Allen-Bradley

PowerFlex® Communications

1769-SM1 Compact I/O to DPI/SCANport Module

FRN 2.xxx

User Manual

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.rockwellautomation.com/literature**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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

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

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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.

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

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 the hazard
- recognize the consequences

Shock Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

Burn Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

The information below summarizes the changes made to this manual since its last release (October 2004):

Description of Changes	Page(s)
In the “Safety Precaution” section, added new Attention information.	1-5
In Table 3.A, corrected the module configuration data words listed in the columns “CH1 Word,” “CH2 Word,” and “CH3 Word.”	3-3
In the “32-Bit Parameters using 16-Bit Datalinks” section, added more explanation on how the values of the Most Significant Word and Least Significant Word are derived.	4-6
In Chapter 5, added missing figure numbers and titles to screen shots.	Chapter 5
In the “Environmental” specifications section, corrected the maximum Operating Temperature Farenheit value from 149°F to 122°F.	A-2

Notes:

Table of Contents

About This Manual

Related Documentation

For:	Refer to:	Publication
DriveExplorer™	http://www.ab.com/drives/driveexplorer, and DriveExplorer online help (installed with the software)	—
DriveTools ™ SP (includes DriveExecutive)	http://www.ab.com/drives/drivetools, and DriveTools SP online help (installed with the software)	—
PowerFlex® HIM	*HIM Quick Reference*	20HIM-QR001…
PowerFlex® 70 Drive (Std. and enhanced control)	*PowerFlex 70 User Manual* *PowerFlex 70 Reference Manual*	20A-UM001… PFLEX-RM-001…
PowerFlex® 700 Drive* PowerFlex® 700 Ser. B Drive *Standard and vector control	*PowerFlex 700 User Manual* *PowerFlex 700 Series B User Manual* *PowerFlex 70/700 Reference Manual*	20B-UM001… 20B-UM002… PFLEX-RM-001…
PowerFlex® 700H Drive	*PowerFlex 700H Installation Instructions* *PowerFlex 700H Programming Manual*	PFLEX-IN006… 20C-PM001…
PowerFlex® 700S Drive (Frames 1 through 6)	*PowerFlex 700S – Phase I Control User Manual* *PowerFlex 700S – Phase II Control User Manual* *PowerFlex 700S Reference Manual*	20D-UM001… 20D-UM006… PFLEX-RM002…
PowerFlex® 700S Drive (Frames 9 through 11)	*PowerFlex 700S Installation Instructions* *PowerFlex 700S – Phase I Control User Manual* *PowerFlex 700S – Phase II Control User Manual* *PowerFlex 700S Reference Manual*	PFLEX-IN006… 20D-UM001… 20D-UM006… PFLEX-RM002…
PowerFlex® Liquid-Cooled Drive	*PowerFlex Liquid-Cooled Installation Manual* *PowerFlex 700 Active Converter Power Module User Manual*	20L-IN001… PFLEX-UM002…
1336 Plus II Drive	*1336 Plus II User Manual*	1336 PLUS-5.3
1305 Drive	*1305 User Manual*	1305-5.2
RSLinx™ or RSLinx™ Lite	*Getting Results with RSLinx Guide*, and online help (installed with the software)	LINX-GR001…
RSLogix™ 500	*RSLogix 500 Getting Results Guide*, and online help (installed with the software)	LG500-GR001…
RSLogix™ 5000	*RSLogix 5000 Getting Results Guide*, and online help (installed with the software)	9399-RLD300GR
RSNetWorx™ for DeviceNet	*RSNetWorx for DeviceNet Getting Results Guide*, and online help (installed with the software)	DNET-GR001…
MicroLogix™ 1500	*User Manual* *Reference Manual*	1764-UM001… 1762-RM001…
CompactLogix™	*User Manual*	1769-UM007…
ControlLogix®	*User Manual*	1756-6.5.13

Documentation can be obtained online at **http://www.rockwellautomation.com/literature**.

Conventions Used in this Manual

The following conventions are used throughout this manual:

- Parameter names are shown in the format **Parameter xx - [*]**. The xx represents the parameter number. The * represents the parameter name. For example **Parameter 01 - [Config Mode]**.
- Menu commands are shown in bold type face and follow the format **Menu > Command**. For example, if you read “Select **File > Open**,” you should click the **File** menu and then click the **Open** command.
- RSNetWorx for DeviceNet (version 4.01) and RSLinx (version 2.40) were used for the screen shots in this manual. Different versions of the software may differ in appearance and procedures.
- The firmware release is displayed as FRN X.xxx. The “FRN” signifies Firmware Release Number. The “X” is the major release number. The “xxx” is the minor update number.
- This manual provides information about the 1769-SM1 Compact I/O to DPI/SCANport module and using it with up to three drives. The module can be used with other products that support DPI or SCANport. Refer to the documentation for your product for specific information about how it works with the module.

Rockwell Automation Support

Rockwell Automation, Inc. offers support services worldwide, with over 75 sales/support offices, over 500 authorized distributors, and over 250 authorized systems integrators located through the United States alone. In addition, Rockwell Automation, Inc. representatives are in every major country in the world.

Local Support

Contact your local Rockwell Automation, Inc. representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

Technical Assistance

If you need to contact Rockwell Automation, Inc. for technical assistance, please review the information in Chapter 8, Troubleshooting first. If you still have problems, then call your local Rockwell Automation, Inc. representative.

U.S. Allen-Bradley Drives Technical Support:
E-mail: support@drives.ra.rockwell.com
Tel: (1) 262.512.8176
Fax (1) 262.512.2222
Online: www.ab.com/support/abdrives

UK Customer Support Center:
E-mail: esupport2@ra.rockwell.com
Tel: +44 (0) 870 2411802
Fax: +44 (0) 1908 838804

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E-mail: ragermany-csc@ra.rockwell.com
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Fax: +49 (0) 2104 960-501

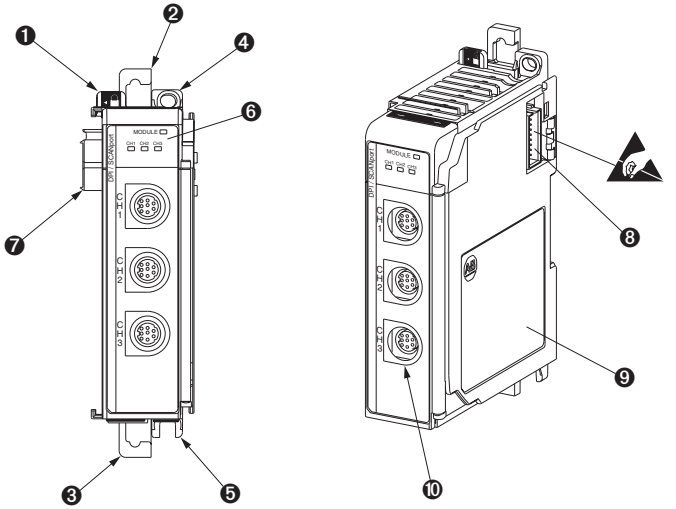
Notes:

Getting Started

The 1769-SM1 Compact I/O to DPI/SCANport module provides a Compact I/O connection for up to three DPI™ or SCANport™-enabled drives or power products. It can be used with a MicroLogix 1500, CompactLogix, or a remote 1769-based adapter such as the 1769-ADN.

Components

Figure 1.1 Components of the Module



Item	Part
❶	Bus lever (with locking function)
❷	Upper DIN rail latch
❸	Lower DIN rail latch
❹	Upper panel mounting tab
❺	Lower panel mounting tab

Item	Part
❻	Module and drive status indicators. See Chapter 8, Troubleshooting for details.
❼	Movable bus connector with female pins
❽	Bus connector with male pins
❾	Nameplate label
❿	DPI/SCANport connectors

Features

The 1769-SM1 Compact I/O to DPI/SCANport module features the following:

- The module can be used as expansion I/O on MicroLogix 1500 and CompactLogix controllers or with a remote 1769-based adapter. It receives the required power from the Compact I/O backplane.
- The module automatically detects the DPI or SCANport Host connected to a channel, and autobauds to the Host's data rate.
- A number of configuration tools can be used to configure the module and connected drive. For DPI products, the tools include the PowerFlex HIM on the drive, network software such as RSNetWorx for DeviceNet, or drive-configuration software such as DriveExplorer (version 3.01 or higher) or DriveExecutive (version 1.01 or higher). For SCANport products, the tool is the controller configuration software.
- I/O messaging, including Logic Command/Reference and up to four bi-directional pairs of Datalinks (parameter read/write) for each module channel, may be configured for your application using a module parameter.
- The following table shows the various controllers that can be used with the 1769-SM1 and whether they can support explicit messaging (parameter read/write, etc.):

Controller Used With 1769-SM1	Supports Explicit Messaging	
	Yes	No
MicroLogix 1500 LSP Series A, B, and C		✔
MicroLogix 1500 LRP Series A and B		✔
MicroLogix 1500 LRP Series C	✔	
CompactLogix 1769-L20		✔
CompactLogix 1769-L30		✔
CompactLogix 1769-L32E	✔	
CompactLogix 1769-L35E	✔	
1769-ADN DeviceNet Adapter		✔

- User-defined fault actions determine how the module and connected drives respond when the controller is in idle mode.
- Bi-color (red/green) status indicators report the status of the module and channel communications.

DPI Compatible Products

The 1769-SM1 module is compatible with Allen-Bradley PowerFlex 7-Class drives and other products that support DPI. At the time of publication, compatible products include:

- PowerFlex 70 drives (standard and enhanced control)
- PowerFlex 700 drives (standard and vector control)
- PowerFlex 700 Ser. B drives (standard and vector control)
- PowerFlex 700H drives
- PowerFlex 700S drives (Phase I and Phase II control)
- PowerFlex 700 Liquid-Cooled drives
- PowerFlex 7000 drives
- SMC Flex

SCANport Compatible Products

The 1769-SM1 module is compatible with drives and other products that support SCANport. At the time of publication, compatible products include:

- 1305 drives
- 1336 PLUS drives
- 1336 PLUS II drives
- 1336 IMPACT drives
- 1336 FORCE drives
- 1336 REGEN drives
- 1336 SPIDER drives
- 1394 Servo drives
- 1397 drives
- 1557 drives
- 2364F RGU
- SMC Dialog Plus
- SMP-3
-
-

Required Equipment

Equipment Shipped with the Module

When you unpack the module, verify that the package includes:

❑ One 1769-SM1 module
❑ This manual

User-Supplied Equipment

To install and configure the 1769-SM1 module, you must supply:

❑ A small flathead screwdriver
❑ Bulletin 1202 Communications Cables (1202-C*)
❑ A configuration tool, such as:
- For drives supporting DPI (PowerFlex):
  – PowerFlex HIM on the PowerFlex drive
  – DriveExplorer software (version 3.01 or higher)
  – DriveExecutive stand-alone software (version 1.01 or higher) or bundled with the DriveTools SP suite (version 1.01 or higher)
  – RSNetWorx for DeviceNet
- For drives supporting SCANport or DPI (PowerFlex):
  – Controller configuration software (e.g., RSLogix 500/5000)

Safety Precautions

Please read the following safety precautions carefully.

ATTENTION: Risk of injury or death exists. The drive may contain high voltages that can cause injury or death. Remove all power from the drive, and then verify power has been removed before installing or removing the module.

ATTENTION: Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start-up, configuration, and subsequent maintenance of the product using the module. Failure to comply may result in injury and/or equipment damage.

ATTENTION: Risk of injury or equipment damage exists. DPI and SCANport host products must not be directly connected together via 1202-C* communications cables. Unpredictable behavior due to timing and other internal procedures can result if two or more devices are connected in this manner.

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting the module.

ATTENTION: Risk of injury or equipment damage exists. **Parameters 09 - [Idle Action 1]**, **26 - [Idle Action 2]**, and **43 - [Idle Action 3]** let you determine the action of the module and connected drives if communications are disrupted. By default, these parameters fault the drive. You can set these parameters so that the drive continues to run. Precautions should be taken to ensure that the settings of these parameters do not create a risk of injury or equipment damage.

ATTENTION: Risk of injury or equipment damage exists. When a system is configured for the first time, there may be unintended or incorrect machine motion. Disconnect the motor from the machine or process during initial system testing.

ATTENTION: Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 (“Industrial Automation Wiring and Grounding Guidelines”), for additional installation requirements pertaining to this equipment.

Quick Start

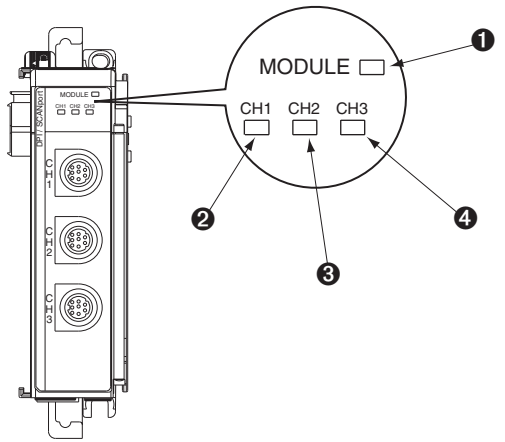
This section is provided to help experienced users quickly start using the 1769-SM1 Compact I/O to DPI/SCANport module. If you are unsure how to complete a step, refer to the referenced chapter.

Step	Action	Refer to…
1	**Review the safety precautions for the module.**	Throughout this manual
2	**Verify that the drive is properly installed.**	Drive User Manual
3	**Install the module.** Verify that the controller is not powered. Then, connect the module to the controller backplane bus, and to the drive using a Bulletin 1202-Cxx communications cable.	Chapter 2, Installing the Module
4	**Apply power to the module.** The module receives power from the controller. Apply power to the controller. The MODULE indicator should be green. If it flashes red, there is a problem. Refer to Chapter 8, Troubleshooting.	
5	**Configure the module for your application.** Set the following parameters for the module as required by your application: • I/O configuration. • Fault actions.	Chapter 3, Configuring the Module
6	**Apply power to the drive.** Verify that the drive is installed properly, and then apply power to it.	*Network Cable System Planning and Installation Manual*
7	**Configure the controller to communicate with the module.**	Depending on controller type: • Chapter 5, MicroLogix 1500 Ladder Example Program • Chapter 6, CompactLogix Ladder Example Program • Chapter 7, ControlLogix w/ 1769-ADN DeviceNet Ladder Example Program
8	**Create a ladder logic program.** Use a programming tool such as RSLogix to create a ladder logic program that enables you to do the following: • Control the module and connected drive. • Monitor or configure the drive using Explicit Messages.	

Modes of Operation

The module uses four status indicators to report its operating status. They can be viewed on the front of the module. See Figure 1.2.

Figure 1.2 Status Indicators



Item	Status Indicator	Status(1)	Description
❶	MODULE	Green	Normal Operation. The module has established communications with the controller.
		Flashing Green	The module is establishing communications with the controller.
❷	CH1	Green	Normal Operation. CH1 is operating and is transferring I/O data between the controller and the drive.
		Flashing Green	Normal Operation. CH1 is operating but is not transferring I/O data between the controller and the drive.
❸	CH2	Green	Normal Operation. CH2 is operating and is transferring I/O data between the controller and the drive.
		Flashing Green	Normal Operation. CH2 is operating but is not transferring I/O data between the controller and the drive.
❹	CH3	Green	Normal Operation. CH3 is operating and is transferring I/O data between the controller and the drive.
		Flashing Green	Normal Operation. CH3 is operating but is not transferring I/O data between the controller and the drive.

(1) If all status indicators are off, the module is not receiving power. Refer to Chapter 2, Installing the Module for instructions on installing the module.

If any other conditions occur, refer to Chapter 8, Troubleshooting.

Notes:

Installing the Module

Chapter 2 provides instructions for installing the 1769-SM1 module as an expansion I/O module on MicroLogix 1500 and CompactLogix controllers, or with a remote 1769-based adapter.

Preparing for an Installation

Consider the following when installing the 1769-SM1 module:

- Verify that you have all required equipment. Refer to Chapter 1, Getting Started.
- A MicroLogix 1500 Base Unit or Compact I/O power supply has limits in the amount of +5V dc and +24V dc current it can supply to modules in its I/O bank. These limits depend on the catalog number (e.g. 1769-PA2) of the supply. A bank of modules must not exceed the current limits of the MicroLogix 1500 Base Unit or I/O bank power supply.

  Refer to the *MicroLogix 1500 User Manual* (Publication No. 1764-UM001…), or the *Compact 1769 Expansion I/O Power Supplies Installation Instructions* (Publication No. 1769-5.14).
- The 1769-SM1 module has a distance rating of six, therefore the module must be within six modules of the I/O bank's power supply.

ATTENTION: Risk of equipment damage exists. The 1769-SM1 module contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the module. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage*, Publication 8000-4.5.2.

Removing Power

ATTENTION: Risk of equipment damage exists. Remove power before installing or removing the 1769-SM1 module. When you install or remove the module with power applied, an electrical arc may occur. An electrical arc can cause personal injury or equipment damage by:

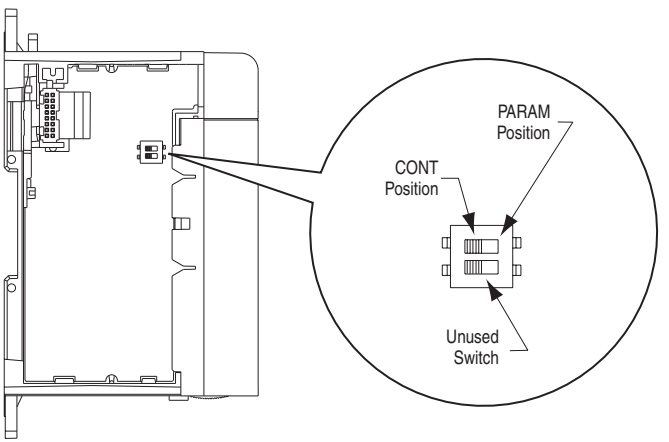
- Sending an erroneous signal to your system's field devices, causing unintended machine motion.
- Causing an explosion in a hazardous environment.

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

Selecting the Configuration Mode

For detailed information on both configuration modes, please refer to Controller Mode on page 3-2 or Parameter Mode on page 3-13. Then set the module Configuration Mode switch (Figure 2.1).

Figure 2.1 Setting the Configuration Mode Switch



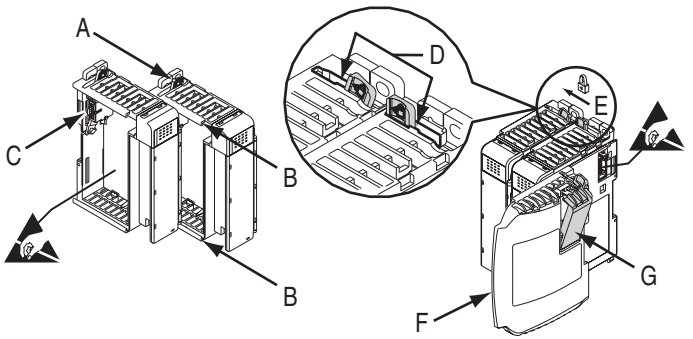
Switch Setting	Description
Controller (Default)	1769-SM1 uses the configuration data downloaded from the controller on power-up and when the controller is placed in run mode.
Parameter	1769-SM1 uses its internal parameter setting to configure the module.

Assembling the Module to the Controller

The 1769-SM1 module can be attached to adjacent controller modules *before* or *after* mounting. For mounting instructions, see Panel Mounting on page 2-4 or DIN Rail Mounting on page 2-7. To work with a system that is already mounted, see Replacing the Module within a System on page 2-7.

Figure 2.2 and the following procedure shows you how to assemble the Compact I/O system.

Figure 2.2 Assembling 1769-SM1 Module to Compact I/O System



1. Disconnect power.
2. Check that the bus lever (A) of the 1769-SM1 module is in the unlocked (fully right) position.
3. Use the upper and lower tongue-and-groove slots (B) to secure the modules together.
4. Move the 1769-SM1 module back along the tongue-and-groove slots until the bus connectors (C) line up with each other.
5. Use your fingers or a small screwdriver to push the bus lever back slightly to clear the positioning tab (D).
6. Move the 1769-SM1 module's bus lever fully to the left (E) until it clicks. Ensure it is locked firmly in place.

ATTENTION: Risk of equipment damage exists. When attaching the 1769-SM1 module to a Compact I/O system, it is very important that the bus connectors are securely locked together to ensure proper electrical connection. Failure to do this may cause an electrical arc, which can cause personal injury or equipment damage.

7. Attach an end cap terminator (F) to the last module in the system by using the tongue-and-groove slots as before.

8. Lock the end cap bus terminator (G).

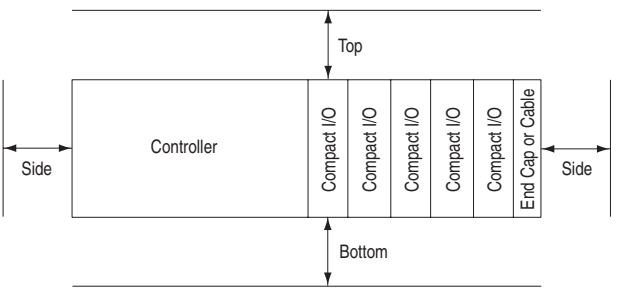
Important: A 1769-ECR or 1769-ECL right or left end cap must be used to terminate the end of the serial communication bus.

Mounting the Module

ATTENTION: Risk of equipment damage exists. During panel or DIN rail mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the 1769-SM1 module. Debris that falls into the module could cause damage on power up.

Minimum Spacing

Maintain spacing from enclosure walls, wireways, adjacent equipment, etc. Allow 50 mm (2 in.) of space on all sides for adequate ventilation as shown:



Allow at least 140 mm (5.5 in.) of enclosure depth to accommodate the 1769-SM1 module.

Panel Mounting

Mount the 1769-SM1 module to a panel using two screws per module. Use M4 or #8 panhead screws. Mounting screws are required on every module.

Panel Mounting Using the Dimensional Drawing

NOTE: All dimensions are in mm (inches). Hole spacing tolerance: ±0.04 mm (0.016 in.).

Figure 2.3 1769-SM1 Module with MicroLogix 1500 Base Unit and Processor

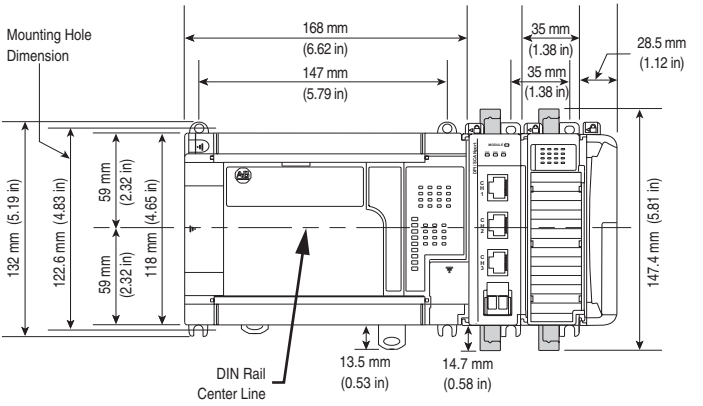


Figure 2.4 1769-SM1 Module with CompactLogix Controller

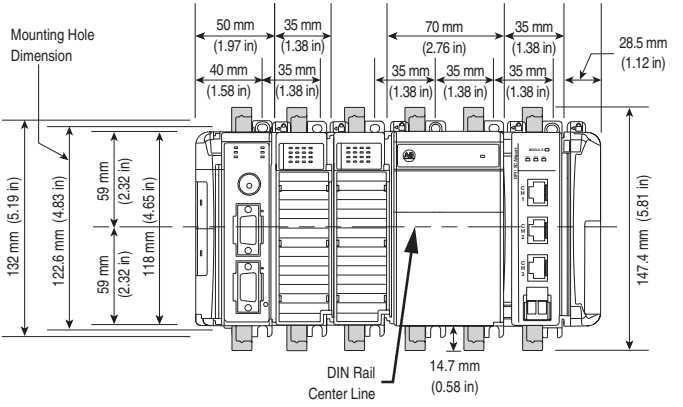
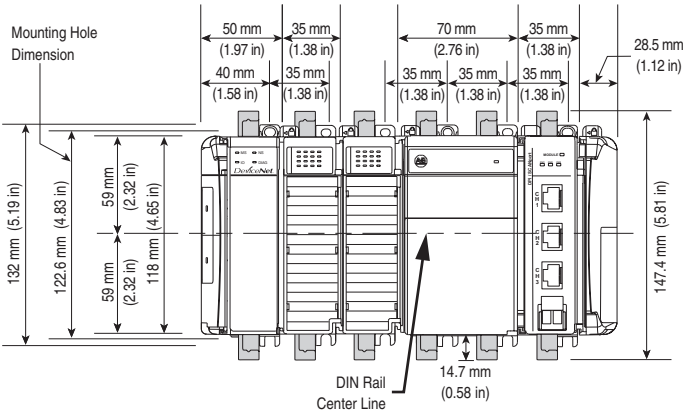


Figure 2.5 1769-SM1 Module with Remote 1769-Based Adapter



Panel Mounting Procedure Using Module as a Template

The following procedure enables you to use the assembled modules as a template for drilling holes in the panel. Due to module mounting hole tolerance, it is important to follow these steps:

1. On a clean work surface, assemble no more than three modules.
2. Using the assembled modules as a template, carefully mark the center of all module-mounting holes on the panel.
3. Return the assembled modules to the clean work surface, including any previously mounted modules.
4. Drill and tap the mounting holes for the recommended M4 or #8 screw.
5. Place the modules back on the panel, and check for proper hole alignment.
6. Attach the modules to the panel using the mounting screws.

DIN Rail Mounting

The 1769-SM1 module can be mounted using the following DIN rails:

- 35 x 7.5 mm (EN 50 022 - 35 x 7.5)
- 35 x 15 mm (EN 50 022 - 35 x 15)

Before mounting the module on a DIN rail, close the DIN rail latches. Press the DIN rail mounting area of the module against the DIN rail. The latches will momentarily open and lock into place.

