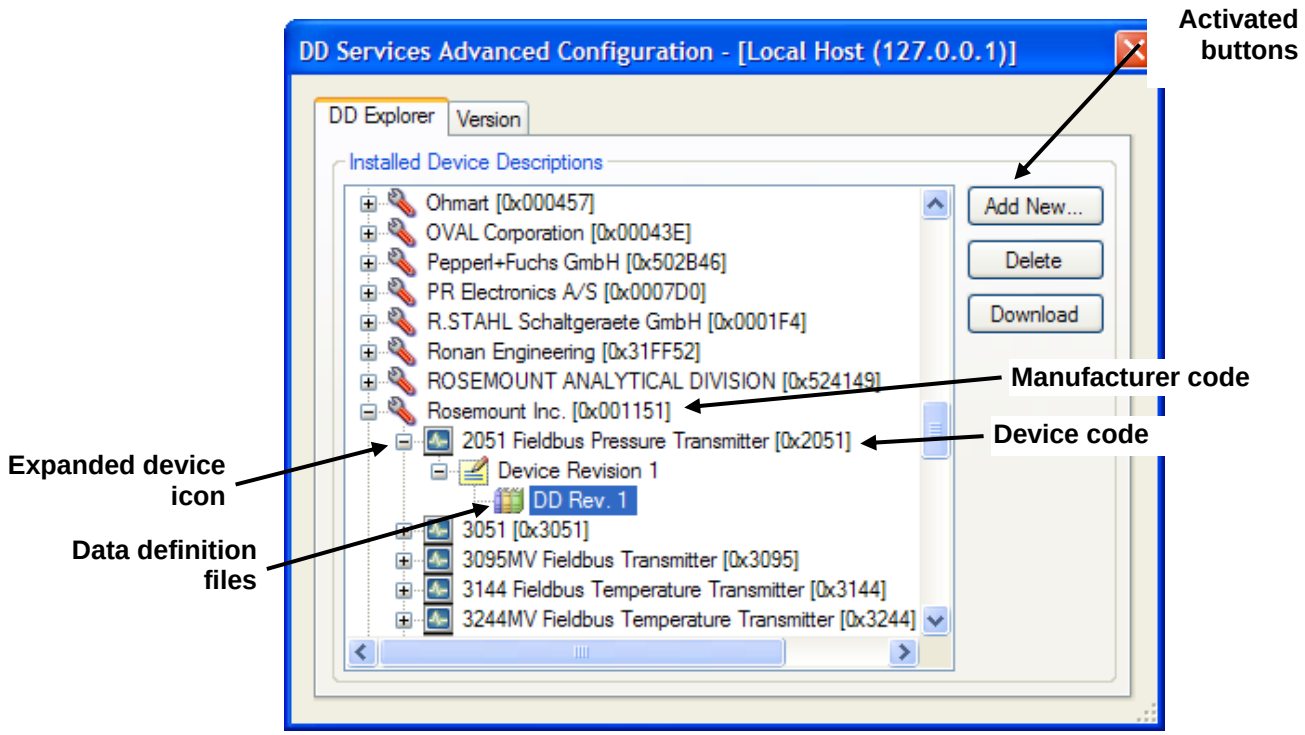


Figure 3-10. DD Services Advanced Configuration (Expanded)

Also notice the manufacturer code (**0x001151**) and the device code (**0x2051**). The Fieldbus Foundation assigns each device manufacturer a unique code. Manufacturers, in turn, assign each device a unique code to help identify it in the DD Services database.

Adding Device Descriptors

Use **Add New** to place additional or updated DD files in the DD database. The Configurator activates **Add New** when you **first** access the DD Services Advanced Configuration screen:

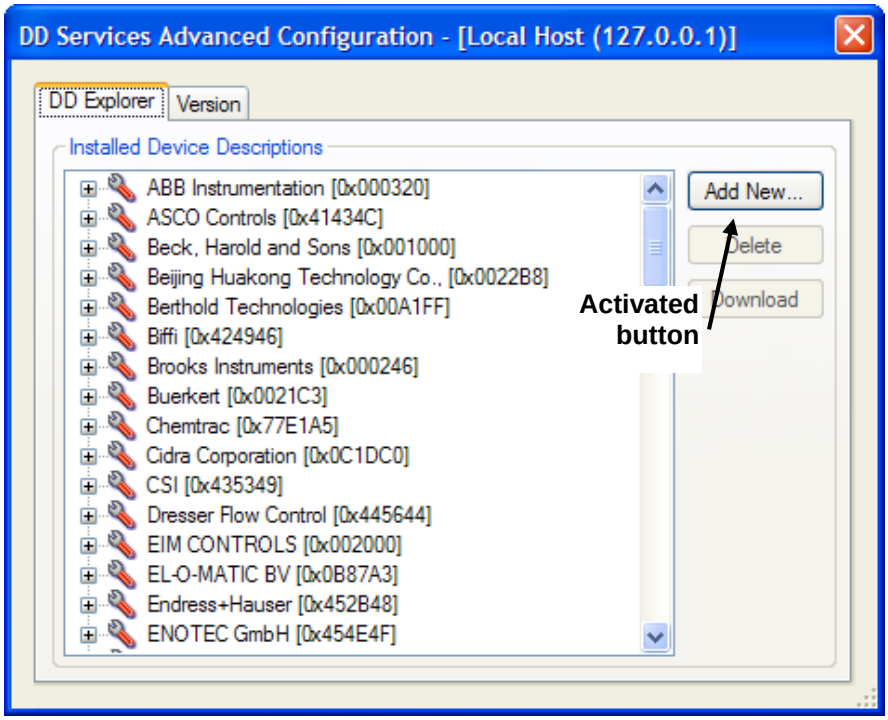


Figure 3-11. DD Services Advanced Configuration (Opening)

Note: When you add a new DD file to the database, you don't need to identify a location. The DD database uses the manufacturer and device codes to add the file in the right place.

Add New assumes you already have updated or additional DD files available on your PC. Click **Add New…** to display a Browse dialog box:

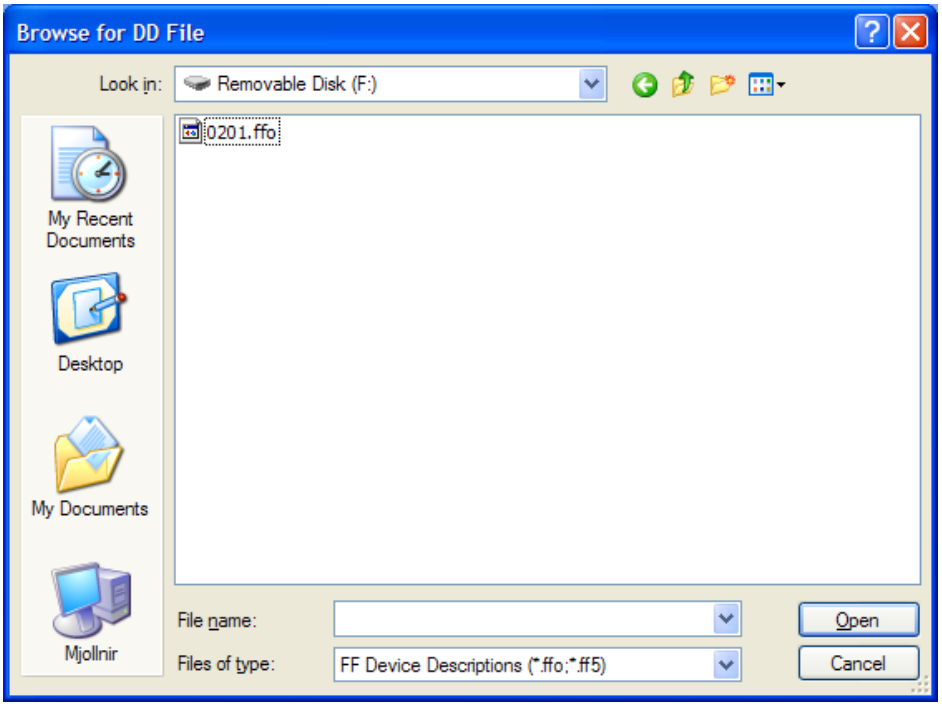


Figure 3-12. Add New Browse dialog

Browse to the location of the DD file (in this case, the file is located on a USB jump drive). Select the file and click **Open**. The Configurator displays a confirmation dialog"

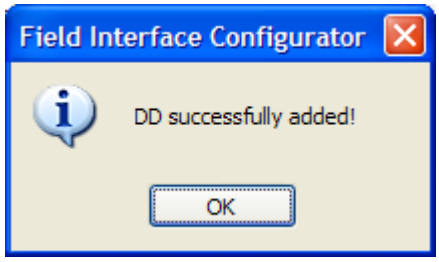


Figure 3-13. Add New Confirmation dialog

Downloading Device Descriptors

The Configurator also enables you to copy ("download") DD files. This is useful if the copy of the Configurator (and the DD Services) software loaded on another PC may not have the device definition files you need. Use this option to copy the files to a portable medium (such as a USB jump drive) and then use the **Add New** option to copy those files to the DD Services software on the second PC.

When you click **Download**, the Configurator displays a verification dialog:

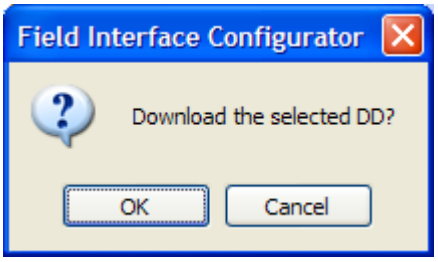


Figure 3-14. Download Verification

Click **OK**. You then specify a target location for the DD files:

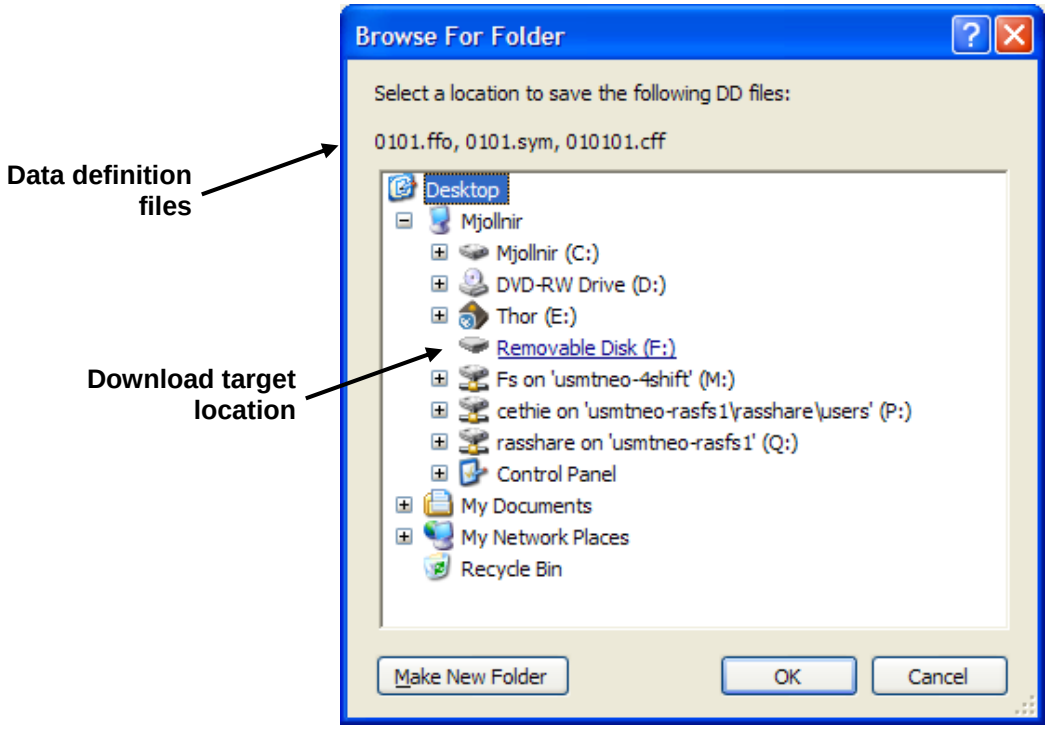


Figure 3-15. Download Browse

Click **OK**. The files copy to the specified location and Configurator displays a confirmation dialog.

Note: The Configurator lists the particular DD files you have selected at the top of this browse dialog. Typically three files comprise a set: .ffo (or .ff5), .sym (or .sy5), and .cff.

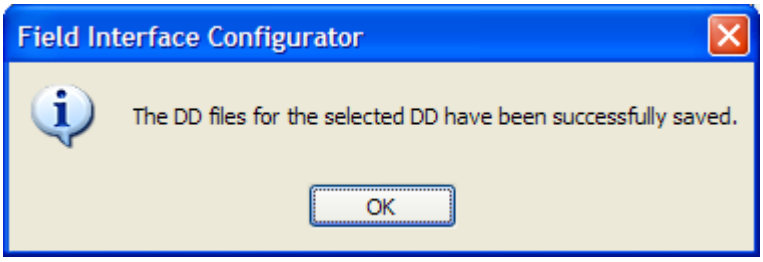


Figure 3-16. Download Confirmation

Click **OK** to exit the dialog and return to the DD Services Advanced Configuration screen.

Locating Missing Device Descriptors

The DD Services software requires devices to have associated device descriptor files. If you try to expand a device that has no DD files, the Configurator displays the screen show in *Figure 3-17*.

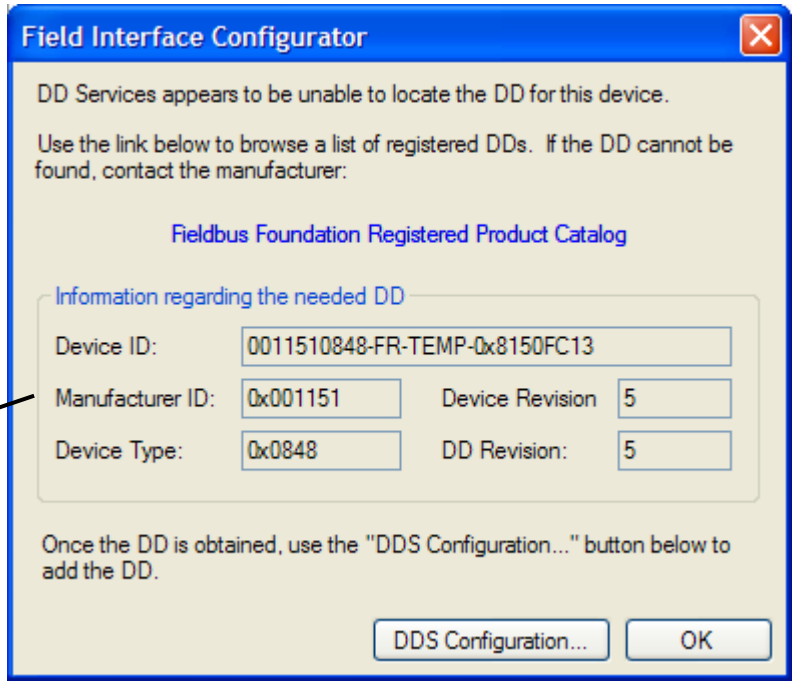


Figure 3-17. DD Services Advanced Configuration (Expanded)

Click on **Fieldbus Foundation Registered Product Catalog**. That starts a web browser session that accesses the Fieldbus Foundations website and database of device description files. Select (by manufacturer and device) the files to download to your PC's DD services database.

Note: This function assumes you have an internet connection.

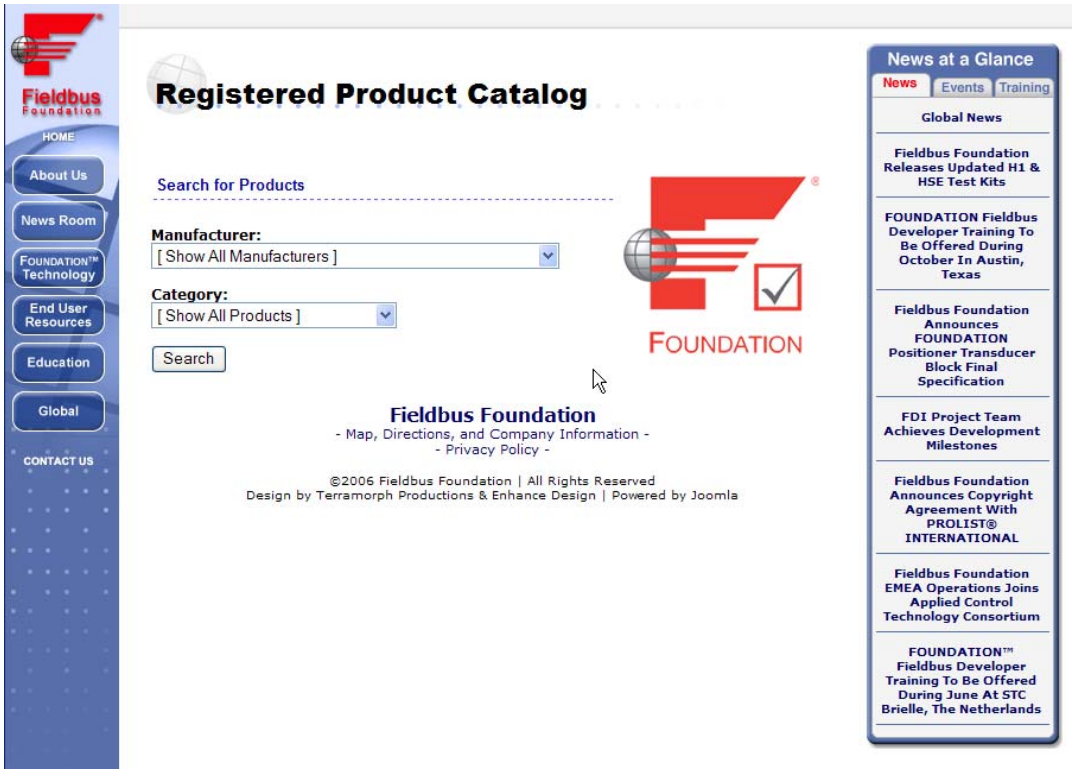


Figure 3-18. Fieldbus Foundation website

Select the manufacturer and device. A device-specific webpage displays that contains a **Download** button:

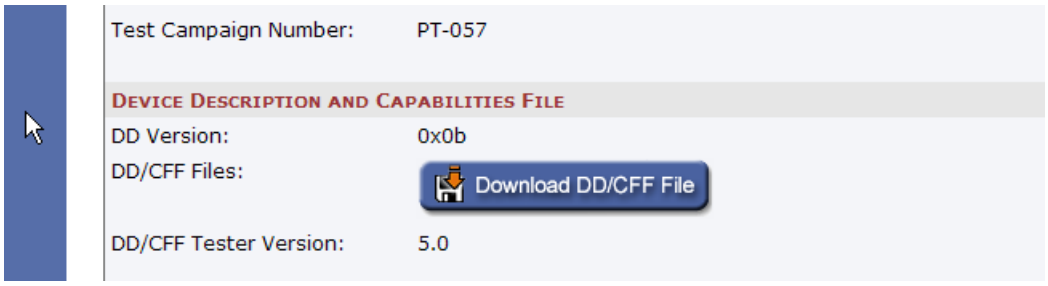


Figure 3-19. Fieldbus Foundation website

Click **Download** to save a copy of the zipped file on your PC.

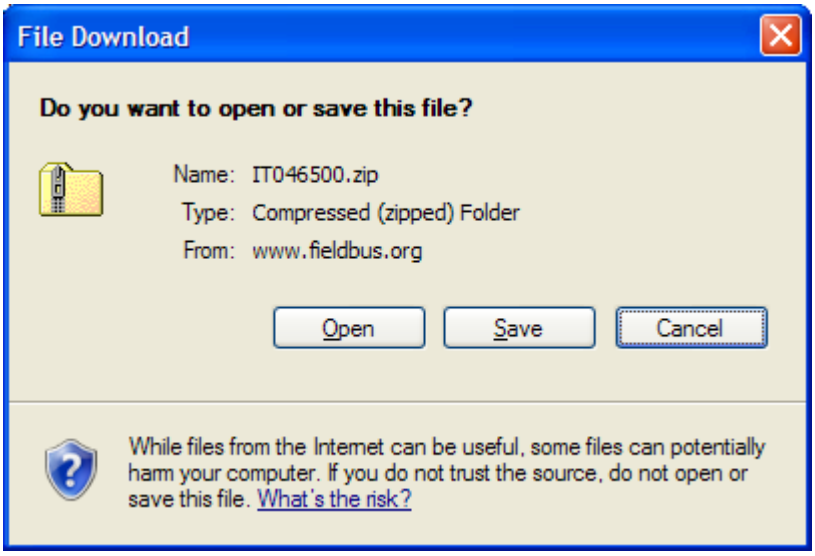


Figure 3-20. Fieldbus Foundation website

Note: You must unzip the files before the Configurator can add them to the DD files database. Where you store the files is unimportant, since you direct Configuration to that location when you use the **Add New** command.

After you save the file, unzip the component files (typically ,ffo, .sym, and .cff files) and use **Add New** to navigate to the storage location and add the .ffo file to the DD Services database. You can then delete the downloaded files.

DD Versions

Select the **Version** tab on the DD Services Advanced Configuration screen to view technical information on the version and location of the DD Services software installed on the host PC.

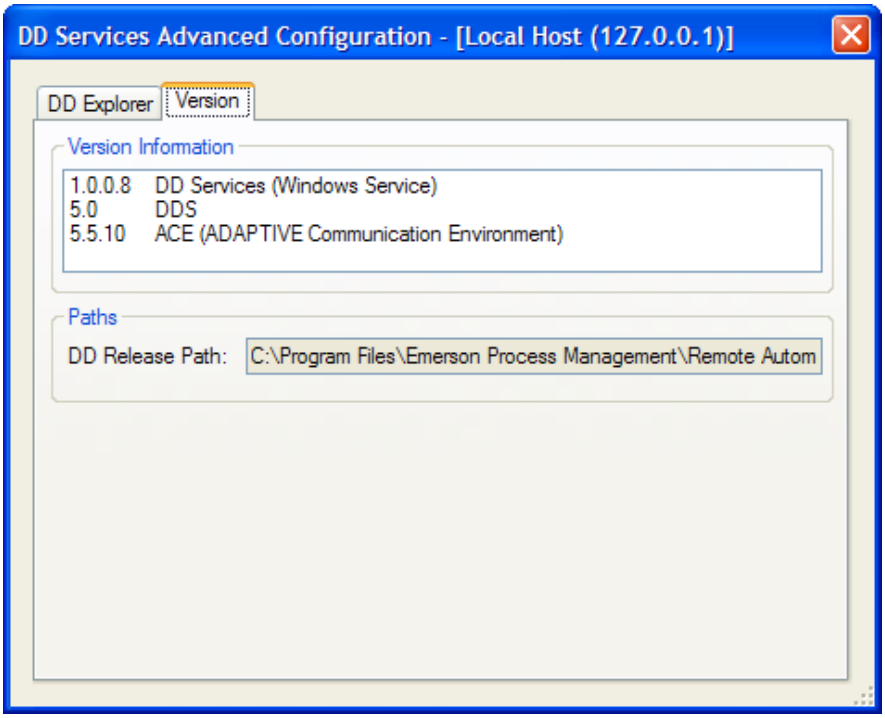


Figure 3-21. DD Services Advanced Configuration (Version tab)

3.3.3 Drop–down Menu Options (HSE Servers)

Right-clicking a server icon in the left-hand portion of the Configurator screen displays a drop-down menu:

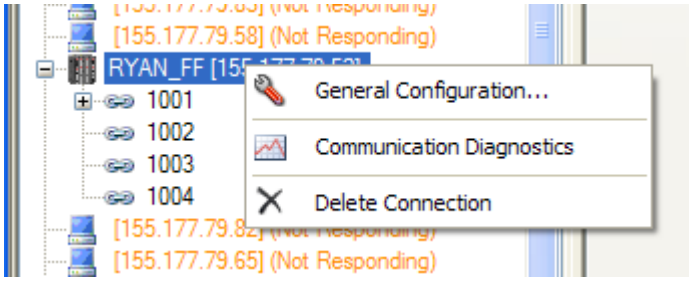


Figure 3-22. Server Drop-down Menu

Note: The options on the drop-down menu change based on the kind of server you select. You cannot configure generic servers (see *Table 3-1*).

Option	Description
General Configuration…	Opens a configuration screen for the server. See *Section 3.3.4, General Configuration*. **Note**: This option is **not** available for generic servers.
Communication Diagnostics	Opens a dialog box with segment-specific communication information.

Option	Description
Delete Connection	Deletes the network connection for the selected server.

3.3.4 General Configuration

Select the **General Configuration** option to verify or modify a server's configurations. The Configurator downloads the device's current configuration and then displays a screen with system information. *Figure 3-23* shows a Configuration screen with all options expanded.

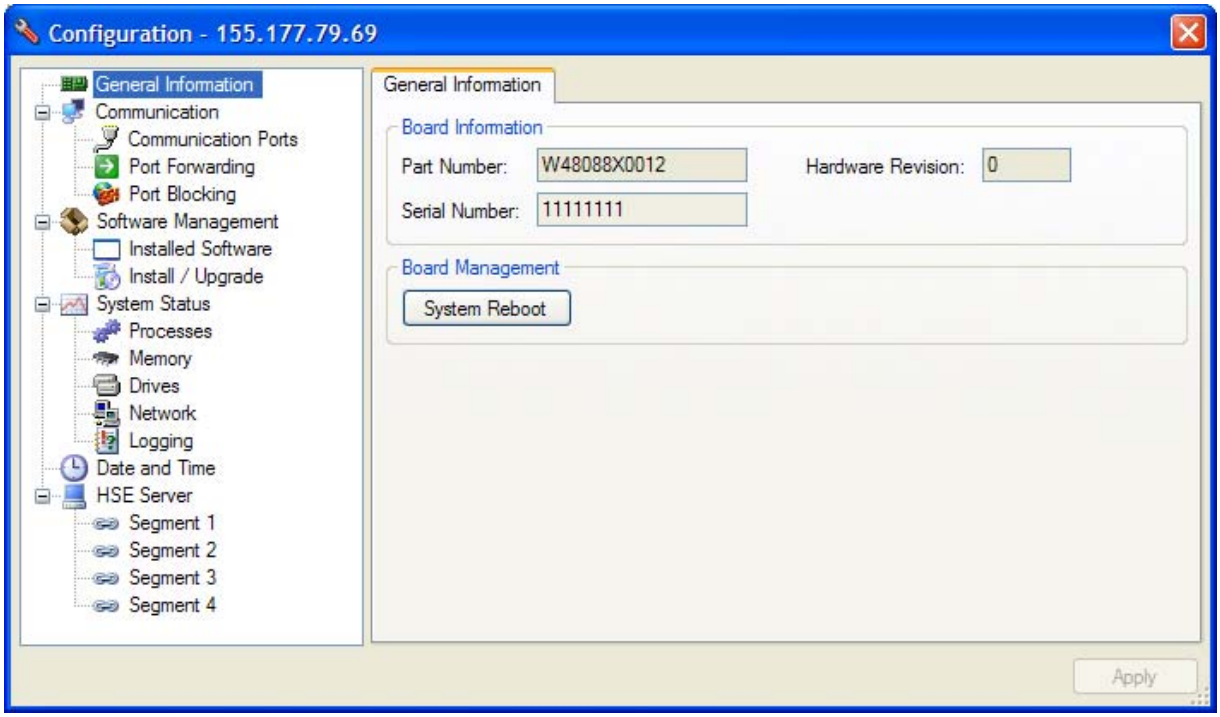


Figure 3-23. Server Configuration (Expanded)

When you select an option in the left-hand portion of the screen, the right-hand portion of the screen changes to reflect both current and available settings.

General Information

The General Information option displays by default when you select **General Configuration** from the drop-down menu. This option shows the server's serial number and provides a button you can use to reboot the selected server.

Note: Double-click a heading to display its subheadings. You can also click ⊞ to expand a heading's component topics without selecting a specific heading.

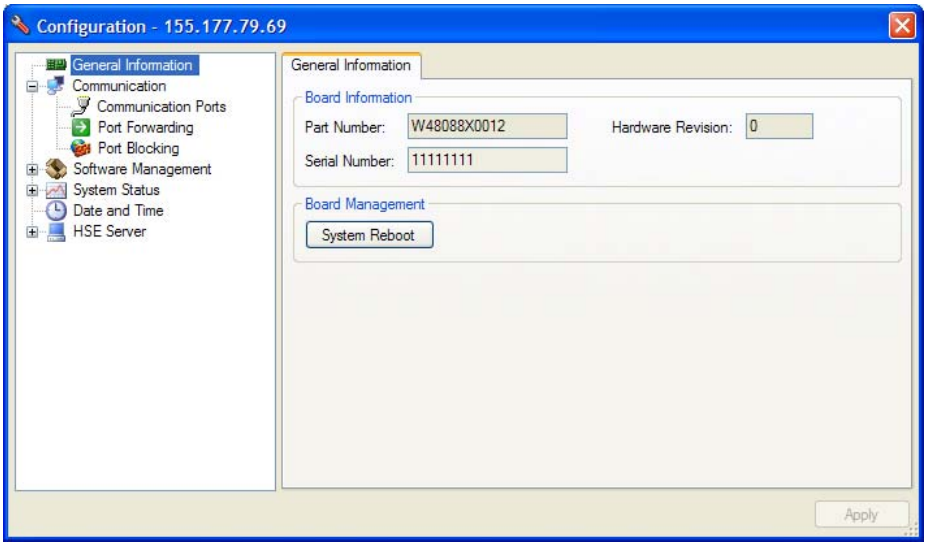


Figure 3-24. General Information

Communication:
Communication Ports

Double-click **Communication** to display communication port and port forwarding settings for the server. The Communication Ports option displays by default.

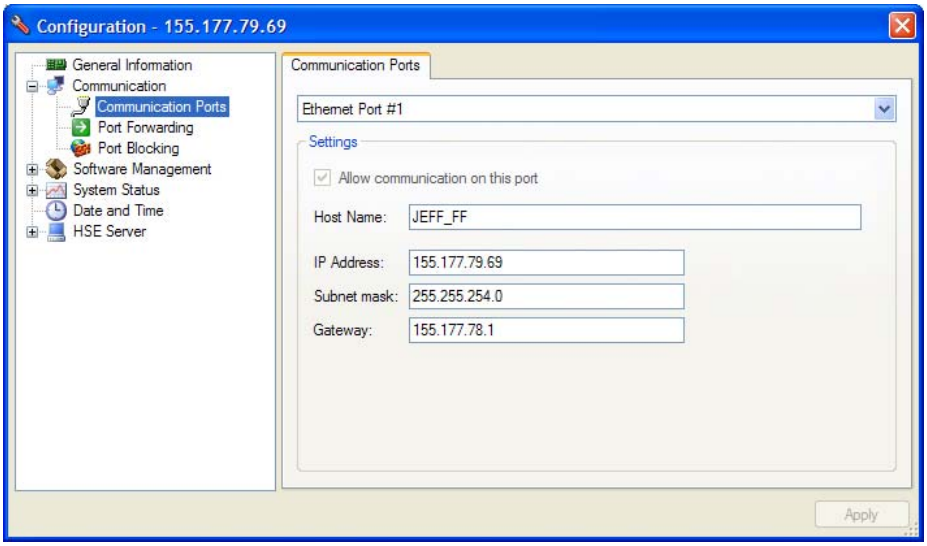


Figure 3-25. Communication Ports

Use this screen to define specific IP information (Host Name, IP Address, and subnet mask) for either of the two Ethernet ports on the Fieldbus Interface.

