POINT I/O and ArmorPOINT I/O DeviceLogix Modules

Catalog Numbers 1734-8CFGDLX, 1738-8CFGDLXM8, 1738-8CFGDLXM12, 1738-8CFGDLXM23

Allen-Bradley
by ROCKWELL AUTOMATION

User Manual

Original Instructions

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.

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

WARNING: 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.

ATTENTION: 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.

These 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).

The following icon may appear in the text of this document.

Identifies information that is useful and can help to make a process easier to do or easier to understand.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

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Set Write Enable Flag using RSNetWorx for DeviceNet

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About This Publication

This manual describes how to install, configure, and troubleshoot your POINT I/O™ DeviceLogix™ and ArmorPOINT® I/O DeviceLogix modules.

POINT I/O and ArmorPOINT I/O modules can be used in EtherNet/IP™, DeviceNet®, and ControlNet® systems. As such, you may need to see other publications in addition to this one. See Additional Resources for the list of related publications.

When using POINT I/O DeviceLogix modules with a communication adapter, use this manual together with the user manual for the adapter.

POINT I/O DeviceLogix modules are not compatible with the PROFIBUS adapter.

When using ArmorPOINT I/O DeviceLogix modules with a communication adapter, use this manual together with the user manual for the adapter you are using.

ArmorPOINT I/O DeviceLogix modules are not compatible with the PROFIBUS adapter. The modules in this manual are DeviceNet-ready. Each module can exist on the DeviceNet network as one of the following:

- An individual node
- With an adapter (1734-ADN or 1734-ADNX) as one node

For applications that use these modules in a network with a 1734-PDN DeviceNet Communication Interface, or a 1734D-xx POINTBlock I/O module, this user manual is the primary documentation.

Who Should Use This Manual

This manual is intended for qualified personnel. You should know how to do the following:

- Use RSNetWorx™ software or similar configuration software to configure and calibrate these modules.
- Download and use electronic data sheet (EDS) files.

In addition, you must be familiar with Studio 5000 Logix Designer® application and CIP™ Network terminology. If you are not, see your software documentation or online help before you attempt to use these modules.

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated template	throughout
Updated screenshots for Studio 5000 Logix Designer application	throughout
Added Inclusive Language Acknowledgment	Important User Information
Added System and Power Considerations topic to Introduction	12
Added Protected Operations topic to Introduction	13
Added Reset to Default Password topic to Set Write Enable Flag using RSNetWorx for DeviceNet	71
Added History of Changes	73

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Additional Resources

Resource	Description
POINT I/O DeviceLogix Module	
POINT I/O Module with 8 Configurable 24V DC Points and DeviceLogix Installation Instructions, publication 1734-IN039	Provides installation information and wiring diagrams for 1734-8CFGDLX modules.
Communication Devices	
POINT I/O ControlNet Adapter Installation Instructions, publication 1734-IN582	Provides installation information about 1734-ACNR adapters.
POINT I/O ControlNet Adapter User Manual, publication 1734-UM008	Describes how to use 1734-ACNR adapters.
POINT I/O DeviceNet Communication Interface Module Installation Instructions, publication 1734-IN057	Provides installation information about 1734-PDN modules.
POINT I/O DeviceNet Adapter Installation Instructions, publication 1734-IN026	Provides installation information about 1734-ADN and 1734-ADNX adapters.
POINT I/O DeviceNet Adapter User Manual, publication 1734-UM002	Describes how to use 1734-ADN and 1734-ADNX adapters.
Getting Results with RSNetWorx for DeviceNet Getting Results Guide, publication DRNET-GR001	Describes how to install and navigate the RSNetWorx™ for DeviceNet software.
POINT I/O EtherNet/IP Adapter Installation Instructions, publication 1734-IN590	Provides installation information about 1734-AENT adapters.
POINT I/O EtherNet/IP Adapter User Manual, publication 1734-UM011	Describes how to use 1734-AENT adapters.
Power Supplies, Wiring Base Assemblies, Miscellaneous	
POINT I/O Field Potential Distributor Module Installation Instructions, publication 1734-IN059	Provides installation information about 1734-FPD distributors.
POINT I/O 24V DC Expansion Power Supply Installation Instructions, publication 1734-IN058	Provides installation information about 1734-EP24DC power supplies.
POINT I/O 120/240V AC Expansion Power Supply Installation Instructions, publication 1734-IN017	Provides installation information about 1734-EPAC power supplies.
POINT I/O Common Terminal Module and Voltage Terminal Module Installation Instructions, publication 1734-IN024	Provides installation information about 1734-CTM and 1734-VTM modules.
POINT I/O Wiring Base Assembly Installation Instructions, publication 1734-IN511	Provides installation information about 1734-TB and 1734-TBS assemblies.
POINT I/O Wiring Base Assembly Installation Instructions, publication 1734-IN013	Provides installation information about 1734-TB3 and 1734-TB3S assemblies.
POINT I/O One-piece Terminal Bases Installation Instructions, publication 1734-IN028	Provides installation information about 1734-TOP, 1734-TOPS, 1734-TOP3, and 1734-TOP3S assemblies.
ArmorPOINT I/O DeviceLogix Module	
ArmorPOINT I/O Modules with 8 Configurable 24V DC Points Wiring Diagrams, publication 1738-WD009	Provides wiring diagrams for 1738-8CFGDLXM8, 1738-8CFGDLXM12, and 1738-8CFGDLXM23 modules.
ArmorPOINT I/O Modules with 8 Configurable 24V DC Points and DeviceLogix Installation Instructions, publication 1738-IN027	Provides installation information about 1738-8CFGDLXM8, 1738-8CFGDLXM12, and 1738-8CFGDLXM23 modules.
Communication Devices	
ArmorPOINT ControlNet Adapter, Series A Installation Instructions, publication 1738-IN016	Provides installation information about 1738-ACNR adapters.
ArmorPOINT I/O DeviceNet Adapters Installation Instructions, publication 1738-IN014	Provides installation information about 1738-ADN and 1738-ADNX adapters.
ArmorPOINT I/O DeviceNet Adapters User Manual, publication 1738-UM001	Describes how to use 1738-ADN and 1738-ADNX adapters.
ArmorPOINT EtherNet/IP Adapter, Series A Installation Instructions, publication 1738-IN017	Provides installation information about 1738-AENT adapters.
ArmorPOINT I/O 2-port EtherNet/IP Adapter, Series A Installation Instructions, publication 1738-IN028	Provides installation information about 1738-AENTR adapters.
Power Supplies, Wiring Base Assemblies, Miscellaneous	
ArmorPOINT I/O Field Potential Distributor, Series A Installation Instructions, publication 1738-IN019	Provides installation information about 1738-FPD distributors.
ArmorPOINT I/O 24V DC Expansion Power Supply, Series A Installation Instructions, publication 1738-IN020	Provides installation information about 1738-EP24DC power supplies.
Other Resources	
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.

Additional Resources (Continued)

Resource	Description
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Selection and Configuration webpage, rok.auto/systemtools	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Notes:

Introduction

The POINT I/O and ArmorPOINT I/O modules work with EtherNet/IP, DeviceNet, and ControlNet network adapters. Each module has eight 24V DC I/O points that self-configure to be inputs or outputs. Inputs are IEC Type 3 and outputs are self-protecting 0.5 A outputs.

The firmware in these modules uses Version 3 (1738-8CFGDLXM8, 1738-8CFGDLXM12, 1738-8CFGDLXM23) and Version 7 (1734-8CFGDLX) of the DeviceLogix master library. The modules can execute 144 DeviceLogix function blocks in 3 ms. Smaller programs that contain fewer than 40 function blocks can be executed in 1 ms.

Each module produces 20 bytes of data including I/O state (8 bits), eight user-defined bits, and eight user-defined words of analog data to be consumed by processors or other DeviceLogix modules. Each module consumes 20 bytes of data to set the I/O state (8 bits), eight user-defined control bits, and eight user-defined words of analog data. It is also possible to consume the data from up to eight other peers.

The following table lists the POINT I/O and ArmorPOINT I/O configurable modules with DeviceLogix.

Module Description	Catalog Number
POINT I/O module with 8 configurable 24V DC I/O points and DeviceLogix capabilities	1734-8CFGDLX
ArmorPOINT I/O module with 8 configurable 24V DC M8 connectors and DeviceLogix	1738-8CFGDLXM8
ArmorPOINT I/O module with 8 configurable 24V DC M12 connectors and DeviceLogix	1738-8CFGDLXM12
ArmorPOINT I/O module with 1 configurable 24V DC M23 connector and DeviceLogix	1738-8CFGDLXM23

1734-8CFGDLX

This module is an 8-point 24V DC I/O module with eight self-configuring points and DeviceLogix capabilities. Each of the I/O points can be either a DC input or output. The module supports removal and insertion under power, auto-address, and auto-baud in compliance with the POINTBus™ backplane.

1738-8CFGDLXM8, 1738-8CFGDLXM12, and 1738-8CFGDLXM23

The ArmorPOINT I/O family consists of modular I/O modules. The sealed IP67 housing of these modules requires no enclosure. Environmental requirements other than IP67 may require an additional appropriate housing. I/O connectors are sealed M8 (Pico™), M12 (micro) or M23 styles. The mounting base ships with the module.

Modes of Usage

The module can be used in one of the following modes:

- As a standard POINT I/O module
- In a standalone DeviceLogix program where it controls its own I/O
- In network applications with or without the peer exchange of data

Standard POINT I/O Module

The module can simply be used as an 8-point configurable POINT I/O module. It uses ODVA predefined Produce and Consume assemblies. Default settings help to facilitate quick setup right out-of-the-box. It is CIP network independent and it can run on DeviceNet, EtherNet/IP or ControlNet when used with an adapter.

Standalone DeviceLogix

If DeviceLogix is enabled (programmed), then the module becomes the owner of its outputs.

The DeviceLogix program reads inputs and controls the onboard outputs.

- The produced assembly may be shared with a controller if a connection exists.
- As the owner of its local outputs, the module may run without an external controller.

An external controller, which is the owner of the connection to the module, can influence the module's logic using a consume assembly – both digital and analog data. Configuration of the module is performed with RSNetWorx for DeviceNet. When used on ControlNet or EtherNet/IP, the tool bridges through the adapter to communicate with the DeviceLogix module directly on the POINT I/O backplane.

Peer Enabled POINT I/O

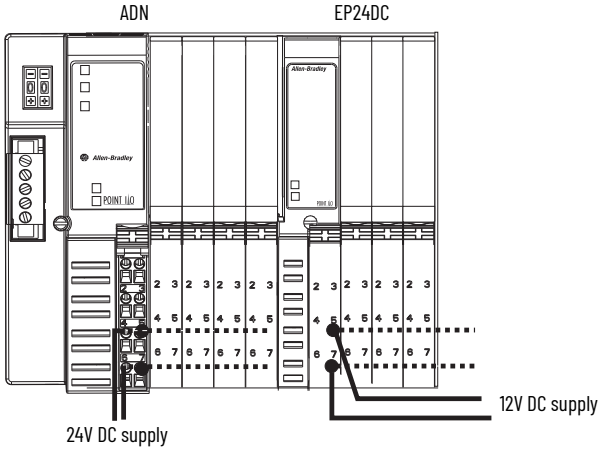
The POINT I/O DeviceLogix module can "listen in" on data connections to other POINT I/O modules on the backplane. This data can be used in the DeviceLogix program to control the outputs. It can consume data from eight different peers. The data from each peer can be up to 24 bytes long. The data can be digital, analog (16-bit), or a mixture. The module supports the "Auto Produce" parameter to produce I/O data automatically without the need for a master. It also produces and consumes network data. Configuration of peer data is performed with RSNetWorx.

System and Power Considerations

There are no power terminals on the POINT I/O DeviceLogix module. The module gets its power from the Field Power Bus of the backplane. Depending on your system and network topology, power can be applied through one of the following:

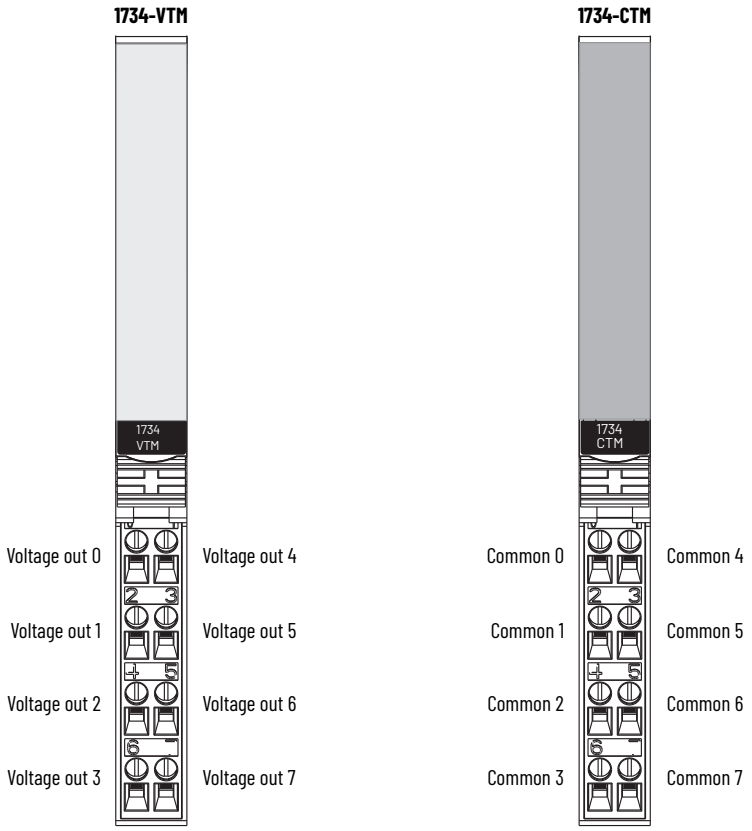
- 1734-PDN (DeviceNet adapter)
- 1734-ADN or 1734-ADNX (DeviceNet adapter)
- 1734-ACNR (ControlNet adapter)
- 1734-AENT or 1734-AENTR (EtherNet/IP adapter)
- 1734-EP24DC (Expansion power supply)
- 1734-FPD (Field power distribution)

Example of Logical Partitioning



Similarly, field power and common (return) can be terminated in the POINT I/O system by using the following modules:

- 1734-VTM (Voltage termination module)
- 1734-CTM (Common termination module)



The ArmorPOINT I/O DeviceLogix module gets its power from the Field Power Bus of the backplane. Depending on your system and network topology, power can be applied through one of the following:

- 1738-ADN12 or 1738-ADN18, 1738-ADN18P, 1738-ADNX (DeviceNet adapter)
- 1738-ACNR (ControlNet adapter)
- 1738-AENT or 1738-AENTR (EtherNet/IP adapter)
- 1738-EP24DC (Expansion power supply)
- 1738-FPD (Field power distribution)

Protected Operations

To help maintain the secure operation of your POINT I/O and ArmorPOINT I/O DeviceLogix modules, operations that can disrupt module operation are restricted based on the operating mode of the module. The following table describes the restrictions.

Current Module Operation		Out-of-Box Reset	Power Cycle Reset
Connection Established	Logic Enable On	Not Accepted	Not Accepter
Connection Not Established	Logic Enable On	Not Accepted	Not Accepted
Connection Established	Logic Enable Off	Not Accepted	Not Accepted
Connection Not Established	Logic Enable Off	Accepted	Accepted

Prepare the Modules to Work on DeviceNet

See the following chapters for instructions on how to configure the modules to work on DeviceNet.

1. DeviceLogix for POINT I/O and ArmorPOINT I/O on DeviceNet
2. Configure POINT I/O and ArmorPOINT I/O DeviceLogix modules using RSNetWorx for DeviceNet
3. DeviceLogix Capabilities

Prepare the Modules to Work on EtherNet/IP and ControlNet

See the following chapters for instructions on how to configure the modules to work on EtherNet/IP and ControlNet.

1. DeviceLogix for POINT I/O and ArmorPOINT I/O on Ethernet/ControlNet
2. DeviceLogix Capabilities

DeviceLogix for POINT I/O and ArmorPOINT I/O on DeviceNet

This chapter provides information on the following:

- Offline Configuration using RSNetWorx for DeviceNet
- Online Configuration using RSNetWorx for DeviceNet
- I/O Data Assembly Maps

Offline Configuration using RSNetWorx for DeviceNet

This section is not a substitute for RSNetWorx or DeviceNet scanner and adapter publications. It is suggested that you have those publications available while performing the procedures in this section. See Additional Resources on page 8 for a list of related publications.

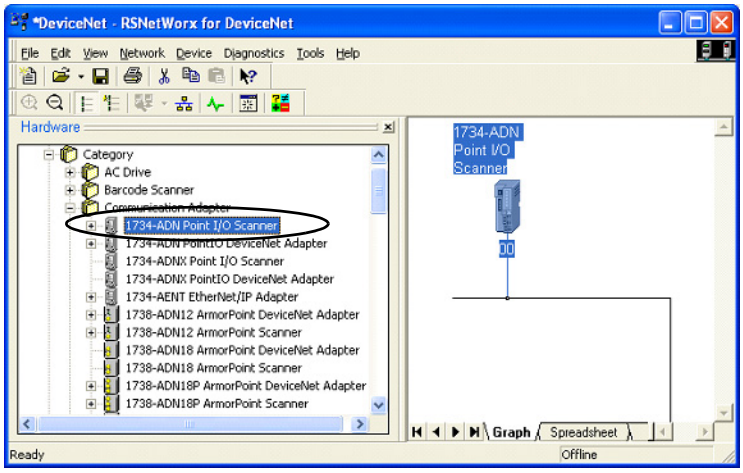
This section describes the setup of a DeviceNet network using RSNetWorx for DeviceNet when the module is not connected to the network.

When configuring the module in the Offline mode, you must place all nodes on the network in The view window manually. Use the Hardware tree to find each module and place it into the view window. To perform this action, double-click the module or drag it to the view window.

If using a POINT I/O or ArmorPOINT I/O DeviceNet adapter, make sure you select Adapter for the main DeviceNet network, and Scanner for the POINTBus backplane.

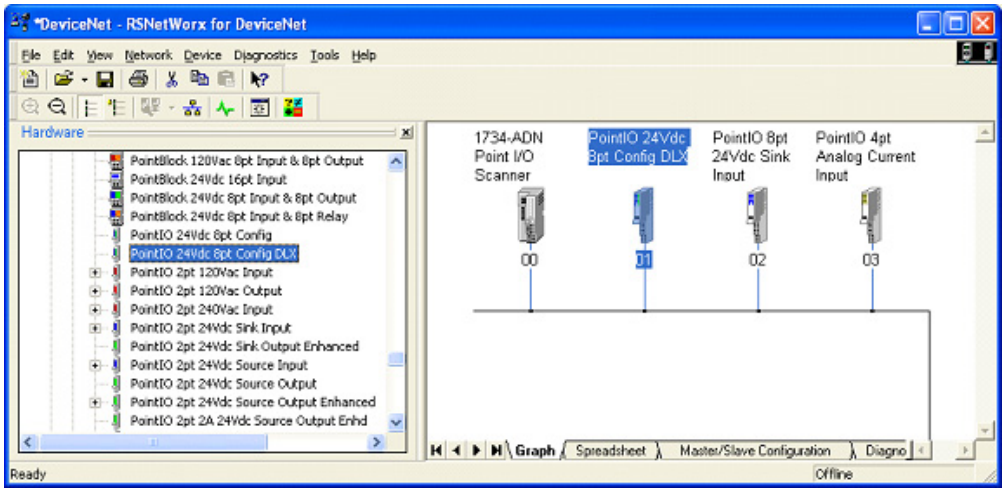
Example: Build the Backplane

This example shows you how to build the backplane. The following screen shows the 1734-ADN POINT I/O Scanner added.



