

# EtherNet/IP and ControlNet to FOUNDATION Fieldbus Linking Devices





### **Important User Information**

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

$\bigwedge$	<b>WARNING:</b> Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
$\bigwedge$	<b>ATTENTION:</b> Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Allen-Bradley, Rockwell Automation, ControlLogix, FactoryTalk, Studio 5000, Logix Designer, and RSNetWorx are trademarks of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.

Table of Contents	
Preface	

### Installation

### Set Up in the Studio 5000 Logix Designer Application

Important User Information 2
Introduction
About the Linking Devices
Network Diagrams
1788-EN2FFR EtherNet/IP Network6
1788-CN2FFR ControlNet Network7
Features
Safety Precautions
Prevent Electrostatic Discharge
Environment and Enclosure
European Hazardous Location Approval 10
NNorth American Hazardous Location Approval 11
Additional Resources

### Chapter 1

Hardware	3
Dimensions 1	3
Power Connection 1	3
H1 Network Connections 1	4
ControlNet and EtherNet/IP Connections 1	6
Shielding 1	6
Set the Linking Device Network Address 1	7
Hardware Switches Location 1	7
Set the ControlNet Node Address 1	7
Set the EtherNet/IP Address 1	8
Ethernet Switch Settings 1	9
Software Installation 2	0
Firmware Version 2	0

### Chapter 2

Add the 1788-EN2FFR Linking Device to the I/O Tree	21
Add the 1788-CN2FFR Linking Device to the I/O Tree	22
RSNetWorx for ControlNet Configuration	23
Linking Device Configuration Using the AOP	26
Master Configuration	28
Add and Manage Device Description Files	31
Field Device Configuration	32
Field Device Block Configuration	36
Field Device Class	42
Scheduling and the LAS	43
Redundant Master Setup	43
Redundant Master Mismatch	45
Redundant Master Disabled	45
MultiMaster Connecting Procedures	46

	Connect Safe Mode Start the Back-up LAS Master (Already Configured) Reconnect Two Separate Running LAS Devices Swap Out Linking Devices	46 47
	Chapter 3	
Logix Assemblies	Input Master Device Tag Structure Field Device Tag Structure	49
	Output Field Device Output Values	53
	Chapter 4	
Diagnostics	Status Screen. PV Data Screen Oscilloscope Screen. The Web Server. Device Type Manager (DTM).	57 57 58
	Appendix A	
Linking Device Display Status	Main Page H1 Master Page Field Device Page	62
	Appendix B	
HSProcessUtility	Use the HSProcessUtility	65
	Appendix C	
Field Device Block Configuration	Overview	69
Examples	AO Function Block Example	70
	DO Function Block Example	
	Appendix D	
H1 Topology	Master Mode 0	85
	Master Mode 1	85
	Master Mode 2	85
	Master Mode 3	86
	Master Mode 4	86
	Master Mode 5	
	Master Mode 6	
	Master Mode 7	
	Master Mode 8	
	Master Mode 9	
	Master Mode 10	87

Master Mode 11	 	 	8
Master Mode 12	 	 	8
Master Mode 13	 	 	8
Master Mode 14	 	 	8
Master Mode 15	 	 	8
Master Mode 16	 	 	8

Glossary Index

### Introduction

This user manual describes the installation and operation of the 1788-EN2FFR and 1788-CN2FFR linking devices.

### **About the Linking Devices**

The 1788-EN2FFR linking device provides a gateway between an EtherNet/IP network and a single segment FOUNDATION Fieldbus H1 layer.

The 1788-CN2FFR linking device provides a gateway between a ControlNet network and a FOUNDATION Fieldbus network.

In this manual, both modules are referred to as the linking device.

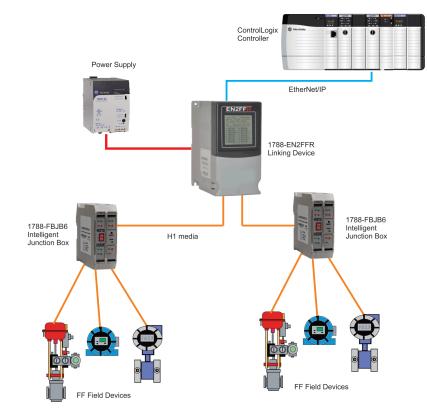
The linking device can support up to16 field devices. It is configurable through the Studio 5000° Logix Designer<sup>™</sup> application by use of a dedicated Add-on Profile (AOP). Multiple levels of media redundancy are supported, including ring, split, and redundant trunk, plus options for H1 media, redundant linking devices, redundant controllers, and redundant ControlNet media.

The linking device has full FOUNDATION fieldbus host capability, including link active scheduler (LAS) capability.

### **Network Diagrams**

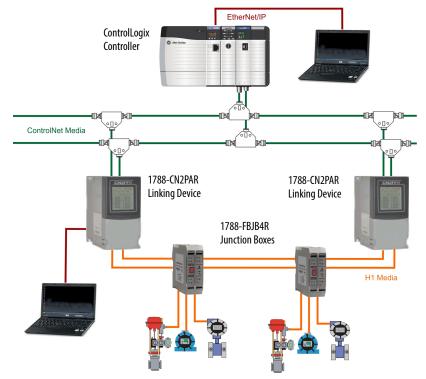
### 1788-EN2FFR EtherNet/IP Network

The diagram below is an example of how a 1788-EN2FFR linking device could be used with an EtherNet/IP network..



#### 1788-CN2FFR ControlNet Network

This diagram shows an example of how a 1788-EN2FFR linking device could be used with a ControlNet network.



#### Features

The AOP provides an intuitive graphical interface to configure devices. A predefined data structure for each field device provides eight input process variables (PVs), eight output PVs, and eight PVs for inter-device communication for full distributed control.

The linking device uses four controller connections. The data for the 16 field devices is distributed over the four CIP connections. Connection A has the data for the linking device and four field devices. Connection B, C, and D have the data of four field devices each. The minimum requested packet interval (RPI) is 100 ms, and the maximum is 3,000 ms.

The HSProcessUtility is used to manage and register the field device description (DD) files. The utility is launched from the AOP in the Studio 5000 Logix Designer application, or directly in the Microsoft Windows operating system.

Field Device Tool/Device Type Manager (FDT/DTM) technology is supported. This allows access to field device configuration and diagnostics via FDT Frames such as FactoryTalk<sup>®</sup> AssetCentre. In addition, the Rockwell Automation FDT ThinFrame (read only) can be launched from a FactoryTalk View or via the AOP providing access to each field devices status and extended diagnostics.

	Built-in power conditioners and protection are provided, which helps to minimize installation space requirements. The H1 segment is divided between two physical ports (A and B) with individual protection and a supply of 500 mA per port. See <u>H1 Network Connections on page 14</u> .
	The basic diagnostics of the linking device and the field devices, is found in the input assemblies. Advanced configuration is found only through the AOP.
	To assist with troubleshooting, a 128 x 128 pixel display provides access to the status of the linking device. Information available includes network voltages and currents, internal temperature, and communication quality to each field device.
	A built-in web server provides remote access to network and field device data.
Safety Precautions	Read and understand all precautions before using the linking device. Prevent Electrostatic Discharge
_	
	ATTENTION: Prevent Electrostatic Discharge
	This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment
	<ul> <li>Touch a grounded object to discharge potential static.</li> </ul>
	Wear an approved grounding wriststrap.
	• Do not touch connectors or pins on component boards.
	Do not touch circuit components inside the equipment.
	Use a static-safe workstation, if available.

• Store the equipment in appropriate static-safe packaging when not in use.

#### **Environment and Enclosure**



#### **ATTENTION: Environment and Enclosure**

- This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
- This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.
- This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.
- In addition to this publication, see the following:
- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

#### European Hazardous Location Approval



**ATTENTION:** Do not place the module in direct sunlight. Prolonged exposure to direct sunlight could degrade the LCD.

#### **European Hazardous Location Approval**

The following applies when the product bears the marking.

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in Zone 2 potentially explosive atmospheres, given in Annex II to this Directive.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15 and EN 60079-0.



**ATTENTION:** This equipment is not resistant to sunlight or other sources of UV radiation.



**WARNING:** This equipment shall be mounted in an ATEX-certified enclosure with a minimum ingress protection rating of at least IP54 ( as defined in IEC60529) and used in an environment of not more than Pollution Degree 2 (as defined in IEC 60664-1) when applied in Zone 2 environments. The enclosure must have a tool-removable cover or door.

**WARNING:** This equipment shall be used within its specified ratings defined by Rockwell Automation.

**WARNING:** Should the unit be installed in an environment where induced transients could exceed 44V, then external transient/surge arrestors should be installed.

**WARNING:** Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.

**WARNING:** Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

**WARNING:** Devices shall be used in an environment of not more than Pollution Degree 2.

### **NNorth American Hazardous Location Approval**

The following information applies when operating this equipment in hazardous locations.

The following information applies when operating this equipment in hazardous locations: Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation		Informations sur l'utilisation de cet équipement en environnements dangereux:         Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.		



**WARNING:** If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

**WARNING:** Temperature rating of conductors must be higher than 82 °C (179.6 °F).

**WARNING:** If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

### **Additional Resources**

These documents contain more information about related products from Rockwell Automation<sup>®</sup>.

Resource	Description
FOUNDATION Fieldbus Linking Devices Technical Data, publication <u>1788-TD001</u>	Provides technical data and specifications for the FOUNDATION Fieldbus linking devices.
FOUNDATION Fieldbus Junction Boxes Installation Instructions, publication <u>1788-IN006</u>	Provides installation instructions and technical information about the FOUNDATION Fieldbus junction boxes (1788-FBJB4R, 1788-FBJB6)
ControlLogix <sup>®</sup> Enhanced Redundancy System User Manual, publication <u>1756-UM535</u>	Provides information specific to enhanced redundancy systems including design and planning considerations, installation procedures, configuration procedures, and maintenance and troubleshooting methods.
ControlLogix EtherNet/IP Module Installation Instructions, publication <u>1756-IN603</u>	Provides hardware installation instructions for the ControlLogix EtherNet/IP module.
EtherNet/IP Network Configuration User Manual, publication ENET-UM001	Describes how you can use EtherNet/IP communication modules with your Logix5000 controller and communicate with various devices on the Ethernet network.
RSNetWorx <sup>™</sup> for ControlNet Getting Results Guide, publication <u>CNET-GR001</u>	Provides information on how to install and navigate the RSNetWorx for ControlNet software. It explains how to use RSNetWorx for ControlNet software and how to access and navigate the online help.
RSNetWorx for EtherNet/IP Getting Results Guide, publication ENET-GR001	Provides information on how to install and navigate the RSNetWorx for EtherNet/IP software. It explains how to use the RSNetWorx for EtherNet/IP software and how to access and navigate the online help.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <u>http://www.ab.com</u>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at

<u>http://www.rockwellautomation.com/literature/</u>. To order paper copies of technical documentation, contact your local Allen-Bradley<sup>®</sup> distributor or Rockwell Automation sales representative.

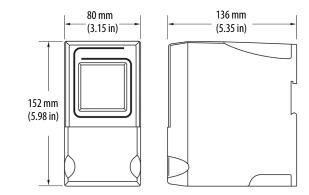
### Installation

### Hardware



ATTENTION: Do not wire more than one conductor on any single terminal.

### Dimensions

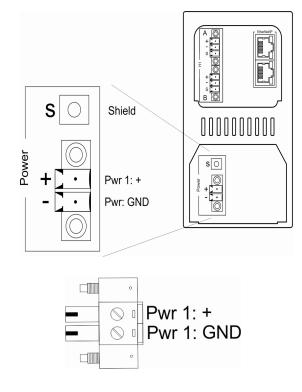


### **Power Connection**

To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

To comply with UL restrictions, this equipment must be powered from a source compliant with Class 2 or Limited Voltage/Current.

We recommend a 24...32V DC power supply for the linking device to operate correctly. No additional power supplies or power conditioners are required. The power supply connection is described here. Tighten DC Power connections to a torque of 0.22...0.25Nm (2...2.2 lb-in).



**IMPORTANT** Do not use additional power supplies or power conditioners with the 1788-EN2FFR and 1788-CN2FFR linking devices.

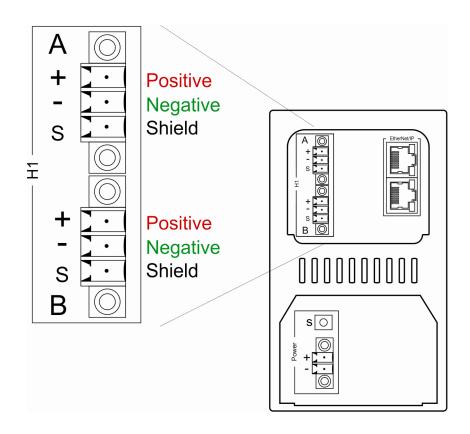
### **H1 Network Connections**

The H1 network must be connected via the H1 terminal on the linking device. The H1 network connection and pinout is described here.

Pin	Description
Right/Top (red)	FF +
Middle (green)	FF -
Left/Bottom	Shield

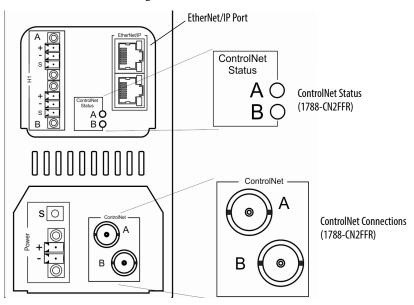
Make Fieldbus connections to a torque of 0.5...0.6 Nm (4.4...5.3 lb-in)

The H1 Segment is split between two physical ports, A and B.



#### **ControlNet and EtherNet/IP Connections**

Two BNC connectors on the base of the 1788-CN2FFR linking device provide connections for single or dual ControlNet media. The 1788-EN2FFR linking device uses an RJ45 connector to connect to an EtherNet/IP network. The dual port EtherNet/IP switch on the 1788-EN2FFR linking device provides connections for multiple Ethernet topologies, including device level ring (DLR). The EtherNet/IP port can also be used as a connection point in the field to access the web server or asset management tools.

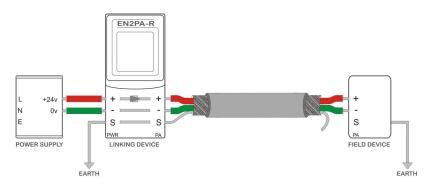


### Shielding

Ground the linking device shield connection to a clean earth connection.

Connect the shield to the H1 media so that connectivity runs through all junction boxes, but is not connected to the field device shield or grounded at the device.

Do not attach the H1 media shield to the field device. Tape the media shield back to avoid accidental contact with other conductors or ground.

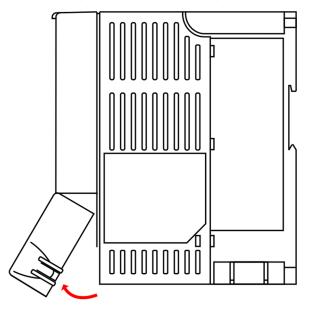


### Set the Linking Device Network Address

This section describes the network address switches.

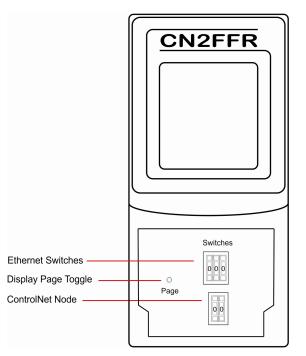
#### **Hardware Switches Location**

The hardware switches are located under the front cover of the linking device. Use the Page button to toggle between different diagnostics on the display.



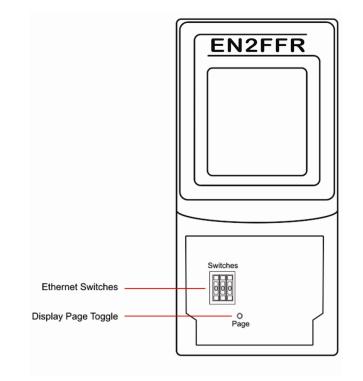
### Set the ControlNet Node Address

To set the ControlNet node address of the 1788-CN2FFR linking device, use the hardware switches behind the front cover.



### Set the EtherNet/IP Address

The linking device ships with BOOTP enabled. To set the IP address of the 1788-EN2FFR linking device, use a BOOTP server or use the hardware switches.



IMPORTANTPower down the linking device before changing the Ethernet switch settings.The IP address is set during powerup.

### **Ethernet Switch Settings**

Ethernet Switch Setting	Description
	To set the IP address of the linking device to the 192.168.1.xxx sub net, set the switches to the required last three digits. In this example, the linking device will start up with IP address: 192.168.1.123.
888	To set the IP address of the linking device via a BOOTP server, set the switches to 888 (factory default setting). Power up the linking device and set the IP address by using any BOOTP server. Once the new IP address has been set, power down the linking device, return the switches to 000, and power up the linking device.
	Normal setting after setting IP address with BOOTP. The 000 setting disables BOOTP and holds the IP address.
7777	The linking device can run the firmware with which it was originally shipped. If power was cycled while upgrading the firmware, the firmware can be corrupted and prevent the linking device from starting up. Set the switches to 777 to set the linking device into Safe mode and upgrade the firmware again.

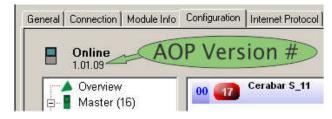
### **Software Installation**

You need the AOP for the Studio 5000 Logix Designer application to configure and manage the linking device. The installation of the AOP includes the HSProcessUtility that is used to manage DTMs and DD service libraries. See <u>Appendix B</u>.

For the latest compatible software information and to download the AOP, see the Product Compatibility and Download Center at

http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page#/tab2.

The AOP version of the linking device is located on the display during the start up process, or via the web server.



TIP

You can also click the upper-left corner of the profile window and click About Module Profile to view the AOP version.

#### **Firmware Version**

The firmware version is printed on the linking device and displayed on the screen during power-up.

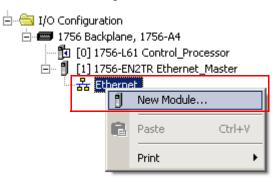
### Set Up in the Studio 5000 Logix Designer Application

## Add the 1788-EN2FFR Linking Device to the I/O Tree

The 1788-EN2FFR linking device must be added to the I/O tree of the Logix controller. The linking device must be added to an Ethernet bridge, such as an Allen-Bradley<sup>®</sup> 1756-EN2T or 1756-EN2TR module.

Follow these steps to add the linking device to the I/O tree of the Logix controller. This example uses the 1756-EN2TR module.

