Allen-Bradley

FlexArmor

1798-ADN (Contains information on 1798-IB4, -IB8, -OB4E, -OB8E, -IB4D, -IE4, -OE2)

User Manual

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

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.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

New Modules Information

In this version of the FlexArmor™ User Manual information was added about the following three FlexArmor modules:

- 1798-IB4D,
- 1798-IE4, and
- 1798-OE2.

Communication and mapping information about these modules are contained in chapter 2. Configuration information is found in chapter 3.

Notes:

Introduction

Use this manual to install, communicate with, map, configure, and troubleshoot the FlexArmor system.

Contents

You will find the following information in this manual:

For information about	See
installing your DeviceNet adapter module	Chapter 1
how communication takes place and I/O image mapping	Chapter 2
how to configure your DeviceNet adapter	Chapter 3
troubleshooting	Chapter 4
module specifications	Appendix A

Audience

This manual is intended for engineers and technicians who are installing, programming, and maintaining a FlexArmor system.

What We assume

We assume you:

- know each of your device's I/O parameters and requirements
- are familiar with RSNetWorx for DeviceNet™
- are familiar with the Microsoft® Windows® environment

Common Techniques Used in This Manual

The following conventions are used throughout this manual:

- Bulleted lists provide information, not procedural steps.
- Numbered lists provide sequential steps.
- Pictures of keys and/or screens represent the actual keys you press or the screens you use.
- Actions you must perform appear in bold text. For example: Click **View** to display the EDS file.

Rockwell Automation Support

Before you contact Rockwell Automation for technical assistance, we suggest you please review the troubleshooting information contained in chapter 4 of this publication first.

If the problem persists, call your local distributor or contact Rockwell Automation in one of the following ways:

Phone	United States/Canada	1.440.646.5800
	Outside United States/Canada	You can access the phone number for your country via the Internet: 1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com) 3. Under *Support Centers*, click on *Contact Information*
Internet	⇒	1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com)

Your Questions or Comments on this Manual

If you find a problem with this manual, please notify us of it on the enclosed How Are We Doing form found in the back of the manual.

Specifications

Appendix A

Install Your DeviceNet Adapter Module

Chapter Objectives

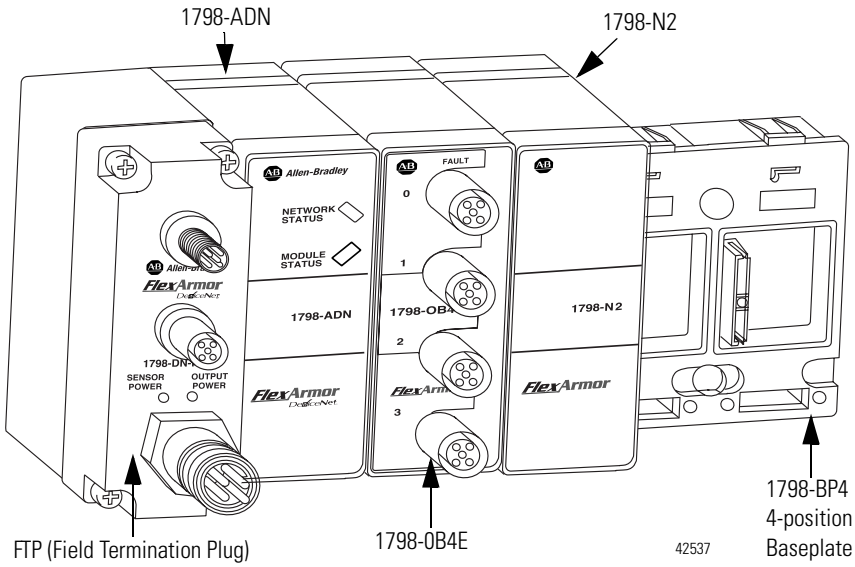
This chapter describes the FlexArmor system, the DeviceNet Adapter and the procedures for installing your DeviceNet adapter module. The sections in this chapter include:

- the FlexArmor system
- adapter components
- power requirements
- mount the adapter
- set the adapter address switches
- install the adapter module
- connect the external wiring

About the FlexArmor System

FlexArmor is a small, modular block I/O system for distributed applications that performs all of the functions of rack-based I/O. The FlexArmor system contains the following components:

- Baseplate, 1798-BP2, -BP4, -BP6, or -BP8
- DeviceNet adapter/power supply, 1798-ADN - powers the internal logic for as many as eight I/O modules
- I/O modules contain the bus interface and circuitry needed to perform specific functions related to your application. These I/O modules include:
  - Input modules, 1798-IB4 or -IB8, -IB4D, and -IE4
  - Output modules, 1798-OB4E or -OB8E, and OE2
- Field Termination Plug (FTP), 1798-DFTP1 or -DFTP2
- Filler module, 1798-N2



For information on how communications occurs on the FlexArmor system backplane, refer to Chapter 2.

DeviceNet Adapter Components

The adapter module consists of the following major components:

- diagnostic indicators
- node address switch

Diagnostic Indicators

Diagnostic indicators are located on the front panel of the adapter module. They show both normal operation and error conditions in your remote I/O system. The indicators are:

- Mod/Net status
- I/O status

A complete description of the diagnostic indicators and how to use them for troubleshooting is explained in Chapter 4.

Power Requirements

The FlexArmor system requires a current of 400 mA at 24V dc from the 1798-FTP sensor power connector for FLEX bus operation. This is sufficient to support up to 8 modules. Remember to add this amount to current requirements for other modules using the same 24V supply. The FlexArmor system consumed 90 mA of DeviceNet power.

Mount the FlexArmor Platform

The DeviceNet adapter module can be mounted directly on a machine. Refer to the specific method of mounting below.

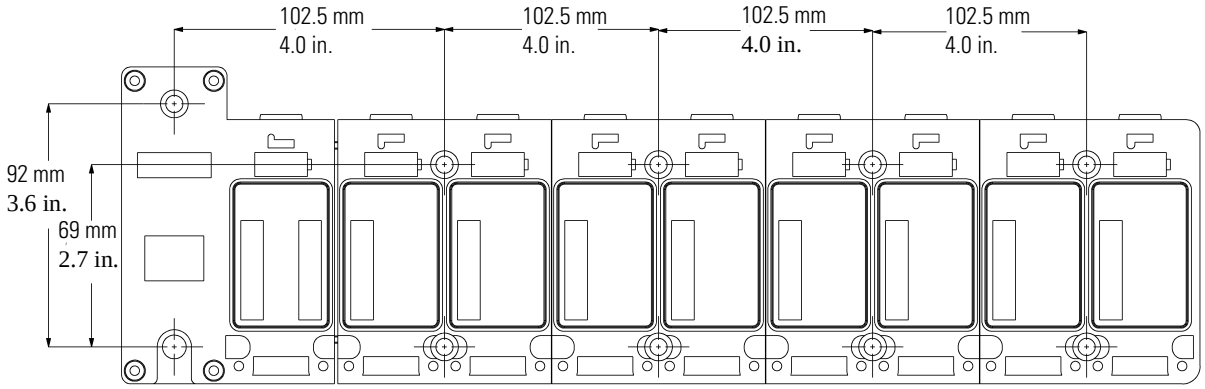
Mounting Instructions

To mount the platform on a wall or panel, use the screw holes provided in the FlexArmor Baseplate.

Install the mounting Baseplate as follows:

1. Lay out the required points as shown in the drilling dimension drawing.

25 mm (0.98 in.) clearance all around



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2. Drill the necessary holes for #10 (M6) machine or self-tapping screws.

3. Mount the Baseplate using #10 (M6) screws.

4. Connect functional ground to ground using the functional ground lug connector.

   To view a drill template for the FlexArmor Baseplate, refer to the website http://www.ab.com/abecad/.

You are now ready to set the node address on the FlexArmor adapter module and to install your selected FlexArmor components. Please refer to the individual component installation instructions for guidelines.

Set the Network Address Switch on the DeviceNet Adapter

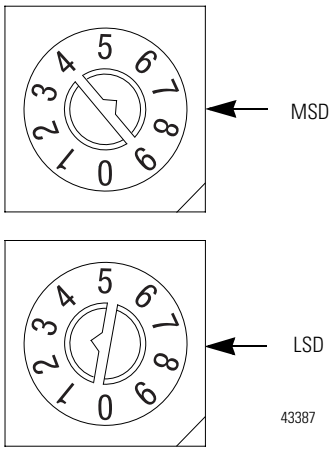
Valid node addresses are **00** to **63**.

Set the network address using the rotary switches. The setting of the network address cannot be changed using the DeviceNet configuration software.

Each module is shipped set for node address **63**. The switches are located on the underside of the module. The two switches are:

- MSD (most significant digit)
- LSD (least significant digit)

To reset the node address, use a small blade screwdriver to rotate the switches. Line up the small black dot on the switch with the number setting you wish to use.



Switches are shown in the 63 position.

IMPORTANT The baud rate for the adapter is set by way of "baud detection" (Autobaud) at power up.

Install Your FlexArmor DeviceNet Adapter Module

To install the FlexArmor DeviceNet Adapter Module:

1. Hold the adapter at an angle and engage the top of the adapter in the indention on the rear of the Baseplate.

IMPORTANT The adapter module must be installed only in the adapter slot, next to the FTP.

2. Press the module down flush with the panel until the locking lever locks.

3. Repeat steps 1 and 2 for each I/O module for the remaining Baseplate I/O slots.

IMPORTANT I/O modules can be installed in any slot location to the right of the adapter module. The adapter is capable of addressing eight modules.

4. Screw down the module retaining screws to ensure IP67 compliance.

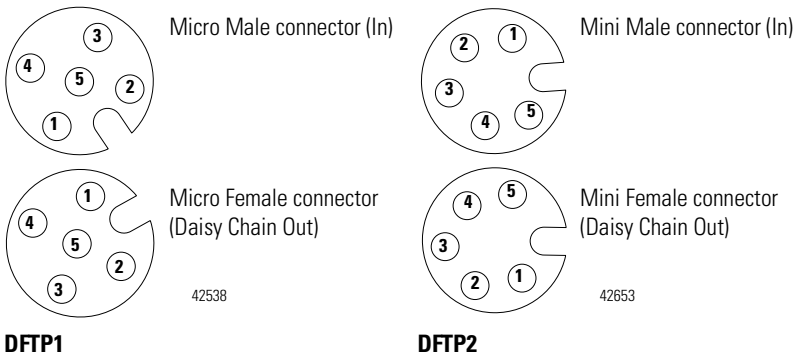
IMPORTANT
- Torque the screws to 0.5-0.7 Nm. (4.43-6.2 inch pounds).
- Dust caps on the I/O modules must have 4 inch pounds of torque to maintain IP67 compliance.

Connect External Wiring

Connect external wiring to the DeviceNet Field Termination Plug (DFTP) as shown below.

1. Connect the DeviceNet cable to the DFTP as shown.

Connect	Connector Pin	To
BLK Wire	3	-V
BLU Wire	5	CAN* Low
Base Wire	1	Drain
WHT Wire	4	CAN High
RED Wire	2	+V
*CAN=Controller Area Network		



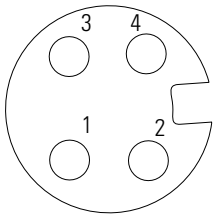
2. Insert the connector into the mating connector on the

3. DeviceNet FTP module.

4. Connect 24V dc power to sensor voltage for adapter and input module power.

5. Connect 24V dc power to output voltage for output module power.

Pin	Function
1	Output Power +
2	Sensor Power +
3	Sensor Power -
4	Output Power -



Male Connector

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How Communication Takes Place and I/O Image Table Mapping

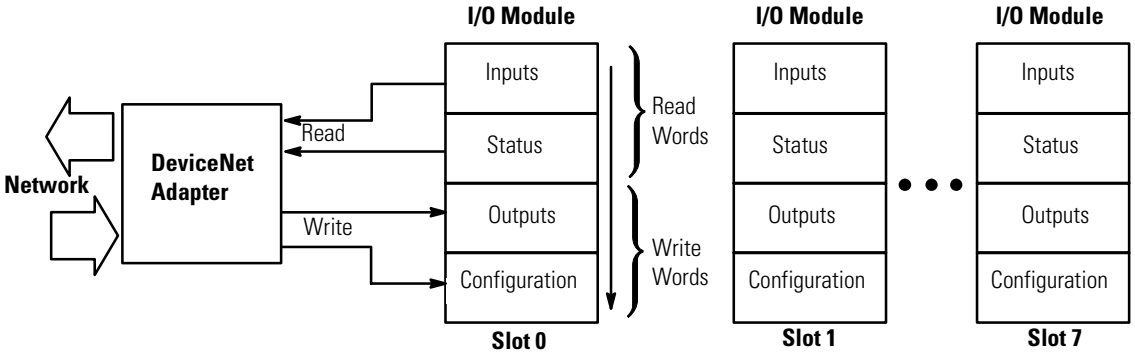
Chapter Objectives

In this chapter, you will learn about:

- communication over the FlexArmor backplane (between the DeviceNet adapter and the I/O modules)
- how data is mapped into the I/O image table

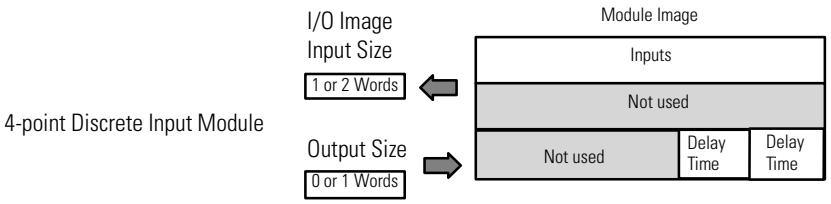
Communication Over the FlexArmor Backplane

One 1798-ADN DeviceNet adapter can interface with up to eight FlexArmor I/O modules placed in a FlexArmor baseplate. The adapter communicates to other network system components (typically one or more controllers or scanners, and/or programming terminals) over the DeviceNet network. The adapter communicates with its I/O modules over the backplane.