Replacing the Module within a System

The 1769-SM1 module can be replaced while the system is mounted to a panel (or DIN rail).

1. Remove power.

ATTENTION: Risk of equipment damage exists. Remove power before installing or removing the 1769-SM1 module. When you install or remove the module with power applied, an electrical arc may occur. An electrical arc can cause personal injury or equipment damage by:

- Sending an erroneous signal to your system's field devices, causing unintended machine motion.
- Causing an explosion in a hazardous environment.

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

2. Unplug the 1202-C* communications cable from each port (CH1, CH2, CH3) on the 1769-SM1 module. Note each drive and the port to which it is connected.
3. Remove the upper and lower mounting screws from the module (or open the DIN latches using a flat-blade screwdriver).
4. On the right-side adjacent module, move its bus lever to the right (unlock) to disconnect it from the module being removed.

5. Gently slide the disconnected 1769-SM1 module forward.

   If you feel excessive resistance, make sure that you disconnected the module from the bus and that you removed both mounting screws (or opened the DIN latches).

   TIP: It may be necessary to rock the module slightly from front to back to remove it, or, in a panel-mounted system, to loosen the screws of adjacent modules.

6. Before installing the replacement 1769-SM1 module, be sure that the bus lever on the right-side adjacent module is in the unlocked (fully right) position.

7. Slide the replacement 1769-SM1 module into the open slot.

8. Connect the 1769-SM1 module and adjacent modules together by locking (fully left) the bus levers on the 1769-SM1 module and the right-side adjacent module.

9. Replace the mounting screws (or snap the module onto the DIN rail).

10. Plug the appropriate 1202-C* communications cable into its respective port on the 1769-SM1 module.

11. Restore 1769-SM1 module configuration using an appropriate configuration tools.

Grounding the Module

The 1769-SM1 module is intended to be mounted to a well-grounded mounting surface such as a metal panel. Additional grounding connections from the module's mounting tabs or DIN rail (if used) are not required unless the mounting surface cannot be grounded. For additional information, refer to *Industrial Automation Wiring and Grounding Guidelines* (Publication No. 1770-4.1).

Connecting the Module to the Drive

1. Plug one male end of a 1202-C* communications cable into a desired port (CH1, CH2 or CH3) on the 1769-SM1 module.

2. Plug the other male end of the cable into the port on the desired drive.

Note: For EMC regulatory compliance, there is a maximum cable distance limit per channel. Please see Regulatory Compliance on page A-2 for more information. For general cable information, please see DPI/SCANport Cable Requirements/Recommendations on page A-2.

Applying Power

ATTENTION: Risk of equipment damage, injury, or death exists. Unpredictable operation may occur if you fail to verify that parameter settings are compatible with your application. Verify that settings are compatible with your application before applying power to the drive.

1. Apply power to the controller. The status indicators can be viewed on the front of the 1769-SM1 module after power has been applied.

2. The module is assigned a unique network address by the bus master during initialization.

3. Apply power to the drive. When you apply power to the 1769-SM1 module, controller, and network for the first time, the status indicators should be green after an initialization. If the status indicators go red, there is a problem. Refer to Chapter 8, Troubleshooting.

Notes:

Configuring the Module

Chapter 3 provides instructions and information for configuring the 1769-SM1 module.

For a list of parameters, refer to Appendix B, Module Parameters. For definitions of terms in this chapter, refer to the Glossary.

Configuration Tools

The 1769-SM1 module stores parameters and other information in its own non-volatile memory. You must, therefore, access the module to view and edit its parameters. The following tools can be used to access the module parameters.

For DPI (PowerFlex)-Supported System:

Tool	Refer to…
DriveExplorer Software (version 3.01 or higher)	http://www.ab.com/drives/driveexplorer, and DriveExplorer online help (installed with the software
DriveExecutive Software (version 1.01 or higher)	http://www.ab.com/drives/drivetools, and DriveExecutive online help (installed with the software
PowerFlex HIM on PowerFlex drive	Page 3-14
RSLogix 500	LG500-GR001…
RSLogix 5000	9399-RLD300GR

For SCANport or DPI (PowerFlex)-Supported System:

Tool	Refer to…
RSLogix 500	LG500-GR001…
RSLogix 5000	9399-RLD300GR

Configuration Methods

The 1769-SM1 has two methods for configuration, which are determined by the Configuration Mode switch (Figure 2.1) on the module:

- Controller mode - The 1769-SM1 uses the configuration data downloaded from the controller on power-up and when the controller is placed in run mode.
- Parameter mode - The 1769-SM1 uses its internal parameter setting to configure the module.

Only one type of configuration is selected, and it is used for all three channels.

Controller mode is required if only SCANport products (1336 PLUS II, etc.) are connected to the module. This is because SCANport peripherals (HIMs, etc.) cannot configure other peripherals, for example, the 1769-SM1. DPI products (PowerFlex 70, etc.) have the option of being used in Controller mode.

If one or more DPI products (PowerFlex 70, etc.) are connected, even if a SCANport product (1336 PLUS II, etc.) is also connected, Parameter mode can be used. This is because DPI peripherals (20-HIMs, etc.) have the ability to configure other peripherals connected to the PowerFlex drive, for example, the 1769-SM1.

Controller Mode

When the Configuration Mode switch is in the default “Controller” position, the 1769-SM1 uses the configuration data downloaded from the controller on power-up and when the controller is placed in run mode. Configuration data is allocated and entered using RSLogix500 or RSLogix 5000, depending on the controller used. Controller mode can be used for either DPI (PowerFlex 70, etc.) or SCANport (1336 PLUS II, etc.) products.

The 1769-SM1 module contains 60 words of configuration data that are used to configure the I/O data and the module's behavior when the controller faults or is placed in program mode.

Table 3.A Module Configuration Data Words in Controller Mode

Description	CH1 Word	CH2 Word	CH3 Word
Idle Action / I/O Config	0	4	8
Fault Config. Logic Command	1	5	9
Fault Config. Reference (Low) *	2	6	10
Fault Config. Reference (High)	3	7	11
Fault Config Datalink In A1 (Low) *	12	16	20
Fault Config Datalink In A1 (High)	13	17	21
Fault Config Datalink In A2 (Low) *	14	18	22
Fault Config Datalink In A2 (High)	15	19	23
Fault Config Datalink In B1 (Low) *	24	28	32
Fault Config Datalink In B1 (High)	25	29	33
Fault Config Datalink In B2 (Low) *	26	30	34
Fault Config Datalink In B2 (High)	27	31	35
Fault Config Datalink In C1 (Low) *	36	40	44
Fault Config Datalink In C1 (High)	37	41	45
Fault Config Datalink In C2 (Low) *	38	42	46
Fault Config Datalink In C2 (High)	39	43	47
Fault Config Datalink In D1 (Low) *	48	52	56
Fault Config Datalink In D1 (High)	49	53	57
Fault Config Datalink In D2 (Low) *	50	54	58
Fault Config Datalink In D2 (High)	51	55	59

* **Note:** Data for 16-bit Reference or 16-bit Datalinks are entered in these locations.

Idle Action / I/O Config Setting

The format for the Idle Action / I/O Config word is:

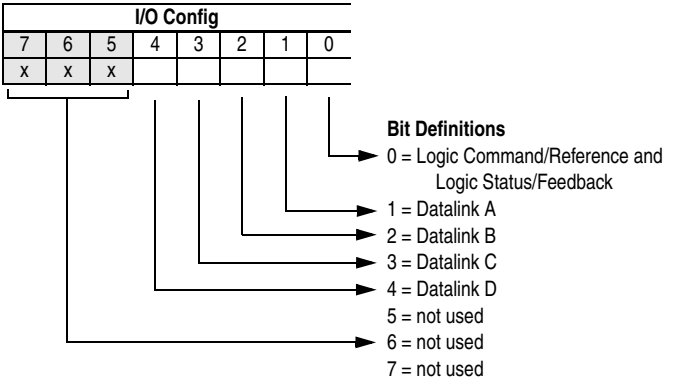
Not Used				Idle Action				I/O Config							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

The Idle Action setting is similar to the **Parameter 09 - [Idle Action 1], 26 - [Idle Action 2]** and **43 - [Idle Action 3]** settings, where:

Idle Action				Decimal Value	Description
11	10	9	8		
0	0	0	0	0	Fault - the connected drive is faulted
0	0	0	1	1	Stop - a Stop command is sent to the drive (1)
0	0	1	0	2	Zero Data - zero's are sent to the drive
0	0	1	1	3	Hold Last - previous data continues to be sent to the drive
0	1	0	0	4	Send Fault Config - fault config data is sent to the drive
0	1	0	1	5	Invalid
0	1	1	0	6	Invalid
0	1	1	1	7	Invalid
0	0	0	0	8	Invalid

(1) "Stop" Idle Action is not supported for SCANport connected channels. If this setting is used, the "Fault" action will be used instead.

The I/O Config setting is similar to the **Parameter 07 - [I/O Config 1], 24 - [I/O Config 2],** and **41 - [I/O Config 3]** settings, where:



A “0” equals I/O disabled and a “1” equals I/O enabled. For example, a “00001” enables Logic Command/Reference and Logic Status/ Feedback, and disables all of the Datalinks.

Fault Config Settings

The 1769-SM1 uses the Fault Configuration data settings when an Idle Fault is detected and the Idle Action = “4” (bit 10 = “1” and bits 11, 9, and 8 = “0”) in the Idle Action / I/O Config word. The Logic Command, Reference, and Datalink configuration settings must be set to perform the desired action. For example, to have a PowerFlex 70 connected to CH1 run forward at 30.0 Hz when a fault condition occurs, set:

Fault Config Logic Command (word 1) = 18**

**Bit 1 START and bit 4 FORWARD COMMAND are “1.”

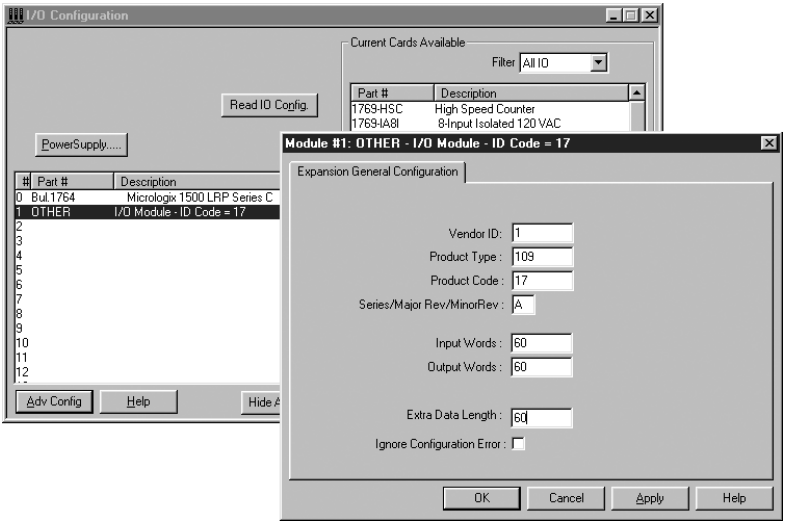
Fault Config Reference (Low) (word 2) = 300

Entering MicroLogix 1500 Configuration Data using RSLogix 500 version 6.0 (or lower)

The configuration data is allocated and entered by performing the following steps:

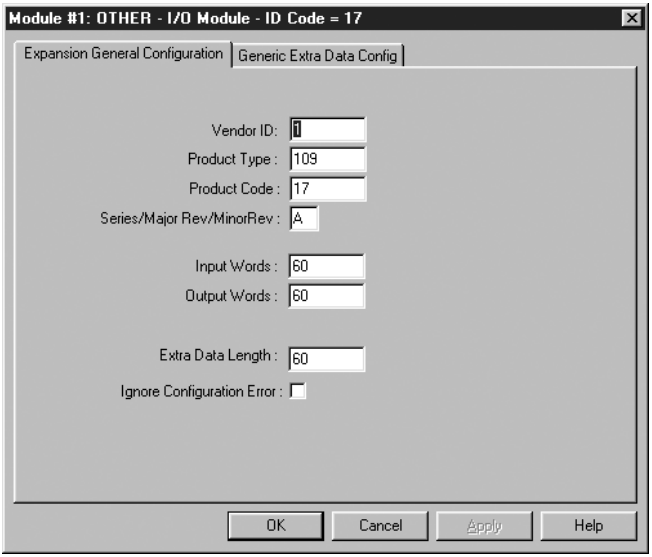
1. Double-click on **I/O Configuration** in the menu tree to open the I/O Configuration window. Select OTHER and click the **Adv Config** command button. A screen with an Expansion General Configuration tab (Figure 3.1) will appear.

Figure 3.1 I/O Configuration Window and Expansion General Configuration Screen



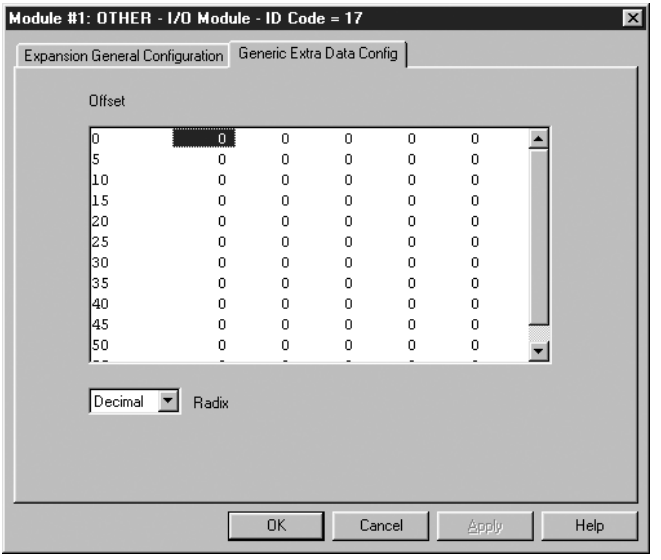
2. Enter the product data for the module as shown above (1, 109, 17, and A), along with the desired Input and Output word length. Enter "**60**" in the Extra Data Length field and click **OK**. From the I/O Configuration window, click on the **Adv Config** command button again and now there are two tabs available (Figure 3.2).

Figure 3.2 Expansion General Configuration Screen w/Generic Extra Data Config Tab



3. Click on the **Generic Extra Data Config** tab (Figure 3.3) to display the configuration data area. Enter the desired configuration data and click **OK** when finished.

Figure 3.3 Data Area on Generic Extra Data Config Tab



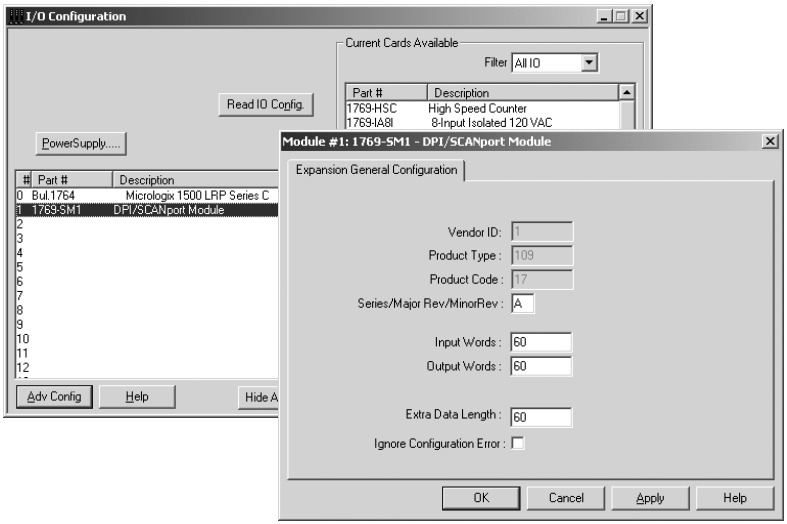
The MicroLogix 1500 will download the configuration data to the 1769-SM1 when the controller is placed in run mode.

Entering MicroLogix 1500 Configuration Data using RSLogix 500 version 6.1 (or higher)

The configuration data is allocated and entered by performing the following steps:

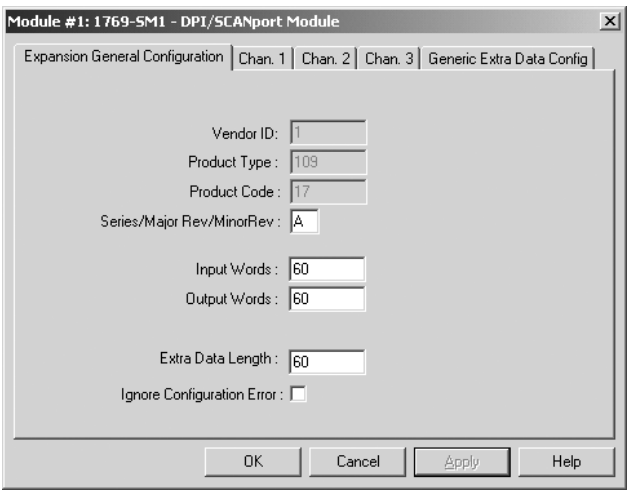
1. Double-click on **I/O Configuration** in the menu tree to open the I/O Configuration window. Select the 1769-SM1 and click the **Adv Config** command button. A screen with an Expansion General Configuration tab (Figure 3.4) will appear.

Figure 3.4 I/O Configuration Window and Expansion General Configuration Screen



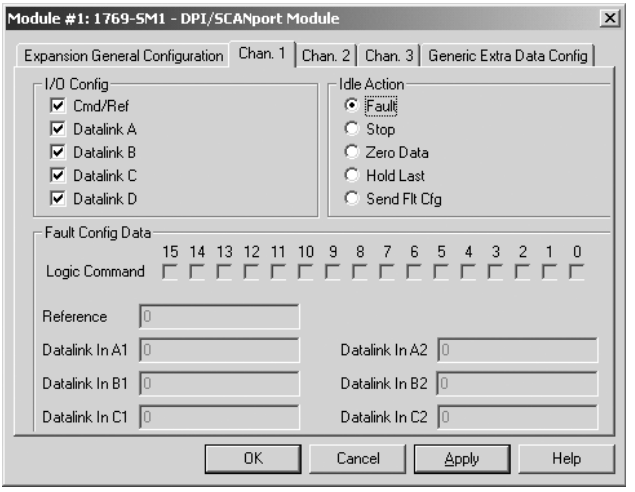
2. Enter "**60**" in the Extra Data Length field and click **Apply**. "60" is the number of configuration words used by the SM1 (20 words per channel). New tabs (Figure 3.5) will appear to allow the configuration.

Figure 3.5 Expansion General Configuration Tab Screen



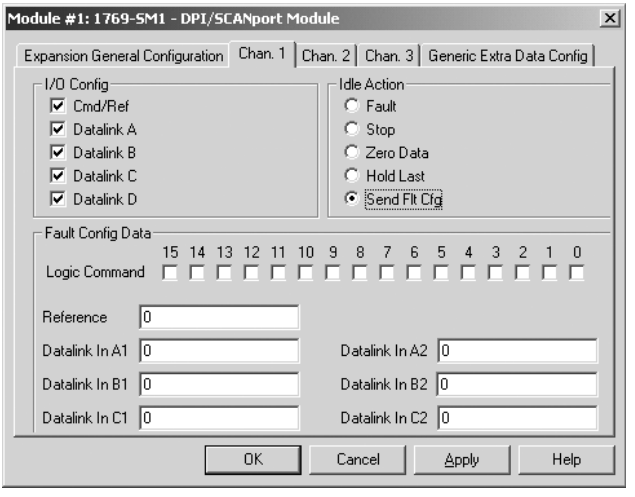
3. Click on the **Chan. 1** tab (Figure 3.6) and set the I/O Config data area accordingly. In this example, Cmd/Ref and all Datalinks are used.

Figure 3.6 Chan. 1 Tab Data Screen



Select the desired Idle Action. Note that the Fault Config Data area (Figure 3.7) can only be accessed if Send Flt Cfg is enabled.

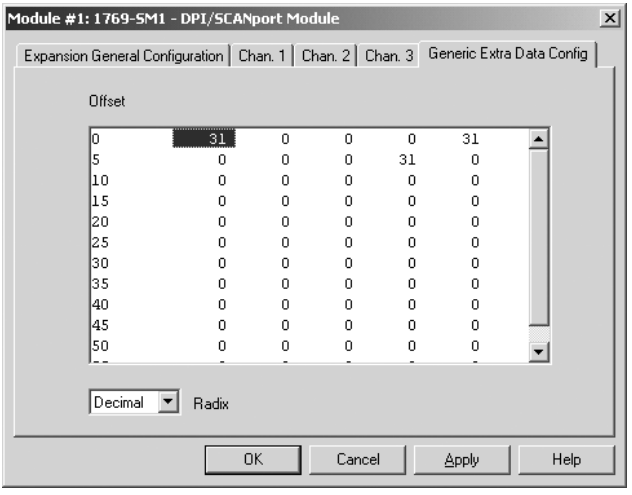
Figure 3.7 Chan. 1 Tab Data Screen with Idle Action - Send Flt Cfg Enabled



4. For each additional channel being used, select its respective tab, set the desired I/O configuration, and enable the appropriate idle action.

5. An alternate to using the Chan. 1-3 tabs to enter data is the Generic Extra Data Config tab (Figure 3.8), which is being shown for identification purposes only. With the easy-to-use Chan.1-3 tabs, there is no need to enter data using the Generic Extra Data Config tab. However, it does show how the data in the configuration words are stored in the controller.

Figure 3.8 Generic Extra Data Config Tab Screen



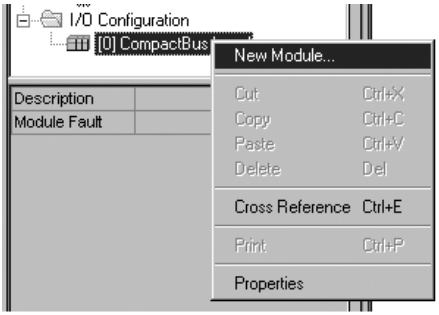
6. Click **OK** when finished. The MicroLogix 1500 will download the configuration data to the 1769-SM1 when the controller is placed in run mode.

Entering CompactLogix Configuration Data using RSLogix 5000 version 10 (or higher)

The CompactLogix configuration data is allocated and entered by performing the following steps:

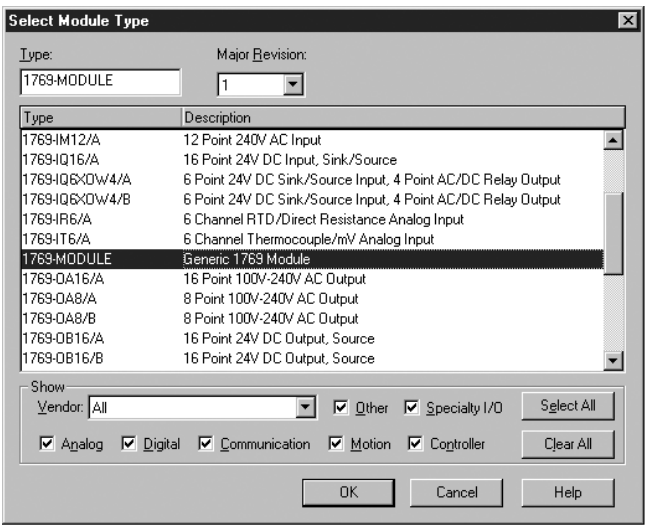
1. Right-click on **CompactBus Local** in the menu tree (Figure 3.9) and select **New Module**.

Figure 3.9 Menu Tree Window with New Module Inset Screen



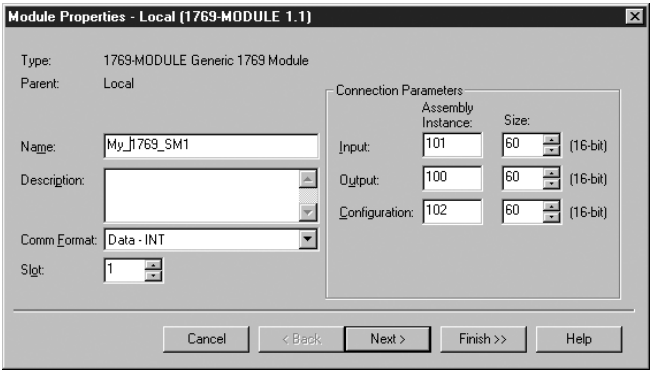
2. Select the **1769-MODULE** (Figure 3.10) and click **OK**.

Figure 3.10 Select Module Type Screen



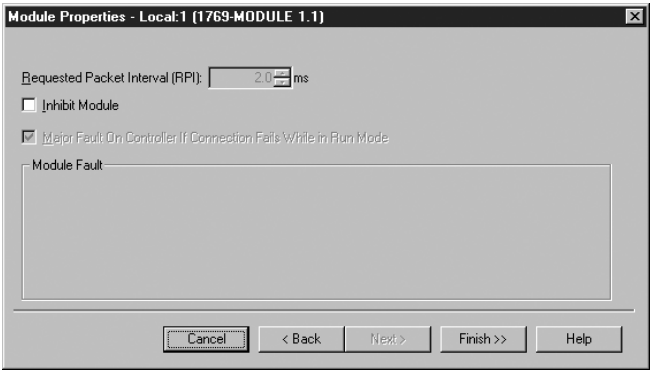
3. In the Module Properties screen (Figure 3.11), enter a name for the module, such as "My_1769_SM1." Change the Comm Format to "Data - INT," which will enable the entry of Output Connection parameters (no longer grayed out). Enter the Slot location of the 1769-SM1 and enter "60" for the Input, Output, and Configuration Connection Parameters. Click **Next >**.