Note: You can define only **one** gateway for a server.

Communication:
Port Forwarding

Click **Port Forwarding** to display a screen you use to define rules the server uses to forward data from one Ethernet port to another.

Port forwarding enables you to define rules and conditions under which the Configurator redirects data from its default destination to any other valid IP location on your network.

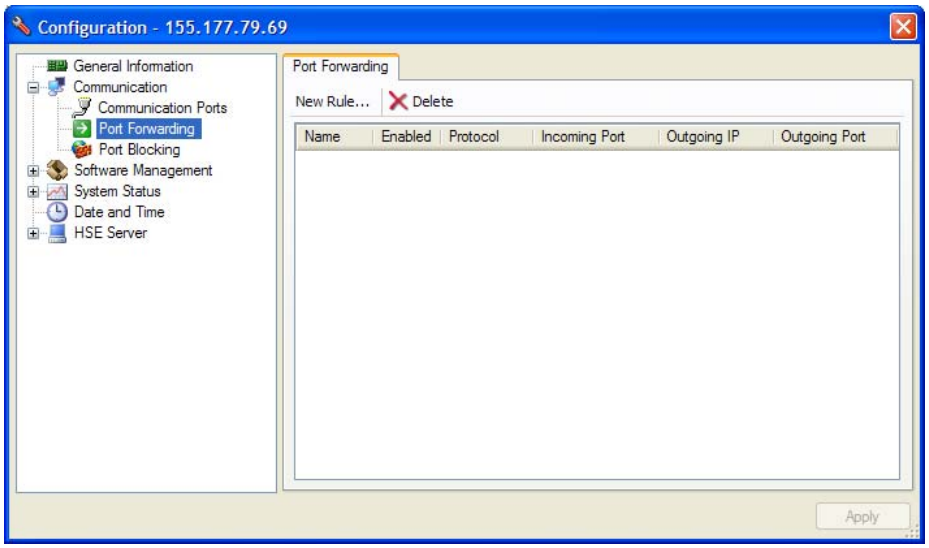


Figure 3-26. Port Forwarding

- Click **New Rule** to start a data wizard that directs you though the rule building process. You specify a rule name, an incoming port on the current HSE, a destination IP address and port, and the transport type (UDP or TCP). You can create up to 10 port forwarding rules.

  Note: Port forwarding is particularly useful if you have a single Ethernet connection at a remote site. You can connect the Ethernet line to the FFI's primary Ethernet port (Eth0), connect the FFI's secondary Ethernet port (Eth1) to the ROC or ControlWave's Ethernet port, and then create port forwarding rules that route content through the FFI. For more information, see *Section 3.3.7, Defining Port Forwarding.*

- Click **Delete** to remove the selected port forwarding rule from the database.

Communication: *Port Blocking*

Click **Port Blocking** to display a screen you use to define rules to prevent communications from leaving the FFI.

Low bandwidth networks may not be able to handle HSE annunciations. In this case, use port blocking to prevent the annunciation signal from going out on the network.

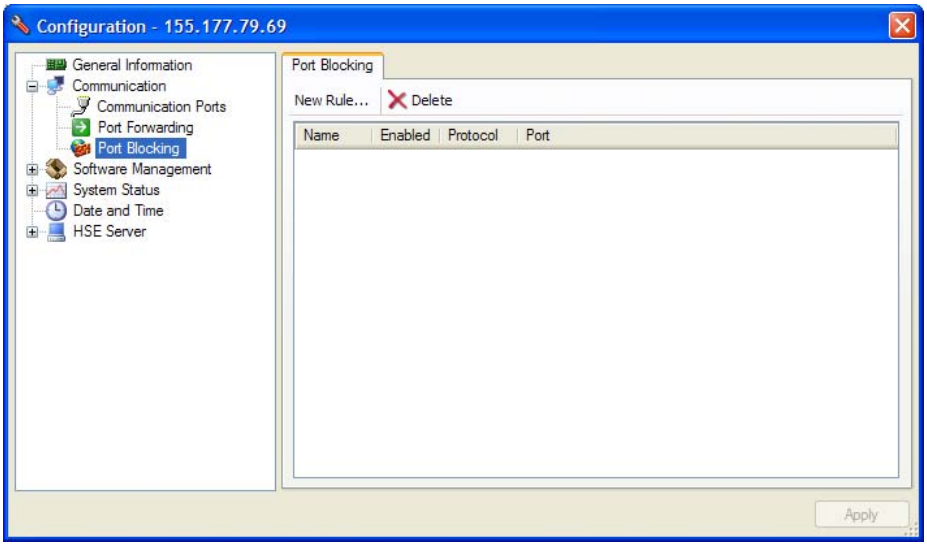


Figure 3-27. Port Blocking

- Click **New Rule** to start a data wizard that directs you though the rule building process. You specify a rule name, a port to be blocked, and the transport type (UDP or TCP). You can create up to 14 port blocking rules.

  Note: Each HSE server has a default port blocking rule, **HSE Annunciation**. This rule enables you to selectively block communication traffic from a specific server. You cannot delete this rule.

- Click **Delete** to remove the selected port blocking rule from the database.

Software Management: *Installed Software*

Double-click **Software Management** to display options to manage the software applications currently installed on the server. This selection has two options, **Installed Software** and **Install/Upgrade**. The **Installed Software** option opens by default.

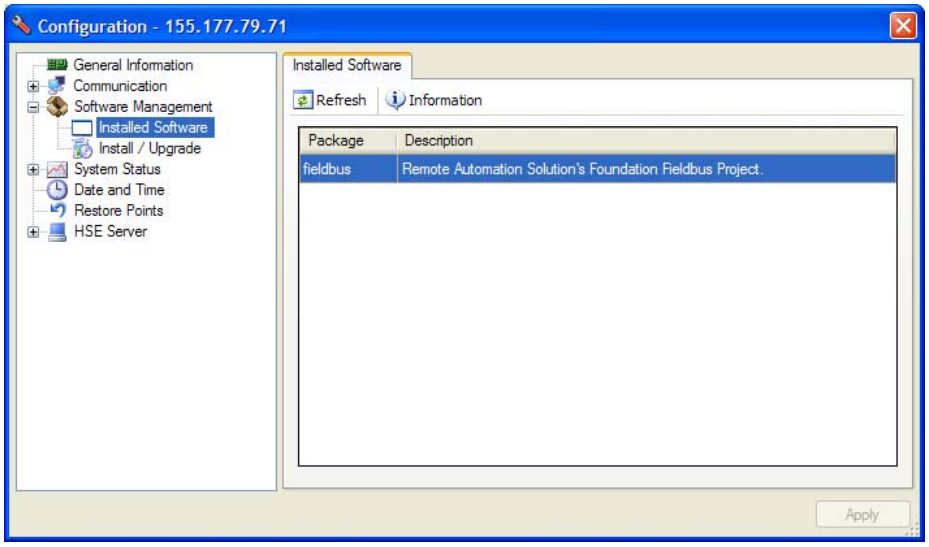


Figure 3-28. Software Management

The Installed Software selection has two options:

Option	Description
Refresh	Refreshes the listing of installed software applications.
Information	Displays a dialog box with two tabs (General and Miscellaneous) of information for the selected application.

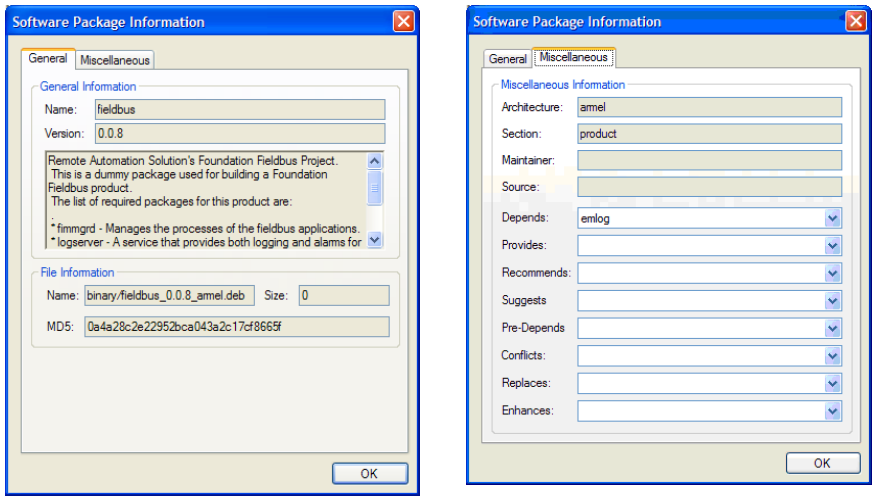


Figure 3-29. Software Information

Software Management: *Install/Upgrade*

Click **Install/Upgrade** to view installation or upgrade information on software applications currently installed on the server.

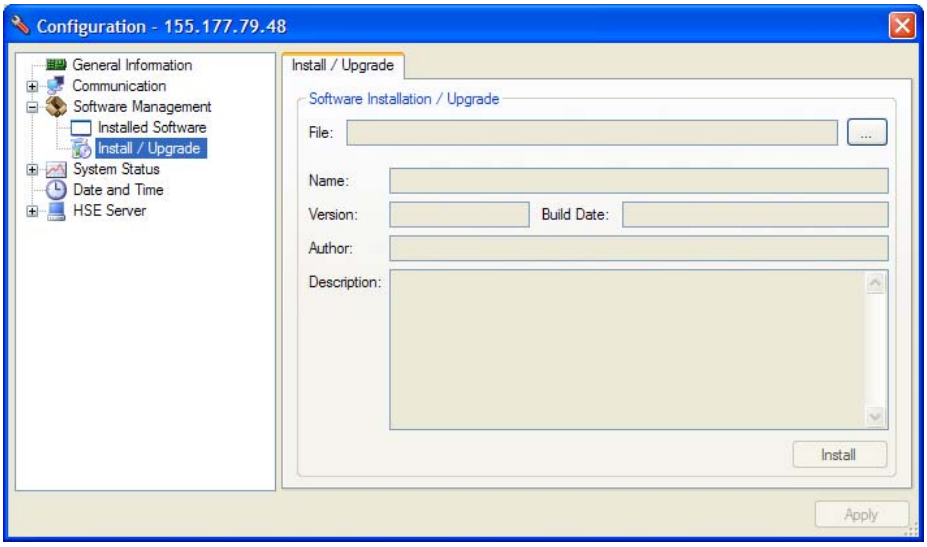


Figure 3-30. Install/Upgrade

System Status: *Processes*

Double-click **System Status** to view information regarding the system's current state. When you select **System Status**, the Processes option displays by default.

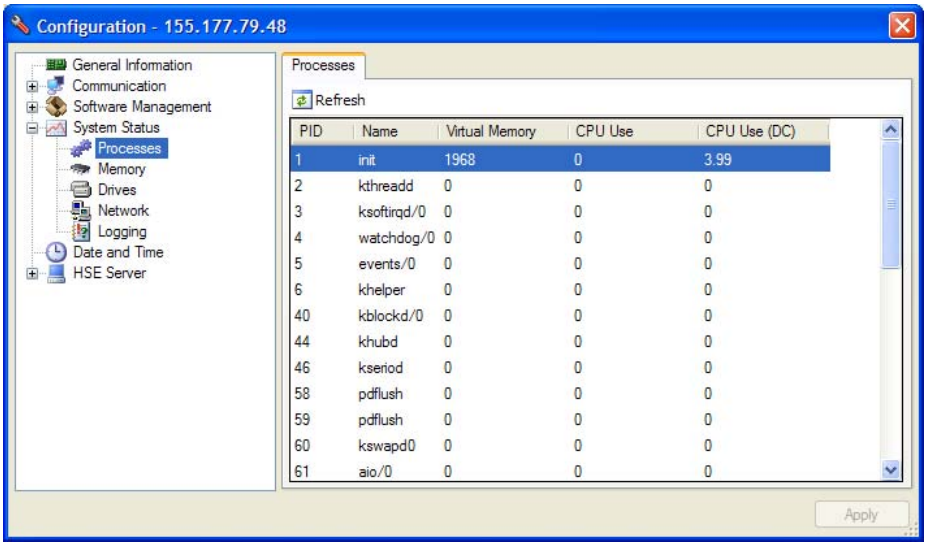


Figure 3-31. Processes

This option displays all processes currently running on the server. Click **Refresh** to update the data.

System Status: *Memory*

Click **Memory** to display a pie chart showing the currently allocated memory usage on the server.

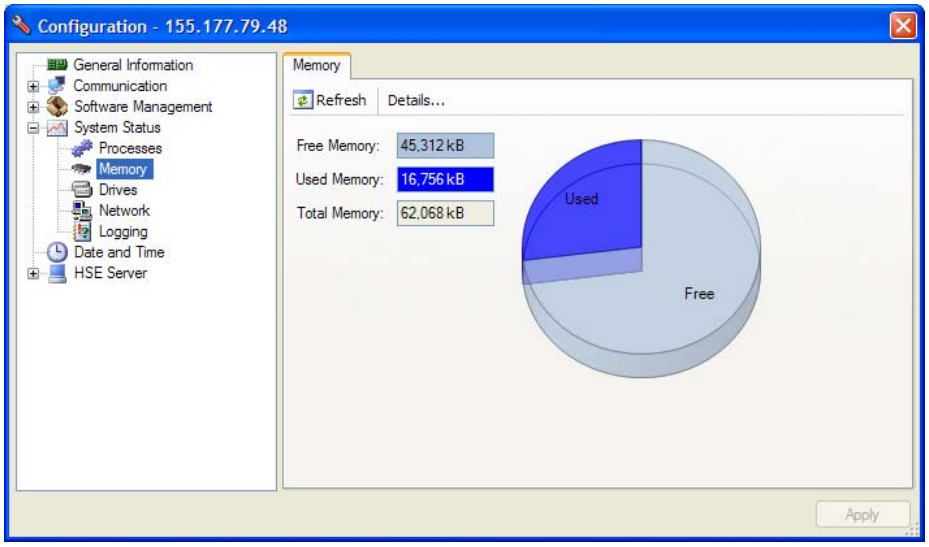


Figure 3-32. Memory (Pie Chart)

Click **Refresh** to update the data.

If you click **Details**, the system displays a detailed view of allocated RAM.

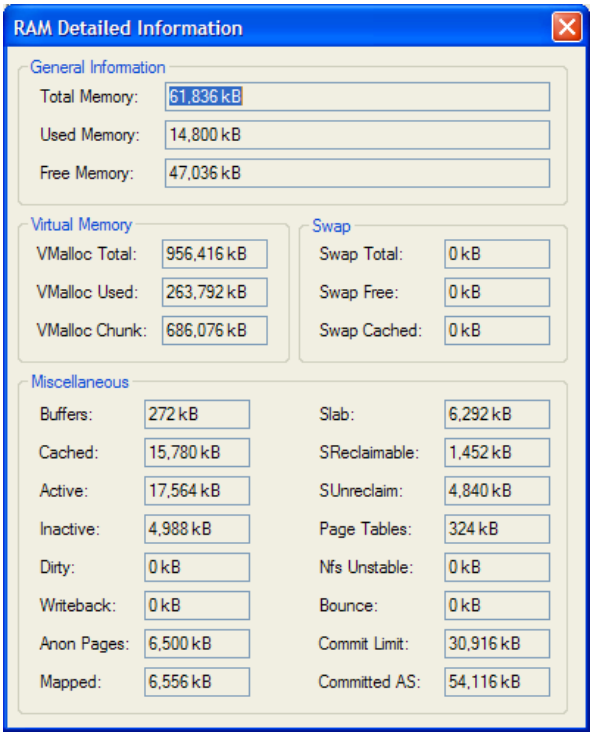


Figure 3-33. RAM Detailed Information

System Status: *Drives* Click **Drives** to display information on any drives mounted on the HSE Interface.

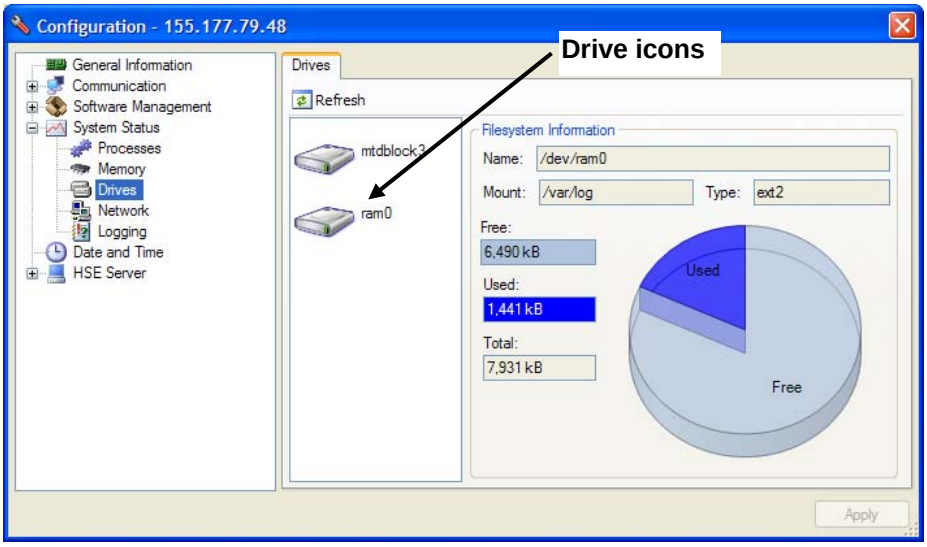


Figure 3-34. Drives

By default, the screen displays information on the first mounted drive (here, **mtdblock3**). Click other drive icons to display information about them or click **Refresh** to update the data.

System Status: *Network*

Click **Network** to display information on current network communications.

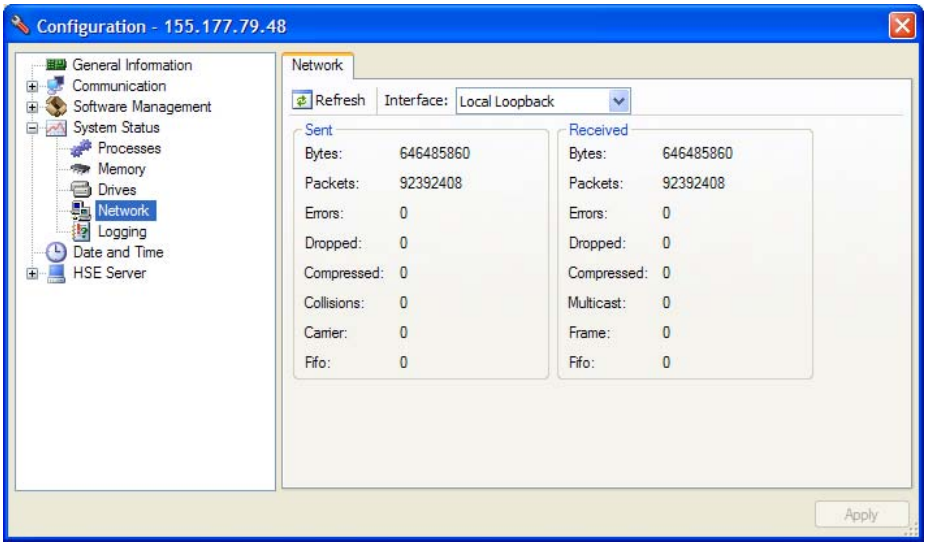


Figure 3-35. Network

Use the drop-down list to select an interface (**Local Loopback** [127.0.0.1], **Ethernet Port #1**, or **Ethernet Port #2**). The display changes to reflect the statistics for your choice. Click **Refresh** to update the data.

System Status: *Logging*

Click **Logging** to display event logs for programs internal to the server.

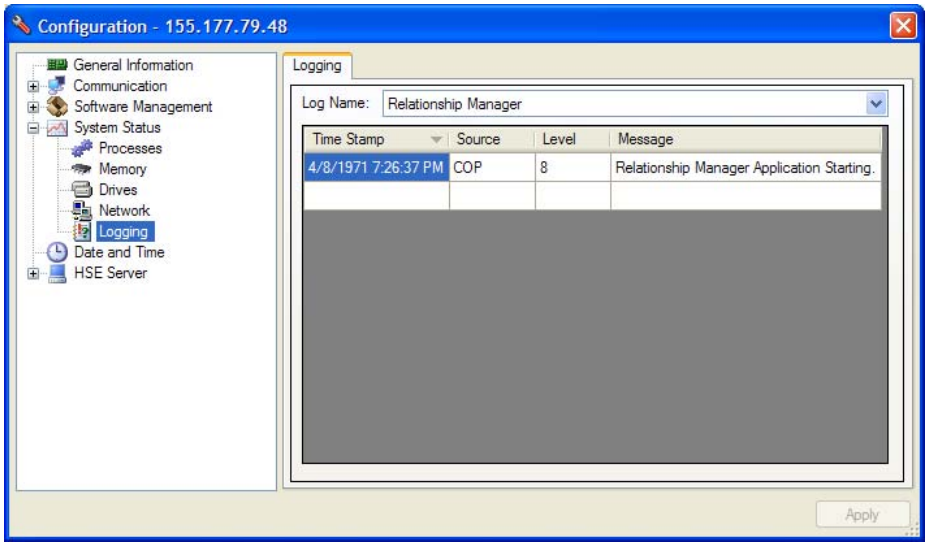


Figure 3-36. Logging

Use the drop-down list to select an event log (System Manager or Relationship Manager).

Date and Time

Click **Date and Time** to display date and time settings for the server.

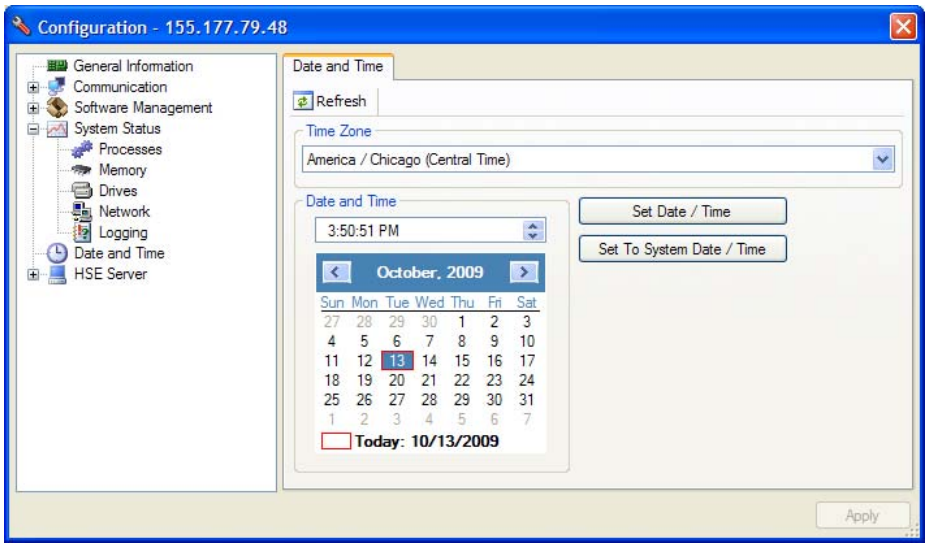


Figure 3-37. Date and Time

Drop-down lists enable you to set the time zone and date and time for the server.

- Click **Set Date / Time** to apply the changes you've made to the server.
- Click **Set to System Date / Time** to use the time and date values for the PC running the Configurator software.
- Click **Refresh** to update the data.

HSE Server

Double-click **HSE Server** to select that option and expand the display to show all segments on the HSE server. A screen displays that you use to enable or disable the H1 segments for that server. An HSE server can manage up to four segments. By default, **all** segments are initially enabled.

Note: Disabling a segment prevents it from appearing on the Foundation Fieldbus server directory.

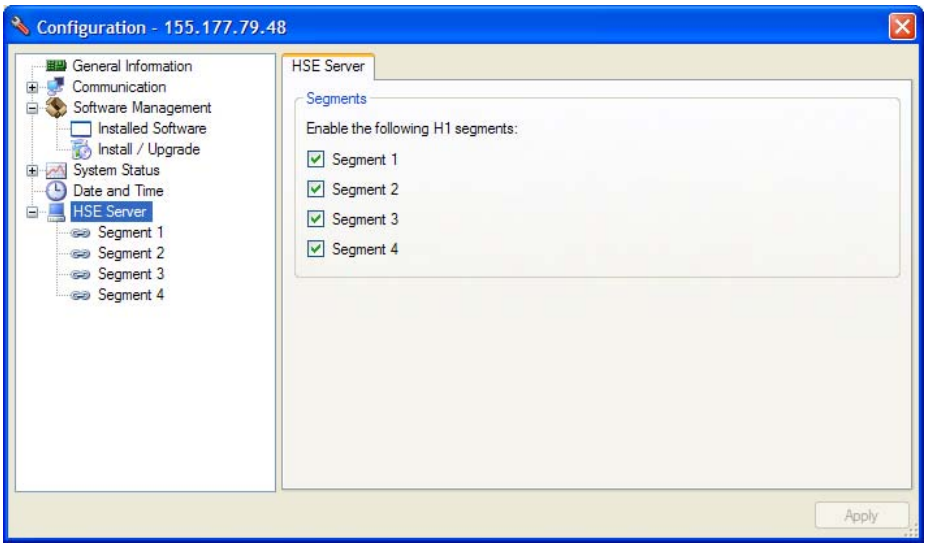


Figure 3-38. HSE Server

HSE Server: *Segments*

Click a segment under an HSE server to display a screen you use to verify the node address and provide unpolled node information.

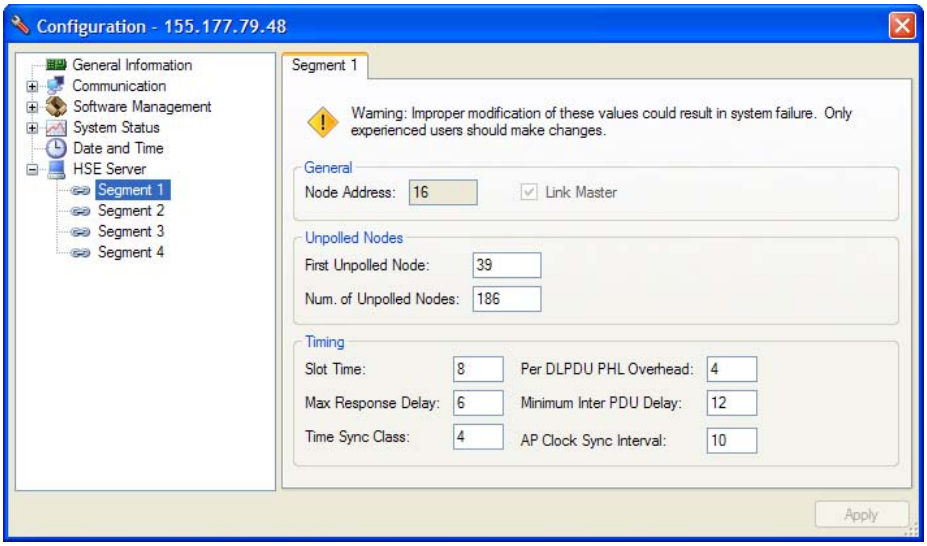


Figure 3-39. Segments

- The Configurator displays the node address (system management identifier) associated with this segment.

- Unpolled nodes are a way of increasing system performance by preventing the Interface from polling unused or unavailable nodes.

Note: Do not modify this field unless you are **extremely** familiar with your device node architecture, since you can easily prevent the system from polling a valid node.

Click **Apply** to save any changes you make to this screen.

3.3.5 Diagnosing Communications

Right-click a server icon to open the drop-down menu and select the **Communication Diagnostics** option.

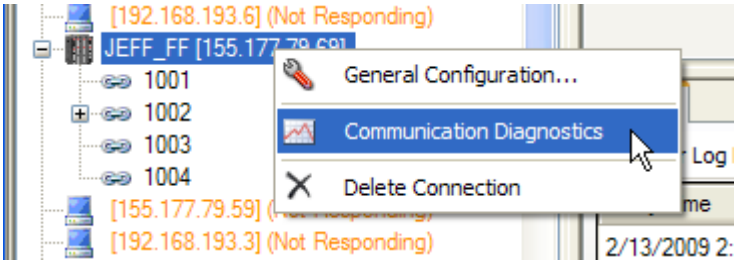


Figure 3-40. Communication Diagnostics options

This option displays a dialog box that displays a count of messages transmitted and received by each H1 segment. Use this display to determine the activity on each segment.

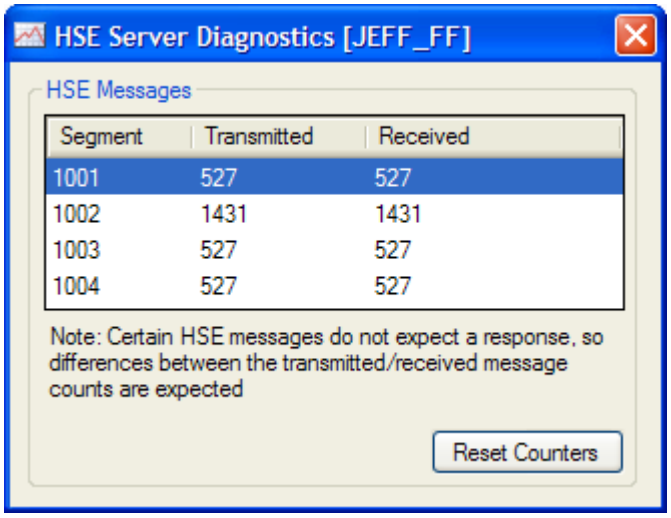


Figure 3-41. HSE Server Diagnostics

Click **Reset Counters** to reset the message count to zero for the selected segment.

3.3.6 Deleting a Connection

Right-click a server icon to open the drop-down menu and select the **Delete Connection** option. Use this option to delete the network connection for the selected server.

Warning	**This option immediately deletes the network connection for the selected server without a confirmation prompt.**

3.3.7 Defining Port Forwarding

As noted in *Section 3.3.4, General Configuration*, one of the communication configuration options enables you to define port forwarding. Port forwarding is useful if you need to redirect data from its default destination to another valid IP address on your network. Using a Configurator-provided software wizard, you define the IP addresses and rules under which port forwarding occurs.