The I/O map for a module is divided into read words and write words. Read words consist of input and status words and write words consist of output and configuration words. The number of read words or write words can be zero or more. The length of each I/O module's read words and write words varies in size depending on module complexity. Each I/O module will support at least 1 input word or 1 output word. Status and configuration are optional, depending on the module.

For example, a 4 point discrete input module will have up to 2 read words and 1 write word.

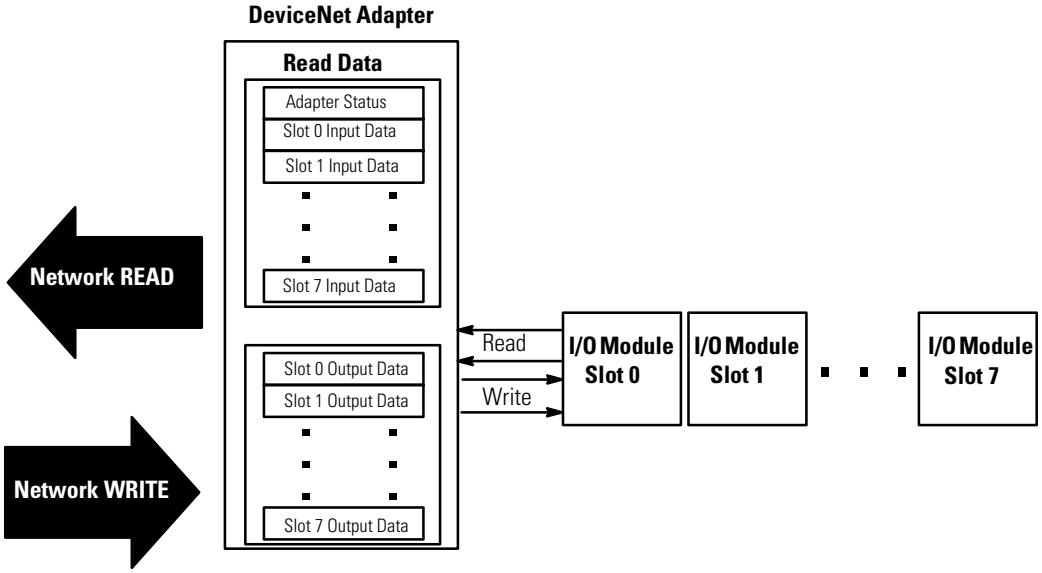


Check the I/O map for each module for the exact mapping.

About I/O Structure

Output data is received by the adapter in the order of the installed I/O modules. The Output data for slot 0 is received first, followed by the Output data for slot 1, and so on up to slot 7.

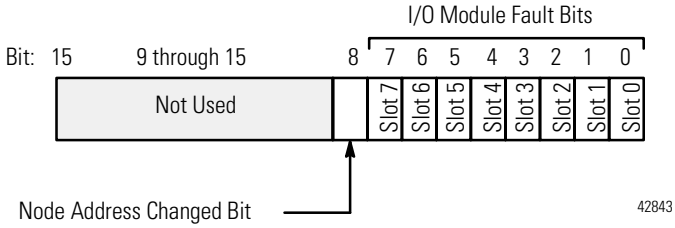
The first word of input data sent by the adapter is the Adapter Status Word. This is followed by the input data from each slot, in the order of the installed I/O modules. The Input data from slot 0 is first after the status word, following by Input data from slot 2, and so on up to slot 7.



Description of Adapter Input Status Word

The input status word consists of:

- I/O module fault bits - 1 status bit for each slot
- node address changed - 1 bit



The adapter input status word bit descriptions are shown in the following table.

Bit Description	Bit	Explanation
I/O Module Fault	0	This bit is set (1) when an error is detected in slot position 0.
	1	This bit is set (1) when an error is detected in slot position 1.
	2	This bit is set (1) when an error is detected in slot position 2.
	3	This bit is set (1) when an error is detected in slot position 3.
	4	This bit is set (1) when an error is detected in slot position 4.
	5	This bit is set (1) when an error is detected in slot position 5.
	6	This bit is set (1) when an error is detected in slot position 6.
	7	This bit is set (1) when an error is detected in slot position 7.
Node Address Changed	8	This bit is set (1) when the node address switch setting has been changed since power up.
	9 thru 15	Not used - sent as zeroes.

Possible causes for an **I/O Module Fault** are:

- transmission errors on the FlexArmor backplane
- a failed module
- a module removed from the FlexArmor Baseplate
- incorrect module inserted in a slot position
- the slot is empty, but the platform is configured for a module in the slot location

Communication Choices

The FlexArmor DeviceNet adapter module supports multiple communication choices. These choices all use the default I/O structure previously described. The adapter master makes the actual communication choice. The choices are:

Polled - data is sent by the adapter in response to received data

Strobe - data is sent by the adapter in response to the strobe command. The single bit allocated to the adapter in the strobe message is not used. If the configured size of the input data (sent from the adapter) is greater than 8 bytes, the strobe connection establishment will fail. In this case, the input size must be re-configured to 8 bytes or less.

Change of State - data is sent by the adapter based on detection of any changed value within the input data. Data is independently received based on change of state from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.

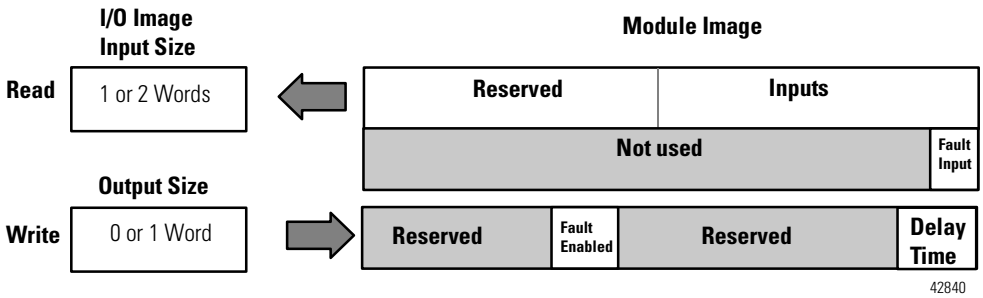
Cyclic - data is sent cyclically by the adapter based on a configured time value. Data is independently received cyclically from the sender. Data in both directions can be acknowledged or unacknowledged depending on the run time configuration of the system.

Mapping Data into the Image Table

All FlexArmor modules are supported by the DeviceNet adapter. At present, these consist of:

Module Description	Catalog Number	For image table mapping refer to:
4 Sinking Input Module	1798-IB4	2-5
4 Sinking Input Diagnostic Module	1798-IB4D	2-6
8 Sinking Input Module	1798-IB8	2-7
4 Electronically Fused Sourcing Output Module	1798-OB4E	2-8
8 Electronically Fused Sourcing Output Module	1798-OB8E	2-9
4 Analog Input Module	1798-IE4	2-9
2 Analog Output Module	1798-OE2	2-12

Description of 1798-IB4 Image Table Mapping



Memory Map of 4 Point Discrete Input Module Image Table - 1798-IB4

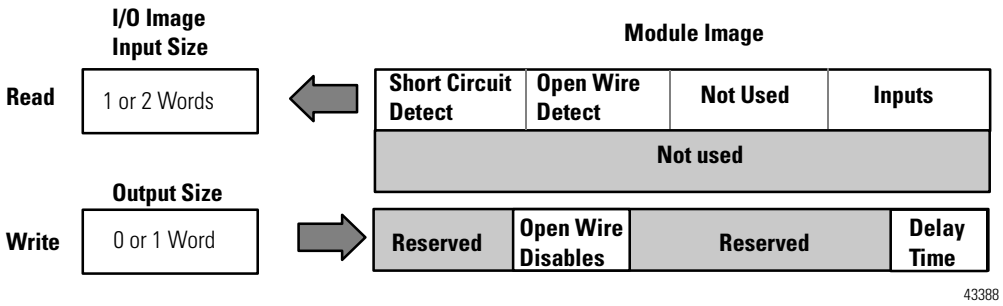
Decimal Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Size
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	Not used												D3	D2	D1	D0	Read Word 1
	Not used															FO	Read Word 2
	Reserved						FE	Reserved						DT 00-3			Write Word 1

Where D = Input Data (D0 corresponds to input 0, D1 corresponds to input 1, etc.), DT = Input Delay Time (DT 00-3 corresponds to inputs 0 through 3), FO = Fault Bit - Indicates status of module sensor power (0=Normal, 1=Sensor Power Shorted), FE = Fault Enabled Bit, must be set to return fault bit (FO) from module. The “Fault Enabled” bit will be set automatically if the input filter times are configured through RSNetWorx for DeviceNet.

Input Delay Times for the 1798-IB4 Input Module

Bits			Description	Selected Delay Time
02	01	00	Delay Time for Inputs 00-03	
0	0	0	Delay Time 0 (default)	256µs
0	0	1	Delay Time 1	512µs
0	1	0	Delay Time 2	1ms
0	1	1	Delay Time 3	2ms
1	0	0	Delay Time 4	4ms
1	0	1	Delay Time 5	8ms
1	1	0	Delay Time 6	16ms
1	1	1	Delay Time 7	32ms

Description of 1798-IB4D Image Table Mapping



Memory Map of 4 Point Discrete Input Module Image Table - 1798-IB4D

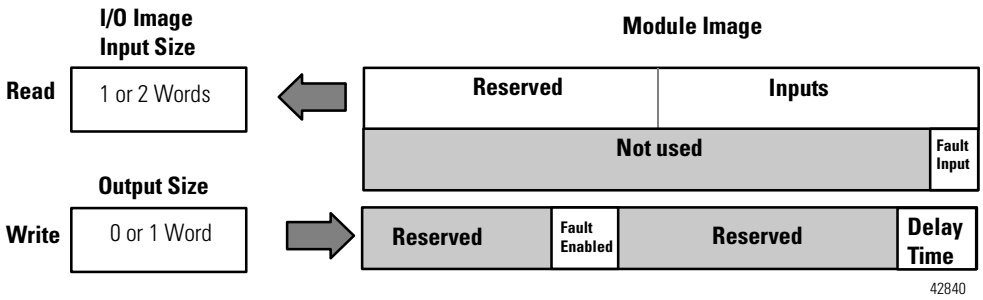
Decimal Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Size
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	Dec
	S3	S2	S1	S0	W3	W2	W1	W0	Not Used				I3	I2	I1	I0	Read Word 1
	Not Used																Read Word 2
	Reserved				D3	D2	D1	D0	Reserved					DT 00-3			Write Word 1

Where I = Input Data (I0 corresponds to input 0, I1 corresponds to input 1, etc.); DT = Input Delay Time (DT 00-3 corresponds to inputs 0 through 3) W = Open Wire Detect; S = Short Circuit Detect; D = Open Wire Disable

Input Delay Times for the 1798-IB4D Input Module

Bits			Description	Selected Delay Time
02	01	00	Delay Time for Inputs 00-03	
0	0	0	Delay Time 0 (default)	256µs
0	0	1	Delay Time 1	512µs
0	1	0	Delay Time 2	1ms
0	1	1	Delay Time 3	2ms
1	0	0	Delay Time 4	4ms
1	0	1	Delay Time 5	8ms
1	1	0	Delay Time 6	16ms
1	1	1	Delay Time 7	32ms

Description of 1798-IB8 Image Table Mapping



Memory Map of 8 Point Discrete Input Module Image Table - 1798-IB8

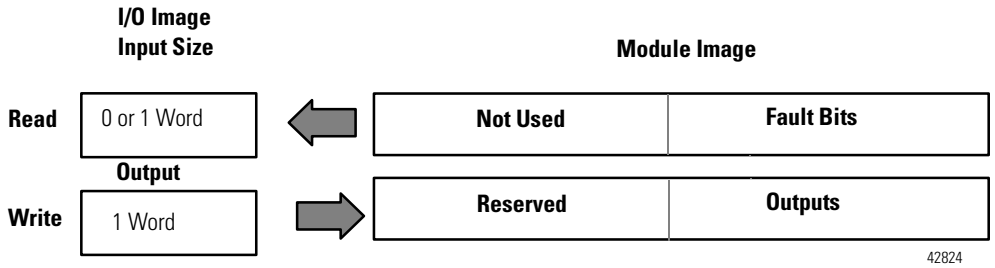
Decimal Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Size
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	Not used								D7	D6	D5	D4	D3	D2	D1	D0	Read Word 1
	Not used															FO	Read Word 2
	Reserved						FE	Reserved						DT 00-07			Write Word 1

Where D = Input Data (D0 corresponds to input 0, D1 corresponds to input 1, etc.), DT = Input Delay Time (DT 00-07 corresponds to inputs 0 through 7) FO = Fault Bit - Indicates status of module sensor power (0=Normal, 1=Sensor Power Shorted), FE = Fault Enabled Bit, must be set to return fault bit (FO) from module. The “Fault Enabled” bit will be set automatically if the input filter times are configured through RSNetWorx for DeviceNet.