Figure 3.11 Module Properties Screen



4. On the Module Properties last screen (Figure 3.12), click **Finish >>**.

Figure 3.12 Module Properties Last Screen

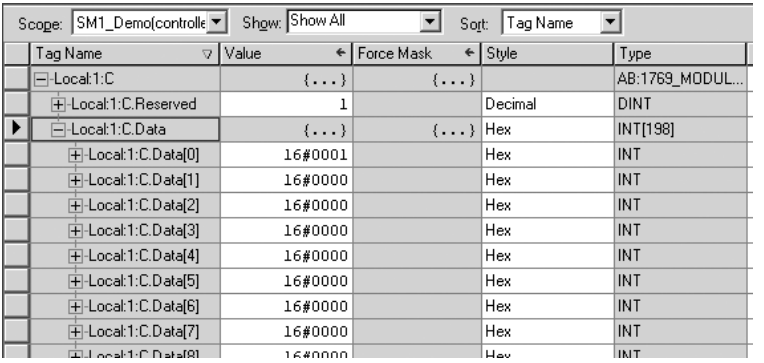


5. The menu tree (Figure 3.13) will now show the 1769-MODULE that you created.

Figure 3.13 Menu Tree Window with Listed 1769-MODULE

6. Double-clicking on **Controller Tags** or **Program Tags** in the menu tree will display the various tags, including the tags for the 1769-SM1 module (Figure 3.14). Click on the **Monitor Tags** tab at the bottom of the window to enter the configuration data.

Figure 3.14 Controller Tags Screen



TIP: RSLogix 5000 creates a data array that is much larger than the 60 words previously specified when the module was configured. Use words 0 - 59 and ignore words 60 - 197. Also, note the data entry format in Figure 3.14 is hexadecimal (16#). To change the format, click on the appropriate field in the “Style” column.

The CompactLogix controller will download the configuration data to the 1769-SM1 module on power-up.

Parameter Mode

When the Configuration Mode switch is in the “Parameter” position, the 1769-SM1 uses its internal parameters setting to configure the module. Any configuration data downloaded by the controller will be ignored.

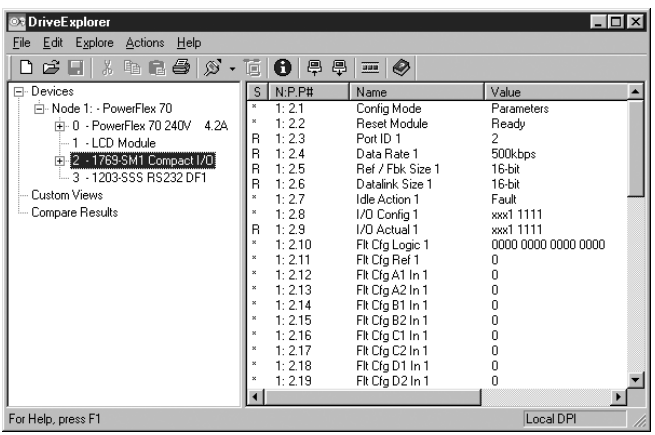
Important: When the Parameter mode is used, the configuration data size in the controller should be set to “0.” Refer to Controller Mode on page 3-2 for more information.

Table 3.B Module Configuration Data Words in Parameter Mode

Description	CH1 Parameter	CH2 Parameter	CH3 Parameter
I/O Config	7	24	41
Idle Action	9	26	43
Fault Config. Logic Command	10	27	44
Fault Config. Reference	11	28	45
Fault Config Datalink In A1	12	29	46
Fault Config Datalink In A2	13	30	47
Fault Config Datalink In B1	14	31	48
Fault Config Datalink In B2	15	32	49
Fault Config Datalink In C1	16	33	50
Fault Config Datalink In C2	17	34	51
Fault Config Datalink In D1	18	35	52
Fault Config Datalink In D2	19	36	53

Only DPI products (PowerFlex 70, etc.) can utilize this feature since DPI peripheral devices (HIMs, DriveExplorer with 1203-SSS converter, etc.) can access the 1769-SM1 directly. Allowing DPI peripherals to change the configuration settings makes the Parameter mode more flexible and simpler to use than Controller mode.

Figure 3.15 DriveExplorer Window with Mapped 1769-SM1 Compact I/O Module



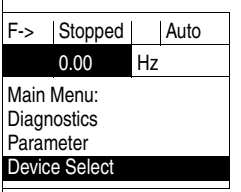
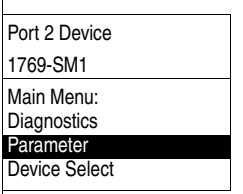
Using the PowerFlex HIM

If your drive has either an LED or LCD HIM (Human Interface Module), access parameters in the 1769-SM1 module as shown below. It is recommended that you read through the steps for your HIM before performing the sequence. For additional HIM information, refer to your PowerFlex Drive User Manual or the HIM Quick Reference card.

Using an LED HIM

Step	Key(s)	Example Screens
1. Press the ALT and then Sel (Device) to display the Device Screen.	Device ALT Sel	
2. Press the Up Arrow or Down Arrow to scroll to the 1769-SM1 module. Letters represent files in the drive, and numbers represent ports. The module is usually connected to port 2.	▲ OR ▼	
3. Press the Enter key to enter your selection. A parameter database is constructed, and then the first parameter is displayed.	↵	
4. Edit the parameters using the same techniques that you use to edit drive parameters.		

Using an LCD HIM

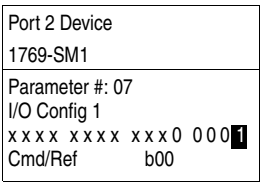
Step	Key(s)	Example Screens
1. In the main menu, press the Up Arrow or Down Arrow to scroll to **Device Select**.	▲ OR ▼	
2. Press Enter to enter your selection.	↵	
3. Press the Up Arrow or Down Arrow to scroll to the 1769-SM1 module.	▲ OR ▼	
4. Press Enter to select the module. A parameter database is constructed, and then the main menu for the module is displayed.	↵	
5. Edit the parameters using the same techniques that you use to edit drive parameters.		

Setting the I/O Configuration

The I/O configuration determines the type of data sent to the drive. Logic Command/Status, Reference/Feedback, and Datalinks may be enabled or disabled. A “1” enables the I/O. A “0” disables it.

1. Set the bits in **Parameters 07 - [I/O Config 1]**, **24 - [I/O Config 2]**, and **41 - [I/O Config 3]** for each respective drive:

Figure 3.16 I/O Configuration Screen for CH1 Drive on an LCD HIM



Bit	Description
0	Logic Command/Reference (Default)
1	Datalink A
2	Datalink B
3	Datalink C
4	Datalink D
5 - 15	Not Used

Bit 0 is the right-most bit. In Figure 3.16, it is highlighted and equals “1.”

2. If you enabled Logic Command/Reference, configure the drive to accept the Logic Command and Reference from the 1769-SM1 module. For example, set parameter 90 - [Speed Ref A Sel] in a PowerFlex 70 or 700 drive to “DPI Port 2” so that the drive uses the Reference from the module. Also, verify that the mask parameters in the drive (for example, parameter 276 - [Logic Mask]) are configured to receive the desired logic from the module.

3. If you enabled one or more Datalinks, configure the drive to determine the source and destination of data in the Datalink(s). Also, ensure that the 1769-SM1 module is the only module using the enabled Datalink(s).

4. Reset the module (see Resetting the Module on page 3-17).

Setting an Idle Action

By default, when the controller is idle, the drive responds by faulting if it is using I/O from the 1769-SM1. You can configure a different response to an idle controller using **Parameters 09 - [Idle Action 1]**, **26 - [Idle Action 2]**, and **43 - [Idle Action 3]** for each respective connected drive.

ATTENTION: Risk of injury or equipment damage exists. **Parameters 09 - [Idle Action 1]**, **26 - [Idle Action 2]**, and **43 - [Idle Action 3]** let you determine the action of the 1769-SM1 module and each connected drive if communications are disrupted or the controller is idle. By default, each of these parameters faults its respective drive. You can set each parameter so that the respective drive continues to run. Precautions should be taken to ensure that the settings of these parameters do not create a hazard of injury or equipment damage.

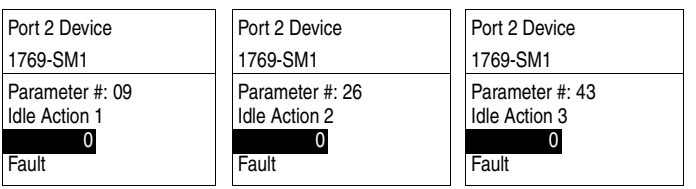
To change the Idle Action

Set the values of **Parameters 09 - [Idle Action 1]**, **26 - [Idle Action 2]**, and **43 - [Idle Action 3]** to the desired responses:

Value	Action	Description
0	Fault (default)	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted. (1)
2	Zero Data	The drive is sent 0 for output data after a communications disruption. This does not command a stop.
3	Hold Last	The drive continues in its present state after a communications disruption.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters (e.g. **Parameter 10 - [Flt Cfg Logic 1]** through **Parameter 19 - [Flt Cfg D2 In1]** for CH1 drive).

(1) "Stop" Idle Action is not supported for SCANport connected channels. If this setting is used, the "Fault" action will be used instead.

Figure 3.17 Fault Action Screens on an LCD HIM



Changes to these parameters take effect immediately. A reset is not required.

To set the fault configuration parameters

If you set **Parameter 09 - [Idle Action 1]**, **26 - [Idle Action 2]**, or **43 - [Idle Action 3]** to "Send Flt Cfg," the values in the following 1769-SM1 module parameters are sent to the drive after an idle action occurs. You must set these parameters to values required by your application.

Parameter			Name	Description
CH1	CH2	CH3		
10	27	44	Flt Cfg Logic	A 16-bit value sent to the drive for Logic Command.
11	28	45	Flt Cfg Ref	A 32-bit value (0 – 4294967295) sent to the drive as a Reference or Datalink. **Important:** If the drive uses a 16-bit Reference or 16-bit Datalinks, the most significant word of the value should be set to zero (0).
12 - 19	29 - 36	46 - 53	Flt Cfg x1 In or Flt Cfg x2 In	

Changes to these parameters take effect immediately. A reset is not required.

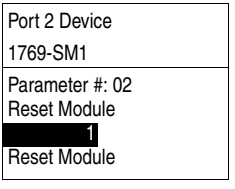
Resetting the Module

Changes to settings on some module parameters require that you reset the 1769-SM1 module before the new settings take effect. You can reset the module by cycling power to the module or by using **Parameter 02 - [Reset Module]**:

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module.

Set the **Parameter 02 - [Reset Module]** to **Reset Module**:

Figure 3.18 Reset Screen on an LCD HIM



Value	Description
0	Ready (Default)
1	Reset Module
2	Set Defaults

When you enter **1 = Reset Module**, the module will be immediately reset. When you enter **2 = Set Defaults**, the module will set all module parameters to their factory-default settings. The value of this parameter will be restored to **0 = Ready** after the module is reset.

Viewing the Module Configuration

The following parameters provide information about how the 1769-SM1 module is configured. You can view these parameters at any time.

<table>
<tr><th>Number</th><th>Name</th><th>Description</th></tr>
<tr><td>01</td><td>Config Mode</td><td>The configuration mode for the module (Controller or Parameters).</td></tr>
<tr><td>05</td><td>Ref/Fbk Size 1</td><td>The size of the Reference/Feedback for the CH1 drive (16 bits or 32 bits). It is set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>06</td><td>Datalink Size 1</td><td>The size of each Datalink for the CH1 drive (16 bits or 32 bits). They are set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>08</td><td>I/O Actual 1</td><td>The Reference/Feedback and Datalinks used by the module for the CH1 drive. This value is the same as Parameter 07 - [I/O Config 1] unless the parameter was changed and the module was not reset.
<table>
<tr><td>Bit Definition</td><td>Not Used</td><td>Not Used</td><td>Not Used</td><td>Datalink D</td><td>Datalink C</td><td>Datalink B</td><td>Datalink A</td><td>Cmd/Sts</td></tr>
<tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
0 = I/O disabled
1 = I/O enabled</td></tr>
<tr><td>22</td><td>Ref/Fbk Size 2</td><td>The size of the Reference/Feedback for the CH2 drive (16 bits or 32 bits). It is set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>23</td><td>Datalink Size 2</td><td>The size of each Datalink for the CH2 drive (16 bits or 32 bits). They are set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>25</td><td>I/O Actual 2</td><td>The Reference/Feedback and Datalinks used by the module for the CH2 drive. This value is the same as Parameter 24 - [I/O Config 2] unless the parameter was changed and the module was not reset.
<table>
<tr><td>Bit Definition</td><td>Not Used</td><td>Not Used</td><td>Not Used</td><td>Datalink D</td><td>Datalink C</td><td>Datalink B</td><td>Datalink A</td><td>Cmd/Sts</td></tr>
<tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
0 = I/O disabled
1 = I/O enabled</td></tr>
<tr><td>39</td><td>Ref/Fbk Size 3</td><td>The size of the Reference/Feedback for the CH3 drive (16 bits or 32 bits). It is set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>40</td><td>Datalink Size 3</td><td>The size of each Datalink for the CH3 drive (16 bits or 32 bits). They are set in the drive and the module automatically uses the correct size.</td></tr>
<tr><td>42</td><td>I/O Actual 3</td><td>The Reference/Feedback and Datalinks used by the module for the CH3 drive. This value is the same as Parameter 41 - [I/O Config 3] unless the parameter was changed and the module was not reset.
<table>
<tr><td>Bit Definition</td><td>Not Used</td><td>Not Used</td><td>Not Used</td><td>Datalink D</td><td>Datalink C</td><td>Datalink B</td><td>Datalink A</td><td>Cmd/Sts</td></tr>
<tr><td>Default</td><td>x</td><td>x</td><td>x</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Bit</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
</table>
0 = I/O disabled
1 = I/O enabled</td></tr>
</table>

Understanding the I/O Image

Chapter 4 provides information and examples of the I/O image of the 1769-SM1 module, including Channel Enable/Status, Logic Command/ Status, Reference/Feedback, and Datalinks.

The I/O image for the 1769-SM1 consists of 60 words of Inputs and 60 words of Outputs maximum, which will vary based on the I/O Config parameter settings for each channel (Parameters 07, 24, and 41).

Table 4.A I/O Image Table

Output Image	Input Image	Word			Related Parameter 07 / 24 / 41 I/O Config Bit
		CH1	CH2	CH3	
Channel Enable Word	Channel Status Word	0	4	8	
Logic Command	Logic Status	1	5	9	"0000x" (bit 0)
Reference (low)	Feedback (low)	2	6	10	
Reference (high)	Feedback (high)	3	7	11	
Datalink In A1 (low)	Datalink Out A1 (low)	12	16	20	"000x0" (bit 1)
Datalink In A1 (high)	Datalink Out A1 (high)	13	17	21	
Datalink In A2 (low)	Datalink Out A2 (low)	14	18	22	
Datalink In A2 (high)	Datalink Out A2 (high)	15	19	23	
Datalink In B1 (low)	Datalink Out B1 (low)	24	28	32	"00x00" (bit 2)
Datalink In B1 (high)	Datalink Out B1 (high)	25	29	33	
Datalink In B2 (low)	Datalink Out B2 (low)	26	30	34	
Datalink In B2 (high)	Datalink Out B2 (high)	27	31	35	
Datalink In C1 (low)	Datalink Out C1 (low)	36	40	44	"0x000" (bit 3)
Datalink In C1 (high)	Datalink Out C1 (high)	37	41	45	
Datalink In C2 (low)	Datalink Out C2 (low)	38	42	46	
Datalink In C2 (high)	Datalink Out C2 (high)	39	43	47	
Datalink In D1 (low)	Datalink Out D1 (low)	48	52	56	"x0000" (bit 4)
Datalink In D1 (high)	Datalink Out D1 (high)	49	53	57	
Datalink In D2 (low)	Datalink Out D2 (low)	50	54	58	
Datalink In D2 (high)	Datalink Out D2 (high)	51	55	59	

Note that the I/O words for each channel are not contiguous, with the assumption being that the typical configuration will utilize most or all of the channels and each channel will have a similar configuration. In these scenarios, the required I/O space is kept to a minimum. For example, to connect three PowerFlex 70 drives and only perform control (Logic Command/Status and Reference/Feedback), only 12 words of I/O are needed. Likewise, three PowerFlex drives using control and Datalink A only require 24 words of I/O.

TIP: To minimize the amount of I/O words needed, follow these simple rules:

1. Connect the DPI or SCANport product(s) starting with CH1, followed by CH2, and then CH3.
2. If Datalinks are used, start with Datalink A, followed in order by B, C, and D.

Table 4.B I/O Image Examples

Parameter 07 - [I/O Config 1]	Parameter 24 - [I/O Config 2]	Parameter 41 - [I/O Config 3]	Resulting Number of Input / Output Words Used	I/O Config 'x' Details
"00001"	"00001"	"00001"	12	Logic Command/Status and Reference/Feedback only
"00011"	"00011"	"00011"	24	+ Datalink A
"00111"	"00111"	"00111"	36	+ Datalink B
"01111"	"01111"	"01111"	48	+ Datalink C
"11111"	"11111"	"11111"	60	+ Datalink D
"10001"	"00001"	"00001"	52	determined by CH1 Datalink D
"00001"	"10001"	"00001"	56	determined by CH2 Datalink D
"00001"	"00001"	"10001"	60	determined by CH3 Datalink D
"11111"	CH2 unoccupied	CH3 unoccupied	52	determined by CH1 Datalink D
CH1 unoccupied	"11111"	CH3 unoccupied	56	determined by CH2 Datalink D
CH1 unoccupied	CH2 unoccupied	"11111"	60	determined by CH3 Datalink D

TIP: To conserve I/O space in the controller, this value — rather than the maximum size of 60 words — can be entered as the I/O size in the RSLogix 500/5000 module configuration window.

Channel Enable Words

A Channel Enable Word is used for each channel (output words 0, 4, and 8), where:

Bit #	Name	Description
0	Channel Enable	"0" = Disables sending output data (Logic Command/ Reference and Datalinks) to the channel. All input data is zeroed ("0") to indicate that the data is no longer being updated. "1" = Enables sending output data (Logic Command/ Reference and Datalinks) to the channel. All respective input data will also be updated.
1-15	Not used	Reserved for future use

The Channel Enable Word is a "master" enable/disable switch for communications on each channel. The actual output/input data being sent/received is determined by **Parameter 07 - [I/O Config 1]**, **Parameter 24 - [I/O Config 2]** and **Parameter 41 - [I/O Config 3]**.

Important: If the Channel Enable bit is transitioned from ON ("1") to OFF ("0"), the connected drive product will fault.

Channel Status Words

A Channel Status Word is used for each channel (input words 0, 4, and 8), where:

Bit #	Name	Description
0	Logic Status Valid	"0" = Logic Status/Feedback data is not valid "1" = Logic Status/Feedback data is valid
1	Datalink Out A	"0" = Datalink Out A data is not valid "1" = Datalink Out A data is valid
2	Datalink Out B	"0" = Datalink Out B data is not valid "1" = Datalink Out B data is valid
3	Datalink Out C	"0" = Datalink Out C data is not valid "1" = Datalink Out C data is valid
4	Datalink Out D	"0" = Datalink Out D data is not valid "1" = Datalink Out D data is valid
5	Not used	Reserved for future use
6	Config Valid	"1" = The module has a valid configuration (reported on CH1 only)
7	Config Error	"1" = The module has a configuration error (reported on CH1 only)

8-10	DPI/SCANport Port ID	Bits 8, 9, & 10 represent the connected port # on the drive: 10 9 8 0 0 1 = Port 1 0 1 0 = Port 2 (typical) 0 1 1 = Port 3 1 0 0 = Port 4 1 0 1 = Port 5 1 1 0 = Port 6 1 1 1 = Port 7
11	SCANport Host	"1" = a SCANport Host (1305, 1336 PLUS II, etc.) is connected
12	DPI Host	"1" = a DPI Host (PowerFlex 70, 700, etc.) is connected
13	32-bit Datalinks	"0" = 16-bit Datalinks are used "1" = 32-bit Datalinks are used
14	32-bit Ref/Fdbk	"0" = 16-bit Reference / Feedback are used "1" = 32-bit Reference / Feedback are used
15	Not used	Reserved for future use

The data valid bits (0-4) can be used in the user ladder program to determine if the received data is valid and can be used. Bits 8-14 provide general information about the connected product. Bits 6 and 7 provide diagnostic feedback on the status of the 1769-SM1 module configuration.

Using Logic Command/Status

The *Logic Command* is a 16-bit word of control produced by the controller and consumed by the 1769-SM1 module. The *Logic Status* is a 16-bit word of status produced by the 1769-SM1 module and consumed by the controller.

This manual contains the bit definitions for compatible products available at the time of publication in Appendix E. For other products, refer to their documentation.

Using Reference/Feedback

The *Reference* (16 bits or 32 bits) is produced by the controller and consumed by the 1769-SM1 module. The *Feedback* (16 bits or 32 bits) is produced by the 1769-SM1 module and consumed by the controller. The size of the Reference/Feedback is determined by the drive and displayed with **Parameter 5 - [Ref/Fbk Size 1]**, **Parameter 22 - [Ref/Fbk 2]**, and **Parameter 39 - [Ref/Fbk 3]** in the 1769-SM1 module. For example, the Reference/Feedback for CH1 is shown below:

Size	Valid Values	Output Image	Input Image	Example
16-bit	-32768 to 32767	Word 2	Word 2	Table 4.B
32-bit	-2147483648 to 2147483647	Word 2 to 3	Word 2 to 3	Table 4.B

Using Datalinks

A Datalink is a mechanism used by PowerFlex drives to transfer data to and from the controller. Datalinks allow a parameter value to be changed without using an Explicit Message. When enabled, each Datalink consumes either two 16-bit or 32-bit words in both the input and output image depending on its size. The size of Datalinks (16-bit words or 32-bit words) is determined by the drive and displayed with **Parameter 06 - [Datalink Size 1]**, **Parameter 23 - [Datalink Size 2]**, and **Parameter 40 - [Datalink Size 3]** in the 1769-SM1 module.

Rules for Using Datalinks

- Each set of Datalink parameters in a PowerFlex drive can be used by only one module. If more than one module is connected to a single drive, multiple modules must not try to use the same Datalink.
- Parameter settings in the drive determine the data passed through the Datalink mechanism. Refer to the documentation for your drive.
- When you use a Datalink to change a value, the value is not written to the Non-Volatile Storage (NVS). The value is stored in volatile memory and lost when the drive loses power. Thus, use Datalinks when you need to change a value of a parameter frequently.

32-Bit Parameters using 16-Bit Datalinks

To read (and/or write) a 32-bit parameter using 16-bit Datalinks, typically both Datalinks of a pair (A, B, C, D) are set to the same 32-bit parameter. For example, to read parameter 09 - [Elapsed MWh] in a PowerFlex 70 drive, both Datalink A1 and A2 are set to “9.” Datalink A1 will contain the least significant word (LSW) and Datalink A2 will contain the most significant word (MSW). In this example, the parameter 09 value of 5.8 MWh is read as a “58” in Datalink A1.

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A1	LSW	09	58
A2	MSW	09	0

Regardless of the Datalink combination, x1 will always contain the LSW and x2 will always contain the MSW. In the following examples, parameter 242 - [Power Up Marker] in a PowerFlex 70 drive contains a value of 88.4541 hours.

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A1	LSW	242	32573
A2	- Not Used -	0	0
A1	- Not Used -	0	0
A2	MSW	242	13
A1	LSW	242	32573
A2	MSW	242	13

The following example shows an unlike Datalink pair of A2 and B1. With A1 already assigned, the next two available Datalinks were used.

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A2	MSW	242	13
B1	LSW	242	32573

32-bit data is stored in binary as follows:

MSW	2^{31} through 2^{16}
LSW	2^{15} through 2^{0}

Example: Parameter 242 - [Power Up Marker] = 88.4541 hours

$MSW = 13_{decimal} = 1101_{binary} = 2^{19} + 2^{18} + 2^{16} = 851968$

$LSW = 32573_{decimal}$

Most Significant Word Value

	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

851968

Least Significant Word Value

0	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

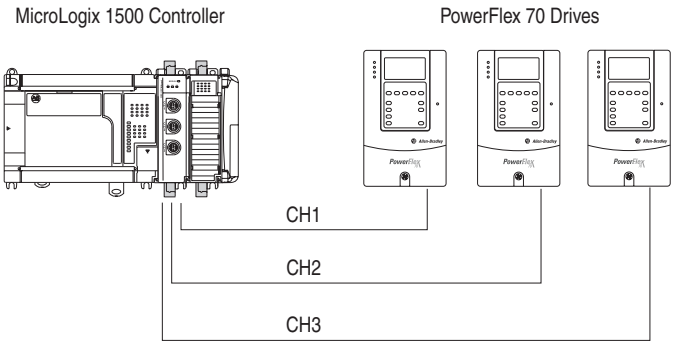
32573

851968 + 32573 = 884541

MicroLogix 1500 Ladder Example Program

Chapter 5 provides an example of using the 1769-SM1 module with a MicroLogix 1500 system (Figure 5.1).

Figure 5.1 Example MicroLogix 1500 System



The ladder example provided in this chapter is based on a 1769-SM1 in slot 1 with three PowerFlex 70 drives connected (one per channel). The ladder example demonstrates the following for each channel (drive):

- Use Logic Command bits to control the drive (for example, start, stop, etc.)
- Send a Reference to the drive
- Obtain status information from the drive (for example, Logic Status, Feedback, etc.)
- Writing and reading Datalinks

Explicit messaging (parameter read/write) capability varies between the controllers and RSLogix software packages:

Controller Used With 1769-SM1	Supports Explicit Messaging	
	Yes	No
MicroLogix 1500 LSP Series A, B, and C		✔
MicroLogix 1500 LRP Series A and B		✔
MicroLogix 1500 LRP Series C	✔	

- RSLogix 500 (version 6.0 or lower) does not support creating a Message instruction for the 1769-SM1. This limits the MicroLogix 1500 to performing I/O messaging (Logic Command/Reference, Logic Status/Feedback, and Datalinks) only.
- RSLogix 500 (version 6.1 or higher) must be used to create Message instructions for sending explicit messages to the 1769-SM1.