For example, our corporate network has the general IP address **155.177.78.***. We have a well site with a ROC800 and a Foundation Fieldbus server. The well site's IP address is **155.177.78.2**: the first Ethernet port on the FF server uses that IP address, the second Ethernet port on the FF server uses **10.0.0.1**, and the ROC800 uses the address **10.0.0.2**. Finally, we've installed ROCLINK 800 and the Configurator software on a computer with the IP address **155.177.78.1** (see *Figure 3-42*):

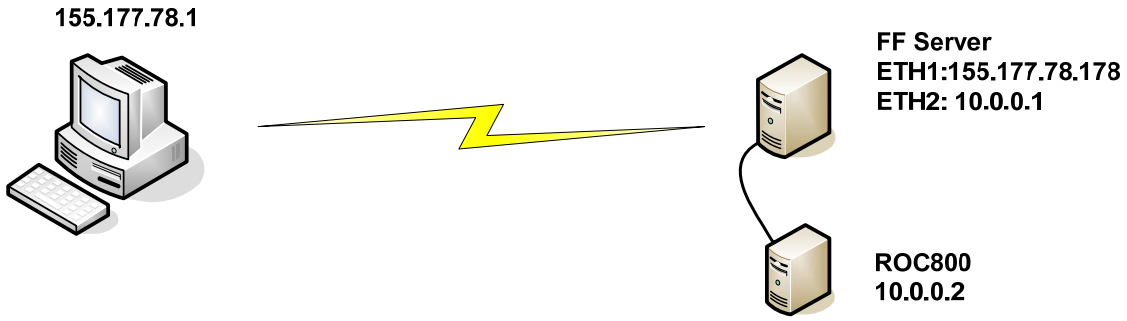


Figure 3-42. Port Forwarding Site

Verify IP Addresses on the FF Server

When we open Configurator (see *Figure 3-43*), we see the FF server in the tree on the left-hand side of the screen and general information about that server on the right-hand side of the screen.

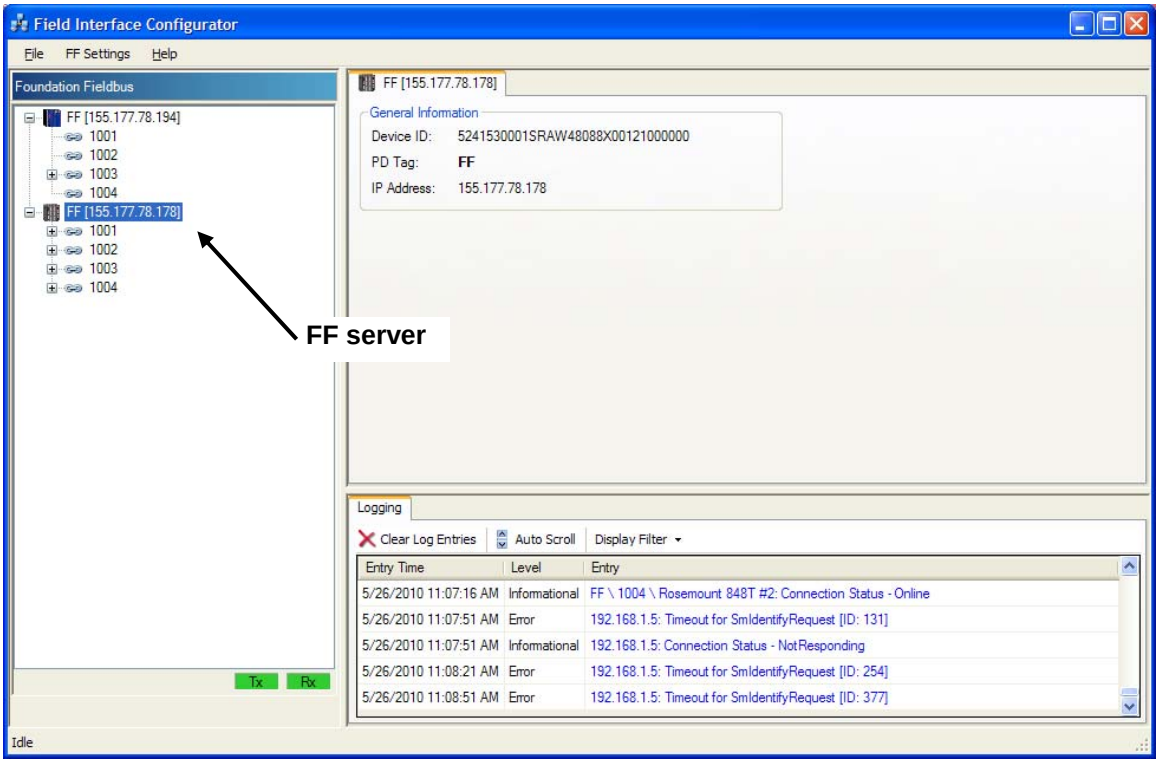


Figure 3-43. Port Forwarding: Configurator

Right-click on the server label and select **General Configuration** from the menu to display the Configuration screen:

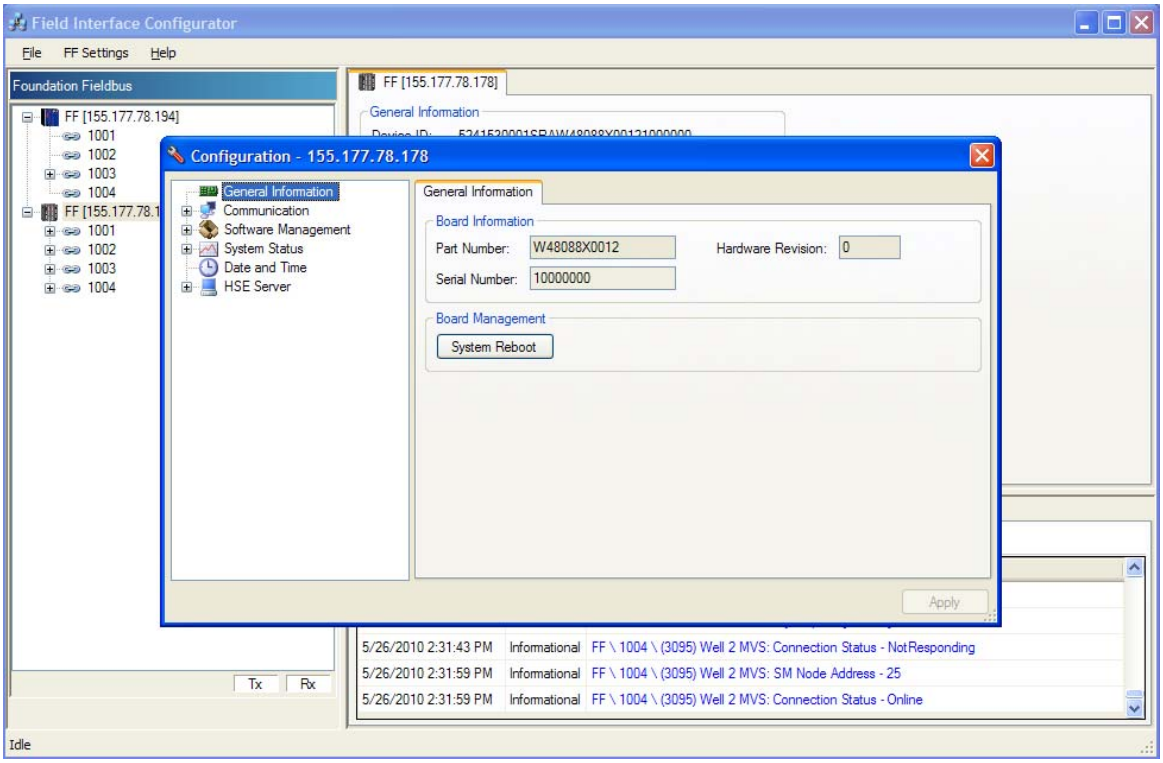


Figure 3-44. Configuration Screen

Double-click on the **Communication** label to display port information on the FF server:

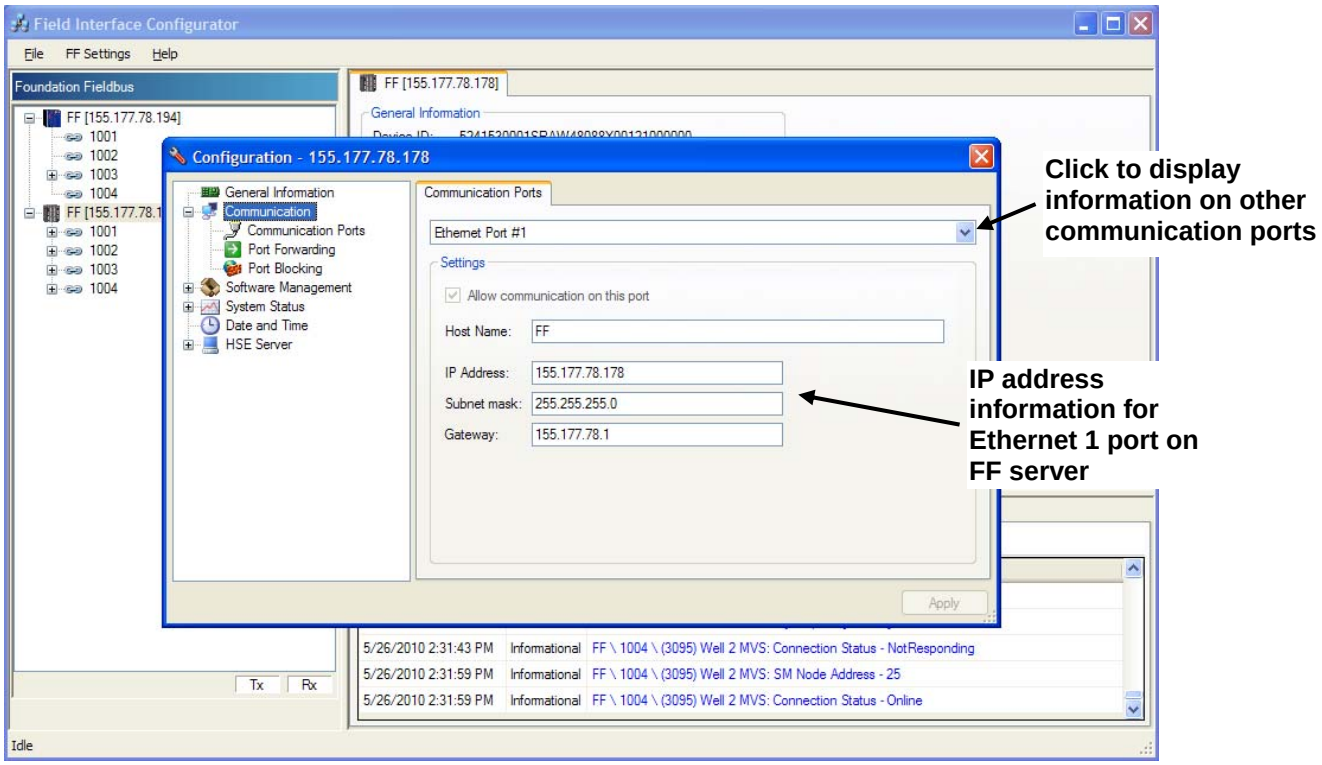


Figure 3-45. Communication Ports Screen

Figure 3-45 shows the IP address information on the Ethernet 1 port on the FF server. Click ▼ in the port's identification field to display and select IP information (address, subnet mask, and gateway) on the FF server's second Ethernet port:

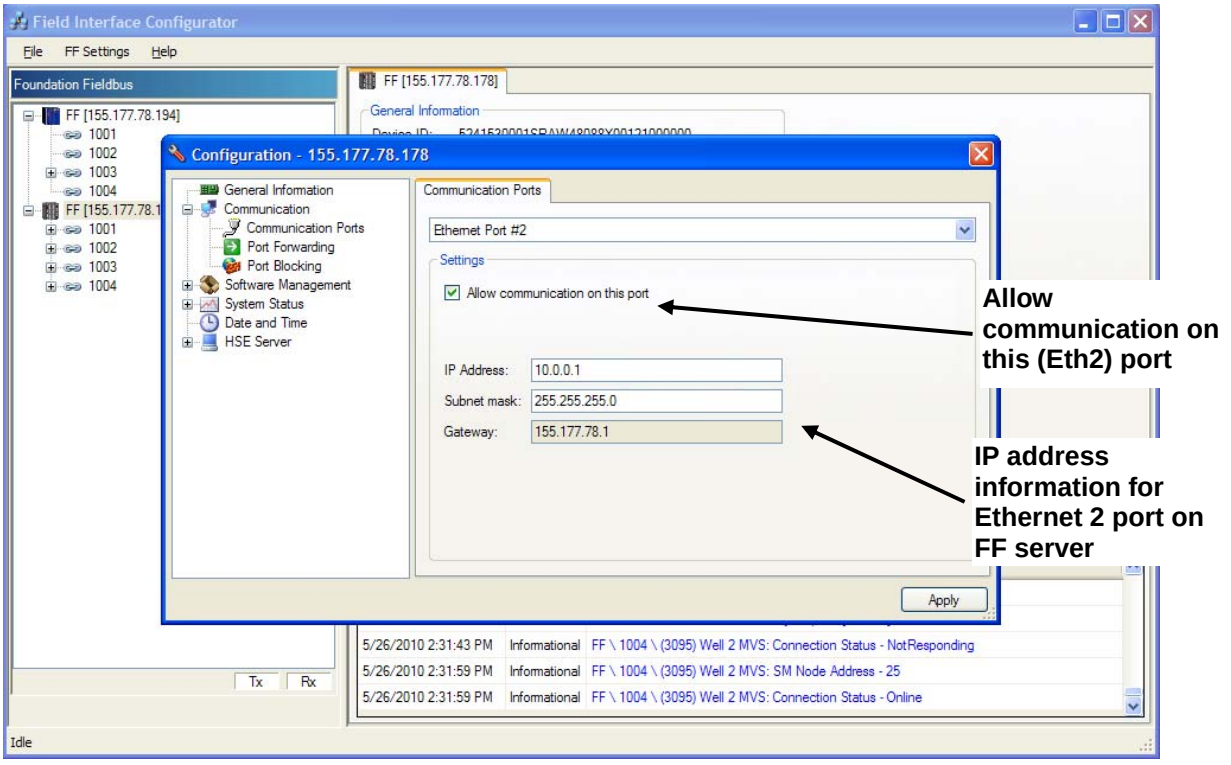


Figure 3-46. Communication Ports Screen

Note: Port forwarding requires that you select **Allow communications on this port**. Click **Apply** to save your changes.

Once you verify the FF server's IP information and enable communications on the second Ethernet port, you can verify the ROC800 or ControlWave port information.

ROC/CW Port Information

ROC800s and ControlWaves use different communication ports for port forwarding. A ROC800 has **one** port you must forward:

- **TCP Port 4000** (ROCLINK 800 and the Configurator use this port when communicating with a ROC800)

A ControlWave (CW) has **seven** ports you must forward:

- **UDP Port 1234** (OpenBSI data)
- **UDP Port 1235** (OpenBSI time synchronization)
- **TCP Port 21** (FTP)
- **TCP Port 2222** (BTCP – web page data collection)
- **TCP Port 20547** (ControlWave Designer access)
- **TCP Port 4000** (Field Interface Configurator)
- **TCP Port 5000** (the FF server uses this port for reading and writing variables in the CW environment)

Note: You must create one rule for each port you want to forward. For the ROC, you need to create only one rule. For the CW, you need to create seven rules.

Starting the Wizard

With this port information, you can select **Port Forwarding** on the Configuration screen:

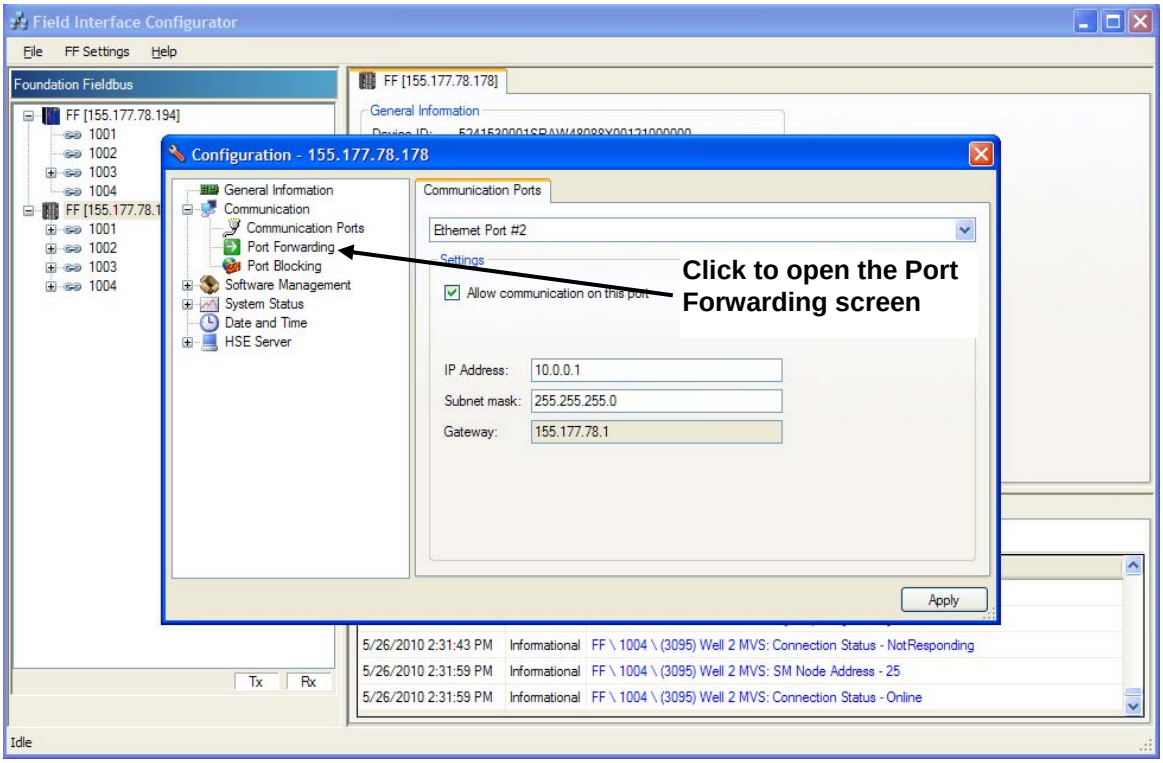


Figure 3-47. Port Forwarding Option

This changes the contents of the right pane of the Configuration screen:

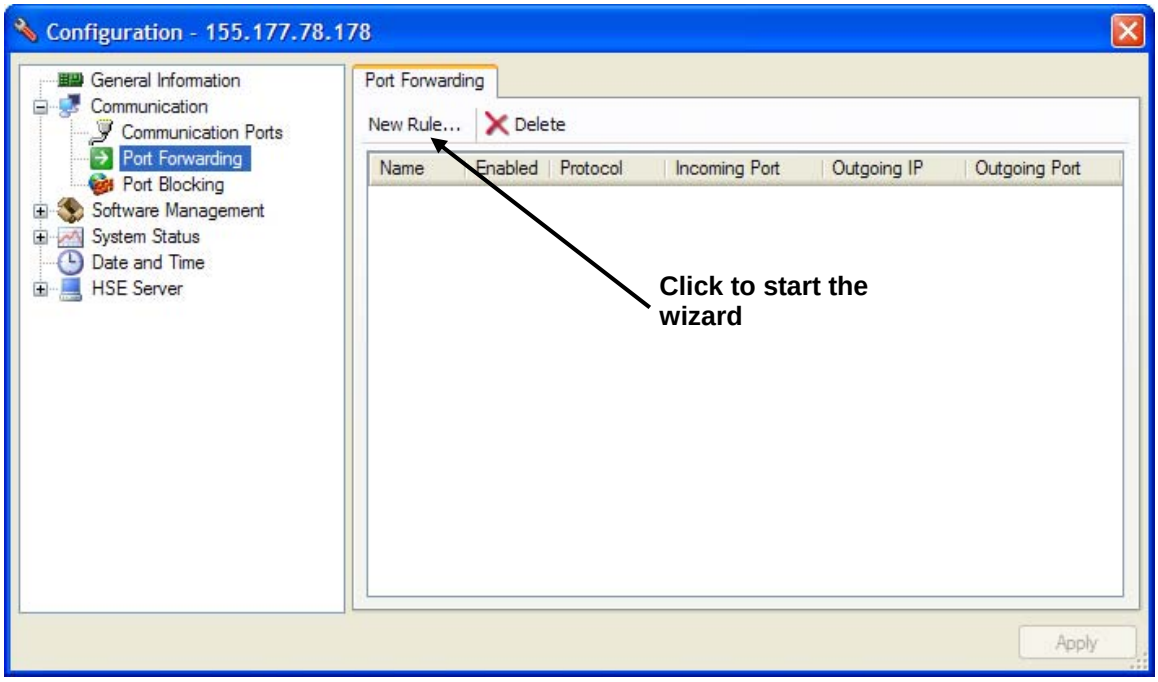


Figure 3-48. Port Forwarding Screen

Click **New Rule** to display the first of five screens in the Port Forwarding Wizard:

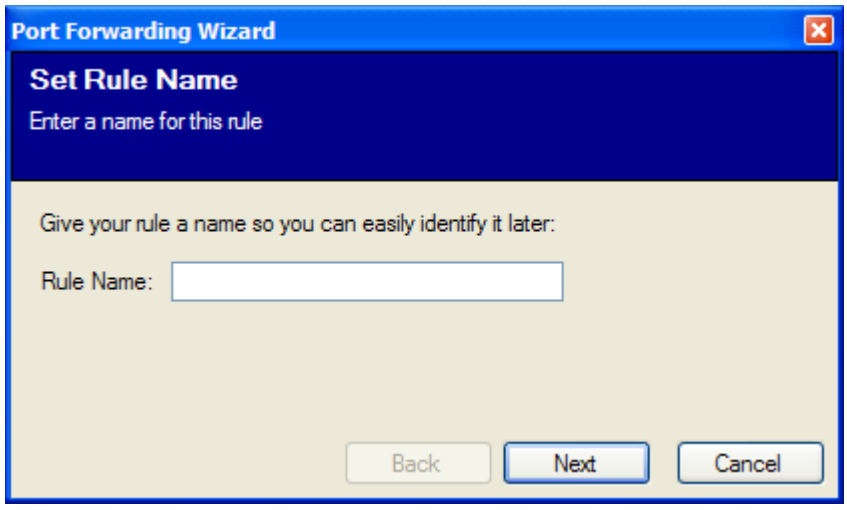


Figure 3-49. Port Forwarding Wizard (1)

Note: This example builds a port forwarding rule for the ROC.

Use the Rule Name field to uniquely identify (using up to 32 characters) this port forwarding rule. Click **Next** to continue.

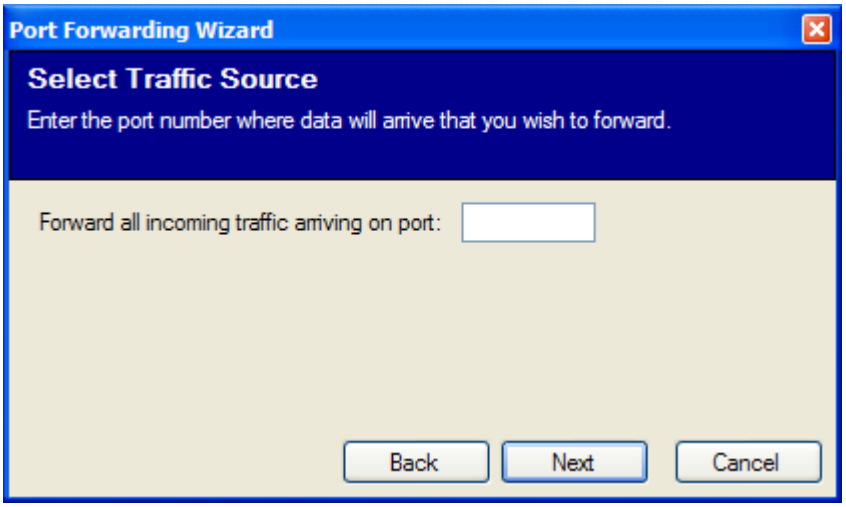


Figure 3-50. Port Forwarding Wizard (2)

This is the port ROCLINK 800 uses to communicate with the FF server. **4000** is typically the default value. Click **Next** to continue.

Figure 3-51. Port Forwarding Wizard (3)

Use this screen to set the destination for forwarding. Since our example ROC800 has an IP address of **10.0.0.2** and port **4000**, enter those values here. Click **Next** to continue.

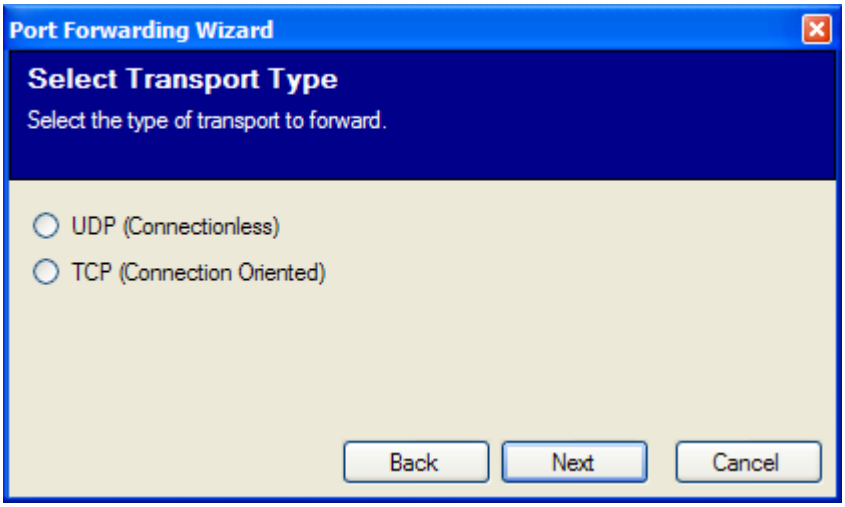


Figure 3-52. Port Forwarding Wizard (4)

Since we use the ROC protocol (which is connection-oriented), select **TCP**. Click **Next** to continue.

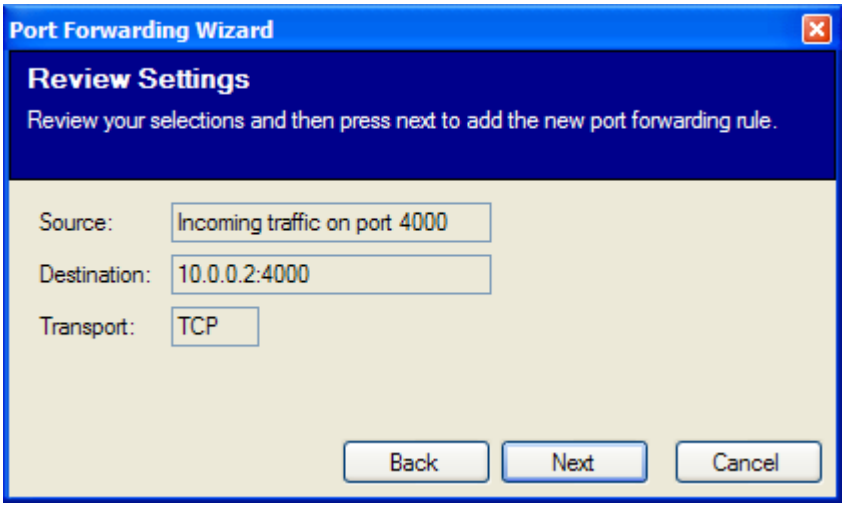


Figure 3-53. Port Forwarding Wizard (5)

This screen, the last in the wizard, summarizes the selections you have made. Review the values. If they are correct, click **Next**. The wizard closes, displaying the Port Forwarding screen and the newly defined rule:

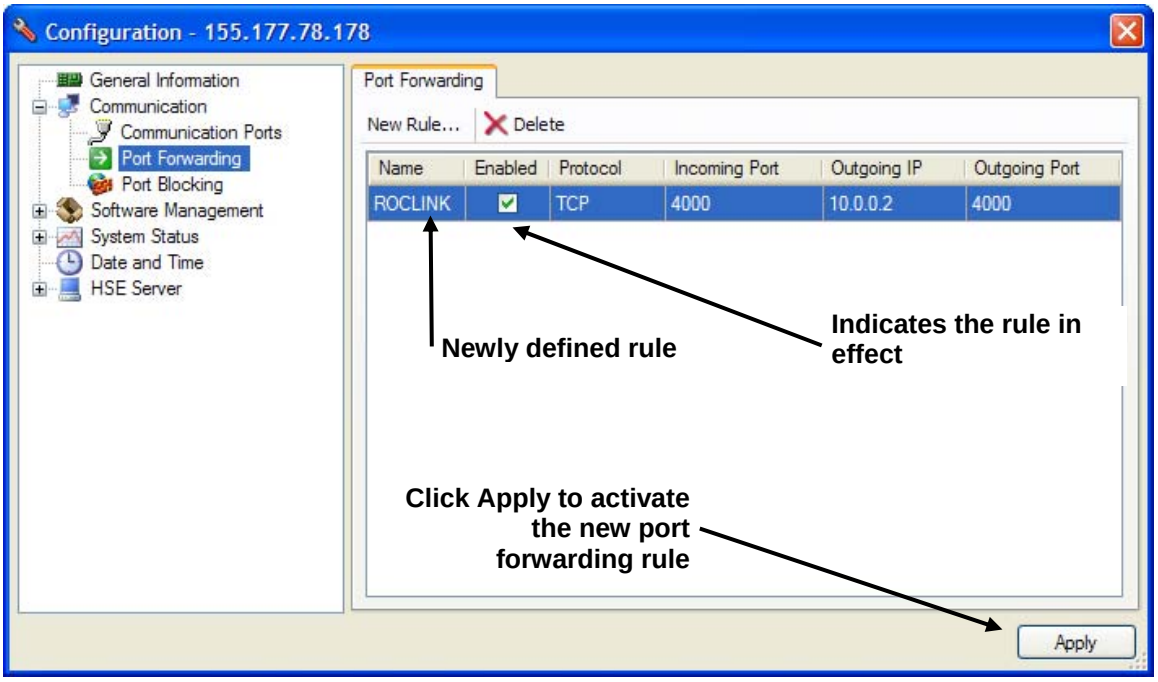


Figure 3-54. Newly Defined Port Forwarding Rule

You must click **Apply** before the system can use the new rule.

Note: The Enabled field indicates the rules currently in effect. If you define only one rule, the system enables that rule by default. If you define several rules, use this field to indicate the port forwarding rules the system should use.