Input Delay Times for the 1798-IB8 Input Module

Bits			Description	Selected Delay Time
02	01	00	Delay Time for Inputs 00-07	
0	0	0	Delay Time 0 (default)	256µs
0	0	1	Delay Time 1	512µs
0	1	0	Delay Time 2	1ms
0	1	1	Delay Time 3	2ms
1	0	0	Delay Time 4	4ms
1	0	1	Delay Time 5	8ms
1	1	0	Delay Time 6	16ms
1	1	1	Delay Time 7	32ms

Description of 1798-OB4E Image Table Mapping

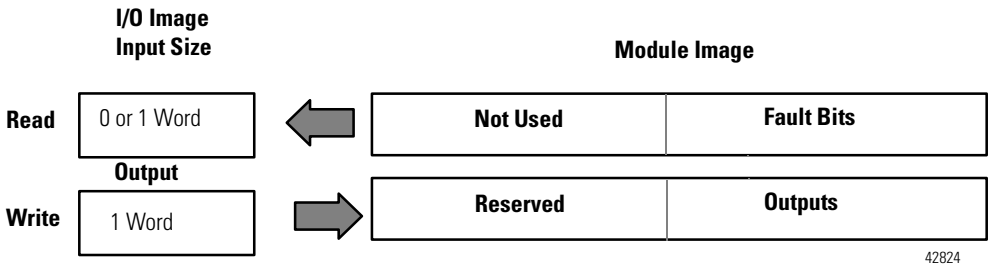


Memory Map of 4 Point Discrete Output Module Image Table - 1798-OB4E

Decimal Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Size
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	Not used												F3	F2	F1	F0	Read Word 1
	Reserved												O3	O2	O1	O0	Write Word 1

Where O = Output Value (O0 corresponds to output 0, O1 corresponds to output 1, etc.)
F0-F3 = Indicate the status of each output point (0=Output normal, 1=Output faulted)

Description of 1798-OB8E Image Table Mapping

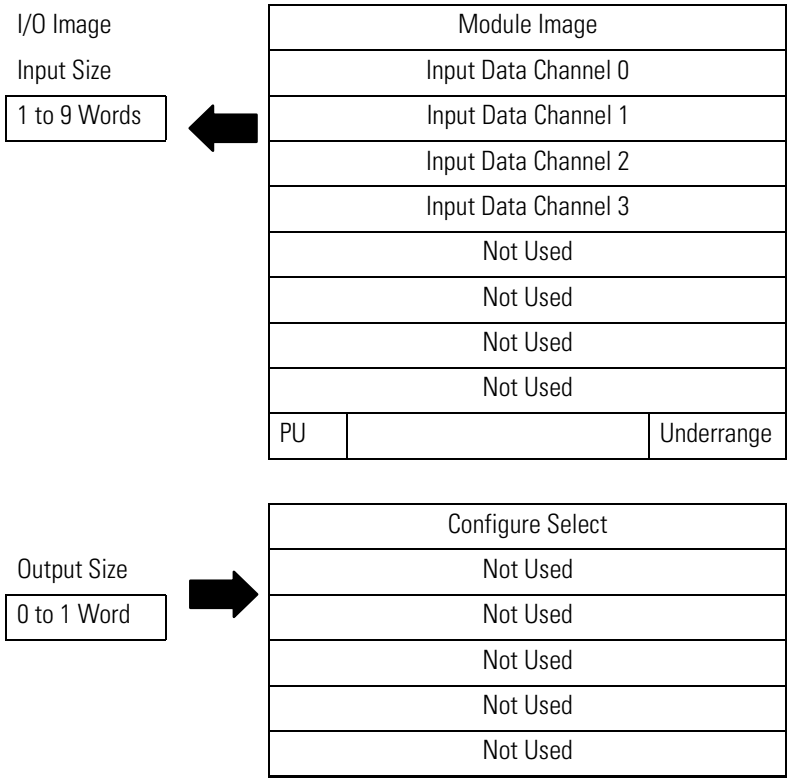


Memory Map of 8 Point Discrete Output Module Image Table - 1798-OB8E

Decimal Bit	**15**	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**	**Size**
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	Not used								F7	F6	F5	F4	F3	F2	F1	F0	Read Word 1
	Reserved								O7	O6	O5	O4	O3	O2	O1	O0	Write Word 1

Where O = Output Value (O0 corresponds to output 0, O1 corresponds to output 1, etc.)
F0-F7 = Indicate the status of each output point (0=Output normal, 1=Output faulted)

Description of 1798-IE4 Image Table Mapping



Memory Map of Analog Input Module Image Table - 1798-IE4

Decimal Bit	**15**	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**	**Size**
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	S	Analog Value Channel 0															Read Word 1
	S	Analog Value Channel 1															Read Word 2
	S	Analog Value Channel 2															Read Word 3
	S	Analog Value Channel 3															Read Word 4
	S	Not Used															Read Word 5
	S	Not Used															Read Word 6
	S	Not Used															Read Word 7
	S	Not Used															Read Word 8
	PU	Not Used - Set to Zero											U3	U2	U1	U0	Read Word 9
	Not Used - Set to 0				C3	C2	C1	C0	Not Used - Set to 0				F3	F2	F1	F0	Write Word 1
	Not Used - Set to 0																Write Word 2 thru 6

Where PU = Power up bit; U = Underrange bits for 4-20mA inputs; C = Configure select bit; F = Full range bit;
S = Sign bit (in 2's complement)

Range Selection Bits for the 1798-IE4

Channel No.	**Channel 0**		**Channel 1**		**Channel 2**		**Channel 3**	
	F0	**C0**	**F1**	**C1**	**F2**	**C2**	**F3**	**C3**
Decimal Bit	**00**	**08**	**01**	**09**	**02**	**10**	**03**	**11**
0-10V dc/0-20mA	1	0	1	0	1	0	1	0
4-20mA	0	1	0	1	0	1	0	1
10 to +10V dc	1	1	1	1	1	1	1	1
Off[1]	0	0	0	0	0	0	0	0

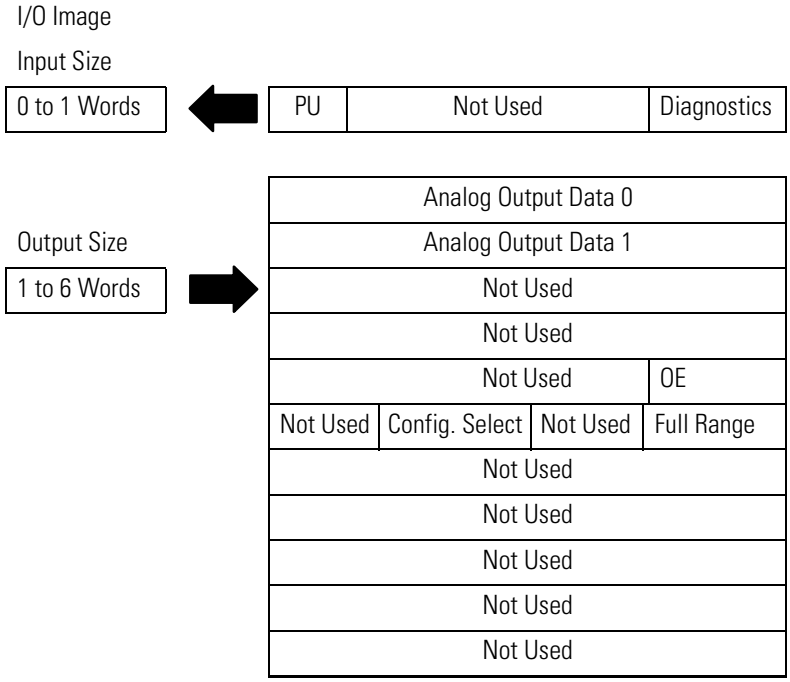
C = Configure select bit; F = Full range bit

1. When configured to off, individual channels will return 0000H.

Word/Bit Descriptions for the 1798-IE4 Analog Input Module Write

Word	Decimal Bit	Definition
Read Word 1	Bits 00-14	Channel 0 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits
	Bit15	Channel 0 analog data sign bit
Read Word 2	Bits 00-14	Channel 1 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits
	Bit15	Channel 1 analog data sign bit
Read Word 3	Bits 00-14	Channel 2 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits
	Bit15	Channel 2 analog data sign bit
Read Word 4	Bits 00-14	Channel 3 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits
	Bit15	Channel 3 analog data sign bit
Read Word 5-8		Not Used
Read Word 9	Bits 00-03	Underrange bits (U) for individual channels (4-20mA current input only) - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1, and so on. When set (1), indicates either a broken or open input wire, or input current below 4-20mA.
	Bits 04-14	Not used - set to 0
	Bit 15	Power Up bit - This bit is set to 1 when all bits in the configuration register are 0 (unconfigured state). The configuration register can be cleared by either of the reset inputs, or by the user writing all zeroes to it.
Write Word 1	Bits 00-03	Full range bits (F) for individual channels - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1, and so on. Refer to range selection above.
	Bits 08-11	Configure select bits (C) for individual channels - Bits 08 corresponds to input channel 0, bit 09 corresponds to input 1, and so on. Refer to range selection above.
Write Word 2-6	Bits 00-15	Not used - set to 0

Description of 1798-OE2 Image Table Mapping



Memory Map of Analog Output Module Image Table - 1798-OE2

Decimal Bit	**15**	**14**	**13**	**12**	**11**	**10**	**09**	**08**	**07**	**06**	**05**	**04**	**03**	**02**	**01**	**00**	**Size**
Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	
	PU	Not Used - Set to Zero													W1	W0	Read Word 1
	S	Analog Value Channel 0															Write Word 1
	S	Analog Value Channel 1															Write Word 2
	S	Not Used															Write Word 3
	S	Not Used															Write Word 4
	S	Not Used - Set to 0													OE1	OE0	Write Word 5
	S	Not Used - Set to 0					C1	C0	Not Used - Set to 0						F1	F0	Write Word 6
	S	Not Used - Set to 0															Write Word 7 thru 14

Where PU = Power up bit; W = Diagnostic bits for current output broken or load resistance high (Not used on voltage outputs.); OE = Output enable bits (bit 00 corresponds to output 0, bit 01 corresponds to output 1. **ATTENTION: These bits must be set to 1**. C = Configure select bit; F = Full range bit; S = Sign bit (in 2's complement)

Range Selection Bits for the 1798-OE2

Channel No.	Channel 0		Channel 1	
	F0	**C0**	**F1**	**C1**
Decimal Bit	**00**	**08**	**01**	**09**
0-10V dc/0-20mA	1	0	1	0
4-20mA	0	1	0	1
10 to +10V dc	1	1	1	1
Off[1]	0	0	0	0

C = Configure select bit; F = Full range bit

1. When configured to off, individual channels will return 0V.

Word/Bit Descriptions for the 1798-OE2 Analog Output Module (Write Word 6)

Word	Decimal Bit	Definition
Read Word 1	Bits 00-01	Current outputs only - When set (1), the wire on the output is broken or the load resistance is too high. Bit 00 corresponds to channel 0, bit 01 corresponds to channel 1.
	Bit 02-14	Not Used - Set to 0.
	Bit 15	Power Up bit - This bit is set to 1 when all bits in the configuration register are 0 (unconfigureed state). The configuration register can be cleared by either of the reset inputs, or by the user writing all zeroes to it.
Write Word 1	Bits 00-14	Channel 0 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits.
	Bit15	Channel 0 analog data sign bit.
Write Word 2	Bits 00-14	Channel 1 analog data - 12-bit left justified two's complement number; unused lower bits are zero; 4-20mA uses all 16 bits.
	Bit15	Channel 1 analog data sign bit.
Read Word 3-4		Not Used
Write Word 5	Bit 00-01	**Output Enable Bits**. Bit 00 corresponds to output 0, 01 corresponds to output 1. **These bits must be set to 1.**
	Bits 02-15	Not Used - Set to 0.
Write Word 6	Bits 00-02	Full range bits (F) for individual channels - Bit 00 corresponds to input channel 0, bit 01 corresponds to input channel 1. Refer to the range selection above.
	Bits 08-09	Configure select bits (C) for individual channels - Bit 08 corresponds to input channel 0, bit 09 corresponds to input channel 1. Refer to range selection above.
Write Word 7-14		Not Used - Set to 0.

Notes:

Configure Your DeviceNet Adapter

Chapter Objectives

In this chapter, you will learn how to use RSNetWorx for DeviceNet software to configure the adapter. You will:

- learn briefly about RSNetWorx for DeviceNet
- configure your FlexArmor adapter and system online
- map the scanner

Configure Your Adapter's FlexArmor System

Configure your FlexArmor system by specifying the FlexArmor module that will reside in each slot. Remember, slot 0 is the closet slot to the adapter and slot 7 is the farthest or last slot.

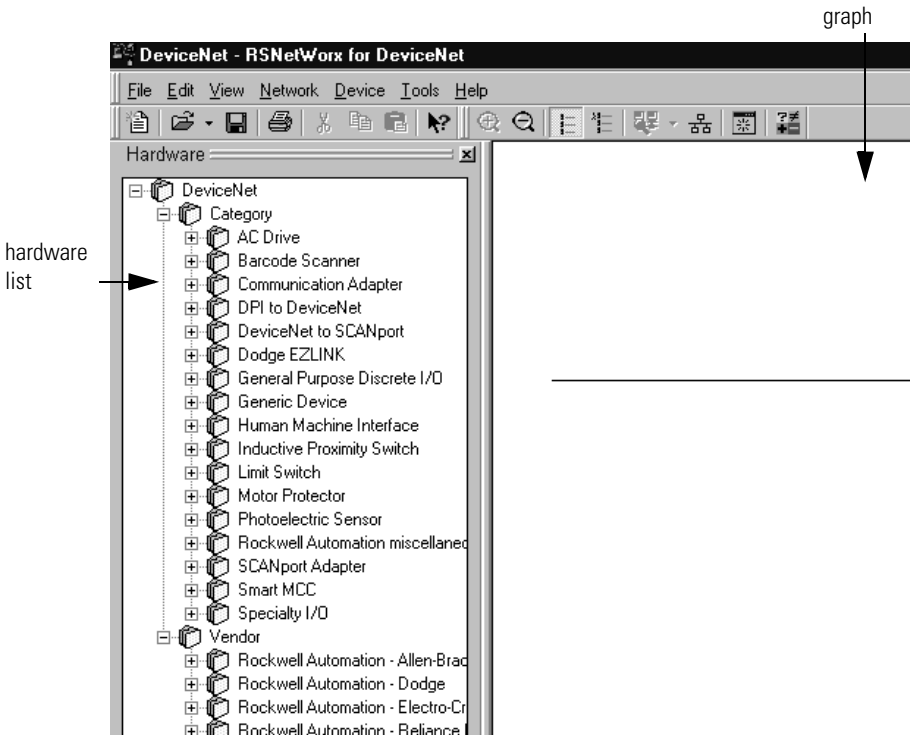
About RSNetWorx for DeviceNet

RSNetWorx for DeviceNet is the software tool used to configure your FlexArmor DeviceNet adapter and its related modules. This software tool can be connected to the adapter via the DeviceNet network.

In this chapter, we assume that you have established a network, and are adding a FlexArmor Adapter to your network.

If you are working off line, drag and drop the devices from the hardware list onto the graph.

IMPORTANT You will be able to perform most of the functions discussed in this section while working off line but you must be on line to perform all of the functions discussed in this chapter.