Next, locate the I/O modules. In this example, the following modules are added:

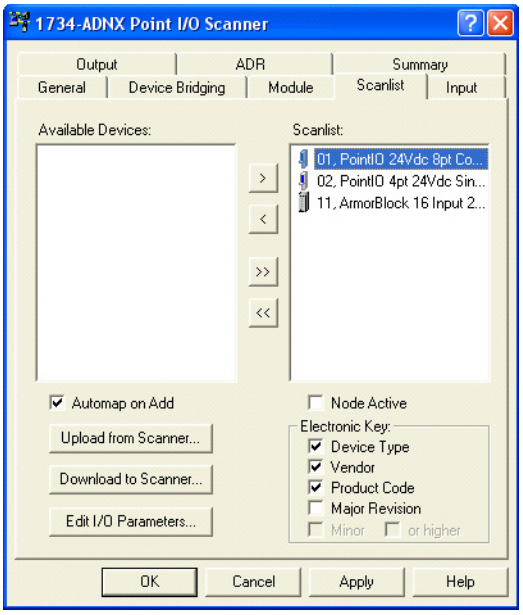
- 1734-8CFGDLX POINT I/O DeviceLogix module
- 1734-IB8 POINT I/O DC Input module
- 1734-IE4C POINT I/O 4...20 mA Analog Input module



The digital modules can be found under the category, “General Purpose Discrete I/O”, and the analog modules can be found under the “Rockwell Automation miscellaneous” category.

The configuration of each module can now be edited from the Properties dialog box of each module. For instructions on how to edit the configuration of the DeviceLogix module, see Chapter 4.

Include all I/O modules in the backplane to the Scanner’s scan list.



After configuration is complete, save your work in the DNT file. “DNT” is the three-letter file name extension. One file contains the configuration data for all modules on the network or backplane.

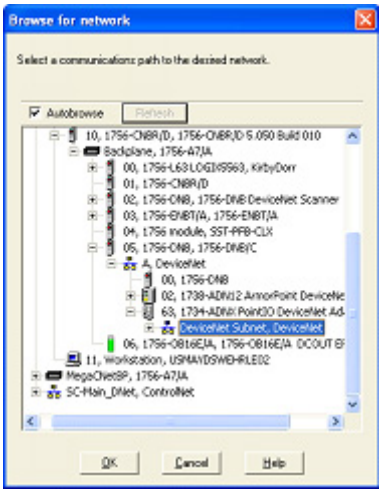
Remember that you must go to Online mode with RSNetWorx for DeviceNet to download the configuration data to the I/O modules and scanners.

Online Configuration using RSNetWorx for DeviceNet

To configure a DeviceNet network using RSNetWorx for DeviceNet when connected to the network, do the following:

1. If you have a DNT file that has been configured, open the file in RSNetWorx for DeviceNet. To do this, go to the Online mode by pressing the "F10" key. You can also click Network > Online, or click the Online button  .

   The RSLinx® application starts. If the Online path is not set in Network > Properties, the Browse for network dialog box appears.



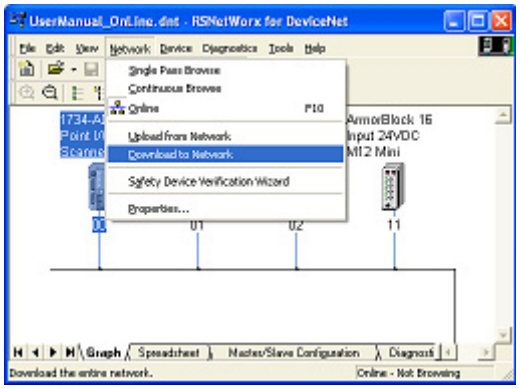
2. Navigate to the DeviceNet network or DeviceNet subnet to configure the backplane.

   The OK button becomes available when you select a valid network. RSNetWorx automatically browses the network to discover all participants.

3. If there are any module identity issues, correct them before continuing.
4. Verify that the configuration in the DNT file matches the configuration in each node.

   In this section, it is assumed that all work was done in Offline mode and that the DNT file contains the correct information.

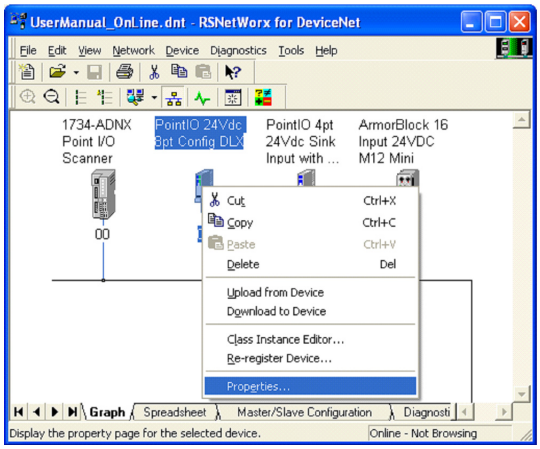
   To update all modules in the most efficient way, click Network > Download to Network on the menu bar.



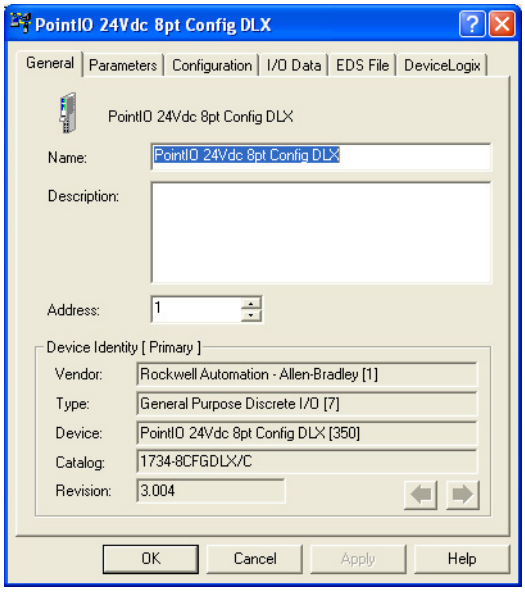
5. Review the Message window for any errors.

   The stored configuration (DNT file) and the configuration of all modules now match.

6. If any changes are made, be sure to download them to the module and save them in the DNT file.
7. When in the Online mode, you can change the configuration of a module by double-clicking its icon. You can also right-click the icon and select Properties.



Familiarize yourself with the tabs in the Properties window before proceeding to Chapter 4 where you will learn how to configure the DeviceLogix module.



I/O Data Assembly Maps

Read this section for information about how to communicate with your module.

I/O messages are sent to (consumed) and received from (produced) the I/O modules. These messages are mapped into the processor's or scanner's memory. Each module produces 1 byte, 8 bytes, or 20 bytes of input data based on which produced assembly is selected. The default setup is 20 bytes. It consumes 1 byte, 8 bytes, or 20 bytes of I/O data (scanner Tx).

Default Data Map - Produced Assembly Instance 101

Message size: 20 Bytes								
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Data [0]	Pt 07	Pt 06	Pt 05	Pt 04	Pt 03	Pt 02	Pt 01	Pt 00
Data [1]	PNB 07	PNB 06	PNB 05	PNB 04	PNB 03	PNB 02	PNB 01	PNB 00
Data [2]	Reserved						Owned	LogicEN
Data [3]	PM7	PM6	PM5	PM4	PM3	PM2	PM1	PM0
Data [4]	Produced Network Analog Word 0							
Data [5]								
Data [6]	Produced Network Analog Word 1							
Data [7]								
Data [8]	Produced Network Analog Word 2							
Data [9]								
Data [10]	Produced Network Analog Word 3							
Data [11]								
Data [12]	Produced Network Analog Word 4							
Data [13]								
Data [14]	Produced Network Analog Word 5							
Data [15]								
Data [16]	Produced Network Analog Word 6							
Data [17]								
Data [18]	Produced Network Analog Word 7							
Data [19]								
Where:	Pt = Value of the I/O point PNB = Produced Network Bit PM = Peer Missing (a 1 indicates the absence of a configured peer) Owned = Owned by a master • When set to 0, the module is producing data without a master. • When set to 1, the module is producing while being owned by a master. LogicEn = Logic Enabled (0 = logic disabled, 1 = logic enabled)							

You can select other produced assemblies:

- Produced Assembly Instance 4 is the first byte of produced Assembly Instance 101 (Data [0]).
- Produced Assembly Instance 111 is the first eight bytes of produced Assembly Instance 101 (Data [0]...[7]).

Default Data Map - Consumed Assembly Instance 102

Message size: 20 Bytes								
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Data [0]	Pt 07	Pt 06	Pt 05	Pt 04	Pt 03	Pt 02	Pt 01	Pt 00
Data [1]	CNB 07	CNB 06	CNB 05	CNB 04	CNB 03	CNB 02	CNB 01	CNB 00
Data [2]	Reserved							
Data [3]								
Data [4]	Consumed Network Analog Word 0							
Data [5]								
Data [6]	Consumed Network Analog Word 1							
Data [7]								
Data [8]	Consumed Network Analog Word 2							
Data [9]								
Data [10]	Consumed Network Analog Word 3							
Data [11]								
Data [12]	Consumed Network Analog Word 4							
Data [13]								
Data [14]	Consumed Network Analog Word 5							
Data [15]								
Data [16]	Consumed Network Analog Word 6							
Data [17]								
Data [18]	Consumed Network Analog Word 7							
Data [19]								
Where:	Pt = Value of the I/O point CNB = Consumed Network Bit							

You can select other consumed assemblies:

- Consumed Assembly Instance 34 is the first byte of consumed Assembly Instance 102 (Data [0]).
- Consumed Assembly Instance 112 is the first eight bytes of consumed Assembly Instance 102 (Data [0]...[7]).

Default Data Map - Configuration Assembly Instance 123

Message size: 48 Bytes								
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Data [0]	Group Off2On Input filter							
Data [1]								
Data [2]	Group On2Off Input filter							
Data [3]								
Data [4]	FltM 7	FltM 6	FltM 5	FltM 4	FltM 3	FltM 2	FltM 1	FltM 0
Data [5]	FltV 7	FltV 6	FltV 5	FltV 4	FltV 3	FltV 2	FltV 1	FltV 0
Data [6]	IdlM 7	IdlM 6	IdlM 5	IdlM 4	IdlM 3	IdlM 2	IdlM 1	IdlM 0
Data [7]	IdlV 7	IdlV 6	IdlV 5	IdlV 4	IdlV 3	IdlV 2	IdlV 1	IdlV 0
Data [8]	Reserved				RACK	CFO	DM	MP
Data [9]	Reserved							
Data [10]	Masterless Produce Assembly Instance (0, 4, 101, 111)							
Data [11]								
Data [12]	Masterless Produce EPR (ms)							
Data [13]								
Data [14]	Masterless Produce PIT (ms)							
Data [15]								
Data [16]	Peer 0 - Slot/MacID							
Data [17]	Peer 0 - Consume Message Length (bytes)							

Default Data Map - Configuration Assembly Instance 123 (Continued)

Message size: 48 Bytes								
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Data [18]	Peer 0 - EPR (ms)							
Data [19]								
Data [20]	Peer 1 - Slot/MacID							
Data [21]	Peer 1 - Consume Message Length (bytes)							
Data [22]	Peer 1 - EPR (ms)							
Data [23]								
Data [24]	Peer 2 - Slot/MacID							
Data [25]	Peer 2 - Consume Message Length (bytes)							
Data [26]	Peer 2 - EPR (ms)							
Data [27]								
Data [28]	Peer 3 - Slot/MacID							
Data [29]	Peer 3 - Consume Message Length (bytes)							
Data [30]	Peer 3 - EPR (ms)							
Data [31]								
Data [32]	Peer 4 - Slot/MacID							
Data [33]	Peer 4 - Consume Message Length (bytes)							
Data [34]	Peer 4 - EPR (ms)							
Data [35]								
Data [36]	Peer 5 - Slot/MacID							
Data [37]	Peer 5 - Consume Message Length (bytes)							
Data [38]	Peer 5 - EPR (ms)							
Data [39]								
Data [40]	Peer 6 - Slot/MacID							
Data [41]	Peer 6 - Consume Message Length (bytes)							
Data [42]	Peer 6 - EPR (ms)							
Data [43]								
Data [44]	Peer 7 - Slot/MacID							
Data [45]	Peer 7 - Consume Message Length (bytes)							
Data [46]	Peer 7 - EPR (ms)							
Data [47]								
Where:	Filter = 0...65,535 µs (1000 = default) FltM = Fault Mode (0 = Use Fault Value (default), 1 = Hold Last State) FltV = Fault Value (0 = OFF (default), 1 = ON) IdlM = Idle Mode (0 = Use Idle Value (default), 1 = Hold Last State) IdlV = Idle Value (0 = OFF (default), 1 = ON) RACK = Produce with Rack Assembly 4 and Consume Rack Assembly 34 (0 = Disabled (default), 1 = Enabled) CFO = DeviceLogix Communication Fault Override of Outputs 1 = Enabled. When enabled, the DeviceLogix program continues to control the outputs even if there is a communication fault. 0 = Disabled (default). When disabled, the outputs follow the Fault and Idle settings if there is a communication fault. DM = Dependent Mode 1 = Enabled. When enabled, the DeviceLogix program execution follows the Run/Idle state of the owning processor. MP = Masterless Produce 0 = Disabled (default), 1 = Enabled. When enabled, the module will begin producing data at power-up and after a connection with a controller is ended. EPR = Expected Packet Rate PIT = Production Inhibit Time Slot/MacID = Address of peer							

Notes:

DeviceLogix for POINT I/O and ArmorPOINT I/O on Ethernet/ControlNet

In this chapter, you will learn how to perform the following tasks:

- Create a POINT I/O DeviceLogix module in Studio 5000 Logix Designer application when using EtherNet/IP or ControlNet adapters.
- Identify the tags created in your program for your use.
- Use RSNetWorx for DeviceNet to configure the POINT I/O DeviceLogix module.

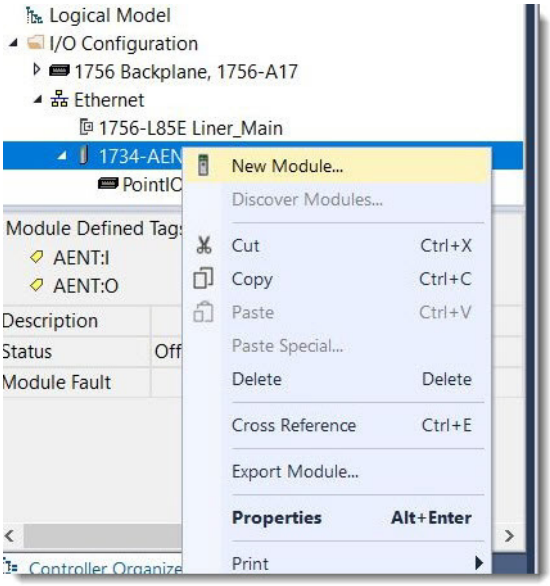
Add a POINT I/O DeviceLogix Module to Studio 5000 Logix Designer application

To add a POINT I/O DeviceLogix module to Studio 5000 Logix Designer application, do the following.

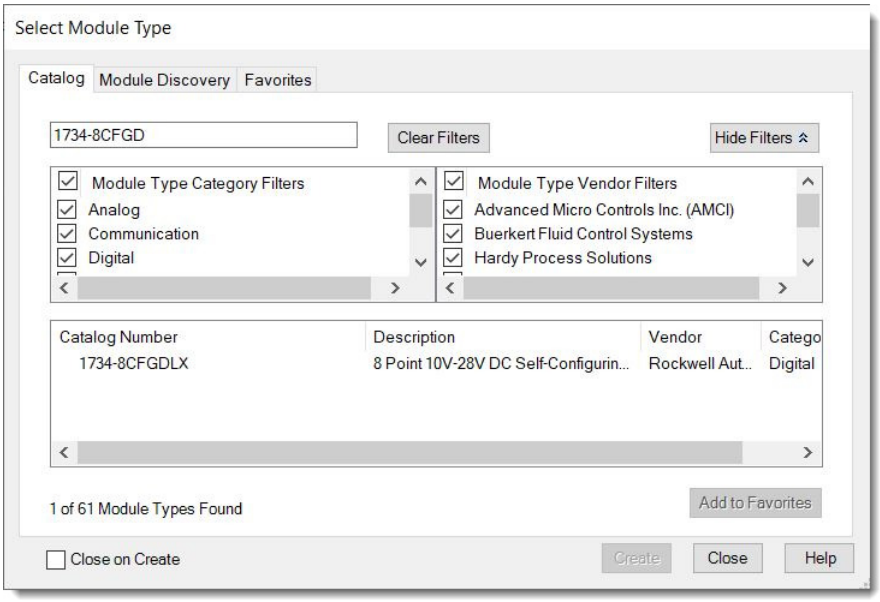
1. In the I/O Configuration tree, find the adapter.

   In this example, we are using the 1734-AENT with the 1734-8CFGDLX. The same procedure applies if you are using an ArmorPOINT I/O DeviceLogix module, or if the network is ControlNet.

2. Right-click the POINT I/O Chassis and select New Module.

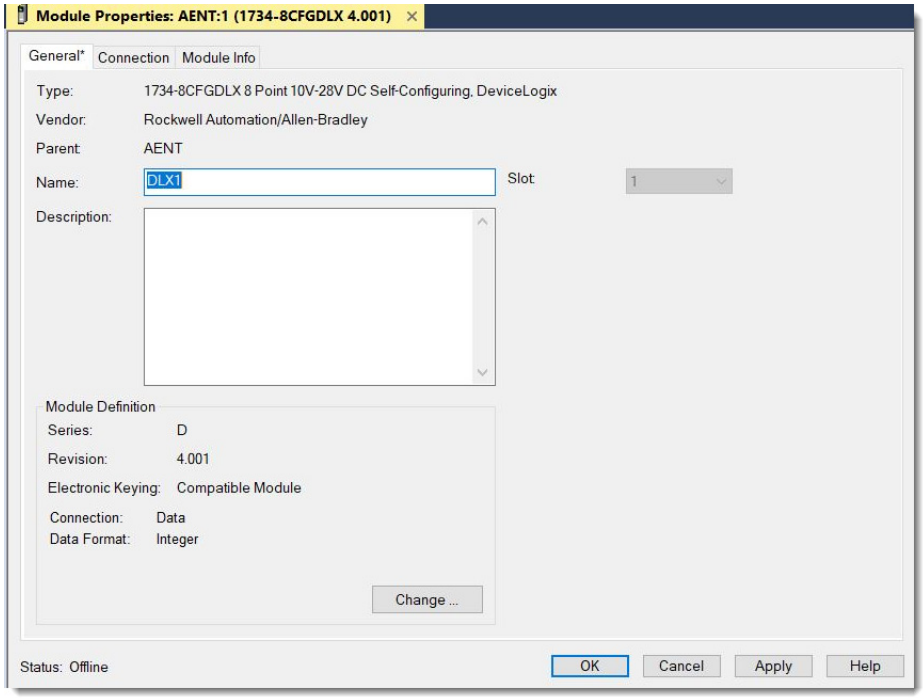


3. Under Digital, double-click the POINT I/O DeviceLogix module.



IMPORTANT If you cannot find the module in the Select Module dialog box, you must install the Add-on Profile (AOP) for the module. You can download the AOP at rok.auto/pcdc.

The following dialog box appears.



4. Enter the slot number in the Slot box.

   It is not possible to make a Rack connection to the POINT I/O DeviceLogix module. The connection must be a direct one.

   On the Connection tab, you can change the Requested Packet Interval (RPI), the default is 20 ms.

   The Module Info tab displays the status and identity information of the module when the module is online.

   There is no tab for configuration. Configuration of the POINT I/O DeviceLogix modules is done only using RSNetWorx for DeviceNet. See Chapter 4 for more details.

The following input tags are created:

- AdapterName:SlotNumber:I.Data
- AdapterName:SlotNumber:I.LogicDefinedData
- AdapterName:SlotNumber:I.Status.LogicEnabled
- AdapterName:SlotNumber:I.Status.Owned
- AdapterName:SlotNumber:I.PeerMissing
- AdapterName:SlotNumber:I.LogicDefinedIntData[0...7]

The following output tags are created:

- AdapterName:SlotNumber:O.Data
- AdapterName:SlotNumber:O.LogicDefinedData
- AdapterName:SlotNumber:O.LogicDefinedIntData[0...7]

I/O Tags

The following table lists the input tags and their descriptions.