3.4 Configuring Segments

You can right-click a segment icon in the left-hand portion of the Configurator screen to display a drop-down menu. Use this menu to configure segments:

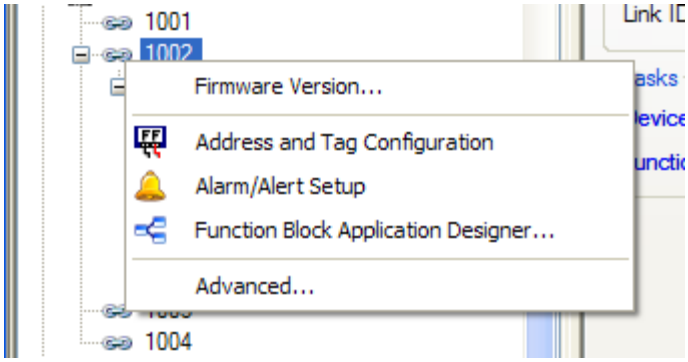
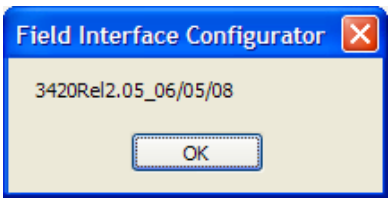
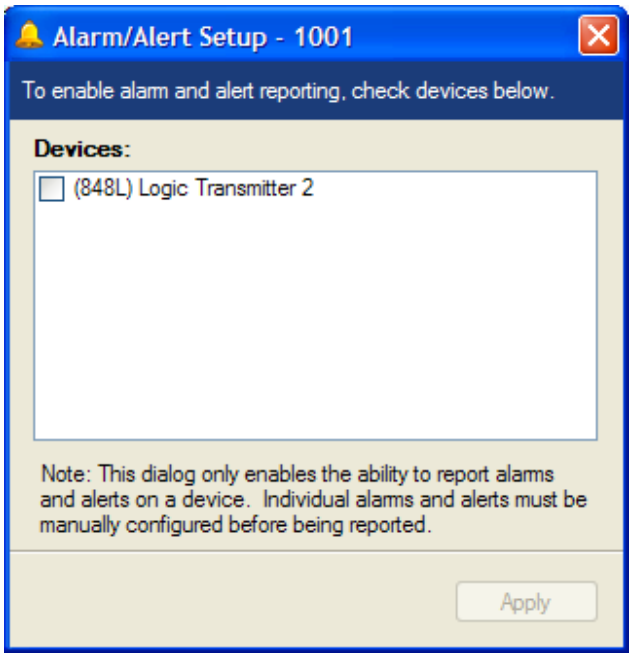
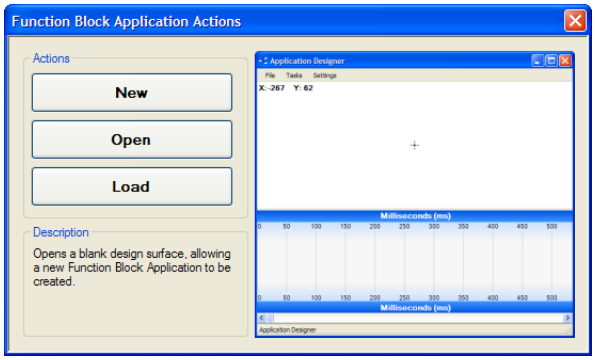
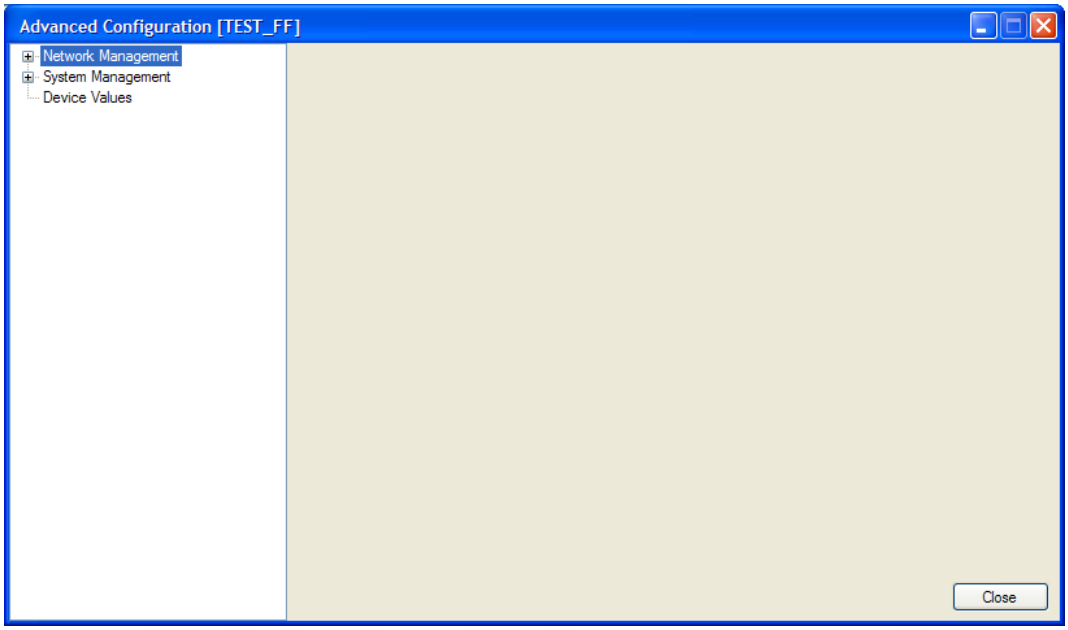


Figure 3-55. Segment Drop-down Menu

Note: The options on the drop-down menu change based on whether the segment has associated devices.

Option	Description
Firmware Version	Displays a dialog box indicating the firmware version associated with the segment module.  **Note**: This option does not display for generic servers.
Address and Tag Configuration	Displays the Device Assignment Configuration screen (see *Figure 3-5* in *Section 3.2.1*). **Note**: This option displays **only** if the selected segment has associated devices.
Alarm/Alert Setup	Displays a dialog box that allows you to **enable** alarms or alerts for a selected device.  **Note**: Refer to the device manufacturer's documentation for the particular parameter values for alarms or alerts. This option displays **only** if the selected segment has associated devices.

Option	Description
Function Block Application Designer	Starts the Function Block Application Designer and displays the Application Actions screen:  Refer to *Chapter 4, Use*, for more information on this utility.
Advanced	Displays the Advanced Configuration screen:  **Note**: Refer to *Section 3.4.1, Advanced Configuration*, for more information on using this utility.

3.4.1 Advanced Configuration

The Configurator provides a series of options and associated screens you can use to perform advanced configurations on segment and device parameters.

Caution	**Use these Advanced Configuration options ONLY at the direction of a Remote Automation Solutions SupportNet technician. These options can fundamentally change the functioning of the Configurator and/or your segment or device parameters.**

Right-click a segment icon and click **Advanced** to display the Advanced Configuration screen (*Figure 3-21* shows the screen completely expanded):

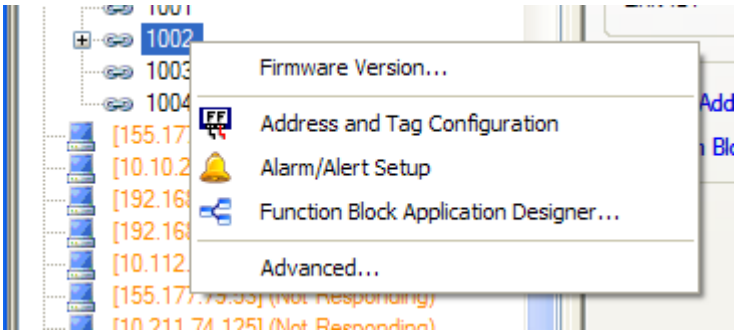


Figure 3-56. Segments

Note: If you right-click a segment and then click **Advanced**, the Advanced Configuration screen displays **Network Management**, **System Management**, and **Device Values** options. If you expand the segment to its component devices, right-click a device, and then click **Advanced**, the Advanced Configuration screen displays an additional option, **Function Block Application Process**. This is the screen shown in *Figure 3-34*.

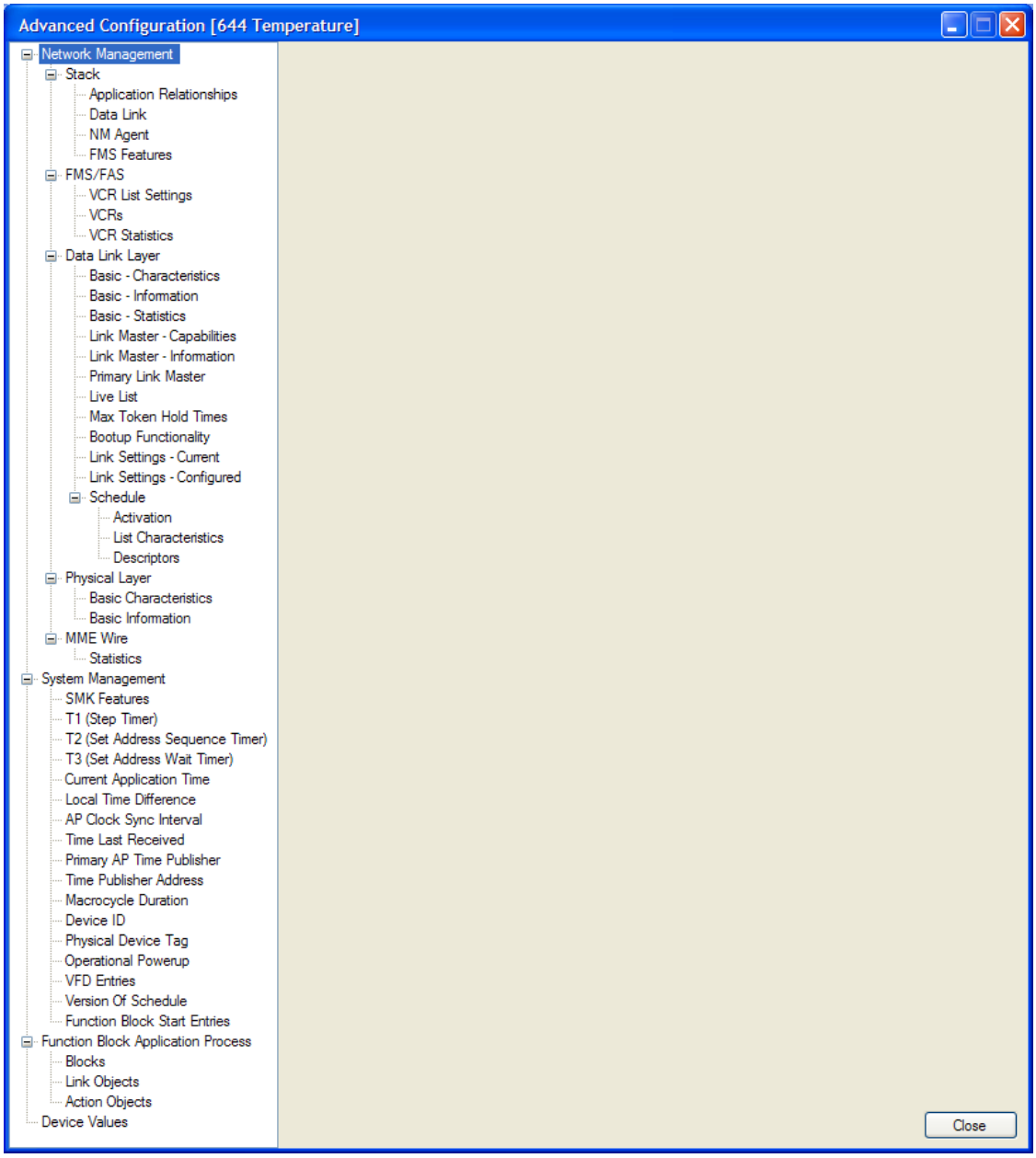


Figure 3-57. Advanced Configuration (Expanded)

Network Management options control how the Interface works within the network environment. System Management options control how the Interface works internally. Function Block Application Process options control how application blocks within a device function. The Device Values option gives you the ability to read or write new values to a particular device.

Refer to the following Fieldbus Foundation documents for further information on these options:

- *FOUNDATION™ Specification System Management* (publication FF-880, Rev 1.6, Dec 1, 2005)

- *FOUNDATION™ Specification Network Management* (publication FF-801, Rev FS 1.8, Oct 17, 2008)
- *FOUNDATION™ Specification Function Block Application Process, Part 1* (publication FF-890, Rev FS 1.8, Nov 7, 2008)

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Chapter 4 – Use

This chapter discusses creating and using data relationships ("applications").

In This Chapter

4.1 Overview

Once you've successfully installed the Field Interface Configurator and DD Services software on your PC (see *Chapter 2*) and configured the software (see *Chapter 3*), you can begin to create data relationships ("applications" in fieldbus terminology). The structure of these applications can be as simple or complex as you need. Using the Function Block Application Designer, you direct data from fieldbus devices through your network of other fieldbus devices, high-speed Ethernet (HSE) servers, and Remote Operation Controllers ("ROCs") or ControlWave ("CW") devices.

The Configurator software—and the Function Block Application Designer utility—is designed to help you as much as possible and be flexible enough to accommodate change. Ultimately, however, you determine the type of data and its destination. The time you spend in planning the flow of information will result in better data management, better reporting, and better control.

Note: If you are using a CW device, you must build a project file (see *Appendix A, Creating the ControlWave Project*) **before** you start creating applications.

Most simply, preparing the Configurator for daily use involves the following steps:

1. Build Function Block Applications

After adding and configuring servers in your network, you create "applications" among the fieldbus devices on a particular H1 segment and the servers (ROCs, CWs, and HSE servers) on your

network. These applications are based on the function blocks in each fieldbus device. See *Section 4.2, Building an Application*.

Note: Each application relates to one H1 segment.

2. **Download Applications**

   Once you finalize an application, you download it from the Application Designer into a segment on the ROC or CW Fieldbus Interface. See *Section 4.5, Loading an Application*.

4.2 Building an Application

One of the primary features of the Configurator is its ability to direct input from fieldbus devices on an H1 segment into ROCs and ControlWaves. Fieldbus calls these directed data relationships *applications.* You can also direct input from fieldbus devices to control mechanisms (such as valves) to provide field-based control ("control in the field").

Note: Refer to the *ControlWave FOUNDATION Fieldbus Interface Instruction Manual* (CI-CWFFI) for further information on ControlWave-specific functions and setup.

You use the Configurator's Function Block Application Designer utility (or "Application Designer") to create applications, which you then download to the Interface that controls the H1 segments.

Function Blocks

Function blocks control system behaviors for a fieldbus device (see *Application Blocks* in *Chapter 3*). Function blocks are also the fundamental components for applications.

Segment-specific

You create applications for a **specific** H1 segment which has fieldbus devices. Since an Interface can support up to four segments, you can create up to four unique applications for each Interface. You **cannot** define applications for segments which do not have fieldbus devices.

Scheduled or Unscheduled?

The Application Designer supports two application components—scheduled and unscheduled—based on communication requirements. Scheduled communications are time-critical and involve processes or measurements. Unscheduled communications are not time-critical, and occur when the application is not active with scheduled communications.

Note: Unscheduled functionality is available **only** in the ROC and ControlWave FF Interfaces, not in generic HSE servers.

A single application can have both scheduled and unscheduled communication components. For example, if you have a pressure transmitter and a level transmitter on the same H1 segment, you might want pressure information transmitted every second (as a scheduled

communication) while tank level information transmits less-frequently (as an unscheduled communication).

Graphical Workspace

The Application Designer provides a graphic workspace to help you create and manage applications. The link to this utility appears when you select an H1 segment with fieldbus devices (see *Figure 4-1*).

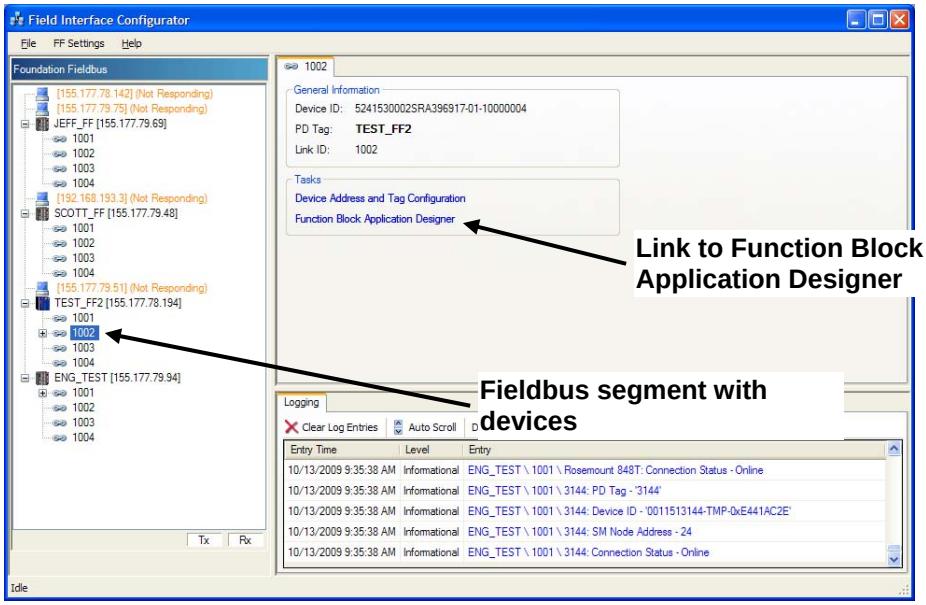


Figure 4-1. Link to Function Block Application Designer

Click **Function Block Application Designer** to open the Function Block Application Actions screen.

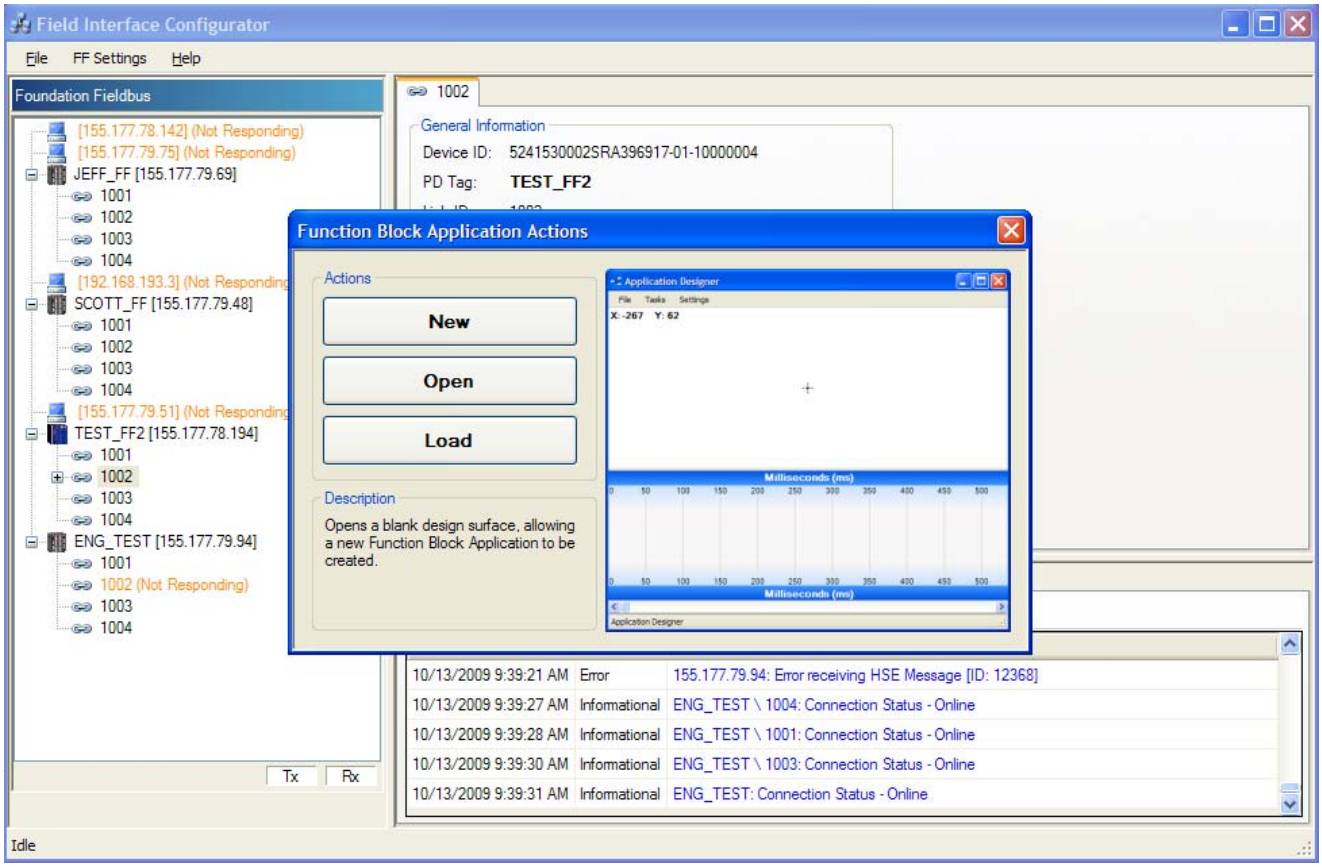


Figure 4-2. Application Designer (initial screen)

This screen has three actions:

Action	Description
New	Opens a blank design surface, allowing you to create a new function block application.
Open	Opens an existing application you previously created and filed. Use this action to edit an application.
Load	Loads an existing application from the Interface server segment to the Configurator. Use this action to modify a working application.

4.2.1 Creating a Scheduled Communication

When you click **New** on the Function Block Application Actions screen, the design workspace displays (opening the Scheduled tab by default).

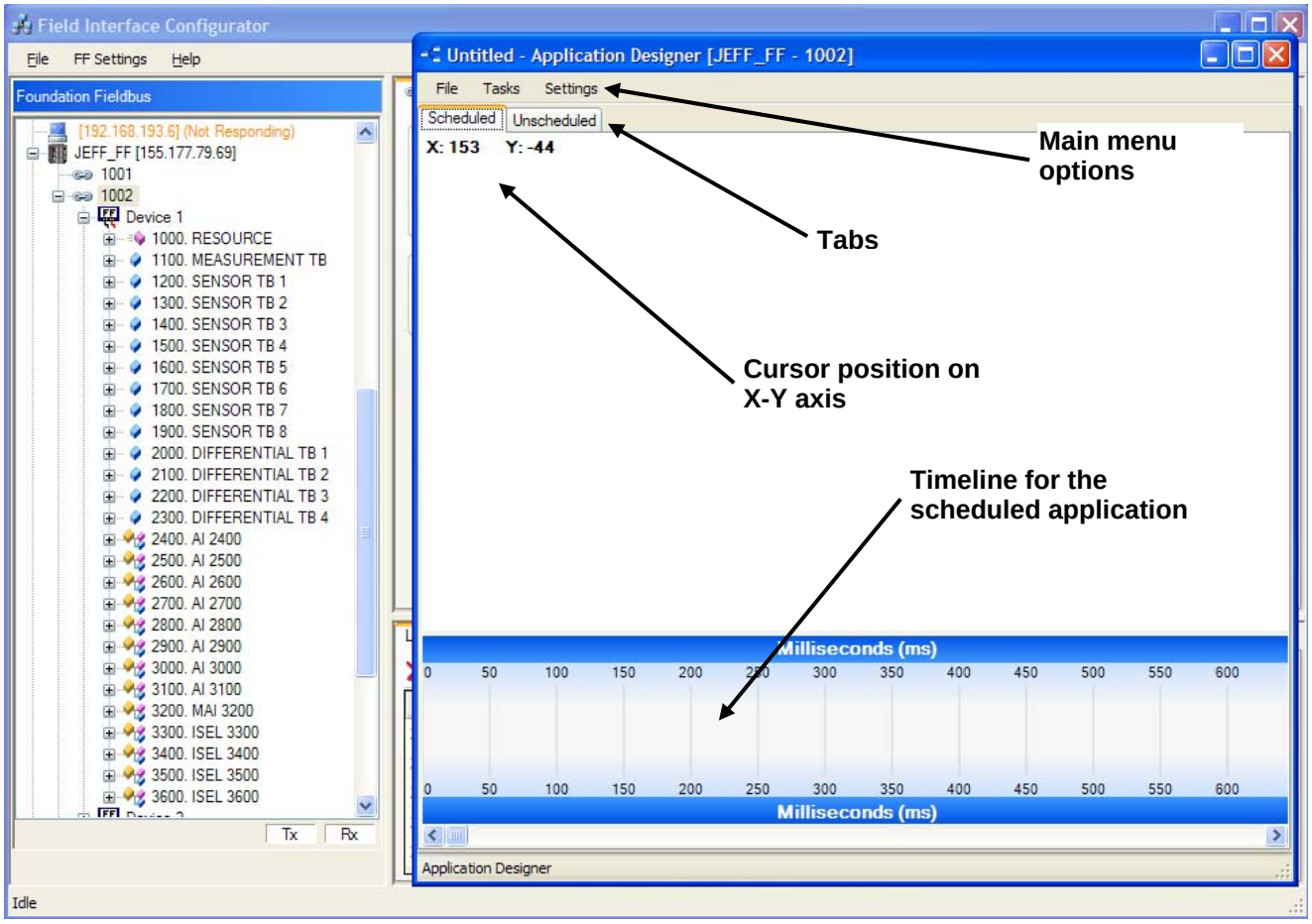
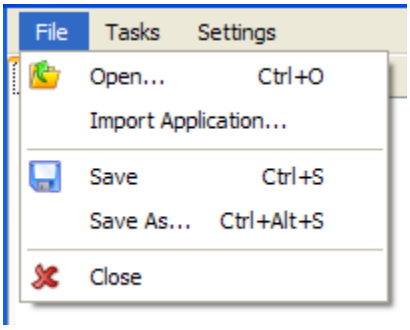


Figure 4-3. Application Designer workspace

Note: For this example we've enlarged the workspace and moved it to the right side of the Configurator screen. We've also expanded the H1 segment display at the left side of the screen to show the fieldbus device's function blocks, which we need to build the application.

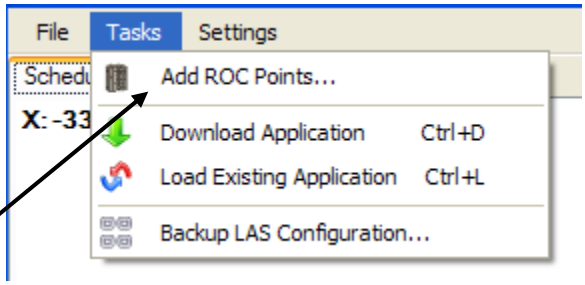
The Application Designer workspace has two tabs, **Scheduled** and **Unscheduled**. Applications can occur either on a particular time schedule you define or whenever the segment has available time. At the bottom of the workspace is a timeline (or "macrocycle"), which only appears on the Scheduled tab.

The workspace also has several menu options, which display as drop-down menus:



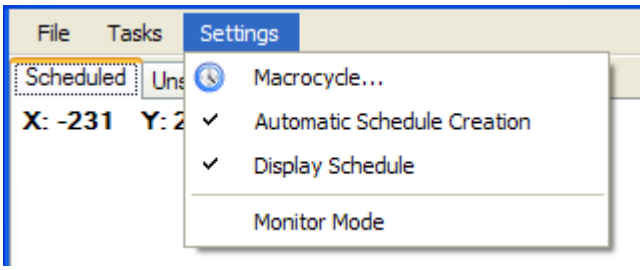
Option	Description	
File	**Open**	Opens a previously saved application.
	Import Application	Enables you to copy a segment application to another segment (see *Section 4.6*).
	Save	Saves the current application to the location you specify.
	Save As	Saves the current application using the name and location you specify.

Option changes based on HSE server type



Option	Description	
Task	**Add ROC Points**	Identifies points within a ROC server to receive application output. **Note**: This option displays **only** for ROC-base HSE servers.
	Add CW Points	Identifies points within a ControlWave server to receive application output. **Note**: This option displays **only** for CW-based HSE servers.
	Download Application	Downloads the current application from the Application Designer to the Interface server segment. See *Downloading an Application*.
	Load Existing Application	Retrieves an application from the Interface server segment to the Configurator. See *Loading an*

Option	Description	
		Application.
	Backup LAS Configuration	Indicates a device to provide LAS backup. See *Configuring LAS Backup*.



Option	Description	
Setting	**Macrocycle**	Specifies the number of milliseconds in a macrocycle (duration of an application). The default value is **1000** milliseconds.
	Automatic Schedule Creation	Prevents conflicts for function blocks you drag onto the workspace. The default value is “on” (checked).
	Display Schedule	Shows or hides the timeline at the bottom of the Scheduled tab. The default value is “show” (checked).
	Monitor Mode	Provides real-time monitoring of the application. The default value is “off” (unchecked).

Drag-and-drop

To begin building an application, you drag a function block from the left portion of the screen onto the workspace.

For example, click on the **2400. AI 2400** application block and drag it onto the workspace. When you release the icon, several things occur:

- The application block appears in the workspace with any inputs and outputs labeled.
- An icon representing the application block appears at the beginning of the timeline. The width of that icon represents the amount of time (in milliseconds) the block takes to perform its operations.
- A label appears at the bottom of the workspace identifying the application block.