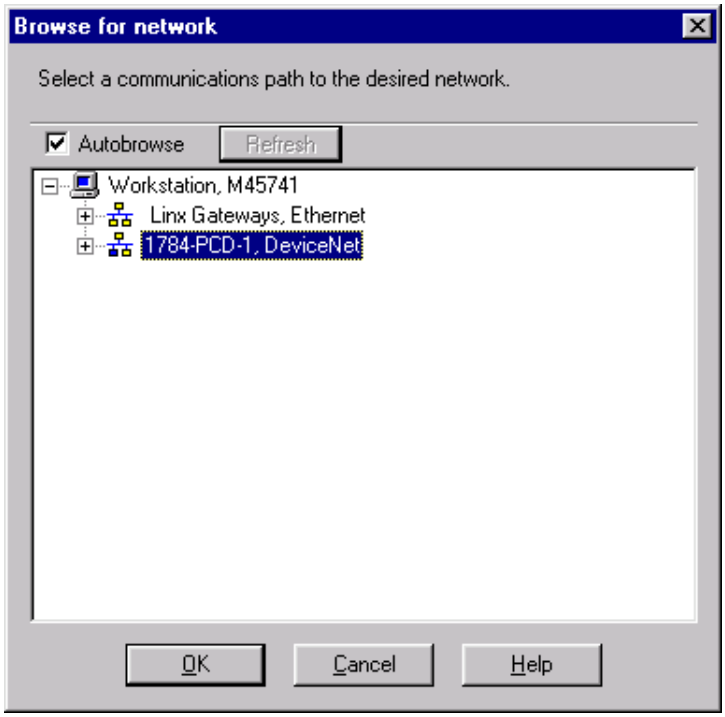


Configure Your FlexArmor Adapter and System Online

To configure your adapter:

1. Open RSNetWorx for DeviceNet.
2. Click the Online icon  . (If you are working off line, skip to the next section to learn how to configure the adapter.)

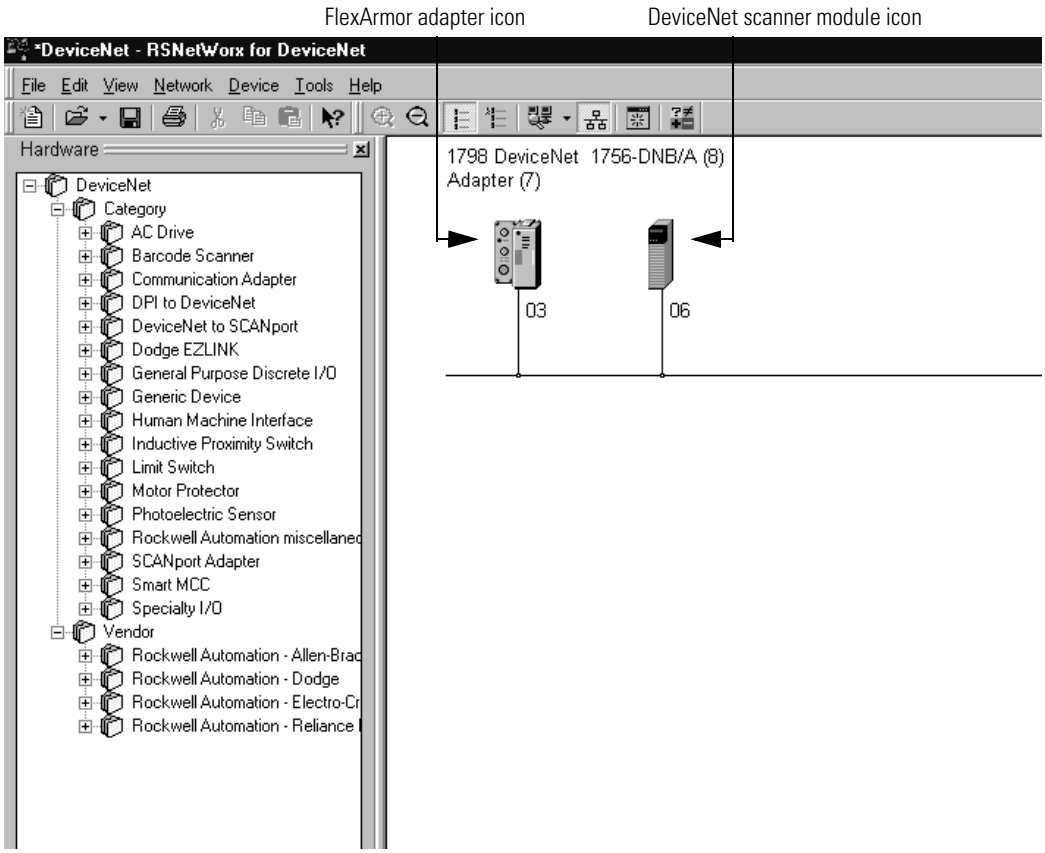
   You see the Browse for Network window.
3. Locate the network you wish to access.



4. Click **OK**.

   You are now in Online mode.
5. Click the Browse for Network icon  .

The network displays on the screen.



Configure the Adapter

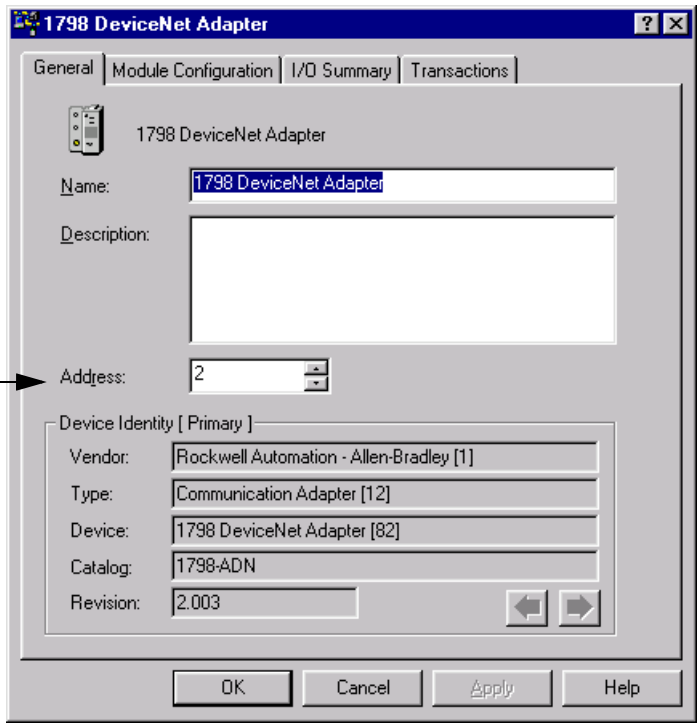
You can determine the adapter configuration and system configuration for an adapter at a specific node address. The node address is assigned at the adapter (using the rotary switch) and in the adapter configuration screen.

IMPORTANT If addressing the adapter in the adapter configuration screen, the address must agree with the physical address of the rotary switches on the adapter.

To access the adapter configuration screen, double-click the FlexArmor adapter icon.

You see the adapter configuration screen.

If configuring the adapter off line, set this address to match the Node Address switches on the 1798-ADN.

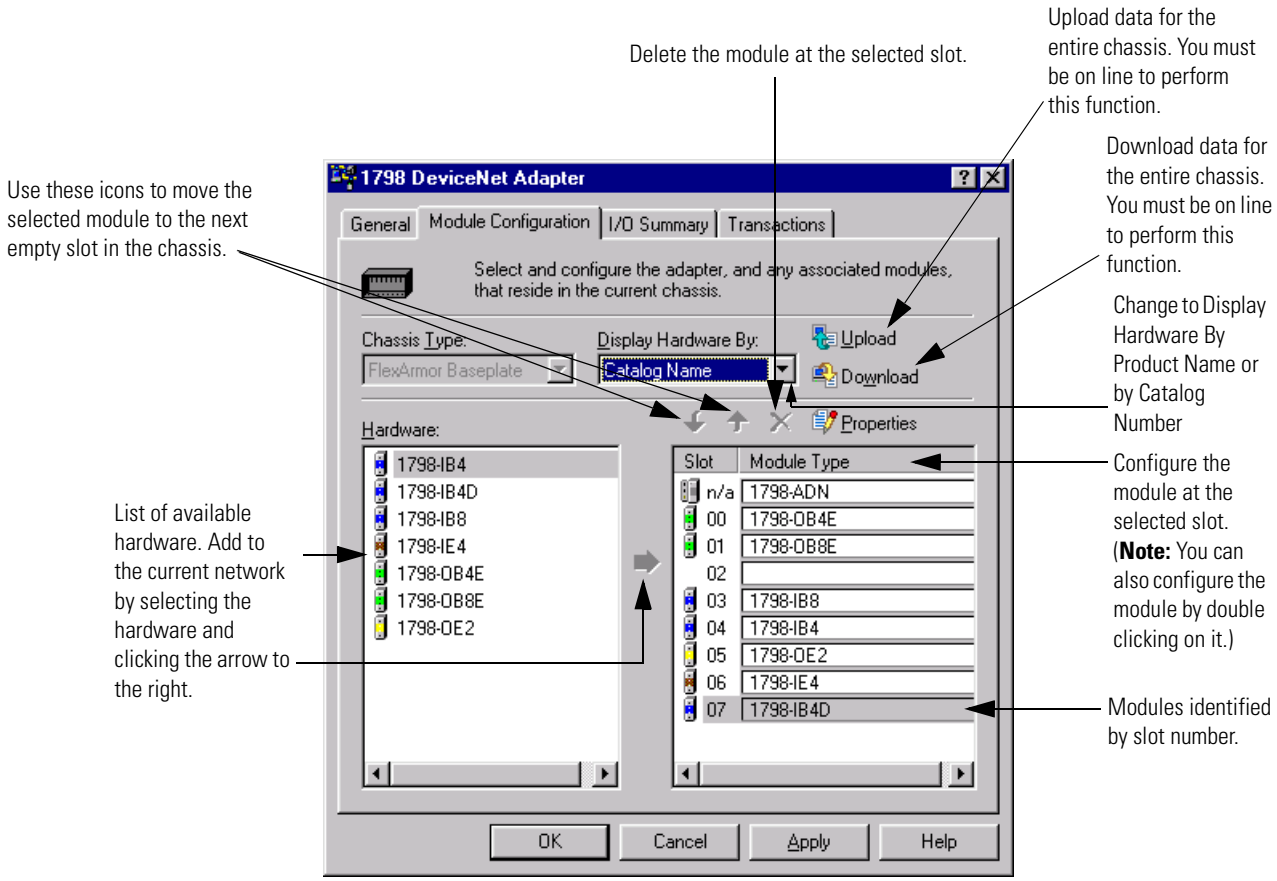


Configure the Module

1. Click the **Module Configuration** tab.
2. Click **Upload**.

IMPORTANT You must be online to perform an upload.

Use the following functions, as needed, to configure the module.



IMPORTANT Downloading to the adapter is an option only when the 1798-ADN is not in the master's scanlist.

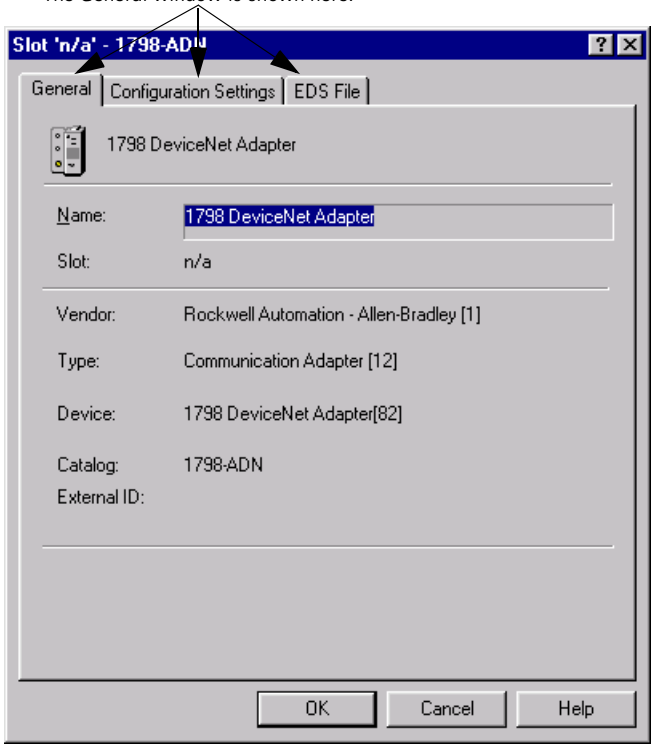
IMPORTANT If you attempt to download when the adapter is in a scanlist, you will receive an **object state conflict** error message.

View Adapter Parameters

1. To display the adapter parameter window, from the **Module Configuration** window, double-click the adapter icon (1798-ADN) under **Module Type**. You see the following window.

Click these tabs to view configuration information.
The General window is shown here.

The General window lists information about the module currently selected.



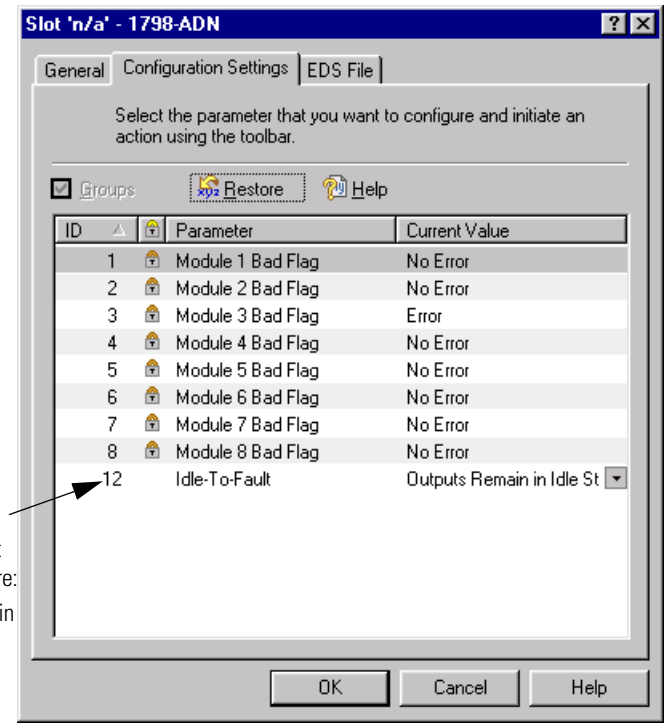
The adapter **Configuration Settings** window lists the status of each module in the FlexArmor system.