List of Input Tags

Tag	Description
Data	This contains the state of eight I/O points. See Chapter 4 for details.
LogicDefinedData	These 8 bits are assigned using the Network Output Bit tags in the DeviceLogix program.
LogicEnabled	When set, the DeviceLogix program is running.
Owned	When set, a master owns the module.
PeerMissing	Each bit represents one of the eight possible peers. If a bit is set, the data from that peer is missing or invalid.
LogicDefinedData[ ]	These eight values are assigned using the Network Output Word tags in the DeviceLogix program.

The following table lists the output tags and their descriptions.

List of Output Tags

Tag	Description
Data	The master sends this value to set the output state of the eight output points. This can be overwritten if the DeviceLogix program is controlling the outputs (Logic Enable On). See Chapter 4 for details.
LogicDefinedData	These 8 bits can be used in the DeviceLogix program with the Network Input Bit tags.
LogicDefinedData[ ]	These eight values can be used in the DeviceLogix program with the Network Input Word tags.

Launch RSNetWorx for DeviceNet to Configure the Module

The POINT I/O DeviceLogix module can only be configured using RSNetWorx for DeviceNet.

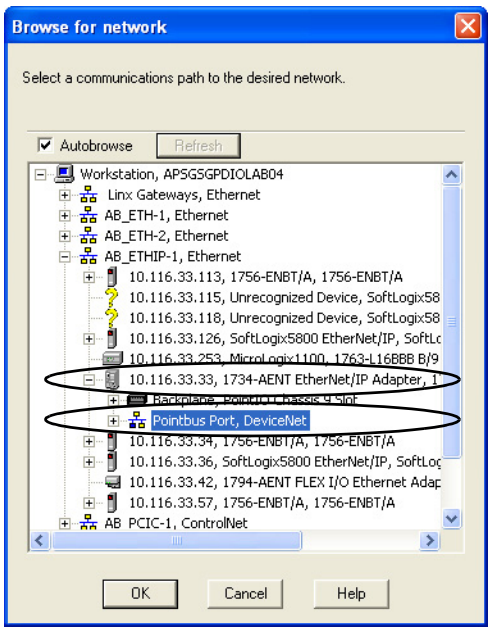
The following example assumes that the module is configured while it is online. If the module is configured offline, then apply the same procedure when you download the contents of the DNT file to the I/O module.

To configure the module:

1. Start RSNetWorx for DeviceNet.
2. Go online by doing one of the following:
   - Click the Online button.
   - On the Network menu, click Online.
   - Press <F10>.

   The Browse for network window appears.
3. Navigate the tree down to the EtherNet/IP or ControlNet POINT I/O or ArmorPOINT I/O adapter.
4. Expand the tree branch for the adapter.

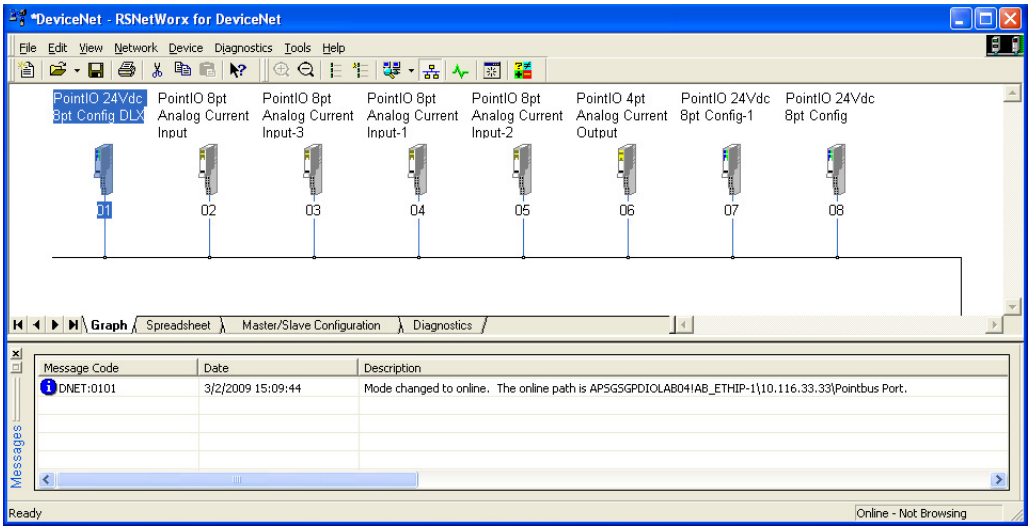
You should see two additional ports. The first is the backplane, and the second is a DeviceNet port. Physically they are the same port, which is the backplane.



RSNetWorx needs a DeviceNet port.

5. Select POINTBus Port, DeviceNet, and click OK.

   RSNetWorx automatically browses the network to discover all participating modules.



IMPORTANT	Note the online path in the Messages window at the bottom half of the screen. This path is saved in the DNT file. To open the file, select Properties on the Network menu.

6. If you are configuring the module offline, you must download the configuration to the module after you go online. To download the configuration, right-click the module's icon and select Download to Device.
7. To change the configuration of a module, double-click that module's icon. Alternatively, you can right-click the icon and select Properties.

   Details on how to configure the module can be found in Chapter 4.

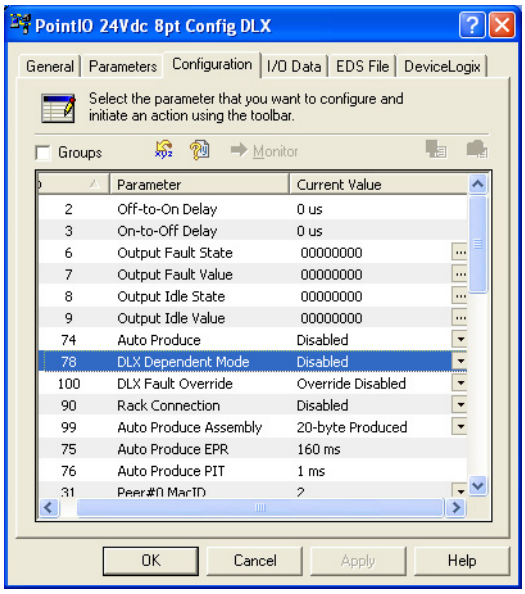
Configure POINT I/O and ArmorPOINT I/O DeviceLogix modules using RSNetWorx for DeviceNet

In this chapter, you will learn how to do the following:

- Configure the module using the Configuration tab.
- Use the data on the Parameters tab.
- Configure peer communication.
- Produce data without using a master.
- Start the DeviceLogix Function Block Editor on the DeviceLogix tab.

Configure the Module Using the Configuration Tab

The following diagram shows the Configuration tab of a POINT I/O DeviceLogix module in RSNetWorx for DeviceNet. The Configuration tab of an ArmorPOINT I/O DeviceLogix module looks similar.



Configuration Tab Parameters

Parameter	Description
Off-to-On Delay	This is the OFF to ON filter constant for all inputs on the module. A high signal must be present for this amount of time before the module reports an ON. The value must be entered in microseconds (µs). The default value is 1000 µs. The minimum value is 0 and the maximum is 65,535 µs. The actual resolution of this value is milliseconds. The user-selected value is truncated at milliseconds. For example, 65,535 µs represents a 65 ms filter value.
On-to-Off Delay	This is the ON to OFF filter constant for all inputs on the module. A low signal must be present for this amount of time before the module reports an OFF. The value must be entered in microseconds (µs). the default value is 1000 µs. The minimum value is 0 and the maximum is 65,535 µs. The actual resolution of this value is millisecond. The user-selected value is truncated at milliseconds. For example, 65,535 µs represents a 65 ms filter value.
Output Fault State	This parameter controls the action of each output during a communication fault. 0 = Go to Output Fault Value (default) 1 = Hold Last State This parameter is ignored if DLX Fault Override is enabled.

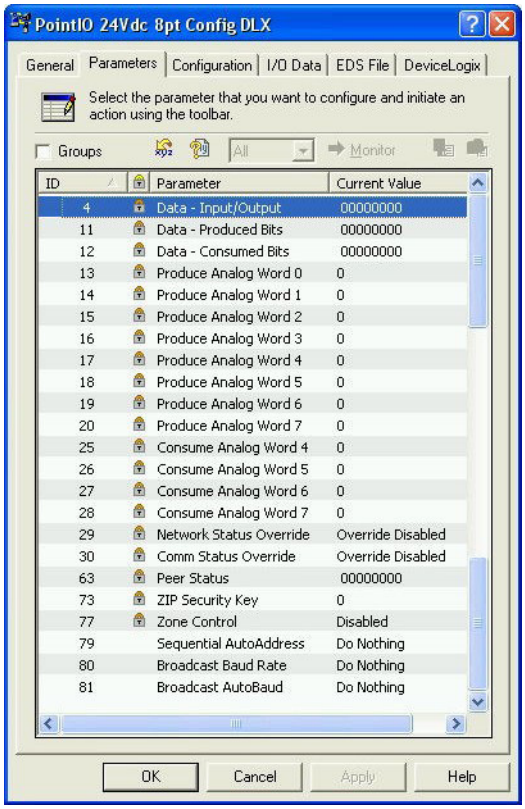
Configuration Tab Parameters (Continued)

Parameter	Description
Output Fault Value	The state of each output if a communication fault occurs. This parameter is ignored if the Output Fault State is set to Hold Last State or if DLX Fault Override is enabled. 0 = OFF (default) 1 = ON
Output Idle State	This parameter controls the action of each output when in Idle state or Program mode. 0 = Go to Output Idle Value (default) 1 = Hold Last State This parameter is ignored if DLX Fault Override is enabled.
Output Idle Value	The state of each output when in Idle state or Program mode. This parameter is ignored if the Output Idle State is set to Hold Last State or if DLX Fault Override is enabled. 0 = OFF (default) 1 = ON
Auto Produce	Enabling this parameter allows the module to produce data without a master. This parameter is disabled by default. If enabled, the module will begin to produce data on the backplane or network after power-up and network address verification (Dup MAC check). The Owned bit in the produced assembly is cleared (0). A master may still make a connection to the module and then the Owned bit will be set (1). If a master connection fails, the module continues to produce data, but the Owned bit is cleared (0). The produced assembly, EPR, and PIT are described later in this table. Auto Produce may be important to support data to peers that are listening.
DLX Dependent Mode	This parameter allows the logic in the module to be enabled or disabled according to the I/O connection status or the state of the owning processor. The default is disabled. If Dependent Mode is enabled, the DeviceLogix program is disabled when the owning processor is in program mode. When the processor transitions to RUN, the logic will automatically be enabled.
DLX Fault Override	When an output is being locally controlled, its state is either controlled by the DeviceLogix program or by the Fault/Idle states. Enabling this parameter allows the local logic to override the Fault/Idle states in there is a communication fault or transition to Idle (Program) state. When this parameter is disabled (default) and a communication fault occurs or when in Idle (Program) state, all outputs, including those that are locally controlled, goes to the Fault/Idle states. Enabling this parameter and using the "Network Fault" status bit (Bus-off or Dup Mac Error) or COS/Cyclic Cnxn Idle/Fault bits in the DeviceLogix program, a controlled stop, or maintenance of a machine state can be achieved when communication is lost with a master.
Auto Produce Assembly	When the Auto produce parameter is enabled, this parameter selects which assembly to produce: 000: 20-byte assembly (default) 004: 1-byte assembly 101: 20-byte assembly 111: 8-byte assembly For details on the contents of the assembly, see I/O Data Assembly Maps on page 19. For the list of I/O tags, see I/O Tags on page 25. The 20-byte assembly contains all data. The 8-byte assembly can be produced in one packet (non-fragmented).
Auto Produce EPR	When the Auto Produce parameter is enabled, this parameter sets the Expected Packet Rate. The units are milliseconds (ms). The default is 1000 ms. The maximum is 65,535 ms and the minimum is 0 ms. When Auto Produce is enabled, the module produces data at every change of state (COS) or when the EPR timer expires.
Auto Produce PIT	When the Auto Produce parameter is enabled, this parameter sets the Product Inhibit Time. The units are milliseconds (ms). The default is 1 ms. The maximum is 65,535 ms, and the minimum is 0 ms. If a Change of State occurs and the PIT has not expired, the message waits until the PIT has expired. This can be used to help prevent one module from using all available network bandwidth.

Configuration Tab Parameters (Continued)

Parameter	Description
Peer #xx MacID	There are eight (0...7) peer Mac ID parameters. Each one defines the MacID or Slot Number of the peer from which this module consumes data. The default is "No Connection." You can enter the MacID or Slot number, 0...63, or a relative offset from the address of the module (-4 to +4). Once a valid MacID is set, Peer Exists = 1 in DeviceLogix program. See more details on peer configuration later in this chapter and in Appendix A.
Peer #xx Size	There are eight (0...7) Peer Size parameters. Each one defines the size in bytes of the message that is received from the peer. The default and maximum value is 24 bytes. The minimum is 1 byte. See Appendix A for peer message sizes of POINT I/O and ArmorPOINT I/O modules. If the received message size does not match the Peer Size value, the data is considered invalid and the appropriate error bits are set (Produced assembly: Peer Missing = 1. In DeviceLogix program: Peer Data valid = 0.) This parameter is ignored if the Peer MacID is set to "No Connection."
Peer #xx EPR	There are eight (0...7) Peer EPR parameters. Each one defines the Expected Packet Rate in milliseconds (ms) of the peer connection. If this module does not receive valid data from a peer for 4 times the EPR, the appropriate error bits are set (Produced assembly: Peer Missing = 1. In DeviceLogix program: Peer Data Valid = 0.) The default value is 1000 ms. The maximum is 65,535 ms and the minimum is 0 ms. This parameter is ignored if the Peer MacID is set to "No Connection."

View Parameters on the Parameter Tab



Parameter Tab Parameters

Parameter	Description
Data - Input/Output	This parameter is the same as the first byte of the Produced I/O assembly. It is the state of the eight I/O points.
Data - Consumed Bits	This parameter is the same as the second byte of the Consumed I/O assembly. It is the state of the Consumed Network Bits or User-Defined Bit Data.
Consumed Analog Word #xx	These eight parameters are from the Consumed I/O assembly. They contain the state of the Consumed Network Words or User-Defined Word Data.
Network Status Override	This is a legacy Parameter for DeviceLogix and ZIP. It shows the state of Network Status Override.

Parameter Tab Parameters (Continued)

Parameter	Description
Comm Status Override	This is a legacy Parameter for DeviceLogix and ZIP. It shows the state of Communication Status Override.
Peer Status	The 8 bits in this parameter are used to determine the connection status of a peer.
ZIP Security Key	This is a legacy parameter for DeviceLogix and ZIP (Zone Interlock Parameters). The ZIP Security Key is a 16-bit value that is used to uniquely identify a module and its configuration. This value can be used in the DeviceLogix program to verify that the configuration of a peer has not changed. More details on using the ZIP Security Key is provided in the later part of this chapter.
Zone Control	This is a legacy parameter for DeviceLogix and ZIP. It shows the state of Zone Control, whether it is enabled or disabled
Sequential Auto Address	Use this parameter only in a DeviceNet system. It is used to set another POINT I/O or ArmorPOINT I/O module to the right of this module to a node address one greater than this module. This message propagates to all modules to the right. Each address changes to one greater than its neighbor.
Broadcast Baud Rate	Use this parameter only in a DeviceNet system. It is used to set another POINT I/O or ArmorPOINT I/O module to the right of this module to the desired baud rate. 1: 125 kHz 2: 250 kHz 3: 500 kHz The only way that a module can achieve a 1 MHz baud rate is by using the AutoBaud feature.
Broadcast AutoBaud	Use this parameter only in a DeviceNet system. It is used to set another POINT I/O or ArmorPOINT I/O module to the right of this module to Autobaud (enable) or used to save the baud rate (disable).

Configure Peer Communication

This section describes how to configure the POINT I/O and ArmorPOINT I/O DeviceLogix module to consume data from peers. The POINT I/O DeviceLogix module can use data from other modules to affect the DeviceLogix program.

The module can perform the following functions:

- Get change of state (COS) data from up to eight I/O modules or peers.
- Each peer can have up to 24 bytes of data.
- Each peer has its own expected packet rate.
- Each peer has its own status bit that can be used in logic.
- The data from each peer can be digital (bit), analog (16-bit words), or a mixture of both.

The following functions are not supported:

- Make a connection
- Configure a peer
- Control outputs on a peer
- Listen to a peer that is on another network

  The module can only listen to peers on the backplane or local DeviceNet network.
- Consume data from a safety connection

  The module can consume data from a safety module with a standard connection.
- Consume data that is sent to a peer from a master

Set Up Peer Communication Parameters

For each peer, you must configure a set of parameters.

Here are the three parameters in their default settings (no peer data).

Parameter Number	Parameter Name	Description	Default Value
31	Peer#0 MacID	Slot number	No connection
39	Peer#0 Size	Input data size	24 bytes
65	Peer#0 EPR	Expected packet rate	1000 ms

Example

To listen to the data from a 1734-IB4 module in the first slot (node 1), you can configure the parameters in the following way:

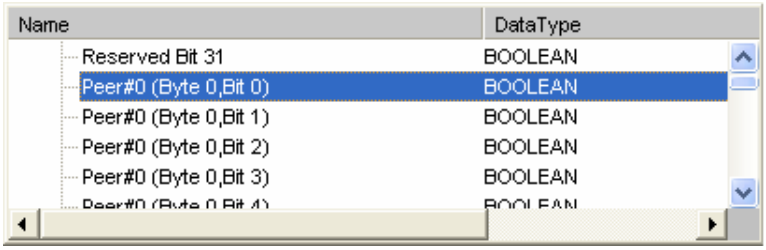
Parameter Number	Parameter Name	Description	Example Value
31	Peer#0 MacID	Slot number	1
39	Peer#0 Size	Input data size	1 byte
65	Peer#0 EPR	Expected packet rate	100 ms

The 1734-IB4 is "Peer#0". Enter its produced data size, "1" as its input data size. If the module does not consume data from this peer in four times the expected packet rate (EPR), which is 400 ms in this case, the Peer #0 connection fault bit is set.

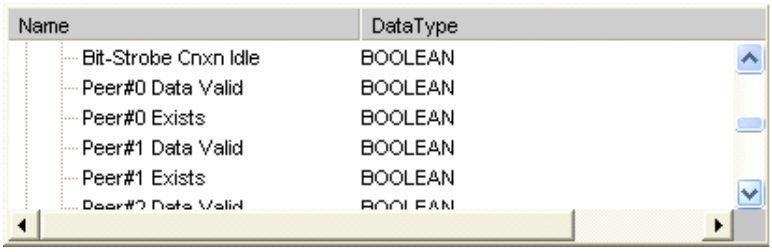
The contents of the data are mapped to the Peer#0 data table.

To use the data from the 1734-IB4 in the DeviceLogix editor, click to place a Boolean bit input on the function block sheet, and select the desired bit to use in logic under the "Network Boolean Input" category.

Select bit0 of byte0. With up to 24 bytes of data available for mapping, the last entry is "Peer#0 (Byte 23, Bit7)." 192 bits per peer can be used for a total of 1536 data bits.



You are highly encouraged to use the connection status bits to verify that the device is receiving valid data from the peer. They are located under the Status Input category of the "bit input" I/O tags.



In our example, "Peer#0 Data Valid" is set to 1 when the POINT I/O DeviceLogix module is consuming data from the peer that is timely (which is, within the EPR timeout) and of the correct length. No other checking is done on the data by the module.