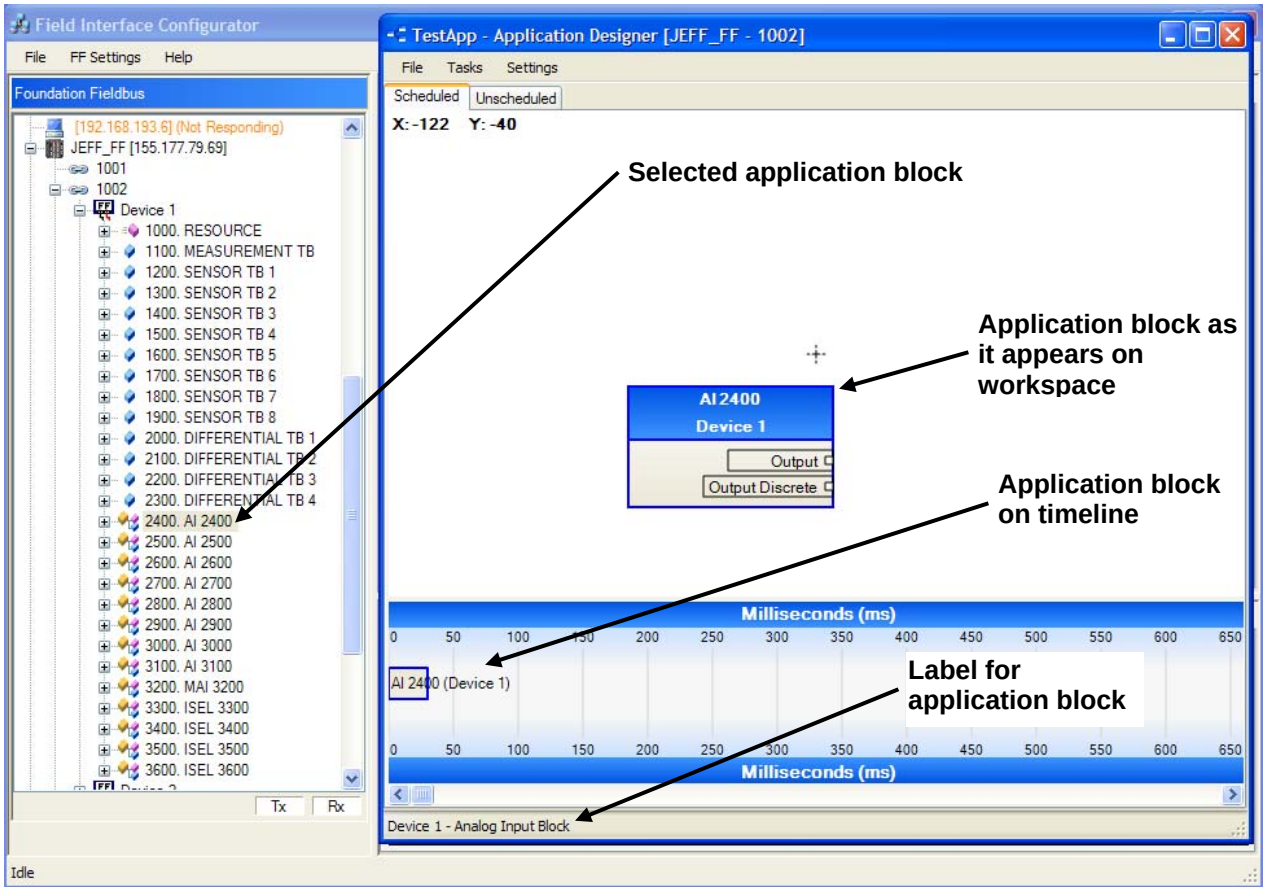
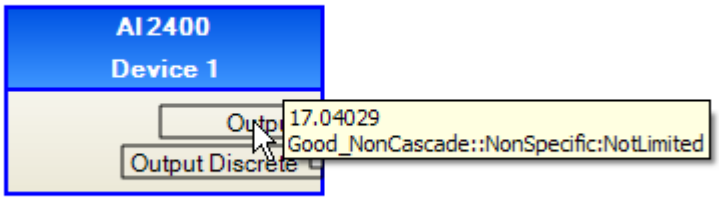
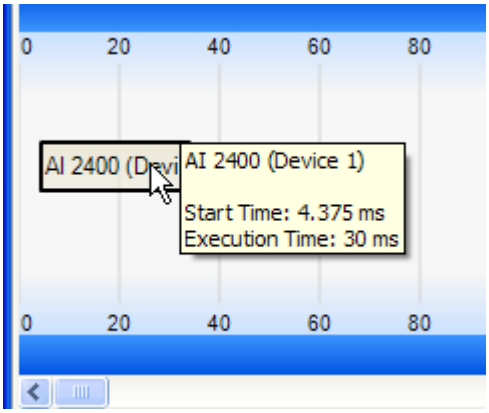


Figure 4-4. Application Designer workspace

If you place the cursor over an input, the Application Designer displays the value and status of that point.



If you place the cursor over a block in the timeline, the Application Designer displays critical information about the start and execution times for that block:



Applications consist of data relationships among blocks, so we need to add at least one more function block. When you drag-and-drop a second function block (for example, **3300. ISEL 3300**) onto the workspace, note how the screen changes:

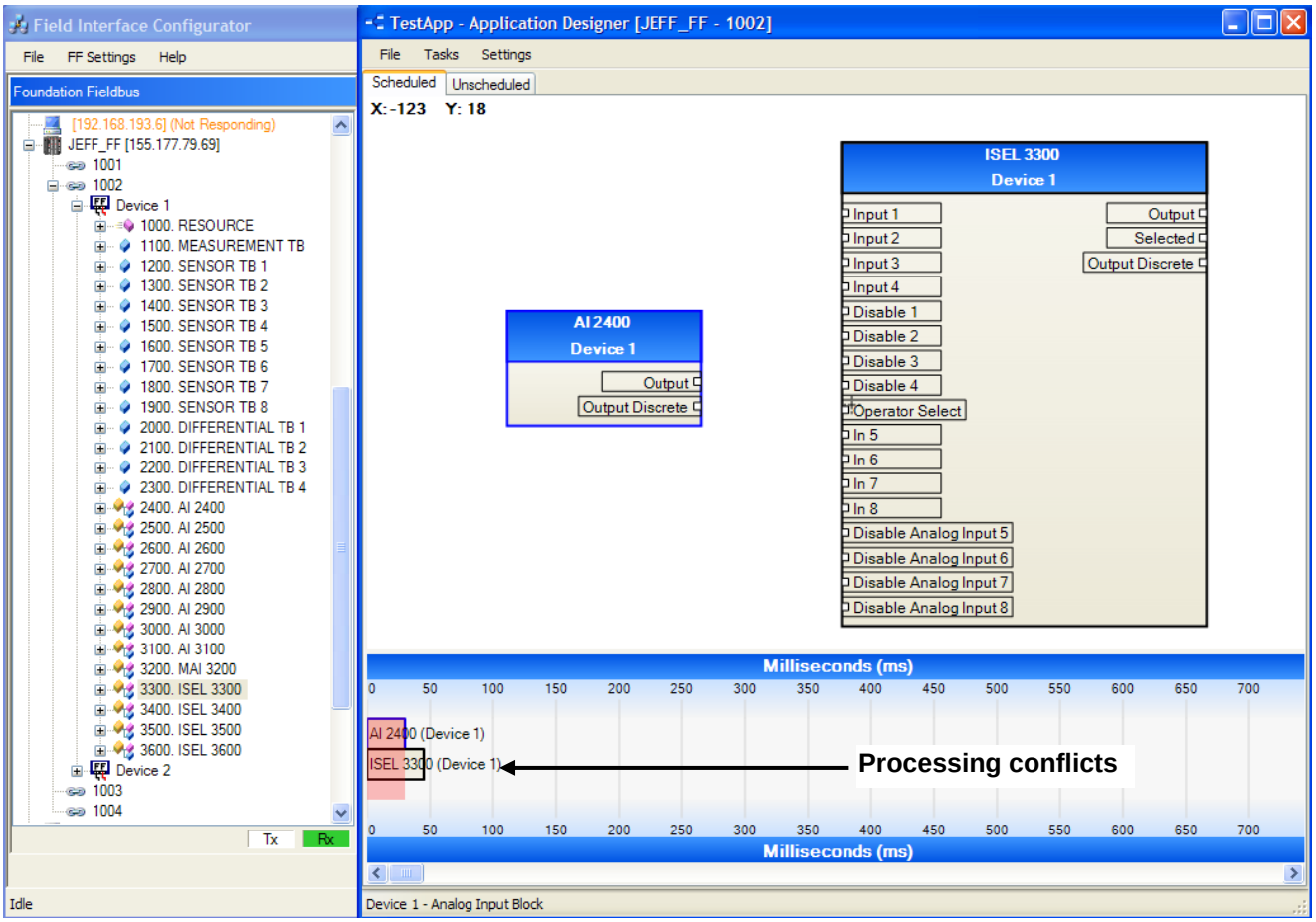
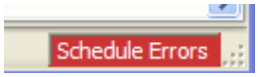


Figure 4-5. Application Designer workspace

Figure 4-6 shows a workspace with two blocks—AI2400 and ISEL3300—with inputs and outputs. The workspace also placed the ISEL3300 block at the beginning of the timeline. Since a single device cannot execute two function blocks at the same time, red shading

indicates processing conflicts. The Designer also displays a warning message in the lower right corner of the workspace to identify processing conflicts:



Managing the Timeline

The Application Designer makes this conflict easy to resolve. First, click on the ISEL 3300 block in the workspace. The border color of that block in the timeline changes to blue. Then click on the ISEL 3300 block in the timeline and pull it to the right. As you move the block to the right, the processing conflict resolves and the red shading clears.

Spacing Block Requests

Leave 5 to 10 milliseconds between block requests on the timeline. The Interface processes any defined unscheduled communication components only when it is not processing scheduled communication components. Leaving space between components allows time to process the unscheduled components. As a general rule, leave 25% of your timeline for unscheduled communications.

Note: If you enable "automatic scheduling" (select **Settings** → **Automatic Schedule Creation**), the Application Designer automatically resolves conflicts as you drag blocks on the design workspace by leaving a 1 or 2 millisecond space between blocks.

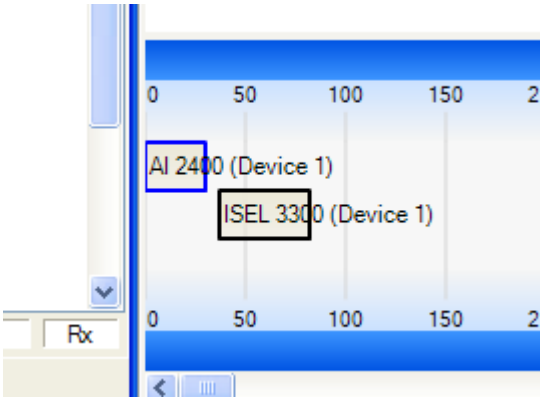


Figure 4-6. Resolved Execution Conflict

This timeline now indicates that the AI 2400 executes first, followed by a few milliseconds, and then the ISEL 3300 executes.

"Wiring" Inputs and Outputs

Now you can connect the inputs and outputs between these two blocks. Again, the graphical format for the workspace streamlines the task of associating inputs and outputs. For any block, outputs are on the right side and inputs are on the left side.

Click on the small square at the right of an output (or at the left of an input). The square turns blue. As you move the mouse you create a graphical "wire" or connector (see *Figure 4-7*).

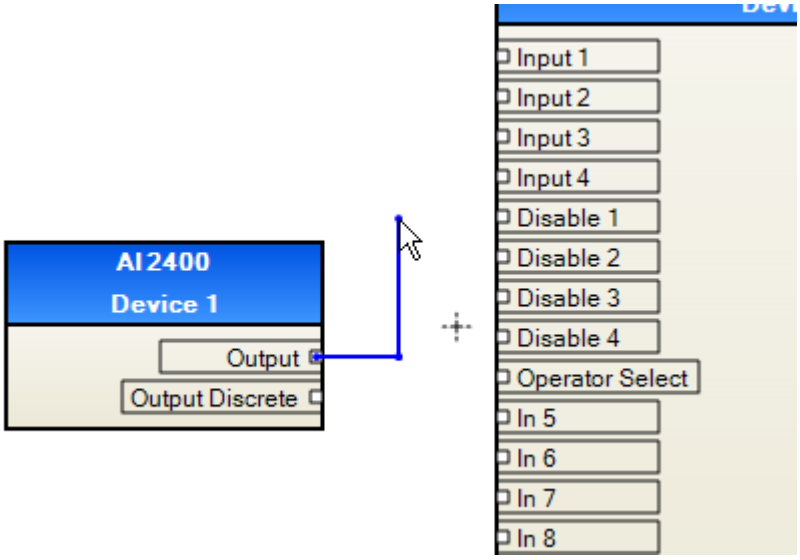


Figure 4-7. Connecting Inputs & Outputs

Use the mouse to move the connector to an input on the ISEL3300.

Note: The Application Designer helps you select valid connections. If the square indicator for the input or output you select turns green, the connection is valid. If the indicator turns red, the connection is invalid and will not complete. Select another input or output.

When you find a valid input or output, left-click to complete the connection:

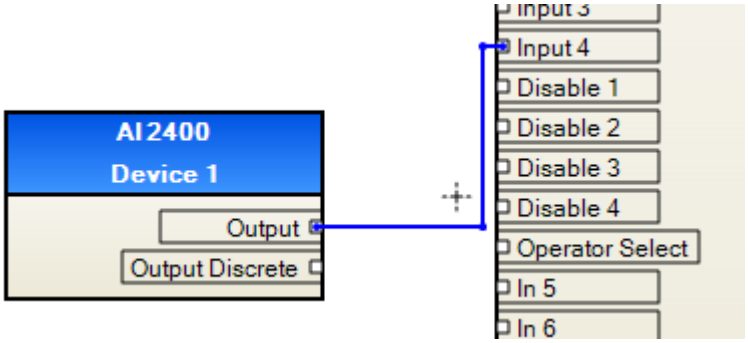


Figure 4-8. Connected Output and Input

Note: The Application Designer uses blue to indicate the selected connection. The color of a connection changes to black when you start to make another connection.

Managing the Workspace

With only two blocks, our workspace is getting filled. The Application Designer has several techniques you can use to adjust the arrangement of blocks on the workspace or manage the size of the workspace itself.

- Right-click and hold any edge of the workspace to expand its general size (as you would any screen in the Windows environment).
- Click (either right-click or left-click) on a block to move it individually to another location on the workspace. (Any connections remain intact.)
- Left-click (and hold the mouse button down) on a clear portion of the workspace to move the entire workspace.
- Right-click on a clear portion of the workspace to display a pop-up menu with additional options:

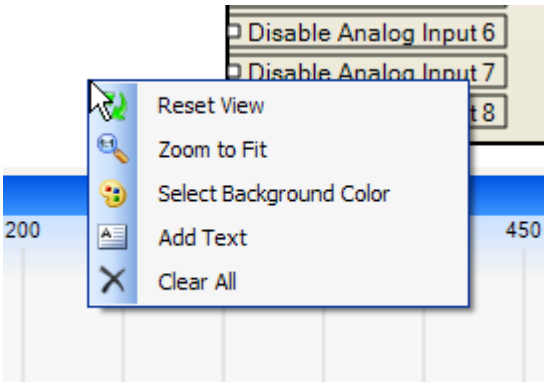


Figure 4-9. Workspace menu

Option	Description
Reset View	Re-centers the view in the available workspace.
Zoom to Fit	Adjusts the proportions of the workspace so you can see all the blocks in the workspace. **Note**: If your mouse has a "wheel" between its right and left buttons, you can use that wheel to shrink or expand the workspace view at any time. If you click the timeline at the bottom of the workspace, you can also use this wheel to expand or contract the timeline.
Select Background Color	Enables you to change the background color for the workspace. This option does not change the color of the blocks.
Add Text	Allows you to add explanatory text to the workspace.
Clear All	Clears the entire workspace. **Note**: Save your application periodically.

Adding ROC or ControlWave Points

Storing output from the fieldbus devices in ROCs or ControlWave servers on the network may be a critical component of an application.

Click **Tasks** on the Application Designer menu bar to display an option you use to add a CW or ROC point to the application:

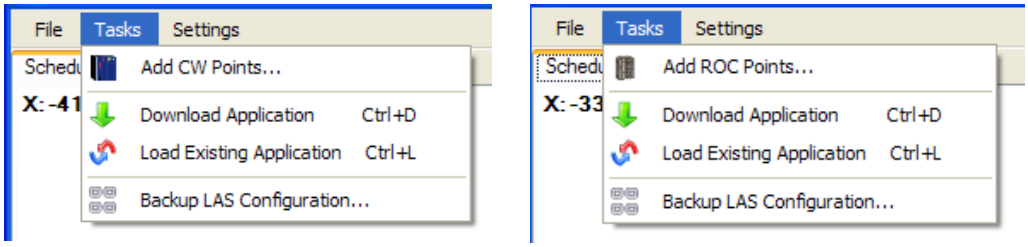


Figure 4-10. Adding CW/ROC Points menu

Note: The Application Designer changes the contents of the Tasks menu depending on whether you direct the fieldbus device output to a ROC or a ControlWave. For this example, we chose a ROC server, although the processes are identical.

Why Add Points?

Depending on the purpose of your application, you may not need or want to accumulate output in your ROC or CW. If the application is designed to simply provide field-level control (such as closing or opening a valve based on tank level or temperature), you may not need to identify and include a ROC or CW point in the application.

However, if you are reporting temperatures or tank levels over a period of time, identifying a ROC or CW point to hold the values is essential.

Our example application now might look like *Figure 4-11*:

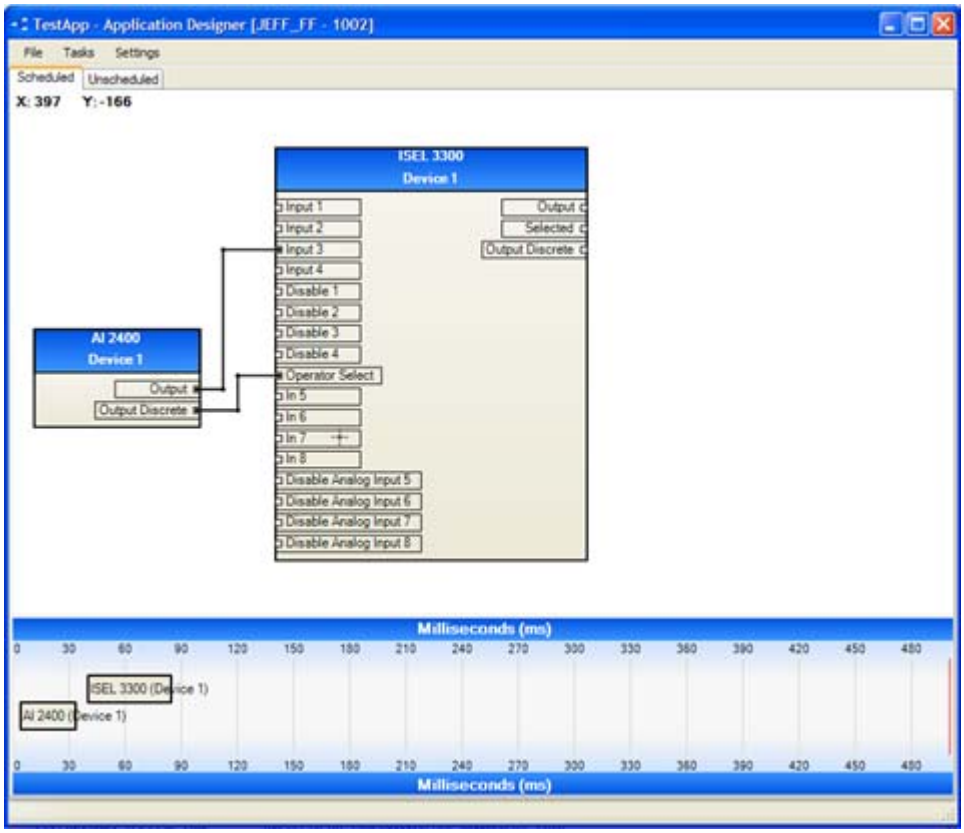
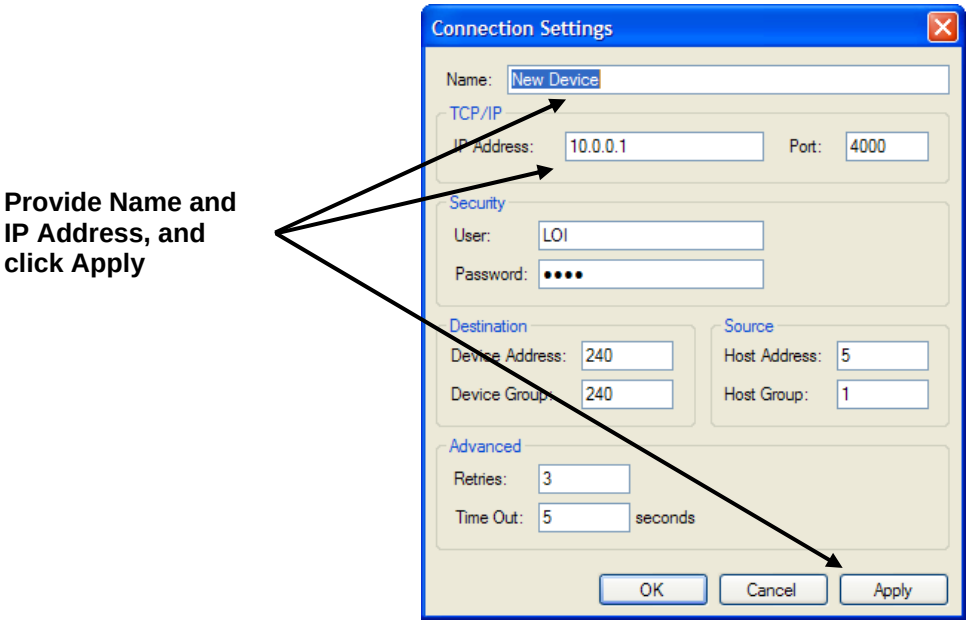


Figure 4-11. Adding ROC Points

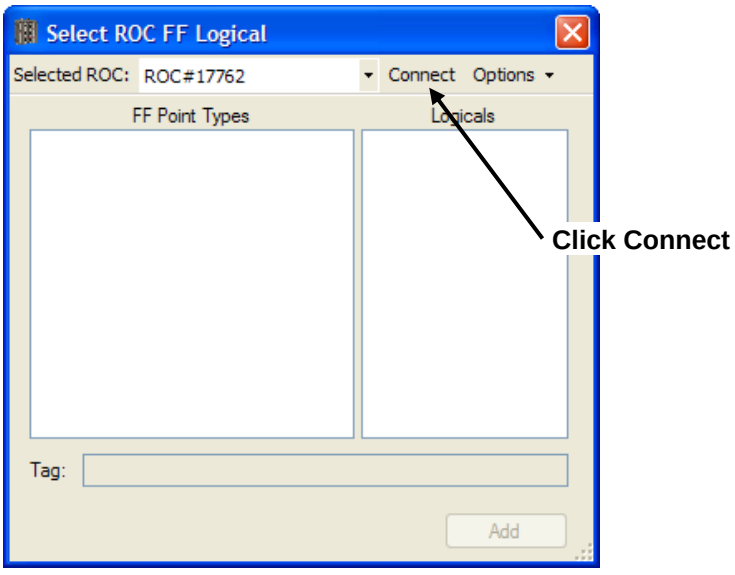
To add a ROC point to the application:

1. Click **Tasks** on the main menu and select **Add ROC Points…** If you have not added a ROC to an application before, the Application Designer displays the Connection Settings dialog:

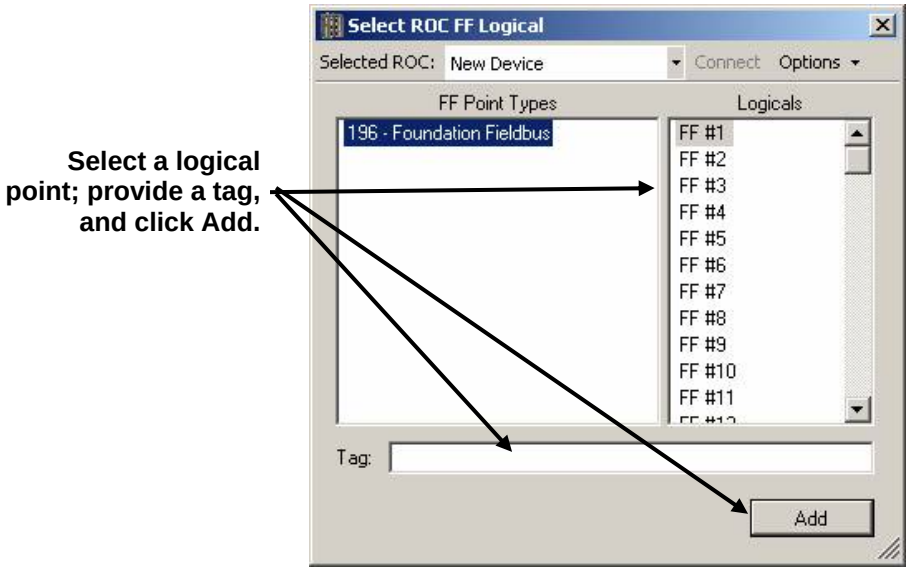


Note: If you **have** previously added a ROC to an application, the Application Designer remembers that device, skips the Connection Settings dialog, and displays that device in the Select ROC FF Logical dialog box. If you want to add a different ROC, click **Options** → **Add ROC** to redisplay the Connection Settings dialog and enter the Name and IP Address for the ROC you desire.

2. Provide a name for the ROC, a valid IP address, and click **Apply**. The Select ROC FF Logical dialog displays.



3. Click **Connect** to connect to the specified ROC. The Application Designer completes the fields on the dialog:



Note: For ROCs, the Application Designer uses point type 196, which maintains up to 100 logicals. For ControlWaves, the Application Designer uses point types 74 through 77 (each of which maintains up to 255 logicals) for a total of 1020 logicals.

4. Select a logical point (FF #1 to FF #100) to receive the output from the fieldbus device, provide a tag to uniquely identify the data, and click **Add**. The Application Designer adds the ROC logical to the workspace and leaves the dialog box on the screen (if you want to add more logicals).

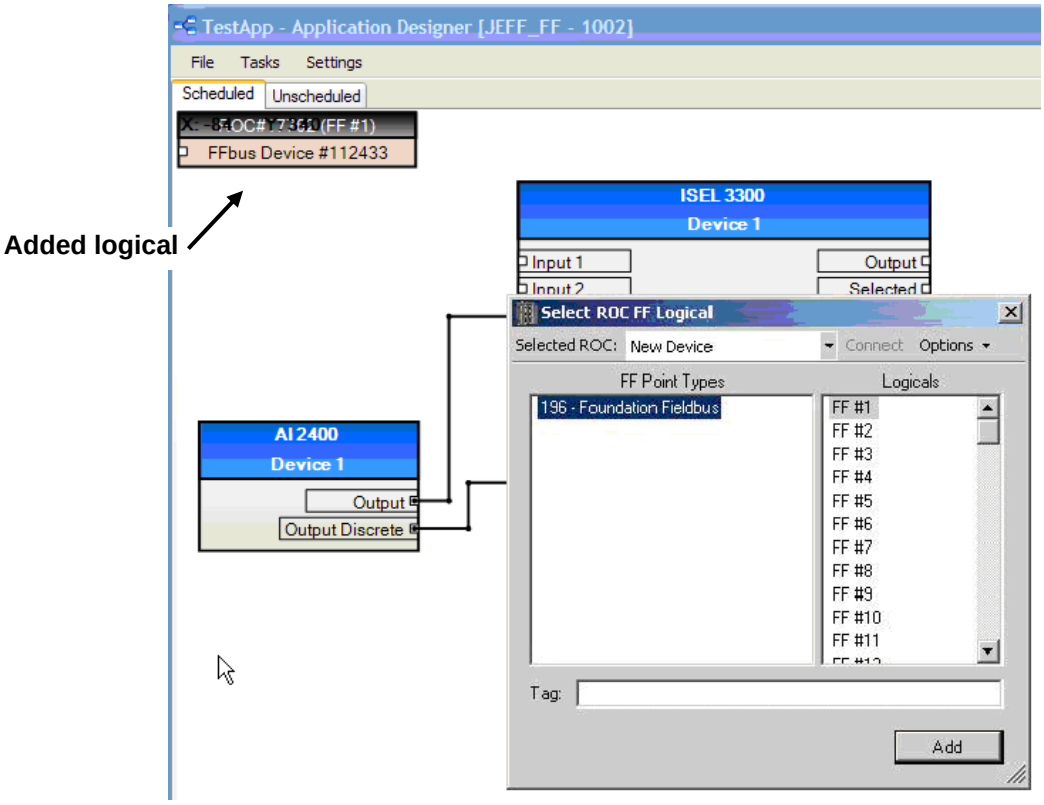


Figure 4-12. New ROC Logical

5. Close the Select ROC FF Logical dialog box.
6. Move the ROC logical into position on the workspace and connect it to the ISEL 3300 (see *Figure 4-13*).

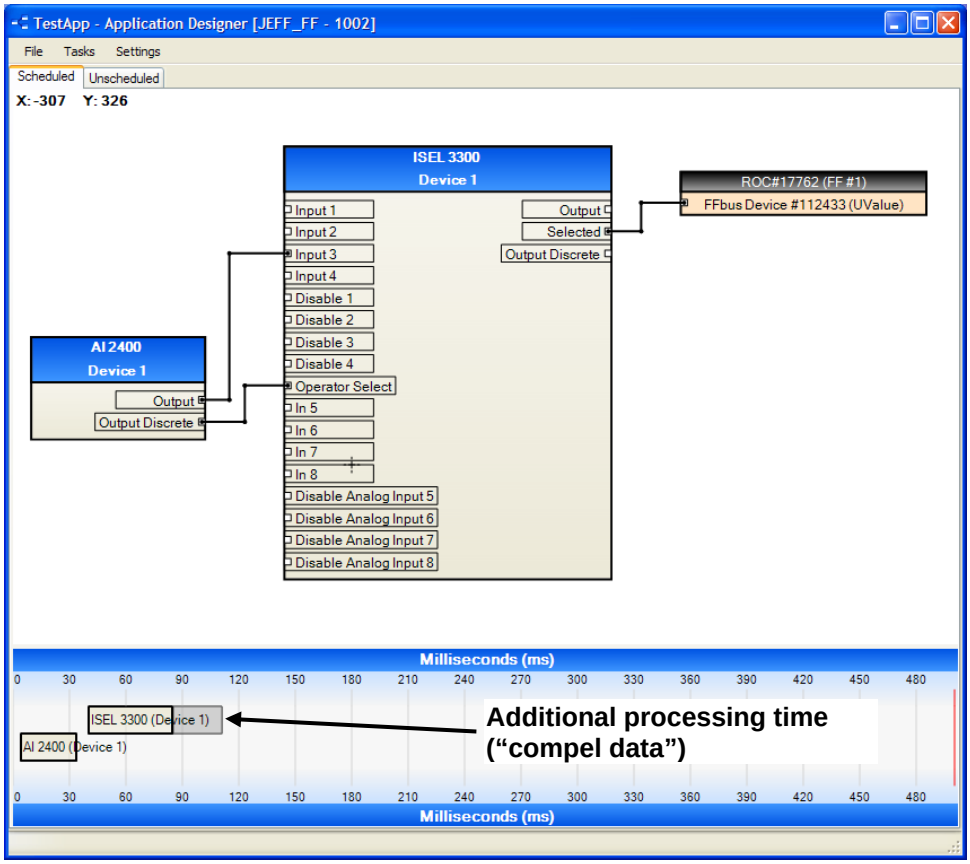


Figure 4-13. Connected ROC Logical

Note: The timeline now includes an area of gray shading, which indicates the time required to send the output to the logical point in the ROC or ControlWave. Fieldbus calls this gray area a "compel data"; it represents the time the device spends communicating.