Module Bad Flag
Possible causes for a Module Bad Flag:

- Transmission errors on the FlexArmor backplane
- A failed module
- A module removed from the baseplate
- Incorrect module inserted in a slot position
- An empty slot

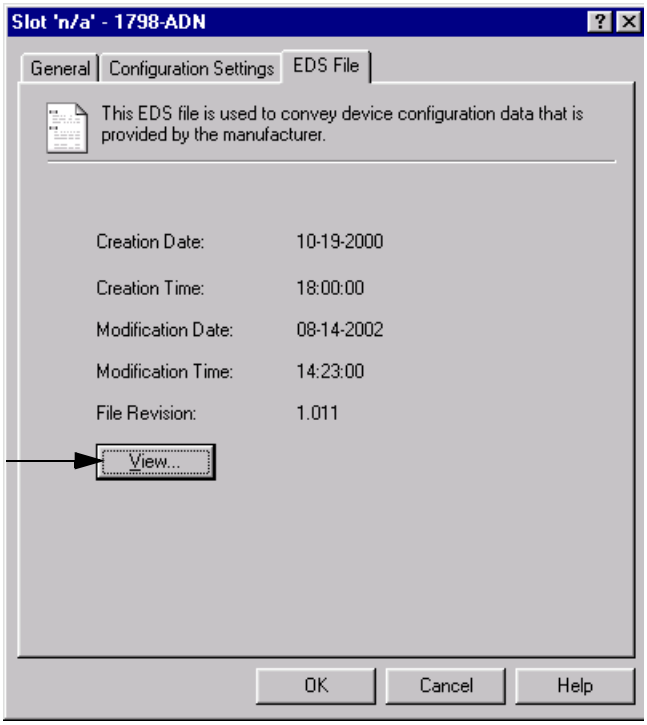
Idle-to-Fault
Determines the state of the Outputs immediately following an Idle to Fault transition. The options are:

- Output Remains in Idle State
- Output Goes to Fault State



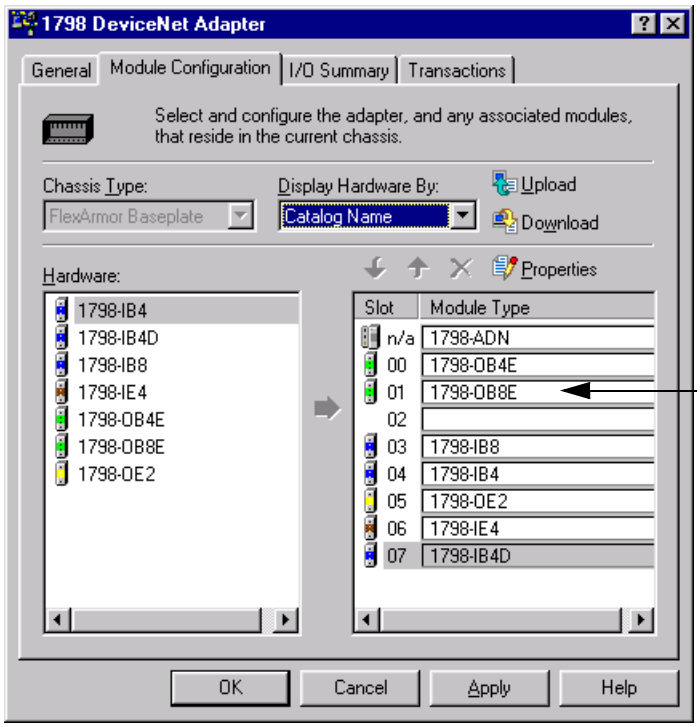
The **EDS File** window lists information about the EDS file currently being used.

Click **View** to display the EDS file.



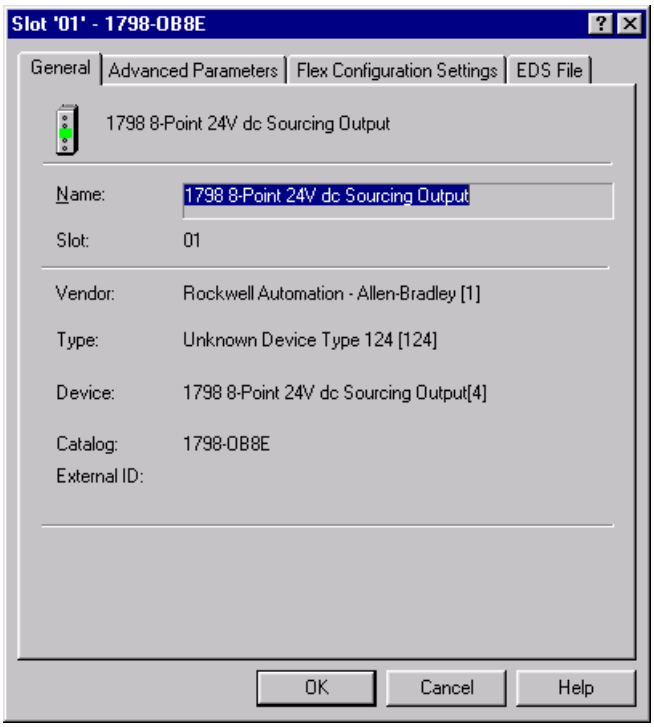
Module Parameters

To view individual module parameters, from the **Module Configuration** tab, double click on the module whose parameters you wish to view.



Double click on the module whose parameters you wish to view. For this example, the 1798-OB8E was chosen.

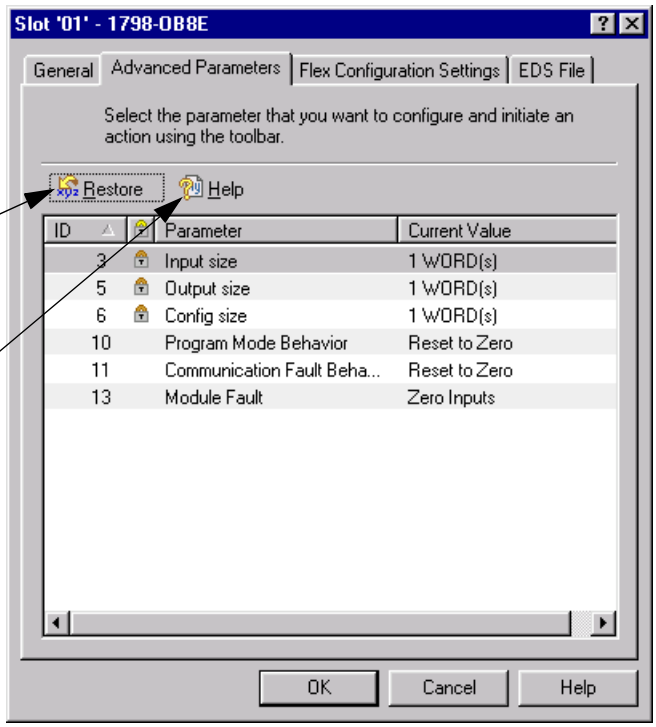
The **General** window lists information about the module currently selected.



The **Advanced Parameters** window lists status information about the module currently selected.

Use this icon to restore the parameters selections to the module default (obtained from the EDS file.)

Displays help information on the selected parameters.

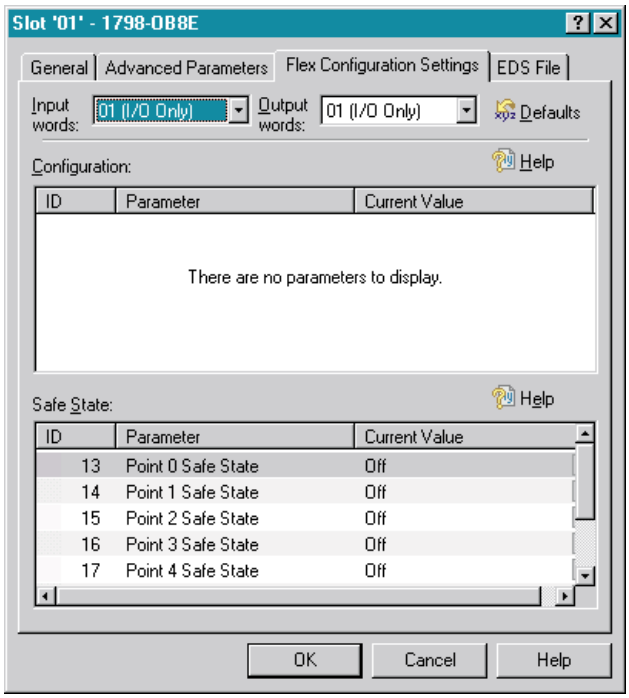


The following table describes the parameters in the **Advanced Parameters** window.

Parameter #	Parameter Name	Description
3	Input Size	Number of Read words. These are determined by other Parameter selections and cannot be set by the user.
5	Output Size	Number of Write words. These are determined by other Parameter selections and cannot be set by the user.
6	Config. Size	Number of Configuration words. These are determined by other Parameter selections and cannot be set by the user
10	Program Mode Behavior	Determines the state of the Outputs when the Controller enters Program mode. The options are: • Reset to Zero • Hold Outputs in Last State • Use Safe State Output Values (Set under Flex Config. tab.)
11	Communication Fault Behavior	Determines the state of the Outputs when the Controller enters Program mode. The options are: • Reset to Zero • Hold Outputs in Last State • Use Safe State Output Values (Set under FLEX Config. tab.)
13	Module Fault	Determines the state of the Inputs in the event of a Module Fault. The options are: • Zero Inputs • Hold Last Input Values

Safe State Data found under the **Flex Configuration Settings** tab is shown below.

Set the value of the safe state data by selecting the value and then choosing either ON or OFF from the drop down list.

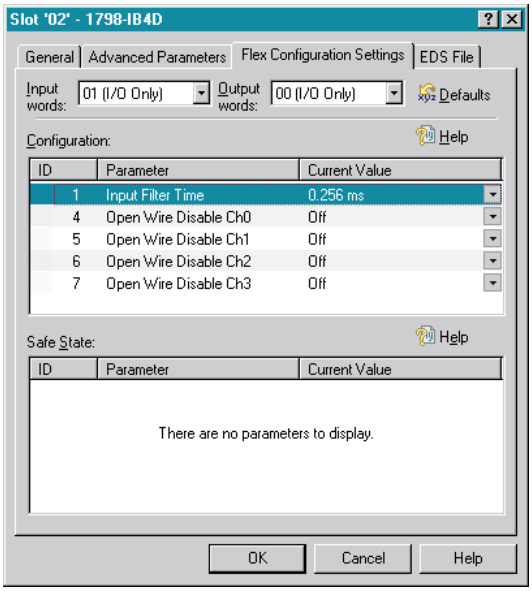


Special Parameters

Special parameters for individual modules can also be found under the **Flex Configuration Settings** tab. The following section identifies special parameter windows for the 1798-IB4D, -IE4, and -OE2 modules.

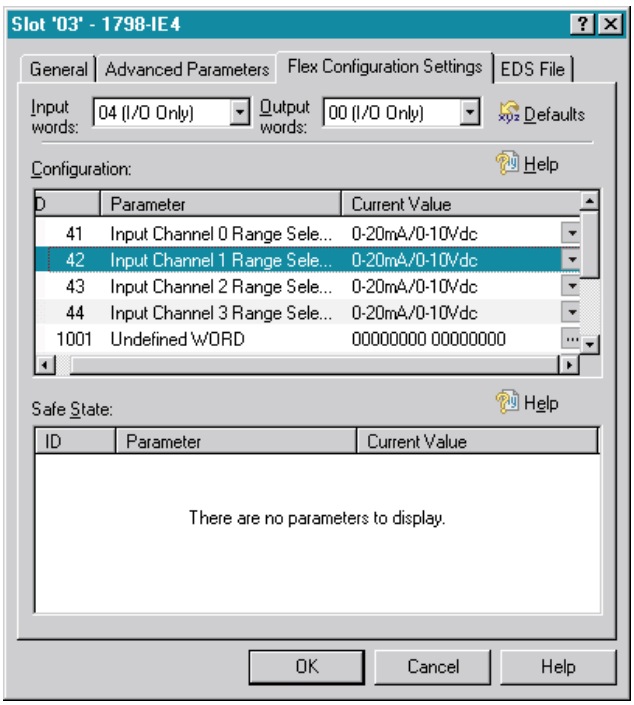
1798-IB4D Filter Time and Open Wire Disable

Enter filter time and open wire parameters for the 1798-IB4D.



1798-IE4 Input Channel Range Selection

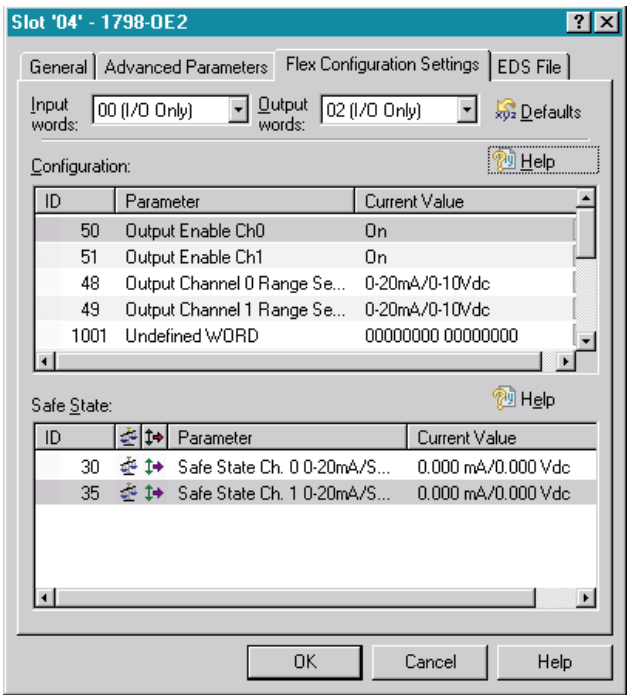
Select the proper current or voltage range for your application.