1. Right-click the Ethernet bridge and choose New Module.



2. Select the linking device that you want to add to the Ethernet bridge.

talog Ente	Module Discove			Clea	r Filter	5		Hide Filters	*
V		Module Type Catego	ry Filters				Module Type Vendor Filters		*
<ul> <li></li> &lt;</ul>	CIP Motion Driv CIP Motion Saf Communication Communication	ety Drive Device				Allen-Brad Cognex Co Endress+H FANUC Co	orporation		
•		III		•	•		m		•
Cat	alog Number	Description	Vendor	(	Categor	/			*
	1783-RMS10 1783-RMS10 1788-EN2DN	Stratix 8300 22 Stratix 8300 18 1788 Ethernet to	Allen-Bradley Allen-Bradley Allen-Bradley	C		ications ications ication			
	1788-EN2FFR	Foundation Field	Hiprom Technol		Commur				
	1788-ENBT 1794-AENT	1788 10/100 M 1794 10/100 M	Allen-Bradley Allen-Bradley		Commun				

3. Click the General tab and set the name, description, and IP address.

4. Set the RPI for the linking device.

```
IMPORTANT The recommended RPI is 1/2 the macrocycle time. Calculate the macrocycle by calculating the total response time of all field devices on the segment and then add 100...200 ms for class 2 (DTM message) data. If the RPI is too low, class 1 data (PVs and status) does not update each cycle, and class 2 data responses can be slow.
```

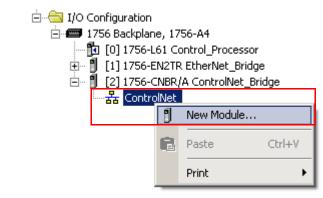
5. Click OK to add the linking device to the I/O tree.

### Add the 1788-CN2FFR Linking Device to the I/O Tree

The 1788-CN2FFR linking device must be added to the I/O tree of the Logix controller. The linking device must be added to a ControlNet bridge, such as an Allen-Bradley 1756-CNB or 1756-CNBR module.

Follow these steps to add the linking device to the I/O tree of the Logix controller. This example uses the 1756-CNBR/A module.

1. Right-click the ControlNet bridge and choose New Module.



2. Select the linking device to add to the ControlNet bridge.

	very Favorites				
Enter Search Text I	Clear Filters	]			Hide Filters 💲
	Module Type Category Filters		Module T	ype Vendor Filters	
Communication Controller Drive HMI Cother	n	✓ ✓ ✓ ✓	Allen-Bradley Hiprom Technologies Mettler-Toledo Parker Hannifin Corpora Reliance Electric	tion	
Catalog Number	Description		Vendor	Category	*
1784-PKTCS PCI-based ControlNet Scanner 1785-PLC5C ControlNet PLC5 1788-CN2DN 1788 ControlNet to DeviceNet Linking Device			Allen-Bradley Allen-Bradley Allen-Bradley	Communication Controller Communication	
1788-CN2FFR Foundation Fieldbus Linking Device			Hiprom Technol	Communication	
1788-CNC 1788-CNCR	1788 ControlNet Bridge, Coax Media 1788 ControlNet Bridge, Redundant Coax Media		Allen-Bradley Allen-Bradley	Communication Communication	

3. Click the General tab and set the name, description, and ControlNet node address.

4. Set the RPI for the linking device.

```
IMPORTANT The recommended RPI is 1/2 the macrocycle time. Calculate the macrocycle by calculating the total response time of all field devices on the segment and then add 100...200 ms for class 2 (DTM message) data. If the RPI is too low, class 1 data (PVs and status) does not update each cycle, and class 2 data responses can be slow.
```

5. Click OK to add the linking device to the I/O tree.

#### **RSNetWorx for ControlNet Configuration**

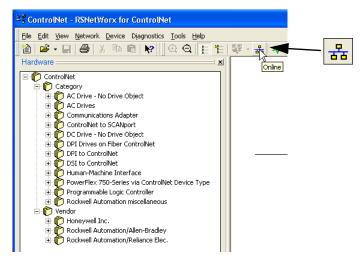
See the RSNetWorx for ControlNet Getting Results Guide, publication <u>CNET-GR001</u>, for more details.

Follow these steps to configure the ControlNet network.

1. Launch RSNetWorx<sup>™</sup> for ControlNet and create a file.

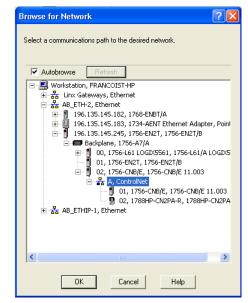
	2	of Co	ontro	lNet -	RSNetW	forx for	r ControlNe	et			
	J	Eile	Edit	⊻iew	<u>N</u> etwork	<u>D</u> evice	Diagnostics				
		睝	<u>V</u> ew				Ctrl+N	⊕ €	2	<b>*</b> E	목 - 용
		🖻 🤅	Open.				Ctrl+O			<b>X</b>	
I			<u>5</u> ave				Ctrl+S				
I		2	5ave /	<u>4</u> s							

2. Click the Online button.



The Browse for Network window appears with the drivers you have installed on your system.

3. Select the communication path to the ControlNet network, select the ControlNet port, and click OK.

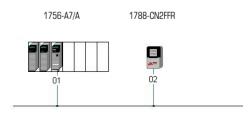


The following pop-up window appears while RSNetWorx browses the network.

Browsing network	
Address 67 browsed.	
Offlink browse not active.	
Cancel	

Once complete, all devices on the network are displayed in the graphic window on the right side of the window.

4. Right-click any white space around the graphics and select Enable Edits.

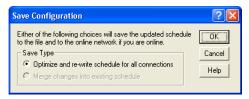


5. Right-click any white space around the graphics and select Properties.

6. On the Networks Parameters Tab, update the Max Unscheduled Address if you are sure that the allocated range is less than 99.

_default		?
Network Parameters Media	a Configuration   Gener	al
	Current	Pending
Network Update <u>T</u> ime (ms):	5.00	5.00
Max Scheduled Address:	01	01 .
Max Unscheduled Address:	05	05
<u>M</u> edia Redundancy:	A Only	A Only 💌
<u>N</u> etwork Name:	_default	_default
	Cancel	Apply Help
		Пер

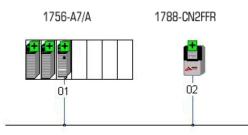
- 7. Click OK.
- 8. Right-click any white space around the graphics and choose Download to Network.
- 9. Select the correct save option for your configuration and click OK.



- **10.** Enter a suitable file name.
- 11. Click Yes to download the configuration.

RSNetWorx for Con	trolNet 🛛 🕅
Downloading network Do you want to proce	configuration. ed with the download?
Yes	No

The ControlNet network is now scheduled and the graphics display green plus signs.



### Linking Device Configuration Using the AOP

Once the linking device has been added to the config tree, you can access the property settings. Right-click the linking device and select Properties. Then click the Configuration tab as shown in <u>Figure 1</u>.

Once the linking device is connected to the controller, you can see the linking device in the Configuration tab.

- Master green in the config tree = linking device is online
- Master gray in the config tree = linking device is offline

The layout of the Configuration tab is shown in <u>Figure 1</u>.



#### Figure 1 - Module Properties Configuration Tab

#### Live List

Once a field device is found and has an address between 16 (0x10) and 247 (0xF7), the device appears in the live list. You can configure this device.

#### Visitor List

Once a field device is found and has an address above 247 (0xF7), the device appears in the visitor list. You cannot configure this device until an address between 16 (0x10) and 247 (0xF7) is given to the field device. See Live List.

#### LAS

The LAS icon indicates if the master is the LAS that requests and receives live data from each field device, or if the master is the back-up LAS. (The back-up LAS has a red X over the icon.) See <u>Redundant Master Setup on page 43</u> for more information.

#### **Config Tree**

Once you have configured the slot for a device (even if not downloaded yet), the device appears in the config tree. Use the config tree to navigate between configuration and status pages for each master and field device.

#### Shortcuts

These shortcuts are located above the live list on the configuration tab.

#### **Table 1 - Configuration Tab Shortcuts**

Shortcut Button	Description
	Used to open the HSProcessUtility, or to refresh the device catalog.
	The Overview page displays a list of configured and attached field devices.
	Export configuration for entire linking device, (including all field devices that are configured under linking device).
	Import configuration for entire linking device, (including all field devices that are configured under linking device).
<b>₽</b> € <b>₽</b>	Used to synchronize the back-up link active scheduler (LAS) to the current LAS. You must first export the project from the LAS AOP. Note that this button is only available to the back-up LAS and is disabled on the LAS.

You can export or import the configuration for either a field device or linking device (with all field devices connected).

**TIP** If you want to replicate the configuration to many devices, the synchronize shortcut can speed up the process.

#### **Master Configuration**

- 1. Open the master configuration page from the config tree to access the linking device master configuration settings.
- 2. Choose the Topology for the master linking device.
- 3. Enter the configuration values.
- **4.** Click the Download Config button to download the settings to the linking device.

The settings are stored in nonvolatile memory in the linking device.

5. Click the Apply button to store the configuration in the project file.

Module Properties: Eth (1788-EN2FFR 1.1)	
General Connection Module Info Configuration* Internet Protocol Port Configuration Network Vendor	
Master Configuration Configuration Advanced Oscilloscope	FF Master Node 16 v Max Scan Address 40 v Slave Retry Limit 5 MacroCycle (ms) 1000 Auto reset trip V Fail status in Prog/Fault Mode
Configuration Configuration Configuration Configuration Configuration Configuration Configuration Config Load Defaults Auto MacroCycle Update Master Time Configuration Config	
Status: Running OK Canc	el Apply Help

#### Topology

Choose the correct Topology mode for the application. The graphical representation must be used to match the topology. See <u>Appendix D</u> for available options. Use this setting to configure redundant linking devices, redundant H1 media, and the internal H1 segment terminators.

#### FF Master Node

The H1 Master (linking device) needs a node number to operate on the H1 network. The default is node number 16 (0x10).

**IMPORTANT** Do not modify the default node number; doing so can result in loss of communication.

#### **Max Scan Address**

When the linking device is operating, a background scan constantly probes each unused node number to see if any new field devices were connected. The background scan runs to the max scan address, then restarts at one.

#### **Slave Retry Limit**

The slave retry limit sets the number of times the H1 Master re-requests data before dropping the connection. The default setting is 5.

IMPORTANT	Do not modify the default setting. A limit above 5 can slow down
	communication.

#### MacroCycle (ms)

The amount of time between data compels (process variables). Too low a number can cause poor performance when downloading and going online with a field device.

#### Auto Reset Trip

Selects the option to reset H1 bus trips due to over-current.

- If the checkbox is selected, the trip automatically resets. The linking device resets the trip each 5 seconds. If the trip is still persistent, the bus will trip again.
- If the checkbox is not selected, reset the bus via the reset button on the master status page.

#### Fail Status in Prog/Fault Mode

The fail status is used when field devices use output blocks (AO or DO) that are receiving data from the Logix controller via the linking device. When the linking device loses connection to the Logix controller, or the Logix controller goes into Program mode or Fault mode, you can choose one of two operations:

- If the checkbox is selected, the linking device detects that there is a comms fault on the Ethernet network and forces all output PV status to Bad:NoComms. If the field device is configured correctly, the field device goes to fail-safe value.
- If the checkbox is not selected, the linking device continues to send the last received data.
  - TIP When Logix is in Prog/Fault mode, you can still go into the tags and change values as the linking device is still connected.

#### **Upload Config**

Uploads the configuration store on the attached linking device.

#### Auto MacroCycle

Calculates the Macro Cycle based on the configured field devices and the number of PVs configured. A window is also added for class II data communication.

#### Advanced

Opens the Advanced Settings window.

#### Load Defaults

Resets the configuration settings to their default values.

#### Update Master Time

Update the master time to local computer time.

#### **Download Schedule**

Download schedule to linking device.

**TIP** This task is performed automatically when field devices are added or edited.

#### **Enable Schedule**

The default is enabled. Used only when the Disable Schedule Function disables the schedule.

#### **Clear Schedule**

Clear the schedule from the linking device and the AOP.

**IMPORTANT** This action causes the module to stop compelling data.

#### **Disable Schedule**

Disable the schedule from executing in the linking device.

#### Advanced

The Advanced button on the master configuration page launches the Master Advanced configuration dialog box (see <u>Master Configuration on page 28</u>).

**IMPORTANT** We recommend that you do not alter these settings; doing so can cause loss of communication.

agname	1788-EN2FFR		
Slot Time	8	Token Hold Time	276
fax Response Delay	8	Target Token Rotation Time	60000
fin Inter PDU Delay	16	Link Maintenance Token Hold Time	299
nter Channel Skew	0	Time Distribution Period	10000
Post Transmission Gap	0	Max Inactivity to Claim LAS	90
Preamble Extension	1	LAS Database Status Update Period	10000
PhiOverhead Max Scheduling Overhead Min Token Delegation Time	0 63 32	Operational Yes	No
Primary Time Publisher	Yes No	Primary Link Master Yes	No
Time Publisher Node 1 AP Sync Interval (s) 10		Device Class Link Master Ba	asic Device

Figure 2 - Master Advanced Configuration Screen

#### Auto MacroCycle

Click the Auto MacroCycle button on the master configuration page to calculate the recommended MacroCycle for the current linking device (see <u>Master</u> <u>Configuration on page 28</u>).

#### Auto MacroCycle Calculation

Macrocycle = [(time for request + receive) x (configured field devices) x (configured PVs for each field device)] + <math>[(configured field devices) x (time for one token exchange)] + [fixed amount of unscheduled time].

**IMPORTANT** The Auto MacroCycle only takes effect after you download it to the master and field devices.

#### Add and Manage Device Description Files

Before field devices can be added to the 1788-CN2FFR/1788-EN2FFR linking device, add a copy of the DD file to the field device catalog by using the HSProcessUtility as described in <u>Appendix B</u>.

The DD file defines the capabilities and configuration parameters of the field device.

#### **Field Device Configuration**

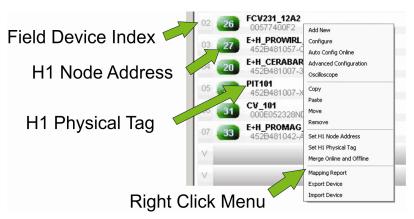
The overview page on the configuration tab displays the field device live list with colored icons that depict the status of each field device (see page <u>26</u>). If the Studio 5000 Logix Designer application is online with the 1788-CN2FFR/1788-EN2FFR link master correctly configured, the attached field devices appear in the live list.

The field device index  $(00\rightarrow 15)$  provides a unique index for each of the 16 field devices that can be connected to the linking device. This index corresponds with the index in the linking device data structure that is located in the controller tags.

The H1 node address and physical tag are also displayed together with the device ID and serial number of the field device.

A right-click menu in the overview page displays functions for addition, configuration, and diagnostics of field devices.

Figure 3 - Overview Page on the Configuration Tab



#### **Field Device Status**

The icon color indicates the status of the field device.

Table 2 - Field Device Status Icons

lcon	Description
19	Green – Field device is online, allocated to a field device index and configured, producing process variables.
19	Yellow — Field device is online, not allocated to a field device index and not configured.
19	Blue – Field device is online, allocated but not configured or producing process variables.
19	Red – Field device is not online.
30	Light blue – Field device identification mismatch (occurs when the field device identity [ident] that is downloaded to the linking device is different than the actual field device).

The color of the text indicates if the online device has the same node address and tag as the offline configured device.

- If the text is **black**, the online and offline node address and tag name match.
- If the text is **red**, the online and offline node address and tag name do not match.

#### Add New

Use this function to add field devices when the linking device is not connected to the field device. The Select Device dialog box displays a list of devices from the field device catalog. Set the H1 Node Address and Tagname.

#### Figure 4 - Select Device Dialog Box

	rice Description	Device			
All		▼ (All)			-
-	Manufacturer	Device	DeviceID	Rev	DDRev
0	Rosemount Inc.	848	0x0848	6	1
1	Rosemount Inc.	3051	0x3051	23	17
2	Rosemount Inc.	8800	0x8800	5	2
3	Endress+Hauser	Cerabar S	0x1007	2	3
4	Endress+Hauser	TMT85	0x10CE	1	4

#### Configure

Launches the field device block configuration screen that is used to configure each field device.

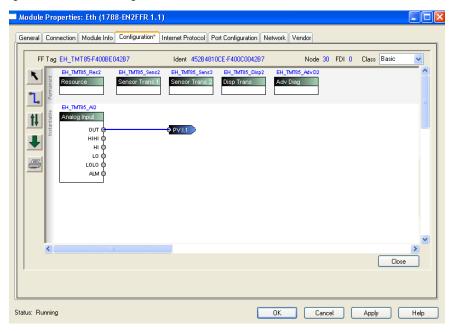
#### Auto Configure Online

IMPORTANT	Requires the field device to be online.
-----------	---

You can right-click on a device (of which the DD files are registered) and choose the Auto Configure Online option. A configuration is applied for basic operation of the field device.

- The AOP adds a resource block and sets the target mode to auto.
- A transducer block is added and the mode block is set to auto.
- An analog input block (if available) is added with the target mode set to auto.
- The channel is set to 1 (in most cases the primary value).

#### Figure 5 - Field Device Configuration Screen



#### **Advanced Configuration**

Used to assign DTM to the field device and to launch the Thin-Frame DTM viewer.

#### Oscilloscope

Displays an oscilloscope trace of the response message from the field device.

#### **Copy and Paste**

After the device configuration is done, you can copy and paste the configuration to speed up the configuration process.

#### Move

You can move a device in the live list to another field device index even if the devices have been configured and are providing process variables.

#### Remove

A device configuration can also be removed (deleted).

**IMPORTANT** If a configuration is stored in the linking device at the specific field device index, it is also removed (deleted).

#### Set H1 Node Address

Used to change the H1 node address on the field device. We recommend that you set the node address from 17 through 247. The linking device uses 16, and node addresses above 247 are placed in the visitor List.

#### Set H1 Physical Tag

Use to change the tag name that is stored in the field device.

#### Merge Online and Offline

The device merge option is used when you want to merge an online device with the offline configuration of a certain device index. Use this option when performing a device exchange for a faulty device.

#### Mapping Report

Produces a report that describes in detail the configuration of the field device.

#### **Export Device and Import Device**

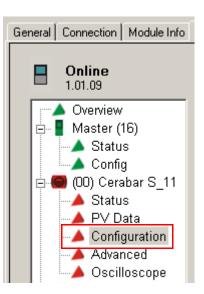
A device configuration can be exported to a file which can later be imported again. This option helps when you have multiple devices with the same configuration.

#### **Field Device Block Configuration**

You can configure the field device blocks from the block configuration view. Choose the Configuration option of the device in the config tree, or from the right-click menu in the live list.

Configuration is device-centric and performed in a graphical view using blocks, wires, and connectors (see <u>Figure 5 on page 34</u>). The graphical interface also provides access to parameters for each block for detailed configuration of each device.

See <u>Appendix C</u>, <u>Field Device Block</u> <u>Configuration Examples on page 69</u> for detailed information about how to configure AO and DO function blocks.



lcon	Description
*	Select and move objects.
٦.	Draw wire.
ţ1	Go online with device.
₽	Download configuration to device.
5	Print.