"Peer#0 Exists" is set to 1 when a peer connection has been configured. Analog data can also be used in a peer connection. If a 1734-IE4C module is in the third slot, you can configure the POINT I/O DeviceLogix module like this:

Parameter Number	Parameter Name	Description	Example Value
32	Peer#0 MacID	Slot number	3
40	Peer#0 Size	Input data size	12 bytes
66	Peer#0 EPR	Expected packet rate	500 ms

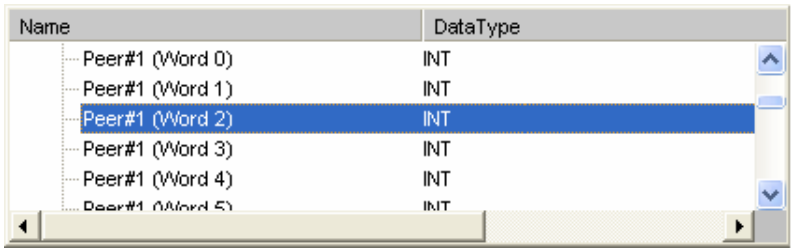
The 1734-IE4C has an input message that looks like this:

Default Data Map for the 1734-IE4C Analog Input Module

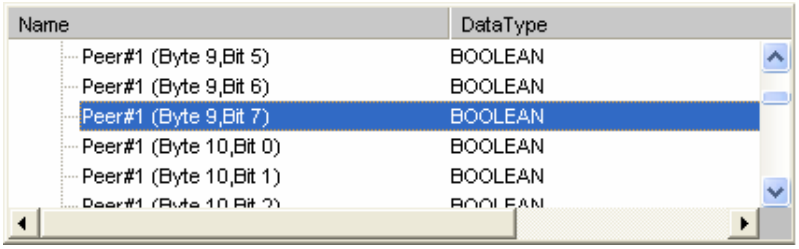
Message size: 12 Bytes																
Byte	**15**	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**
Produces (scanner Rx)	Input Channel 0 High Byte								Input Channel 0 Low Byte							
	Input Channel 1 High Byte								Input Channel 1 Low Byte							
	Input Channel 2 High Byte								Input Channel 2 Low Byte							
	Input Channel 3 High Byte								Input Channel 3 Low Byte							
	Status Byte for Channel 1								Status Byte for Channel 0							
	OR	UR	HHA	LLA	HA	LA	CM	CF	OR	UR	HHA	LLA	HA	LA	CM	CF
	Status Byte for Channel 3								Status Byte for Channel 2							
	OR	UR	HHA	LLA	HA	LA	CM	CF	OR	UR	HHA	LLA	HA	LA	CM	CF

To use the analog data from channel 2, click to place an analog bit input on the function block sheet in the DeviceLogix editor.

Channel 2 is mapped to Word 2. Select this Word as shown in the following example. For help on mappings, see Peer Data Maps on page 55.



To use the overrange bit of channel 1, you can use "bit input" I/O tag and select Peer#1, byte 9, bit 7.



Again, it is best to use the Peer Connection Status bits (Peer#1 Data Valid and Peer#1 Exists) to validate the data before using it.

If the POINT I/O DeviceLogix module is consuming data from a peer that has double precision analog data (32-bit), like the 1734-VHSC24, the data can be used in logic by addressing the high-word and low-word separately. By using math functions (multiply and add), the two words can be combined into one value.

See Very High-Speed Counter Input Modules on page 63.

Produce Data Without Using a Master

With the POINT I/O DeviceLogix module (and other DeviceLogix modules that support "ZIP"), you can send data to another listener without a network master to create the connection.

The following parameters are used to configure this feature:

Parameter Number	Parameter Name	Description	Default Value
74	Auto Produce	See Auto Produce on page 28.	Disabled
75	Auto Produce EPR	See Auto Produce EPR on page 28.	1000 ms
76	Auto Produce PIT	See Auto Produce PIT on page 28.	1 ms
99	Auto Produce Assembly	See Auto Produce Assembly on page 28.	20 bytes produced (default)

Soon after power-up and getting online, when Auto Produce is enabled, the POINT I/O DeviceLogix module begins producing change of state (COS) type I/O data on the connected network or backplane. It produces the selected "Auto Produce Assembly" at the selected "Auto Produce EPR" (Expected Packet Rate).

The Auto Produce Assembly data can be:

- 20 bytes of produced data (it sends all possible data)
- 8 bytes of produced data (this does not require the fragmentation protocol, so it reduces network bandwidth)
- 1 byte of produced data (only the state of the 8 I/O)

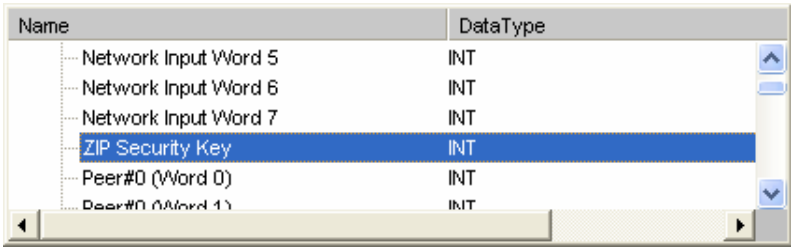
A description of these assemblies can be found in DeviceLogix for POINT I/O and ArmorPOINT I/O on DeviceNet on page 15.

The Auto Produce EPR sets the cyclic rate at which data is produced if there is no change of I/O state. If there is a change of state, new data is produced immediately. If data changes often, to reduce change of state traffic on the network, you can increase the Auto Produce Production Inhibit Time (PIT).

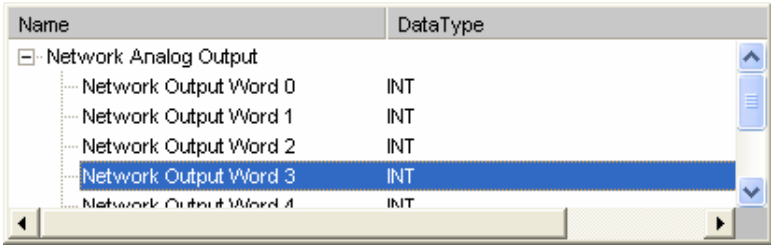
For example, if the PIT is set to 10 ms, the quickest the module can produce data is once every 10 ms even if there is a change of state.

Auto Produce is only recommended on a DeviceNet network in situations where a master is not required.

Because there is no master to verify the connection and the configuration of each module, it is recommended that the ZIP Security Key be produced in the data. This unique number is calculated using the identity of the module and the present configuration. The ZIP Security Key value is in the DeviceLogix Logic Editor, under the Analog Input I/O tags.

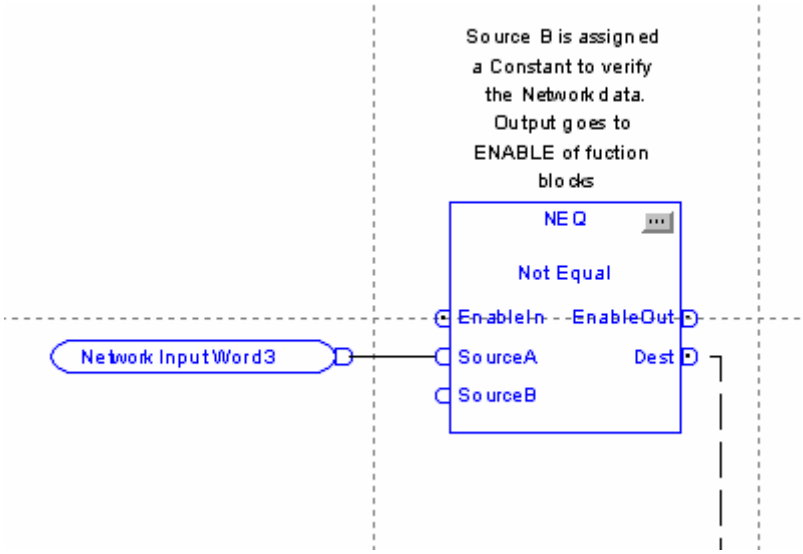


The output of the Analog Input I/O tag can be wired to the input of an Analog Output I/O tag to map it into the Produced Assembly Image:



In this example, the ZIP Security Key is mapped to Network Output Word 3.

Any module that receives this data should verify the constant value. For example:



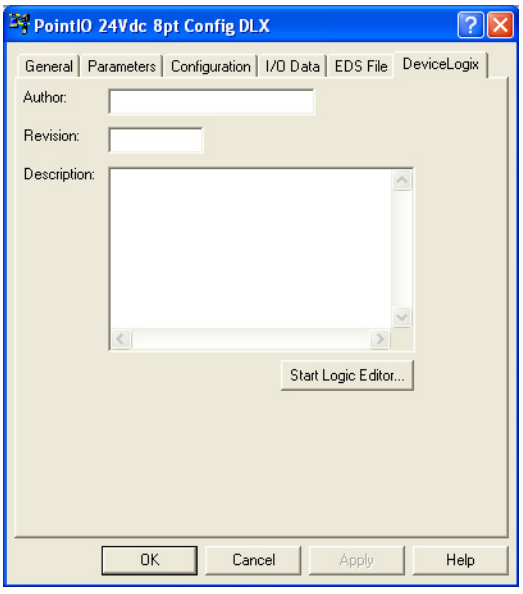
The ZIP Security Key constant is added using the ellipses button of the NEQ function block. This output can be used to condition the execution of other function blocks using the Enable input.

There could be an "unsigned value to signed value conversion" when the ZIP Security Key is displayed in the Logic Editor, which leads to a mismatch of displayed value. However, the value is consistent in HEX format.

Start the Function Block Editor

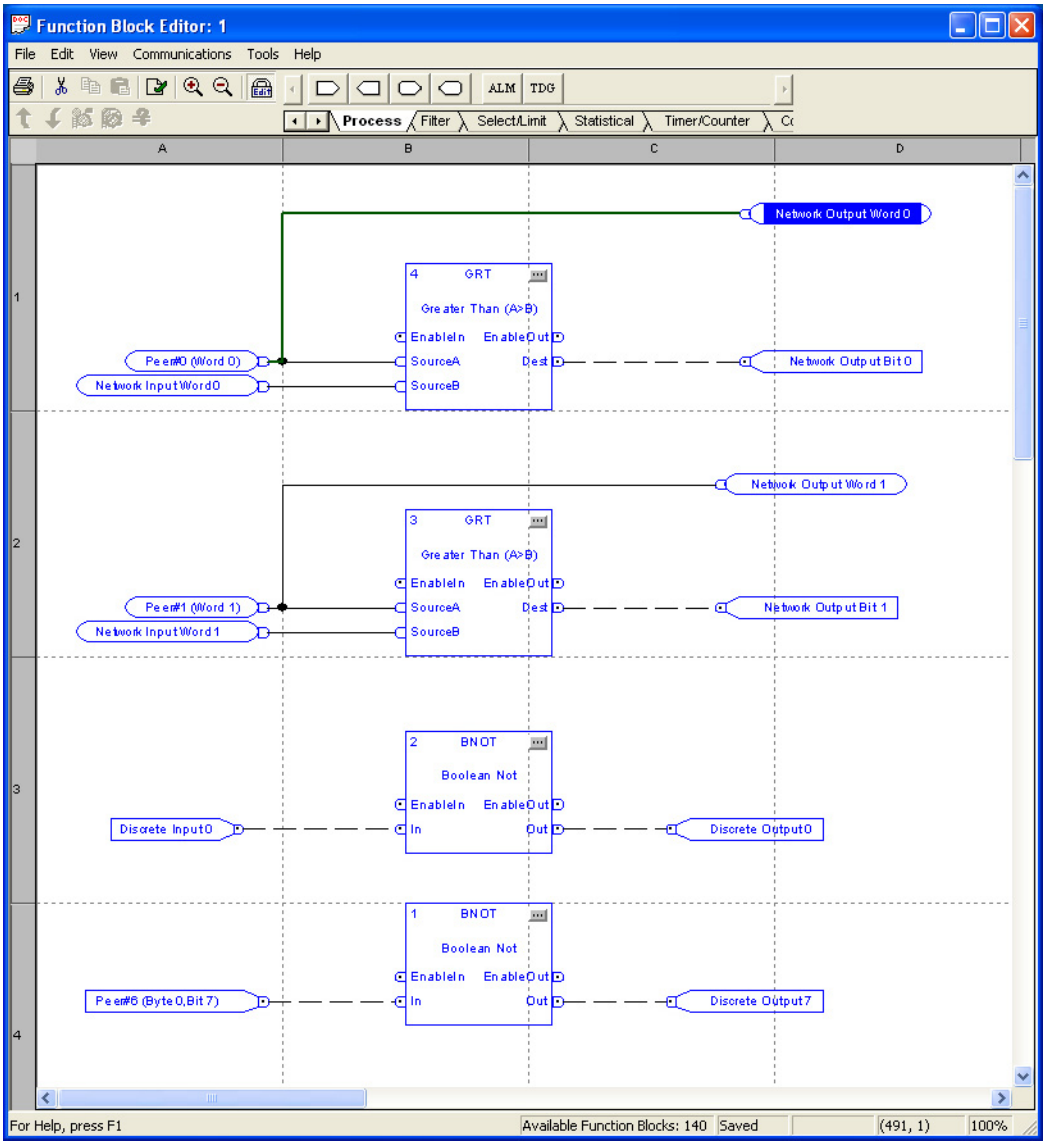
To start the Function Block editor, do the following.

1. Go to the property dialog box of the module.
2. Click the DeviceLogix tab, followed by Start Logic Editor.



On this tab, you can enter the Author's name, revision, and description of the logic program. These are generic text fields. They are saved in the DNT file that is created by the RSNetWorx for DeviceNet application.

If a program is saved in the DNT file, it is displayed.



To learn how to use this editor, see Chapter 2 of the DeviceLogix System User Manual, publication RA-UM003. For specific uses of the POINT I/O and ArmorPOINT I/O DeviceLogix modules, proceed to DeviceLogix Capabilities on page 37.

Notes:

DeviceLogix Capabilities

This chapter lists the DeviceLogix capabilities that the POINT I/O DeviceLogix and ArmorPOINT I/O DeviceLogix modules support.

Function Block Instructions

The module can support up to 144 function blocks. These function blocks are categorized in the following manner:

- Process
- Filter
- Select/Limit
- Statistical
- Timer/Counter
- Comparison
- Compute/Math
- Move/Logical

Process Category

The process category includes the following instruction types:

- Alarm
- Timing Diagnosis

Alarm

The Alarm function block initiates an alert that is based on the comparison between the input value and the threshold. The output of the DeviceLogix Alarm function block contains these alerts.

- High-High alarm
- High alarm
- Low alarm
- Low-Low alarm

Timing Diagnosis

The DeviceLogix Timing Diagnosis function block object determines whether the occurrence of the expected event is within the preset timing interval.

For more information on the Alarm and Timing Diagnosis function blocks, See the DeviceLogix System User Manual, publication RA-UM003.

Filter Category

The Filter category includes one instruction type: Low Pass Filter.

Low Pass Filter

The DeviceLogix Low Pass Filter (LPF) function block provides a filter to attenuate the input frequency above the cutoff frequency. The module supports only two instances of the LPF function block.

For more information on the Low Pass Filter function block, see the DeviceLogix System User Manual, publication RA-UM003.

Select Limit Category

The Select Limit category includes the following instruction types:

- Select
- High Low Limit

Select

The DeviceLogix Select function block identifies one input within the selected two function block inputs as the output according to the value of the selector. The Select function block is outlined in detail as follows.

```
IF Selector = 1
    Output = value of Input 2
IF Selector = 0
    Output = value of Input 1
END
```

High/Low Limit

The DeviceLogix High/Low Limit function block limits the input value within the specified data range. The High/Low Limit function block is outlined in detail as follows.

```
IF value of Input > HighLimit
    Output = HighLimit
ELSE IF value of Input < LowLimit
    Output = LowLimit
ELSE
    Output = Input
END
```

For more information on the Select and High/Low Limit function block, see the DeviceLogix System User Manual, publication RA-UM003.

Statistical Category

The statistical category includes one instruction type: Moving Average.

Moving Average

IMPORTANT	The module supports only two instances of the Moving Average (MAV) function block.

The DeviceLogix Moving Average function block calculates a time average value for the input signal.

For more information on the Moving Average function block, see the DeviceLogix System User Manual, publication RA-UM003.

Timer/Counter Category

The Timer/Counter category includes the following instruction types:

- On-delay Timer
- Off-delay Timer
- Pulse Timer
- Up Counter
- Down Counter
- Up/Down Counter

IMPORTANT From DeviceLogix firmware revision 5 onwards, the accumulator (ACC) is available as output for Timer and Counter.

For more information on the Timer/Counter category, see the DeviceLogix System User Manual, publication RA-UM003.

Comparison Category

The Comparison category includes basic comparison functions, including these instruction types:

- Greater Than (GRT)
- Greater Than or Equal To (GEQ)
- Equal (EQU)
- Not Equal (NEQ)
- Less Than (LES)
- Less Than or Equal (LEQ)
- Mask (MEQ)

Operation rules [all except Mask (MEQ)]

The conditions and outputs of each function block are described as follows.

Function Block Type	Condition	Output
Greater Than (GRT)	Source A > Source B	1
	Source A <= Source B	0
Greater Than or Equal (GEQ)	Source A >= Source B	1
	Source A < Source B	0
Equal (EQU)	Source A == Source B	1
	Source A!= Source B	0
Not Equal (NEQ)	Source A!= Source B	1
	Source A == Source B	0
Less Than (LES)	Source A < Source B	1
	Source A >= Source B	0
Less Than or Equal (LEQ)	Source A <= Source B	1
	Source A > Source B	0

Operation rules [Mask (MEQ) only]

The Mask process is outlined as follows:

```
IF (Source AND Mask) == (Compare AND Mask)
    Output is Set
ELSE
    Output is Clear
END
```

For more information on the Comparison category, see the DeviceLogix System User Manual, publication RA-UM003.

Compute Category

The Compute category includes fundamental arithmetic operations, including the instruction types:

- Add (ADD)
- Multiple (MUL)
- Subtract (SUB)
- Divide (DIV)
- Modulus (DINT)
- Modulus (REAL)
- Absolute (ABS)
- Negative (NEG)
- Square Root (SQR)
- Power (XPY)

Operation rules

The outputs of each function block are described as follows.

Function Block Type	Output
Add (ADD)	= Source A + Source B
Multiply (MUL)	= Source A x Source B
Subtract (SUB)	= Source A - Source B
Divide (DIV)	= Source A / Source B
Modulus (DINT)	= Source A - (Source A / Source B) x Source B
Modulus (REAL)	= Source A - (DINT)(Source A / Source B) x Source B
Absolute (ABS)	= Absolute value of (Source A)
Negative (NEG)	= -Source A
Square Root (SQR)	= Square root of (Source A(1))
Power (XPY)	= Source A ^ Source B

(1) If Source A is negative, the operation takes the absolute value of Source A before calculating the square root and no fault is reported.

Move/Logical Category

The Move/Logical category includes fundamental bit type logic operations, including the instruction types:

- Boolean
  - AND (BAND)
  - Not AND (BNAND)
  - OR (BOR)
  - Not OR (BNOR)
  - Exclusive OR (BXOR)
  - Exclusive Not OR (BXNOR)
  - NOT (BNOT)
- Latch
  - Set Latch (SETD)
  - Reset Latch (RESD)

Boolean Functions

The Boolean functions are as follows. The number of inputs can be changed on some functions but are limited to a maximum of four. The latch instruction type has two fixed inputs, "Set" as input 1 and "Reset" as input 2.

Function Block Type	Input 1	Input 2	Output
AND (BAND)	0	0	0
	0	1	0
	1	0	0
	1	1	1
Not AND (BNAND)	0	0	1
	0	1	1
	1	0	1
	1	1	0
OR (BOR)	0	0	0
	0	1	1
	1	0	1
	1	1	1
Not OR (BNOR)	0	0	1
	0	1	0
	1	0	0
	1	1	0
Exclusive OR (BXOR)	0	0	0
	0	1	1
	1	0	1
	1	1	0
Exclusive Not OR (BXNOR)	0	0	1
	0	1	0
	1	0	0
	1	1	1
NOT (BNOT)[1]	0	–	1
	1	–	0

(1) The Input number can be set in a property page; the default number is 2. BNOT has only one input.