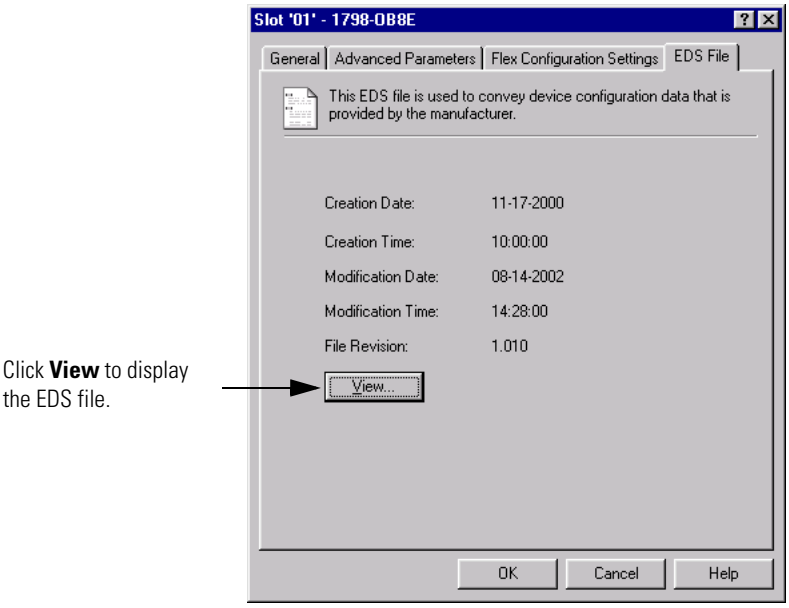
1798-OE2 Output Channel Enable and Range Selection

Enable output channels and select the output channel range appropriate for your application.

Set safe state values

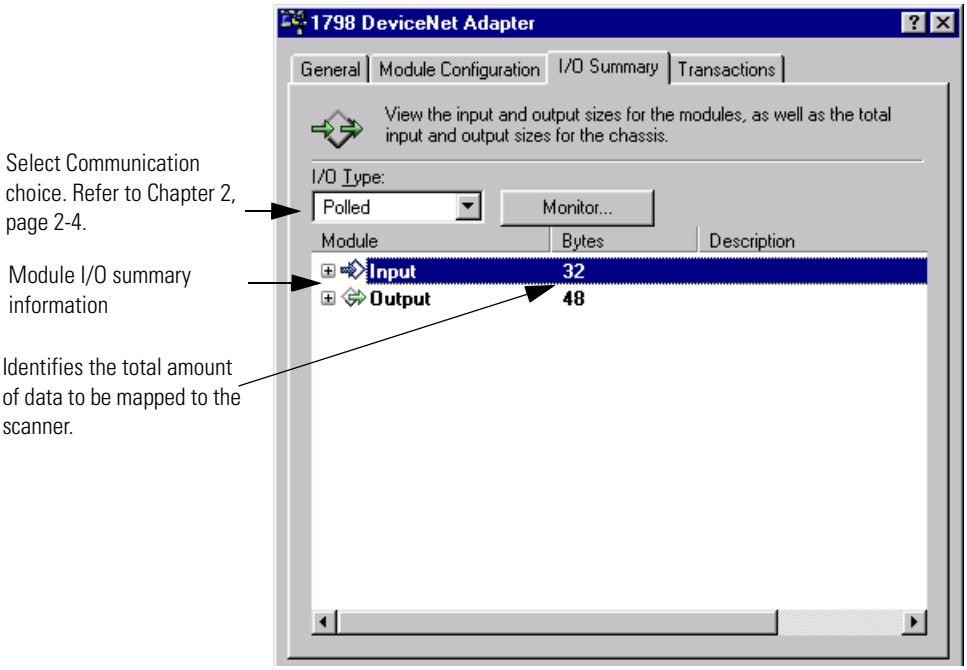


The **EDS File** window is the last tab in the module parameters window. The **EDS File** window lists information about the EDS file currently being used.

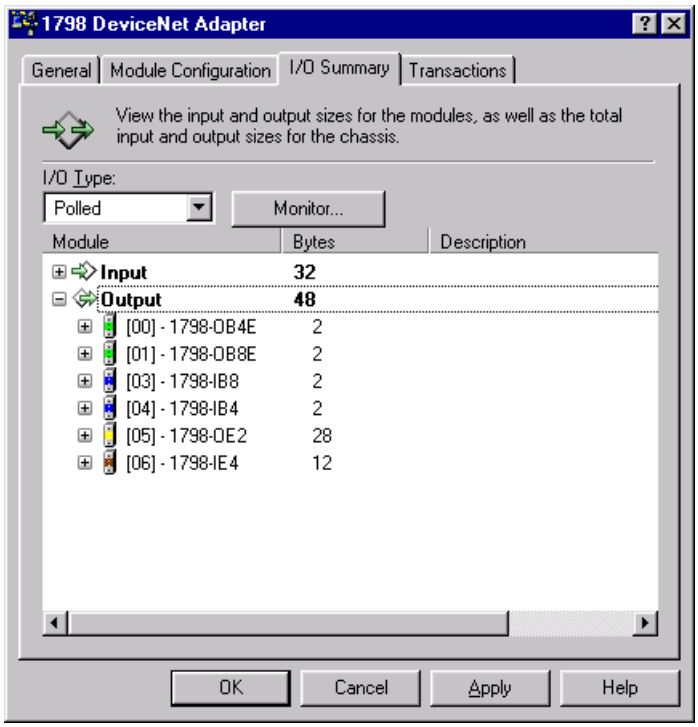


View I/O Summary

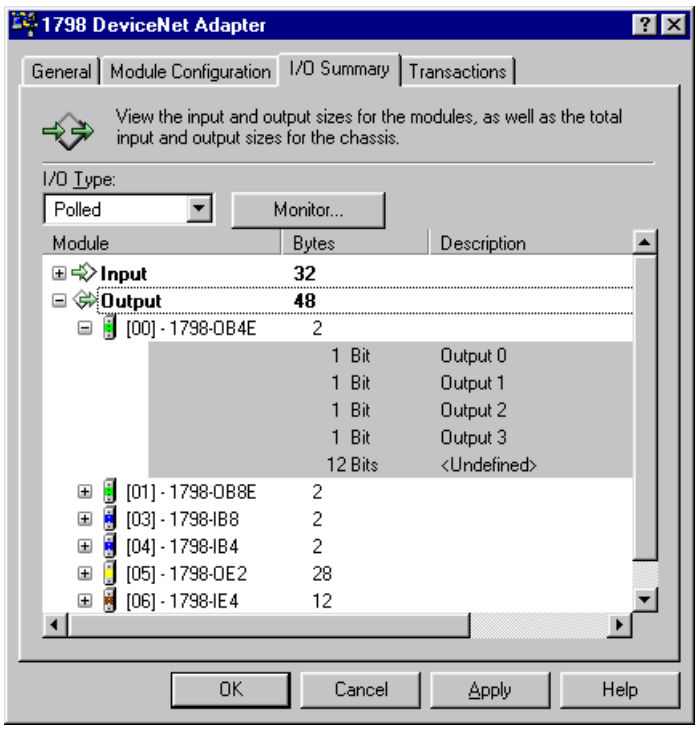
1. To view I/O summary information, click the **I/O Summary** tab from the adapter window.



2. Click the + sign to the left of the input or output module to view the amount of data mapped to each module in the system.

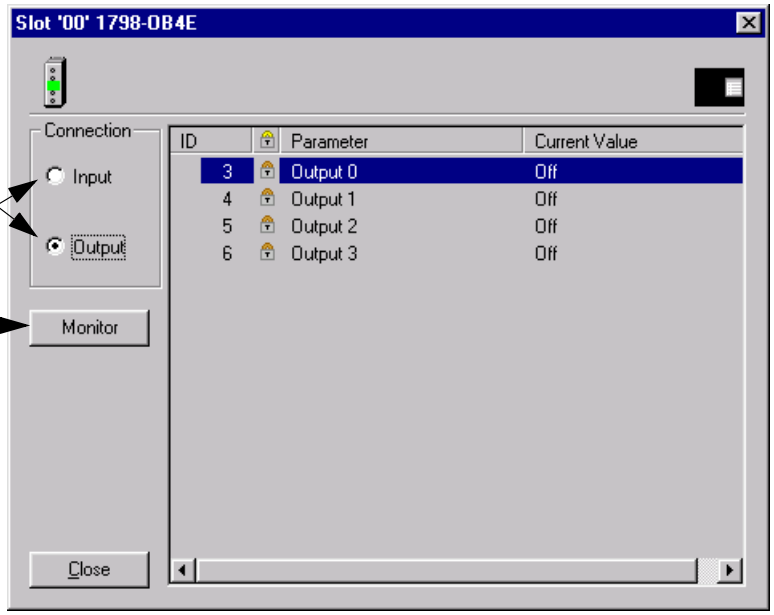


3. Click the + sign to the left of a module to display detailed module information.

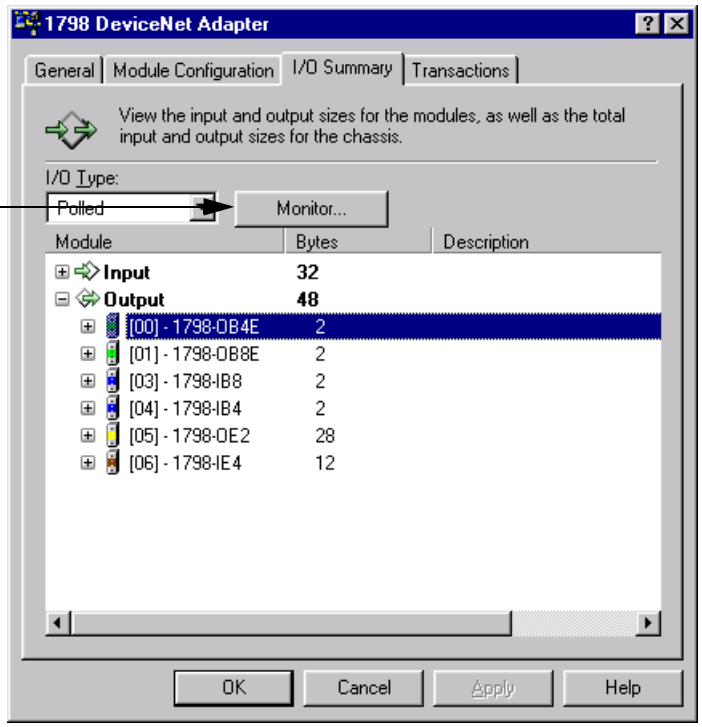


Toggle between input and output data mapped to the module.

Clicking the **Monitor** button will display the current value of the listed parameters.



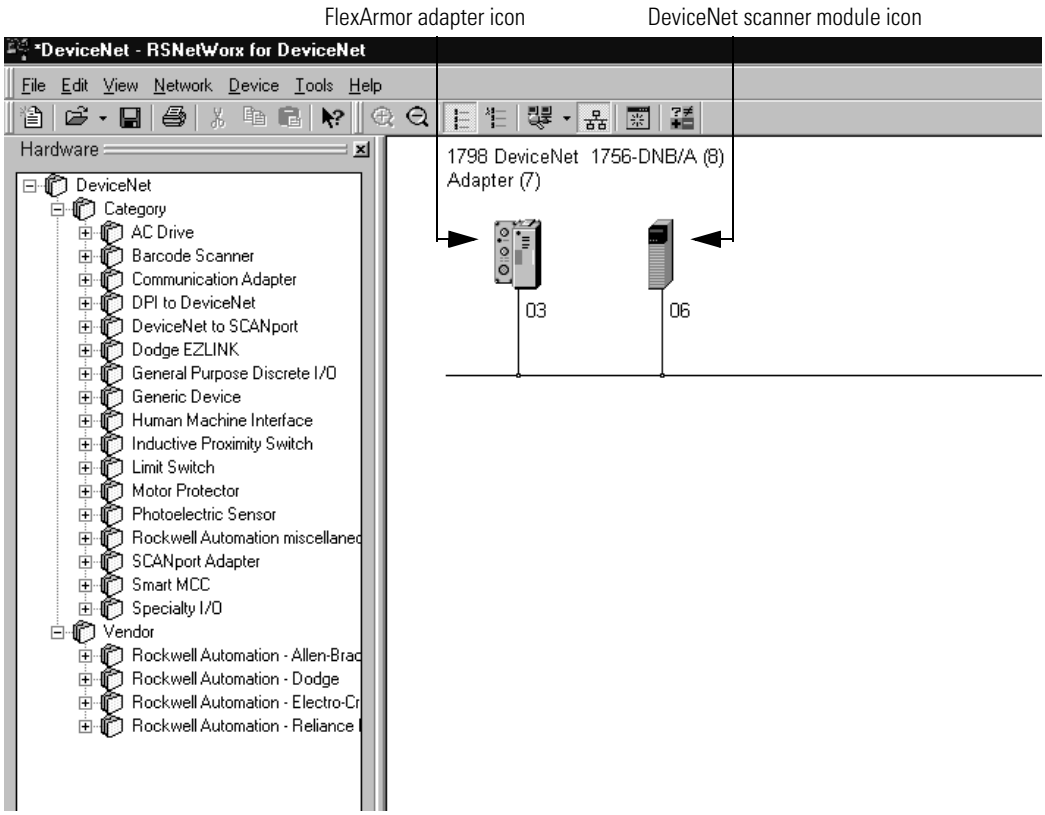
Highlight a module and then click the **Monitor** button to display detailed module information as shown in the example on the next page. **NOTE:** You must be in online mode to perform this function.