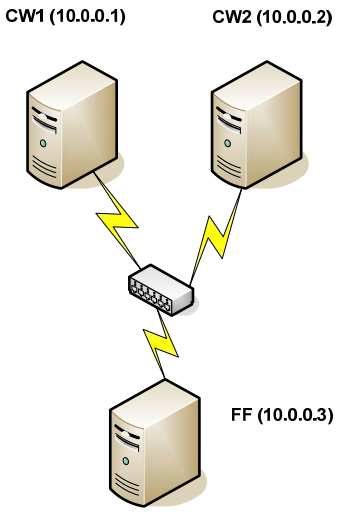
Application Complexity

The sample application we've just built is simplistic, but it shows the general processes of selecting devices and connecting devices and servers. You determine how complex your application needs to be. Regardless, remember to save your application (**File → Save**) as you create or modify it.

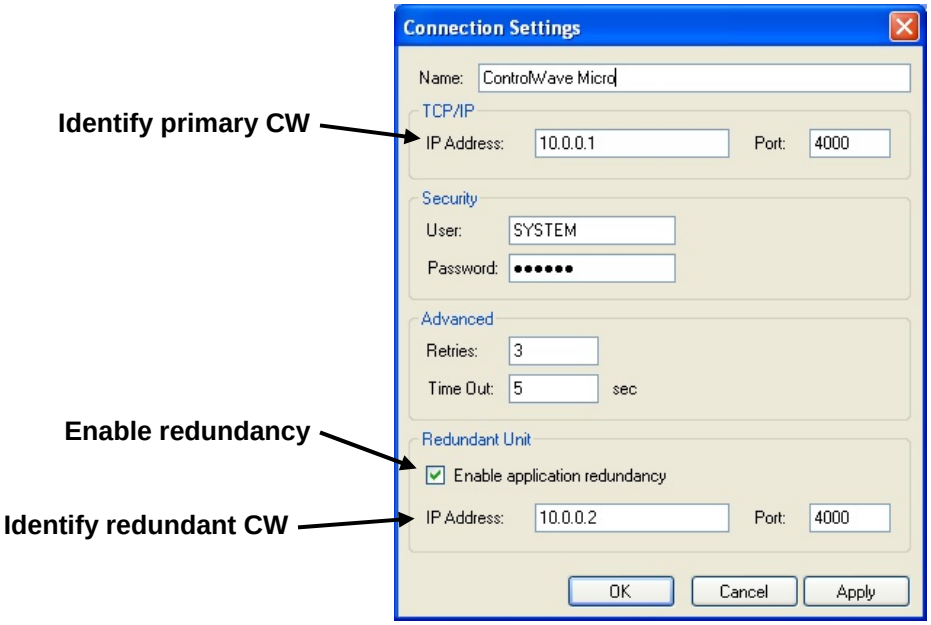
ControlWave Redundancy

The ControlWave Micro supports a redundant system. The Configurator cannot **automatically** detect a redundant system but it provides you with an option to accommodate this configuration as part of the ControlWave-specific Connection Settings dialog.

For this example, we have two CWs in a redundant configuration. The primary CW has an IP address of 10.0.0.1, the secondary CW has an IP address of 10.0.0.2, and the FFbus has an IP address of 10.0.0.3.



At step 1, when you select **Add CW Points**, the Connection Settings dialog displays:



You identify the primary CW (10.0.0.1) in the IP Address field in the TCP/IP frame. In the Redundant Unit frame, select **Enable application redundancy** and complete the IP address and Port for the redundant unit. Click **Apply** to save the changes.

This enables the FFbus server to transparently provide information to both the primary and redundant CWs.

Note: For more detailed information on ControlWave redundancy, refer to the *ControlWave Redundancy Setup Guide* (D5123, part number D301424X012). This document is available at *www.emersonprocess.com/Remote*.

4.2.2 Creating an Unscheduled Communication

The unscheduled communication components of an application are **not** time-critical. The segment processes unscheduled communications during "inactive" times, such as the several-millisecond gaps you leave between the compel data periods of an application. Host systems (such as AMS Device Manager) also use unscheduled times for communication.

Note: Leave at least 25% of any scheduled communication component unused by compel data periods to permit processing for unscheduled communications.

To create an unscheduled communication:

1. Click the **Unscheduled** tab on the design workspace. A blank design workspace displays. Note that this workspace does **not** have a timeline.

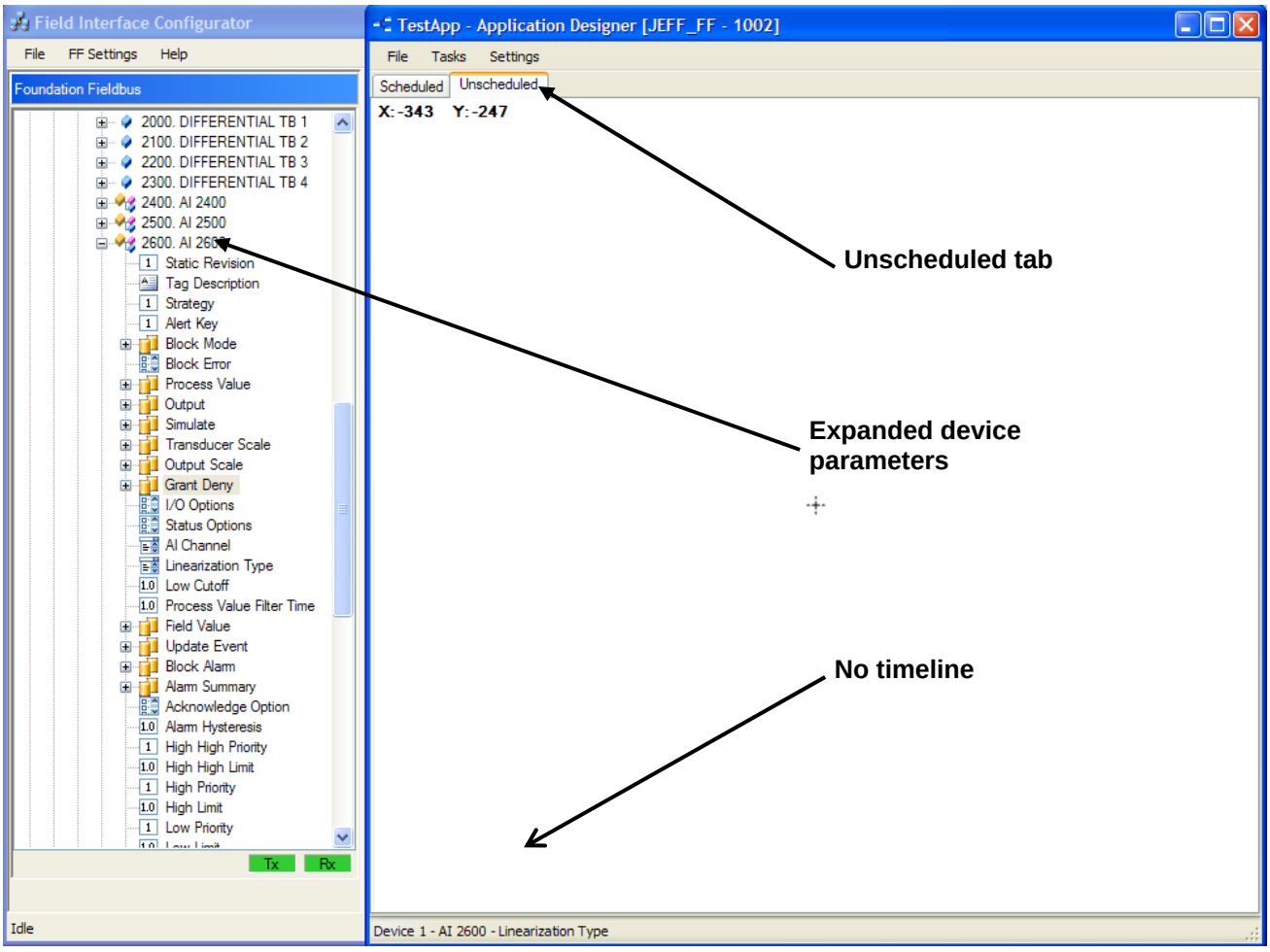


Figure 4-14. Unscheduled Design Workspace

Parameter- The major difference between creating scheduled and unscheduled communications is that you use the **parameters** within a device's

Based function blocks to create unscheduled communications. Expand a device icon to display its parameters (see *Figure 4-14*). You can then drag these parameters into the workspace.

2. Select and connect function block parameters or servers as described in *Creating a Scheduled Communication*. Your completed unscheduled communication may look something like *Figure 4-15*:

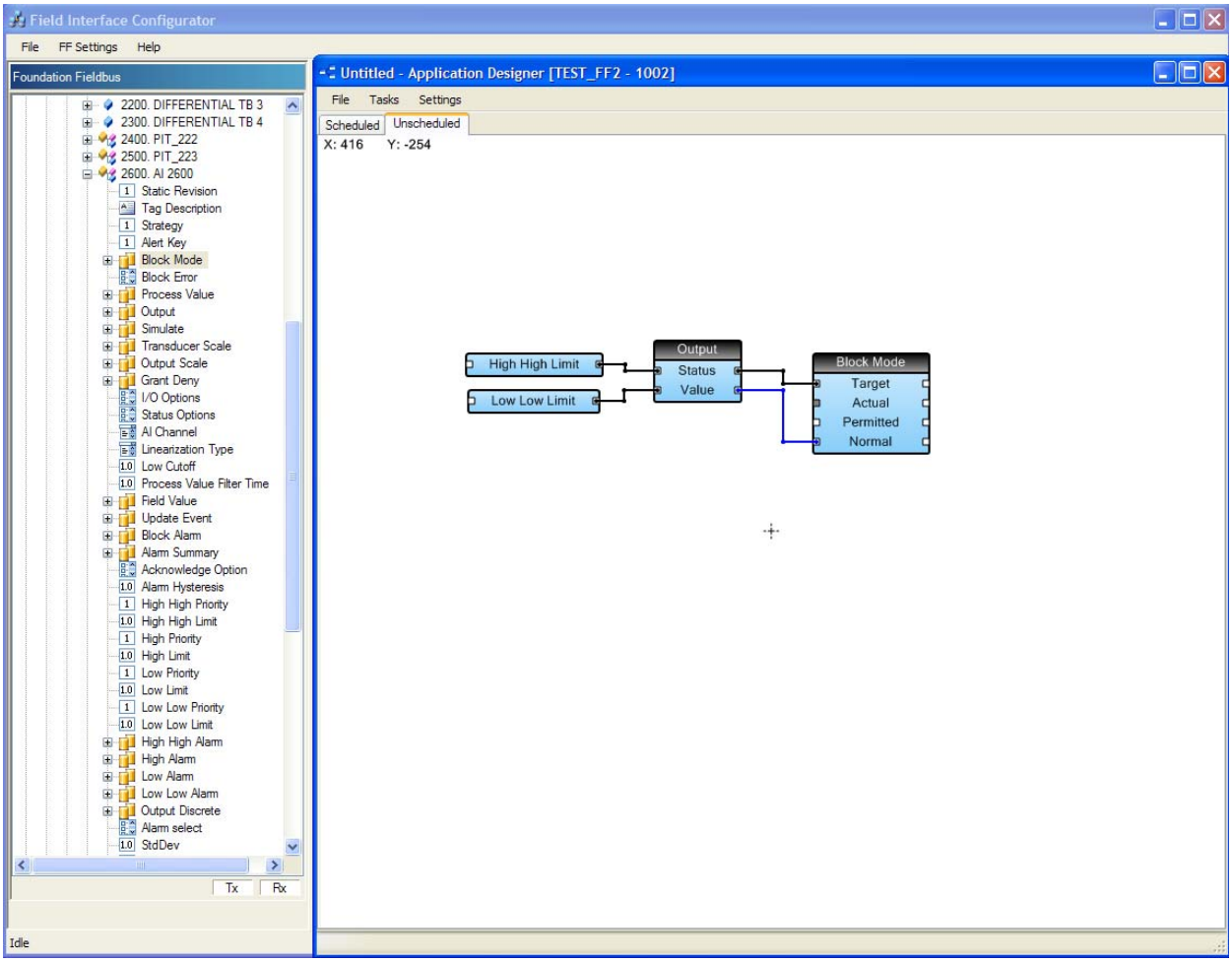


Figure 4-15. Completed Unscheduled Communication

As with scheduled applications, you can choose to add a ROC or ControlWave point to accumulate information.

3. Save your unscheduled communication (**File → Save**).

4.3 Downloading an Application

Once you have designed (and saved) your application, download it to the Fieldbus Interface segment for which it was created.

You perform this download using the Tasks menu option on the Application Designer workspace.

1. Click **Tasks** → **Download Application**:

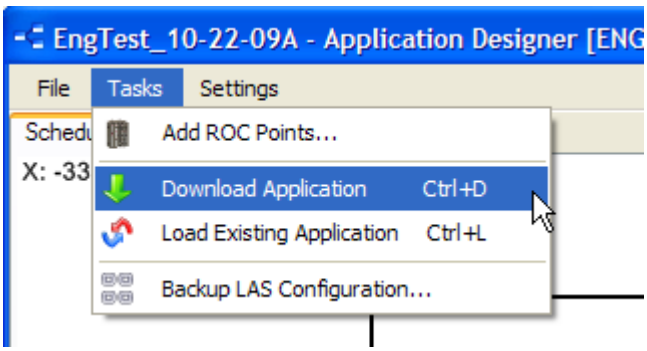


Figure 4-16. Downloading an Application

The Designer first presents a Download Summary screen that indicates the activities to be performed, block mode handling options to select, and any warnings:

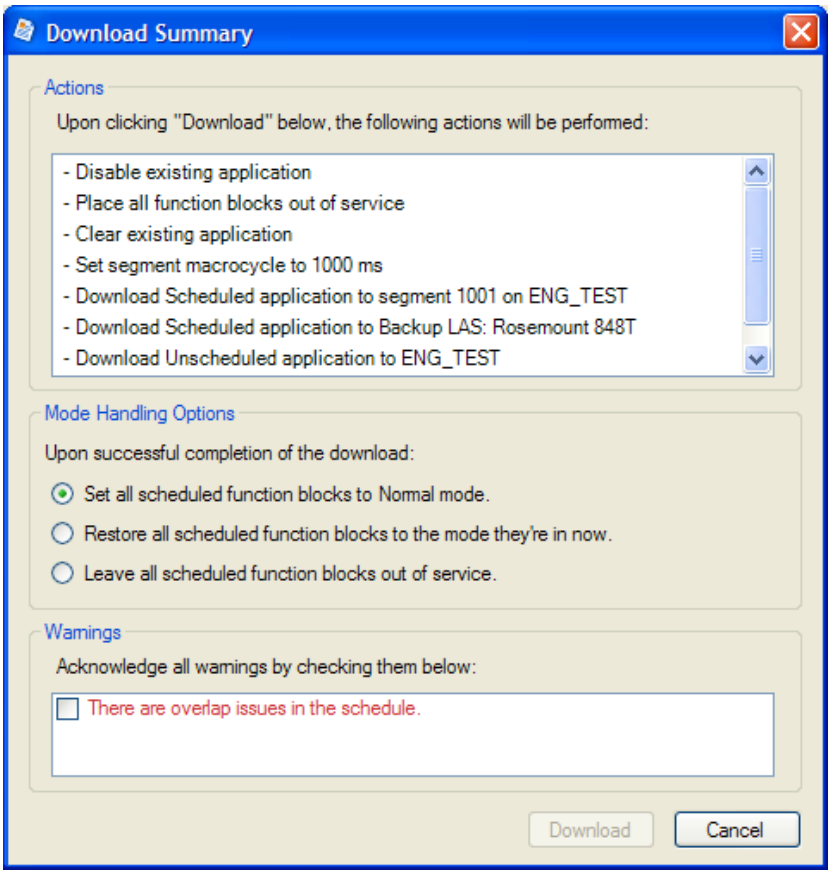


Figure 4-17. Download Summary

2. Review the Download Summary. If you have any warnings, click **Cancel** to stop the download and resolve the issues.

Option	Description

Option	Description
Actions	Identifies the routine actions the Application Designer takes during the download.
Mode Handling Options	Manages how the block mode handling works after a successful download. **Note**: The default (**Set all scheduled function blocks to Normal mode**) maintains any settings you have defined for your function blocks.

Warning **This is an advanced fieldbus function. Change block mode handling options ONLY if you have advanced fieldbus knowledge.**

Warnings	Indicates any error conditions in the application. Click **Cancel** to stop the download. Resolve these issues before continuing.

3. The Configurator begins downloading the application to the segment, displaying a progress screen. The application icon moves from left to right, indicating that the Configurator is copying the application to the designated segment.

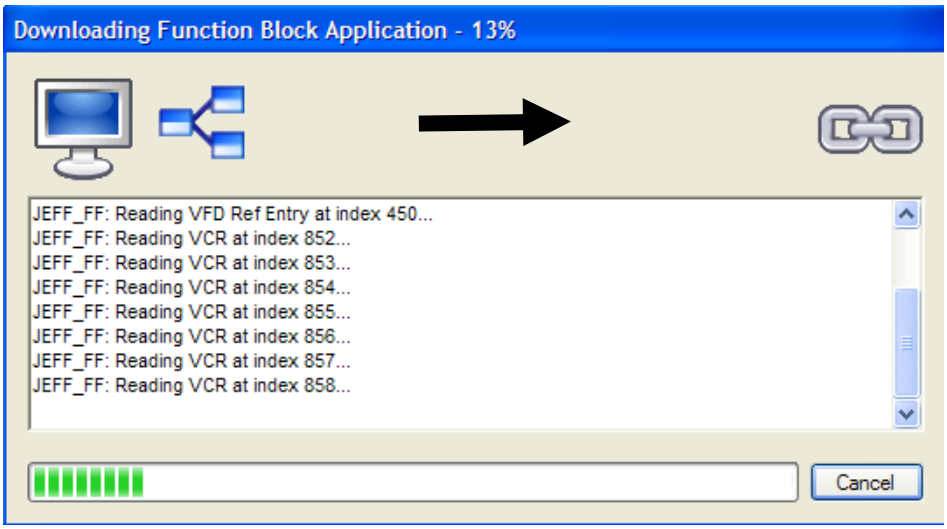


Figure 4-18. Downloading Progress

4. When the download completes, click **Done** to close the download screen and return to the workspace. Click the **Save Log As** button (that displays at completion) to save the download log on your PC's hard drive.

Note: To ensure that the download has been successful, select the **Load Existing Application** on the Tasks menu. This option copies the application currently loaded on the segment into your Application workspace, and you can visually verify the success of your download.

4.4 Editing an Application

When you save an application, the Configurator stores it as a *.fbapp file in a folder on the PC on which you've installed the Configurator software.

Note: Unless you specify otherwise, the Configurator uses the folder: **C:\Program Files\Emerson Process Management\Remote Automation Solutions\Field Interface Configurator** as the default storage location for application files.

However, you may need to edit (or "open") the application at some later time.

To do this:

1. Select **Open** on the Function Block Application Actions screen. An Open Existing Application… screen displays.

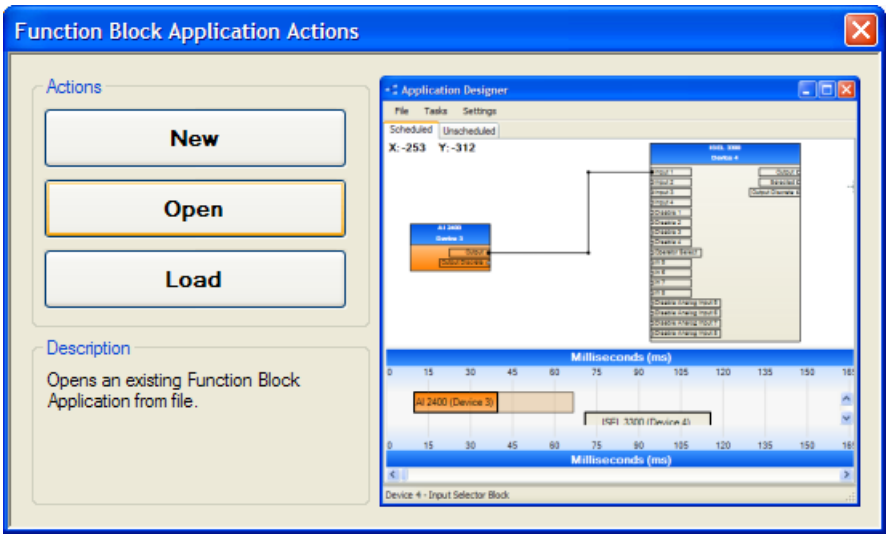


Figure 4-19. Opening an Application

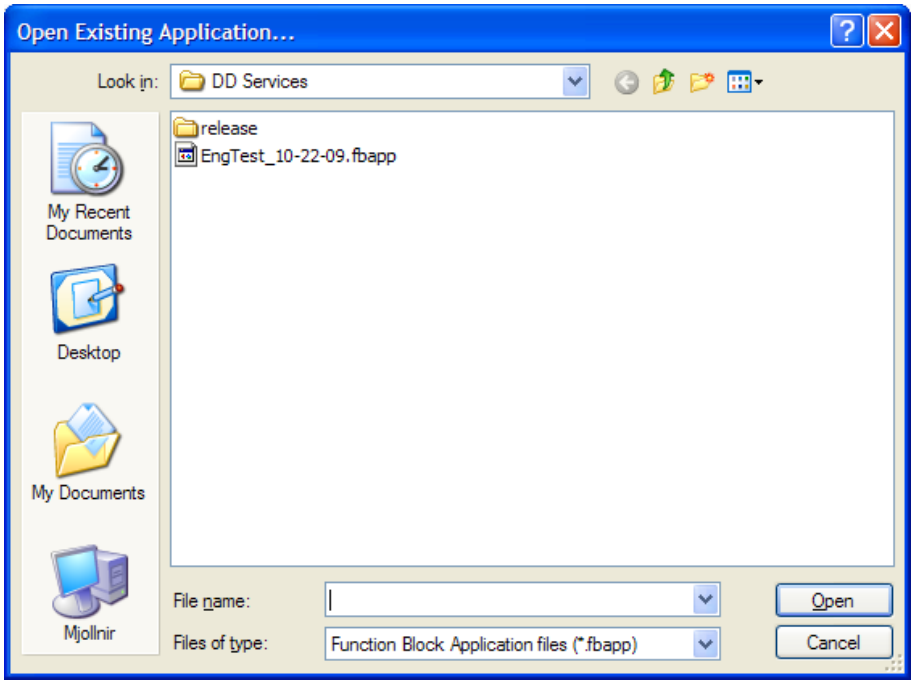


Figure 4-20. Select an Application

2. Double-click the application file (here, *EngTest_10-22-09.fbapp*). The Configurator opens all the parameters associated with the application and displays it:

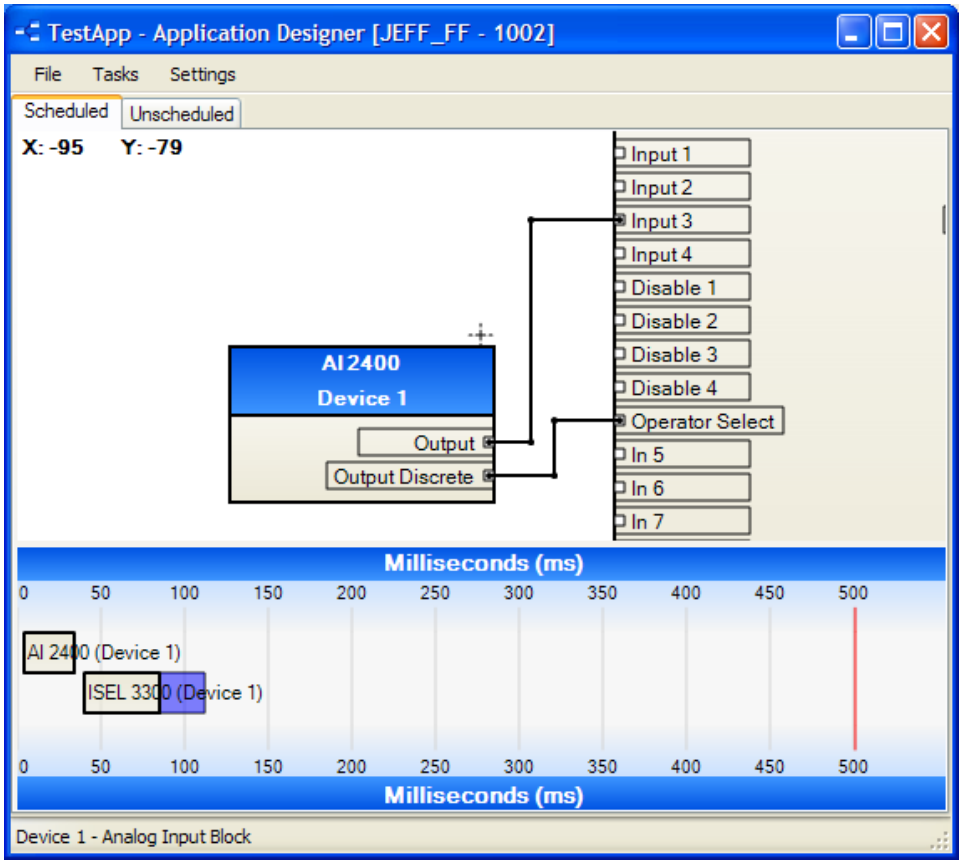


Figure 4-21. Opened Application

3. Change the size of the workspace and make your changes.
4. Save your modified application.

Note: If you make any changes to this application, you need to re-download the application to the Interface segment to reflect the changed functionality.

4.5 Loading an Application

Use this option to copy an application currently residing in a segment into the Configurator. First, select the segment. Then click **Function Block Application Designer** to start the Designer.

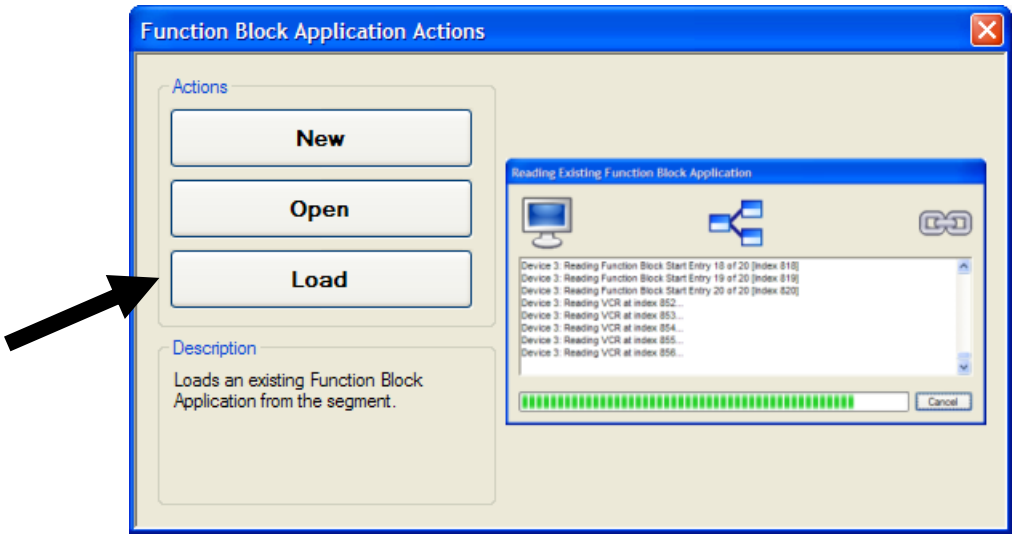


Figure 4-22. Loading an Application (1)

When you click **Load**, the application icon begins moving from right to left, indicating that the Configurator is copying the application from the segment into the Configurator:

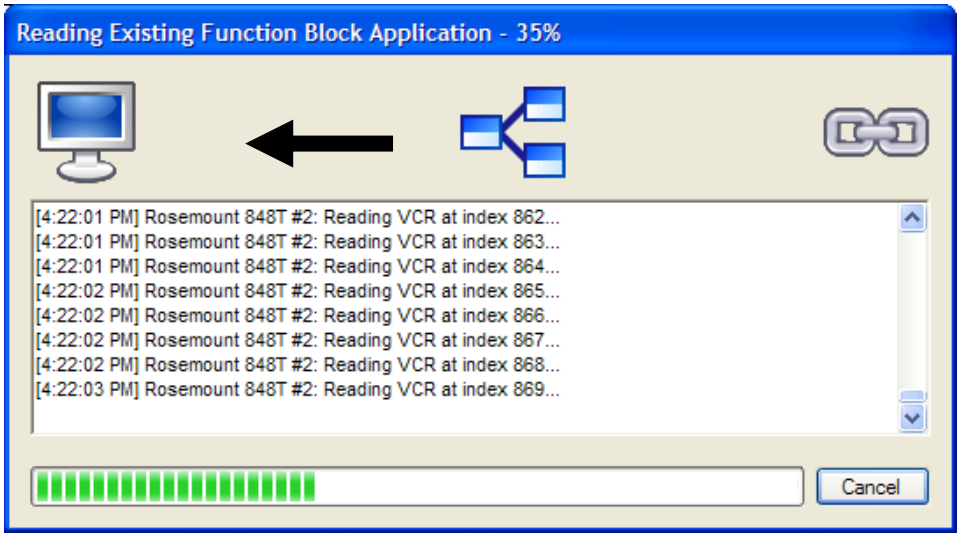


Figure 4-23. Loading an Application (2)

The Application Designer displays a message when the load completes (see *Figure 4-24*).

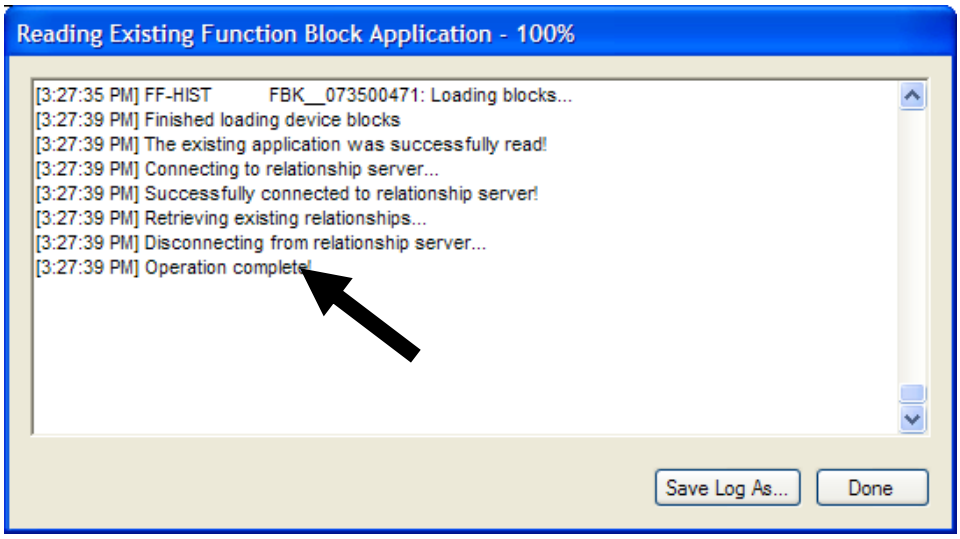


Figure 4-24. Loading an Application (3)

Click **Done**. The Application Designer loads the application on the workspace. Adjust the workspace (if necessary) to display all portions of the application.