PowerFlex 70 Settings

The PowerFlex 70 drives used in the example program have the following parameter settings:

Parameter		Setting	Description
No.	Name		
90	Speed Ref A Sel	19	"DPI Port 2"
300	Data In A1	140	Parameter 140 - [Accel Time 1]
301	Data In A2	142	Parameter 142 - [Decel Time 1]
302	Data In B1	100	Parameter 100 - [Jog Speed]
303	Data In B2	155	Parameter 155 - [Stop Mode A]
304	Data In C1	101	Parameter 101 - [Preset Speed 1]
305	Data In C2	102	Parameter 102 - [Preset Speed 2]
306	Data In D1	103	Parameter 103 - [Preset Speed 3]
307	Data In D2	104	Parameter 104 - [Preset Speed 4]
310	Data Out A1	140	Parameter 140 - [Accel Time 1]
311	Data Out A2	142	Parameter 142 - [Decel Time 1]
312	Data Out B1	100	Parameter 100 - [Jog Speed]
313	Data Out B2	155	Parameter 155 - [Stop Mode A]
314	Data Out C1	101	Parameter 101 - [Preset Speed 1]
315	Data Out C2	102	Parameter 102 - [Preset Speed 2]
316	Data Out D1	103	Parameter 103 - [Preset Speed 3]
317	Data Out D2	104	Parameter 104 - [Preset Speed 4]

Note that the Data Out settings are set to match the respective Data In settings for demonstration purposes only. This allows read/write capability for the eight parameters selected and provides the ability to verify that a change was made to a parameter value.

1769-SM1 Settings

The 1769-SM1 used in the example program has the following parameter settings:

Parameter		Setting	Description
No.	Name		
07	I/O Config 1	11111	CH1 Command/Status and all Datalinks are enabled
24	I/O Config 2	11111	CH2 Command/Status and all Datalinks are enabled
41	I/O Config 3	11111	CH3 Command/Status and all Datalinks are enabled

Note that the module must be reset using **Parameter 02 - [Reset Module]** before these parameter settings take effect.

Refer to Chapter 4 for information about the I/O Image layout, Channel Enable/Status, Logic Command/Status, Reference/Feedback, and Datalinks.

MicroLogix 1500 Example Program

Figure 5.2 MicroLogix 1500 Ladder Logic Main Program

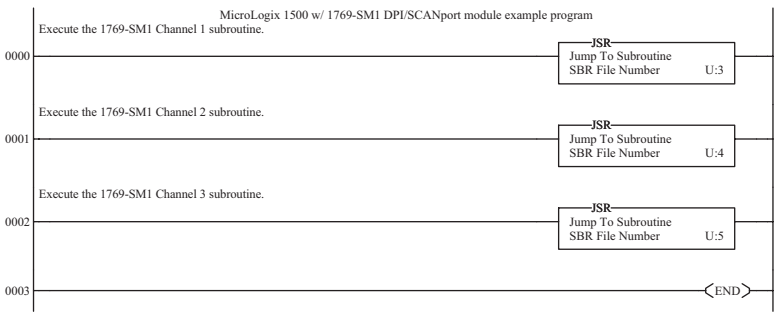


Figure 5.3 MicroLogix 1500 Ladder Logic Channel 1 Subroutine

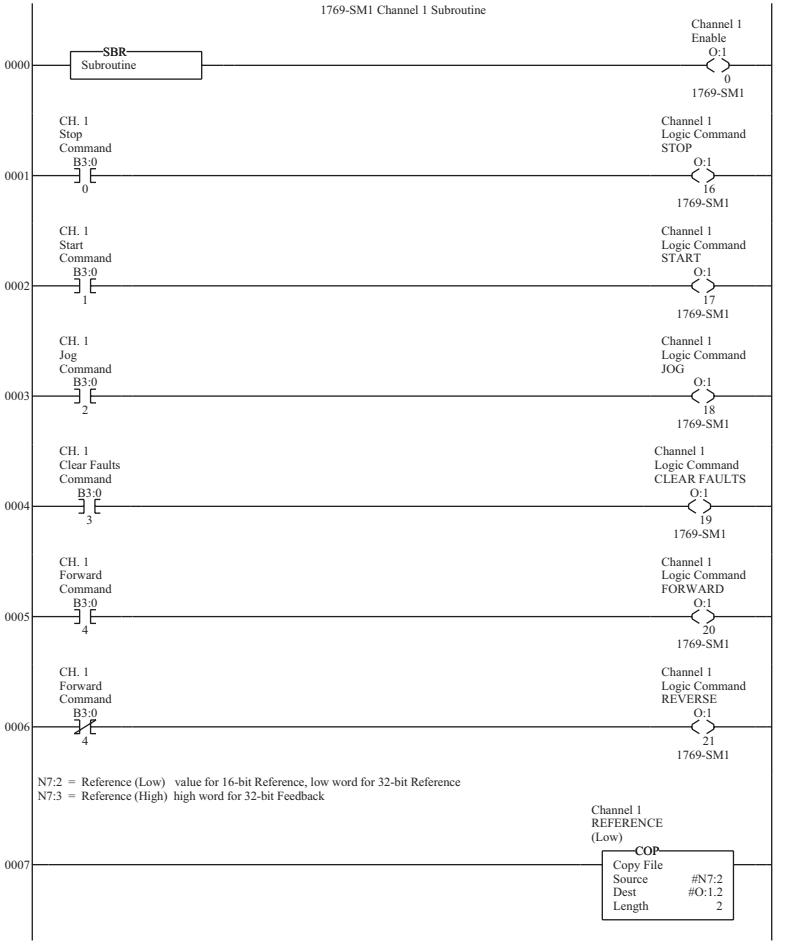


Figure 5.3 MicroLogix 1500 Ladder Logic Channel 1 Subroutine (Continued)

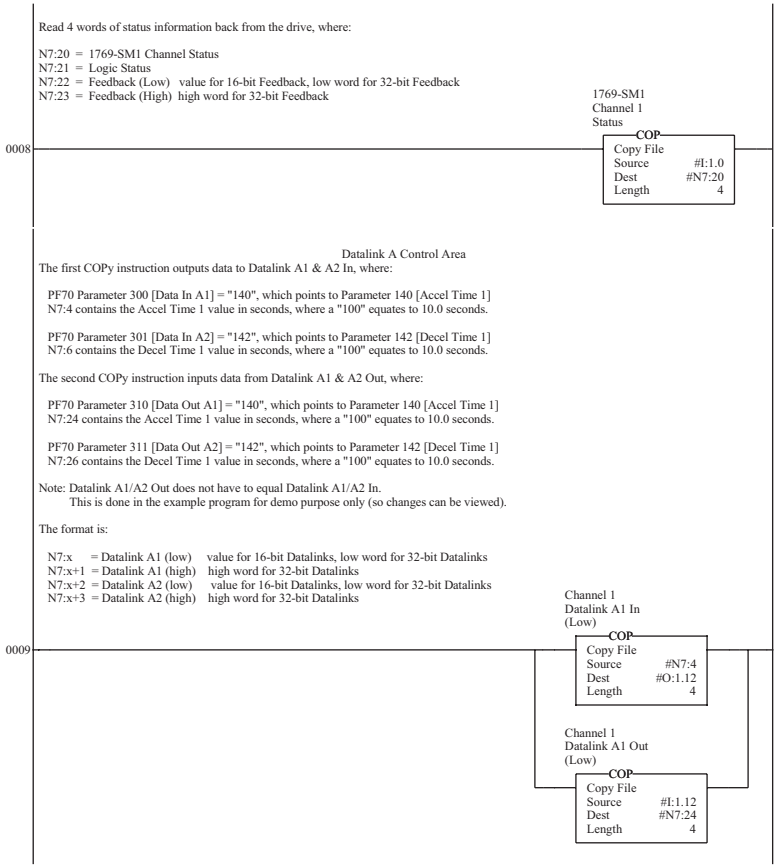


Figure 5.3 MicroLogix 1500 Ladder Logic Channel 1 Subroutine (Continued)

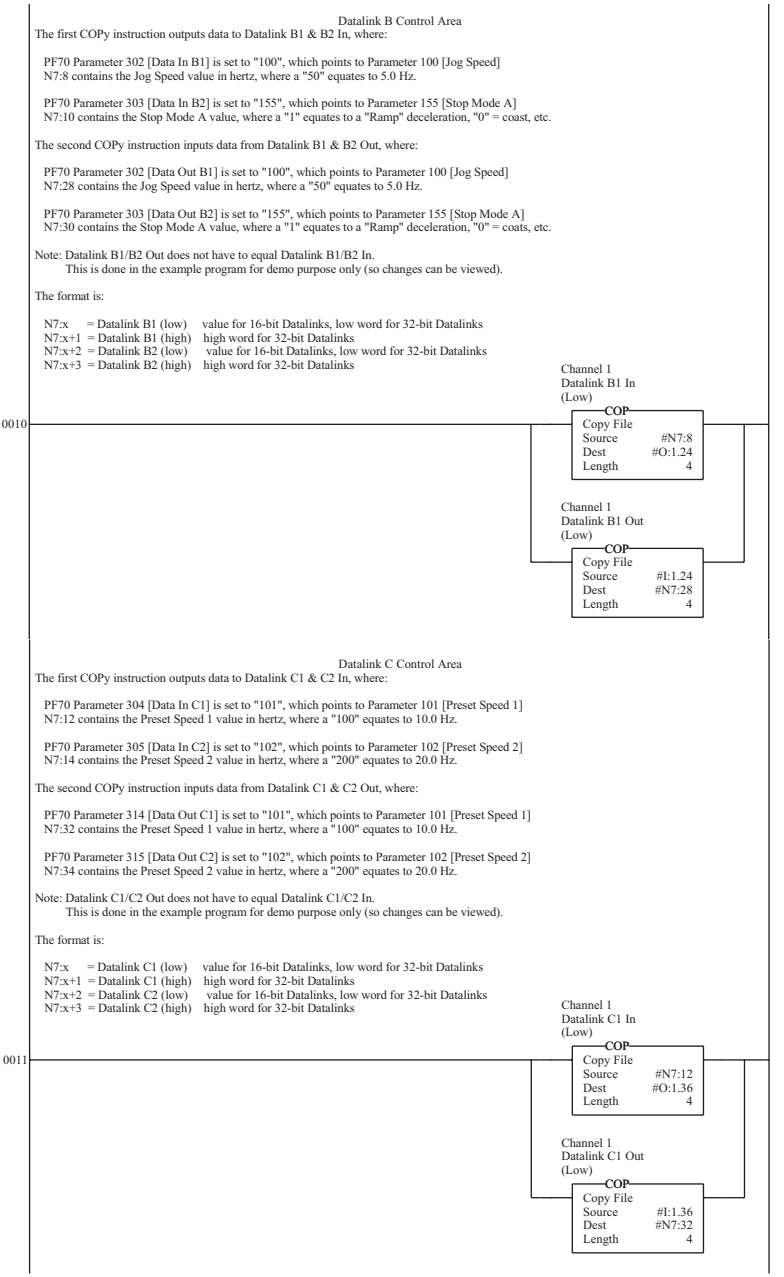
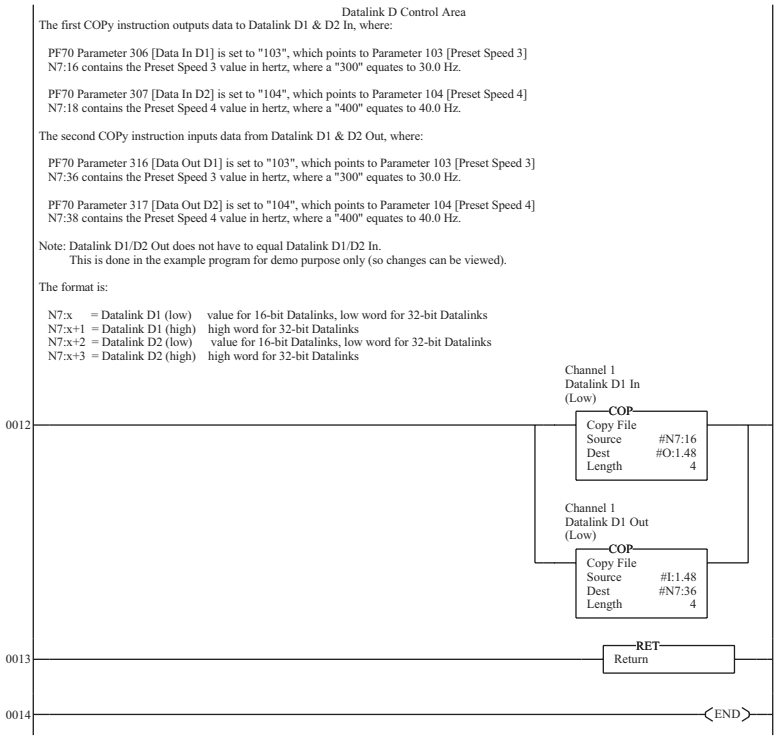


Figure 5.3 MicroLogix 1500 Ladder Logic Channel 1 Subroutine (Continued)



Channel 2 and Channel 3 ladder subroutines are similar to the Channel 1 subroutine and are not provided.

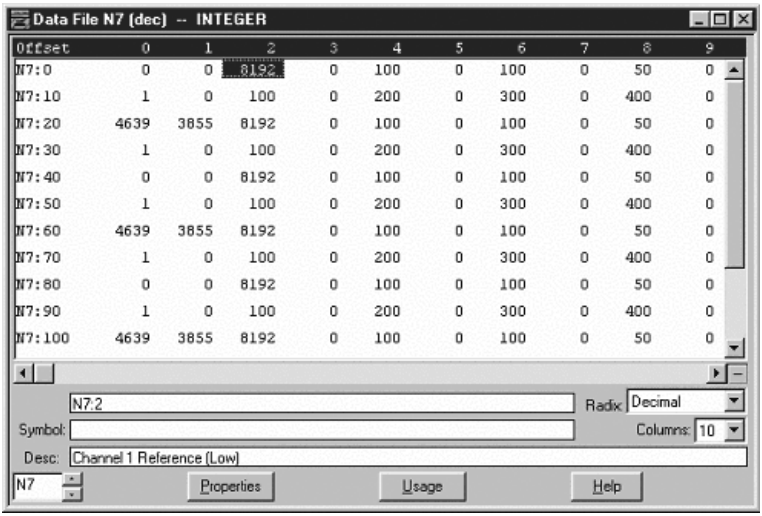
Example Program Data Table

Integer File N7: is used to contain the input and output data to/from the three channels:

N7: Word			Description
Channel 1	Channel 2	Channel 3	
0	40	80	not used
1	41	81	not used
2	42	82	Reference (low)
3	43	83	Reference (high)
4	44	84	Datalink A1 Out (low)
5	45	85	Datalink A1 Out (high)
6	46	86	Datalink A2 Out (low)
7	47	87	Datalink A2 Out (high)
8	48	88	Datalink B1 Out (low)
9	49	89	Datalink B1 Out (high)
10	50	90	Datalink B2 Out (low)
11	51	91	Datalink B2 Out (high)
12	52	92	Datalink C1 Out (low)
13	53	93	Datalink C1 Out (high)
14	54	94	Datalink C2 Out (low)
15	55	95	Datalink C2 Out (high)
16	56	96	Datalink D1 Out (low)
17	57	97	Datalink D1 Out (high)
18	58	98	Datalink D2 Out (low)
19	59	99	Datalink D2 Out (high)
20	60	100	Channel Status
21	61	101	Logic Status
22	62	102	Feedback (low)
23	63	103	Feedback (high)
24	64	104	Datalink A1 In (low)
25	65	105	Datalink A1 In (high)
26	66	106	Datalink A2 In (low)
27	67	107	Datalink A2 In (high)
28	68	108	Datalink B1 In (low)
29	69	109	Datalink B1 In (high)
30	70	110	Datalink B2 In (low)
31	71	111	Datalink B2 In (high)
32	72	112	Datalink C1 In (low)
33	73	113	Datalink C1 In (high)
34	74	114	Datalink C2 In (low)
35	75	115	Datalink C2 In (high)
36	76	116	Datalink D1 In (low)
37	77	117	Datalink D1 In (high)
38	78	118	Datalink D2 In (low)
39	79	119	Datalink D2 In (high)

An example of data table values is shown in Figure 5.4.

Figure 5.4 Example Data Table Values



Note that since PowerFlex 70 drives, which use 16-bit Reference/ Feedback and Datalinks, are used in the example, the data is contained in the low word for each item.

Using Explicit Messaging

This section provides information and examples that explain how to use Explicit Messaging to monitor and configure the 1769-SM1 and connected drive(s).

Explicit messaging with the 1769-SM1 is supported only by the MicroLogix 1500 LRP processor and RSLogix 500 (version 6.1 or higher).

Important: The MicroLogix 1500 LRP processor supports messaging only for the first 2 I/O modules capable of messaging.

ATTENTION: Hazard of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

ATTENTION: Hazard of equipment damage exists. If Explicit Messages are programmed to write parameter data to Non-Volatile Storage (NVS) frequently, the NVS will quickly exceed its life cycle and cause the drive to malfunction. Do not create a program that frequently uses Explicit Messages to write parameter data to NVS. Datalinks do not write to NVS and should be used for frequently changed parameters.

About Explicit Messaging

Explicit Messaging is used to transfer data that does not require continuous updates. With Explicit Messaging, you can configure and monitor a drive's parameters in the controller's ladder program.

Formatting Explicit Messages

Each message must be formatted as shown in Figure 5.5. Refer to Table 5.A for a description of the data that is required in each box.

TIP: A message file must be created for use by the message instructions. Create a new data file having type = Message, and containing at least one element for each message instruction in the ladder program.

Figure 5.5 MicroLogix 1500 Message Setup Window

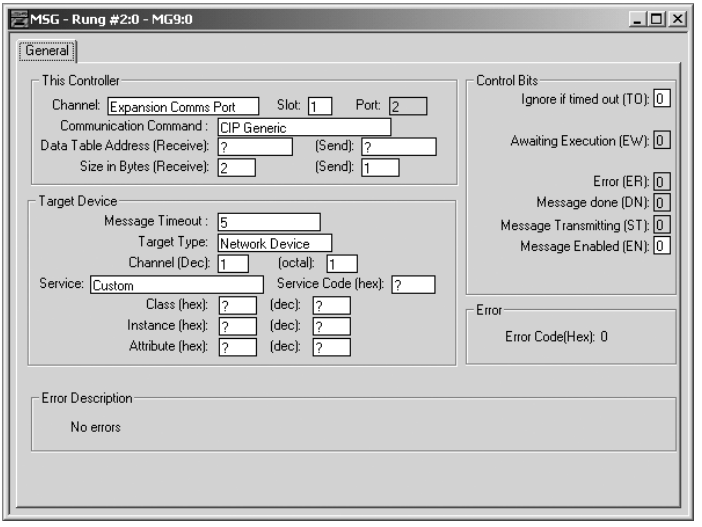


Table 5.A MicroLogix 1500 Message Setup Window Data

Window Field	Description
Channel	Always use “Expansion Comms Port.”
Slot	The slot number for the 1769-SM1.
Communication Command	Always use “CIP Generic.”
Data Table Address (Receive)	This box contains the file and element where the response service data (if any) is stored.
Size in Bytes (Receive)	This box contains the number of bytes of response service data (if any).
Data Table Address (Send)	This box contains the file and element where the request service data (if any) is stored.
Size in Bytes (Send)	This box contains the number of bytes of request service data (if any).
Message Timeout	This box contains the timeout delay in seconds.
Target Type	Always use “Network Device.”
Channel (Dec or Octal)	This box contains the number of the channel on the 1769-SM1 where the message will be sent. Use 1, 2, or 3.
Service (Text or hex)	This box contains the service code.
Class (hex or dec)	This box contains the Class ID.
Instance (hex or dec)	This box contains the Instance number.
Attribute (hex or dec)	This box contains the Attribute number.

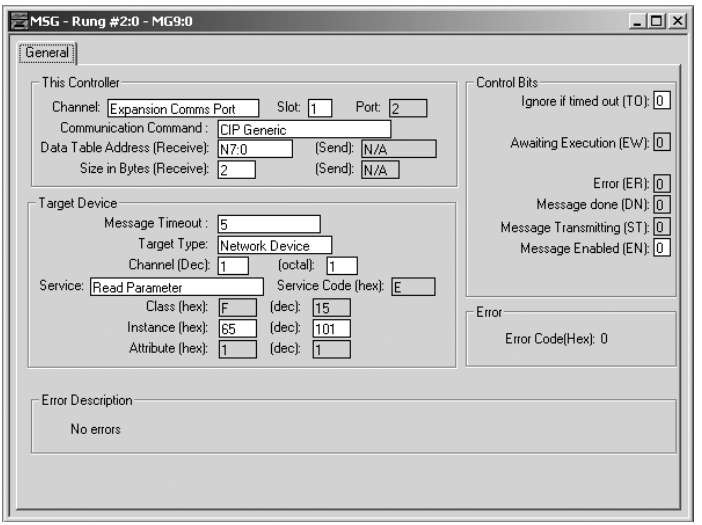
Parameter Read/Write Example

In this example, a read and a write of PowerFlex 70 drive parameter 101 - [Preset Speed 1] is being performed.

The Message Configuration screen in RSLogix 500 for the message doing the read operation is shown in Figure 5.6. It is assumed that the 1769-SM1 occupies slot number 1, and that the PowerFlex 70 drive is connected to the 1769-SM1 channel 1.

Refer to Table 5.A on page 5-11 for a description of the content in each box.

Figure 5.6 RSLogix 500 Parameter Read Message Configuration Screen

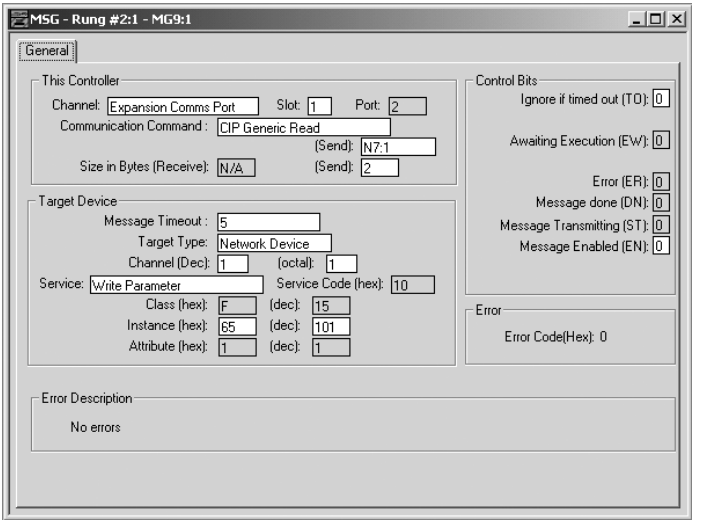


The response data for the message is stored at Data Table Address N7:0. The Size in Bytes of the response data is 2 bytes because the data size for PowerFlex 70 drive parameter 101 - [Preset Speed 1] is 2 bytes (1 word). No Data Table Address is specified for the request data since the Read Parameter service has no request data.

The Message Configuration screen in RSLogix 500 for the message doing the write operation is shown in Figure 5.7. It is assumed that the 1769-SM1 occupies slot number 1, and that the PowerFlex 70 drive is connected to the 1769-SM1 channel 1.

Refer to Table 5.A on page 5-11 for a description of the content in each box.

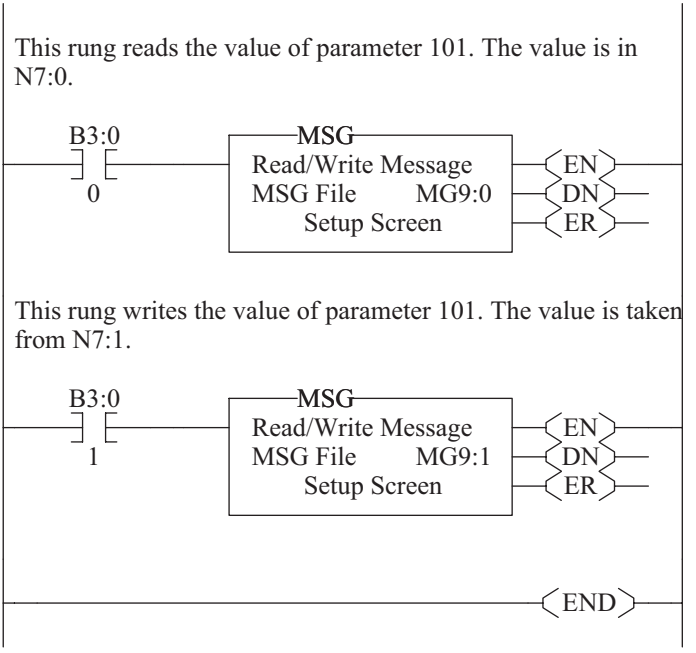
Figure 5.7 RSLogix 500 Parameter Write Message Configuration Screen



The request data for the message is stored at Data Table Address N7:1. The Size in Bytes of the request data is 2 bytes because the data size for PowerFlex 70 drive parameter 101 - [Preset Speed 1] is 2 bytes (1 word). No Data Table Address is specified for the response data since the Write Parameter service has no response data.

The MicroLogix 1500 ladder program for this example is shown in Figure 5.8.

Figure 5.8 Explicit Messaging Ladder Logic Example Program



Get Attributes Scattered Example

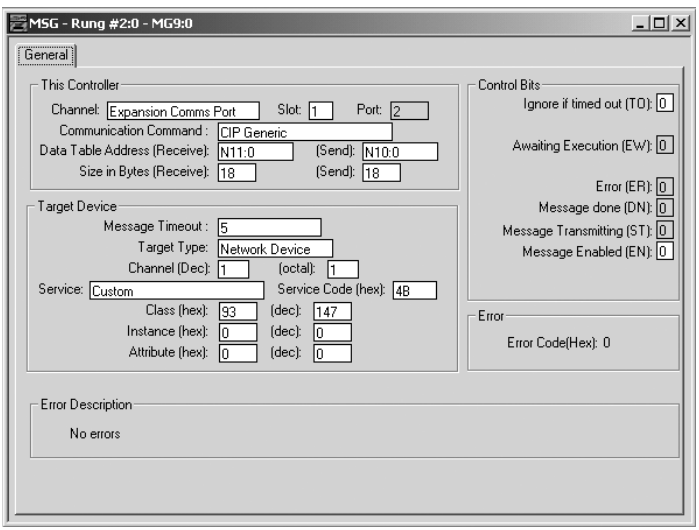
The Get Attributes Scattered service can be used with the DPI Parameter object to read the value of more than one parameter with a single message instruction.