#### **Table 3 - Field Device Configuration Tools**

#### Add a Block

Blocks are defined by the field device manufacturer and described in the DD files.	TMT85_11_PID2 PID OUT ©	
There are three classes of blocks:	BKCAL OUT O	
<b>R</b> – Resource Block	Cancel New Wire	O CAS IN O BKCAL IN O TRK IN D
T – Transducer Block	New Block New Connector	O TRK VAL O FF VAL
E Errentian Dia da		

**F** – Function Block

Only function blocks have ports that are used to transfer data to and from the block:

- Ports on the left of the function blocks are inputs.
- Ports on the right of the function blocks are outputs.

For detailed descriptions and uses of each block, refer to the user manual of the field device.

Follow these steps to add a block.

1. To add (instantiate) a block, right-click in the window and choose New Block.

A list of all available blocks for the specific device appears.

2. Choose the block that you want to use.

The block appears on the screen.

dx	Class	Full Name	#P	#I	DD Item	Profile	Revision
0	R	Resource 2	0	0	0x80020AF0	0x0133	0x0101
1	T	TMT162 Sensor Transducer 1	1	0	0x000200A2	0x8400	0x0001
2	T	TMT162 Sensor Transducer 2	1	0	0x000200A3	0x8401	0x0001
3	Т	TMT162 Display Transducer	1	0	0x000200A4	0x8402	0x0001
4	Т	TMT162 Adv Diag	1	0	0x000200A5	0x8403	0x0001
5	F	Analog Input	3	3	0x800201D0	0x0101	0x0101
6	F	Proportional Integral Derivative	1	0	0x800202B0	0x0108	0x0001
7	F	Input Selector	1	0	0x80028070	0x0126	0x0001

#### Adjust Block Parameters

To change the parameters of a block, right-click the title portion of the block and choose Parameters.



To enable a parameter for editing, click the box in the En column. A green check mark indicates the parameter is enabled for editing. Different parameters will have different classes as shown in <u>Table 4</u>.

Table 4 - Parameter Class Descriptions

lcon	Parameter Class Description
C	Configurable parameter but non output
*	Input port
1	Read-only
+	Tune
•	Output port
2	Alarm
?	Parameter help (provides information about the parameter)

- 1. Click a parameter that is enabled for editing to display a list of options to choose from.
- 2. Select a new value in the pop-up dialog box and click OK.

			_	110.	-1 40	IDBE042B7 Ident 452	34810CE-F400C0042B7	Node 30 FDI 0 Class Basic 🗸
	rame	_			_			T et
	Index			ass		Parameter	Value	Live
X			C	1	?	ST_REV	0	
	2		C		?	TAG_DESC	EH_TMT85_AI2	
	3		C		?	STRATEGY	0	
	4		C		?	ALERT_KEY	0	
	5 5.1	*	C	_	?	MODE_BLK		
	5.1 5.2	*	C		?	TARGET ACTUAL	ROut	<u>~</u>
	5.2 5.3			1	?	PERMITTED	RCas	
	5.4	*	C		?	NORMAL	Cas	
	5.4 6	-	C	-	?	BLOCK_ERR	Auto Man	×
	о 7		C	1	?	PV		
	7.1		C	4	?	STATUS	ва ОК	Cancel
	7.1 7.2		C	1	?	VALUE		
	7.2 8	٨	•	1	?	OUT	0.0	
	8.1	*			?	STATUS	Bad::NonSpecific:NotLimited	
	8.2	Ä			?	VALUE	0.0	
	9	T	C		?	SIMULATE	0.0	
	9.1		C		?	SIMULATE_STATUS	Bad::NonSpecific:NotLimited	
1000						anno ite inine	2 C	
								Enable All Disable All Close

#### Add a Connector

A connector enables transfer of data between the block of the field device and the data structure in the controller, or between field device blocks on the same segment. Data transfers between segments are performed via the controller.

Cancel New Wire New Block New Connector

Follow these steps to add a connector.

- 1. To add a connector, right-click in the window and choose New Connector.
- 2. Set the desired options in the Add Connector dialog box to configure the connector, and click OK.

Add Connector			×
Connector Type	Logix Assembly		
A located DV	PV Slot	1	~
⊙ Input : I.PV	PV Data		
Output: 0.PV	Data Type	FLOAT	~
	Length (bytes)	4	~
Network Publication	Offset (bytes)	1	~
Network Subscription	Status Data		
Ŭ.	Offset (bytes)	0	*
	Cancel		

#### TIP

The configuration of input and output connectors requires the definition of the data being transferred. See the user manual of the field device for data type, length, offset, and number of status bytes. The default is the most common.

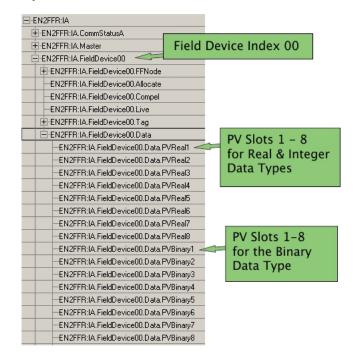
Table 5 describes the four types of connectors.

#### Table 5 - Connector Types

Connector Type	Data Transfer Use	lcon
Input : I.PV	From a field device to the controller.	• PV:1.1
Output : O.PV	From the controller to the field device.	PV:0.30
Network Publication	From a field device to another field device on the same segment.	LinkTag
Network Subscription	From another field device on the same segment to the field device.	LinkTag

The field device index, PV slot, and data type define where the connector points to in the data structure of the controller tags.

#### Figure 6 - Example of a Field Device Index



- For **Input : I.PV** connectors, the data types of float and integer both connect to PVReal in the input image, while binary data types connect to PVBinary.
- For **Output : O.PV** connectors, the output image of the linking device provides separate data types for float, integer, and binary.
- Network Publication and Network Subscription are used for control in the field where data is sent from one field device to another without any intervention from the LAS (master).

Each Network Publication connector must be given a unique name that is used as the reference for the Network Subscription connectors.

**IMPORTANT** Network Publication connectors must be defined first.

#### Add Wires

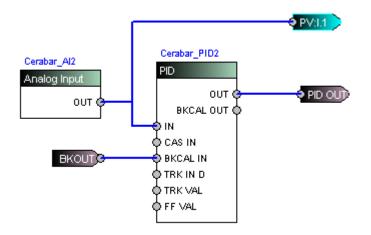
Wires are used to connect input and output ports on the blocks to other ports or connectors.

Follow these steps to add a wire.

1. To add a wire, right-click in the window and choose New Wire.

Cancel
New Wire
New Block
New Connector

2. Drag the ends of the wires to the docking points on the block and the connectors.



#### Download the Configuration



When the configuration is complete, click the Download button to download the configuration to the field device. The download status is displayed in the progress bar.

Downloading	
FMSUploadSystem : SMIB SM Support	
	Abort

**IMPORTANT** The first configuration download for a device requires more time than subsequent downloads due to extra data required for configuring the communication links (virtual communication relationship [VCR]).

After the communication links are created, configuration downloads are quicker.

Once the download is done and the device is providing process variables, the device will be **green** in the configuration tree and the live list.



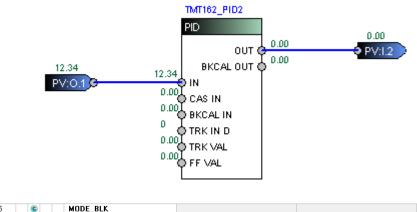
If the device is not producing data (for example, incorrect configuration) the device will be **blue** in the configuration tree and the live list.



#### Go Online



Click the Go Online button to see process variables and change parameters in real time.



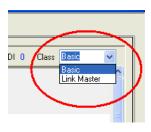
V 5	0	MODE_BLK		
<b>√</b> 5.1	0	TARGET	Auto	Auto
✓ 5.2	C 🗲	ACTUAL	Auto	IMan
5.3	0	PERMITTED	Auto + 00S	Auto + 00S
✓ 5.4	0	NORMAL	Auto	Auto

Click a parameter to change it in real time. If the block is in Auto mode, you are prompted to change the mode to Out of Service (OOS). Some parameters cannot be changed while the block is in Auto mode.

See <u>Appendix C</u>, <u>Field Device Block Configuration Examples on page 69</u> for detailed information about how to configure AO and DO function blocks.

#### **Field Device Class**

A field device can have one of two classes. It can be a basic device (normal operation) or it can be a link master (LAS capability). Choose Basic or Link Master on the block configuration screen. Power cycle the field device for the changes to take effect.



**IMPORTANT** We recommend that you set up all field devices as basic (default).

## Scheduling and the LAS

The 1788-CN2FFR/1788-EN2FFR linking device generates the LAS schedule, which determines when each function block executes and transmits data. Newly added field devices are automatically added to the schedule, and removed from the schedule when removed from the live list.

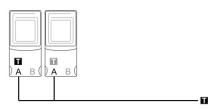
Figure 7 - Master Configuration Dialog Box

Master Configuration				
			FF Master Node	16 💌
			Max Scan Address	247 💌
			Slave Retry Limit	5
			MacroCycle	1000
		0		
Topology				
SST - Single Master - Split Bus	s - Terminated	•		
Configuration		Schedule		
Download Config	Advanced	Download Sched	lule Clear Scheo	lule
Upload Config	Load Defaults	Enable Schedu	le Disable Sche	dule
Auto MacroCycle	odate Master Time			

The Download Schedule function is only needed when the 1788-CN2FFR/ 1788-EN2FFR linking device has been replaced.

## **Redundant Master Setup**

You can configure a second 1788-CN2FFR/1788-EN2FFR linking device to act as a backup. You can choose from various architectures (see <u>Appendix D</u>). The figure shows an example of MultiMaster architecture, A bus only, with a shared termination.



IMPORTANT	When connecting to running linking devices, you must follow the procedures in <u>MultiMaster Connecting Procedures on page 46</u> to avoid losing the connection to certain devices.
IMPORTANT	You must not have any other back-up LAS devices. Be sure that the field devices have been configured with the class set to basic. See <u>Field Device Class on page 42</u> .
IMPORTANT	Test and verify that the specific field devices that are connected to the MultiMaster operate correctly when one of the linking devices fails.

We recommend you use the given AOI when using redundant masters. The AOI swaps between masters when one fails and automatically updates the destination PV with the back-up master data.

Only one of the masters is the LAS that requests and receives live data from each field device.

- If the device is the LAS, the device icon is displayed without a cross (see page <u>26</u>).
- If the device is the **back-up LAS**, the device icon is displayed with a cross.



Follow these steps to configure one master to take priority as the primary master.

1. Set the back-up master Primary Link Master to No in the Master Advanced options (see Figure 2 on page 31).

Primary Link Master	Yes	No

- 2. Create the network on the LAS.
- 3. Click the Export button to export the bridge configuration.



4. On the back-up LAS, click the Sync Masters button and choose the file that was exported.

All scheduled configurations are downloaded to the back-up LAS. Once this download is done, the status indicates **Active - Backup LAS** as shown.

Module Properties: Eth (178 General Connection Module Info	B-EN2FFR 1.1) Configuration Network Vendor	
Config 1.01.11 Corrview Master (16) Config Config 00 EH_TMT85-F400BE04	Master Status     Reset       Channel A     Active + Leminated       Reset     Reset       Multi-Master     Active + Leminated       Temperature     40.3 °C       138.8 °C     Event Log       H1 Node Address     16	
		600 500 400 300 200 100 0 mA
Status: Running	OK Cancel Apply	Help

### **Redundant Master Mismatch**

If the two masters are not synchronized (for example, there is a configuration mismatch) one of the following errors on the back-up LAS is displayed.

Adule Properties: Eth (1788-EN2FFR 1.1)
General Connection Module Info Configuration* Internet Protocol Port Configuration Network Vendor
Online         ■ </td
Overview       Master (16)         Status       Channel A         Config       Active + Terminated         HithMaster       Master (16)         Multi-Master       Master (16)         Master (16)       Event Log         H1 Node Address       16         MacroCycle       1000ms         30       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       500         20       21.0 V         21.0 V       24 mA         33 mA       mA         V       Supply (V)         Ch.A Voltage       Ch.A Curre
Status: Running OK Cancel Apply Help

- Master + Device Config Mismatch indicates that there is a difference between the LAS and back-up LAS master configuration.
- **Device Config Mismatch** indicates that there is a difference in at least one of the field devices between the LAS and back-up LAS configuration.

#### **Redundant Master Disabled**

If a redundant master is not in use, the Multi-Master status is disabled.

Module Properties: Eth (1788-	-EN2FFR 1.1)	
General Connection Module Info	Configuration* Internet Protocol Port Configuration Network Vendor	
General Connection Module Info C	Configuration*       Internet Protocol       Port Configuration       Network       Vendor         Image: Status       Image: Status       Image: Status       Image: Status       Image: Status         Channel A       Active + Temmated       Reset       Image: Status       Image: Status         Channel A       Active + Temmated       Reset       Image: Status       Image: Status         Multi-Master       Disabled       Reset       Image: Status       Image: Status	- 600
Status: Running	20	- 400 - 300 - 200 - 100 - 0 mA Help

## MultiMaster Connecting Procedures

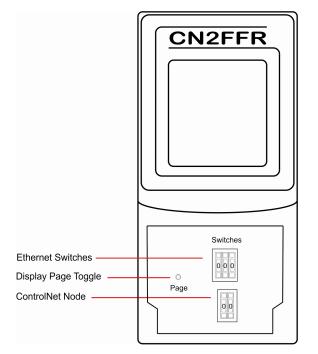
To avoid communication loss, or a field device going to the visitor address range, follow the MultiMaster connection procedures in this section.

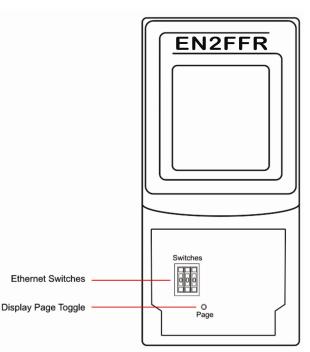
#### **Connect Safe Mode**

The Connect Safe mode is used in the <u>Reconnect Two Separate Running LAS</u> <u>Devices on page 47</u> and <u>Swap Out Linking Devices on page 47</u> procedures.

To enter the **Connect Safe mode**, hold the Page button for at least 5 seconds. The LCD displays the time until communication is re-established to the linking device (10 seconds).

#### Figure 8 - Location of the Page Button for Connect Safe Mode





#### Start the Back-up LAS Master (Already Configured)

Follow these steps to start the Back-up LAS master.

- 1. Plug in all communication connectors (H1, EtherNet/IP or ControlNet cables), but not the power.
- **2.** Once all communication connectors are plugged in, connect the power to the linking device.

The linking device starts in Back-up LAS mode and does not disturb communication.

#### **Reconnect Two Separate Running LAS Devices**

If two masters are configured on a network (one on each end) and the cable between them is broken, some devices will be connected to one master, and the remaining devices will be connected to the other master.

See master modes 9, 12, and 15 in <u>Appendix D</u>.

Follow these steps to connect the two H1 segments.

1. Hold the Page button for 5 seconds to put one of the masters into Connect Safe mode (see <u>Connect Safe Mode on page 46</u>).

You have 10 seconds to reconnect the segments.

**IMPORTANT** Failure to enter Connect Safe mode can result in a loss of communication, or devices going to the visitor range.

2. Reconnect the cable between the masters.

#### Swap Out Linking Devices

Follow these steps to swap out a linking device.

- 1. Plug in all communication and power connectors, but not the H1 segment.
- **2.** Once the linking device is connected to Logix, change the node address to anything other than the node address of the running master.
- 3. Hold the Page button for 5 seconds to put the linking device into Connect Safe mode (see <u>Connect Safe Mode on page 46</u>).

You have 10 seconds to reconnect the segments.

**IMPORTANT** Failure to enter Connect Safe mode can result in a loss of communication, or devices going to the visitor range.

 Click the Master Sync button in the overview window to synchronize the new master with the current running master (see <u>Redundant Master Setup</u> on page 43)

# **Logix Assemblies**

## Input

The linking device uses four CIP connections for the 16 field devices. Connection A has the master instance and four field devices. The other connections (B, C, and D) have only the four field devices. All device assemblies are identical.

#### Figure 9 - Example of Linking Device Connections Tag Data Structure

- FFR:IA	()	{		HT:1788HP_EN2FFB_0_3:IA:0
+ FFR:IA.CommStatusA	16#0000_0000		Hex	DINT
± FFR:IA.Master	()	{		HT:1788HP_EN2FFR_MasterIma
FFR:IA.FieldDevice00	{}	{		HT:1788HP_EN2FFR_DeviceIm-
± FFR:IA.FieldDevice01	{}	{		HT:1788HP_EN2FFR_DeviceIm
+ FFR:IA.FieldDevice02	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:IA.FieldDevice03	()	{		HT:1788HP_EN2FFR_DeviceIm-
- FFR:IB	()	{		HT:1788HP_EN2FFR_4_7:IB:0
FFR:IB.CommStatusB	16#0000_0000		Hex	DINT
+ FFR:IB.FieldDevice04	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:IB.FieldDevice05	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:IB.FieldDevice06	()	{		HT:1788HP_EN2FFR_DeviceIm-
FFR:IB.FieldDevice07	()	{		HT:1788HP_EN2FFR_DeviceIm-
- FFR:IC	()	{		HT:1788HP_EN2FFB_8_11:IC:0
+ FFR:IC.CommStatusC	16#0000_0000		Hex	DINT
+ FFR:IC.FieldDevice08	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:IC.FieldDevice09	()	{		HT:1788HP_EN2FFR_DeviceIm-
FFR:IC.FieldDevice10	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:IC.FieldDevice11	()	{		HT:1788HP_EN2FFR_DeviceIm-
- FFR:ID	{}	{		HT:1788HP_EN2FFR_12_15:ID:
+ FFR:ID.CommStatusD	16#0000_0000		Hex	DINT
+ FFR:ID.FieldDevice12	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:ID.FieldDevice13	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:ID.FieldDevice14	()	{		HT:1788HP_EN2FFR_DeviceIm-
+ FFR:ID.FieldDevice15	()	{		HT:1788HP_EN2FFR_DeviceIm

## **Master Device Tag Structure**

This section describes the values on the elements in the master device status tag structure.