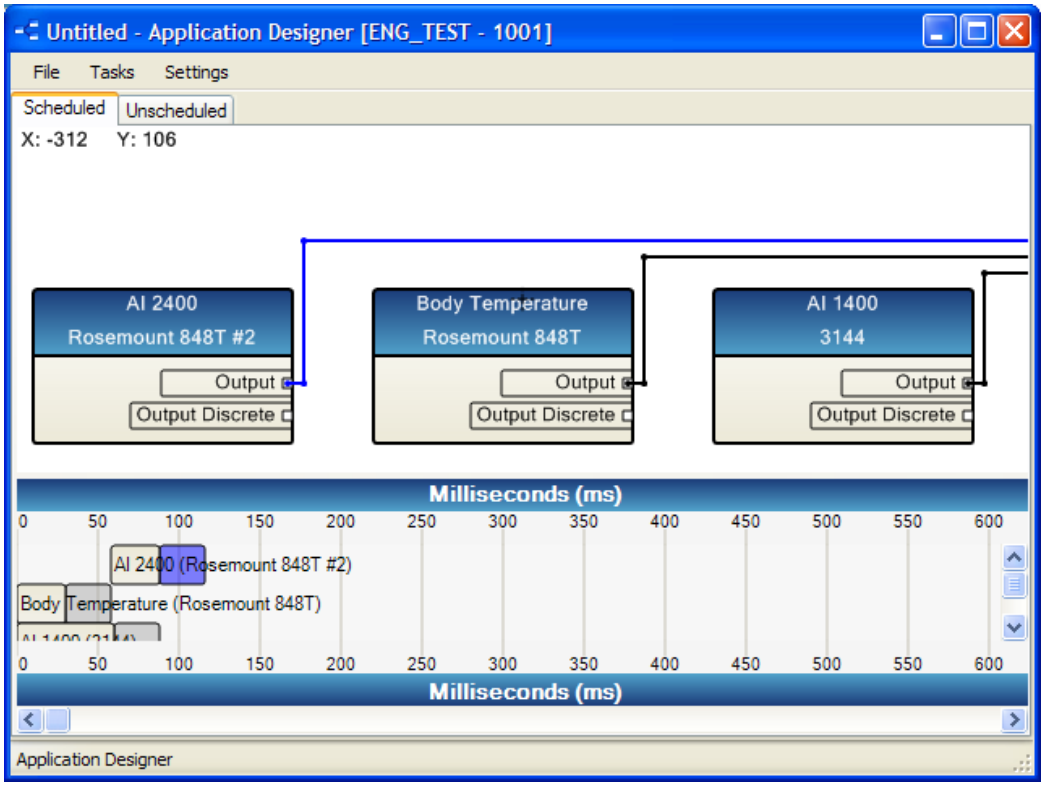


Figure 4-25. Loading an Application (4)

You can then edit the scheduled or unscheduled portions of the application

Note: The Application Designer verifies that you have all the DD files for the components in the application. If you do **not** have all the required DD files (and an Internet connection is available), the Designer displays a screen you can use to locate those files. Click **Fieldbus Foundation Registered Product Catalog** to obtain the files. Refer to *Locating Missing Device Descriptors* in *Chapter 3* for further instructions.

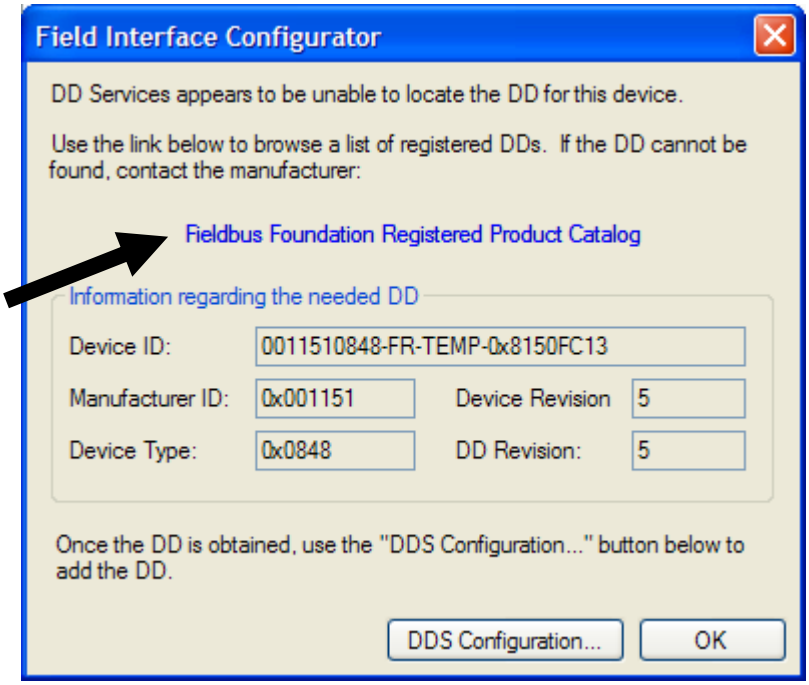
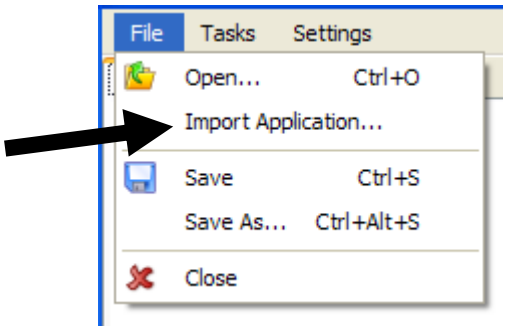


Figure 4-26. DD Services Search

4.6 Importing an Application

Use the **Import Application** option (on the File menu in the Application Designer workspace) when you want to create an application for a new segment that is identical (or very similar) in structure and function to a segment application you've already defined.



This option copies the application for an existing segment to a new segment. Remember that applications are **segment-specific**: you can modify the application's tags and IP addresses, but you **cannot** change the logical numbers the segment's devices use.

Note: If the fieldbus devices on the new segment require different logicals, you must create a new application that uses the different logicals.

Once you select an application to import, you:

- Create one-to-one mappings between devices in the original application and devices in the new (“live”) application.
- Copy the overall structure of the original application to the live application
- Include explanatory textboxes in scheduled and unscheduled components

This import process **cannot** automatically add new devices or change any device definitions in the new segment. You must make those modifications manually.

Note: Commission all devices (set unique labels, define IP addresses, and configure function blocks) on any new segment **before** you begin importing applications.

When you click **Import Application** the system displays an Import Existing Application screen (see *Figure 4-27*). Use it to select the application you want to import.

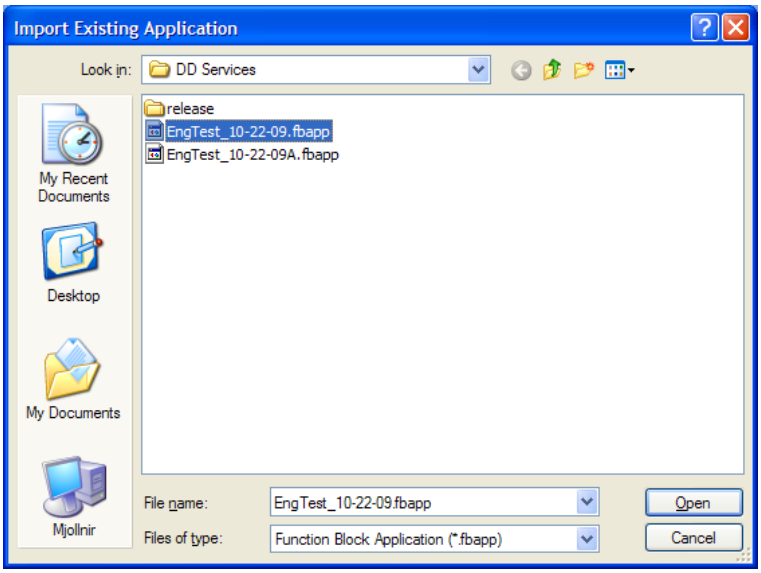


Figure 4-27. Import Existing Application

When you click **Open**, you start a software wizard that guides you through the major steps of defining the segment components. The first step, shown in *Figure 4-28*, is to indicate the fieldbus devices on the current (or “live”) segment.

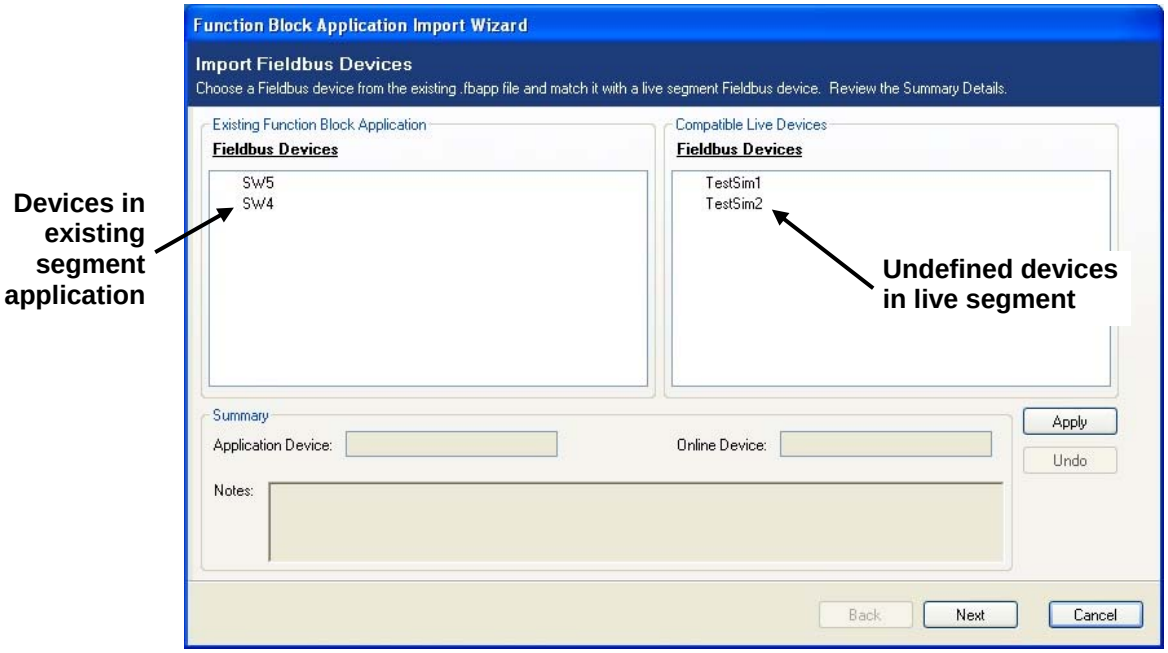


Figure 4-28. Import Wizard - Fieldbus Devices screen (Undefined)

The left pane indicates the fieldbus devices defined in the existing application, and the right pane indicates the devices in the live segment. Select a device from the left pane (it appears in the Application Device field) and a device from the right pane (it appears in the Online Device field).

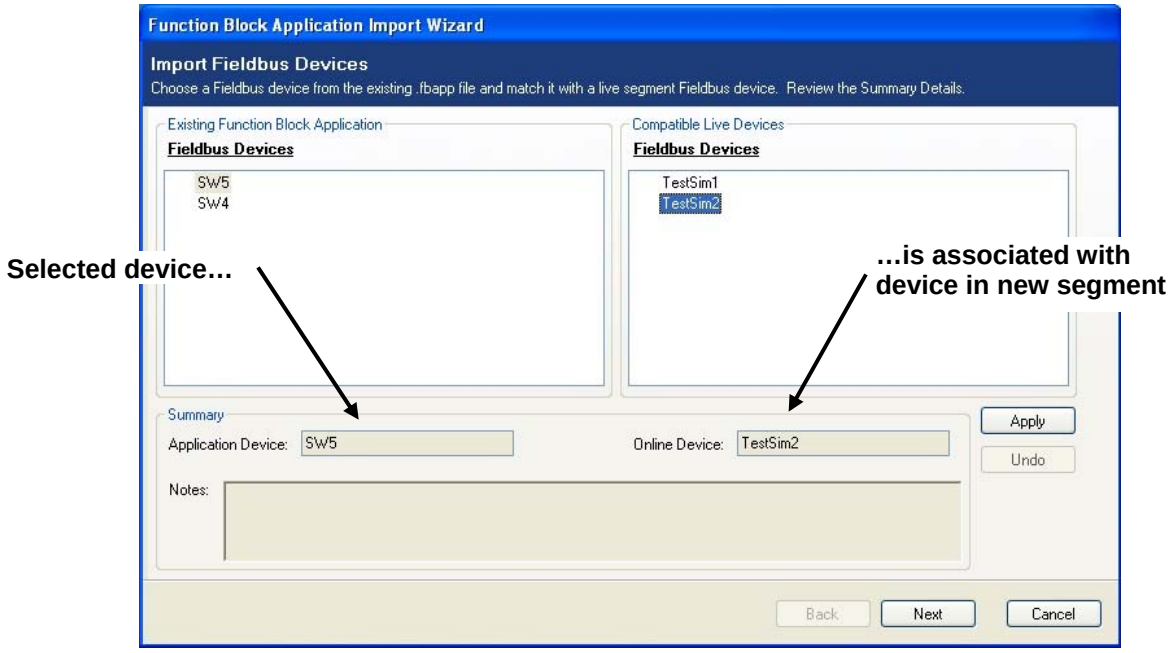


Figure 4-29. Import Wizard - Fieldbus Devices screen (Defined)

Note: The right-hand pane of *Figure 4-29* shows devices *TestSim1* and *TestSim2*. Unless you know that *TestSim1* **is** a Rosemount 848T temperature transmitter (for example), that tag is too vague to be helpful. When you commission devices, give them tags that uniquely describe their location or function.

When you click **Apply**, the wizard associates the device with the definition in the application. Continue until you have defined all devices on the new segment application.

Device-to-Device Correspondence

Figure 4-29 shows two devices in the application and two devices in the "target" segment. Understanding this one-to-one device correspondence is critical to a successful import.

The Import process can only import the devices defined in the original application. It **cannot** automatically add new devices or change any device definitions in the new segment application. You must manually define additional devices or modify device parameters, if necessary.

Click **Next** when you finish defining devices. The wizard displays a Connections and Logicals screen:

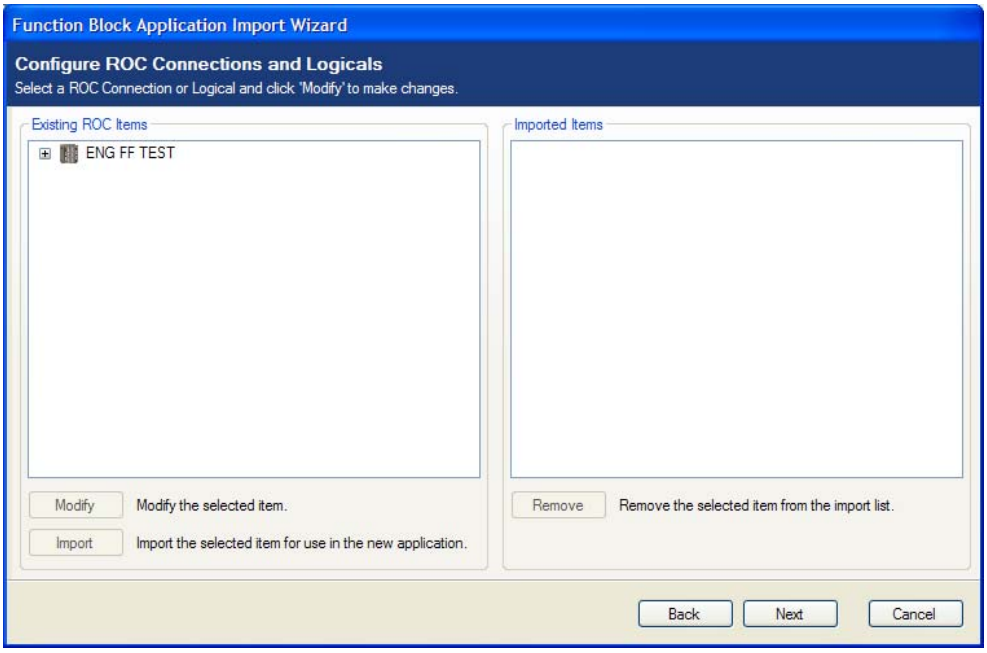


Figure 4-30. Import Wizard - Connections and Logicals screen

Double-click the tag (here, **ENG FF TEST**) to expand the graphical tree and display the application's RTU mapping structure. *Figure 4-31* shows a simple RTU and logical structure; more complex applications may have several RTUs and many logicals.

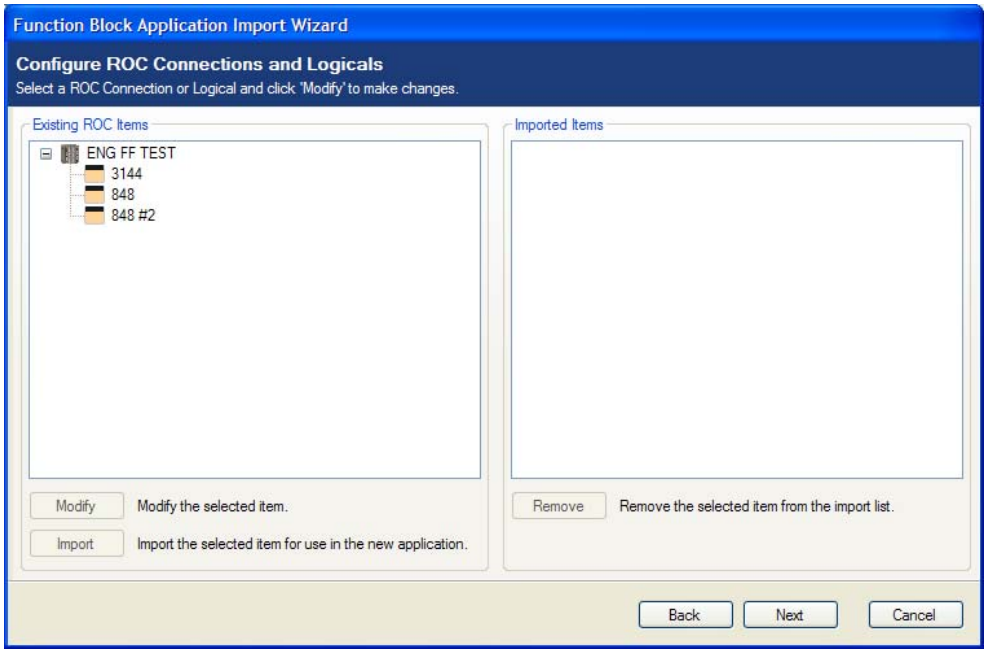


Figure 4-31. Import Wizard - Connections and Logicals screen (expanded)

This screen enables you to see the template application's RTU structure before you import ("copy") it to the live segment.

You can change some aspects of the structure before you import the application. Select an RTU or an associated logical and click **Modify**. You can only change a logical's tag. If you select an RTU, clicking **Modify** opens a Connection Settings dialog (*Figure 4-32*), which you can use to change the RTU's name or provide an alternate IP address.

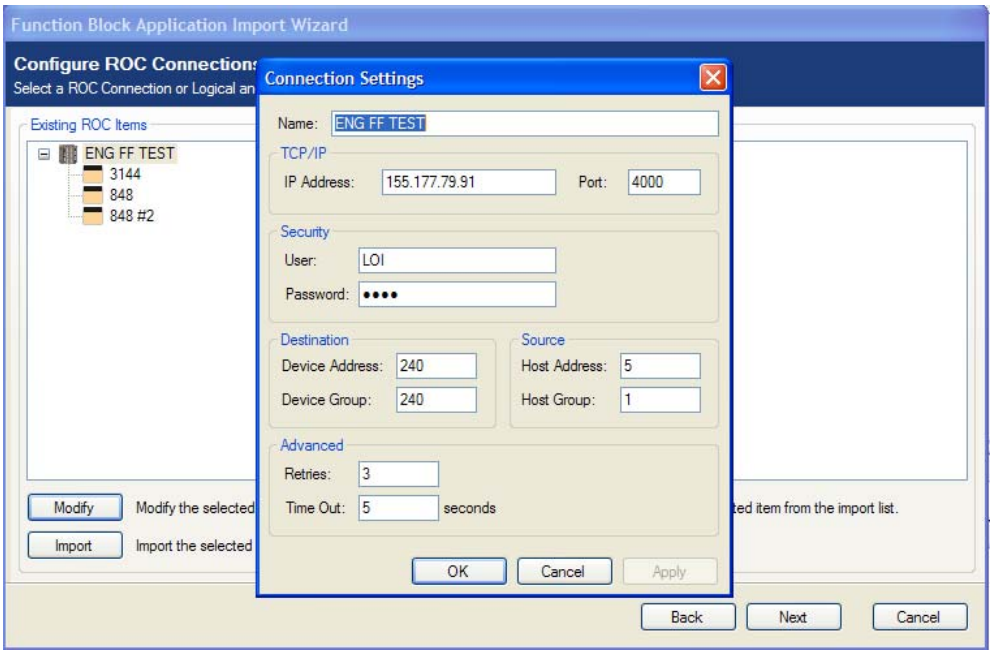


Figure 4-32. Import Wizard - Connections and Logicals screen (modify)

Click **Apply** to save your RTU changes and return to the wizard.

Note: You must select a logical or RTU to activate **Modify** or **Import**.

After you select an RTU, click **Import** to copy the application's RTU mapping structure to the live segment (shown in *Figure 4-33*).

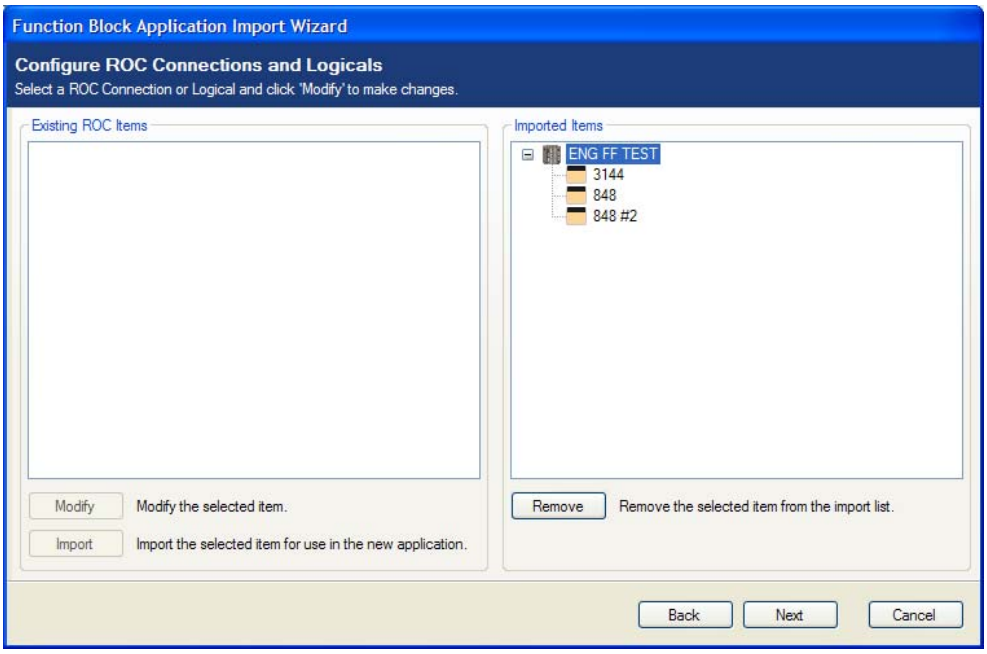


Figure 4-33. Import Wizard - Connections and Logicals screen (imported)

Note: Repeat this process if your application has multiple RTUs.

Click **Remove** to remove the application's structure from the target segment. The wizard restores the structure to the left pane and clears the right pane.

Click **Next** when you finish defining connections and logicals. The wizard displays an Import Textbox Labels screen:

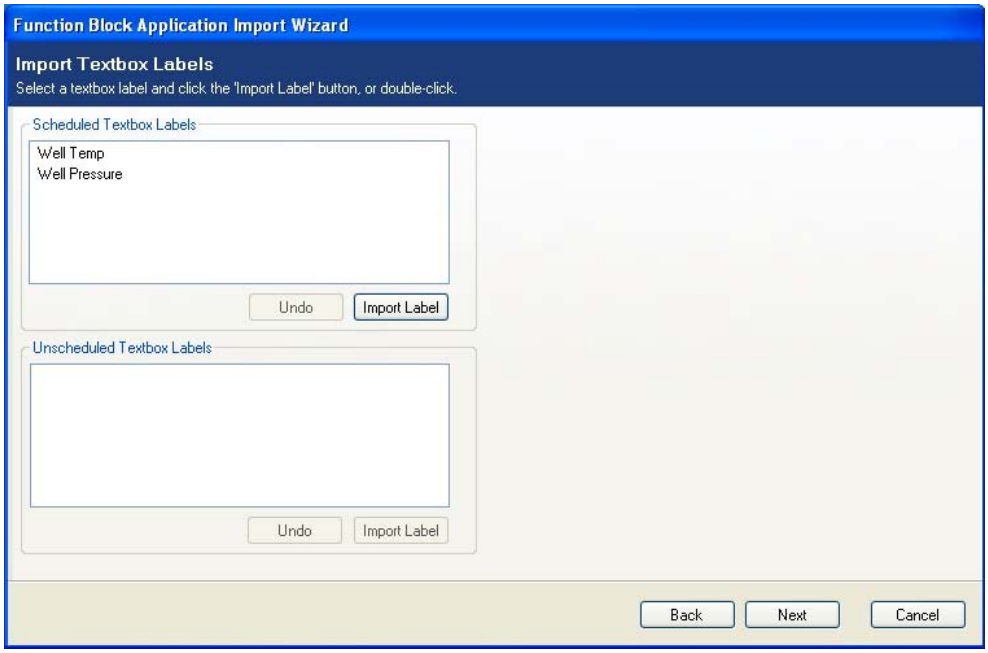


Figure 4-34. Import Wizard - Textbox Labels screen

If you have defined textbox labels in either the scheduled or unscheduled components of the template application (with the Add Text workspace function), use this option to copy one or more of those labels into the new application.

Note: You can edit any labels you import, as well as many other application components. See *Section 4.4, Editing an Application.*

Click **Next** when you finish including labels. The wizard displays an Application Import screen:

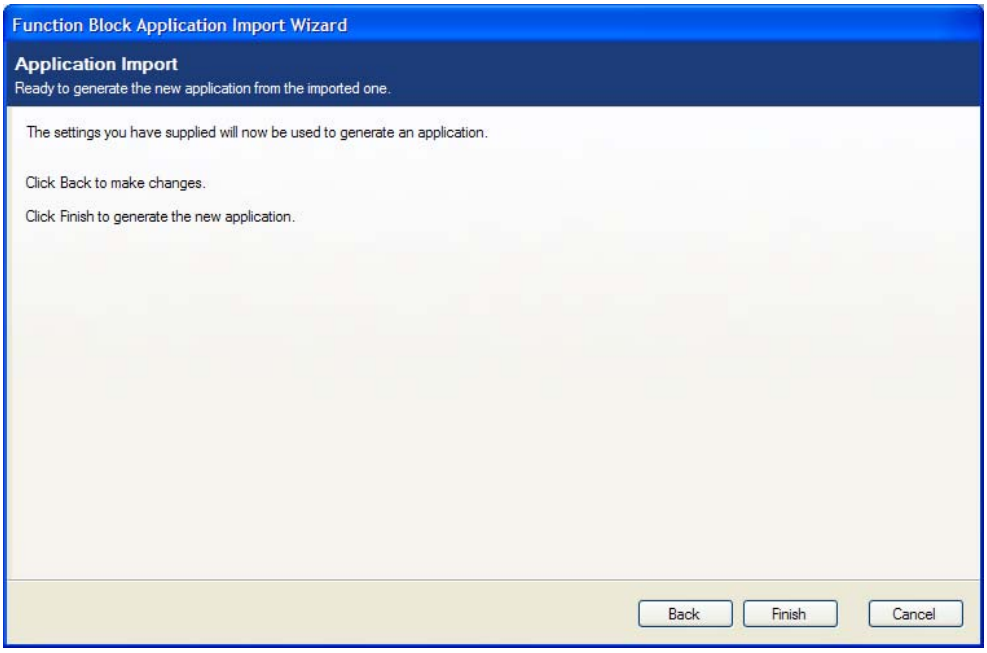


Figure 4-35. Import Wizard – Application Import screen

Click **Finish** to complete the import of the template application (as you have configured it) into the new application.

Note: This completes the process of importing the segment-specific application. To use the application, you must download the application to the Configurator (see *Section 4.5, Loading an Application*).

4.7 Configuring LAS Backup

Link Active Scheduling (LAS) is a way to provide redundant communication management for a segment. The H1 segment module is the primary LAS device. Should the H1 segment module fail for any reason, you can specify one or more LAS-capable fieldbus devices on the segment to take over communication management.

Note: Not all fieldbus devices are LAS-capable. When you select this option, the Application Designer checks the devices in the segment and identifies any LAS-capable devices. You can then select and enable one or more of those devices.

Once you identify one or more fieldbus devices as LAS backups, the next time you download an application to the segment the Application Designer also loads that application to the designated devices. This provides the communication redundancy.