Latch Functions

There are two kinds of Latch functions: Set Dominant Latch (SR) and Reset Dominant Latch (RS). Unlike the Latch in Studio 5000 Logix Designer application, DeviceLogix Latch requires the Reset binding. So the Set/Reset appears in pair and the RS type and SR type have different element order. See its truth table as follows.

Function Block Type	Reset	Set	Value at Time + T_0	Value at Time + T_{0+1}
SR (Set Dominant)	0	0	0	0
	0	1	0	1
	1	0	0	0
	1	1	0	1
	0	0	1	1
	0	1	1	1
	1	0	1	0
	1	1	1	1
RS (Reset Dominant)	0	0	0	0
	0	1	0	1
	1	0	0	0
	1	1	0	0
	0	0	1	1
	0	1	1	1
	1	0	1	0
	1	1	1	0

For more information on the Move/Logical category, see the DeviceLogix System User Manual, publication RA-UM003.

Logic Execution Time

The execution time is dependent on the total number of function blocks that are used in the entire DeviceLogix program.

Number of Function Blocks	Approximate Expected Execution Time
0...40	1 ms
41...100	2 ms
101...144	3 ms

The module executes the entire logic program before applying the outputs.

The module follows these steps:

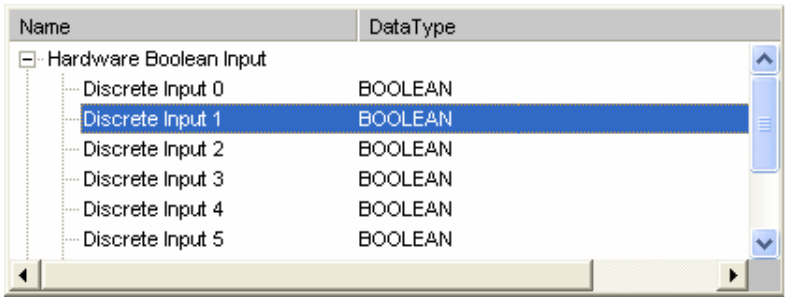
1. Sample all inputs (hardware, network, peer).
2. Execute logic.
3. Apply all outputs (hardware, network).

Digital Inputs to Function Blocks

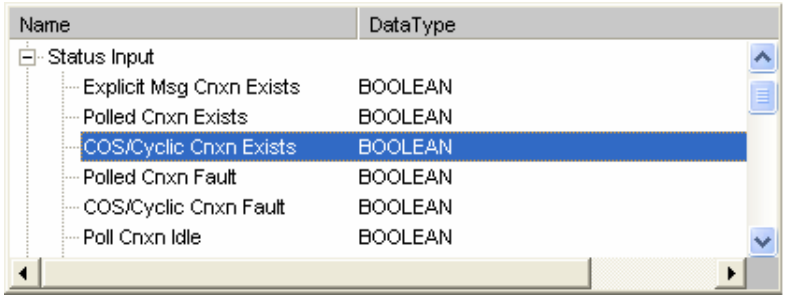
When the Bit Input I/O tag connector is added to the DeviceLogix editor, the following input options are available:

Hardware

Discrete Input 0 through Discrete Input 7 are the states of the eight I/O points on the module.



Status



The following is a list of status bits that can be selected. Most are used only in a DeviceNet network:

- Explicit Msg Cnxn Exists
- Polled Cnxn Exists
- COS/Cyclic Cnxn Exists
- Polled Cnxn Fault
- COS/Cyclic Cnxn Fault
- Polled Cnxn Idle
- Network Fault
- Minor Module Fault
- Bit-Strobe Cnxn Exists
- Bit-Strobe Cnxn Fault
- Bit-Strobe Cnxn Idle

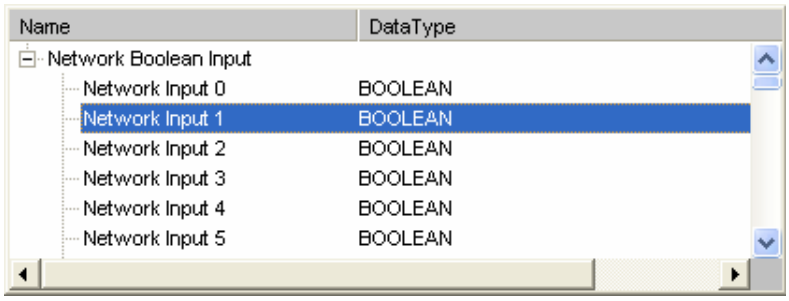
If you are using the EtherNet/IP or ControlNet adapter, it is suggested that you use the COS/Cyclic connection status bits to determine the health of the connection with a master.

The following are the status bits for the eight Peer connections:

- Peer#X Data valid
- Peer#X Exists

Use the Exists bits to determine if a connection is configured, and the Data Valid bit to check if the data from the peer has been received in the expected time (EPR) and with the expected data size.

Network



Network Input 0 through Network Input 7 are sent to the DeviceLogix program through the Output Data assembly byte 1. In Studio 5000 Logix Designer application, the tag name for these bits is UserDefinedBitData.

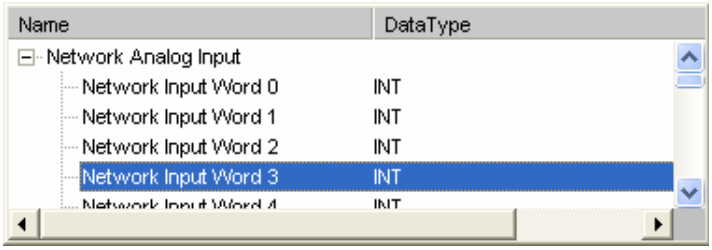
Reserved Bit 8 through Reserved Bit 31 are legacy bits and should not be used.

There are many Peer#X (Byte X Bit X) bits. This is a mapping of 24-byte bit data for the eight peer connections. You must know the Input Memory map of each of the peers to use this data. See Peer Data Maps on page 55.

Analog Inputs to Function Blocks

When the Analog Input I/O tag connector is added to the DeviceLogix editor, the following options are available.

Network Analog Input



Network Input Word 0 through Network Input Word 7 are sent to the DeviceLogix program through the Output Assembly. In Studio 5000 Logix Designer application, the tag name for these words is UserDefinedWordData[0...7].

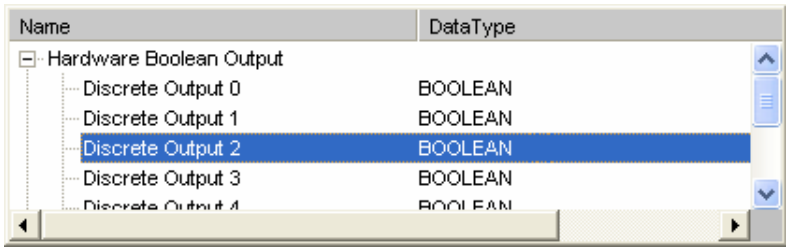
The ZIP Security Key defines a unique number that can be sent to a peer to verify the identity and configuration of the module. The ZIP key can be directly tied to a Network Output Word in the DeviceLogix program.

Peer#x (Word x)

There are eight groups of peer data (0...7) and 12 words within each group. These are the eight peers and up to 24 bytes of data mapped from each peer. You must know the input data map from each peer to know what data to use. See Peer Data Maps on page 55.

Digital Outputs from Function Blocks

Hardware

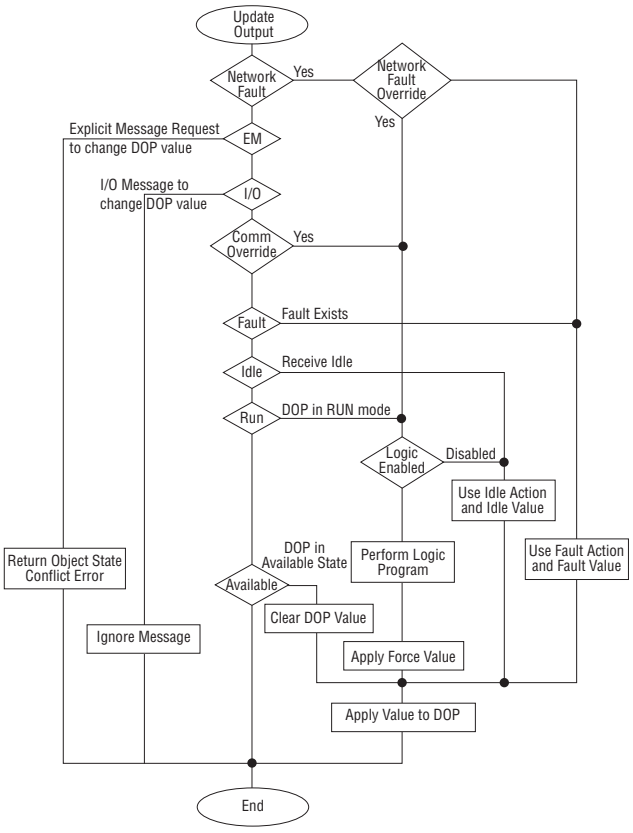


Discrete Output 0 through Discrete Output 7 are the eight hardware outputs available on the module. If these tags are unused (that is, not mapped in the DeviceLogix program), then there is a virtual mapping from the Data Byte Output Assembly to the output point. This means that the output is under the control of the owning processor. If the Discrete Output is mapped in logic, it is controlled by the module.

Virtual Connection if Output Not Used in Logic

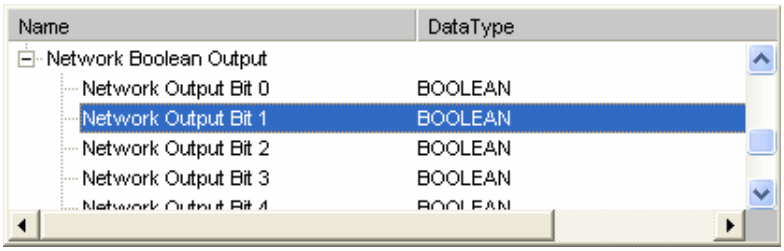
This flowchart shows the process and priority that the module follows when updating each Digital Output Point (DOP). The process considers module states such as Network Fault and Run/Idle, configurable parameters such as Network Fault Override, and Logic states such as Logic Enabled and Force.

Output Ownership (Value Source Selector Behavior for Bound Outputs)



DOP: Digital Output Point
EM: Explicit Message

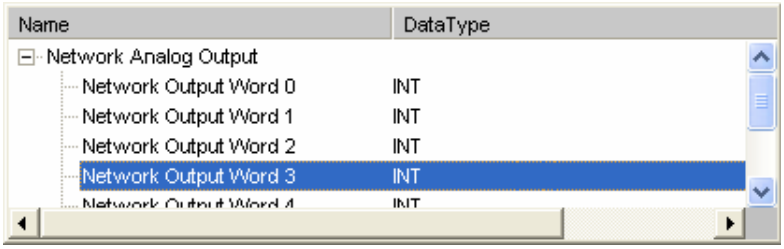
Network



Network Output Bit 0 through Network Output Bit 7 are mapped to the Input I/O Assembly byte 1. These bits can be sent to the owning processor or to other peers. In Studio 5000 Logix Designer application, the tag name is UserDefinedBitData.

Analog Outputs from Function Blocks

Network



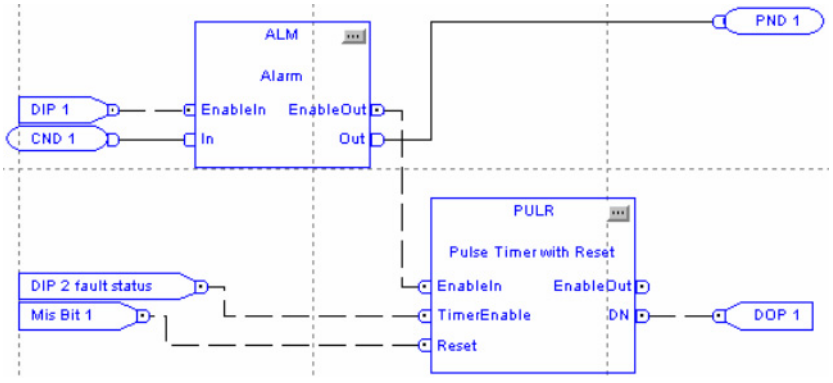
Network Output Word 0 through Network Output Word 7 are mapped to the Input I/O Assembly. These words can be sent to the owning processor or to other peers. In Studio 5000 Logix Designer application, the tag name is UserDefinedWordData[0...7].

Enable Line Feature

Each instruction type in the Function Block Editor supports the Enable Line feature. When an instruction supports the Enable Line feature, that particular instruction can only be executed when Enable Line is on; otherwise, that instruction maintains the data from the last data scan. In this manner, functions can be executed conditionally based on the state of the Enable input. Under normal conditions, the Enable output will have the same value as the input, passing the enable information to the next instruction. Certain error conditions that occur within the processing of a function block may cause the Enable output to go false.

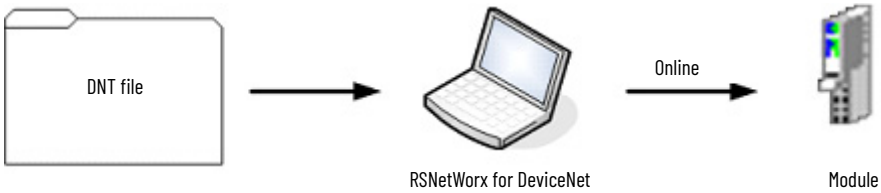
If the Enable Line feature is used, EnableIn can be connected to an input I/O tag or the output of another function block. The EnableIn input retains the value of the source that it is bound to.

If the Enable Line feature is not needed, the EnableIn input can use a constant value that can be set on each instruction's property page. By default, this constant allows the execution of the function.



Offline and Online Editing

Editing of the configuration and DeviceLogix program can be done offline and saved in the DNT file that is created by RSNetWorx for DeviceNet. The changes, however, must be manually downloaded to the module while online. When using Studio 5000 Logix Designer application with an EtherNet/IP or ControlNet adapter, the forward open to the DeviceLogix module does not contain any configuration information. The configuration must be sent via RSNetWorx for DeviceNet while online.



The I/O module saves the configuration and DeviceLogix program locally (inside the module). You must download the configuration once. If you replace the device, you must download the configuration to the new module.

Before the DeviceLogix program executes, it must be enabled. You can do this using the Editor while online. For details, see Enable/Disable Logic on page 47. Alternatively, you can use the owning processor to enable the program. For details, see Messaging on page 47.

Enable/Disable Logic

For logic to execute, it must be enabled. While editing online with RSNetWorx for DeviceNet, you can enable logic.

Logic Enable On

Use the Logic Enable On function to notify the device to start processing the stored logic diagram. To set Logic Enable On, select Communications > Logic Enable On.

Logic Enable Off

Use the Logic Enable Off option to notify the device to stop executing the logic program. When you select this option, the device enters an idle state and turns off the Logic Enable Bit in the produced data. The Logic Enable bit in the Produced I/O assembly of the device reflects a 0 or 1 for Logic Enable Off or Logic Enable On. To set Logic Enable Off, select Communications > Logic Enable Off.

Dependent Mode

Logic is also enabled or disabled if the Dependent Mode parameter is Enabled. In this case, logic executes following the state of the owning connection. When the connection is in RUN, the logic is enabled. When the connection is in Idle, Fault, or non-existent, logic is disabled.

You can also enable or disable logic through explicit messages from the owning controller. See Messaging on page 47.

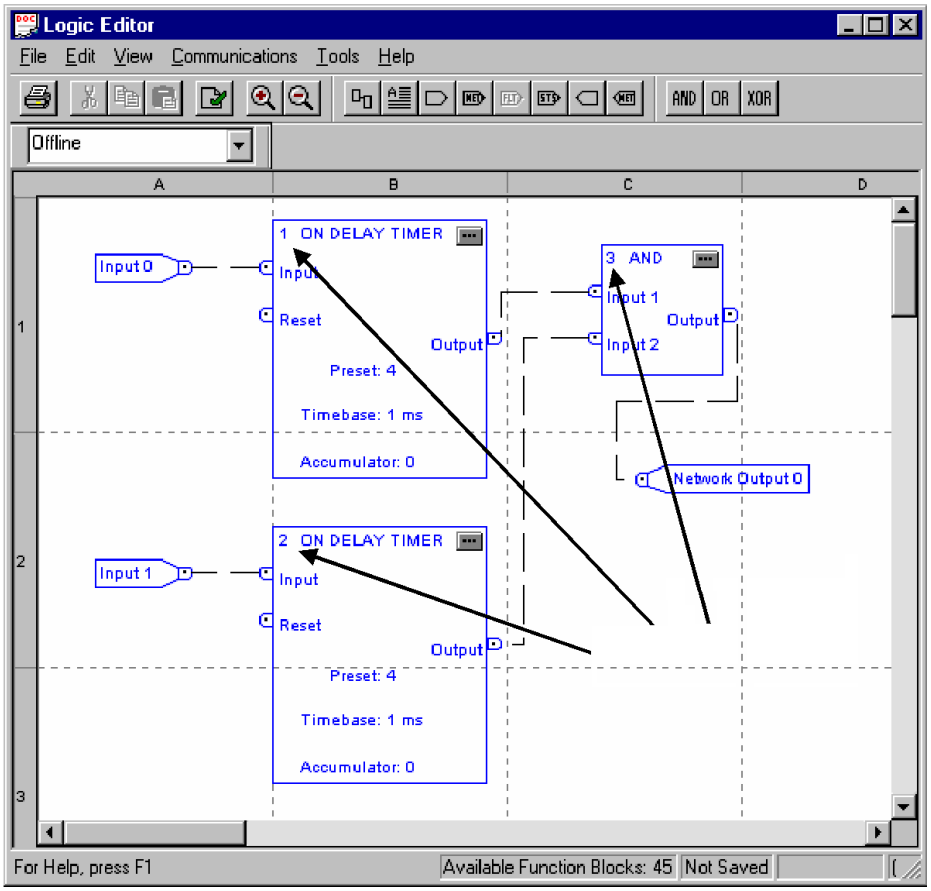
Messaging

There are certain parameters that you may want to SET or READ from the module that are not part of the I/O Assemblies. Those parameters are still available through messaging.

This section contains advanced user information. You should understand the CIP object model and be familiar with the terms Service, Class, Instance, and Attribute.

This section discusses how to SET and READ information from the Timer and Counter function blocks and how to enable and disable logic with the Logic Supervisor Object.

The first thing that is important to know is that each function block has a handle or an instance number. The editor assigns this instance number and is found in the upper left corner of the function block.



The instance number can change if you edit the program. It may also differ from module to module. Verify the instance number before using messaging.

IMPORTANT For devices running firmware revision 4 or higher, each instruction instance ID number is assigned once and never changes.