Name <u>=8</u>	Value +	Force Mask 🛛 🔦	Style	Data Type
- FFR01:IA	()	{}		HT:1788HP_EN
+ FFR01:IA.CommStatusA	16#0000_0000		Hex	DINT
FFR01:IA.Master	)	{}		HT:1788HP_EN
FFR01:IA.Master.FFBusVoltageA	0.0		Float	REAL
FFR01:IA.Master.FFBusCurrentA	0.0		Float	REAL
FFR01:IA.Master.FFBusVoltageB	0.0		Float	REAL
FFR01:IA.Master.FFBusCurrentB	0.0		Float	REAL
FFR01:IA.Master.ExternalVoltage	0.0		Float	REAL
FFR01:IA.Master.Temperature	0.0		Float	REAL
FFR01:IA.Master.BusAEnabled	0		Decimal	BOOL
FFR01:IA.Master.BusBEnabled	0		Decimal	BOOL
FFR01:IA.Master.BusATripped	0		Decimal	BOOL
FFR01:IA.Master.BusBTripped	0		Decimal	BOOL
-FFR01:IA.Master.BusATerminated	0		Decimal	BOOL
FFR01:IA.Master.BusBTerminated	0		Decimal	BOOL
FFR01:IA.Master.NewFieldDevice	0		Decimal	BOOL
FFR01:IA.Master.LinkActiveScheduler	0		Decimal	BOOL
+ FFR01:IA.Master.MasterMode	0		Decimal	SINT
FFR01:IA.Master.RedundantMediaOK	0		Decimal	BOOL
+ FFR01:IA.Master.ConnectionStatus	2#0000 0000 0000 0000 0000 0000 0000 00		Binary	DINT

#### **Bus A/BTripped**

If too much current (> 500 mA) is drawn on Bus A or Bus B, a trip occurs and the bus is no longer functional. The trip is indicated in the input image.

#### NewFieldDevice

If a new field device is found which is not in the configuration of the H1 master, a new field device bit is set.

#### LinkActiveScheduler

This bit indicates if the current device is the LAS or the back-up LAS (set indicating that the linking device is the LAS).

#### MasterMode

N/A

#### LinkingDeviceStatus

This is currently reserved.

#### **ConnectionStatus**

If a field device is online and running (exchanging cyclic data), its field device index bit (in the connection status) is set. If the device goes offline, the bit is cleared.

#### FFBusVoltageA/B

The voltage on the H1 bus as measured at port A and port B on the linking device.

#### FFBusCurrentA/B

The current being drawn by the H1 bus through port A and port B.

#### ExternalVoltage

The voltage of the external power supply.

#### Temperature

The internal temperature of the linking device.

#### **BusA/BEnabled**

The master mode setting enables and disables the H1 ports A and B. For example, if the master mode setting is Master Mode 0 - Single Master, A Bus Only, then A is enabled and B is disabled (see page <u>85</u>).

#### **BusA/BTerminated**

The master mode setting sets the termination for H1 ports A and B. For example, if the mode setting is Master Mode 0 - Single Master, A Bus Only, then A is enabled and terminated (see page <u>85</u>).

#### **Field Device Tag Structure**

This section describes the elements of the field device tag structure.

EN2H1R01:IA.FieldDevice00	{}	{	
EN2H1R01:IA.FieldDevice00.FFNode	24		Decimal
-EN2H1R01:IA.FieldDevice00.Allocate	1		Decimal
-EN2H1R01:IA.FieldDevice00.Compet	1		Decimal
-EN2H1R01:IA.FieldDevice00.Live	1		Decimal
EN2H1R01:IA.FieldDevice00.Tag	{}	{	

#### FFNode

The node value specifies the number of the field device.

#### Allocate

Indicates that this field device index has been allocated for a specific field device and another device cannot use it.

#### Compel

If this bit is set, the linking device is requesting process variable data from the field device.

#### Live

A connection has been established to the field device and the linking device is receiving live data.

#### Tag

This element specifies the tag name of the field device.

#### PVReal1...PVReal8

This element contains the process variable (PV) float or integer value from the field device. Each field device can have a maximum of eight real PVs.

-EN2H1R01:IA.FieldDevice00.Daţa.PVReal1	50.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal2	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal3	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal4	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal5	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal6	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal7	0.0	Float
EN2H1R01:IA.FieldDevice00.Data.PVReal8	0.0	Float

#### PVBinary1...PVBinary8

This element contains the process variable (PV) Boolean value from the field device. Each field device can have a maximum of eight binary PVs.

EN2H1R01:IA.FieldDevice00.Data.PVBinary1	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary2	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary3	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary4	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary5	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary6	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary7	0	Decimal
EN2H1R01:IA.FieldDevice00.Data.PVBinary8	0	Decimal

#### **PVStatus**

The PV status indicates these quality values:

- Bad
- Uncertain
- GoodNonCascade
- GoodCascade

The PV status indicates these limit values:

- NotLimited
- LowLimited
- HighLimited
- Constant

0	Decimal
0	Decimal
1	Decimal
0	Decimal
1	Decimal
	0 1 0 0

#### **PVDiagnostics**

This tag contains the diagnostics information that is associated with each PV.

R01:IA.FieldDevice00.Data.PV1Diagnostics	{}	{}	HT:170
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.Bad_NonSpecific	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.ConfigurationError	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.NotConnected	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.DeviceFailure	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.SensorFailure	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.NoCommWithLastUsableValue	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.NoCommWithNoLastUsableValue	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.OutOfService	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.Bad_TransducerInManual	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.Uncertain_NonSpecific	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.LastUsableValue	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.Substitute	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.IntialValue	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.SensorConvNotAccurate	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.EngUnitRangeViolation	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.SubNormal	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.Uncertain_TransducerInManual	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.ActiveBlockAlarm	0	Decimal	BOOL
FFR01:1A. FieldDevice00. Data. PV1Diagnostics. ActiveAdvisoryAlarm	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.ActiveCriticalAlarm	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.UnAckBlockAlarm	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.UnAckAdvisoryAlarm	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.UnAckCriticalAlarm	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.PV1Diagnostics.GoodNonCasade_IntialFaultState	0	Decimal	BOOL
FFR01:1A.FieldDevice00.Data.FV1Diagnostics.GoodCasade_NonSpecific	0	Decimal	BOOL
FFR01:1A, FieldDevice00, Data, PV1Diagnostics, InitAcknowledge	0	Decimal	BOOL
FFR01:1A, FieldDevice00, Data, PV1Diagnostics, InitRequest	0	Decimal	BOOL
FFR01:IA. FieldDevice00.Data.PV1Diagnostics.NotInvited	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.PV1Diagnostics.NotSelected	0	Decimal	BOOL
FFR01:IA.FieldDevice00.Data.FV1Diagnostics.LocalOverride	0	Decimal	BOOL
FFR01:IA, FieldDevice00, Data, PV1Diagnostics, FaultStateActive	0	Decimal	BOOL
FFR01:IA, FieldDevice00.Data, PV1Diagnostics.GoodCasade IntialFaultState	0	Decimal	BOOL

## Output

This section describes the values on the field device output status screen.

#### Field Device Output Values

#### PVReal1...PVReal8

For a field device that requires an output, the data must be updated in the output image of that field device. If the data type for the connector is set to **Float**, then the data for that connector is read from the real value in the output image.

#### PVInt1...PVInt8

For a field device that requires an output, the data must be updated in the output image of that field device. If the data type for the connector is set to **Integer**, then the data for that connector is read from the integer value in the output image.

#### PVBinary1...PVBinary8

For a field device that requires an output, the data must be updated in the output image of that field device. If the data type for the connector is set to **Boolean**, then the data for that connector is read from the binary value in the output image.

#### PVStatus1...PVStatus8

If the connector for the PV output is set to have a status, you must put a status in the output image that will be sent with the process variable.

PV Status	Status
$PVStatus \geq 0x80$	Green = good
$0x40 \le PVStatus < 0x80$	Orange = uncertain
PVStatus < 0x40	Red = bad

#### Figure 10 - Example of Field Device Output Screen

FFR01:0A.FieldDevice00	()	{}		HT:17
FFR01:0A.FieldDevice00.PVReal1	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal2	0.0		Float	REAL
-FFR01:0A.FieldDevice00.PVReal3	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal4	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal5	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal6	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal7	0.0		Float	REAL
FFR01:0A.FieldDevice00.PVReal8	0.0		Float	REAL
EFFR01:0A.FieldDevice00.PVInt1	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt2	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt3	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt4	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt5	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt6	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt7	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVInt8	0		Decimal	DINT
FFR01:0A.FieldDevice00.PVBinary1	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary2	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary3	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary4	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary5	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary6	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary7	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PVBinary8	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Bad	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Uncertain	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodNonCascade	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodCascade	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_NotLimited	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_LowLimited	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_HighLimited	0		Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Constant	0		Decimal	BOOL
+ FFR01:0A.FieldDevice00.PV1_SubStatus	0		Decimal	SINT

# Diagnostics

## **Status Screen**

The diagnostic status provides basic device data and statistics. Click Status in the config tree to view basic data and statistics for the device.

Overview     Master (16)     Master (16)     Status     Config     O0 EH_TMT85-F400BE04:     A Status     PV Data	Status Status Online Tag EH_TMT85	6-F400C0042B7	Device	45284810CE-F400C004287 TMT85 Endress+Hauser	
Configuration	Foundation Fieldbus Pack	et Statistics			
Advanced Oscilloscope	Good Packets Bad CRC Packets No Replies	16627 0 0	Succes Rati Signal Qualit		
	- Foundation Fieldbus Diagn	ostics			
	Allocated Compel Live Data	True True False			
<					

#### Status

The connectivity status of the linking device.

Value	Description
80100	Good
4179	Uncertain
040	Bad

#### Tag

The tag name that is stored in the field device.

#### Ident

The identity of field device.

#### Device

The field device type.

#### Vendor

The field device vendor.

#### **Good Packets**

The count of good quality reply packets that are received from the field device. (Cyclic Redundant Code [CRC] check passed.)

#### **Bad CRC Packets**

The count of reply packets that are received from the field device that were rejected because the CRC check failed.

#### No Replies

The count of communication request to which the field device did not respond.

#### Success Rate

The rate of good replies to the number of requests for the last 100 requests.

#### **Signal Quality**

Displays the quality of the waveform for the field device by evaluating slew rate, amplitude, distortion, noise, and balance.

Value	Description
033	Bad
3466	Poor
67100	Good

#### Allocated

True if the field device has been allocated a field device index of 00 through 15. If a field device is in the visitor list, it has not been allocated.

#### Compel

True if the field device has been allocated and configured to compel data. The field device is also included in the schedule.

#### Live Data

True if the field device is allocated and configured, and is currently producing live data.

## **PV Data Screen**

If a field device has been configured and scheduled, its scheduled PV values are displayed here. The name of the function block parameter that produces or consumes the data is also displayed.

#### Table 6 - PV Status Colors

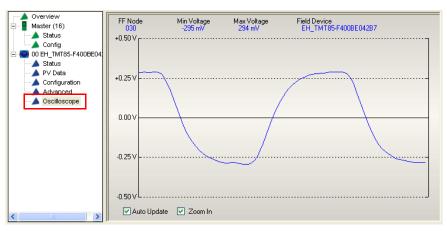
PV Status	Status Color
$PVStatus \ge 0x80$	Green = good
0x40 ≤ PVStatus < 0x80	Orange = uncertain
PVStatus < 0x40	Red = bad

Click PV Data in the config tree to view the PV data for the device.

<ul> <li>Overview</li> </ul>	Propos	s Variables		
🖻 – 🚪 Master (16)				
🛁 Status	PV	Description	Val	Status
Config	<u>In 1</u>	Analog Input->OUT	0.000	Bad::NonSpecific:NotLimited
00 EH_TMT85-F400BE04;	In 2			
A Status	In 3			
A PV Data	In 4			
Configuration	In 5			
Advanced	In 6			
Oscilloscope	In 7			
	In 8			
	Out 1	Input Sel-SIN_1	999 700	Good, Descede: Notinvited:Constant
			333.700	doba_cascadeNotimitted.constant
	Out 7			
	Out 8			
	1			F
1		1		
~				
Oscilloscope	In 7 In 8 Out 1 Out 2 Out 3 Out 4 Out 5 Out 6 Out 7		999.700	Good_Cascade::NotInvited:Constant

## **Oscilloscope Screen**

The last packet received (good or bad) is displayed in the oscilloscope trace. Click Oscilloscope in the config tree to view the last packet that is received for the device.



## **The Web Server**

To view detailed status and diagnostic information for the device in the web server, enter the IP address of the device into the address field of a web browser and press Enter.