1. Select **Backup LAS Configuration** form the Tasks menu on the Application Designer.

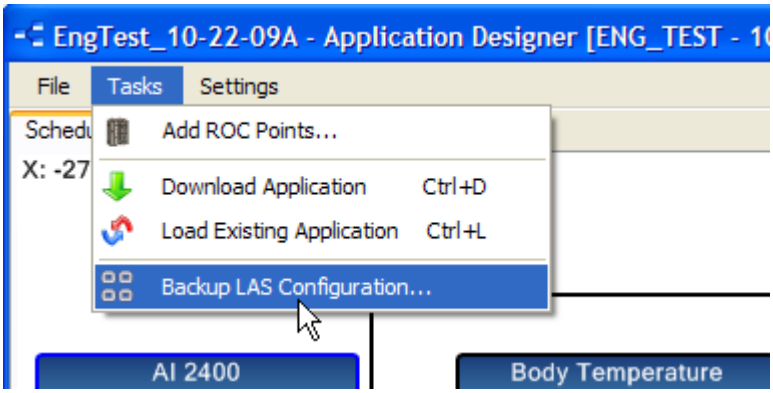
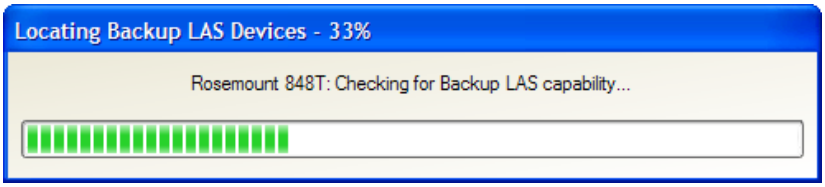


Figure 4-36. Tasks Menu

Designer first identifies the LAS-capable fieldbus devices on the segment:



It then displays a selection dialog based on those findings:

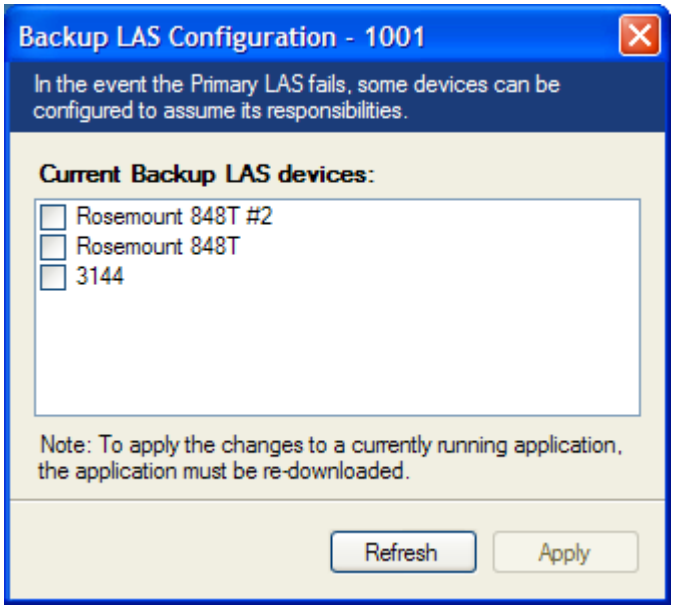


Figure 4-37. Backup LAS Configuration

2. Select one or more of the LAS-capable devices and click **Apply**.

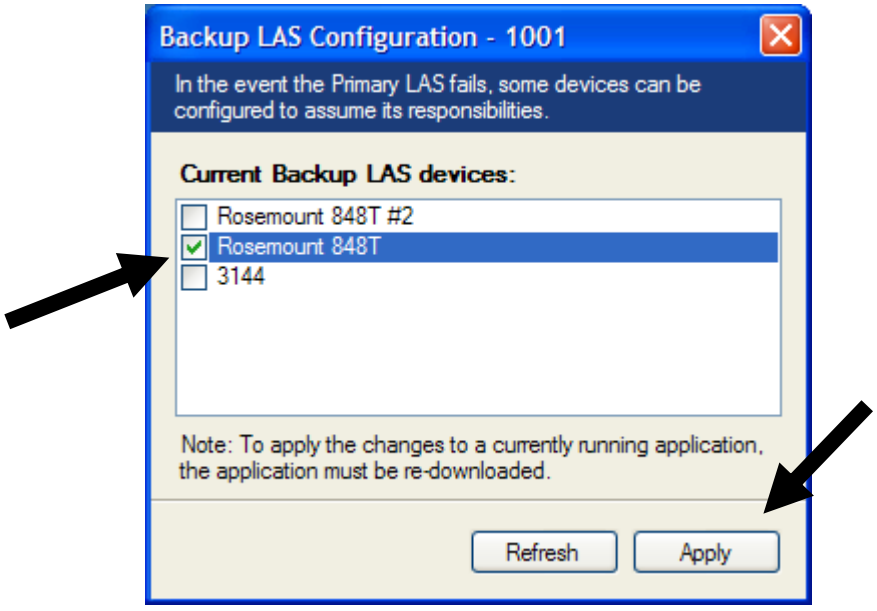
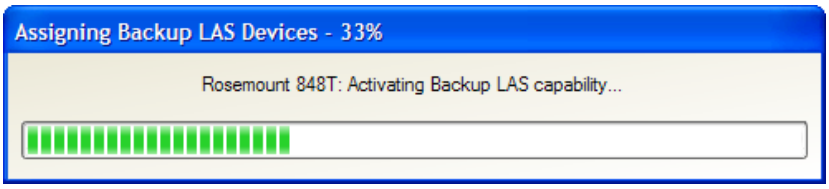


Figure 4-38. Backup LAS Configuration (Completed)

The Designer activates the LAS capability in the selected devices:



Note: To activate device-level LAS capabilities on a currently running application, you must download the application to the segment (select **Tasks → Download Application**).

3. Close the dialog to return to the workspace.

4.8 Logging Activities

The Configurator maintains a detailed log of all activity. The **Logging** tab at the lower right-hand side of the Configurator screen to access this log.

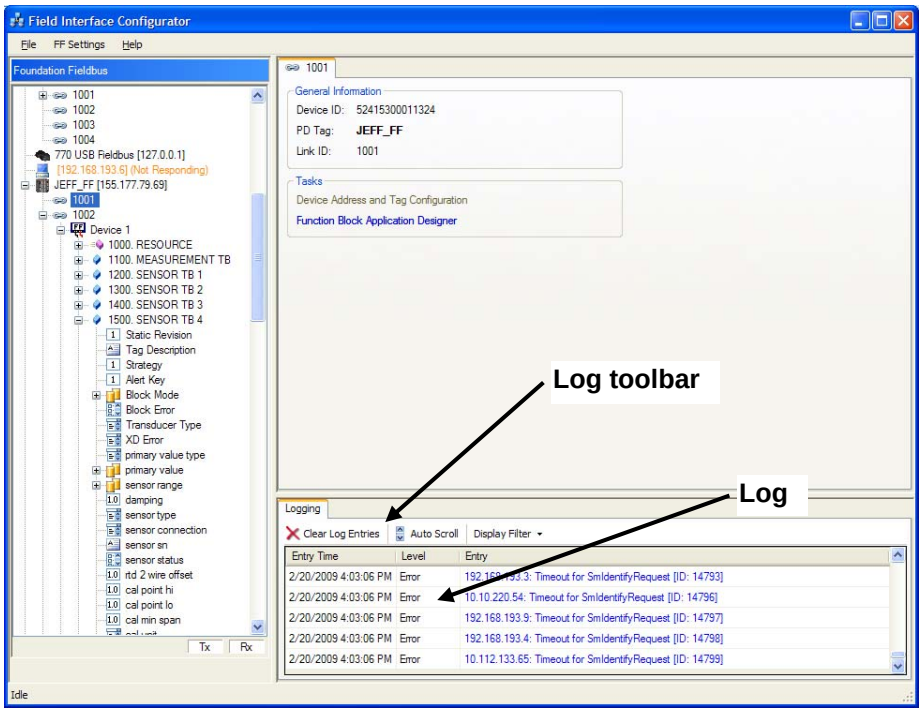
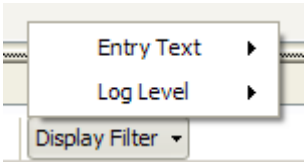


Figure 4-39. Logging tab

The Log's toolbar provides the following tools:

Icon	Description
Clear Log Entries	Clears **all** entries from the display.
Auto Scroll	Automatically scrolls to the most recent log entry as it occurs.
Display Filter	Enables you to set filters on the displayed log entries. When you click **Display Filter**, a menu displays:  This menu allows you to limit the display of log entries only to those entries containing a specific text string you define (such as **HSE**) or to entries of a particular severity level (**Informational**, **Warning**, **Error**, or **All**). The default Log Level filter is **All**; there is no default Entry Text filter.

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Chapter A – Configuring the ControlWave Project

This appendix discusses how to configure your ControlWave project to work with the CWFFI. Ensure that you have OpenBSI Version 5.7 Service Pack 2 Patch C (or newer) and ControlWave firmware Version 05.10 (or newer).

Note: This appendix assumes you have basic knowledge of ControlWave Designer, including how to create a new project, how to insert function blocks, and how to compile the project and download it into the ControlWave. For details on these subjects, see *Getting Started with ControlWave Designer* (D5085), the *ControlWave Designer Programmer's Handbook* (D5125), and the online help in ControlWave Designer.

A.1 Before You Start

To communicate with FFbus devices, your ControlWave project requires a FIELDBUS function block and some related structures. You must modify your ControlWave project **before** running the Field Interface Configurator.

You need to:

- Create several user-defined data types and data structures that are used with the FIELDBUS function block. The most important data structure is the TLP (**T**ype, **L**ogical number, and **P**arameter) table. The TLP table describes each I/O point and holds the values from the FFbus device.)
- Configure the FIELDBUS function block and its parameters. For detailed configuration information, refer to the ACCOL3 online help. Mark the TLP table as a **retain** variable to ensure retention of the FFbus data between reboots.
- Map TLP table elements to variables.

  Note: This is an **optional** step, since you can directly access the array cells.

A.2 Create User Defined Data Types and Data Structures

Note: The Structured Text (ST) examples in this appendix are drawn from the sample project file FieldbusSlaveExample.ZWT, which is included in C:\OpenBSI\Projects as part of the OpenBSI installation process.

1. Define two string data types (**STRING23** and **STRING43** in the example) to hold tag names and addresses.
2. Define a data type (**StructFFLogical**) that specifies the storage location in the ControlWave project for each relevant I/O point in the FFbus device. The example uses three I/O points.

Note: Each I/O point is referred to as a "logical." Do not confuse this with a logical or BOOL variable; it simply refers to an instance of the I/O structure.

3. Define a data type (**StructFieldbus**) that is an array of these "StructFFLogical" structures. A variable of this type becomes your TLP table.

```
TYPE
      (*************************************************************)
      (* Valid data type definitions for Fieldbus function block use *)
      (*************************************************************)

      (* String sized to accommodate an IPV6 address. *)
      STRING43 : STRING(43);
      (* String sized for Tag Names *)
      STRING23 : STRING(23);

      StructFFLogical:              (* Data structure for each Logical Point *)
      STRUCT
            ostrTagName : STRING23; (* Tag Name *)
            fValue : REAL;          (* Float Value *)
            ifFaultValue : REAL;    (* Float Fault Value *)
            udValue : UDINT;        (* Integer Value *)
            iudFaultValue : UDINT;  (* Integer Fault Value *)
            ousActiveData : USINT;  (* Active Data Parameter *)
            obWriteActive : BOOL8;  (* Data writes are active *)
            obScheduleActive : BOOL8;(* Data access is scheduled *)
            ibFaultEnable : BOOL8;  (* Enable Fault values *)
            iValueStatus : INT;     (* Data Status *)
            ouiUpdateTime : UINT;   (* Update time in ms *)
            iiTimeout : INT;        (* Data update timeout in seconds *)
            oiLinkStatus : INT; (* Current status of the link with the FF HSE
Server *)
                                                (* Where:
                                                      0 = Active connection
                                                      1 = Bad/Disconnected
                                                      2 = Bad/Timeout
                                                      3 = Fault/Disconnected
                                                      4 = Fault/Timeout *)
            iudTLP : UDINT;                 (* TLP remap value *)
      END_STRUCT;
```

Note: Size the StructFieldbus array based on the number of Fieldbus points you want to access. Since we want three points, the array has three columns. You can configure up to 1020 points.

```
      (* Data structure to use for iaFFStruct parameter *)
      StructFieldbus : ARRAY [1..3] OF StructFFLogical;
```

4. Define a data type (**ArrayRemAddress** in our example) that is an array of IP address strings. This array holds the IP address of each HSE server that connects to the ControlWave.

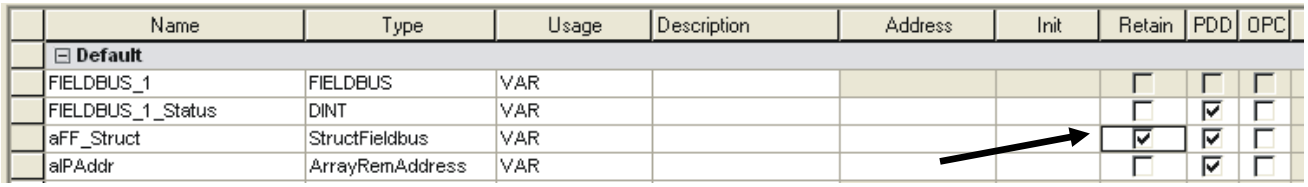
```
StructIPAddress:  (* Data structure for each Remote IP Address *)
STRUCT
            osIPAddress : STRING43; (* IP Address of remote connection *)
END_STRUCT;
      (* IP addresses of the FF HSE Server connections *)
      ArrayRemAddress : ARRAY [1..3] OF StructIPAddress;
END_TYPE
```

A.3 Configure the FIELDBUS Function Block

Insert a FIELDBUS function block in one of the POUs of your project. Execute the FIELDBUS function block once at startup:

```
FIELDBUS_1(
   iaFFStruct:=aFF_Struct,     ←This variable is your TLP Table
   iaRemoteAddress:=aIPAddr);←This is the array of IP addresses
FIELDBUS_1_Status:=FIELDBUS_1.odiStatus;
```

The aFF_Struct must be of type StructFieldbus (the data type you defined earlier). This is your TLP table. You must mark it as a retain variable to ensure that the ControlWave maintains FFbus data between application warm starts (see *Figure A-1).*



	Name	Type	Usage	Description	Address	Init	Retain	PDD	OPC
	⊟ **Default**								
	FIELDBUS_1	FIELDBUS	VAR				☐	☐	☐
	FIELDBUS_1_Status	DINT	VAR				☐	☑	☐
	aFF_Struct	StructFieldbus	VAR				☑	☑	☐
	aIPAddr	ArrayRemAddress	VAR				☐	☑	☐

Figure A-1. Mark the TLP table as "Retain"

You access the entries in the TLP table as you would any other array. Optionally, you could map the array entries to variables, for ease of use.

A.4 Map TLP Table Elements to Variables

Note: This is an **optional** step, since you can directly access the array cells.

You can assign variables to reference cells in the TLP table. These variables enable you to read and write data in the TLP table. The following example shows the mapping for a single I/O point:

```
aFF_Struct[1].osTagName := Tag_Name_01;
```

```
aFF_Struct[1].ofFaultValue := F_Fault_Val_01;
aFF_Struct[1].oudFaultValue := UL_Fault_Val_01;
aFF_Struct[1].obFaultEnable := Fault_Enable_01;
aFF_Struct[1].ouiTimeout := Timeout_01;
F_Val_01 := aFF_Struct[1].fValue;
UL_Val_01 := aFF_Struct[1].udValue;
Value_Status_01 := aFF_Struct[1].ouiValueStatus;
Update_Time_01 := aFF_Struct[1].ouiUpdateTime;
Link_Status_01 := aFF_Struct[1].ousLinkStatus;
IP_Address_01 := aIPAddr[1].osIPAddress;
```

Note: Reference **only** the cells you intend to use.

Once you have the individual data in variables, you can treat it like any other variable. The following example shows the variables assigned to a list:

```
LOGICAL_1_LIST(
      iiListNumber:=1,
      ianyElement1:=Tag_Name_01,
      ianyElement2:=F_Val_01,
      ianyElement3:=F_Fault_Val_01,
      ianyElement4:=UL_Val_01,
      ianyElement5:=UL_Fault_Val_01,
      ianyElement6:=Value_Status_01,
      ianyElement7:=Update_Time_01,
      ianyElement8:=Link_Status_01,
      ianyElement9:=Fault_Enable_01,
      ianyElement10:=Timeout_01,
      ianyElement11:=IP_Address_01);
LOGICAL_1_LIST_Status:=LOGICAL_1_LIST.odiStatus;
```

Repeat this mapping configuration for each I/O point you want to access from the FFbus device. When finished, build the project and download it into your ControlWave.

Now you can run the Field Interface Configurator software, discussed in *Chapter 4, Use*.

Appendix B – Glossary

Note: This is a generalized glossary of terms. Not all the terms may necessarily correspond to the particular device or software described in this manual. For that reason, the term "ROC" is used to identify all varieties of Remote Operations Controllers (including ROC800-Series, ROC300-Series, FloBoss™ 100-Series, FloBoss 300-Series, FloBoss 500-Series, and FloBoss 407 units).

A

A/D	Analog to Digital signal conversion.
ABS	Acrylonitrile Butadiene Styrene.
ACCOL III	An IEC-61131-3 compliant software product providing a firmware library of functions and function blocks used in the ControlWave Designer application to create ControlWave projects.
ADC	Analog to Digital Converter. Used to convert analog inputs (AI) to a format the flow computer can use.
AGA	American Gas Association. A professional organization that oversees the AGA3 (orifice), AGA5 (heating value), AGA7 (turbine), AGA8 (compressibility), and AGA11 (ultrasonic) gas flow calculation standards. See *http://www.aga.org*.
AWG	American Wire Gauge.
AI	Analog Input.
AO	Analog Output.
Analog	Analog data is represented by a continuous variable, such as an electrical current signal.
AP	Absolute Pressure.
API	American Petroleum Institute. See *http://www.api.org*.
Area	A user-defined grouping of database entities.
ASCII	American (National) Standard Code for Information Interchange.
Attribute	A parameter that provides information about an aspect of a database point. For example, the alarm attribute is an attribute that uniquely identifies the configured value of an alarm.

B

BMV	Base Multiplier Value, used in AGA7 (turbine) calculations.
BPS	Bits Per Second, associated with baud rate.
BTU	British Thermal Unit, a measure of heat energy.
Built-in I/O	I/O channels that are fabricated into the ROC and do not require a separate option. Also called "on-board" I/O.

C

C1D2	Class 1, Division 2 hazardous area
CMOS	Complementary Metal Oxide Semiconductor, a type of microprocessor used in a ROC.
Coil	Digital output, a bit to be cleared or set.

C (continued)

COL	Ethernet Packet Collision.
COM	Communications port on a personal computer (PC).
COMM	Communications port on a ROC used for host communications. . **Note**: On FloBoss 500-Series and FloBoss 407s, COMM1 is built-in for RS-232 serial communications.
Comm Module	Module that plugs into a ROC to provide a channel for communications via a specified communications protocol, such as EIA-422 (RS-422) or HART.
CF	Compare Flag; stores the Signal Value Discrete (SVD).
Configuration	Refers either to the process of setting up the software for a given system or the result of performing this process. The configuration activity includes editing the database, building schematic displays and reports, and defining user calculations. Typically, the software setup of a device that can often be defined and changed. Can also mean the hardware assembly scheme.
Configuration Tree	In ROCLINK 800, the graphical display that appears when a configuration file opens. It is a hierarchical branching ("tree-style") method for navigating within the configuration screens.
ControlWave	A family of micro-processor based RTUs/PLCs that provide remote monitoring, flow measurement, and control.
CPU	Central Processing Unit.
CRC	Cyclical Redundancy Check error checking.
Crosstalk	The amount of signal that crosses over between the receive and transmit pairs, and signal attenuation, which is the amount of signal loss encountered on the Ethernet segment.
CSA	Canadian Standards Association. See http://www.csa.ca.
CSMA/CD	Carrier Sense Multiple Access with Collision Detection.
CTS	Clear to Send modem communications signal.

D

D/A	Digital to Analog signal conversion.
DB	Database.
dB	Decibel. A unit for expressing the ratio of the magnitudes of two electric signals on a logarithmic scale.
DCD	**Data Carrier Detect** modem communications signal. In addition, **Discrete Control Device** – A discrete control device energizes a set of discrete outputs for a given setpoint and matches the desired result against a set of discrete inputs (DI).
DCE	Data Communication Equipment.
Deadband	A value that is an inactive zone above the low limits and below the high limits. The purpose of the deadband is to prevent a value (such as an alarm) from being set and cleared continuously when the input value is oscillating around the specified limit. This also prevents the logs or data storage location from being over-filled with data.
Device Directory	In ROCLINK 800, the graphical display that allows navigation through the PC Comm Ports and ROC Comm Ports setup screen.
DI	Discrete Input.
Discrete	Input or output that is non-continuous, typically representing two levels (such as on/off).
DMM	Digital multimeter.
DO	Discrete Output.
Download	The process of sending data, a file, or a program from a PC to a ROC.

D (continued)

DP	Differential Pressure.
DSR	Data Set Ready modem communications signal.
DTE	Data Terminal Equipment.
DTR	Data Terminal Ready modem communications signal.
Duty Cycle	Proportion of time during a cycle that a device is activated. A short duty cycle conserves power for I/O channels, radios, and so on.
DVM	Digital voltmeter.
DVS	Dual-Variable Sensor. A device that provides static and differential pressure inputs to a ROC.

E

EDS	Electronic Static Discharge.
EEPROM	Electrically Erasable Programmable Read-Only Memory, a form of permanent memory on a ROC.
EFM	Electronic Flow Metering or Measurement.
EIA-232 (RS-232)	Serial Communications Protocol using three or more signal lines, intended for short distances. Concerning RS232D and RS232C, the letters C or D refer to the physical connector type. D specifies the RJ-11 connector where a C specifies a DB25 type connector.
EIA-422 (RS-422)	Serial Communications Protocol using four signal lines.
EIA-485 (RS-485)	Serial Communications Protocol requiring only two signal lines. Can allow up to 32 devices to be connected together in a daisy-chained fashion.
EMF	Electro-Motive Force.
EMI	Electro-Magnetic Interference.
ESD	Electro-Static Discharge.
EU	Engineering Units. Units of measure, such as MCF/DAY.

F

FCC	Federal Communications Commission. See *http://www.fcc.gov*.
Firmware	Internal software that is factory-loaded into a form of ROM. In a ROC, the firmware supplies the software used for gathering input data, converting raw input data values, storing values, and providing control signals.
FlashPAC module	ROM and RAM module for a ROC300-Series unit that contains the operating system, applications firmware, and communications protocol.
Flash ROM	A type of read-only memory that can be electrically re-programmed. It is a form of permanent memory (requires no backup power). Also called Flash memory.
FloBoss	A microprocess-based device that provides flow calculations, remote monitoring, and remote control. A FloBoss is a type of ROC.
FM	Factory Mutual.
Force	Write an ON/OFF, True/False, or 1/0 value to a coil.
FOUNDATION™ Fieldbus	An open architecture for information integration, managed by the Fieldbus Foundation (www.fieldbus.org).
FPV	Compressibility Factor.
FSK	Frequency Shift Keypad.

F (continued)

FST	Function Sequence Table, a type of user-written program in a high-level language designed by Emerson Process Management's Flow Computer Division.
Ft	Foot or feet.

G

GFA	Ground Fault Analysis.
GND	Electrical ground, such as used by the ROC's power supply.
GP	Gauge Pressure.

H

H1	A Foundation Fieldbus protocol operating at 31.25 kbit/s that interconnects field devices (such as sensors or I/O devices).
HART	Highway Addressable Remote Transducer.
Holding Register	Analog output number value to be read.
HSE Protocol	High Speed Ethernet protocol; a communications protocol operating at 100 Mbit/s used to integrate high-speed controllers (or servers) connected via Ethernet.
Hw	Differential pressure.
Hz	Hertz.

I, J

IC	Integrated Circuit. Also, Industry Canada (more recently known as Measurement Canada), an organization that grants custody transfer approvals on certain ROC units.
ID	Identification.
IEC	Industrial Electrical Code or International Electrotechnical Commission. See *http://www.iec.ch*.
IEEE	Institute of Electrical and Electronic Engineers. A professional organization that, in conjunction with the International Standards Organization (ISO), establishes and maintains the Open System Interconnection (OSI) reference model and an international standard for the organization of local area networks (LANs). Refer to http://www.ieee.org.
IMV	Integral Multiplier Value, used in AGA3 (orifice) calculations.
Input	Digital input, a bit to be read.
Input Register	Input numeric value to be read.
Local Port	Also LOI; the serial EIA-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.
I/O	Input/Output.
I/O Module	Module that plugs into an I/O slot on a ROC to provide an I/O channel.
IRQ	Interrupt Request. Hardware address oriented.
ISO	International Standards Organization. See http://www.iso.ch.
IV	Integral Value.

K

KB	Kilobytes.
KHz	KiloHertz.

L

LCD Liquid Crystal Display.

LDP Local Display Panel, a display-only device that plugs into ROC300-Series units (via a parallel interface cable) used to access information stored in the ROC.

LED Light-Emitting Diode.

Logical Number The point number the ROC and ROC Plus protocols use for I/O point types are based on a physical input or output with a terminal location; the point numbers for all other point types are “logical” and are simply numbered in sequence.

LNK Ethernet has linked.

LOI Local Operator Interface (or Local Port). Refers to the serial EAI-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.

LPM Lightning Protection Module; a device that provides lightning and power surge protection for ROCs.

LRC Longitudinal Redundancy Checking error checking.

M

m Meter.

mA Milliamp(s); one thousandth of an ampere.

MAC Address Media Access Control Address; a hardware address that uniquely identifies each node of a network.

Manual mode For a ROC, indicates that the I/O scanning has been disabled.

MAU Medium Attachment Unit.

MCU Master Controller Unit.

Modbus A popular device communications protocol developed by Gould-Modicon.

MPU Micro-Processor Unit.

mm Millimeter.

MMBTU Million British Thermal Units.

msec Millisecond, or 0.001 second.

MVS Multi-Variable Sensor. A device that provides differential pressure, static pressure, and temperature inputs to a ROC for orifice flow calculations.

mV Millivolts, or 0.001 volt.

mW Milliwatts, or 0.001 watt.

N

NEC National Electrical Code.

NEMA National Electrical Manufacturer’s Association. See http://www.nema.org.

O

OH Off-Hook modem communications signal.

Off-line Accomplished while the target device is not connected (by a communications link). For example, “off-line configuration” refers to configuring an electronic file that is later loaded into a ROC.

Ohms Units of electrical resistance.

O (continued)

On-line Accomplished while connected (by a communications link) to the target device. For example, “on-line configuration” refers to configuring a ROC800-Series unit while connected to it, so that you can view the current parameter values and immediately load new values.

Opcode Type of message protocol the ROC uses to communicate with the configuration software, as well as host computers with ROC driver software.

Operator Interface Also LOI or Local Port; the serial EIA-232 (RS-232) port on the ROC through which local communications are established, typically for configuration software running on a PC.

Orifice meter A meter that records the flow rate of gas through a pipeline. The flow rate is calculated from the pressure differential created by the fluid passing through an orifice of a particular size and other parameters.

P, Q

Parameter A property of a point that typically can be configured or set. For example, the Point Tag ID is a parameter of an Analog Input point. Parameters are normally edited by using configuration software running on a PC.

PC Personal Computer.

Pf Flowing pressure.

P/DP Pressure/Differential Pressure.

PI Pulse Input.

PID Proportional, Integral, and Derivative control feedback action.

PIT Periodic Timer Interrupt.

PLC Programmable Logic Controller.

Point Software-oriented term for an I/O channel or some other function, such as a flow calculation. Points are defined by a collection of parameters.

Point Number The physical location of an I/O point (module slot and channel) as installed in the ROC.

Point Type Defines the database point to be a specific type of point available to the system. The point type determines the basic functions of a point.

Preset Number value previously determined for a register.

PRI Primary PID control loop.

Project A file, created using ControlWave Designer, that provides the control strategy for a ControlWave application.

Protocol A set of standards that enables communication or file transfers between two computers. Protocol parameters include baud rate, parity, data bits, stop bit, and the type of duplex.

PSTN Public Switched Telephone Network.

PT Process Temperature.

PTT Push-to-Talk signal.

Pulse Transient variation of a signal whose value is normally constant.

Pulse Interface module A module that provides line pressure, auxiliary pressure, and pulse counts to a ROC.

PV Process Variable or Process Value.

R

Rack	A row of slots on a ROC into which I/O modules can be plugged. Racks are given a letter to physically identify the location of an I/O channel (such as “A” for the first rack). Built-in I/O channels are assigned a rack identifier of “A” while diagnostic I/O channels are considered to be in “E” rack.
RAM	Random Access Memory. RAM is used to store history, data, most user programs, and additional configuration data.
RBX	Report-by-exception. RBX always refers to Spontaneous RBX in which the ROC contacts the host to report an alarm condition.
RR	Results Register; stores the Signal Value Analog (SVA).
RFI	Radio Frequency Interference.
RI	Ring Indicator modem communications signal.
ROC	Remote Operations Controller microprocessor-based unit that provides remote monitoring and control.
ROCLINK 800	Microsoft® Windows®-based software used to configure functionality in ROC units.
ROM	Read-only memory. Typically used to store firmware. Flash memory.
Rotary Meter	A positive displacement meter used to measure flow rate, also known as a Roots meter.
RTC	Real-Time Clock.
RTD	Resistance Temperature Detector.
RTS	Ready to Send modem communications signal.
RTU	Remote Terminal Unit.
RTV	Room Temperature Vulcanizing, typically a sealant or caulk such as silicon rubber.
RS-232	Serial Communications Protocol using three or more signal lines, intended for short distances. Also referred to as the EIA-232 standard.
RS-422	Serial Communications Protocol using four signal lines. Also referred to as the EIA-422 standard.
RS-485	Serial Communications Protocol requiring only two signal lines. Can allow up to 32 devices to be connected together in a daisy-chained fashion. Also referred to as the EIA-485 standard.
RX or RXD	Received Data communications signal.

S

SAMA	Scientific Apparatus Maker’s Association.
Script	An uncompiled text file (such as keystrokes for a macro) that a program interprets in order to perform certain functions. Typically, the end user can easily create or edit scripts to customize the software.
Soft Points	A type of ROC point with generic parameters that can be configured to hold data as desired by the user.
SP	Setpoint, or Static Pressure.
SPI	Slow Pulse Input.
SPK	Speaker.
SRAM	Static Random Access Memory. Stores data as long as power is applied; typically backed up by a lithium battery or supercapacitor.
SRBX	Spontaneous Report-By-Exception. SRBX always refers to Spontaneous RBX in which the ROC contacts the host to report an alarm condition.

S (continued)

SVA	Signal Value Analog. Stored in the Results Register, it is the analog value that is passed between functions in an FST.
SVD	Signal Value Discrete. Stored in the Compare Flag, it is the discrete value that is passed down the sequence of functions in an FST.
System Variables	Configured parameters that describe the ROC; set using ROCLINK software.

T

T/C	Thermocouple Input.
TCP/IP	Transmission Control Protocol/Internet Protocol.
TDI	Time Duration Input.
TDO	Time Duration Output.
Tf	Flowing temperature.
TLP	Type (of point), Logical (or point) number, and Parameter number.
TX or TXD	Transmitted Data communications signal.
Turbine meter	A device used to measure flow rate and other parameters.

U

Upload	Send data, a file, or a program from the ROC to a PC or other host.
USB	Universal Serial Bus, a serial bus standard used to connect devices.

V-Z

V	Volts.

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