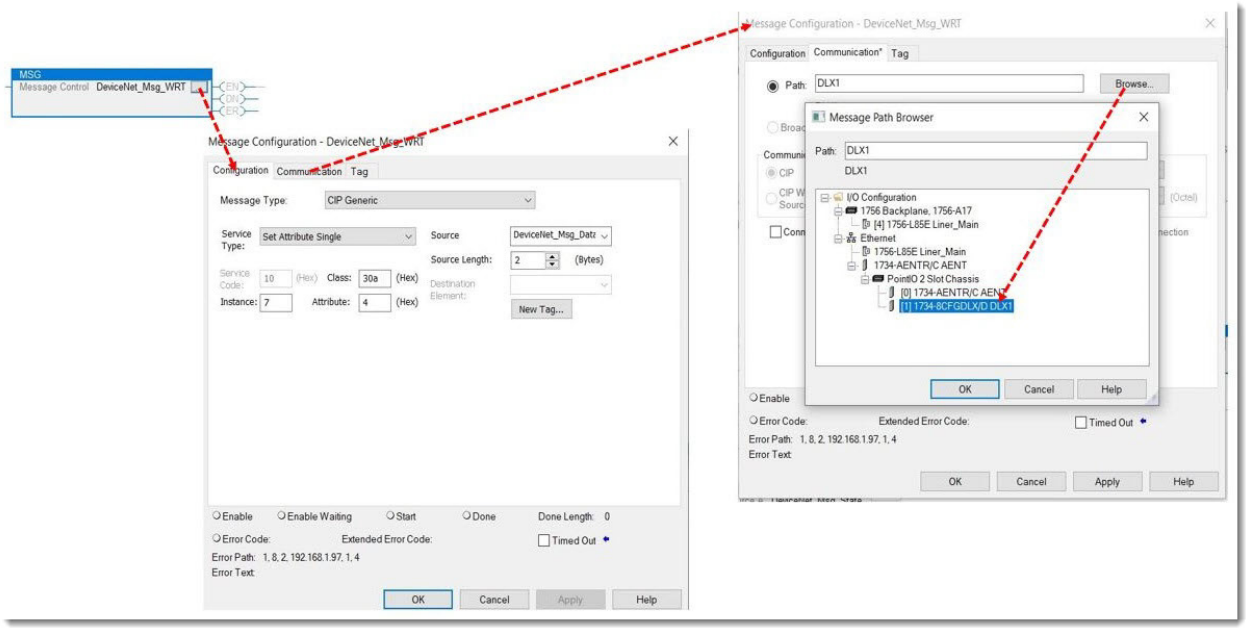
To access the information, you need the "address" of that information. The address is made up of the Class Code, the instance (as discussed previously), and the attribute.

The following table shows this data for the Logic Supervisor, Timer, and Counter function blocks.

Function Block	Class Code	Instance	Attribute	Data Length
Logic Supervisor	0x30E	1	Logic Enable (0x01)	1 byte
Timer Function Block	0x30A	Displayed in editor	Preset Time (0x04)	2 bytes
			Elapsed Time (0x07)	2 bytes
			Time Base (0x08)	1 byte 0 = 1 ms (default) 1 = 10 ms
Counter Function Block	0x309		Preset Value (0x05)	2 bytes
			Count Value (0x07)	2 bytes
			Maximum Input Frequency (0x08)	2 bytes

There is only one Logic Supervisor and its instance is always "1".

If you are using Studio 5000 Logix Designer application, you can send a message by using the MSG instruction.

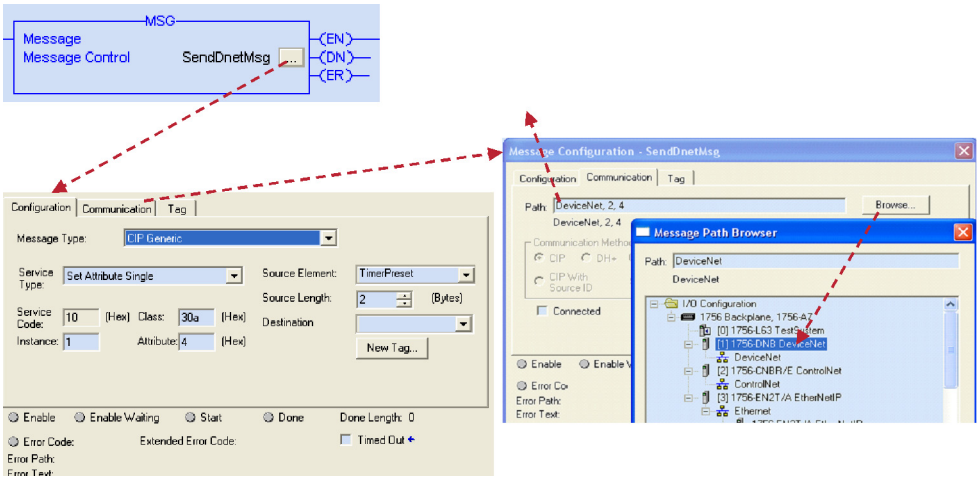


To configure the message, do the following:

1. Click the ellipsis (...) button.

   The Message Configuration dialog box appears.
2. Set the message type to "CIP Generic."
3. Set the Service Type to "Set Attribute Single" to set data or "Get Attribute Single" to read data.
4. Enter the Class value in hexadecimal from the table ("30a" is the Timer function block).
5. Copy the Instance number from the upper left corner of the Timer function block to which you are sending the message.
6. Enter the Attribute number in hexadecimal ("4" is the Preset Time).
7. Verify that the Source Element and Source Length (in bytes) are correct.
8. Click the Communication tab.
9. If you are using EtherNet/IP or ControlNet, click Browse to navigate to the DeviceLogix module.

   If you are using DeviceNet, browse to the DeviceNet Scanner (1756-DNB) and enter Port "2" (for the DeviceNet port) and the node number of the DeviceLogix module (node "4" in the following example) separated by commas.



Notes:

Troubleshooting

This chapter provides information about module diagnostics, and about troubleshooting with the following indicators:

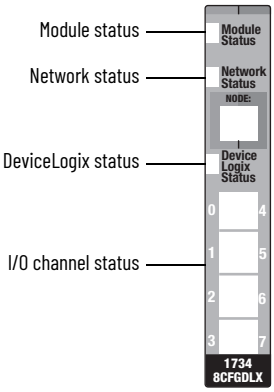
- Module status
- Network status
- DeviceLogix status
- Power indication
- I/O channel status (ON/OFF, fault, or diagnostic)

In addition, the following troubleshooting scenarios are provided:

- Peer connection is not working.
- Configuration or DeviceLogix program cannot be downloaded to the module.
- Module's DeviceLogix program exits the Run mode unexpectedly.

About Module Diagnostics

All status and diagnostic information (strobed, polled, cyclic, or change of state) is reported back over the network communication adapter. One point of failure is detected and reported at the module and to the control system.



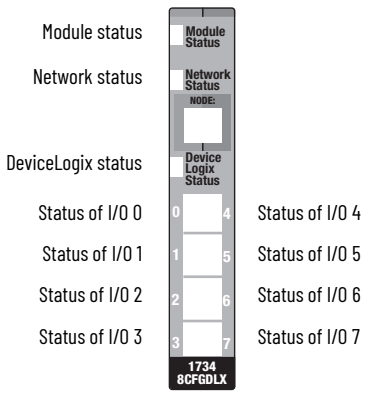
Node-level diagnostics:

- Module status indicates the health of the module.
- Network status indicates the status of the communication link.
- DeviceLogix status indicates the state of the DeviceLogix program.
- I/O channel status indicates I/O (ON/OFF, fault, or diagnostic) status.

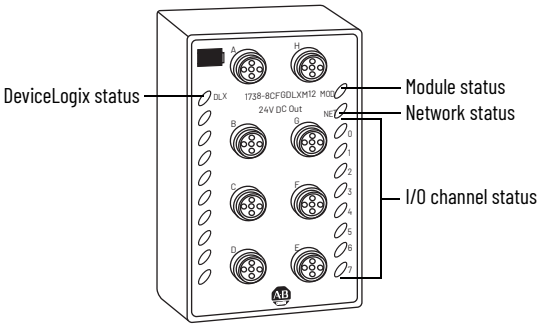
Status Indicators of POINT I/O and ArmorPOINT I/O Modules

See the figure and tables that show how to interpret the status indicators.

1734-8CFGDLX



1738-8CFGDLXM8, 1738-CFGDLXM12, 1738-8CFGDLXM23 (1738-CFGDLXM12 shown)



Module Status

Indication	Probable Cause	Recommended Action
Off	No power applied to the device	Apply power to device.
Green	Device operating normally	None
Flashing green	Device needs commissioning due to missing, incomplete, or incorrect configuration.	Configure device properly.
Flashing red	Recoverable fault	Do the following: 1. Cycle power to device. 2. If condition persists, replace device.
Red	Unrecoverable fault may require device replacement.	Replace device.
Flashing red/green	Device is in self-test.	None

Network Status

Indication	Probable Cause	Recommended Action
Off	Device is not online. • Device has not completed dup_MAC_id test. • Device not powered - check module status indicator.	Apply power to device, wait for dup_MAC_id to complete, and correct, as needed.
Green	Device is online and has connections in the established state.	None
Flashing green	Device is online but has no connections in the established state.	None
Flashing red	One or more I/O connections are in the timed-out state. This could also mean that a peer is not producing data at all, or it is not configured correctly.	Check I/O connection with master. Verify that peers are present and configured properly.
Red	Critical link failure – failed communication device. Device detected an error that prevents it from communicating on the network.	Verify that the adapter and terminal bases are properly installed, and reinstall, as needed.
Flashing red/green	Device is in self-test.	None

DeviceLogix Status

Indication	Probable Cause	Recommended Action
Off	DeviceLogix program is not controlling outputs.	None
Green	DeviceLogix program is controlling outputs.	None
Flashing green	At least one input in DeviceLogix program is forced on/off.	None

I/O Status

Indication	Probable Cause	Recommended Action
Off	I/O is inactive.	None
Yellow	I/O is active and under control.	None

Troubleshooting Scenarios

The following are scenarios that you may encounter while using the modules.

Peer connection is not working

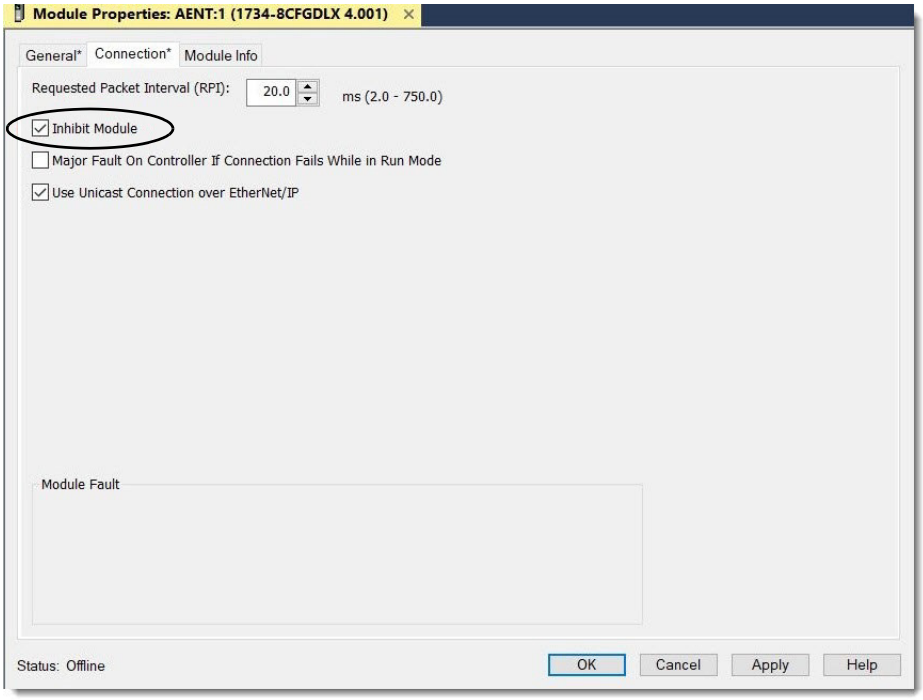
If the Network Status LED is flashing red, one or more connections to the device are broken or not functioning properly. If the device has been configured to consume data from peers, it is possible that the data size or data rate have not been configured correctly.

- Use the Peer Missing bits in the I/O assembly to check which peer connection is missing.
- Verify that the configuration is correct. Upload from the module into RSNetWorx for DeviceNet.
- Verify that the Node number or Slot number is correct.
- Verify that the connection size is correct.
- Increase the EPR (Expected Packet Rate).
- Verify that the owner of the connection to the peer (usually a scanner or controller) is receiving data. The DeviceLogix module cannot make a connection to a peer; it can only listen to COS (change of state) I/O data going from the peer to the master.

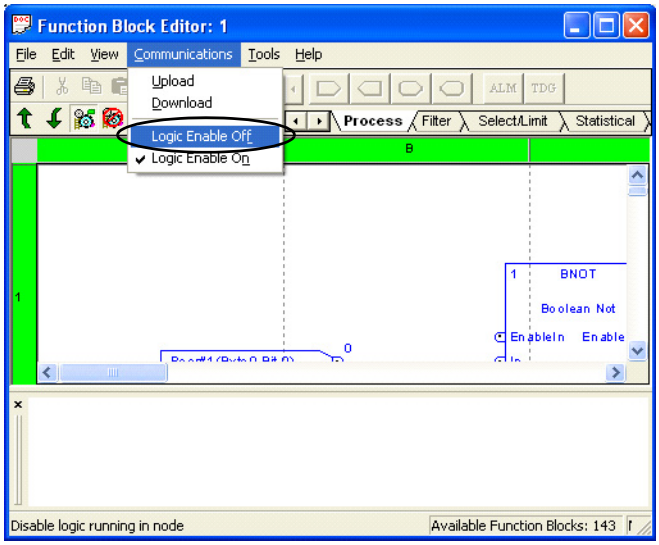
Configuration or DeviceLogix program cannot be downloaded to the module

A DeviceLogix program and most configurable parameters cannot be changed while the DeviceLogix program is running or when an I/O connection is active.

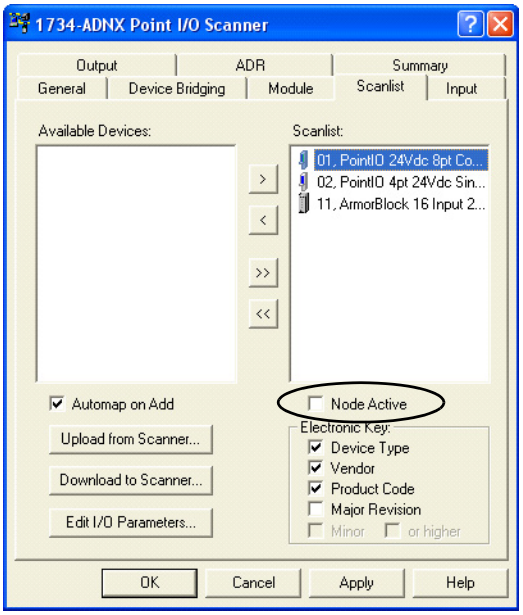
- Inhibit the connection in Studio 5000 Logix Designer application (if using EtherNet/IP and ControlNet).



- Disable logic in RSNetWorx for DeviceNet before downloading.



- Clear the Node Active checkbox in RSNetWorx for DeviceNet (if using a DeviceNet scanner or DeviceNet adapter).



Module's DeviceLogix program exits the Run mode unexpectedly

The module's DeviceLogix program exits the Run mode unexpectedly. A possible reason may be that the ADR feature of the scanner is turned on and the ADR data of the module that is stored in the scanner is not consistent with what is on the module. When the scanner establishes connection to the module, it verifies the configuration in itself with what is in the module. Any mismatch would result in the scanner downloading its saved ADR data to the module.

- Check the ADR feature of the network scanner and verify if the configuration stored in the scanner is the most recent and correct version.

Peer Data Maps

This appendix contains information to help you use peer data from POINT I/O and ArmorPOINT I/O modules in your DeviceLogix program. For descriptions or details on the individual modules, see the Installation Instructions or User Manual for the specific modules.

Peer I/O Sizes

The following tables list the produced I/O sizes of the digital and analog input modules, including the POINT I/O and ArmorPOINT I/O modules.

Only the input modules are listed in the following table. The data that is sent to or consumed by output modules cannot be used in Peer data connections. Although it is possible to read the status information produced from some output modules, they are not included here for the sake of brevity. If another module's output data is required in your DeviceLogix program, it is suggested that this data be sent from the owning master to the DeviceLogix module through the output (consumed) data assembly.

Digital Input Modules

Produced I/O Sizes of Digital Input Modules

Catalog Number	Description	Produced Size
1734-IB2	2-point sinking DC input	1
1738-IB2M12 (M8)		1
1734-IB4	4-point sinking DC input	1
1738-IB4M12 (M8)		1
1734-IB4D	4-point sinking DC input with diagnostics	2 (default), 1
1738-IB4DM12		2 (default), 1
1734-IB8	8-point sinking DC input	1
1738-IB8M12 (M8, M23)		1
1734-IV2	2-point sourcing DC input	1
1734-IV4	4-point sourcing DC input	1
1738-IV4M12 (M8)		1
1734-IV8	8-point sourcing DC input	1
1738-IV8M12 (M8, M23)		1
1734-IA2	2-channel 120V AC input	1
1738-IA2M12AC3		1
1738-IA2M12AC4		1
1734-IA4	4-channel 120V AC input	1
1734-IM2	2-channel 220V AC input	1
1734-IM4	4-channel 220V AC input	1
1734-IB16DM12	16-point sinking DC input with diagnostics	2 (default), 3
1734-8CFG	8-point DC input/output	1
1738-8CFGM12 (M8, M23)		1
1734-8CFGDLX	8-point DC input/output with DeviceLogix	20 (default), 8, 1
1738-8CFGDLXM12 (M8, M23)		20 (default), 8, 1

Analog and Specialty Input Modules

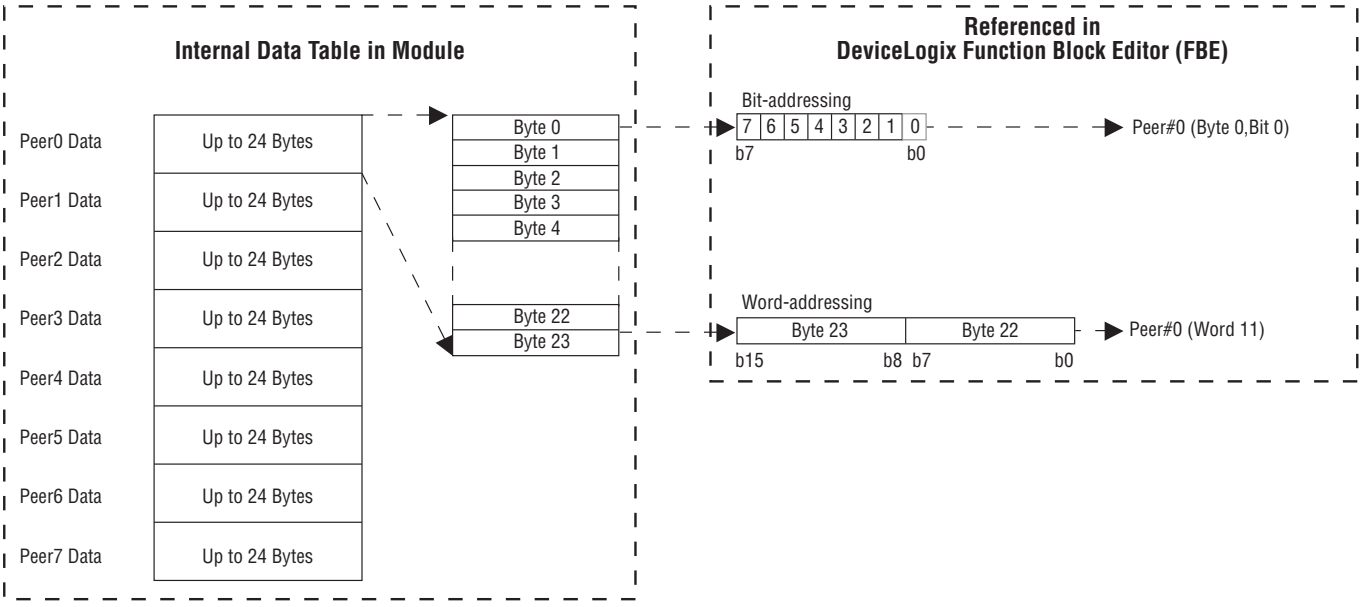
Produced I/O Sizes of Analog and Specialty Input Modules

Catalog Number	Description	Produced Size
1734-VHSC5	1-channel, 5V, 2-out Very High-Speed Counter	6, 6, 10 (default)
1734-VHSC24	1-channel, 24V, 2-out Very High-Speed Counter	6, 6, 10 (default)
1734-VHSC24M23	1-channel, 24V, 2-out Very High-Speed Counter	6, 6, 10 (default)
1734-IJ	1-channel, 5V counter	6, 6, 10 (default)
1738-IJM23		6, 6, 10 (default)
1734-IK	1-channel, 24V counter	6, 6, 10 (default)
1734-IE2C	2-channel analog input	6
1738-IE2CM12		6
1734-IE4C	4-channel analog input	12
1738-IE4CM12		12
1734-IE8C	8-channel analog input	24
1734-IE2V	2-channel analog voltage input	6
1738-IE2VM12		6
1734-IT2I	2-channel, thermocouple input	8
1738-IT2IM12		8
1734-IR2	2-channel, 2-point RTD input	6
1738-IR2M12		6
1734-SSI	Synchronous Serial Interface	10
1738-SSIM23		10
1734-232ASC	RS-232 ASCII Interface	4...132, 24 (default)
1738-232ASCM12		4...132, 24 (default)
1734-485ASC	RS-485 ASCII Interface	4...132, 24 (default)
1738-485ASCM12		4...132, 24 (default)

Peer Data Maps

The following are data maps for each of the catalogs that are listed in the preceding tables. The peer data is mapped into one of eight 24-byte memory spaces. Peer X is the specific memory space where X is 0...7.