POUNDATION FIELDBUS - H1 Master         Main       General         Tag       1788-EN2FFR         Overview       Ident       1788-EN2FFR_3511-6F1F         Network settings       Ident       1788-EN2FFR_3511-6F1F         Network settings       Ident       1788-EN2FFR_3511-6F1F         Node Address       16         Status       Ok         Debug       Logix Owned         P ABus A Enabled       True         P ABus B Enabled       True         P ABus B Tripped       False         P ABus B Tripped       False         P ABus B Tripped       False         P Field Device Index 0       PA Bus B Terminated         Field Device Index 1       Primary Linking Device       True         MacroCycle       1000ms         P ABus A Voitage       24.29 V         P Field Device Index 5       External Voitage       24.29 V         P ABus A Voitage       24.01 V       PA Bus B Current         P ABus B Current       79.20 mA       PA Bus B Current       79.20 mA         P Field Device Index 11       PA Bus B Current       79.20 mA       PA Bus B Current       79.20 mA         P Field Device Index 12       PA Bus B Current       79.20	HIPROM TECHNOLOGIES	1788-EN2FFR	
Home       General         Tag       1788-EN2FFR         Overview       Ident       1788-EN2FFR_3511-6F1F         Network settings       Ident       1788-EN2FFR_3511-6F1F         Network settings       Status       Ok         Debug       Logix Owned       True         P ABus A Enabled       True         P ABus A Enabled       True         P ABus A Enabled       True         P Foundation Fieldbus       PA Bus A Tripped         P Field Device Index 0       PA Bus A Tripped         P Field Device Index 1       Mutti-master Mode         P Field Device Index 2       Primary Linking Device       True         P Field Device Index 3       MacroCycle       1000ms         P Field Device Index 4       External Voltage       26.70 V         P Field Device Index 5       Diagnostics       External Voltage         P Field Device Index 7       PA Bus A Current       0.00 mA         P Field Device Index 11       PA Bus A Current       0.00 mA         P Field Device Index 12       PA Bus A Current       79.20 mA         P Field Device Index 11       PA Bus A Current       5         P Field Device Index 12       PA Bus A Current       5         P Field Device Inde	open all   close all	FOUNDATION FIELDB	US - H1 Master
Tag       1788-EN2FFR         Overview       Ident       1788-EN2FFR_3511-6F1F         Network settings       Node Address       16         Debug       Logic Owned       True         P ABus A Enabled       True       PABus A Enabled         P Foundation Fieldbus       PA Bus B Enabled       True         P Foundation Fieldbus       PA Bus B Tripped       False         P Field Device Index 0       PA Bus B Triminated       True         P Field Device Index 1       PA Bus B Terminated       True         P Field Device Index 2       Primary Linking Device       True         P Field Device Index 3       MacroCycle       1000ms         P Field Device Index 4       PA Bus A Voltage       24.29 V         P Field Device Index 7       PA Bus B Voltage       24.01 V         P Field Device Index 10       PA Bus A Current       0.00 mA         P Field Device Index 11       PA Bus B Voltage       24.01 V         P Field Device Index 12       Internal Temperature       35.75 C         P Field Device Index 13       Retry Limit       5         P Field Device Index 14       Response Timeout       15 ms	3	General	
Ident       1788-EN2FFR_3511-8F1F         Network settings       Ident         Eventlog       Status         Debug       Logix Owned         True       Debug         Debug       Logix Owned         True       PA Bus A Enabled         True       PA Bus A Enabled         Foundation Fieldbus       PA Bus A Tripped         False       PA Bus B Tripped         Field Device Index 0       PA Bus B Terminated         Field Device Index 1       Multi-master Mode         Field Device Index 2       Primary Linking Device         Field Device Index 3       MacroCycle         Field Device Index 4       Diagnostics         Field Device Index 5       Diagnostics         Field Device Index 6       PA Bus A Voltage         Pield Device Index 1       PA Bus A Voltage         Pield Device Index 3       PA Bus A Voltage         Pield Device Index 1       PA Bus A Voltage         Pield Device Index 1       PA Bus A Current         Pield Device Index 11       PA Bus A Current         Piel			1700 ENGER
Note work settings       Node Address       16         Node Address       16         Eventlog       Status       Ok         Debug       Logix Owned       True         P ABus A Enabled       True         P ABus A Enabled       True         P ABus B Enabled       True         P ABus A Enabled       True         P ABus A Tripped       False         P Foundation Fieldbus       P ABus A Tripped         P Field Device Index 0       P ABus A Tripped         Field Device Index 1       Muti-master Mode         P field Device Index 2       Primary Linking Device         P field Device Index 3       MacroCycle         P field Device Index 4       MacroCycle         P field Device Index 5       Diagnostics         P field Device Index 7       P ABus A Voltage         P ABus A Voltage       24.29 V         P Field Device Index 11       P ABus A Voltage         P field Device Index 11       P ABus A Current         P ABus B Current       0.00 mA         P Field Device Index 11       P ABus B Current         P field Device Index 13       Retry Limit         Field Device Index 13       Retry Limit         P field Device Index 13       Re			
Instruct       The status         Eventlog       Status         Debug       Logix Owned         True       PABus A Enabled         Foundation Fieldbus       PA Bus A Enabled         Foundation Fieldbus       PA Bus A Tripped         Field Device Index 0       PA Bus A Tripped         Field Device Index 1       PA Bus A Terminated         Field Device Index 2       Primary Linking Device         Field Device Index 3       MacroCycle         Field Device Index 4       MacroCycle         Field Device Index 5       Diagnostics         Field Device Index 6       External Voltage         PA Bus A Current       0.00 mA         Field Device Index 11       PA Bus A Current         Field Device Index 12       PA Bus A Current         Field Device Index 13       PA Bus A Current         Field Device Index 11       PA Bus A Current         Field Device Index 12       Internal Temperature         Field Device Index 13       Rety Limit         Field Device Index 12       Internal Temperature         Field Device Index 13       Rety Limit         Field Device Index 13       Rety Limit			-
Debug       Logix Owned       True         Debug       Logix Owned       True         PABus A Enabled       True         Poundation Fieldbus       PABus B Enabled       True         PABus B Enabled       True         PABus B Enabled       True         PABus B Tripped       False         PABus B Tripped       False         PABus A Terminated       True         PABus B Terminated       True         Pield Device Index 0       PABus B Terminated         Pield Device Index 1       Multi-master Mode         Pield Device Index 2       Primary Linking Device         Pield Device Index 3       MacroCycle         1000ms       Field Device Index 4         Pield Device Index 5       Diagnostics         Pield Device Index 7       PABus A Voltage         Pield Device Index 7       PABus A Voltage         Pield Device Index 10       PABus A Current         Pield Device Index 11       PABus B Current         Pield Device Index 12       Internal Temperature         35.75 C       Field Device Index 13         Pield Device Index 14       Response Timeout         Pield Device Index 15       Field Device Index 14			
PABus A Enabled       True         PABus A Enabled       True         PABus A Enabled       True         PABus A Enabled       True         PABus A Tripped       False         PABus B Tripped       False         PABus A Terminated       True         PABus B Terminated       True         PABus B Terminated       True         PABus B Terminated       True         Pield Device Index 1       Multi-master Mode       False         Pield Device Index 2       Primary Linking Device       True         Pield Device Index 5       Diagnostics       Diagnostics         Pield Device Index 5       External Voltage       24.01 V         Pield Device Index 8       PABus A Voltage       24.29 V         Pield Device Index 11       PABus B Current       79.20 mA         Pield Device Index 11       PABus B Current       79.20 mA         Pield Device Index 12       Internal Temperature       35.75 C         Pield Device Index 13       Retry Limit       5         Pield Device Index 14			
Ethernet       PA Bus B Enabled       True         Foundation Fieldbus       PA Bus A Tripped       False         PA Bus B Triminated       True         PA Bus B Terminated       True         PA Bus B Terminated       True         PA Bus B Terminated       True         Palse B Tripped       False         Palse B Terminated       True         MacroCycle       1000ms         Field Device Index 5       External Voltage         Palse A Voltage       24.20 V         Palse A Voltage       24.20 V         Palse B Voltage       24.01 V         Palse B Current       0.00 mA         Palse B Current       79.20 mA         Pald Device Index 11       PA Bus B Current </td <td></td> <td>-</td> <td></td>		-	
Foundation Fieldbus       FABus A Tripped       False         PA Bus A Tripped       False         PA Bus A Tripped       False         PA Bus A Terminated       True         Pield Device Index 1       PA Bus A Terminated       True         Pield Device Index 2       Primary Linking Device       True         Pield Device Index 3       Primary Linking Device       True         Pield Device Index 4       Primary Linking Device       True         Pield Device Index 5       Primary Linking Device       True         Pield Device Index 5       Diagnostics       Diagnostics         Pield Device Index 7       PA Bus A Voltage       24.29 V         Pield Device Index 9       PA Bus A Current       0.00 mA         Pield Device Index 11       PA Bus A Current       0.00 mA         Pield Device Index 12       Internal Temperature       35.75 C         Pield Device Index 13       Retry Limit       5         Pield Device Index 14       Response Timeout       15 ms			
PA Bus B Tripped       False         PA Bus B Terminated       True         Multi-master Mode       False         Pield Device Index 2       Primary Linking Device         Field Device Index 4       MacroCycle         Diagnostics       Diagnostics         Pield Device Index 7       PA Bus A Voltage         PA Bus A Voltage       24.29 V         PA Bus A Voltage       24.29 V         PA Bus B Voltage       24.01 V         Pield Device Index 11       PA Bus A Current         PA Bus B Current       79.20 mA         Field Device Index 12       Internal Temperature         Pield Device Index 13       Retry Limit         Pield Device Index 14       Response Timeout         15 ms       Tield Device Index 15		THE COLOR DE LINGSTON	
H1 Master       PA Bus A Terminated       True         Field Device Index 1       PA Bus B Terminated       True         Field Device Index 1       Multi-master Mode       False         Field Device Index 2       Primary Linking Device       True         Field Device Index 3       MacroCycle       1000ms         Field Device Index 4       MacroCycle       1000ms         Field Device Index 5       Diagnostics       1000ms         Field Device Index 6       External Voltage       26.70 V         Field Device Index 7       PA Bus A Voltage       24.29 V         Field Device Index 8       PA Bus A Voltage       24.01 V         Field Device Index 9       PA Bus B Voltage       24.01 V         Field Device Index 11       PA Bus B Current       79.20 mA         Field Device Index 12       Internal Temperature       35.75 C         Field Device Index 13       Retry Limit       5         Field Device Index 14       Response Timeout       15 ms			1 400
<ul> <li>Field Device Index 0</li> <li>Field Device Index 1</li> <li>Field Device Index 2</li> <li>Field Device Index 2</li> <li>Field Device Index 3</li> <li>Field Device Index 4</li> <li>Field Device Index 5</li> <li>Field Device Index 5</li> <li>Field Device Index 6</li> <li>Field Device Index 6</li> <li>Field Device Index 7</li> <li>Field Device Index 8</li> <li>Field Device Index 9</li> <li>Field Device Index 9</li> <li>Field Device Index 9</li> <li>Field Device Index 1000 mA</li> <li>Field Device Index 11</li> <li>Field Device Index 11</li> <li>Field Device Index 12</li> <li>Field Device Index 13</li> <li>Field Device Index 14</li> <li>Field Device Index 15</li> </ul>	H1 Master		
Field Device Index 1       Multi-master Mode       Fielse         Field Device Index 2       Primary Linking Device       True         Field Device Index 3       MacroCycle       1000ms         Field Device Index 5       Diagnostics       Diagnostics         Field Device Index 7       PA Bus A Voltage       24.29 V         Field Device Index 9       PA Bus B Voltage       24.01 V         Field Device Index 11       PA Bus B Current       0.00 mA         Field Device Index 11       PA Bus B Current       79.20 mA         Field Device Index 12       Internal Temperature       35.75 C         Field Device Index 13       Retry Limit       5         Field Device Index 14       Response Timeout       15 ms	Field Device Index 0		
Field Device Index 2       Frield Device Index 3         Field Device Index 3       Frield Device Index 4         Field Device Index 4       MacroCycle         Field Device Index 5       Diagnostics         Field Device Index 7       External Voltage         Field Device Index 8       PA Bus A Voltage         Field Device Index 7       PA Bus A Voltage         Field Device Index 8       PA Bus A Voltage         Field Device Index 10       PA Bus B Voltage         Field Device Index 11       PA Bus B Voltage         Field Device Index 11       PA Bus B Current         Field Device Index 11       PA Bus B Current         Field Device Index 11       PA Bus B Current         Field Device Index 12       Internal Temperature         Field Device Index 13       Retry Limit         Field Device Index 14       Response Timeout         Field Device Index 15       Field Device Index 14			
Field Device Index 3     MacroCycle     1000ms       Field Device Index 4     Field Device Index 5     Diagnostics       Field Device Index 6     External Voltage     26.70 V       Field Device Index 7     Field Device Index 8     PA Bus A Voltage       Field Device Index 8     PA Bus B Voltage     24.29 V       Field Device Index 9     PA Bus B Voltage     24.01 V       Field Device Index 10     PA Bus B Voltage     24.01 V       Field Device Index 11     PA Bus B Current     0.00 mA       Field Device Index 12     Internal Temperature     35.75 C       Field Device Index 13     Retry Limit     5       Field Device Index 14     Response Timeout     15 ms			1 4100
Field Device Index 4     Diagnostics       Field Device Index 5     Field Device Index 6       Field Device Index 7     Field Device Index 7       Field Device Index 8     PABus A Voltage       24.29 V       Field Device Index 9     PABus A Voltage       24.01 V       Field Device Index 10       Field Device Index 11       PABus A Current       0.00 mA       Field Device Index 11       PABus B Current       79.20 mA       Field Device Index 12       Internal Temperature       35.75 C       Field Device Index 13       Field Device Index 14       Retry Limit       5       Field Device Index 15			
Diagnostics       Field Device Index 6       Field Device Index 7       Field Device Index 8       Field Device Index 9       Field Device Index 9       Field Device Index 10       Field Device Index 11       Field Device Index 11       Field Device Index 11       Field Device Index 11       Field Device Index 12       Field Device Index 12       Field Device Index 13       Field Device Index 14       Field Device Index 14       Field Device Index 14       Field Device Index 14       Field Device Index 15		Macrocycle	looons
Field Device Index 7     External Voltage     26.70 V       Field Device Index 7     PA Bus A Voltage     24.29 V       Field Device Index 8     PA Bus B Voltage     24.29 V       Field Device Index 10     PA Bus B Voltage     24.01 V       Field Device Index 11     PA Bus A Current     0.00 mA       Field Device Index 12     Internal Temperature     35.75 C       Field Device Index 13     Retry Limit     5       Field Device Index 15     Field Device Index 15     15 ms	Field Device Index 5	Disgnastics	
Field Device Index 7     FABus A Voltage     24.29 V     Field Device Index 8     PA Bus B Voltage     24.01 V     Field Device Index 10     Field Device Index 11     PA Bus A Current     0.00 mA     Field Device Index 11     PA Bus B Current     Field Device Index 12     Internal Temperature     35.75 C     Field Device Index 13     Retry Limit     5     Field Device Index 14     Response Timeout     15 ms		-	00.701/
Field Device Index 9     PA Bus B Voltage     24.01 V     Field Device Index 10     Field Device Index 11     PA Bus A Current     0.00 mA     Field Device Index 11     PA Bus B Current     79.20 mA     Field Device Index 12     Internal Temperature     35.75 C     Field Device Index 13     Retry Limit     5     Field Device Index 14     Response Timeout     15 ms		-	
Includ Device Index 10     PA Bus A Current     0.00 mA       Field Device Index 11     PA Bus B Current     79.20 mA       Field Device Index 12     Internal Temperature     35.75 C       Field Device Index 13     Retry Limit     5       Field Device Index 14     Response Timeout     15 ms		-	
Field Device Index 11     PA Bus B Current     79.20 mA     Field Device Index 12     Internal Temperature     35.75 C     Field Device Index 13     Retry Limit     5     Field Device Index 14     Response Timeout     15 ms			
Field Device Index 12     Internal Temperature 35.75 C     Field Device Index 13     Retry Limit 5     Field Device Index 14     Response Timeout 15 ms			
Image: Field Device Index 13         Retry Limit         5           Field Device Index 14         Response Timeout         15 ms           Field Device Index 15         Field Device Index 15         15 ms			
Field Device Index 14         Response Timeout         15 ms           Field Device Index 15         Field Device Index 15         15 ms			
Field Device Index 15			-
		Response rimeout	15 ms
Visitor		Copyright © 2011 Hiprom Technologies,	Inc. All Rights Reserved.

# **IMPORTANT** If data is not being updated, turn off page caching or try a different web browser.

## **Device Type Manager (DTM)**

Use the HSThinFrame to open the device DTM in the Studio 5000 Logix Designer application. The DTM is read-only when opened in the Studio 5000 Logix Designer application.

**IMPORTANT** The correct DTM must be installed and the HSProcessUtility DTM Catalog must be updated for the correct DTM to display in the pull-down list.

Follow these steps to open the DTM.

- 1. Click Advanced in the config tree.
- 2. Choose the DD revision from the pull-down list.
- 3. Click Open DTM.

Overview ⊡-∎ Master (16) ▲ Status	Device Vendor	MICROPILOT M Endress+Hauser	DD Revision 3 Dev Revision 5
Config     (10) ABB TZIDC     (01) SC1001     (02) E+H_MICROPI     Status     PV Data     Configuration     Advanced     Oscilloscope	DTM	Open DTM	Micropilot M / FMR 2xx / FF / FW 1.05.zz / Dev.Rev. 5 Micropilot M / FMR 2xx / FF / FW 1.04.zz / Dev.Rev. 4 Micropilot M / FMR 2xx / FF / FW 1.05.zz / Dev.Rev. 5

4. Choose the device information that you want to view.

🔺 HSThinFrameEx Ver 1.17 - Sele 🕂 🖃 🔳 🔀
Online
Offline
Configuration
Observe
Diagnosis

5. View the selected device information.

HSThinFrameEx Ver 1.17 - Micropilot M / FMR 2xx / FF / FW 1.05.zz / Dev nguage			0 3 -
			_
DeviceType: Micropilot M / FMR 2xx / FF / V5.xx Device Revision: 5	measured value: 0.0	%	
Device ID: 0x100P PD Tag: Status signal 🔥 Out of Specification	measured dist.: 40.000	m	
Some star (1) on a shore room.			
Instrument Health Status			
🕆 Failure			
W Function Check			
<ul> <li>A Out of Specification</li> </ul>			
<ul> <li>no usable echo channel 1 check calibr. E641</li> </ul>			
Cause: echo lost due to application conditions or			
buildup on probe Remedy: check basic setup;			
clean probe (see Operating Instructions, Troubleshooting)			
Maintenance Required			

# **Linking Device Display Status**

The display of the linking device provides status and diagnostic data in one of three page formats: main page, H1 master page, or field device page. Use the display Page button behind the front cover to scroll through the pages (see <u>Figure 8 on page 46</u> for location of the Page button).

## **Main Page**

The main page is the default display, and the linking device returns to this page after 10 seconds.

H1Bus A/B: Displays the bus voltages on each port.

**IP:** Displays the current IP address or BOOTP if enabled.

**STS:** Displays the status (see <u>Table 7</u>).

#### Table 7 - STS Status Descriptions

Status	Description
Ok	No events
New device found	New device on the bus
Redundancy ok	Masters are synchronized
Redundancy err	Masters out of sync
Bus A Tripped	Bus A over current trip
Bus B Tripped	Bus B over current trip
SAFE MODE	linking device set to Safe mode

H1 Bus A: 24.4V B:24.7V
IP: 192.168.1.203
STS: Ok
<u>00</u> → >
01 → >>>
02 → >>
03 → XXX
04 → ???
05 → OOS
$06 \rightarrow Off$
07 → Err

The lower portion of the main page shows the communication quality to each field device as the percentage of data packets sent compared to data packets received for each field device index (see <u>Table 8</u>).

#### **Table 8 - Field Device Communication Quality**

Display	<b>Communication Quality</b>
>>>	95+
>>	80+
>	60+
XXX	Below 60

Display	Communication Quality
???	Unknown
005	Allocated, On-line, not Compelling Data
Off	Allocated, Off-line
Err	Allocated, On-line, not producing Compelled Data

H1 Master Page	Page button is	that is accessed by the the H1 Master page. plays the bus voltages,	H1 Master Bus A: 21.5V 36.7mA Bus B: 21.7V 20.7mA
	-	: Displays the internal	Temperature: 34.50 C External Pwr: 23.29V FF Node: 16 Bus A Enabled: True
	-	f the linking device. : Displays the power	Bus B Enabled: True Bus A Tripped: False
	supply voltage		Bus B Tripped: False Bus A Term: True Bus B Term: True
		splays the H1 node e master (default 16).	
	BusA/B Enat	bled: H1 Bus A or H1 Bus I	B is enabled for communication.
		<b>ped:</b> H1 Bus A or H1 Bus I nt on either port.	3 has tripped indicating that there was
	<b>BusA/B Tern</b> Bus B.	<b>n:</b> The linking device is con	figured to terminate H1 Bus A or H1
Field Device Page		F Field Device pages tus of each of the field	FF Field Device - 0 FF Node: 1A Device Tag Name
	<b>FF Node:</b> Dis address.	splays the H1 node	Status: Online Success: 100 Pckt Send: 22409
	<b>Device Tag N</b> the device.	a <b>me:</b> The tag name of	Pckt Recv: 22209 Bad CRC: 98 No Reply: 102
	<b>Status:</b> Displa (see <u>Table 9</u> .)	ays the field device status	Signal Quality: 87
	Table 9 - Field De	vice Status	
	Status	Description	
	Not Connected	Device cannot be seen	
	Online	Online - not configured	
	ConfigRunning	Device is configured and running	

**Success:** Displays the data packets that are received as a percentage of packets that are sent for the previous 100 packets.

**Pckt Send:** Displays the total number of data packets that are sent from the field device.

**Pckt Recv:** Displays the total number of data packets that are received from the field device.

Bad CRC: Displays the total number of bad CRC packets received.

**No Reply:** Displays the total number of data requests to which the field device did not respond.

**Signal Quality:** Displays the quality of the waveform for the field device by evaluating slew rate, amplitude, distortion, noise, and balance.

Value	Description
033	Bad
3466	Poor
67100	Good

## Notes:

# **HSProcessUtility**

# Use the HSProcessUtility

Follow these steps to use the HSProcessUtility to add a device description to a field device.

- 1. Click the HSProcessUtility icon in the AOP and click Launch HSProcessUtility.
  - **TIP** You can also click the refresh catalog option to refresh the device catalog once a DD file has been added.



The HSProcessUtility opens. Because the same utility is used to register GSD files (PROFIBUS PA) and DTMs, these options are still in the menu bar.

- 2. Select the FOUNDATION Fieldbus option and choose Add Device Description. Three files are required to update the library:
  - Binary file (.ffo)
  - Symbol file (.sym)
  - Capability file (.cff)

**3.** Select the binary file, the appropriate symbol file, and the correct version of the capability file.

+ 📥	ISProcessUt	ility 1.19							×
File	Profibus-PA	Foundation Fiel	dbus DTM						
F	oundation Fiel	dbus							
	Mar	nufacturer	Device D	eviceID	Rev DDRev	· CF	F Path		HDD Path
	0 Rosemou	🔺 Register D	evice Descripti	ion					<u> </u>
	1 Rosemour 2 Rosemour	C Select Files							
-	3 Endress+ł 4 Endress+ł	Binary File (.f	fo)						
	- Linalotte I	C:\Docume	nts and Settings\g	gdprocto\h	ly Documents\	Hiprom\FF\D	DR Files\E&	HiTemp85\0	D104.f
		Symbol File (	.sym)						
		C:\Docume	nts and Settings\g	gdprocto\/\	ly Documents\	Hiprom\FF\D	DR Files\E&	HiTemp85\0	0104
		Capability File	e (.cff)						
		C:\Docume	nts and Settings\g	gdprocto\N	ly Documents\	Hiprom\FF\D	DR Files\E&	HiTemp85\0	01010
		– Details –––							
		Manufacti	arer Endress+	Hauser		De	evice ID	0x10CE	
		Device	TMT85				evice Rev	1	
						DE	) Rev	4	
					Ok	Cano	cel		

A new file is generated and the library directory is updated.

H	SProcessUtility 1.19							3
ile Profibus-PA Foundation Fieldbus DTM								
Fou	undation Fieldbus							
	Manufacturer	Device	DeviceID	Rev	DDRev	CFF Path	HDD Path	•
	Endress+Hauser	TMT162	0x10CC	1	2	452B48\10CC\010103.cff	452B48\10CC\0102.hd	
0	Endress+Hauser	TMT85	0x10CE	1	3	452B48\10CE\010103.cff	452B48\10CE\0103.hd	Г
2	Endress+Hauser	TMT85	0x10CE	1	4	452B48\10CE\010105.cff	452B48\10CE\0104.hd	
3	Endress+Hauser	Deltabar S	0x1009	6	3	452B48\1009\060104.cff	452B48\1009\0603.hdc	
4	Endress+Hauser	Prowirl 73	0x1057	1	1	452B48\1057\010101.cff	452B48\1057\0101.hdc	
5	Metso Automation Inc.	ND9000F	0x2328	3	1	000E05\2328\030102.cff	000E05\2328\0301.hdc	
E	SMAR	TT302	0x0002	6	1	000302\0002\060101.cff	000302\0002\0601.hdc	

**TIP** Before the field device can be configured in the AOP, the catalog must be refreshed.

4. Click the HSProcessUtility icon and choose Refresh Catalog.

	Launch HSProcessUtility	
00	Refresh Catalog	

**5.** Install the device DTMs from the vendors, then go to the DTM tab in HSProcessUtility and click Update Catalog.

👍 н	SProcessUt	ility 1.19		
File	Profibus-PA	Foundation Fieldbus	DTM	
			Update Catalog	
		-	View Catalog	
			DTM Viewer	

## Notes:

## **Field Device Block Configuration Examples**

## **Overview**

This appendix provides examples of how to use field bus output devices with the linking device.