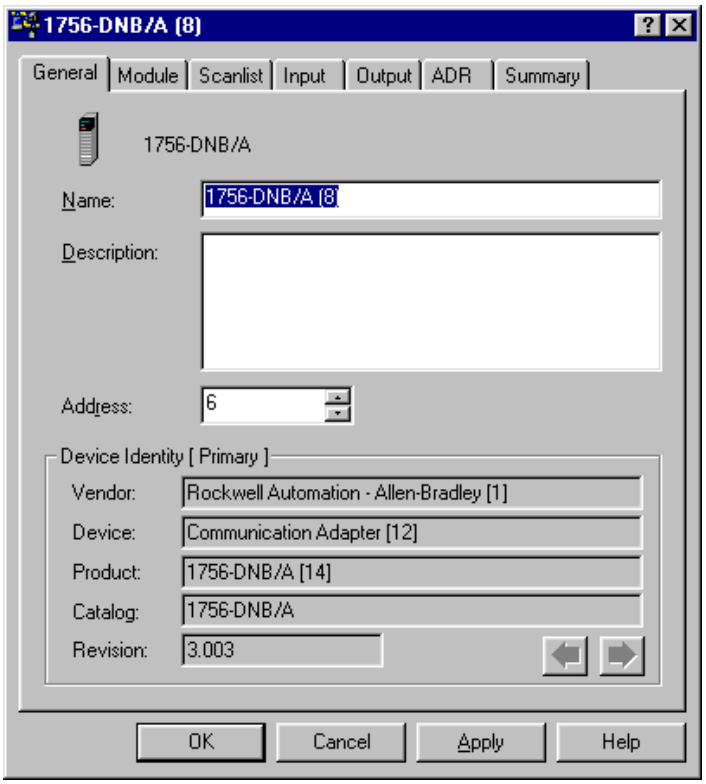
Map the Scanner

To map the scanner:

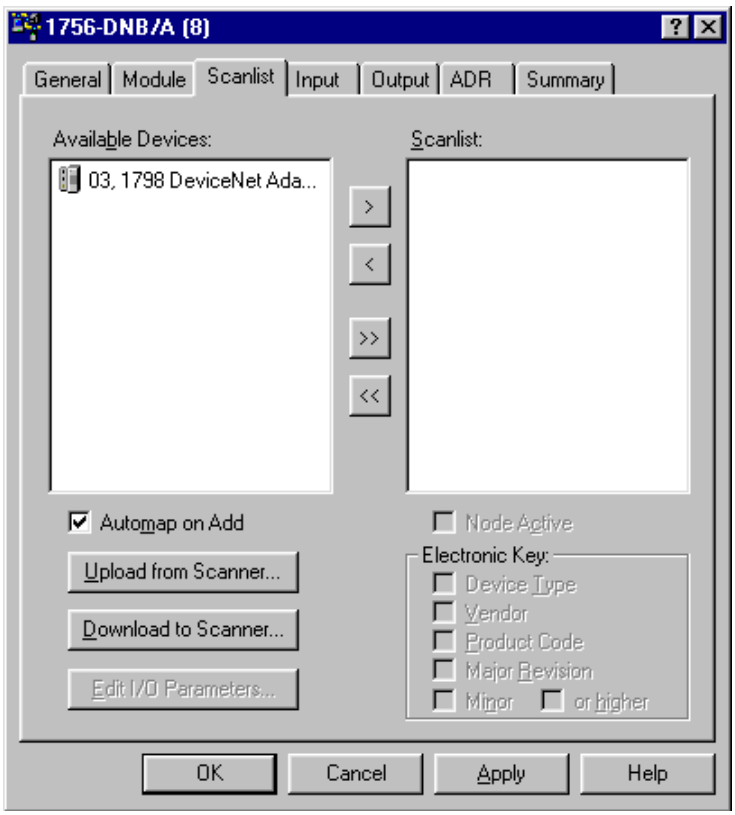
1. From the RSNetWorx for DeviceNet configuration screen, double-click the scanner.



You see the scanner configuration window.

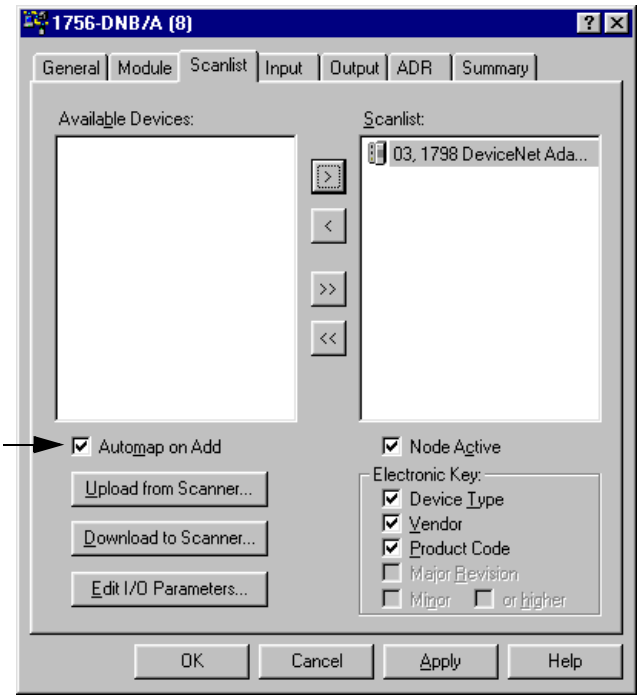


2. Click the **Scanlist** tab.



3. Highlight the device in the **Available Devices** list and click the right arrow to move the device to the Scanlist.

Select **Automap on Add** to automatically map the correct amount of input and output data at the time the FlexArmor system is added to the scanlist.



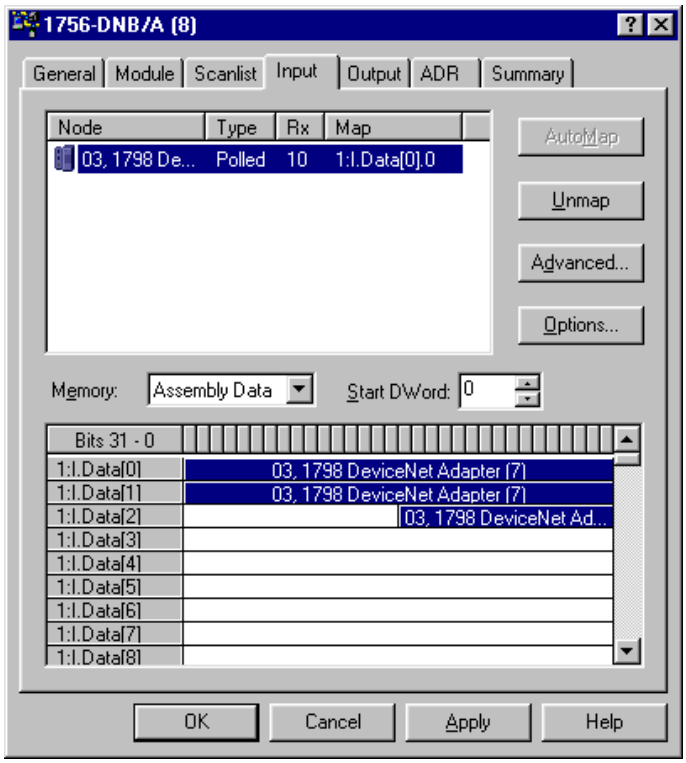
4. Click **OK**.

   The devices in the scanlist will be mapped automatically.

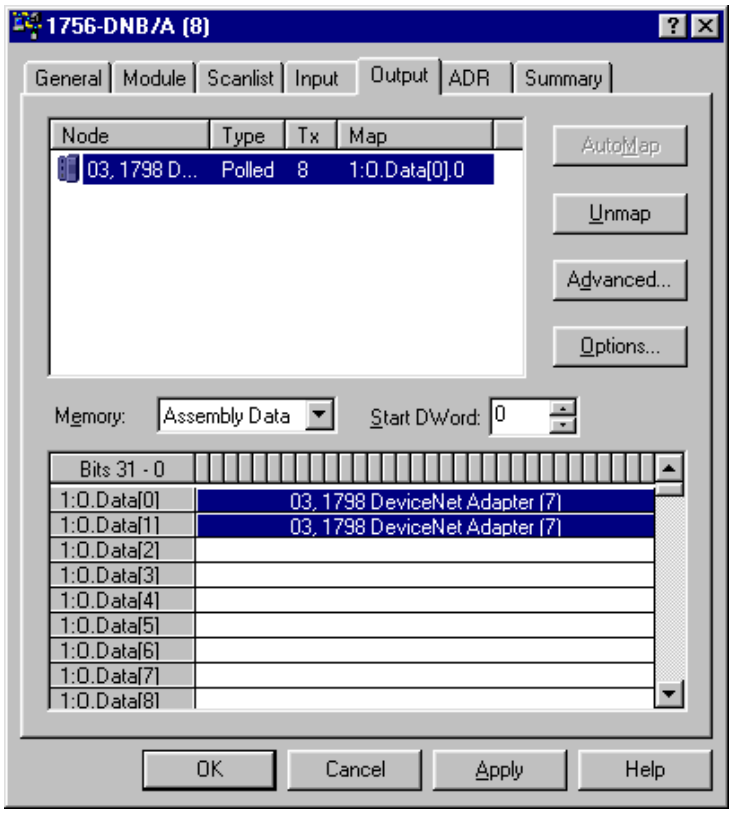
   To map devices manually, click the **Edit I/O Parameters** button.

5. Click **Yes** to download the changes. (You must be on line to perform this function.)

6. Click the **Input** tab to view input data mapped to the scanner.

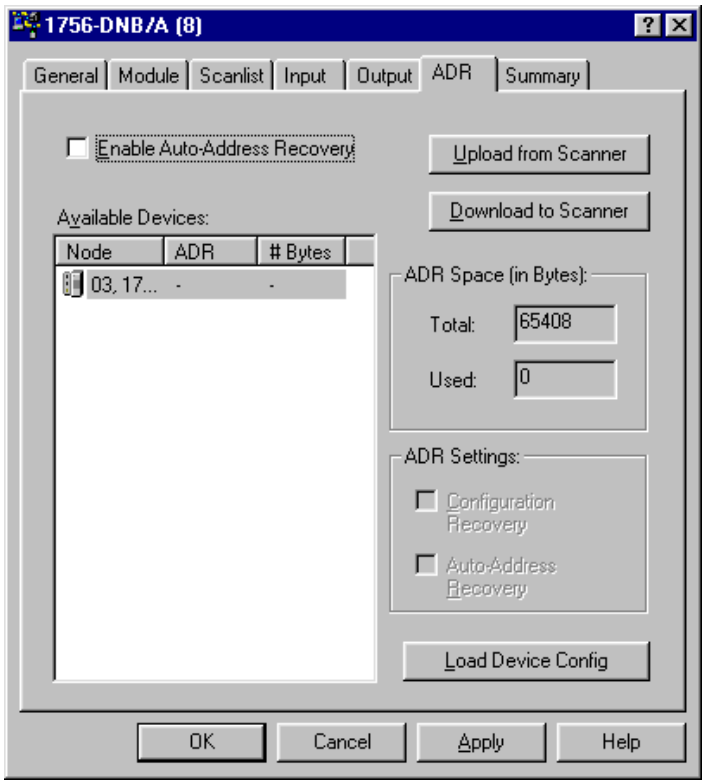


7. Click the **Output** tab to view output data mapped to the scanner.

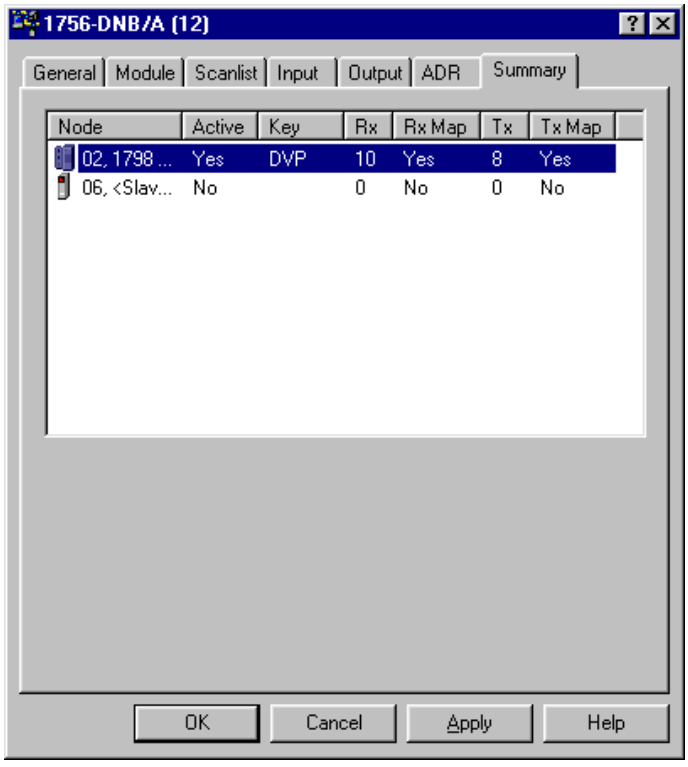


8. Click the **ADR** tab to view ADR (Auto Device Replace) options.

For information about enabling ADR, see the documentation that comes with the scanner.



The **Summary** tab contains a list of the devices to which the scanner is currently talking.



Troubleshooting

Chapter Objectives

This chapter describes how to use the indicators on the module for troubleshooting.

Troubleshoot With the Indicators

Diagnostic indicators are located on the front of the adapter module. They show both normal operation and error conditions in your remote I/O system. The indicators are:

- Mod/Net status
- I/O status

The table below provides the indicator conditions and status.