The following is a diagram to help explain the addressing of bit data and word data in the DeviceLogix function block editor.



In the following sections, the input tag name in the DeviceLogix editor is given in the left column, and a description of the tag is given in the right column. This section is intended to be used as a quick guide. For details, see the installation instructions or user manual for the specific peer module.

2-point Digital Input Modules

1734-IB2, 1734-IV2, 1734-IA2, 1734-IM2, 1738-IB2M12, 1738-IB2M8, 1738-IA2M12AC3, 1738-IA2M12AC4

Input Tags for 2-point Digital Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	Input channel 0
Peer X (byte 0, bit 1)	Input channel 1

4-point Digital Input Modules

1734-IB4, 1734-IV4, 1734-IA4, 1734-IM4, 1738-IB4M12, 1738-IB4M8, 1738-IV4M12, 1738-IV4M8

Input Tags for 4-point Digital Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	Input channel 0
Peer X (byte 0, bit 1)	Input channel 1
Peer X (byte 0, bit 2)	Input channel 2
Peer X (byte 0, bit 3)	Input channel 3

4-point Digital Input with Diagnostics Modules

1734-IB4D, 1738-IB4DM12

Input Tags for 4-point Digital Input with Diagnostic Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	Input channel 0
Peer X (byte 0, bit 1)	Input channel 1
Peer X (byte 0, bit 2)	Input channel 2
Peer X (byte 0, bit 3)	Input channel 3
Peer X (byte 0, bit 4)	Fault channel 0
Peer X (byte 0, bit 5)	Fault channel 1
Peer X (byte 0, bit 6)	Fault channel 2
Peer X (byte 0, bit 7)	Fault channel 3
Peer X (byte 1, bit 0)	Open wire channel 0
Peer X (byte 1, bit 1)	Open wire channel 1
Peer X (byte 1, bit 2)	Open wire channel 2
Peer X (byte 1, bit 3)	Open wire channel 3
Peer X (byte 1, bit 4)	Short circuit channel 0
Peer X (byte 1, bit 5)	Short circuit channel 1
Peer X (byte 1, bit 6)	Short circuit channel 2
Peer X (byte 1, bit 7)	Short circuit channel 3

8-point Digital Input Modules

1734-IB8, 1734-IV8, 1738-IB8M12, 1738-IB8M8, 1738-IB8M23, 1738-IV8M12, 1738-IV8M8, 1738-IV8M23

Input Tags for 8-point Digital Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	Input channel 0
Peer X (byte 0, bit 1)	Input channel 1
Peer X (byte 0, bit 2)	Input channel 2
Peer X (byte 0, bit 3)	Input channel 3
Peer X (byte 0, bit 4)	Input channel 4
Peer X (byte 0, bit 5)	Input channel 5
Peer X (byte 0, bit 6)	Input channel 6
Peer X (byte 0, bit 7)	Input channel 7

8-point Configurable Modules

1734-8CFG, 1738-8CFGM8, 1738-8CFGM12, 1738-8CFGM23

Input Tags for 8-point Configurable Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	I/O channel 0
Peer X (byte 0, bit 1)	I/O channel 1
Peer X (byte 0, bit 2)	I/O channel 2
Peer X (byte 0, bit 3)	I/O channel 3
Peer X (byte 0, bit 4)	I/O channel 4
Peer X (byte 0, bit 5)	I/O channel 5
Peer X (byte 0, bit 6)	I/O channel 6
Peer X (byte 0, bit 7)	I/O channel 7

16-point Digital Input Modules

1738-IB16M12

Input Tags for 16-point Digital Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	Input channel 0
Peer X (byte 0, bit 1)	Input channel 1
Peer X (byte 0, bit 2)	Input channel 2
Peer X (byte 0, bit 3)	Input channel 3
Peer X (byte 0, bit 4)	Input channel 4
Peer X (byte 0, bit 5)	Input channel 5
Peer X (byte 0, bit 6)	Input channel 6
Peer X (byte 0, bit 7)	Input channel 7
Peer X (byte 1, bit 0)	Input channel 8
Peer X (byte 1, bit 1)	Input channel 9
Peer X (byte 1, bit 2)	Input channel 10
Peer X (byte 1, bit 3)	Input channel 11
Peer X (byte 1, bit 4)	Input channel 12
Peer X (byte 1, bit 5)	Input channel 13
Peer X (byte 1, bit 6)	Input channel 14

Input Tags for 16-point Digital Input Modules (Continued)

Input Tag in DeviceLogix Editor	Data
Peer X (byte 1, bit 7)	Input channel 15
Peer X (byte 2, bit 0)	SSV fault channel 0…3
Peer X (byte 2, bit 1)	SSV fault channel 4…7
Peer X (byte 2, bit 2)	SSV fault channel 8…11
Peer X (byte 2, bit 3)	SSV fault channel 12…15
Peer X (byte 2, bit 4)	Fault LED state

8-point Digital Input Modules with DeviceLogix

1734-8CFGDLX, 1738-8CFGDLXM12, 1738-8CFGDLXM8, 1738-8CFGDLXM23

Input Tags for 8-Point Digital Input Modules with DeviceLogix

Input Tag in DeviceLogix Editor	Data
Peer X (byte 0, bit 0)	I/O channel 0
Peer X (byte 0, bit 1)	I/O channel 1
Peer X (byte 0, bit 2)	I/O channel 2
Peer X (byte 0, bit 3)	I/O channel 3
Peer X (byte 0, bit 4)	I/O channel 4
Peer X (byte 0, bit 5)	I/O channel 5
Peer X (byte 0, bit 6)	I/O channel 6
Peer X (byte 0, bit 7)	I/O channel 7
Peer X (byte 1, bit 0)	User-defined bit 0 (PNB0)
Peer X (byte 1, bit 1)	User-defined bit 1 (PNB1)
Peer X (byte 1, bit 2)	User-defined bit 2 (PNB2)
Peer X (byte 1, bit 3)	User-defined bit 3 (PNB3)
Peer X (byte 1, bit 4)	User-defined bit 4 (PNB4)
Peer X (byte 1, bit 5)	User-defined bit 5 (PNB5)
Peer X (byte 1, bit 6)	User-defined bit 6 (PNB6)
Peer X (byte 1, bit 7)	User-defined bit 7 (PNB7)
Peer X (byte 2, bit 0)	Logic enabled
Peer X (byte 2, bit 1)	Owned
Peer X (byte 3, bit 0)	Peer missing 0
Peer X (byte 3, bit 1)	Peer missing 1
Peer X (byte 3, bit 2)	Peer missing 2
Peer X (byte 3, bit 3)	Peer missing 3
Peer X (byte 3, bit 4)	Peer missing 4
Peer X (byte 3, bit 5)	Peer missing 5
Peer X (byte 3, bit 6)	Peer missing 6
Peer X (byte 3, bit 7)	Peer missing 7
Peer X (word 2)	User-defined word 0 (PNW0)
Peer X (word 3)	User-defined word 1 (PNW1)
Peer X (word 4)	User-defined word 2 (PNW2)
Peer X (word 5)	User-defined word 3 (PNW3)
Peer X (word 6)	User-defined word 4 (PNW4)
Peer X (word 7)	User-defined word 5 (PNW5)
Peer X (word 8)	User-defined word 6 (PNW6)
Peer X (word 9)	User-defined word 7 (PNW7)

2-point Analog Input Modules and RTD (Resistant Temperature Device)

1734-IE2C, 1734-IE2V, 1734-IR2, 1738-IE2CM12, 1738-IE2VM12, 1738-IR2M12

Input Tags for 2-point Analog Input Modules and RTD

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Input channel 0
Peer X (word 1)	Input channel 1
Peer X (byte 4, bit 0)	Channel 0 fault
Peer X (byte 4, bit 1)	Channel 0 calibration mode
Peer X (byte 4, bit 2)	Channel 0 low alarm
Peer X (byte 4, bit 3)	Channel 0 high alarm
Peer X (byte 4, bit 4)	Channel 0 low low alarm
Peer X (byte 4, bit 5)	Channel 0 high high alarm
Peer X (byte 4, bit 6)	Channel 0 underrange
Peer X (byte 4, bit 7)	Channel 0 overrange
Peer X (byte 5, bit 0)	Channel 1 fault
Peer X (byte 5, bit 1)	Channel 1 calibration mode
Peer X (byte 5, bit 2)	Channel 1 low alarm
Peer X (byte 5, bit 3)	Channel 1 high alarm
Peer X (byte 5, bit 4)	Channel 1 low low alarm
Peer X (byte 5, bit 5)	Channel 1 high high alarm
Peer X (byte 5, bit 6)	Channel 1 underrange
Peer X (byte 5, bit 7)	Channel 1 overrange

4-point Analog Input Modules

1734-IE4C, 1738-IE4CM12

Input Tags for 4-point Analog Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Input channel 0
Peer X (word 1)	Input channel 1
Peer X (word 2)	Input channel 2
Peer X (word 3)	Input channel 3
Peer X (byte 8, bit 0)	Channel 0 fault
Peer X (byte 8, bit 1)	Channel 0 calibration mode
Peer X (byte 8, bit 2)	Channel 0 low alarm
Peer X (byte 8, bit 3)	Channel 0 high alarm
Peer X (byte 8, bit 4)	Channel 0 low low alarm
Peer X (byte 8, bit 5)	Channel 0 high high alarm
Peer X (byte 8, bit 6)	Channel 0 underrange
Peer X (byte 8, bit 7)	Channel 0 overrange
Peer X (byte 9, bit 0)	Channel 1 fault
Peer X (byte 9, bit 1)	Channel 1 calibration mode
Peer X (byte 9, bit 2)	Channel 1 low alarm
Peer X (byte 9, bit 3)	Channel 1 high alarm
Peer X (byte 9, bit 4)	Channel 1 low low alarm
Peer X (byte 9, bit 5)	Channel 1 high high alarm
Peer X (byte 9, bit 6)	Channel 1 underrange
Peer X (byte 9, bit 7)	Channel 1 overrange

Input Tags for 4-point Analog Input Modules (Continued)

Input Tag in DeviceLogix Editor	Data
Peer X (byte 10, bit 0)	Channel 2 fault
Peer X (byte 10, bit 1)	Channel 2 calibration mode
Peer X (byte 10, bit 2)	Channel 2 low alarm
Peer X (byte 10, bit 3)	Channel 2 high alarm
Peer X (byte 10, bit 4)	Channel 2 low low alarm
Peer X (byte 10, bit 5)	Channel 2 high high alarm
Peer X (byte 10, bit 6)	Channel 2 underrange
Peer X (byte 10, bit 7)	Channel 2 overrange
Peer X (byte 11, bit 0)	Channel 3 fault
Peer X (byte 11, bit 1)	Channel 3 calibration mode
Peer X (byte 11, bit 2)	Channel 3 low alarm
Peer X (byte 11, bit 3)	Channel 3 high alarm
Peer X (byte 11, bit 4)	Channel 3 low low alarm
Peer X (byte 11, bit 5)	Channel 3 high high alarm
Peer X (byte 11, bit 6)	Channel 3 underrange
Peer X (byte 11, bit 7)	Channel 3 overrange

8-point Analog Input Modules

1734-IE8C

Input Tags for 8-point Analog Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Input channel 0
Peer X (word 1)	Input channel 1
Peer X (word 2)	Input channel 2
Peer X (word 3)	Input channel 3
Peer X (word 4)	Input channel 4
Peer X (word 5)	Input channel 5
Peer X (word 6)	Input channel 6
Peer X (word 7)	Input channel 7
Peer X (byte 16, bit 0)	Channel 0 fault
Peer X (byte 16, bit 1)	Channel 0 calibration mode
Peer X (byte 16, bit 2)	Channel 0 low alarm
Peer X (byte 16, bit 3)	Channel 0 high alarm
Peer X (byte 16, bit 4)	Channel 0 low low alarm
Peer X (byte 16, bit 5)	Channel 0 high high alarm
Peer X (byte 16, bit 6)	Channel 0 underrange
Peer X (byte 16, bit 7)	Channel 0 overrange
Peer X (byte 17, bit 0)	Channel 1 fault
Peer X (byte 17, bit 1)	Channel 1 calibration mode
Peer X (byte 17, bit 2)	Channel 1 low alarm
Peer X (byte 17, bit 3)	Channel 1 high alarm
Peer X (byte 17, bit 4)	Channel 1 low low alarm
Peer X (byte 17, bit 5)	Channel 1 high high alarm
Peer X (byte 17, bit 6)	Channel 1 underrange
Peer X (byte 17, bit 7)	Channel 1 overrange
Peer X (byte 18, bit 0)	Channel 2 fault
Peer X (byte 18, bit 1)	Channel 2 calibration mode
Peer X (byte 18, bit 2)	Channel 2 low alarm

Input Tags for 8-point Analog Input Modules (Continued)

Input Tag in DeviceLogix Editor	Data
Peer X (byte 18, bit 3)	Channel 2 high alarm
Peer X (byte 18, bit 4)	Channel 2 low low alarm
Peer X (byte 18, bit 5)	Channel 2 high high alarm
Peer X (byte 18, bit 6)	Channel 2 underrange
Peer X (byte 18, bit 7)	Channel 2 overrange
Peer X (byte 19, bit 0)	Channel 3 fault
Peer X (byte 19, bit 1)	Channel 3 calibration mode
Peer X (byte 19, bit 2)	Channel 3 low alarm
Peer X (byte 19, bit 3)	Channel 3 high alarm
Peer X (byte 19, bit 4)	Channel 3 low low alarm
Peer X (byte 19, bit 5)	Channel 3 high high alarm
Peer X (byte 19, bit 6)	Channel 3 underrange
Peer X (byte 19, bit 7)	Channel 3 overrange
Peer X (byte 20, bit 0)	Channel 4 fault
Peer X (byte 20, bit 1)	Channel 4 calibration mode
Peer X (byte 20, bit 2)	Channel 4 low alarm
Peer X (byte 20, bit 3)	Channel 4 high alarm
Peer X (byte 20, bit 4)	Channel 4 low low alarm
Peer X (byte 20, bit 5)	Channel 4 high high alarm
Peer X (byte 20, bit 6)	Channel 4 underrange
Peer X (byte 20, bit 7)	Channel 4 overrange
Peer X (byte 21, bit 0)	Channel 5 fault
Peer X (byte 21, bit 1)	Channel 5 calibration mode
Peer X (byte 21, bit 2)	Channel 5 low alarm
Peer X (byte 21, bit 3)	Channel 5 high alarm
Peer X (byte 21, bit 4)	Channel 5 low low alarm
Peer X (byte 21, bit 5)	Channel 5 high high alarm
Peer X (byte 21, bit 6)	Channel 5 underrange
Peer X (byte 21, bit 7)	Channel 5 overrange
Peer X (byte 22, bit 0)	Channel 6 fault
Peer X (byte 22, bit 1)	Channel 6 calibration mode
Peer X (byte 22, bit 2)	Channel 6 low alarm
Peer X (byte 22, bit 3)	Channel 6 high alarm
Peer X (byte 22, bit 4)	Channel 6 low low alarm
Peer X (byte 22, bit 5)	Channel 6 high high alarm
Peer X (byte 22, bit 6)	Channel 6 underrange
Peer X (byte 22, bit 7)	Channel 6 overrange
Peer X (byte 23, bit 0)	Channel 7 fault
Peer X (byte 23, bit 1)	Channel 7 calibration mode
Peer X (byte 23, bit 2)	Channel 7 low alarm
Peer X (byte 23, bit 3)	Channel 7 high alarm
Peer X (byte 23, bit 4)	Channel 7 low low alarm
Peer X (byte 23, bit 5)	Channel 7 high high alarm
Peer X (byte 23, bit 6)	Channel 7 underrange
Peer X (byte 23, bit 7)	Channel 7 overrange

2-point Thermocouple Input Modules

1734-IT2I, 1738-IT2IM12

Input Tags for 2-point Thermocouple Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Input channel 0
Peer X (word 1)	Input channel 1
Peer X (byte 4, bit 0)	Channel 0 fault
Peer X (byte 4, bit 1)	Channel 0 calibration mode
Peer X (byte 4, bit 2)	Channel 0 low alarm
Peer X (byte 4, bit 3)	Channel 0 high alarm
Peer X (byte 4, bit 4)	Channel 0 low low alarm
Peer X (byte 4, bit 5)	Channel 0 high high alarm
Peer X (byte 4, bit 6)	Channel 0 underrange
Peer X (byte 4, bit 7)	Channel 0 overrange
Peer X (byte 5, bit 0)	Channel 1 fault
Peer X (byte 5, bit 1)	Channel 1 calibration mode
Peer X (byte 5, bit 2)	Channel 1 low alarm
Peer X (byte 5, bit 3)	Channel 1 high alarm
Peer X (byte 5, bit 4)	Channel 1 low low alarm
Peer X (byte 5, bit 5)	Channel 1 high high alarm
Peer X (byte 5, bit 6)	Channel 1 underrange
Peer X (byte 5, bit 7)	Channel 1 overrange
Peer X (word 3)	Cold junction temperature
Peer X (byte 7, bit 6)	Cold junction underrange
Peer X (byte 7, bit 7)	Cold junction overrange

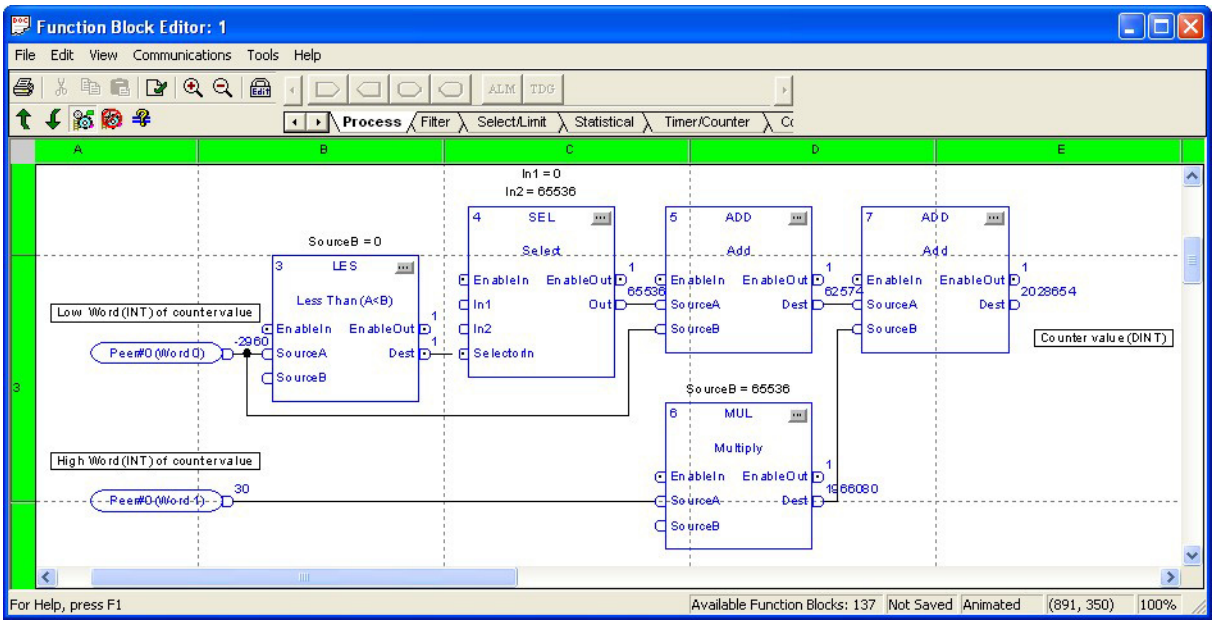
Very High-Speed Counter Input Modules

1734-VHSC24, 1734-VHSC5, 1738-VHSC24M23

Input Tags for Very High-Speed Counter Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Present data low word
Peer X (word 1)	Present data high word
Peer X (word 2)	Stored data low word
Peer X (word 3)	Stored data high word
Peer X (byte 8, bit 1)	Zero frequency detected
Peer X (byte 8, bit 2)	Stored data count 2
Peer X (byte 8, bit 3)	Stored data count 3
Peer X (byte 8, bit 4)	A input status
Peer X (byte 8, bit 5)	B input status
Peer X (byte 8, bit 6)	Z input status
Peer X (byte 9, bit 0)	Output 0 status
Peer X (byte 9, bit 1)	Output 1 status
Peer X (byte 9, bit 2)	Output 0 fault
Peer X (byte 9, bit 3)	Output 1 fault
Peer X (byte 9, bit 5)	Not ready
Peer X (byte 9, bit 6)	EEPROM fault
Peer X (byte 9, bit 7)	Program fault

The counter modules produce Double Word values for the Present and Stored Count value, but the DeviceLogix module only uses 16-bit Word values. To recombine the Double Word, the following logic can be used.