Each example starts from an empty live list, adds the device to the network, and configures an analog output (AO) or discreet output (DO) function.

The purpose of these examples is to place the AO or DO function block in the Cas mode, so the values entered in CAS\_IN are processed into the SET\_POINT value.

See <u>Field Device Block Configuration on page 36</u> for general field device block configuration information.

#### Figure 11 - Empty Live List

Module Properties: ENBT (1788-	I Module Properties: ENBT (1788-EN2FFR 2.1)					
General Connection Module Info	Configuration Internet Protocol Port Configuration Ne	twork Vendor				
Online 1.01.10		0				
Overview 	00	08				
Status	01	09				
	02	10				
	03	11				
	04	12				
	05	13				
	06	14				
	07	15				
	v	V				
	v	V				
	×	V				
	×	V				
	] ,	,				
Status: Running	(	OK Cancel Apply Help				

## **AO Function Block Example**

This example describes the steps that are used to configure an AO function block for the linking device. The linking device tag name in this example is SMAR FI302.

1. Add the linking device to the field bus network.

Module Properties: ENBT (1788-	EN2FFR 2.1)	
General Connection Module Info	Configuration Internet Protocol Port Configuration Network	vork Vendor
Online 1.01.10		
Overview	00 25 FI302 FBUS Only_3743 0003020005:SMAR-FI302:0063400	08
Status	01	09
Coming	02	10
	03	11
	04	12
	05	13
	06	14
	07	15
	V	v
	v	V
	v	V
	v	V
	]]	
Status: Running		OK Cancel Apply Help

2. Right-click the linking device and choose Auto Configure Online.

Module Properties: ENBT (1788- 1000)	EN2FFR 2.1)		
General Connection Module Info	Configuration Internet Protoco	ol Port Configuration Network Vendor	]
Online 1.01.10			
Overview	00 25 FI302 FBUS	Add New	
Status	01	Configure	
Config	02	Auto Configure Online	
	03	Advanced Confguration	
	03	Oscilloscope	
	04		
	05	Сору	
	06	Paste	
	07	Remove	
	V	Set H1 Node Address	
	V	Set H1 Physical Tag	
	V	Merge Online and Offline	
	V		
		Mapping Report	
		Export Device	
		Import Device	
Status: Running		OK Cancel Apply	Help

Module Properties: ENBT (1788-EN2FFR 2.1)     General Connection Module Info Configuration Internet Protocol   Port Configuration	Network Vendor
Tag FI302 FBUS Only_3743         Ident 0003020005.SMAR-FI302           FI302 FB_Res2         FI302 FB_Tran2         FI302 FB_Tran3         FI302 FB_Tran3           FI302 FB_Res2         FI302 FB_Tran2         FI302 FB_Tran3         FI302 FB_Tran3         FI302 FB_Tran3           FI302 FB_Arat2         Analog Output         Output         PVILI           So Online         CAS IN         PVILI	
	, * Close
Status: Running	OK Cancel Apply Help

3. Click the Go Online button.

4. Right-click the resource function block and choose Parameters.

Verify that the correct DD files were enabled.

- 5. Scroll down to Index rows 10, 11, 12, and 13.
- 6. Check the En column for Index rows 10, 11, 12, and 13.

A green check displays in the box.

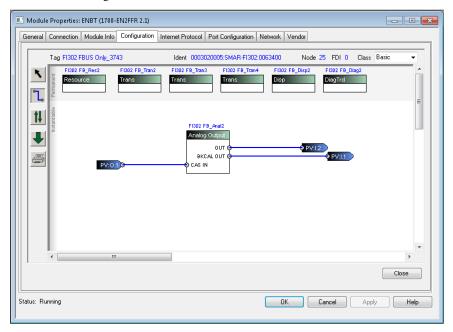
Tag	FI302 FBUS C	Ident Ident	0003020005:SMAR-F1302:0063400 Node	25 FDI 0 Class Basic -
Paramet	ters			En All Dis All
En Index	Class	Parameter	Value	Live
🗵 8.7	0	VALUE_7	0	
🗵 8.8	0	VALUE_8	0.0	
🗵 8.9	0	VALUE_9		
🗵 8.10	0	VALUE_10		
🗵 8.11	C	VALUE_11	00/00/00 00:00:00000	
🗵 8.12	C	VALUE_12	0 days 0 ms	
🗵 8.13	0	VALUE_13	0 days 0 ms	
🗵 8.14	0	VALUE_14	100000000000000000000000000000000000000	
🗵 8.15	0	VALUE_15	0 ms	
× 9	C 🕖	DD_RESOURCE		
✓ 10	© 🗡	MANUFAC_ID	0	770
✓ 11	© 🗡	DEV_TYPE	0	5
✓ 12	© 🗡	DEV_REV	0	4
✓ 13	© 🗲	DD_REV	0	2
× 14	C	GRANT_DENY		
🗵 14.1	0	GRANT	-	-
🗵 14.2	0	DENY	-	-
🗵 15	C 🗲	HARD_TYPES	-	
🖂 16	0	RESTART	Uninitialized	
区 17	C 🗲	FEATURES	-	
Less 1 1				

7. Verify that the Dev\_Rev and DD\_REV in the Parameters screen matches the Rev and DDRev revisions in the HSProcessUtility (compare Figure and Figure 7).

	Profibus-PA Founda	tion Fieldbus	DTM				
ou	ndation Fieldbus						
_	Manufacturer	Device	DeviceID	Rev	DDRev	CFF Path	HDD Path
0	SMAR	FI302	0x0005	4	2	000302\0005\040201.cff	000302\0005\0402.hdc
1	SMAR	IF302	0x0003	4	2	000302\0003\040201.cff	000302\0003\0402.hdc
2	SMAR	LD 302	0x0001	4	2	000302\0001\040201.cff	000302\0001\0402.hdc
3	SMAR	TT302	0x0002	4	2	000302\0002\040201.cff	000302\0002\0402.hdc
4	Rosemount Inc.	3051	0x3051	7	2	001151\3051\070201.cff	001151\3051\0702.hdc
5	Rosemount Inc.	848	0x0848	5	9	001151\0848\050502.cff	001151\0848\0509.hdc
6	Rosemount Inc.	644	0x0644	2	1	001151\0644\020101.cff	001151\0644\0201.hdc
7	VEGA	'EGAPULS 6	0x0BFD	5	1	564748\08FD\050101.cff	564748\08FD\0501.hd
8	Yokogawa Electric	EJX	0x000C	3	3	594543\000C\030102.cff	594543\000C\0303.hdc
9	Rosemount Inc.	848	0x0848	4	9	001151\0848\040906.cff	001151\0848\0409.hdc
10	StoneL	screte and Ar	0x00F2	2	1	005774\00F2\020101.cff	005774\00F2\0201.hdc
11	Rosemount Inc.	8732	0x8732	2	1	001151\8732\020101.cff	001151\8732\0201.hdc
12	WTVC	.OCK DISCRI	0x0001	1	1	574343\0001\010101.cff	574343\0001\0101.hdc
13	Rosemount Inc.	848	0x0848	6	1	001151\0848\060101.cff	001151\0848\0601.hdc
14	Rosemount Inc.	3051	0x3051	23	17	001151\3051\170309.cff	001151\3051\1711.hdc
15	Endress+Hauser	Cerabar S	0x1007	6	3	452B48\1007\060104.cff	452B48\1007\0603.hdc
16	Endress+Hauser	Cerabar S	0x1007	2	1	452B48\1007\020101.CFF	452B48\1007\0201.hdc
	Endress+Hauser	Cerabar S	0x1007	6	1	452B48\1007\060101.cff	452B48\1007\0601.hdc
18	Endress+Hauser	TMT162	0x10CC	1	2	452B48\10CC\010103.cff	452B48\10CC\0102.hd
19	Endress+Hauser	Prowirl 73	0x1057	1	1	452B48\1057\010102.cff	452B48\1057\0101.hdc
2ſ ∙	Endress+Hauser	Cerahar S	0v1007	5	1	452848\1007\050102 cff	452B48\1007\0501.bdr

8. Use the tools in the Configuration screen to build the configuration as shown in Figure.

See <u>Field Device Block Configuration on page 36</u> for general field device block configuration information.

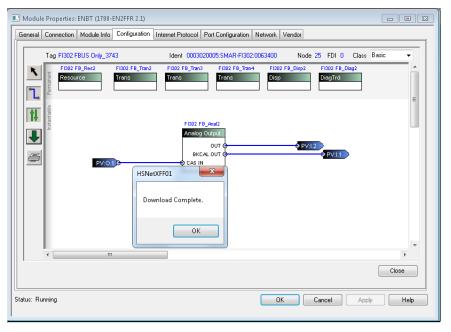


**9.** Click the download button to download the AO function block to the linking device.

Ī	🛛 Mo	dul	e Prop	oerties: EN	VBT (17	88-EN2	2FFR 2.:	L)													- (	
	Gene	ral	Conn	ection N	lodule Ir	nfo Co	onfigural	tion In	iternet	Protocol	Port (	Configurat	ion Ne	etwork	Vendo	ſ						
			Tag	FI302 FBI	JS Only	3743			Ide	ent 0003	020005	SMAR-F	1302:00	63400	٩	lode :	25 FD	0	Class	Basic		-
		۲	Permanent	FI302 FB_ Resource	_	_	802 FB_T ans	iran2	F130 Trai	02 FB_Tran NS		FI302 FB_ Trans	Tran4	FI302 Disp	FB_Dis	:p2	F1302 DiagT		g2			
	1	1	instantiable							_	FB_Anal g Outpu	_										
D	ownic	ad	Devic	e	PV	0.10					OU CAL OU	ī ģ				PV:1.2		1.1				
			 ∢ [	_	_	III	_	_													ŀ	•
																					Close	
	Status:	Ru	unning										(	Oł	<	(	Cancel		Appl	y	H	elp

The download operation completes without errors.

### 10. Click OK.



- **11.** Click the Go Online button.
- 12. Right-click the Analog Output function block.
- 13. Choose Parameters.

Module Properties: ENBT (1788-EN2FFR 2.1)	• ×
General Connection Module Info Configuration Internet Protocol Port Configuration Network Vendor	
Tag FI302 FBUS Only_3743 Ident 0003020005:SMAR-FI302:0063400 Node 25 FDI 0 Class Basic	-
Fi302 F8_Res2         Fi302 F8_Tran2         Fi302 F8_Tran3         Fi302 F8_Tran4         Fi302 F8_Disp2         Fi302 F8_Disp2           Trans         Trans         Trans         Disp         DisgTrd	
FIO2 F8_Anal2 Analos Parameters 6.51 16.70	
15.70 BK0 Delete PV.12 15.70 PV.0.1 3 15.70 CAS IN	
<	
Close	e
Status: Running OK Cancel Apply	Help

### The linking device parameters are displayed.

						_
Tag F	1302 F	BUS	Dnly_3743 Ident	0003020005:SMAR-FI302:0063400	Node 25 FDI 0 Class Basic 👻	
Paramete	ers				En All Dis All	X
En Index	Cla	ISS	Parameter	Value	Live	-
× 1	C	1	ST_REV	0		
2	0		TAG_DESC	FI302 FB_Anal2	F1302 FB_Anal2	_
× 3	C		STRATEGY	0		
× 4	C		ALERT_KEY	0		
✓ 5	C		MODE_BLK			
5.1	C		TARGET	005	005	
5.2	C	1	ACTUAL	Auto	005	
5.3	C		PERMITTED	Auto + 00S	Auto + OOS	
5.4	C		NORMAL	Auto	Auto	
⊠ 6	C	F	BLOCK_ERR	· ·		
⊠ 7	C		PV			
🗵 7.1	C	1	STATUS	Bad::NonSpecific:NotLimited	Bad::NonSpecific:NotLimited	
区 7.2	C	1	VALUE	0.0	15.70000	
× 8	C		SP			
🗵 8.1	C		STATUS	Bad::NonSpecific:NotLimited	<pre>scade::InitializationAcknowledge:N</pre>	
🗵 8.2	C		VALUE	0.0	15.70000	
<b>√</b> 9	•		DUT 0UT			
9.1	•		STATUS	Bad::NonSpecific:NotLimited	Bad::OutOfService:NotLimited	
9.2	•		VALUE	0.0	20.00000	
🗵 10	C		SIMULATE			•

- 14. Under MODE\_BLK > PERMITTED, right-click the Value column and select Cas.
- **15.** Click OK to add the Cas mode.

	erties: ENBT ection Modu	(1788-EN2FFR 2.1) Ile Info Configuration Internet Protoco	I Port Configuration Network Vendor	
Tag F	FI302 FBUS C	0nly_3743 Ident 000	3020005:SMAR-F1302:0063400 N	ode 25 FDI 0 Class Basic 🔻
Paramete	ers			En All Dis All X
En Index	Class	Parameter	Value	Live
⊠ 1	© 🗡	ST_REV	0	
✓ 2	0	TAG_DESC	FI302 FB_Anal2	FI302 FB_Anal2
× 3	C	STRATEGY	0	
× 4	C	ALERT_KEY	0	
✓ 5	0	MODE_BLK		
5.1	0	TARGET	Auto	Auto
5.2	© 🗲	ACTUAL	Auto	Auto
5.3	0	PERMITTED		Auto + 00S
5.4	0	NORMAL		Auto
× 6	C 🗲	BLOCK_ERR	✓ Cas	E
× 7	C	PV	Man	
⊠ 7.1	C 🖌	STATUS	Bad: LO	I::NonSpecific:NotLimited
⊠ 7.2	C 🕖	VALUE		15.70000
× 8	C	SP	OK Cano	cel
🗵 8.1	C	STATUS	Badtreonopeemetreotennee	peage. InitializationAcknowledge:N
🗵 8.2	C	VALUE	0.0	15.70000
<b>√</b> 9	•	) OUT		
✓ 9.1	•	STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit
9.2	•	VALUE	0.0	6.51200
× 10	C	SIMULATE		-
10	C	SIMULATE		l [_
tus: Running			OK	Cancel Apply Help

- Under MODE\_BLK > TARGET, right-click the Value column and select Cas and Auto.
- 17. Click OK to add the Cas+Auto mode.

				ly_3743 Ident 0003	020005:SMAR-F1302:0063400	Node 25 FDI 0 Class Basic -
Paramete			_			En All Dis All 🛛
En Index	Cla	388		Parameter	Value	Live
× 1	C	1		ST_REV	0	
2	0			TAG_DESC	FI302 FB_Anal2	FI302 FB_Anal2
× 3	C			STRATEGY	0	
× 4	C			ALERT_KEY	0	
✓ 5	0			MODE_BLK		
5.1	C			TARGET	Auto BOut	Auto
✓ 5.2	C	¥		ACTUAL	Auto	
5.3	C			PERMITTED	Cas + Auto + UU	≡ 00S
5.4	C			NORMAL	Auto 🗸 Auto	
🗵 6	C	1		BLOCK_ERR	- Man	-
× 7	C			PV		
🗵 7.1	C	F		STATUS		K Cancel NotLimited
⊠ 7.2	C	1		VALUE	0.0	10.1000
× 8	C			SP		
🗵 8.1	C			STATUS	Bad::NonSpecific:NotLimited	<pre>scade::InitializationAcknowledge:N</pre>
🔀 8.2	C			VALUE	0.0	15.70000
<b>V</b> 9	•		0			
9.1	•			STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit
9.2	•			VALUE	0.0	6.51200
× 10	C			SIMULATE		

 Verify that the MODE\_BLK > TARGET value is Cas + Auto and the MODE\_BLK > ACTUAL value is Auto.

Tay	F1302 FE	05.0	nly_3743 Ident (	0003020005:SMAR-FI302:0063400	Node 25 FDI 0 Class Basic 👻
Paramet	ers				En All Dis All >
En Index	Clas	s	Parameter	Value	Live
× 1		1	ST_REV	0	
✓ 2	C		TAG_DESC	FI302 FB_Anal2	FI302 FB_Anal2
× 3	C		STRATEGY	0	
⊠ 4	C		ALERT_KEY	0	
<b>√</b> 5	C		MODE_BLK		
5.1	C		TARGET	Cas + Auto	Cas + Auto
5.2	C	1	ACTUAL	Auto	Auto
5.3	C		PERMITTED	Cas + Auto + UUS	Cas + Auto + OOS
5.4	C		NORMAL	Auto	Auto
⊠ 6	C	F	BLOCK_ERR	·	
⊠ 7	C		PV		
🗵 7.1		1	STATUS	Bad::NonSpecific:NotLimited	Bad::NonSpecific:NotLimited
🗵 7.2		£	VALUE	0.0	15.70000
⊠ 8	C		SP		
🗵 8.1	C		STATUS	Bad::NonSpecific:NotLimited	<pre>:cade::InitializationAcknowledge:N</pre>
🔀 8.2	C		VALUE	0.0	15.70000
<b>√</b> 9	•	C	OUT		
✓ 9.1	•	_	STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit
<b>√</b> 9.2	•	_	VALUE	0.0	6.51200
🗵 10	C		SIMULATE		

- **19.** In the parameter screen, scroll down to parameters CAS\_IN and BKCAL\_OUT.
- **20.** Verify that the BKCAL\_OUT > STATUS in the Live column indicates a NotInvited condition.

Before the output control loop can be initialized, the NotInvited condition must be cleared.

_			00.	5 011	ly_3743 Ident 000	3020005:SMAR-FI302:0063400 No	ode 25 FDI 0	Class Ba		•
Ρ	aramete	ers						En All	Dis All	X
En	Index	CI	ass		Parameter	Value		Live		Т
X	16.2	C	1		VALUE	0.0				
$\checkmark$	17	•			CAS_IN					
$\checkmark$	17.1	-			STATUS	Good Cascade::NonSpecific:NotLimited	cade::Initializ	ationAck	nowledge:l	N
$\checkmark$	17.2	-			VALUE	0.0	1	5.70000		
X	18	C			SP_RATE_DN	0.0				Г
X	19	C			SP_RATE_UP	0.0				T
X	20	C			SP_HI_LIM	0.0				
X	21	C			SP_LO_LIM	0.0				
$\checkmark$	22	C			CHANNEL	1		1		
X	23	C			FSTATE_TIME	0.0				
X	24	C			FSTATE_VAL	0.0				
$\checkmark$	25			0	BKCAL OUT					
$\checkmark$	25.1	•	1		STATUS	Bad.NonSpecific.NotLin	ood Cascade::	NotInvite:	d:NotLimit	ε
$\checkmark$	25.2	•	1		VALUE	0.0	1	5.70000		
X	26	C			RCAS_IN					Τ-
X	26.1	C			STATUS	Bad::NonSpecific:NotLimited				
X	26.2	C			VALUE	0.0				
X	27	C			SHED_OPT	Uninitialized				
X	28	C			RCAS_OUT					T
X	28.1	C	1		STATUS	Bad::NonSpecific:NotLimited				
X	28.1	C	1		STATUS	Bad::NonSpecific:NotLimited				

**21.** Set the value of the controller tag that is associated with the quality of CAS\_IN (connector PV:O.1) status parameter (PVx\_GoodCascade) to the value 1.