In this example, a read of PowerFlex 70 drive parameters 1 - [Output Freq], 3 - [Output Current], and 6 - [Output Voltage] is being performed.

The Message Configuration screen in RSLogix 500 for this example is shown in Figure 5.9. It is assumed that the 1769-SM1 occupies slot number 1, and that the PowerFlex 70 drive is connected to the 1769-SM1 channel 1.

Refer to Table 5.A on page 5-11 for a description of the content in each box.

Figure 5.9 Get Attributes Scattered Read Message Configuration Screen

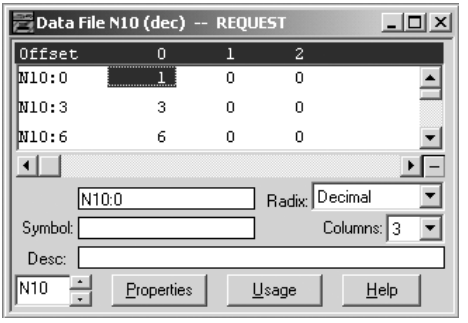


Configuration	Value	Description	Refer to...
Service Code	4B (hex)	Get_Attribute_Scattered	C-11
Class	93 (hex)	DPI Parameter Object	C-8

Refer to Appendix C, Object Specific Services for information on the message data format.

The request data for the message starts at Data Table Address N10:0, and is shown in Figure 5.10.

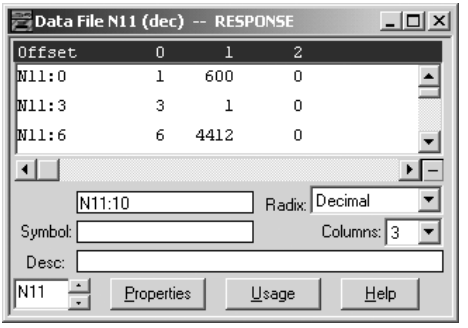
Figure 5.10 Request Data Screen for Get Attributes Scattered Message



Note the two pad words of zeros required between each parameter number.

The response data for the message starts at Data Table Address N11:0, and is shown in Figure 5.11. The values 600 (60.0 Hz), 1 (0.1 A), and 4412 (441.2 V) are representative only.

Figure 5.11 Response Data Screen for Get Attributes Scattered Message



Set Attributes Scattered Example

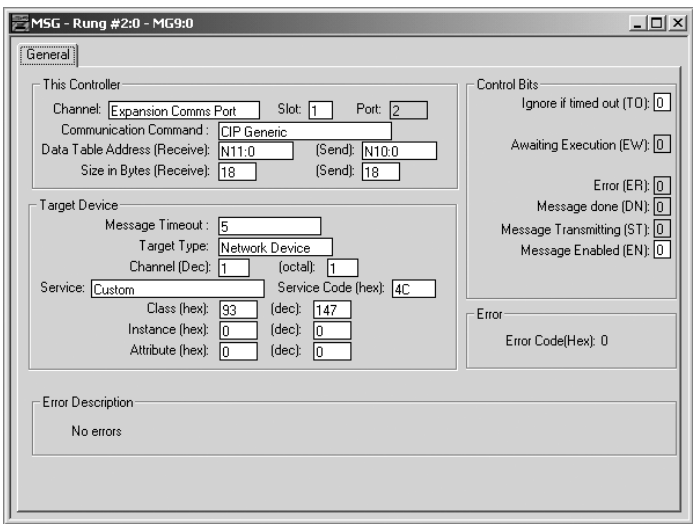
The Set Attributes Scattered service can be used with the DPI Parameter object to write the value of more than one parameter with a single message instruction.

In this example, a write of PowerFlex 70 drive parameters 140 - [Accel Time 1], 142 - [Decel Time 1], and 100 - [Jog Speed] is being performed.

The Message Configuration screen in RSLogix 500 for this example is shown in Figure 5.12. It is assumed that the 1769-SM1 occupies slot number 1, and that the PowerFlex 70 drive is connected to the 1769-SM1 channel 1.

Refer to Table 5.A on page 5-11 for a description of the content in each box.

Figure 5.12 Set Attributes Scattered Write Message Configuration Screen

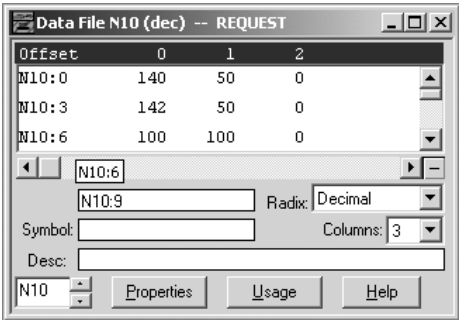


Configuration	Value	Description	Refer to...
Service Code	4C (hex)	Set_Attribute_Scattered	C-11
Class	93 (hex)	DPI Parameter Object	C-8

Refer to Appendix C, Object Specific Services for information on the message data format.

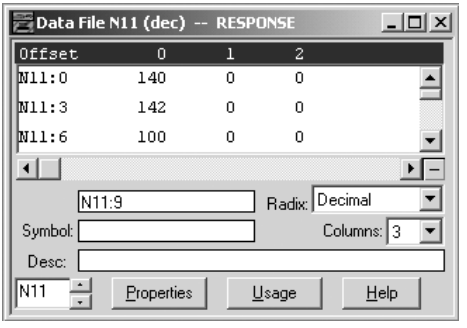
The request data for the message starts at Data Table Address N10:0, and is shown in Figure 5.13. The values 50 (5.0 sec), 50 (5.0 sec), and 100 (10.0 Hz) are representative only.

Figure 5.13 Request Data Screen for Set Attributes Scattered Message



The response data for the message starts at Data Table Address N11:0, and is shown in Figure 5.14 (successful message).

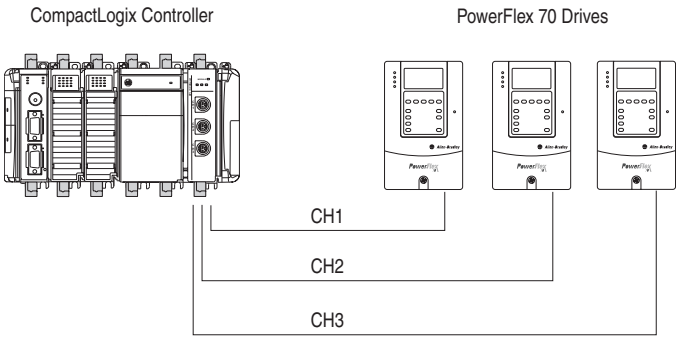
Figure 5.14 Response Data Screen for Set Attributes Scattered Message



CompactLogix Ladder Example Program

Chapter 6 provides an example of using the 1769-SM1 module with a CompactLogix system (Figure 6.1).

Figure 6.1 Example CompactLogix System



The ladder example provided in this chapter is based on a 1769-SM1 in slot 1 with three PowerFlex 70 drives connected (one per channel). The ladder example demonstrates the following for each channel (drive):

- Use Logic Command bits to control the drive (for example, start, stop, etc.)
- Send a Reference to the drive
- Obtain status information from the drive (for example, Logic Status, Feedback, etc.)
- Writing and reading Datalinks

Explicit messaging (parameter read/write) capability varies between CompactLogix controllers:

Controller Used With 1769-SM1	Supports Explicit Messaging	
	Yes	No
CompactLogix 1769-L20		✔
CompactLogix 1769-L30		✔
CompactLogix 1769-L32E	✔	
CompactLogix 1769-L35E	✔	

PowerFlex 70 Settings

The PowerFlex 70 drives used in the example program have the following parameter settings:

Parameter		Setting	Description
No.	Name		
90	Speed Ref A Sel	19	"DPI Port 2"
300	Data In A1	140	Parameter 140 - [Accel Time 1]
301	Data In A2	142	Parameter 142 - [Decel Time 1]
302	Data In B1	100	Parameter 100 - [Jog Speed]
303	Data In B2	155	Parameter 155 - [Stop Mode A]
304	Data In C1	101	Parameter 101 - [Preset Speed 1]
305	Data In C2	102	Parameter 102 - [Preset Speed 2]
306	Data In D1	103	Parameter 103 - [Preset Speed 3]
307	Data In D2	104	Parameter 104 - [Preset Speed 4]
310	Data Out A1	140	Parameter 140 - [Accel Time 1]
311	Data Out A2	142	Parameter 142 - [Decel Time 1]
312	Data Out B1	100	Parameter 100 - [Jog Speed]
313	Data Out B2	155	Parameter 155 - [Stop Mode A]
314	Data Out C1	101	Parameter 101 - [Preset Speed 1]
315	Data Out C2	102	Parameter 102 - [Preset Speed 2]
316	Data Out D1	103	Parameter 103 - [Preset Speed 3]
317	Data Out D2	104	Parameter 104 - [Preset Speed 4]

Note that the Data Out settings are set to match the respective Data In settings for demonstration purposes only. This allows read/write capability for the eight parameters selected and provides the ability to verify that a change was made to a parameter value.

1769-SM1 Settings

The 1769-SM1 used in the example program has the following parameter settings:

Parameter		Setting	Description
No.	Name		
07	I/O Config 1	11111	CH1 Command/Status and all Datalinks are enabled
24	I/O Config 2	11111	CH2 Command/Status and all Datalinks are enabled
41	I/O Config 3	11111	CH3 Command/Status and all Datalinks are enabled

Note that the module must be reset using **Parameter 02 - [Reset Module]** before these parameter settings take effect.

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting I/O that controls the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting the module.

Refer to Chapter 4 for information about the I/O Image layout, Channel Enable/Status, Logic Command/Status, Reference/Feedback, and Datalinks.

CompactLogix Example Program

Figure 6.2 CompactLogix Ladder Logic Main Program

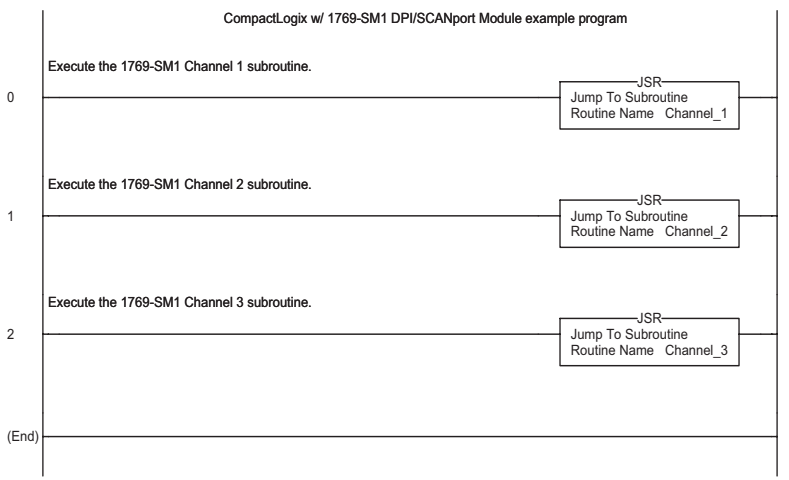


Figure 6.3 CompactLogix Ladder Logic Channel 1 Subroutine

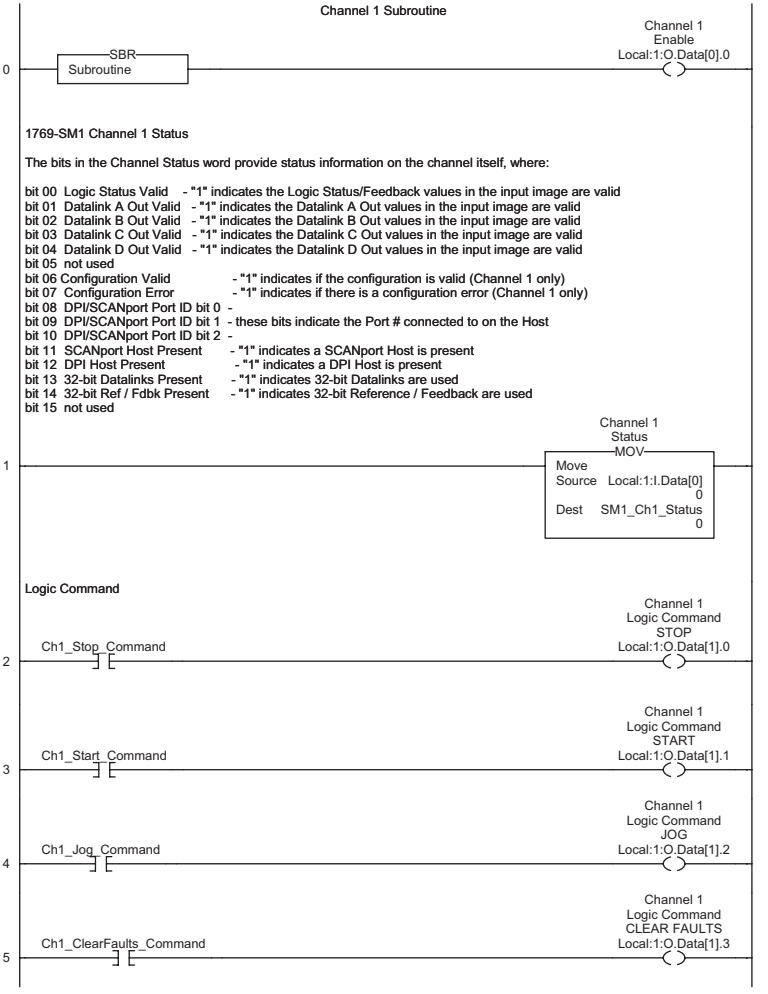


Figure 6.3 CompactLogix Ladder Logic Channel 1 Subroutine (Continued)

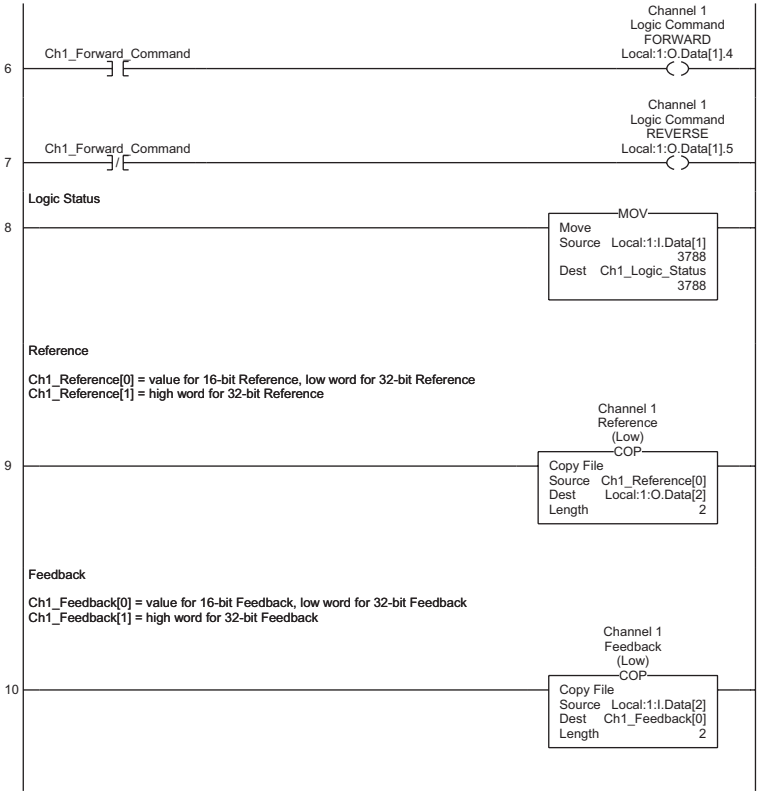


Figure 6.3 CompactLogix Ladder Logic Channel 1 Subroutine (Continued)

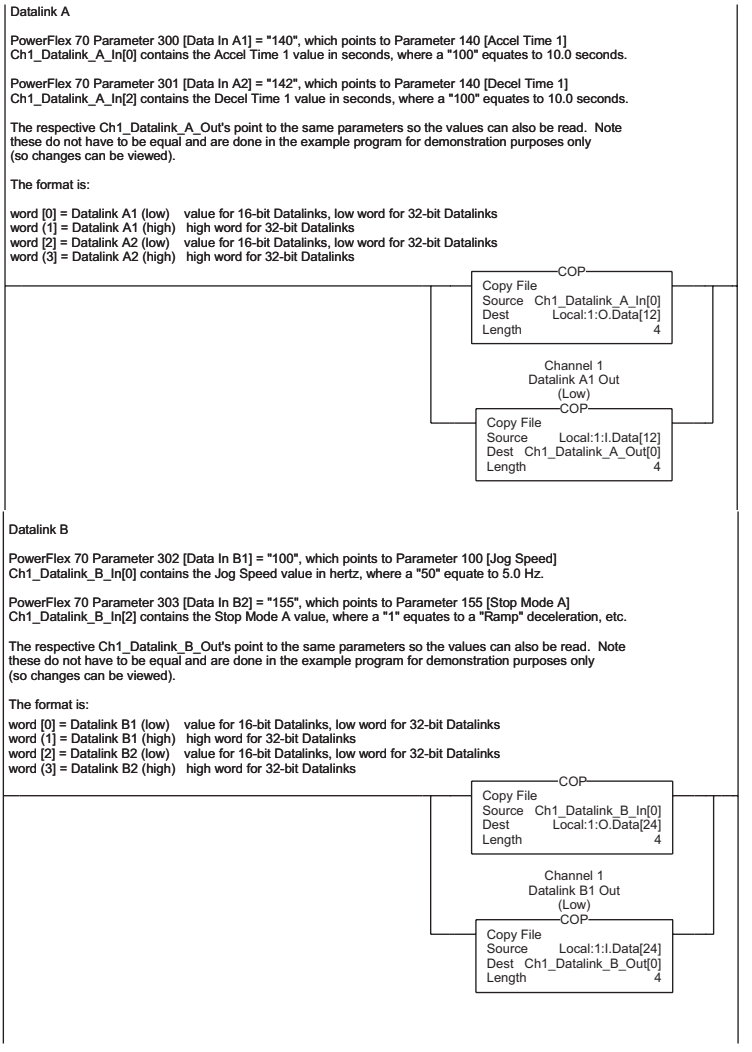
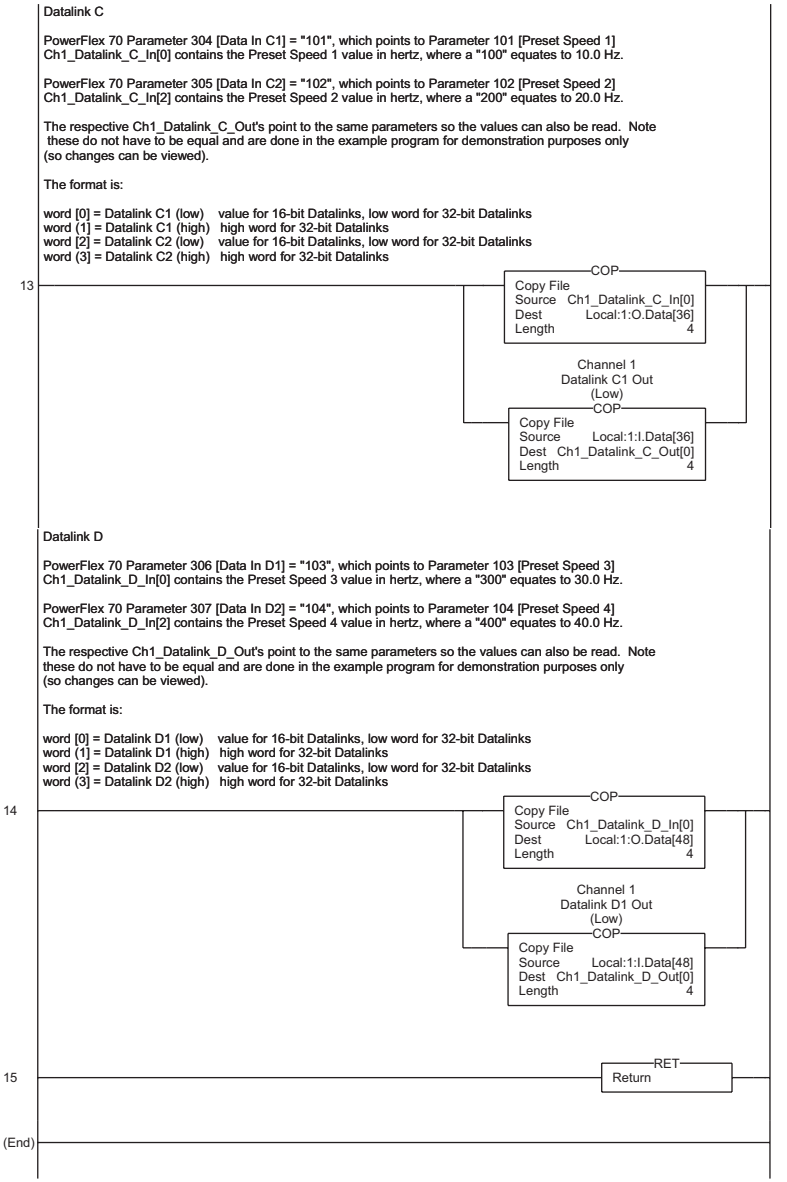


Figure 6.3 CompactLogix Ladder Logic Channel 1 Subroutine (Continued)

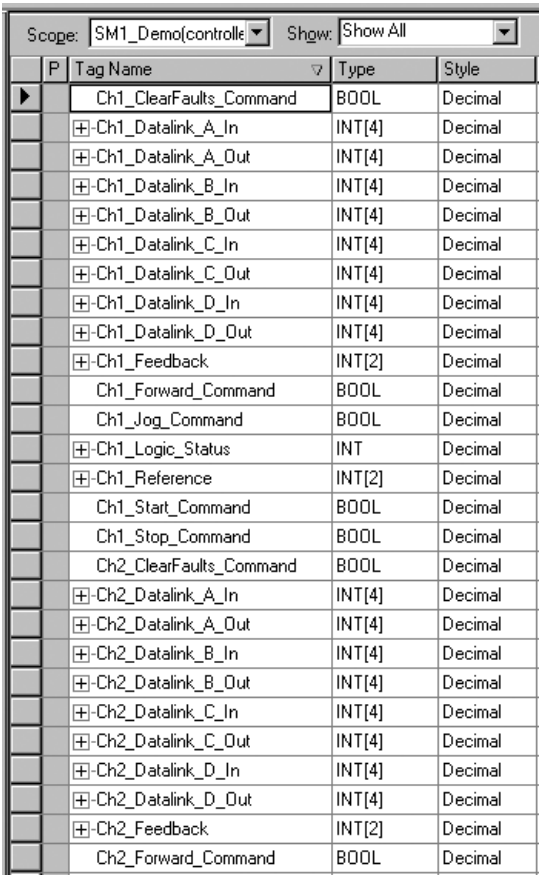


Channel 2 and Channel 3 ladder subroutines are similar to the Channel 1 subroutine and are not provided.