Mod/Net Status Indicator	
Indication	**Status**
Off	No power, or no network access
Flashing Green/OFF	On line, but not connected to master
Solid Green	On line, link OK, connected
Flashing Red	Recoverable fault
Solid Red	Critical adapter failure
I/O Status Indicator	
Indication	**Status**
Off	No power or outputs off
Flashing Red/Off	Recoverable fault - outputs in fault
Flashing Green/Off	Idle/program mode - outputs in Idle
Solid Green	Device operational - outputs live - run
Solid Red	Critical adapter fault - unrecoverable

Notes:

Specifications

Input Module Specifications

Specifications for the 1798-IB4 Module

Specifications	1798-IB4
Module Type	Digital Input, Sinking
Number of Channels	1 group of 4
Sensor Source Current	400 mA maximum
On-state Voltage	10-28.8V dc; 24V dc nominal
On-state Current	2-12 mA; 8 mA @ 24V dc
Off-state Voltage	5V dc maximum
Off-State Current	1.5 mA minimum
Channel Impedance	4.6KΩ maximum
Isolation Voltage	850V dc channel-to-system for 1s
Delay Times:Off to On On to Off	256 us, 512 us, 1 ms, 2ms 4 ms, 8 ms, 16 ms, 32 ms (Selectable; 256 us default)
FlexBus Current	20 mA maximum
Power Dissipation	2.0W @ 28.8V dc
Thermal Dissipation	6.8 BTU/hr. @ 28.8V dc
Indicators	4 channel status - yellow 1 fault LED indicator- red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 450 mA maximum
Dimensions (H x D x W)	118 mm X 57 mm X 40 mm 4.63 in. X 2.25 in. X 1.58 in.
Environmental Conditions: Operating Temperature Storage Temperature Shock: Operating Non-Operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30G peak, 11±1 ms pulse width 50G peak, 11±1 ms pulse width 5G @ 10-500 Hz per IEC 68-2-6
Conductors	See publication DN-6.7.2
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

1. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Specifications for the 1798-IB8 Module

Specifications	1798-IB8
Module Type	Digital Input, Sinking
Number of Channels	1 group of 8
Sensor Source Current	400 mA maximum
On-state Voltage	10-28.8V dc; 24V dc nominal
On-state Current	2-12 mA; 8 mA @ 24V dc
Off-state Voltage	5V dc maximum
Off-State Current	1.5 mA minimum
Channel Impedance	4.6KΩ maximum
Isolation Voltage	850V dc channel-to-system for 1s
Delay Times:Off to On On to Off	256 us, 512 us, 1 ms, 2ms 4 ms, 8 ms, 16 ms, 32 ms (Selectable; 256 us default)
FlexBus Current	20 mA maximum
Power Dissipation	3.0W @ 28.8V dc
Thermal Dissipation	10.2 BTU/hr. @ 28.8V dc
Indicators	8 channel status - yellow 1 fault LED indicator - red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 500 mA maximum
Dimensions (H x D x W)	118 mm X 57 mm X 40 mm 4.63 in. X 2.25 in. X 1.58 in.
Environmental Conditions: Operating Temperature Storage Temperature Shock: Operating Non-Operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30G peak, 11±1 ms pulse width 50G peak, 11±1 ms pulse width 5G @ 10-500 Hz per IEC 68-2-6
Conductors	See publication DN-6.7.2
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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Specifications for the 1798-IB4D Module

Specifications - 1798-IB4D	
Module Type	Digital Input, Sinking
Number of Channels	1 group of 4
Sensor Source Current	50 mA per connector
On-state Voltage	10-28.8V dc; 24V dc nominal
On-state Current	2-12 mA; 8 mA @ 24V dc
Off-state Voltage	5V dc maximum
Off-State Current	1.5 mA minimum
Channel Impedance	4.6KΩ maximum
Isolation Voltage	850V dc channel-to-system for 1s
Delay Times:Off to On On to Off	256 us, 512 us, 1 ms, 2ms 4 ms, 8 ms, 16 ms, 32 ms (Selectable; 256 us default)
FlexBus Current	80 mA maximum
Power Dissipation	2.0W @ 28.8V dc
Thermal Dissipation	6.8 BTU/hr. @ 28.8V dc
Indicators	4 channel status - yellow 4 diagnostic indicators- red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 300 mA maximum
Dimensions (H x D x W)	118 mm x 57 mm x 40 mm 4.63 in. x 2.25 in. x 1.58 in.
Operational Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 60°C (-4 to 140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900MHz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on power ports ±2kV at 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz

Specifications - 1798-IB4D (continued)	
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz
Conductors	See publication DN-6.7.2
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-usUL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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Specifications for the 1798-IE4 Module

Specifications - 1798-IE4 Analog Input Module	
Module Type	Analog Input
Number of Channels	4 single-ended, non-isolated
ResolutionBits Voltage/Cnt Current/Cnt	12 - Unipolar, 11+ sign - Bipolar 2.56 mV - Unipolar; 5.13 mV - Bipolar 5.13 uA
Data Format	16 bit; 2's complement; left-justified
Conversion Type	Successive approximation
Conversion Rate	256 us - All channels
Current Terminal	4-20 mA; 0-20 mA (user configurable)
Voltage Terminal	±10V; 0-10V (user configurable)
Normal Mode Rejection Voltage Terminal Current Terminal	 -3 db @ 17 Hz; -20 db/decade; -10 db @ 50 Hz; 11.4 db @ 60 Hz -3 db @ 9 Hz; -20 db/decade; -15.3 db @ 50 Hz; -16.8 db @ 60 Hz
Step Response to 63% Voltage Terminal Current Terminal	 9.4 ms 18.2 ms
Impedance:Voltage Terminal Current Terminal	100 kΩ; 200 kΩ @ DC 238Ω
Absolute Accuracy Voltage Terminal Current Terminal	 0.20% FS @ 25°C 0.20% FS @ 25°C
Accuracy Drift:Voltage Terminal Current Terminal	0.00428% FS per°C 0.00407% FS per°C
Calibration	None Required
Maximum Overload Voltage Terminal Current Terminal	Single channel; continuous 30V 32 mA
Isolation Voltage	850V dc channel-to-system for 1s
FlexBus Current	10 mA maximum
Sensor Source Current (per connector)	 50 mA
Power dissipation	2.5W @ 28.8V dc
Thermal Dissipation	8.5 BTU/hr @ 28.8V dc
Indicator	1 fault LED Indicator - red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 50 mA @ 24V dc
Dimensions (H x D x W)	118 mm x 57 mm x 40 mm 4.63 in. x 2.25 in. x 1.58 in.
Operational Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 60°C (-4 to 140°F)

Specifications - 1798-IE4 Analog Input Module (Continued)	
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900MHz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on power ports ±2kV at 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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Output Module Specifications

Specifications for the 1798-OB4E Module

Specifications	1798-OB4E
Module Type	Digital Output, Sourcing
Number of Channels	1 group of 4
On-state Voltage	10-28.8V dc; 24V dc nominal
On-state Current (per channel)	1.0A per channel
On-state Current (per module)	4.0A per module
Off-state Voltage	28.8V dc maximum
Off-State Current	0.5 mA maximum leakage
On-State Voltage Drop	0.5V dc maximum drop
Surge Current	2.0A for 50 ms (Repeatable every 2 seconds)
Isolation Voltage	850V dc for 1 second
Delay Times:Off to On On to Off	0.5 ms maximum 1.0 ms maximum
FlexBus Current	60 mA maximum
Power Dissipation	2.4 W @ 28.8 V dc
Thermal Dissipation	8.2 BTU/hr. @ 28.8V dc
Indicators	4 channel status - yellow 1 fault LED indicator- red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 4.0A maximum
Dimensions (H x D x W)	118 mm X 57 mm X 40 mm 4.63 in. X 2.25 in. X 1.58 in.
Environmental Conditions: Operating Temperature Storage Temperature Shock: Operating Non-Operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30G peak, 11±1ms pulse width 50G peak, 11±1ms pulse width 5G @ 10-500Hz per IEC 68-2-6 (see graph on next page)
Conductors	See publication DN-6.7.2
Cordsets	5 pin micro (12mm) style connectors
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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Specifications for the 1798-OB8E Module

Specifications	1798-OB8E
Module Type	Digital Output, Sourcing
Number of Channels	1 group of 8
On-state Voltage	10-28.8V dc; 24V dc nominal
On-state Current (per channel)	1.0A per channel
On-state Current (per module)	5.0A per module
Off-state Voltage	28.8V dc maximum
Off-State Current	0.5 mA maximum leakage
On-State Voltage Drop	0.5V dc maximum drop
Surge Current	2.0A for 50 ms (Repeatable every 2 seconds)
Isolation Voltage	850V dc for 1 second
Delay Times:Off to On On to Off	0.5 ms maximum 1.0 ms maximum
FlexBus Current	60 mA maximum
Power Dissipation	2.9 W @ 28.8 V dc
Thermal Dissipation	9.9 BTU/hr. @ 28.8V dc
Indicators	8 channel status - yellow 1 fault LED indicator - red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 5.0A maximum
Dimensions (H x D x W)	118 mm X 57 mm X 40 mm 4.63 in. X 2.25 in. X 1.58 in.
Environmental Conditions: Operating Temperature Storage Temperature Shock: Operating Non-Operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30G peak, 11±1ms pulse width 50G peak, 11±1ms pulse width 5G @ 10-500Hz per IEC 68-2-6 (see graph on next page)
Conductors	See publication DN-6.7.2
Cordsets	5 pin micro (12mm) style connectors
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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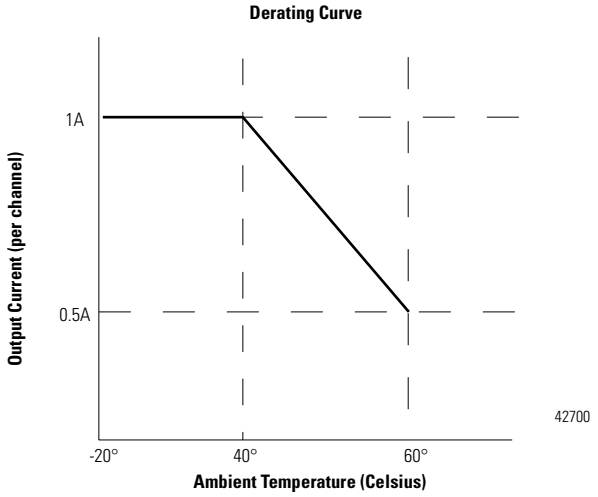

Operating Temperature CD Rating Curve

Specifications for the 1798-OE2 Module

Specifications - 1798-OE2 Analog Output Module	
Module Type	Analog Output
Number of Channels	2 single-ended, non-isolated
ResolutionBits Voltage/Cnt Current/Cnt	12 + sign 2.56 mV 5.13 uA
Data Format	16 bit; 2's complement; left-justified
Conversion Type	Pulse width modulation
Conversion Rate	1.024 ms - All channels
Current Terminal	4-20 mA; 0-20 mA (0 mA output until the module is configured)
Voltage Terminal	±10V; 0-10V - 3 mA maximum (0V output until the module is configured)
Step Response to 63% of FS	24 mS
Output Load on Voltage	3 mA maximum
Resistive Load on mA Output	15-750 ohms
Absolute Accuracy Voltage Terminal Current Terminal	 0.133% FS @ 25°C 0.425% FS @ 25°C
Accuracy Drift Voltage Terminal Current Terminal	 0.0045% FS per°C 0.0069% FS per°C
Calibration	None Required
FlexBus Current	10 mA maximum
Power dissipation	2.5W @ 28.8V dc
Sensor Source Current (per connector)	50 mA

Specifications - 1798-OE2 Analog Output Module	
Thermal Dissipation	8.5 BTU/hr @ 28.8V dc
Indicator	1 fault LED Indicator - red
External DC Power Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 85 mA @ 24V dc
Dimensions (H x D x W)	118 mm x 57 mm x 40 mm 4.63 in. x 2.25 in. x 1.58 in.
Operational Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 60°C (-4 to 140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900MHz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on power ports ±2kV at 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz
Conductors	See publication DN-6.7.2
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz
Enclosure	Meets IP67

Certifications (When product is marked)	c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada
	UL	UL Listed Industrial Control Equipment
	CE[1]	European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity
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Communication Adapter Specifications

Specifications for the 1798-ADN modules are listed below.

Specifications	1798-ADN
External DC Power (Input Power): Voltage (24V dc nom.) Current	 10-28.8V dc; 5% AC ripple 400 mA @ 24V dc
FlexBus (Output Power): Voltage (5V dc nom.) Current	 4.75 - 5.2V dc; 5% AC ripple 640 mA @ 5.2V dc
Isolation Voltage (Communication Lines/System): 24V dc External Power to 5V dc FlexBus Output	 850V dc for 1 second
Dimensions (H x D x W)	118 mm X 50 mm X 40 mm 4.63 in. X 1.95 in. X 1.58 in.
Environmental Conditions: Operating Temperature Storage Temperature Shock: Operating Non-Operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30G peak, 11±1 ms pulse width 50G peak, 11±1 ms pulse width 5G @ 10-500 Hz per IEC 68-2-6
Enclosure	Meets IP67
Certifications (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions ODVA ODVA conformance tested to ODVA DeviceNet specifications

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Field Termination Plug Specifications

Specifications for the Field Termination Plug are listed below.

Voltage Rating	28.8V dc maximum
Sensor and Adapter Current	2.5A maximum
Output Current	10A maximum
Sensor/Output Voltage	10-28.8V dc
Sensor/Output Power Connector	0.875 in male
Dimensions (H x D x W)	121 mm X 36.3 mm X 42 mm 4.75 in. X 1.43 in. X 1.65 in.
Environmental Conditions Operational Temperature Storage Temperature Shock Operating Non-operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30g peak acceleration, 11(±1) ms pulse width 50g peak acceleration, 11(±1) ms pulse width Tested 5g @ 10-500 Hz per IEC 68-2-6
Conductors	See publication DN-6.7.2
Enclosure	Meets IP67
Agency Certification (When product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada UL UL Listed Industrial Control Equipment CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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Baseplate Specifications

Specifications for the Baseplate are listed below.

FlexArmor Baseplates - Cat. No. 1798-BP2, -BP4, -BP6, -BP8		
General Specifications		
External Power	28.8V dc maximum	
Sensor Power Bus Output Power Bus	2.5A maximum 10A maximum	
Environmental Conditions Operational Temperature Storage Temperature Shock Operating Non-operating Vibration	 -20 to 60°C (-4 to 140°F) -40 to 85°C (-40 to 185°F) 30g peak acceleration, 11(±1) ms pulse width 50g peak acceleration, 11(±1) ms pulse width Tested 5g @ 10-500 Hz per IEC 68-2-6	
Enclosure	Meets IP67	
Certifications (When product is marked)	c-UL-us US UL CE[1] C-Tick[1]	UL Listed Industrial Control Equipment, certified for and Canada UL Listed Industrial Control Equipment European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions

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