FFR01:0A.FieldDevice00.PV1_Bad	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Uncertain	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodNonCascade	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_GoodCascade	1	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_NotLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_LowLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_HighLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_Constant	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_SubStatus	0	Decimal	SINT

**22.** Verify that the NotInvited status has been replaced by the new status, InitializationRequest.

vlodule Prope	erties: I	ENB"	Г (1	788-EN2FFR 2.1)		
eneral Conne	ection	Мос	lule	Info Configuration Internet Protocol	Port Configuration Network Vendo	r.
Tag F	1302 FI	BUS	Onļ	y_3743 Ident 0003	8020005:SMAR-FI302:0063400 N	lode 25 FDI 0 Class Basic 👻
Paramete	ers					En All Dis All X
En Index	Cla	ISS		Parameter	Value	Live 🔺
🗵 16.2	C	1		VALUE	0.0	
17	-			CAS_IN		
17.1	-			STATUS		d od Cascade::NonSpecific:NotLimit
17.2	-			VALUE	0.0	0.0
🗵 18	C			SP_RATE_DN	0.0	
× 19	C			SP_RATE_UP	0.0	
× 20	C			SP_HI_LIM	0.0	
× 21	C			SP_LO_LIM	0.0	
22	C	_	_	CHANNEL	1	1
23	C	_		FSTATE_TIME	0.0	
24	C			FSTATE_VAL	0.0	
25	•	1	9	RKCAL OUT	De la Marco de Martin	
<ul> <li>✓ 25.1</li> <li>✓ 25.2</li> </ul>		1	4	STATUS	bddronopeene.rrotein	Cascade::InitializationRequest:No
25.2	(C)	/	-	VALUE DCAC IN	0.0	15.70000
× 26 × 26.1	C	-		RCAS_IN STATUS	Bad::NonSpecific:NotLimited	
26.1	C	-		VALUE	0.0	
× 26.2	C	-		SHED_OPT	Uninitialized	
× 27	C			RCAS_OUT	Uninitialized	
× 28.1	C	1		STATUS	Bad::NonSpecific:NotLimited	
	1.000					
us: Running					ОК	Cancel Apply Help
FFRO	1:0A.F	ieldD	evi	ce00.PV1_Bad	0	Decimal BOOL
FFR0	1:0A.F	ieldD	evi	ce00.PV1 Uncertain	0	Decimal BOOL
				ce00.PV1 GoodNonCascade	0	Decimal BOOL
				ce00.PV1_GoodCascade	1	Decimal BOOL
				ce00.PV1_NotLimited	0	Decimal BOOL
FFRO	1:0A.F	ieldD	evi	e00.PV1 LowLimited	0	Decimal BOOL

The InitializationRequested must receive a response.

**23.** Set the value of the Controller Tag associated with the substatus of CAS\_IN (connector PV:O.1) status parameter (PV1\_SubStatus) to the value 1, which is InitializationAcknowledge.

The InitializationRequested status in BKCAL\_OUT > STATUS > Live column is cleared and replaced by the value, NonSpecific.

Module Properties: ENBT (1788-EN2FFR 2.1) - • • General Connection Module Info Configuration Internet Protocol Port Configuration Network Vendor Tag FI302 FBUS Only\_3743 Ident 0003020005:SMAR-FI302:0063400 Node 25 FDI 0 Class Basic En All Dis All X 
 En Index.

 ⊠ 16.2

 ✓ 17.1

 ✓ 17.2

 ⊠ 18

 ⊠ 19

 ⊠ 20

 ⊠ 21

 ✓ 22

 ≅ 23

 ≅ 24

 ✓ 25.1

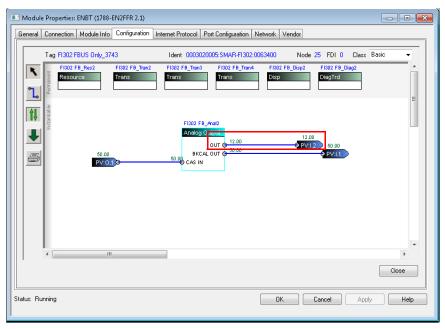
 ✓ 25.2
 Class Parameter Value Live VALUE 0.0 수 수 수 CAS\_IN CAS IN STATUS VALUE SP\_RATE\_DN SP\_RATE\_UP SP\_HI\_LIM SP\_LO\_LIM CHANNEL FSTATE\_TIME FSTATE\_TIME FSTATE\_VAL BKCAL OUT cade::InitializationAcknowledge:N 0.0 0.0 C 0.0 0.0 0.0 1 0.0 S BKCAL OUT STATUS VALUE onSpec 0.0 0.0 25.2
 26.1
 26.2
 26.2
 27
 28
 28.1 RCAS\_IN STATUS VALUE Bad::NonSpecific:NotLimited C 0.0 SHED\_OPT Uninitialized RCAS\_OUT C STATUS Bad::NonSpecific:NotLimited -Status: Running Help OK Cancel Apply FFR01:0A.FieldDevice00.PV1\_Bad 0 BOOL Decimal FFR01:0A.FieldDevice00.PV1\_Uncertain BOOL Decimal 0 FFR01:0A.FieldDevice00.PV1\_GoodNonCascade BOOL 0 Decimal FFR01:0A.FieldDevice00.PV1\_GoodCascade Decimal BOOL 1 FFR01:0A.FieldDevice00.PV1\_NotLimited Decimal BOOL 0 FFR01:0A.FieldDevice00.PV1\_LowLimited 0 Decimal BOOL FFR01:0A.FieldDevice00.PV1\_HighLimited 0 Decimal BOOL FFR01:0A.FieldDevice00.PV1 Constant BOOL 0 Decimal + FFR01:0A.FieldDevice00.PV1\_SubStatus 1 Decimal SINT

The CAS\_IN > STATUS > Live column displays a status of InitializationAcknowledge.

**24.** Verify that the AO function block MODE\_BLK > ACTUAL > Live column displays Cas.

	_	_	_	_	ly_3743 Ident 000:			-
	ramet					-	En All Dis All	×
	Index		ass		Parameter	Value	Live	
	3	C			STRATEGY	0		
	4	C			ALERT_KEY	0		H
	5	C			MODE_BLK			L
	5.1	C			TARGET	Cas + Auto	Cas + Auto	
	5.2	C	1		ACTUAL	Auto	Cas	
	5.3	C			PERMITTED	Cas + Auto + OOS	Cas + Auto + 00S	
	5.4	C			NORMAL	Auto	Auto	
	6	C	1		BLOCK_ERR	•		
	7	C			PV			
	7.1	C	1		STATUS	Bad::NonSpecific:NotLimited	Bad::NonSpecific:NotLimited	
10-04	7.2	C	1		VALUE	0.0	15.70000	
	8	C			SP			
	8.1	C			STATUS	Bad::NonSpecific:NotLimited	cade::InitializationAcknowledge:N	
	8.2	C			VALUE	0.0	15.70000	
	9	•		O	OUT			
	9.1	•			STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit	
	9.2 10	(C)			VALUE	0.0	4.00000	
	10.1	C				Design of the Second Second Second Second		
	10.1	C			SIMULATE_STATUS SIMULATE_VALUE	Bad::NonSpecific:NotLimited 0.0		
X	10.2	C			SIMULATE_VALUE	0.0		Ľ

- 25. Set the CAS\_IN (PV:O.1) value to 50%.
- **26.** Verify that the BKCAL\_OUT (PV:I.1) and OUT (PV:I.2) values change as required (50% equals 12 mA at the OUT parameter).



The AO function block is now created, initialized, and operating correctly.

## **DO Function Block Example**

This example describes the how to configure a DO function block for the linking device. The device that is used in this example is FPAC\_2.

1. Add the linking device to the field bus network.

Module Properties: ENBT (1788-	EN2FFR 2.1)	
General Connection Module Info	Configuration Internet Protocol Port Configuration Net	work Vendor
Online 1.01.10		
Overview	00 27 FPAC_2 5743430001VVestlock A00000370	08
Status	01	09
	02	10
	03	11
	04	12
	05	13
	06	14
	07	15
	×	V
	V	V
	V	V
	×	V
	,	,
Status: Running		OK Cancel Apply Help

2. Add a DO function block to the configuration.

] Modul General	e Properties: E Connection		· · · · · · · · · · · · · · · · · · ·	ernet Proto	col Port Configuratio	n Net	work Vend	or				
۲ ۲	Tag FPAC_2	Res2	FPAC_2_Disc2 Discrete Xducer	Ident 5	i743430001Westlock	A0000	00370	Node 27	FDI 0	Class	Basic	•
	Instantiable				FPAC_2_Disc3 Discrete Output OUT D ( BKCAL OUT D ( CAS IN D	•						II
		Π	1								C	r Nose
atus: Ru	unning					C	OK	Can	cel	Appl	y	Help



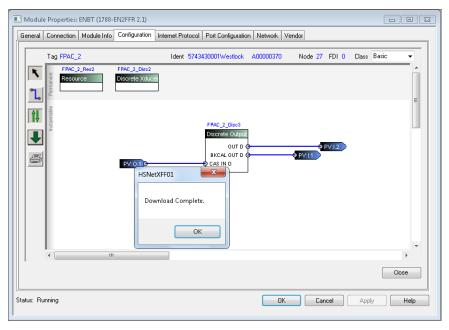
You can delete other function blocks and connections.

- 3. Make connections to CAS\_IN\_D, OUT\_D, and BKCAL\_OUT\_D.
- **4.** Click the Download button to download the DO function block to the linking device.

Module Properties: ENBT (1788-EN2FFR 2.1)	
General Connection Module Info Configuration Internet Protocol Port Configuration Network Vendor	
Tag FPAC_2 Ident 5743430001Westlock A00000370 Node 27 FDI 0 Cla	ss Basic 💌
FPAC_2_Res2         FPAC_2_Dirc2           Resource         Discrete Xaluee	<u>^</u>
FPAC_2_Direct	
	T I
	Close
Status: Running OK Cancel A	Apply Help

The download operation completes without errors.

5. Click OK.



- 6. Click the Go Online button.
- 7. Right-click the Discreet Output function block.
- 8. Choose Parameters.

Module Properties: ENBT (1788-EN2FFR 2.1)	- • •
General Connection Module Info Configuration Internet Protocol Port Configuration Network Vendor	
Tag FPAC_2 Ident 5743430001Westlock A00000370 Node 27 FDI 0 Class Basic	
FPAC_2_Res2 FPAC_2_Disc2  Resource Discrete Xduoe	Ê
	r Close
Status: Running OK Cancel Apply	Help

The linking device parameters are displayed.

T	ag <mark>FPA</mark>	0_2		Ident 5	743430001Westlock A00000370	Node 27 FDI 0 Class Basic 💌
Parar	neters					En All Dis All X
En Ind	ex	Class		Parameter	Value	Live
× 1	1	c) 🥖		ST_REV	0	
V 2	3	C		TAG_DESC	FPAC_2_Disc3	FPAC_2_Disc3
× 3	1	C		STRATEGY	0	
× 4	1	C		ALERT_KEY	0	
<b>√</b> 5	3	C		MODE_BLK		
5.1		C		TARGET	Cas + Auto	Cas + Auto
5.2		C) 🖌		ACTUAL	Auto	Auto
5.3		C		PERMITTED	Cas + Auto + OOS	Cas + Auto + OOS
5.4		C		NORMAL	Auto	Auto
× 6	1	C 🖌		BLOCK_ERR	·	
⊠ 7	1	C		PV_D		
🗵 7.1		C) 🥖		STATUS	Bad::NonSpecific:NotLimited	
🗵 7.2		C		VALUE	Close	
× 8		C		SP_D		
🗵 8.1		C		STATUS	Bad::NonSpecific:NotLimited	
× 8.2		C		VALUE	Close	
V 9		•	0	OUT_D		
9.1		•		STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit
× 9.2		C		VALUE	Close	
		C		SIMULATE D		-

9. In the Parameters screen, scroll down to parameters CAS\_IN\_D and BKCAL\_OUT\_D.

10. Verify that the BKCAL\_OUT\_D > STATUS in the Live column indicates a NotInvited condition.

Module Properties: ENBT (1788-EN2FFR 2.1) - • × General Connection Module Info Configuration Internet Protocol Port Configuration Network Vendor Ident 5743430001Westlock Tag FPAC\_2 A00000370 Node 27 FDI 0 Class Basic En All Dis All X En Index 15 16 -Class Parameter Value Live STATUS\_OPTS READBACK\_D C C STATUS VALUE Bad::NonSpecific:NotLimited 16.1 

 Image: No.1

 is Closed CAS\_IN\_D STATUS VALUE • Bad::NonSpecific:NotLimited cade::InitializationAcknowle dge:N C C C Close CHANNEL FSTATE\_TIME FSTATE\_VAL\_D Open/Close 0.0 Open/Close 15 20 1 21 21.1 21.2 21.2 22 22 C 0 STATE\_VAL\_L BKCAL OUT D STATUS VALUE 0 \*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\*
\* pod Cascade::NotInvited:NotLimite . State 0 State 0 RCAS\_IN\_D

Bad::NonSpecific:NotLimited Close

Uninitialized Bad::NonSpecific:NotLimited

. State 0

OK Cancel Apply

Before the output control loop can be initialized, the NotInvited condition must be cleared.

11. Set the value of the controller tag that is associated with the quality of BKCAL\_OUT\_D (connector PV:O.1) status parameter (PVx\_GoodCascade) to the value 1.

FFR01:0A.FieldDevice00.PV1_Bad	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Uncertain	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodNonCascade	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.FV1_GoodCascade	1	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_NotLimited	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_LowLimited	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_HighLimited	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_Constant	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_SubStatus	0	Decimal	SINT

12. Verify that the NotInvited status has been replaced by the new status, InitializationRequest.

	ection	Mo	dule	Info Configuration Internet Pro	tocol Port Configuration Network Vendo	r
Tag F	PAC_	2		Ident	5743430001Westlock A00000370 N	lode 27 FDI 0 Class Basic 💌
Paramete	ers					En All Dis All
En Index	CI	ass		Parameter	Value	Live
× 15	C			STATUS_OPTS		
× 16	C			READBACK D		
× 16.1	C	1		STATUS	Bad::NonSpecific:NotLimited	
⊠ 16.2	C			VALUE	is Closed	
✓ 17	•			CAS IN D		
✓ 17.1	-			STATUS	Bad::NonSpecific:NotLimited	od Cascade::NonSpecific:NotLimit
⊠ 17.2	C			VALUE	Close	
✓ 18	C			CHANNEL	Open/Close	Open/Close
× 19	C			FSTATE_TIME	0.0	
× 20	C			FSTATE VAL D	0	
✓ 21	•		0	BKCAL OUT D		
21.1		1		STATUS	BadNonSpecific.NotLinite	Cascade::InitializationRequest:Notl
21.2	•	1		VALUE	State 0	State 0
× 22	C			RCAS IN D		

The InitializationRequest must receive a response.

22.1 22.2 23 24 24.1

24.2 C

Status: Running

C

C

C

STATUS VALUE

SHED\_OPT RCAS\_OUT\_D STATUS VALUE

-

Help

13. Set the value of the Controller Tag associated with the substatus of CAS\_IN\_D (connector PV:O.1) status parameter (PV1\_SubStatus) to the value 1, which is InitializationAcknowledge.

FFR01:0A.FieldDevice00.PV1_Bad	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_Uncertain	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_GoodNonCascade	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodCascade	1	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_NotLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_LowLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_HighLimited	0	Decimal	BOOL
-FFR01:0A.FieldDevice00.PV1_Constant	0	Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_SubStatus	1	Decimal	SINT

**14.** Verify that the DO function block MODE\_BLK > ACTUAL > Live column displays Cas.

neral Conne	ction Modu	ule Info Configuration Internet Prot	ocol Port Configu	ation Networl	< Ver	ndor			
Tag F	PAC_2	Ident	5743430001Westlo	ck A000003	70	Node 27 F	DI O	Class Basic	•
Paramete	۲S							En All Dis	AII X
En Index	Class	Parameter		Value				Live	
× 1	C 🖌	ST_REV		0					
<b>√</b> 2	0	TAG_DESC	F	PAC_2_Disc3			- FPa	AC_2_Disc3	
× 3	C	STRATEGY		0					
× 4	C	ALERT_KEY		0					
<b>√</b> 5	0	MODE_BLK							
5.1	0	TARGET		Cas + Auto			. (	Cas + Auto	
5.2	© 🗡	ACTUAL		Auto				Cas	
5.3	0	PERMITTED	Ca	s + Auto + 009	5		Cas	+ Auto + 005	
5.4	0	NORMAL		Auto				Auto	
× 6	© 🗡	BLOCK_ERR		•					
× 7	C	PV_D							
⊠ 7.1	C 🕖	STATUS	Bad::No	nSpecific:NotL	imited				
× 7.2	©	VALUE		Close					
X 8	C	SP_D							
Controller Ta	ags - Hipror	n(controller)							
ope: 🐧 Hip	orom	✓ Show: All Tags				• Y.			
Name			<b>18</b>	Value	+	Force Mask	٠	Style	Data Type
FFR01:0	DA.FieldDevi	ce00.PV1_Bad			0			Decimal	BOOL
FFR01:0	)A.FieldDevi	ce00.PV1_Uncertain			0			Decimal	BOOL
FFR01:0A.FieldDevice00.PV1 GoodNonCascade					0			Decimal	BOOL
FFR01:0A.FieldDevice00.PV1_GoodCascade					1			Decimal	BOOL
FFR01:0A,FieldDevice00.FV1 NotLimited					0			Decimal	BOOL
		ce00.PV1 LowLimited			0			Decimal	BOOL
		ce00.PV1 HighLimited			0			Decimal	BOOL
		ce00.PV1 Constant			0			Decimal	BOOL
									SINT

The DO function block is now created, initialized, and operating correctly.

Т

# H1 Topology

## Master Mode 0

### Single Master



Terminated at the linking device.

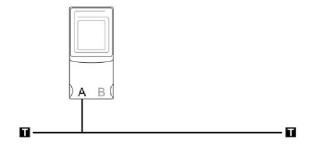


## Master Mode 1



A Bus Only

Not terminated at the linking device.



Master Mode 2

Single Master

B Bus Only

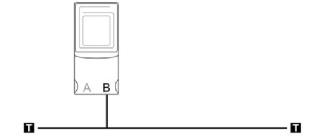
Terminated at the linking device.





B Bus Only

Not terminated at the linking device.

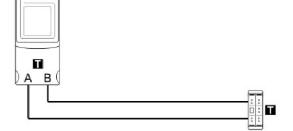


## **Master Mode 4**

Single Master

Dual Bus

Terminated at the linking device.