The logic multiplies (MUL function block 6) the high word by 65536 (Source B) and adds it to the Low Word (Add Function Block 7). Function blocks 3, 4, and 5 change the signed word value into an unsigned double word value. Function block 3 checks if the low word is less than 0, if so, the Select block outputs 65535 to the Add block. Otherwise, zero is added to the low word.

Encoder/Counter Input Modules

1734-IJ, 1734-IK, and 1738-IJM23

Input Tags for Encoder/Counter Input Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Present data low word
Peer X (word 1)	Present data high word
Peer X (word 2)	Stored data low word
Peer X (word 3)	Stored data high word
Peer X (byte 8, bit 1)	Zero frequency detected
Peer X (byte 8, bit 2)	Stored data count 2
Peer X (byte 8, bit 3)	Stored data count 3
Peer X (byte 8, bit 4)	A input status
Peer X (byte 8, bit 5)	B input status
Peer X (byte 8, bit 6)	Z input status
Peer X (byte 9, bit 5)	Not ready
Peer X (byte 9, bit 6)	EEPROM fault
Peer X (byte 9, bit 7)	Program fault

Synchronous Serial Interface Modules

1734-SSI and 1738-SSIM12

Input Tags for Synchronous Serial Interface Modules

Input Tag in DeviceLogix Editor	Data
Peer X (word 0)	Present SSI data low word
Peer X (word 1)	Present SSI data high word
Peer X (word 2)	Stored SSI data low word
Peer X (word 3)	Stored SSI data high word
Peer X (byte 8, bit 0)	I1 - Input 1 status
Peer X (byte 8, bit 1)	Run - SSI clock output status
Peer X (byte 8, bit 2)	DEC - SSI data count decreasing
Peer X (byte 8, bit 3)	INC - SSI data count increasing
Peer X (byte 8, bit 4)	C1R - Comparator 1 value reached
Peer X (byte 8, bit 5)	C2R - Comparator 2 value reached
Peer X (byte 8, bit 6)	C1ST - Comparator 1 active
Peer X (byte 8, bit 7)	C2ST - Comparator 2 active
Peer X (byte 9, bit 0)	SPF - SSI sensor power fault
Peer X (byte 9, bit 1)	CCF - Coprocessor configuration fault
Peer X (byte 9, bit 2)	CCE - Coprocessor communication error
Peer X (byte 9, bit 3)	IDF - SSI input data fault
Peer X (byte 9, bit 4)	LHON - Latched data is stored

See Very High-Speed Counter Input Modules on page 63 for an example of how to convert Word Data to Double Word in your DeviceLogix program.

RS-232 and RS-485 Interface Module

1734-232ASC, 1734-485ASC, 1738-232ASCM12, 1738-485ASCM12

Although the RS-232 and RS-485 modules can produce up to 132 bytes of data, the DeviceLogix module can only consume a message of 24 bytes.

The data from these modules can be addressed in the DeviceLogix program using either bit or word tags.

Peer X (byte 0, bit 0)...Peer X (byte 23, bit 7)

Peer X (word 0)...Peer X (word 11)

Notes:

Set Write Enable Flag using RSNetWorx for DeviceNet

This appendix contains information to help you enable the Write Enable Flag feature in your DeviceLogix module, using RSNetWorx for DeviceNet software.

The feature adds a mechanism to help prevent unintended modification in your DeviceLogix program. The Write Enable/Disable feature is only available with 1734-8CFGDLX series D and above.

Terms

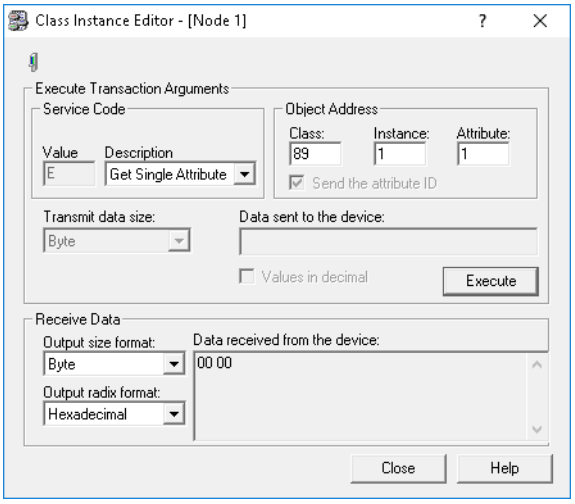
The following table describes the basic functions of the Write Enable Flag feature.

Function	Description
Write Enable	Read/modify the DeviceLogix Configuration and Data using CIP message is allowed.
Write Disable	Read/modify the DeviceLogix Configuration and Data using CIP message is blocked.
Flag Setting	A binary value: • Write Disable (1) • Write Enable (0) Default setting is Write Enable.
Flag Value	An array of values set as required. It is used to change the Flag Setting.
Change Request	Byte values used in the CIP message to change the Flag Setting: • 0x01: Request to change Flag Setting to Write Enable • 0x02: Request to change Flag Setting to Write Disable

Flag Setting

1. Check the existing Flag Setting

Properties	Values
Class	0x89
Service	0x0E Get Single Attribute
Instance	A binary value: • Write Disable (1) • Write Enable (0) Default setting is Write Enable.
Attributes	0x01
Response Data Type	UINT
Response Value	0x00: Write Enable (default) 0x01: Write Disable



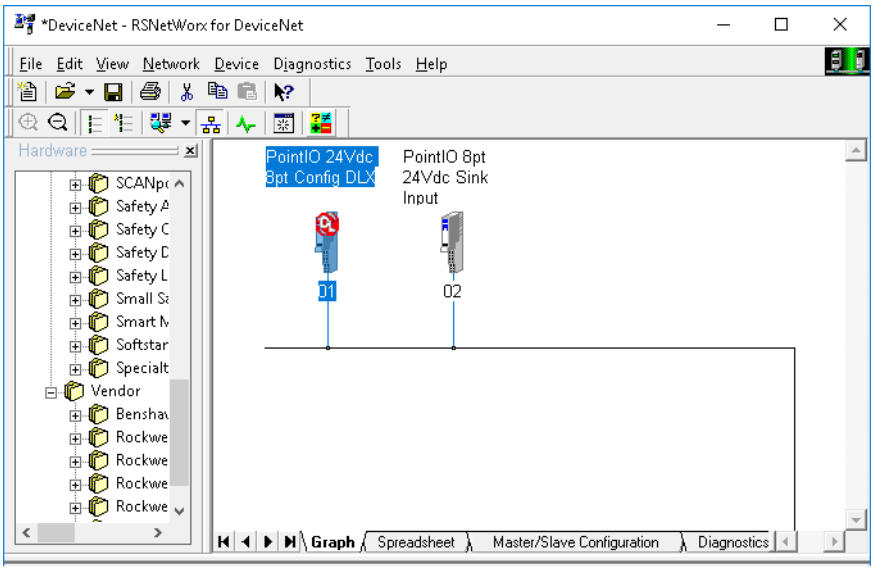
2. Change the Flag Setting. The following table displays the required values.

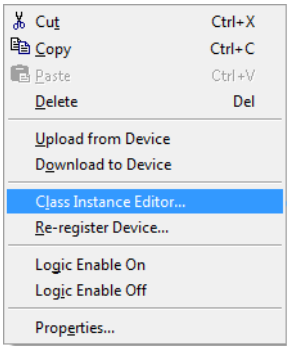
Properties	Values
Class	0x89
Service	0x4B - Change Write Enable Flag Setting
Instance	0x00 (Class Level)
Attributes	0x01
Input Data Type	Array of 8-bit UINT
Input Data Format	1 Byte - Change Request 4...32 Bytes - Flag Value in Hexadecimal (range from 0x00...0xFF)
Change Request	0x02: Request to change Flag Setting to Write Disable (1)(1) 0x01: Request to change Flag Setting to Write Enable (0)(2)
Response	ASCII value of AUTH = Change Request Success 0x0C = Object State Conflict (Flag Setting is already the same as requested) 0x0F = Access Denied (Flag Value is incorrect or Service is blocked) 0x20 = Invalid Parameter (Data Format is incorrect)

(1) You can change the Flag Setting to Write Disable using the Studio 5000 Logix Designer application or RSNetWorx for DeviceNet software.
(2) After changing the Flag Setting to Write Disable, you can change the setting back to Write Enable using the RSNetWorx for DeviceNet software.

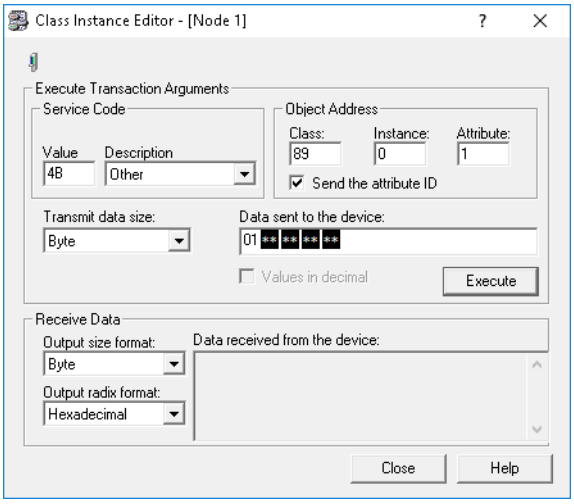
3. Change the Flag Setting back to Write Enable using the RSNetWorx for DeviceNet Software. You should be an advanced user and understand the CIP object model and be familiar with the terms Service, Class, Instance, and Attribute to perform this step.

   See guidelines at rok.auto/knowledgebase Answer ID IN25345 and QA11928 for more information.





Data Format:
- 1 Byte: Change request
- 2...33 Bytes: Flag value
  (Flag Value length range: 4...32 Bytes)



Affected Behavior

If you have three consecutive failed attempts to change the Flag Setting to Write Enable, the service to change the Flag setting is locked for 30 seconds. During this period, the service returns a 0x0F status regardless of the input data.

If the Flag Setting is set as Write Disable, the CIP Message to the following objects is prohibited. This applies to all Services and Attributes at Class and Instance Level.

CIP Messages

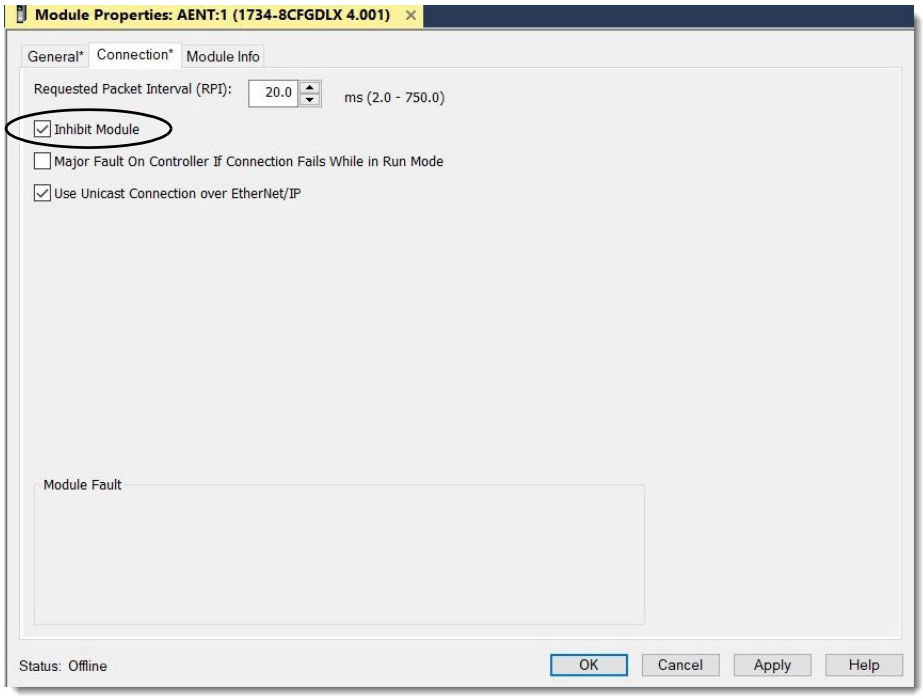
CIP Object	Hexadecimal Value
Assembly Object	0x004
Connection Object	0x005
Discrete Input Object	0x008
Discrete Output Object	0x009
Discrete Input Group Object	0x01D
Discrete Output Group Object	0x01E
File Object (for DeviceLogix Program)	0x037
Data Table Object (For DeviceLogix Program)	0x06A
Logic Supervisor Object	0x30E
ZIP Object	0x32E
Functional Blocks for DeviceLogix Program:	0x3xx
Boolean FB Object	0x307
Bistable FB Object	0x308
Counters FB Object	0x309
Timer FB Object	0x30A
Produced Network Data FB Object	0x30F
Arithmetic FB Object	0x310
Moving Average FB Object	0x333
Comparison FB Object	0x336
Mask Equal FB Object	0x339
Alarm FB Object	0x33B
Timing Diagnostic FB Object	0x33C
High Low Limit FB Object	0x33D
Select FB Object	0x346
Low Pass Filter FB Object	0x347

Disabled Functions

The following functions are disabled when the Write Enable Flag is set as Write Disable.

Software	Functions	Description
RSNetWorx for DeviceNet	Upload to Device	All values in .dnt files are maintained and not updated.
	Download to Device	All values in .dnt files are not downloaded to the module.
	Properties of module	All values in .dnt files are maintained and not updated. No update after the upload. No download available to the device.
	Logic Enable On	Deactivated
	Logic Enable Off	Deactivated
	Automatic Device Recovery (ADR)	Unable to work properly
Studio 5000 Logix Designer	I/O module detection	The 1734-8CFGDLX module is not detected as timeout.
	Send message or make changes to I/O module	Deactivated in 1734-8CFGDLX
	Read data or configuration from I/O module	Unable to work properly

Since Connection Object is prohibited after the Flag Setting is changed to Write Disable, it is recommended to inhibit the module before changing the Flag Setting to prevent Network Timeout Error.



The disabled functions are reactivated once the Write Enable Flag is set back to Write Enable.

Risk Factors

The following are the known risks that are associated when the Write Enable Flag feature is used.

Risk	Description	Mitigation Plan
Ransomware	Hackers can change the Flag Setting to Write Disable and demand ransom.	Out-of-Box Factory reset using the explicit CIP message. After reset, the module configurations default values is restored. CIP Messages format for Out-of-Box factory reset: • Service = 0x05 (Reset) • Class = 0x01 (Identity Object) • Instance = 0x01 (Instance Level) • Attribute = 0x01 (Out of Box Reset)
Brute Force Attack	A repetitive action to gain access to the server or site	After three failed attempts, the service to change Write Enable Flag setting is blocked for 30 s.
Rainbow Attack	Attacker is able to read data from the memory and gain authentication by cracking the Flag Value hash.	No available mitigation. You must generate a unique Flag Values.
Sniffing Attack	Corresponds to theft or interception of data when you change the Flag Setting to Write Enable along with the Flag Values	No available mitigation. The feature is not used for IP protection. It is provided to help prevent accidental modification of DeviceLogix configuration.

Reset to Default Password

When the module is in Write Disable state (Write Enable Flag value = 1) and Logic Enable Off, the module password is changed to its default value when you send a Factory Reset CIP message to the module.

This function is only available to modules with firmware revision 4.015 or later.

To perform a factory reset using a CIP message, do the following:

1. Set the Flag Value to Write Disable.

Properties	Values
Class	0x89
Service	0x4B - Change Write Enable Flag Setting
Instance	0x00 (Class Level)
Attributes	0x01
Input Data Type	Array of 8-bit UINT
Input Data Format	1 Byte - Change Request 4...32 Bytes - Flag Value in Hexadecimal (range from 0x00...0xFF)
Change Request	0x02: Request to change Flag Setting to Write Disable (1)[1]
Response	ASCII value of AUTH = Change Request Success 0x0C = Object State Conflict (Flag Setting is already same as requested) 0x0F = Access Denied (Flag Value is incorrect or Service is blocked) 0x20 = Invalid Parameter (Data Format is incorrect)

(1) You can change the Flag Setting to Write Disable using the Studio 5000 Logix Designer application or RSNetWorx for DeviceNet software.

2. Stop the logic program from executing with the Logic Enable Off feature. For information on how disable Logic, see Logic Enable Off on page 47.
3. Send an Out-of-Box (Factory Reset) CIP message to the module.

Properties	Values
Class	0x01 (Identity Object)
Service	0x5 - Reset
Instance	0x01 (Instance Level)
Attributes	0x01 (Out-of-Box Reset)
Response	0x0F = Privilege Violation (Flag Value is incorrect or Service is blocked)

The password is changed to the default value, “password”.

4. Use the hex value of the default password to change the module to Write Enable state (Write Enable Flag value = 0). The following table displays the hex value.

Hex value of default password							
'p'	'a'	's'	's'	'w'	'o'	'r'	'd'
0x70	0x61	0x73	0x73	0x77	0x6F	0x72	0x62

Change the module to Write Enable state.

Properties	Values
Class	0x89
Service	0x4B - Change Write Enable Flag Setting
Instance	0x00 (Class Level)
Attributes	0x01
Input Data	01 70 61 73 73 77 6F 72 64[1]
Response	ASCII value of AUTH = Change Request Success 0x0C = Object State Conflict (Flag Setting is already the same as requested) 0x0F = Access Denied (Flag Value is incorrect or Service is blocked) 0x20 = Invalid Parameter (Data Format is incorrect)

(1) First byte of Input Data '01' – Request to change Flag Setting to Write Enable (0), followed by eight bytes of the default password.

History of Changes

This appendix contains the new or updated information for each revision of this publication. These lists include substantive updates only and are not intended to reflect all changes. Translated versions are not always available for each revision.

1734-UM015B-EN-E, May 2020

Change
Updated version and revision information
Changed Function Block category to Compute/Math
Added Down Counter type in Timer/Counter category instruction types
Updated Timer/Counter Category information
Removed Square Root (SQR) and Power (XPY) in the Compute Category
Updated Logic Execution Time table
New Appendix section for Write Enable Flag Feature

Notes:

Numerics

C

D

E

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T

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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