Example Program Data Table

In this example program, the following controller tags are used:

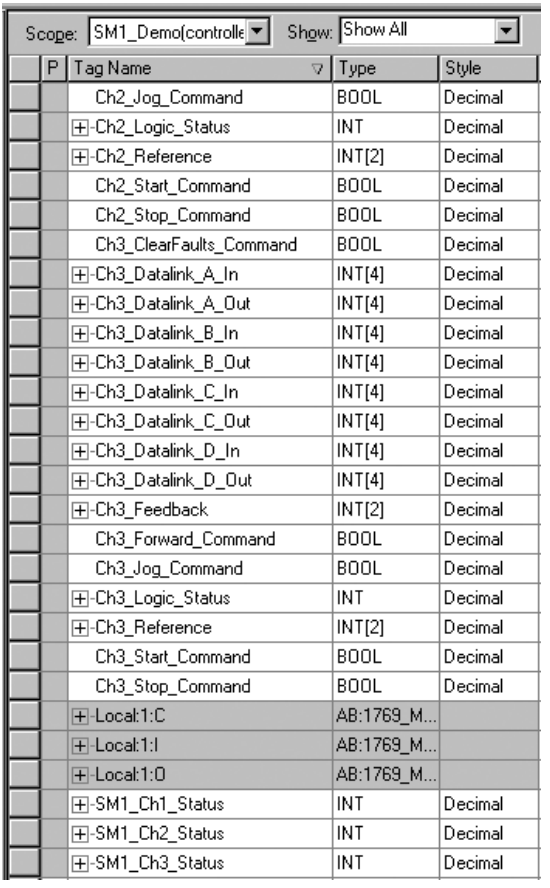
Figure 6.4 Controller Tags



Scope: SM1_Demo(controlle Show: Show All

	P	Tag Name	Type	Style
▶		Ch1_ClearFaults_Command	BOOL	Decimal
		⊞-Ch1_Datalink_A_In	INT[4]	Decimal
		⊞-Ch1_Datalink_A_Out	INT[4]	Decimal
		⊞-Ch1_Datalink_B_In	INT[4]	Decimal
		⊞-Ch1_Datalink_B_Out	INT[4]	Decimal
		⊞-Ch1_Datalink_C_In	INT[4]	Decimal
		⊞-Ch1_Datalink_C_Out	INT[4]	Decimal
		⊞-Ch1_Datalink_D_In	INT[4]	Decimal
		⊞-Ch1_Datalink_D_Out	INT[4]	Decimal
		⊞-Ch1_Feedback	INT[2]	Decimal
		Ch1_Forward_Command	BOOL	Decimal
		Ch1_Jog_Command	BOOL	Decimal
		⊞-Ch1_Logic_Status	INT	Decimal
		⊞-Ch1_Reference	INT[2]	Decimal
		Ch1_Start_Command	BOOL	Decimal
		Ch1_Stop_Command	BOOL	Decimal
		Ch2_ClearFaults_Command	BOOL	Decimal
		⊞-Ch2_Datalink_A_In	INT[4]	Decimal
		⊞-Ch2_Datalink_A_Out	INT[4]	Decimal
		⊞-Ch2_Datalink_B_In	INT[4]	Decimal
		⊞-Ch2_Datalink_B_Out	INT[4]	Decimal
		⊞-Ch2_Datalink_C_In	INT[4]	Decimal
		⊞-Ch2_Datalink_C_Out	INT[4]	Decimal
		⊞-Ch2_Datalink_D_In	INT[4]	Decimal
		⊞-Ch2_Datalink_D_Out	INT[4]	Decimal
		⊞-Ch2_Feedback	INT[2]	Decimal
		Ch2_Forward_Command	BOOL	Decimal

Figure 6.4 Controller Tags (Continued)

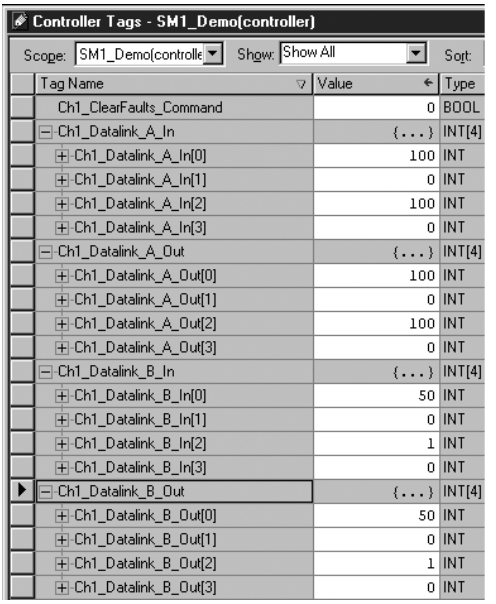


Scope: SM1_Demo(controlle Show: Show All

P	Tag Name	Type	Style
	Ch2_Jog_Command	BOOL	Decimal
	⊞-Ch2_Logic_Status	INT	Decimal
	⊞-Ch2_Reference	INT[2]	Decimal
	Ch2_Start_Command	BOOL	Decimal
	Ch2_Stop_Command	BOOL	Decimal
	Ch3_ClearFaults_Command	BOOL	Decimal
	⊞-Ch3_Datalink_A_In	INT[4]	Decimal
	⊞-Ch3_Datalink_A_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_B_In	INT[4]	Decimal
	⊞-Ch3_Datalink_B_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_C_In	INT[4]	Decimal
	⊞-Ch3_Datalink_C_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_D_In	INT[4]	Decimal
	⊞-Ch3_Datalink_D_Out	INT[4]	Decimal
	⊞-Ch3_Feedback	INT[2]	Decimal
	Ch3_Forward_Command	BOOL	Decimal
	Ch3_Jog_Command	BOOL	Decimal
	⊞-Ch3_Logic_Status	INT	Decimal
	⊞-Ch3_Reference	INT[2]	Decimal
	Ch3_Start_Command	BOOL	Decimal
	Ch3_Stop_Command	BOOL	Decimal
	⊞-Local:1:C	AB:1769_M...	
	⊞-Local:1:I	AB:1769_M...	
	⊞-Local:1:O	AB:1769_M...	
	⊞-SM1_Ch1_Status	INT	Decimal
	⊞-SM1_Ch2_Status	INT	Decimal
	⊞-SM1_Ch3_Status	INT	Decimal

An example of the Channel 1 data table values are shown below:

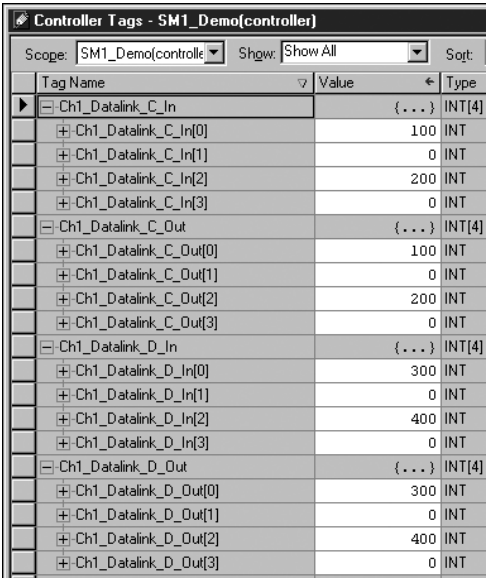
Figure 6.5 Channel 1 Values



Controller Tags - SM1_Demo(controller)

Scope: SM1_Demo(controlle Show: Show All Sort:

Tag Name	Value	Type
Ch1_ClearFaults_Command	0	BOOL
Ch1_Datalink_A_In	{...}	INT[4]
Ch1_Datalink_A_In[0]	100	INT
Ch1_Datalink_A_In[1]	0	INT
Ch1_Datalink_A_In[2]	100	INT
Ch1_Datalink_A_In[3]	0	INT
Ch1_Datalink_A_Out	{...}	INT[4]
Ch1_Datalink_A_Out[0]	100	INT
Ch1_Datalink_A_Out[1]	0	INT
Ch1_Datalink_A_Out[2]	100	INT
Ch1_Datalink_A_Out[3]	0	INT
Ch1_Datalink_B_In	{...}	INT[4]
Ch1_Datalink_B_In[0]	50	INT
Ch1_Datalink_B_In[1]	0	INT
Ch1_Datalink_B_In[2]	1	INT
Ch1_Datalink_B_In[3]	0	INT
Ch1_Datalink_B_Out	{...}	INT[4]
Ch1_Datalink_B_Out[0]	50	INT
Ch1_Datalink_B_Out[1]	0	INT
Ch1_Datalink_B_Out[2]	1	INT
Ch1_Datalink_B_Out[3]	0	INT

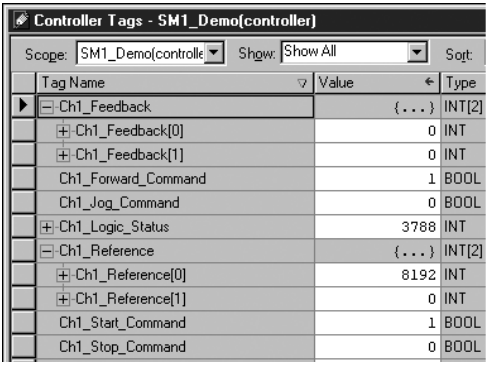


Controller Tags - SM1_Demo(controller)

Scope: SM1_Demo(controlle Show: Show All Sort:

Tag Name	Value	Type
Ch1_Datalink_C_In	{...}	INT[4]
Ch1_Datalink_C_In[0]	100	INT
Ch1_Datalink_C_In[1]	0	INT
Ch1_Datalink_C_In[2]	200	INT
Ch1_Datalink_C_In[3]	0	INT
Ch1_Datalink_C_Out	{...}	INT[4]
Ch1_Datalink_C_Out[0]	100	INT
Ch1_Datalink_C_Out[1]	0	INT
Ch1_Datalink_C_Out[2]	200	INT
Ch1_Datalink_C_Out[3]	0	INT
Ch1_Datalink_D_In	{...}	INT[4]
Ch1_Datalink_D_In[0]	300	INT
Ch1_Datalink_D_In[1]	0	INT
Ch1_Datalink_D_In[2]	400	INT
Ch1_Datalink_D_In[3]	0	INT
Ch1_Datalink_D_Out	{...}	INT[4]
Ch1_Datalink_D_Out[0]	300	INT
Ch1_Datalink_D_Out[1]	0	INT
Ch1_Datalink_D_Out[2]	400	INT
Ch1_Datalink_D_Out[3]	0	INT

Figure 6.5 Channel 1 Values (Continued)



Channel 2 and 3 data table values are not shown, but are similar to Channel 1 data.

Note that since PowerFlex 70 drives, which use 16-bit Reference/ Feedback and Datalinks, are used in the example, the data is contained in the low word for each item.

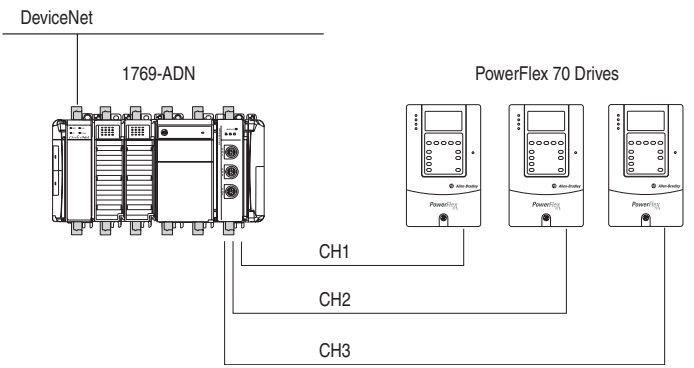
Notes:

ControlLogix w/1769-ADN DeviceNet Ladder Example Program

Chapter 7 provides an example of using the 1769-SM1 module with a ControlLogix controller and 1769-ADN Remote DeviceNet adapter.

Important: The 1769-SM1 Configuration Mode switch must be set to the "Controller" position (default) when the SM1 module is used with the 1769-ADN. Refer to Chapter 2 for information regarding Configuration Mode switch settings.

Figure 7.1 Example 1769-ADN DeviceNet Adapter System



The ladder example provided in this chapter is based on a 1769-SM1 in slot 1 with three PowerFlex 70 drives connected (one per channel). The ladder example demonstrates the following for each channel (drive):

- Use Logic Command bits to control the drive (e.g., start, stop, etc.)
- Send a Reference to the drive

- Obtain status information from the drive (for example, Logic Status, Feedback, etc.)
- Writing and reading Datalinks

Explicit messaging (parameter read/write) capability:

Controller Used With 1769-SM1	Supports Explicit Messaging	
	Yes	No
1769-ADN DeviceNet Adapter		✔

The 1769-ADN Remote DeviceNet adapter does not support explicit messaging. Refer to ControlLogix and 1769-ADN support documentation for information about possible future explicit messaging support.

Using RSNetWorx for DeviceNet

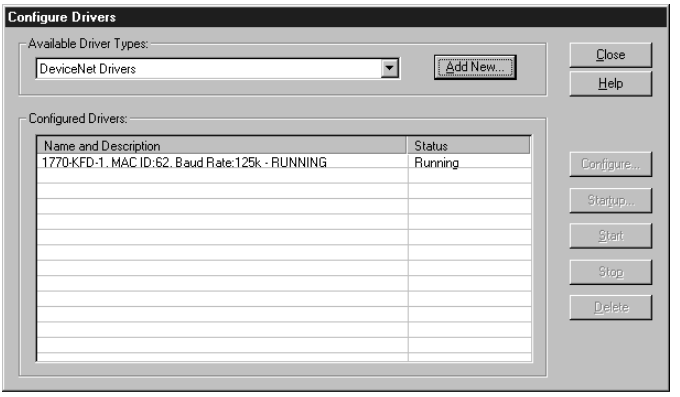
RSNetWorx for DeviceNet is a Rockwell Software application that can be used to set up DeviceNet networks and configure connected devices.

To set up RSLinx for RSNetWorx for DeviceNet

To use RSNetWorx for DeviceNet, you must first set up a driver in RSLinx. The driver provides a communications link between the computer and DeviceNet network.

Step	Icons
1. Start RSLinx, and select **Communications > Configure Drivers** to display the Configure Drivers screen. 2. In the Available Driver Types box, select **DeviceNet Drivers**, and then click **Add New**. The DeviceNet Driver Selection screen appears. 3. In the Available DeviceNet Drivers list, select the module connected to your computer, and then click **Select**. A Driver Configuration screen appears. 4. Configure the driver for your computer and network settings, and then click **OK**. The Configure Drivers screen reports the progress of the configuration. Then, the Add New RSLinx Driver screen appears. 5. Type a name (if desired), and then click **OK**. The Configure Drivers screen reappears, and the new driver is in the Configured Drivers List (Figure 7.2). 6. Click **Close** to close the screen. Leave RSLinx running.	 Shortcut to RSLinx

Figure 7.2 Configure Drivers Screen with a Configured Driver

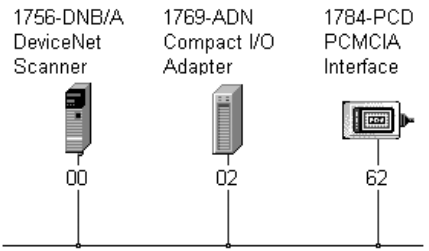


To go online with RSNetWorx for DeviceNet

You can view the devices on a DeviceNet network by going online. A device may appear as an unrecognized device if RSNetWorx for DeviceNet does not have an EDS file for it.

Step	Icons
1. After setting up a driver in RSLinx, start RSNetWorx for DeviceNet. 2. Select **Network > Online**. If the Browse for Network screen appears, RSLinx has multiple drivers configured. Select your DeviceNet network, and click **OK**. A prompt appears. 3. Click **OK** to go online. The devices on the network appear in the Configuration View. You can select Graph, Spreadsheet, or Master/Slave views. Figure 7.3 shows an example network in a Graph view.	 Shortcut to RSNetWorx

Figure 7.3 Example DeviceNet Network

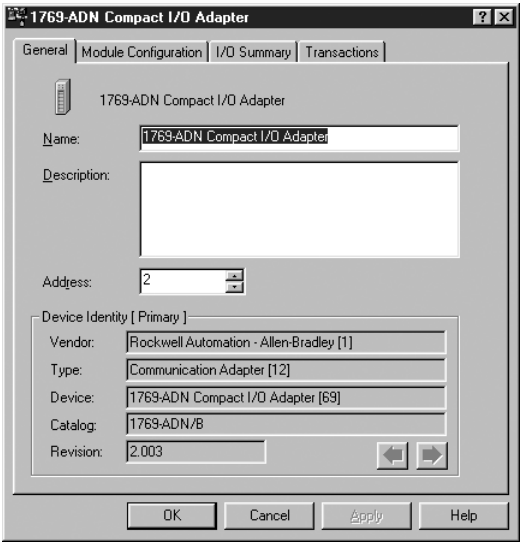


Setting Up the 1769-ADN

To configure the 1769-ADN for use with the example program using RSNetWorx for DeviceNet (version 3.21), perform the following steps:

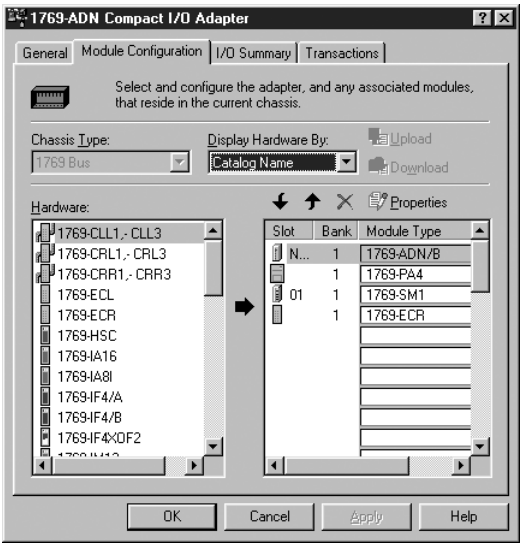
1. Double-click on the 1769-ADN adapter icon in the graphic view window (Figure 7.3) to display the 1769-ADN adapter image screen (Figure 7.4). For the system in the ladder example, the node address setting on the adapter is "2."

Figure 7.4 1769-ADN Adapter Image Screen



2. Select the Module Configuration tab screen (Figure 7.5) and build the remote ADN system by dragging and dropping components. In the ladder example, the remote drop consists of an ADN, PA4 power supply, SM1 module, and ECR end cap terminator.

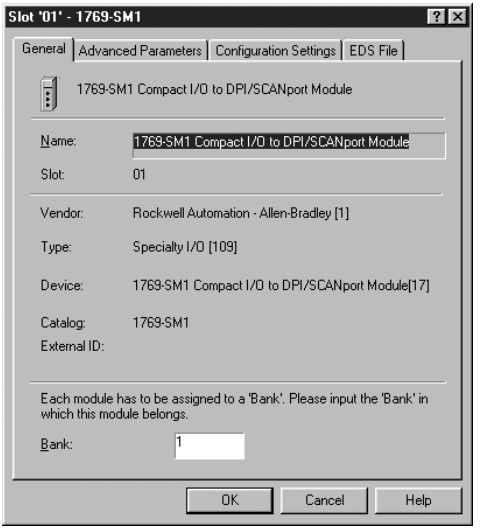
Figure 7.5 1769-ADN Adapter Module Configuration Tab Screen



The EDS file for the 1769-SM1 module is needed to configure the remote 1769-ADN DeviceNet system. If the 1769-SM1 (shown in Figure 7.5) is not listed as a selection, you will need to download the file from the Internet. For more information, refer to Registering the 1769-SM1 EDS File on page 7-10.

3. Select the 1769-SM1 and click on the Properties command button above the Module Type column. A screen similar to Figure 7.6 will appear.

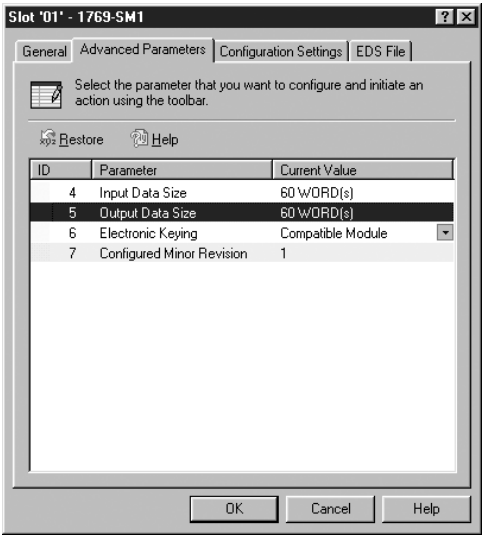
Figure 7.6 1769-SM1 Module General Properties Screen



Enter a "1" for the Bank, and click **OK**.

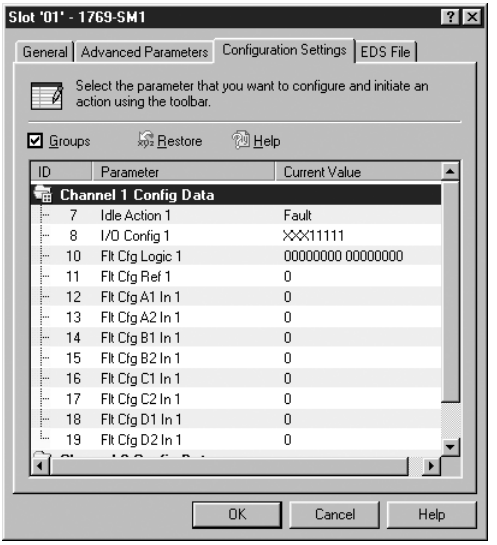
4. Select the Advanced Parameters tab (Figure 7.7). Refer to Chapter 4, Understanding the I/O Image regarding the Input and Output Data Sizes. In the ladder example, the Input and Output Data Sizes are set for 60 words each to allow for Logic Command/Reference, Logic Status/Feedback, and all Datalinks enabled.

Figure 7.7 1769-SM1 Module Advanced Parameters Tab Screen



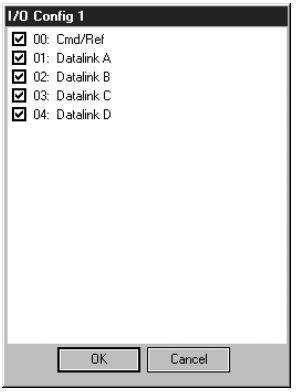
5. Select the Configuration Settings tab. Each channel has a folder that contains its configuration data. Click on the Channel 1 folder (Figure 7.8).

Figure 7.8 1769-SM1 Module Configuration Settings Screen



6. Double-click the "I/O Config 1" setting to display its edit screen (Figure 7.9).

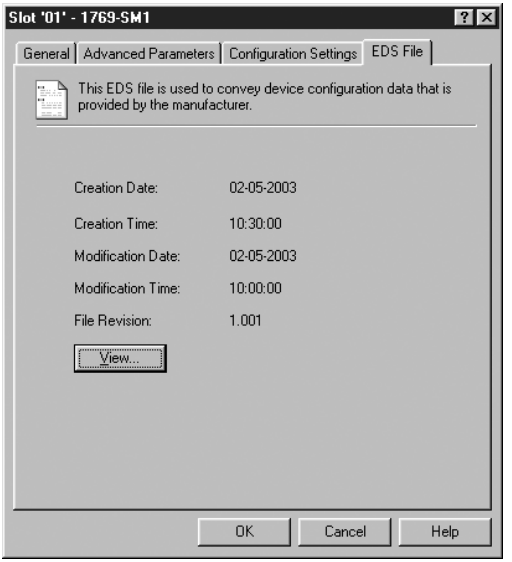
Figure 7.9 1769-SM1 Channel 1 I/O Config Edit Screen



For the ladder example, enable all items in the I/O configuration and click **OK**. Select the same for I/O Config 2 and I/O Config 3.

7. Select the EDS File tab (Figure 7.10). This screen is informational and provides a way to view the EDS file for the 1769-SM1 if desired.

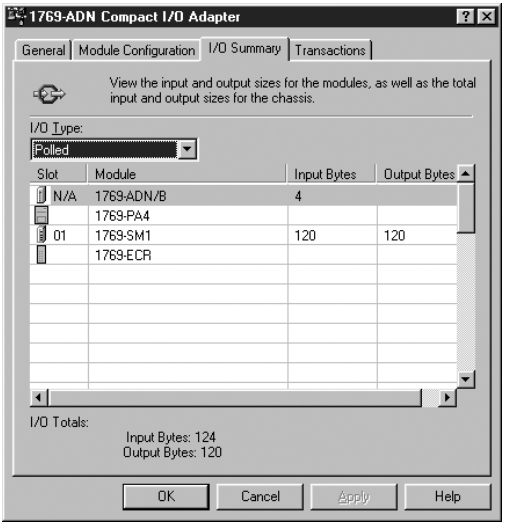
Figure 7.10 1769-SM1 Module EDS File Tab Screen



Click **OK** to complete the 1769-SM1 configuration. The 1769-ADN Adapter Module Configuration Tab screen (Figure 7.5) reappears.

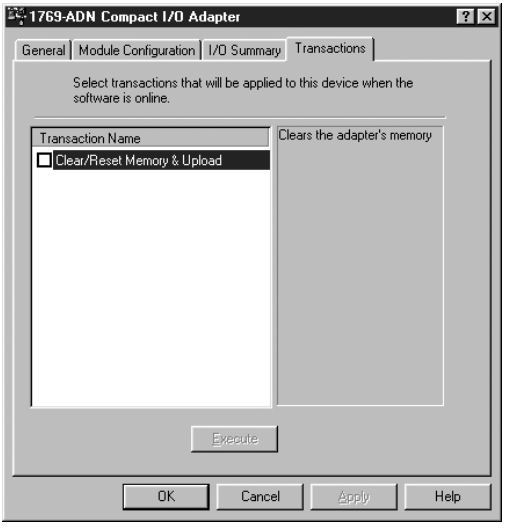
8. Select the I/O Summary tab (Figure 7.11). The 1769-ADN uses 4 Input Bytes and the 1769-SM1 has been configured for 120 bytes (60 words) of Input and Output data. The I/O Summary in Figure 7.11 is needed for the example ladder program.

Figure 7.11 1769-ADN Adapter I/O Summary Tab Screen



9. Select the Transactions tab (Figure 7.12). This tab provides the means to clear the adapter's memory.

Figure 7.12 1769-ADN Adapter Transactions Tab Screen

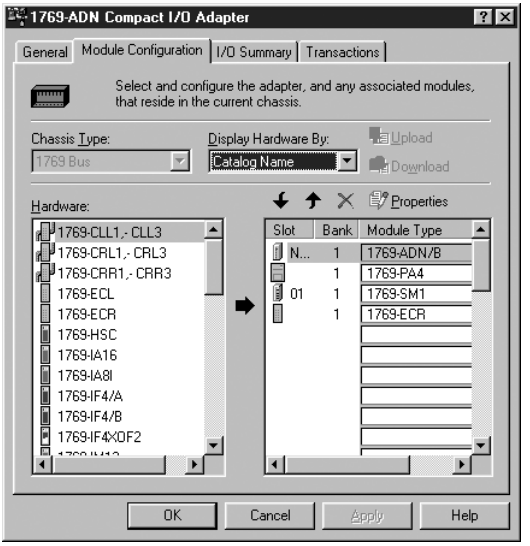


Click **OK** to complete the configuration.

Registering the 1769-SM1 EDS File

The 1769-SM1 EDS File is needed to configure the remote 1769-ADN DeviceNet system. If the 1769-SM1 (shown in Figure 7.13) is not listed as a selection in the Hardware list, the file will need to be downloaded from the Internet and registered using the EDS Wizard.

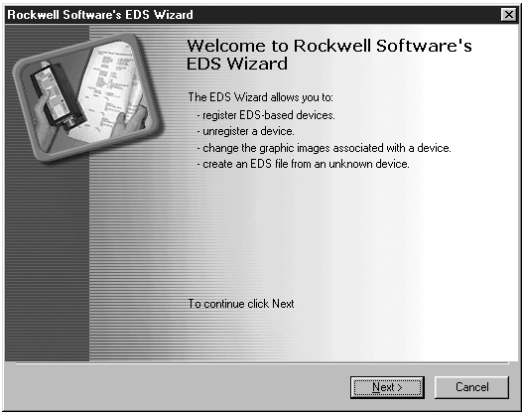
Figure 7.13 1769-ADN Adapter Module Configuration Tab Screen



1. Download the EDS file from www.ab.com/drives or www.ab.com/networks/eds to your computer hard drive.

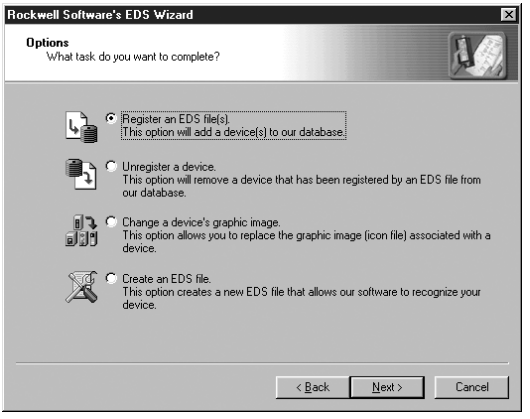
2. Using RSNetWorx for DeviceNet, click on **Tools > EDS Wizard** to launch the EDS Wizard (Figure 7.14), and click **Next >**.