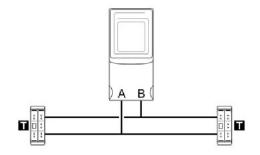


## **Master Mode 5**

Single Master

Dual Bus

Not terminated at the linking device.

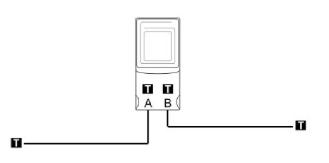


Master Mode 6

Single Master

Split Bus

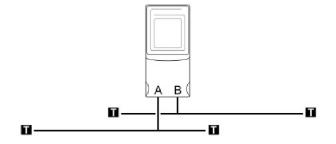
Terminated at the linking device.



Single Master

Split Bus

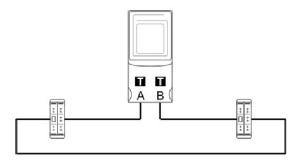
Not terminated at the linking device.



**Master Mode 8** 

Single Master

**Ring Bus** 



## **Master Mode 9**

MultiMaster

A Bus Only

Terminated at the linking devices.

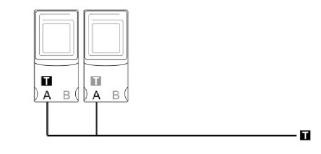


Master Mode 10

MultiMaster

A Bus Only

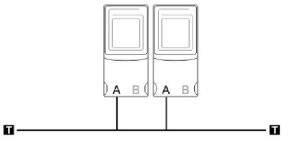
Shared termination at the linking devices.



#### MultiMaster

A Bus Only

Not terminated at the linking devices.



Master Mode 12

#### MultiMaster

B Bus Only

Terminated at the linking devices.

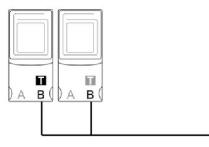


Master Mode 13

MultiMaster

B Bus Only

Shared termination at the linking devices.

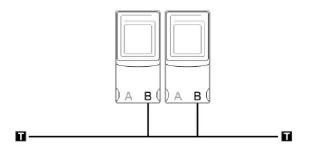


Master Mode 14

MultiMaster

B Bus Only Not terminated at

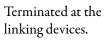
the linking devices.

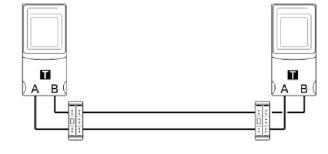


Т

#### MultiMaster

Dual Bus



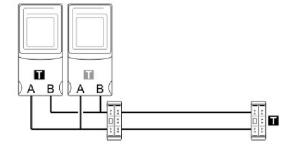


## Master Mode 16

MultiMaster

Dual Bus

Shared termination at the linking devices.



## Notes:

	The following terms and abbreviations are used throughout this manual. For definitions of terms not listed here, refer to the Allen-Bradley Industrial Automation Glossary, publication <u>AG-7.1</u> .
1788-EN2FFR linking device	Provides a gateway between EtherNet/IP and a single segment FOUNDATION Fieldbus H1 layer.
1788-CN2FFR linking device	Provides a gateway between ControlNet and FOUNDATION Fieldbus (FF).
AO	Abbreviation for an analog output; signal is generated by the host system and transmitted to a field device.
АОР	Abbreviation for Add-on Profile; provides an intuitive graphical interface for configuring devices.
basic device	A device that can communicate on the fieldbus, but cannot become the LAS.
block	See <u>function block</u> , <u>resource block (RES)</u> , and <u>transducer block</u> .
воотр	A protocol to boot a diskless workstation and receive the boot information from a server.
bridge	An interface in a fieldbus network that interconnects two or more H1 networks.
bus	An H1 fieldbus cable between a Host and field devices connected to multiple segments, sometimes through the use of repeaters.
CAS	Abbreviation for Cascade.
channel	A path for a signal.
CIP	Acronym for Common Industrial Protocol; a communication protocol, or language, between industrial devices. CIP provides seamless communication for devices on DeviceNet, ControlNet, and EtherNet/IP networks.
configurable	Capability to select and connect standard hardware modules to create a system; or the capability to change functionality or sizing of software functions by changing parameters without having to modify or regenerate software.
configuration	Physical installation of hardware modules to satisfy system requirements; or the selection of software options to satisfy system requirements.
connector	Coupling device used to connect the wire medium to a fieldbus device or to another segment of wire.
control loop	Group of function blocks that execute at a specified rate within a FOUNDATION Fieldbus device or distributed across the fieldbus network.

ControlNet network	An open control network that uses the producer/consumer model to combine the functionality of an I/O network and peer-to-peer network, while providing high-speed performance for both functions.
cycle	Scanning of inputs, execution of algorithms and transmission of output values to devices.
device description (DD)	Abbreviated as DD, this is a set of files (CFF, SYM, and FFO) that describes the parameter capabilities of a fieldbus device. The file information on these block parameters includes names, data types, and specifications.
device	The term in this manual refers to the instruments that make up the fieldbus system.
device ID	An identifier for a device that the manufacturer assigns. Device IDs must be unique to the device; no two devices can have the same device ID.
device tag	A character string name that uniquely identifies a device on a fieldbus network.
DO	Abbreviation for discrete output; signal is generated by the host system and transmitted to a field device.
Ethernet	Physical and data link layer defined by IEEE 802 standards used by EtherNet/IP.
EtherNet/IP	An open, industrial networking standard that supports both real-time I/O messaging and message exchange.
fieldbus	A digital, two-way, multi-drop communication link among intelligent measurement and control devices. It serves as a Local Area Network (LAN) for advanced process control, remote input/output, and high-speed factory automation applications.
FOUNDATION Fieldbus	The communication network that the Fieldbus Foundation created.
function block	A named block consisting of one or more input, output, and contained parameters. The block performs some control function as its algorithm. Function blocks are the core components with which you control a system. The Fieldbus Foundation defines standard sets of function blocks.
gateway	Translates another protocol to FOUNDATION fieldbus or vice versa, for example HART to FOUNDATION fieldbus or Modbus to FOUNDATION fieldbus.
H1	A FOUNDATION fieldbus segment that operates at 31.25 Kbps.

- **host** Control system that has FOUNDATION fieldbus capabilities to configure and operate FOUNDATION fieldbus segments. There are several classes of Host systems:
  - Class 61 Integrated Host Primary, or process Host that manages the communication and application configuration of all devices on the network.
  - Class 62 Visitor Host Temporary, on process Host with limited access to device parameterization.
  - Class 63 Bench Host Primary, off process Host for configuration and setup of a non-commissioned device.
  - Class 64 Bench host Primary, off process Host with limited access to device parameterization of an off-line, commissioned device.
  - Class 71 Safety Integrated Host Primary, on-process Host that manages the communication and application configuration of all safety and control and monitoring devices on a network.

#### LAS See <u>link active scheduler</u>.

- **link** A logical link is a connection between function blocks; a physical link is a connection between fieldbus devices.
- **linking device** As a bridge, enables peer-to-peer communication between H1 devices without the need for host system intervention. As a gateway, connects the H1 network to other plant control and information networks, such as EtherNet/IP and ControlNet.
- **link active scheduler** Abbreviated as LAS, this scheduler is responsible for coordinating all communication on the fieldbus; maintaining a list of transmission times for all data buffers in all devices that need to be cyclically transmitted. The LAS circulates tokens, distributes time, probes for new devices, and removes non-responsive devices from the link.
  - link masterAn LM is a device that contains LAS functionality that can control<br/>communication on a FOUNDATION fieldbus H1 fieldbus link.<br/>There must be at least one LM on the H1 link; one of those LM devices is<br/>chosen as the LAS.
  - **macrocycle** A calculated time for a fieldbus device to send and receive data. The AOP can automatically generate the value, or the value can be manually entered. The LAS is responsible for scheduling of the segment macrocycle.
    - mode Control block operational condition, such as manual, automatic, or cascade.
    - **network** A network as applied in this document is the termination of one or more fieldbus segments into an interface card of the Host system.
      - node The connection point at which media access is provided.
      - **offline** Perform tasks while the Host system is not communicating with the field devices.

**online** Perform tasks, such as configuration, while the Host system is communicating with the field devices. **PV** Acronym for Process Variable, which is the primary value. resource block (RES) This block controls the linking device. It contains data specific to the linking device's hardware. All data is modeled as contained, so there are no links in this block. redundancy The duplication of devices for the purpose of enhancing the reliability or continuity of operations in the event of a failure without loss of a system function. **ring bus** A network where signals are transmitted from one station and replayed through each subsequent station in the network. Signal can travel in either direction of the ring so it creates network redundancy; if the ring breaks in one place the nodes can still communicate. **RSLogix** Software that provides a programming environment for sequential, process, drive, and motion control programming. The RSLogix environment provides an IEC 61131-3 compliant interface for controls programming. segment A physical link (cable) between fieldbus devices and a pair of terminators on an H1 channel. Segments can be linked by repeaters to form a longer H1 fieldbus. A fully loaded (maximum number of connected devices) 31.25 Kbps voltage-mode fieldbus segment should have a total cable length, including spurs, between any two devices of up to 1900 m. There cannot be a non-redundant segment between two redundant systems. signal The event or electrical quantity that conveys information from one point to another. tag Unique alphanumeric code assigned to inputs, outputs, equipment items, and control blocks. terminator Impedance-matching module used at or near each end of a transmission line that has the same characteristic impedance of the line. Terminators are used to minimize signal distortion, which can cause data errors. H1 terminators convert the current signal transmitted by one device to a voltage signal that can be received by all devices on the network. topology The shape and design of the fieldbus network. transducer block The transducer block decouples function blocks from the local input/output (I/O) function required to read sensors and command output hardware. Transducer blocks contain information, such as calibration date and sensor type. There is usually one transducer block for each input or output of a function block. trunk The main communication highway between devices on an H1 fieldbus network.

The trunk acts as a source of main supply to spurs on the network.

VCR Acronym for Virtual Communication Relationship. Configured application layer channels that provide for the transfer of data between applications. FOUNDATION Fieldbus describes three types of VCRs: Publisher/Subscriber, Client/Server, and Source/Sink.

## Notes:

#### Numerics

1756-CNB ControlNet bridge 22 1756-CNBR ControlNet bridge 22 1756-EN2T Ethernet bridge 21 1756-EN2TR Ethernet bridge 21 1788-CN2FFR ControlNet network 7 1788-EN2FFR EtherNet/IP network 6

#### A

add linking device to I/O tree 22, 23 add new field device 33 add-on-profile 20 advanced configuration 8 advanced settings 30 A0 function block example 70 AOP install file 20 version 20 Auto MacroCycle 30, 31 Auto MacroCycle calculation 31 auto reset trip 29

### B

background scan 29 backup linking device 43 backup master 44 backup-LAS mode 46 bad CRC packets received 63 binary file (.ffo) 65 block classes F – function block 37 R – resource block 37 T – transducer block 37 block configuration block classes 37 block parameters 38 connectors 39 download configuration to device 36 draw wire 36 go online with device 36 input I.PV connectors 40 network publication 40 network subscription 40 output 0.PV connectors 40 print 36 select and move objects 36 wires 41 block parameters 38 block ports input 41 output 41 bridge ControlNet 22 Ethernet 21 bridge configuration, export 44 bus voltages, currents, and bus status 62

### C

capability file (.cff) 65 catalog refresh 66 update 67 change parameters in real time 42 class description alarm 38 configurable parameter but non-output 38 input port 38 output port 38 read-only 38 tune 38 clear schedule 30 config tree 27 configuration replication 27 configuration shortcuts display list of configured and attached field devices 27 export configuration 27 import configuration 27 synchronize the backup LAS 27 configure internal H1 segment terminators 28 redundant H1 media 28 redundant linking devices 28 **Connect Safe mode** 46, 47 ControlNet connections 16 network 7, 23 node address 17 port 24 **ControlNet bridge** 1756-CNB 22 1756-CNBR 22 D data compels 29 data packets sent from field device 62 data requests not responded to by field device 63 default node number 28 determine the RPI 22, 23 device config mismatch 45

config mismatch 45 description (DD) files 7 statistics 55 diagnostic and status information 58 diagnostic data 61 diagnostic status 55 diagnostics Device Type Manager (DTM) 59 oscilloscope screen 57 PV data screen 57 status screen 55 Web server 58 dimensions 13

disable schedule 30

display status field device page bad CRC 63 data packet transfer success rate 62 device tag name 62 FF node 62 field device status 62 no reply 63 pckt recv 63 pckt send 62 signal quality 63 status 62 H1 master page bus A/B 62 busA/B enabled 62 busA/B term 62 busA/B tripped 62 external pwr 62 FF node 62 temperature 62 main page bus A tripped 61 bus B tripped 61 bus voltages 61 communication quality 61 H1Bus A/B 61 IP address or BOOTP 61 new device found 61 0k 61 redundancy err 61 redundancy ok 61 SAFE MODE 61 STS 61 **DO function block example** 80 download schedule 30, 43 download settings to linking device 28 downloading the field device configuration 41

### Ε

earth ground 16 enable schedule 30 Ethernet bridge 1756-EN2T 21 1756-EN2TR 21 Ethernet switch settings 19 EtherNet/IP address 18 EtherNet/IP network 6 export and import device configuration 35 export bridge configuration 44

#### F

FactoryTalk AssetCentre 7 fail status in prog/fault mode 29 FF master node 28 FF node 62 field device adding 32 configuring 32 diagnosing 32 index 32 status 62 status icons 32 status, viewing 32 field device block configuration download configuration to device 36 draw wire 36 go online with device 36 print 36 select and move objects 36 field device catalog 31, 33 field device class basic device (normal operation) 42 link master (LAS capability) 42 field device configuration add new field device 33 advanced configuration 34 auto configure online 34 configure 34 copy and paste 35 export and import device configuration 35 mapping report 35 merge online and offline 35 move device 35 oscilloscope 34 remove device configuration 35 set H1 node address 35 set H1 physical tag 35 field device output image boolean 54 float 53 integer 53 field device tool (FDT) 7 fieldbus host capability 5 firmware version 20 firmware, flashing 19 function block configuration example AO 70 DO 80

#### G

grounding 16

### Η

H1 network connection 14 H1 node address 62 address and physical tag 32 H1 node address 35 H1 physical tag 35 H1 segment ports 8 H1 topology, multi-master A bus only not terminated 88 shared termination 87

terminated 87 B bus only not terminated 88 shared termination 88 terminated 88 dual bus shared termination 89 terminated 89 H1 topology, single master A bus only mon-terminated 85 terminated 85 B bus only non-terminated 86 terminated 85 dual bus non-terminated 86 terminated 86 ring bus 87 split bus non-terminated 87 terminated 86 HSProcessUtility 20, 31 **HSThinFrame** 59

#### 

I/O tree 21 add linking device 22, 23 import and export device configuration 35 input and output ports on blocks 41 input I.PV connectors 39, 40 instantiate a block 37 IP address setting via BOOTP 19 setting via Ethernet switches 19

#### L

LAS 27 LAS device icon LAS 44 LAS backup 44 LAS errors device config mismatch 45 master + device config mismatch 45 LAS schedule 43 library directory 66 linking device add to I/O tree 22, 23 non-volatile memory 28 offline status indicator 26 online status indicator 26 linking device property settings 26 live list 26 load defaults 30 Logix assemblies, input field device allocate 51 compel 51 FFNode 51 live 51

PVBinary1...PVBinary8 52 **PVDiagnostics 53** PVReal1...PVReal8 52 PVStatus 52 tag 51 master bus A/B tripped 50 **BusA/BEnabled 50 BusA/BTerminated 51 ConnectionStatus 50** ExternalVoltage 50 FFBusCurrentA/B 50 FFBusVoltageA/B 50 LinkActiveScheduler 50 LinkingDeviceStatus 50 MasterMode 50 NewFieldDevice 50 Temperature 50 Logix assemblies, output field device PVBinary1...PVBinary8 54 PVInt1...PVInt8 53 PVReal1...PVReal8 53 PVStatus1...PVStatus8 54 Logix controller 21

### М

MacroCycle 29 master backup 44 primary 44 master + device config mismatch 45 master advanced configuration screen 30 master configuration advanced 30 Auto MacroCycle 30 auto reset trip 29 clear schedule 30 disable schedule 30 download schedule 30 enable schedule 30 fail status in prog/fault mode 29 FF master node 28 load defaults 30 MacroCycle 29 max scan address 29 slave retry 29 topology mode 28 update master time 30 upload config 29 max scan address 29 media redundancy supported redundant controllers 5 redundant Ethernet media 5 redundant linking devices 5 redundant trunk 5 ring 5 split 5 memory, non-volatile 28

module properties, configuration tab config tree 27 LAS 27 live list 26 shortcuts 27 visitor list 26

### Ν

network publication connectors 39 subscription connectors 39 network connection, H1 14 network diagrams ControlNet network 7 EtherNet/IP network 6 network subscriptions 40 node address ControlNet 17 node address and tag name online and offline do not match 33 online and offline match 33 node number default 28 non-volatile memory 28

### 0

oscilloscope trace 57 output and input ports on blocks 41 output image boolean 54 float 53 integer 53 output **0.PV connectors** 39, 40

### Ρ

parameter class description alarm 38 configurable parameter but non-output 38 input port 38 output port 38 read-only 38 tune 38 parameter help 38 ports, H1 segment 8 power additional supplies 14 conditioners 8, 14 connection 13 supply 14 supply connection 14 supply voltage 62 primary master 44 process variables 7 viewing online 42 property settings linking device 26 publication connectors 39 PV data 57

PV status bad 57 good 57 limit values constant 52 HighLimited 52 LowLimited 52 NotLimited 52 quality values bad 52 good\_cascade 52 good\_noncascade 52 uncertain 57

### R

refresh catalog 66 remote access 8 replicate configuration 27 request packet interval 22, 23 minimum and maximum 7 RJ45 connector 16 RPI determining 22, 23 minimum and maximum 7 RSNetWorx for ControlNet 23

### S

Safe mode 19 set the H1 node address and tag name 33 shielding 16 slave retry 29 status and diagnostic information 58 status icons field device 32 store configuration in project file 28 subscription connectors 39 symbol file (.sym) 65

### T

temperature of linking device 62 topology mode 28 troubleshooting 8, 55

#### U

update catalog 67 update master time 30 upload config 29

#### V

visitor list 26

## **Rockwell Automation Support**

Rockwell Automation provides technical information on the Web to assist you in using its products. At <u>http://www.rockwellautomation.com/support</u> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <u>https://rockwellautomation.custhelp.com/</u> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <a href="http://www.rockwellautomation.com/services/online-phone">http://www.rockwellautomation.com/services/online-phone</a>.

### Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the <u>Worldwide Locator</u> at <u>http://www.rockwellautomation.com/rockwellautomation/support/overview.page</u> , or contact your local Rockwell Automation representative.

### **New Product Satisfaction Return**

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

## **Documentation Feedback**

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication <u>RA-DU002</u>, available at <u>http://www.rockwellautomation.com/literature/</u>.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

#### www.rockwellautomation.com

#### Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444 Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640 Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846