Figure 7.14 EDS Wizard Welcome Screen



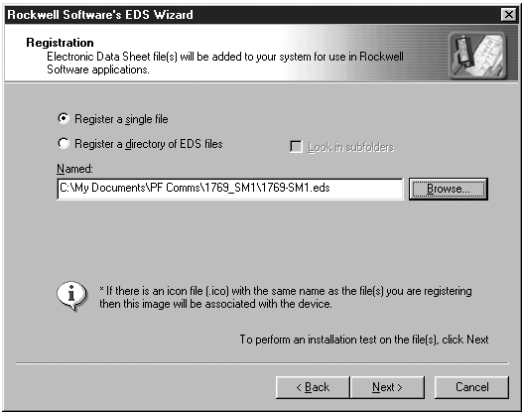
3. The EDS Wizard Task screen (Figure 7.15) appears. Select **Register an EDS file(s)** and click **Next >**.

Figure 7.15 EDS Wizard Task Screen



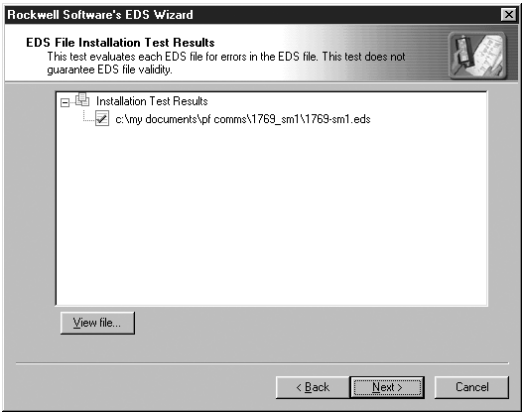
4. The EDS Wizard Registration screen (Figure 7.16) appears. Select **Register a single file** and locate the EDS file on your computer hard drive (downloaded in Step 1) using the **Browse** command button. Click **Next >**.

Figure 7.16 EDS Wizard Registration Screen



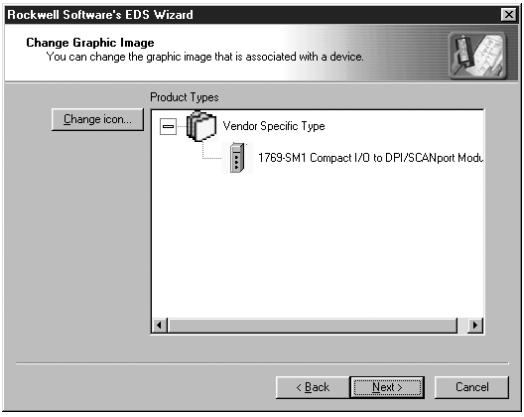
5. The EDS file is installed and tested (Figure 7.17). Click **Next >**.

Figure 7.17 EDS Wizard Installation Test Screen



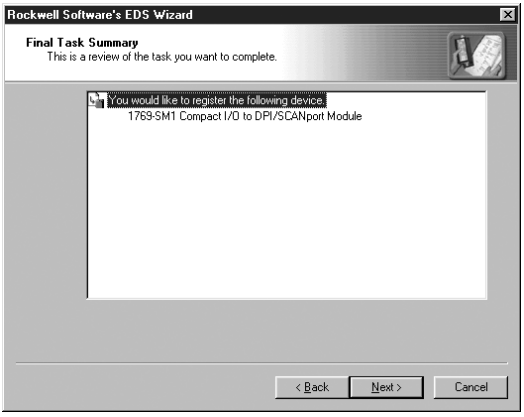
6. The EDS Wizard enables the icon associated with the EDS file to be changed if desired (Figure 7.18). Click **Next >**.

Figure 7.18 EDS Wizard Change Graphic Image Screen



7. The EDS Wizard Final Task Summary screen (Figure 7.19) appears. Click **Next >** to register the 1769-SM1.

Figure 7.19 EDS Wizard Final Task Summary Screen



8. The EDS Wizard is now finished (Figure 7.20). Click **Finish**.

Figure 7.20 EDS Wizard Finish Screen

Earlier versions of RSNetWorx for DeviceNet require you to close and restart RSNetWorx to enable the 1769-SM1 to appear in the 1769-ADN Module Configuration tab (Figure 7.13). If you do not see the 1769-SM1 in the Hardware list, close and restart RSNetWorx for DeviceNet.

PowerFlex 70 Settings

The PowerFlex 70 drives used in the example program have the following parameter settings:

Parameter		Setting	Description
No.	Name		
90	Speed Ref A Sel	19	“DPI Port 2”
300	Data In A1	140	Parameter 140 - [Accel Time 1]
301	Data In A2	142	Parameter 142 - [Decel Time 1]
302	Data In B1	100	Parameter 100 - [Jog Speed]
303	Data In B2	155	Parameter 155 - [Stop Mode A]
304	Data In C1	101	Parameter 101 - [Preset Speed 1]
305	Data In C2	102	Parameter 102 - [Preset Speed 2]
306	Data In D1	103	Parameter 103 - [Preset Speed 3]
307	Data In D2	104	Parameter 104 - [Preset Speed 4]
310	Data Out A1	140	Parameter 140 - [Accel Time 1]
311	Data Out A2	142	Parameter 142 - [Decel Time 1]
312	Data Out B1	100	Parameter 100 - [Jog Speed]
313	Data Out B2	155	Parameter 155 - [Stop Mode A]
314	Data Out C1	101	Parameter 101 - [Preset Speed 1]
315	Data Out C2	102	Parameter 102 - [Preset Speed 2]
316	Data Out D1	103	Parameter 103 - [Preset Speed 3]
317	Data Out D2	104	Parameter 104 - [Preset Speed 4]

Note that the Data Out settings are set to match the respective Data In settings for demonstration purposes only. This allows read/write capability for the eight parameters selected and provides the ability to verify that a change was made to a parameter value.

1769-SM1 Settings

The 1769-SM1 used in the example program has the following parameter settings:

Parameter		Setting	Description
No.	Name		
07	I/O Config 1	11111	CH1 Command/Status and all Datalinks are enabled
24	I/O Config 2	11111	CH2 Command/Status and all Datalinks are enabled
41	I/O Config 3	11111	CH3 Command/Status and all Datalinks are enabled

Note that the module must be reset using **Parameter 02 - [Reset Module]** before these parameter settings take effect.

Refer to Chapter 4 for information about the I/O Image layout, Channel Enable/Status, Logic Command/Status, Reference/Feedback, and Datalinks.

ControlLogix w/1769-ADN Example Program

Figure 7.21 ControlLogix Ladder Logic Main Program

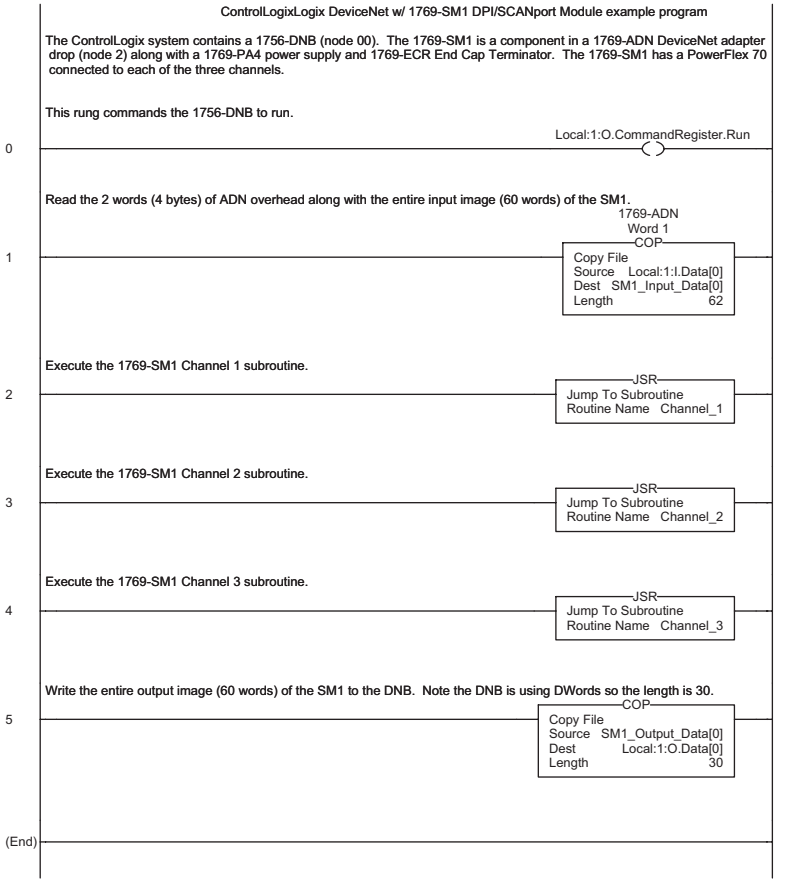


Figure 7.22 ControlLogix Ladder Logic Channel 1 Subroutine

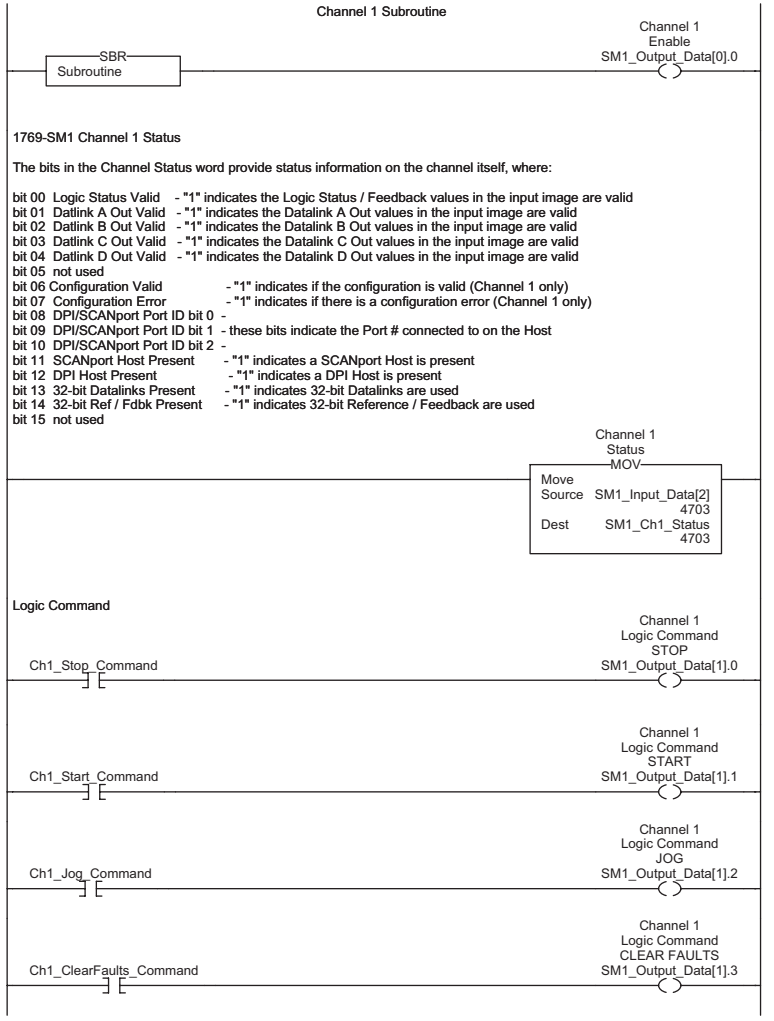


Figure 7.22 ControlLogix Ladder Logic Channel 1 Subroutine (Continued)

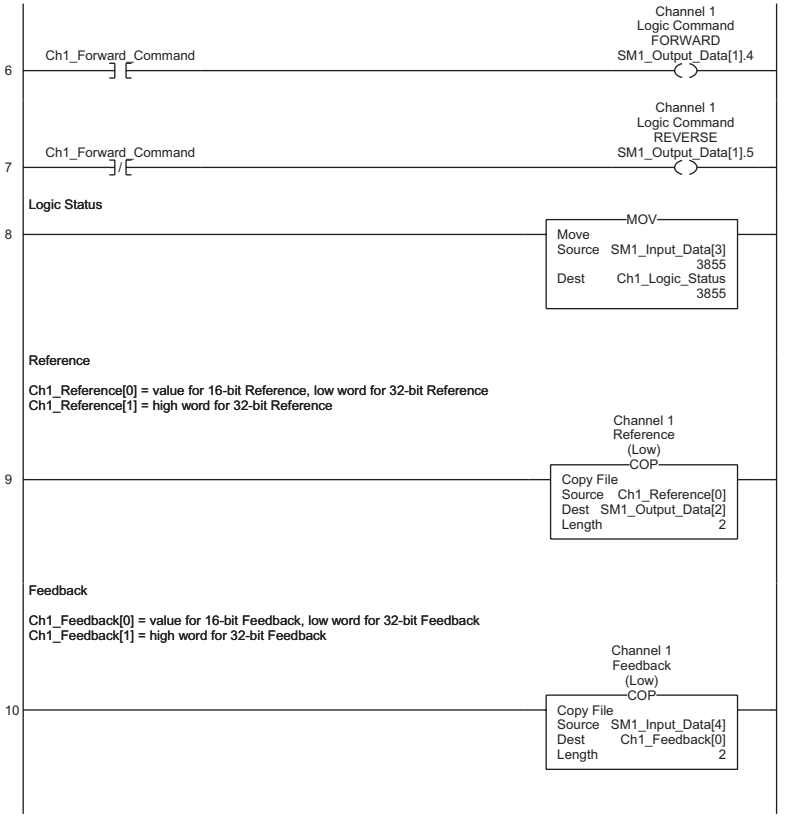


Figure 7.22 ControlLogix Ladder Logic Channel 1 Subroutine (Continued)

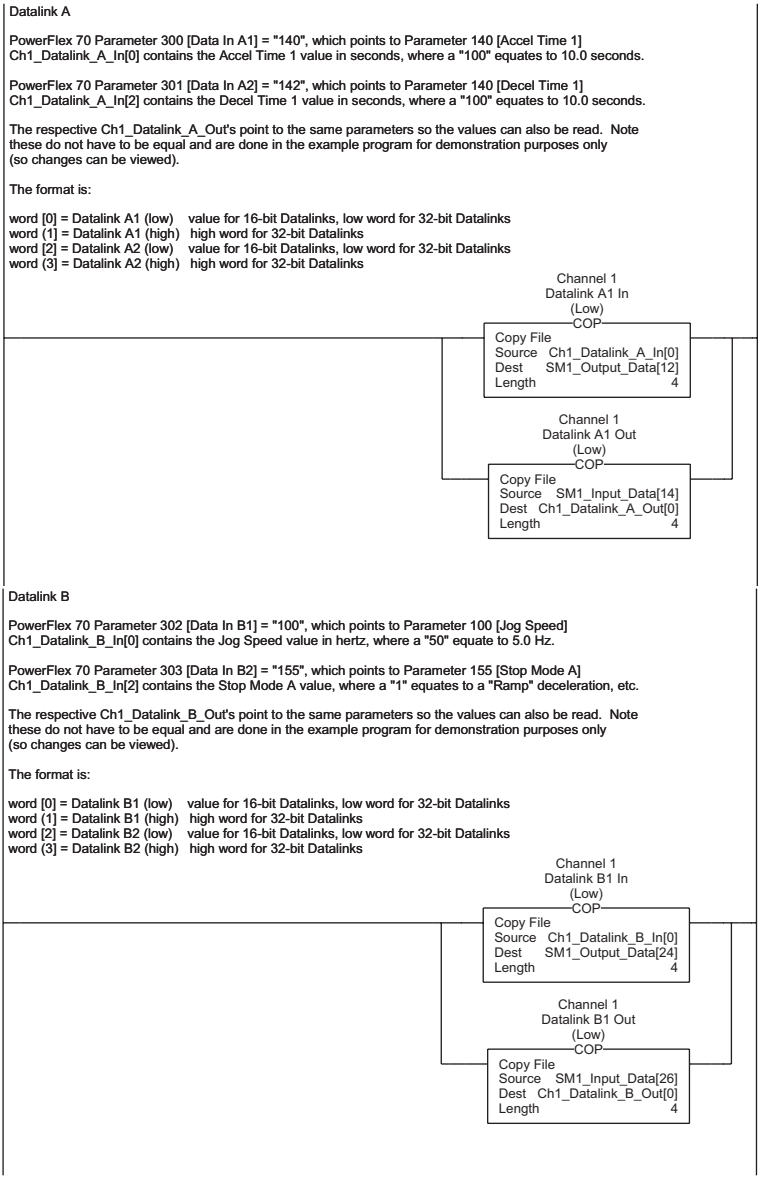
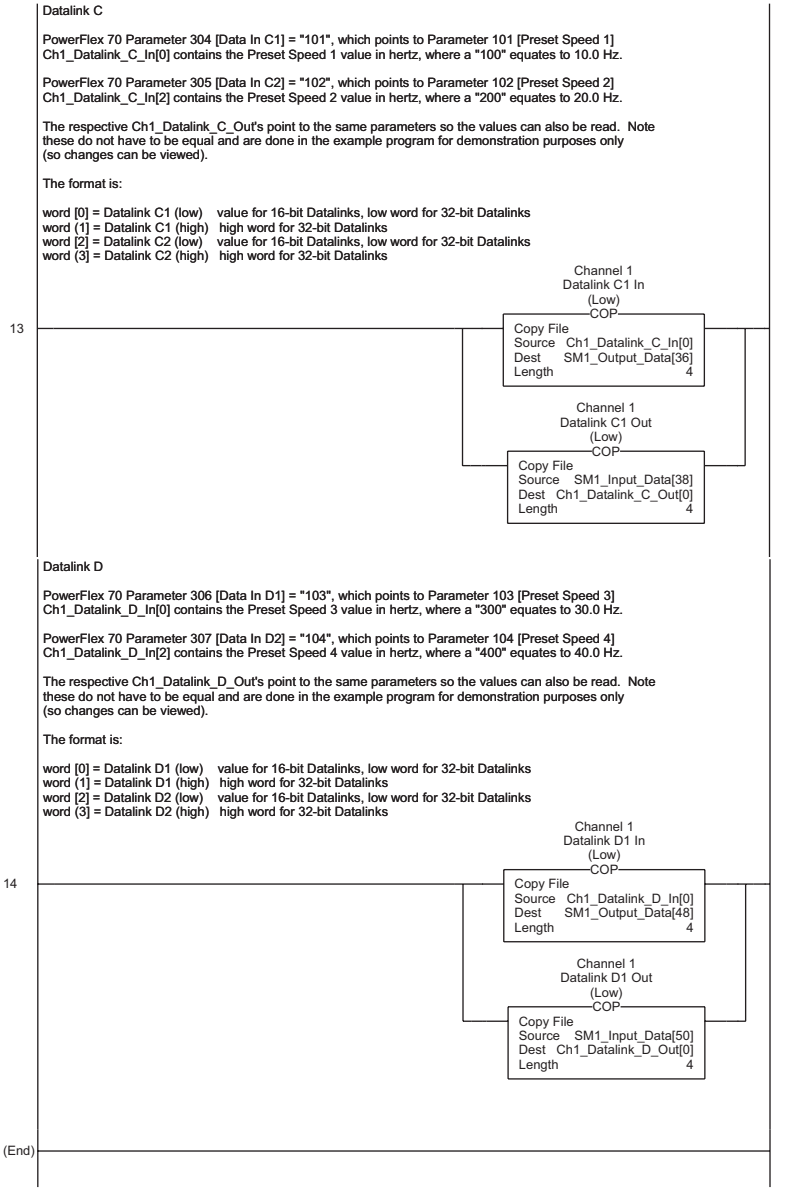


Figure 7.22 ControlLogix Ladder Logic Channel 1 Subroutine (Continued)

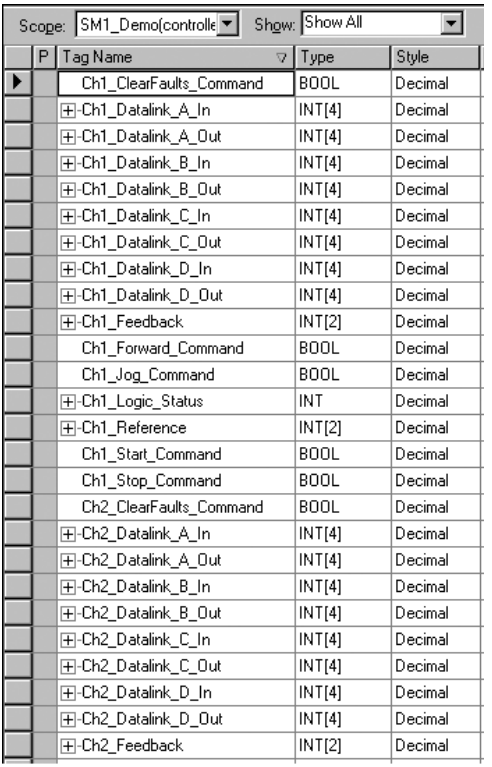


Channel 2 and Channel 3 ladder subroutines are similar to the Channel 1 subroutine and are not provided.

Example Program Data Table

In this example program, the following controller tags are used:

Figure 7.23 Controller Tags



Scope: SM1_Demo(controlle Show: Show All

P	Tag Name	Type	Style
	Ch1_ClearFaults_Command	BOOL	Decimal
	+Ch1_Datalink_A_In	INT[4]	Decimal
	+Ch1_Datalink_A_Out	INT[4]	Decimal
	+Ch1_Datalink_B_In	INT[4]	Decimal
	+Ch1_Datalink_B_Out	INT[4]	Decimal
	+Ch1_Datalink_C_In	INT[4]	Decimal
	+Ch1_Datalink_C_Out	INT[4]	Decimal
	+Ch1_Datalink_D_In	INT[4]	Decimal
	+Ch1_Datalink_D_Out	INT[4]	Decimal
	+Ch1_Feedback	INT[2]	Decimal
	Ch1_Forward_Command	BOOL	Decimal
	Ch1_Jog_Command	BOOL	Decimal
	+Ch1_Logic_Status	INT	Decimal
	+Ch1_Reference	INT[2]	Decimal
	Ch1_Start_Command	BOOL	Decimal
	Ch1_Stop_Command	BOOL	Decimal
	Ch2_ClearFaults_Command	BOOL	Decimal
	+Ch2_Datalink_A_In	INT[4]	Decimal
	+Ch2_Datalink_A_Out	INT[4]	Decimal
	+Ch2_Datalink_B_In	INT[4]	Decimal
	+Ch2_Datalink_B_Out	INT[4]	Decimal
	+Ch2_Datalink_C_In	INT[4]	Decimal
	+Ch2_Datalink_C_Out	INT[4]	Decimal
	+Ch2_Datalink_D_In	INT[4]	Decimal
	+Ch2_Datalink_D_Out	INT[4]	Decimal
	+Ch2_Feedback	INT[2]	Decimal

Figure 7.23 Controller Tags (Continued)

Scope: SM1_Demo(controlle Show: Show All

P	Tag Name	Type	Style
	Ch2_Forward_Command	BOOL	Decimal
	Ch2_Jog_Command	BOOL	Decimal
	⊞-Ch2_Logic_Status	INT	Decimal
	⊞-Ch2_Reference	INT[2]	Decimal
	Ch2_Start_Command	BOOL	Decimal
	Ch2_Stop_Command	BOOL	Decimal
	Ch3_ClearFaults_Command	BOOL	Decimal
	⊞-Ch3_Datalink_A_In	INT[4]	Decimal
	⊞-Ch3_Datalink_A_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_B_In	INT[4]	Decimal
	⊞-Ch3_Datalink_B_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_C_In	INT[4]	Decimal
	⊞-Ch3_Datalink_C_Out	INT[4]	Decimal
	⊞-Ch3_Datalink_D_In	INT[4]	Decimal
	⊞-Ch3_Datalink_D_Out	INT[4]	Decimal
	⊞-Ch3_Feedback	INT[2]	Decimal
	Ch3_Forward_Command	BOOL	Decimal
	Ch3_Jog_Command	BOOL	Decimal
	⊞-Ch3_Logic_Status	INT	Decimal
	⊞-Ch3_Reference	INT[2]	Decimal
	Ch3_Start_Command	BOOL	Decimal
	Ch3_Stop_Command	BOOL	Decimal

	⊞-Local:1:I	AB:1756_D...		
	⊞-Local:1:O	AB:1756_D...		
	⊞-Local:1:S	AB:1756_D...		
	⊞-SM1_Ch1_Status	INT	Decimal	Channel 1 Status
	⊞-SM1_Ch2_Status	INT	Decimal	Channel 2 Status
	⊞-SM1_Ch3_Status	INT	Decimal	Channel 3 Status
	⊞-SM1_Input_Data	INT[62]	Decimal	1769-SM1 Input Image
▶	⊞-SM1_Output_Data	INT[60]	Decimal	1769-SM1 Output Image
*				

An example of Channel 1 data table values are shown in Figure 7.24:

Figure 7.24 Channel 1 Values

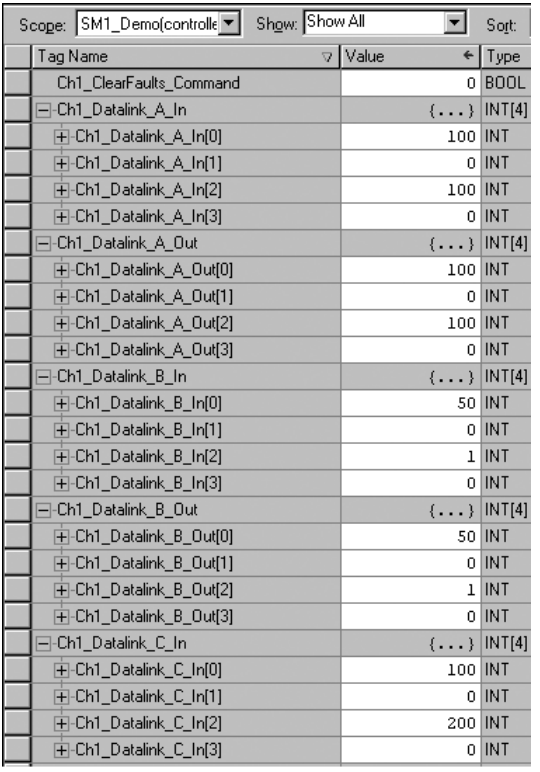


Figure 7.24 Channel 1 Values (Continued)

Scope: SM1_Demo(controlle Show: Show All Sort:

Tag Name	Value	Type
Ch1_Datalink_C_Out[0]	100	INT
Ch1_Datalink_C_Out[1]	0	INT
Ch1_Datalink_C_Out[2]	200	INT
Ch1_Datalink_C_Out[3]	0	INT
Ch1_Datalink_D_In	{...}	INT[4]
Ch1_Datalink_D_In[0]	300	INT
Ch1_Datalink_D_In[1]	0	INT
Ch1_Datalink_D_In[2]	400	INT
Ch1_Datalink_D_In[3]	0	INT
Ch1_Datalink_D_Out	{...}	INT[4]
Ch1_Datalink_D_Out[0]	300	INT
Ch1_Datalink_D_Out[1]	0	INT
Ch1_Datalink_D_Out[2]	400	INT
Ch1_Datalink_D_Out[3]	0	INT
Ch1_Feedback	{...}	INT[2]
Ch1_Feedback[0]	8192	INT
Ch1_Feedback[1]	0	INT
Ch1_Forward_Command	1	BOOL
Ch1_Jog_Command	0	BOOL
Ch1_Logic_Status	3855	INT
Ch1_Reference	{...}	INT[2]
Ch1_Reference[0]	8192	INT
Ch1_Reference[1]	0	INT
Ch1_Start_Command	1	BOOL
Ch1_Stop_Command	0	BOOL

Channel 2 and 3 data table values are not shown, but are similar to Channel 1 data.

Note that since PowerFlex 70 drives, which use 16-bit Reference/ Feedback and Datalinks, are used in the example, the data is contained in the low word for each item.

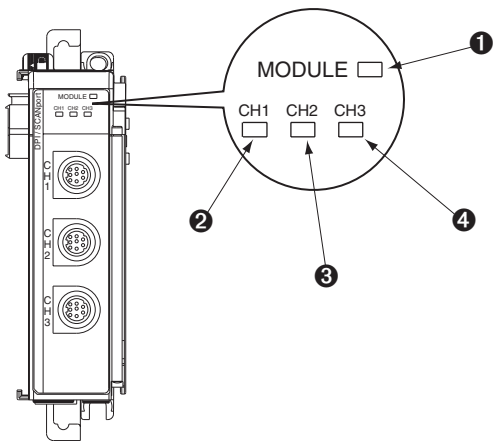
Troubleshooting

Chapter 8 provides information for troubleshooting potential problems with the 1769-SM1 module and network.

Locating the Status Indicators

The 1769-SM1 module has four status indicators. They can be viewed on the front of the module. See Figure 8.1.

Figure 8.1 Status Indicators



Item	Status Indicator	Description	Page
❶	MODULE	Module Status	8-2
❷	CH1	Channel 1 Status	8-3
❸	CH2	Channel 2 Status	8-3
❹	CH3	Channel 3 Status	8-3

MODULE Status Indicator

The MODULE status indicator is a bicolor (red and green) LED.

Status	Cause	Corrective Action
Off	The 1769-SM1 module is not powered.	Apply power to the 1769-SM1 module.
Flashing Red	The 1769-SM1 module's configuration data is not valid.	• Change the controller configuration data to valid settings. • Reset the 1769-SM1 module parameters to their default settings, and then reset the 1769-SM1.
Solid Red	The 1769-SM1 module was unable to establish communication with the controller.	Cycle power to the controller.
Flashing Green	The 1769-SM1 module is establishing communications with the controller.	Normal behavior – no action required.
Solid Green	The 1769-SM1 module has established communications with the controller.	Normal behavior – no action required.
Flashing Red/Green	The 1769-SM1 module is in boot mode.	Flash download the application code to the 1769-SM1 module.
Orange	The 1769-SM1 module is in reset.	• Cycle power to the controller. • Replace the 1769-SM1 module.

CH1 - CH3 Status Indicators

The CH1, CH2, and CH3 status indicators are bicolor (red and green) LEDs.

Status	Cause	Corrective Action
Off	The 1769-SM1 module is not powered. The channel is not connected to a DPI or SCANport-supported drive. The port ID is not valid.	• Apply power to the 1769-SM1 module. • Apply power to the DPI or SCANport-supported drive. • Connect the 1769-SM1 module to the drive using a 1202-C* communications cable.
Flashing Red	An error occurred during the initialization/logon sequence. A ping timeout error occurred. A status timeout error occurred. The channel was enabled to pass I/O to the drive, and then was disabled.	• Verify that the 1202-C* communications cable is securely connected. • Cycle power to the drive. • Avoid disabling a channel after enabling it to pass I/O.
Solid Red	The drive has refused an I/O connection from the 1769-SM1 module. Another peripheral is using the same DPI/SCANport port as the 1769-SM1 module. The DPI/SCANport port number has changed or is not valid. A CAN bus-off error occurred.	**Important:** Cycle power to the drive after making any of the following corrections: • Verify that all 1202-C* communications cables are securely connected and not damaged. Replace cables if necessary. • Verify that the drive supports Datalinks. • Configure the 1769-SM1 module to use a Datalink that is not already being used by another peripheral.
Flashing Green	The channel is connected to a drive, but I/O data is not being passed between the controller and drive.	No action required. Normal behavior if I/O is not enabled.
Solid Green	The channel is connected to a drive, and I/O data is being passed between the controller and drive.	No action required.

Viewing Module Diagnostic Items

The following 1769-SM1 module diagnostic items can be viewed using DriveExplorer (version 3.01 or higher) software, or a PowerFlex LCD HIM (Diagnostics/Device Items).

No.	Name	Description
1	Common Logic Cmd	Current value of the Common Logic Command being transmitted to the drive by this module.
2	Prod Logic Cmd	Current value of the product-specific Logic Command being transmitted to the drive by this module.
3	Reference	Current value of the product-specific Reference being transmitted to the drive by this module.
4	Common Logic Sts	Current value of the Common Logic Status being received from the drive by this module.
5	Prod Logic Sts	Current value of the product-specific Logic Status being received from the drive by this module.
6	Feedback	Current value of the product-specific Feedback being received from the drive by this module.
7 8 9 10 11 12 13 14	Datalink A1 In Datalink A2 In Datalink B1 In Datalink B2 In Datalink C1 In Datalink C2 In Datalink D1 In Datalink D2 In	Current value of respective Datalink In being transmitted to the drive by this module. (If not using a Datalink, this parameter should have a value of zero.)
15 16 17 18 19 20 21 22	Datalink A1 Out Datalink A2 Out Datalink B1 Out Datalink B2 Out Datalink C1 Out Datalink C2 Out Datalink D1 Out Datalink D2 Out	Current value of respective Datalink Out being received from the drive by this module. (If the drive indicates a 16-bit datalink size, the value appears in the least significant 16 bits of this diagnostic item, and the most significant 16 bits of this diagnostic item is zero.)
23	DPI Rx Errors	Current value of the DPI CAN Receive Error Counter register.
24	DPI Rx Error Max	Maximum value of the DPI CAN Receive Error Counter register. (If the associated CAN controller does not provide the maximum error value, the module will periodically poll the error counter register and report the maximum value it has read in this diagnostic instance.)
25	DPI Tx Errors	Current value of the DPI CAN Transmit Error Counter register.
26	DPI Tx Error Max	Maximum value of the DPI CAN Transmit Error Counter register. (If the associated CAN controller does not provide the maximum error value, the module will periodically poll the error counter register and report the maximum value it has read in this diagnostic instance.)
27	Flash Count	Number of times the boot or application firmware in the module has been flash updated.
28	I/O Image Size	Number of words being used in the I/O image.

Diagnostic items are available for each individual channel.

Viewing and Clearing Events

The 1769-SM1 module maintains an event queue that reports the history of its actions. You can view the event queue using a PowerFlex LCD HIM, DriveExplorer (version 3.01 or higher) software, or DriveExecutive (version 1.01 or higher) software.

To view and clear events

Step	Keys	Example Screen
Viewing Events		
1. Access parameters in the 1769-SM1 module. Refer to Using the PowerFlex HIM on page 3-14.		Main Menu: Diagnostics Parameter Device Select
2. Press the Up Arrow or Down Arrow to scroll to **Diagnostics**.		
3. Press Enter to display the Diagnostics menu in the 1769-SM1.		Event Q: 1 E3 Ping Time Flt
4. Repeat steps 2 and 3 to enter the **Events** option and then **View Event Queue** option.		
5. Press the Up Arrow or Down Arrow to scroll through the events. The most recent event is Event 1.		
Clearing Events		
1. Access parameters in the 1769-SM1 module. Refer to Using the PowerFlex HIM on page 3-14.		
2. Press the Up Arrow or Down Arrow to scroll to **Diagnostics**.		
3. Press Enter to display the Diagnostics menu in the 1769-SM1.		
4. Repeat steps 2 and 3 to enter the **Events** option and then the **Clear Event** option or **Clr Event Queue** option. A message will pop up to confirm that you want to clear the message or queue.		Dgn: Events View Event Queue Clear Event Clr Event Queue
5. Press Enter to clear all events out of the event queue. All event queue entries will then display “No Event.”		

Events

Many events in the Event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Allen-Bradley personnel troubleshoot the problem. The following events may appear in the event queue:

Code	Event	Description
1	No Event	Empty event queue entry.
2	DPI Bus Off Flt	A bus-off condition was detected on DPI. This event may be caused by loose or broken cables or by noise.
3	Ping Time Flt	A ping message was not received on DPI within the specified time.
4	Port ID Flt	The debounced DPI Pin ID is read as zero or seven after the module has completed startup.
5	Port Change Flt	The debounced DPI Pin ID has changed after the module has completed startup.
6	Host Sent Reset	The drive sent a reset event message.
7	EEPROM Sum Flt	The startup sequence detected corrupt EEPROM storage in the module.
8	Online @ 125 kbps	The module detected that the drive is communicating at 125 kbps.
9	Online @ 500 kbps	The module detected that the drive is communicating at 500 kbps.
10	Bad Host Flt	The module is connected to an incompatible drive.
11	Dup. Port Flt	Another peripheral with the same port number is already in use.
12	Type 0 Login	The module has logged in for type 0 control.
13	Type 0 Time Flt	The module has not received a type 0 status message within the specified time.
14	DL Login	The module has logged in for a Datalink.
15	DL Reject Flt	The drive rejected an attempt to log in to a Datalink because the Datalink is not supported or is used by another peripheral.
16	DL Time Flt	The module has not received a Datalink message within the specified time.
17	Reserved	—
18	Control Disabled	The module has sent a “Soft Control Disable” command to the drive.
19	Control Enabled	The module has sent a “Soft Control Enable” command to the drive.
20	Message Timeout	A Client-Server message sent by the module was not completed.
21	Flt Cfg Error	The module detected a 32-bit fault configuration reference or Datalink when the drive expects a 16-bit value.
22	App Updated	Startup sequence detected new application firmware in the flash candidate area.
23	Net Comm Fault	The module detected a communications fault on the network.
24	Net Sent Reset	The module received a reset from the network.
25	Net Close Flt	An I/O connection from the network to the module was closed.

Code	Event	Description
26	Net Idle Flt	The module is receiving “Idle” packets from the network.
27	Net Open	An I/O connection from the network to the module was opened.
28	Net Timeout Flt	An I/O connection from the network to the module has timed out.
29	Watchdog T/O Flt	The software watchdog detected a failure.
30	EEPROM Init	Startup sequence detected a blank EEPROM map revision.
31	Normal Startup	The module successfully started up.
32	Manual Reset	The module was reset by the user.

Notes:

Specifications

Appendix A presents the specifications for the 1769-SM1 module.

Communications

Drive	
Protocol	DPI or SCANport
Data Rates	125 kbps or 500 kbps

Electrical

Consumption	
Module	280 mA @ 5 Vdc and 0 mA @ 24 Vdc supplied by the Compact I/O power supply
Channel	60 mA @ 12 Vdc per channel supplied by the DPI or SCANport host
Power Supply Distance Rating	6 (The 1769-SM1 may not be more than 6 modules away from the power supply.)

Mechanical

Dimensions	
Height	118 mm (4.65 inches)
Depth	87 mm (3.43 inches)
Width	35 mm (1.38 inches)
Weight	142g (5 oz.)

Environmental

Temperature	
Operating	-10 to 50°C (14 to 122°F)
Storage	-40 to 85°C (-40 to 185°F)
Relative Humidity	-5 to 95% non-condensing
Atmosphere	**Important:** The 1769-SM1 must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors, or dust. If the module is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.
Shock	
Operational	30g, 11 ms
Non-operational	50g, 11 ms
Vibration	
Operational	5g, 10 to 500 Hz.
Non-operational	5g, 5 to 2000 Hz.

Regulatory Compliance

UL	UL508C
cUL	CAN / CSA C22.2 No. 14-M91
CE	EN50081-2 and EN61000-6-2
CTick	AS/NZS 2064, 1997, Group 1, Class A

NOTE: In order to remain CE and CTick compliant, the DPI/SCANport cable length may not exceed 10 m (32.8 ft.).

NOTE: In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.

DPI/SCANport Cable Requirements/Recommendations

Maximum cable distance between the 1769-SM1 and connected device:

SCANport Host (1336, 1305, etc.)	10 m (32.8 ft.)
DPI Host (PowerFlex, etc.)	75 m (246 ft.) with 500 kbps DPI data rate 100 m (328 ft.) with 125 kbps DPI data rate

- The maximum cable length is the SUM of all connected cables between the drive and peripheral(s). This includes all cables connected via the DPI Screw Terminal cable, 1203-S03 splitter cable, and 1203-SG2/1203-SG4 expander modules.
- Installer must follow common system wiring practices and route cables away from sources of EMI.
- 1202-Hxx Extension cables are recommended for extending the 1202-Cxx cable length.

Module Parameters

Appendix B provides information about the parameters of the 1769-SM1 module.

About Parameter Numbers

The parameters in the 1769-SM1 module are numbered consecutively.

Configuration Tool	Numbering Scheme
• DriveExplorer • DriveExecutive • HIM	The 1769-SM1 parameters begin with parameter 01. For example, **Parameter 01 - [Config Mode]** is parameter 01 as indicated by this manual.

TIP: All 1769-SM1 module parameters except **Parameters 01 - [Config Mode]** and **02 - [Reset Module]** are grouped by module channel number (CH1, CH2, and CH3). The parameter names include a suffix number that corresponds with its assigned channel.

Parameter List

Parameter No.	Name and Description	Details	
01	**[Config Mode]** Displays the module's configuration mode set with the Configuration Mode switch (Figure 2.1).	Default: Values: Type:	0 = Controller 0 = Controller 1 = Parameter Read Only

Parameter No.	Name and Description	Details
02	**[Reset Module]** No action if set to "Ready." Resets the module if set to "Reset Module." Restores the module to its factory default settings if set to "Set Defaults." This parameter is a command. It will be reset to "0 = Ready" after the command has been performed.	Default: 0 = Ready Values 0 = Ready 1 = Reset Module 2 = Set Defaults Type: Read/Write Reset Required: No

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting I/O that controls the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting the module.

03	**[Port ID 1]** Displays the port number to which CH1 is connected.	Default: 0 Minimum: 0 Maximum: 7 Type: Read Only
04	**[Data Rate 1]** Displays the data rate used by the CH1 drive. This data rate is set in the drive, and the module detects it.	Default: 0 = 125 kbps Values: 0 = 125 kbps 1 = 500 kbps Type: Read Only
05	**[Ref/Fbk Size 1]** Displays the size of the Reference and Feedback for the CH1 drive. The drive determines the size of the Reference and Feedback.	Default: 0 = 16-bit Value: 0 = 16-bit 1 = 32-bit Type: Read Only
06	**[Datalink Size 1]** Displays the size of each Datalink word for the CH1 drive. The drive determines the size of Datalinks.	Default: 0 = 16-bit Values: 0 = 16-bit 1 = 32-bit Type: Read Only
07	**[I/O Config 1]** Sets the I/O that is transferred through the module to the CH1 drive.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read/Write Reset Required: Yes

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

08	**[I/O Actual 1]** Displays the Reference/Feedback and Datalinks actively transmitted by the module for the CH1 drive. The value of this parameter will usually be equal to the value of **Parameter 07 - [I/O Config 1]**.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read Only

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

Parameter No.	Name and Description	Details
09	**[Idle Action 1]** Sets the action that the module and CH1 drive take if the module detects that the controller was switched to program mode. This setting is effective only if I/O that controls the drive is transmitted through the module.	Default: 0 = Fault Values: 0 = Fault 1 = Stop (DPI only) 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Type: Read/Write Reset Required: No
	 **ATTENTION:** Risk of injury or equipment damage exists. **Parameter 09 - [Idle Action 1]** lets you determine the action of the module and connected drive if the controller is idle. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. The "Stop" Idle Action is not supported for SCANport connected channels. If this setting is used, the "Fault" action will be used instead.	
10	**[Flt Cfg Logic 1]** Sets the Logic Command data that is sent to the CH1 drive if **Parameter 09 - [Idle Action 1]** is set to "Send Flt Cfg" and the controller is put into Program or Test mode. The bit definitions will depend on the drive that is connected to the module.	Default: 0000 0000 0000 0000 Minimum: 0000 0000 0000 0000 Maximum: 1111 1111 1111 1111 Type: Read/Write Reset Required: No
11	**[Flt Cfg Ref 1]** Sets the Reference data that is sent to the CH1 drive if **Parameter 09 - [Idle Action 1]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.
12 13 14 15 16 17 18 19	**[Flt Cfg A1 In1]** **[Flt Cfg A2 In1]** **[Flt Cfg B1 In1]** **[Flt Cfg B2 In1]** **[Flt Cfg C1 In1]** **[Flt Cfg C2 In1]** **[Flt Cfg D1 In1]** **[Flt Cfg D2 In1]** Sets the data that is sent to the Datalink in the CH1 drive if **Parameter 09 - [Idle Action 1]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses 16-bit Datalinks, the most significant word of this value must be set to zero (0) or a fault will occur.
20	**[Port ID 2]** Displays the port number to which CH2 is connected.	Default: 0 Minimum: 0 Maximum: 7 Type: Read Only

Parameter No.	Name and Description	Details
21	**[Data Rate 2]** Displays the data rate used by the CH2 drive. This data rate is set in the drive, and the module detects it.	Default: 0 = 125 kbps Values: 0 = 125 kbps 1 = 500 kbps Type: Read Only
22	**[Ref/Fbk Size 2]** Displays the size of the Reference and Feedback for the CH2 drive. The drive determines the size of the Reference and Feedback.	Default: 0 = 16-bit Value: 0 = 16-bit 1 = 32-bit Type: Read Only
23	**[Datalink Size 2]** Displays the size of each Datalink word for the CH2 drive. The drive determines the size of Datalinks.	Default: 0 = 16-bit Values: 0 = 16-bit 1 = 32-bit Type: Read Only
24	**[I/O Config 2]** Sets the I/O that is transferred through the module to the CH2 drive.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read/Write Reset Required: Yes

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

25	**[I/O Actual 2]** Displays the Reference/Feedback and Datalinks actively transmitted by the module for the CH2 drive. The value of this parameter will usually be equal to the value of **Parameter 24 - [I/O Config 2]**.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read Only

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

Parameter No.	Name and Description	Details
26	**[Idle Action 2]** Sets the action that the module and CH2 drive take if the module detects that the controller was switched to program mode. This setting is effective only if I/O that controls the drive is transmitted through the module.	Default: 0 = Fault Values: 0 = Fault 1 = Stop (DPI only) 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Type: Read/Write Reset Required: No
	 **ATTENTION:** Risk of injury or equipment damage exists. **Parameter 26 - [Idle Action 2]** lets you determine the action of the module and connected drive if the controller is idle. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. The "Stop" Idle Action is not supported for SCANport connected channels. If this setting is used, the "Fault" action will be used instead.	
27	**[Flt Cfg Logic 2]** Sets the Logic Command data that is sent to the CH1 drive if **Parameter 26 - [Idle Action 2]** is set to "Send Flt Cfg" and the controller is put into Program or Test mode. The bit definitions will depend on the drive that is connected to the module.	Default: 0000 0000 0000 0000 Minimum: 0000 0000 0000 0000 Maximum: 1111 1111 1111 1111 Type: Read/Write Reset Required: No
28	**[Flt Cfg Ref 2]** Sets the Reference data that is sent to the CH2 drive if **Parameter 26 - [Idle Action 2]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.
29 30 31 32 33 34 35 36	**[Flt Cfg A1 In2]** **[Flt Cfg A2 In2]** **[Flt Cfg B1 In2]** **[Flt Cfg B2 In2]** **[Flt Cfg C1 In2]** **[Flt Cfg C2 In2]** **[Flt Cfg D1 In2]** **[Flt Cfg D2 In2]** Sets the data that is sent to the Datalink in the CH2 drive if **Parameter 26 - [Idle Action 2]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses 16-bit Datalinks, the most significant word of this value must be set to zero (0) or a fault will occur.
37	**[Port ID 3]** Displays the port number to which CH3 is connected.	Default: 0 Minimum: 0 Maximum: 7 Type: Read Only

Parameter No.	Name and Description	Details
38	**[Data Rate 3]** Displays the data rate used by the CH3 drive. This data rate is set in the drive, and the module detects it.	Default: 0 = 125 kbps Values: 0 = 125 kbps 1 = 500 kbps Type: Read Only
39	**[Ref/Fbk Size 3]** Displays the size of the Reference and Feedback for the CH3 drive. The drive determines the size of the Reference and Feedback.	Default: 0 = 16-bit Value: 0 = 16-bit 1 = 32-bit Type: Read Only
40	**[Datalink Size 3]** Displays the size of each Datalink word for the CH3 drive. The drive determines the size of Datalinks.	Default: 0 = 16-bit Values: 0 = 16-bit 1 = 32-bit Type: Read Only
41	**[I/O Config 3]** Sets the I/O that is transferred through the module to the CH3 drive.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read/Write Reset Required: Yes

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

42	**[I/O Actual 3]** Displays the Reference/Feedback and Datalinks actively transmitted by the module for the CH3 drive. The value of this parameter will usually be equal to the value of **Parameter 41 - [I/O Config 3]**.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read Only

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Sts
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

Parameter No.	Name and Description	Details
43	**[Idle Action 3]** Sets the action that the module and CH3 drive take if the module detects that the controller was switched to program mode. This setting is effective only if I/O that controls the drive is transmitted through the module.	Default: 0 = Fault Values: 0 = Fault 1 = Stop (DPI only) 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Type: Read/Write Reset Required: No
	 **ATTENTION:** Risk of injury or equipment damage exists. **Parameter 43 - [Idle Action 3]** lets you determine the action of the module and connected drive if the controller is idle. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. The "Stop" Idle Action is not supported for SCANport connected channels. If this setting is used, the "Fault" action will be used instead.	
44	**[Flt Cfg Logic 3]** Sets the Logic Command data that is sent to the CH3 drive if **Parameter 43 - [Idle Action 3]** is set to "Send Flt Cfg" and the controller is put into Program or Test mode. The bit definitions will depend on the drive that is connected to the module.	Default: 0000 0000 0000 0000 Minimum: 0000 0000 0000 0000 Maximum: 1111 1111 1111 1111 Type: Read/Write Reset Required: No
45	**[Flt Cfg Ref 3]** Sets the Reference data that is sent to the CH3 drive if **Parameter 43 - [Idle Action 3]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.
46 47 48 49 50 51 52 53	**[Flt Cfg A1 In3]** **[Flt Cfg A2 In3]** **[Flt Cfg B1 In3]** **[Flt Cfg B2 In3]** **[Flt Cfg C1 In3]** **[Flt Cfg C2 In3]** **[Flt Cfg D1 In3]** **[Flt Cfg D2 In3]** Sets the data that is sent to the Datalink in the CH3 drive if **Parameter 43 - [Idle Action 3]** is set to "Send Flt Cfg" and the controller is put into Program mode.	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses 16-bit Datalinks, the most significant word of this value must be set to zero (0) or a fault will occur.

Notes:

CIP/DPI Objects

Appendix C presents information about the CIP and DPI objects that can be accessed using Explicit Messages. The DPI objects can only be accessed when the channel being used is connected to a DPI-supported drive.

For information on the format of Explicit Messages and example ladder logic programs, refer to the appropriate chapter:

- Chapter 5, MicroLogix 1500 Ladder Example Program
- Chapter 6, CompactLogix Ladder Example Program
- Chapter 7, ControlLogix w/1769-ADN DeviceNet Ladder Example Program

TIP: Refer to the CIP Common specification for more information about CIP objects. Information about the CIP Common specification is available on the ODVA web site (http://www.odva.org).

Parameter Object

Class Code

Hexadecimal	Decimal
0x0F	15

Instances

The number of instances depends on the number of parameters in the target device. The total number of parameters can be read in Instance 0, Attribute 2.

Instance	Description
0	Class Attributes
1	Parameter 1 Attributes
↕	↕
n (1)	Last Parameter Attributes

(1) The Instance n represents the number of parameters in the target device.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	1
2	Get	Max Instance	UINT	Number of parameters
8	Get	Parameter Class Descriptor	WORD	Bits that describe parameters.
9	Get	Configuration Assembly Instance	UINT	0
10	Get	Native Language	USINT	0 = English 1 = French 2 = Spanish 3 = Italian 4 = German 5 = Japanese 6 = Portuguese 7 = Mandarin Chinese 8 = Russian 9 = Dutch

Parameter Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	(1)	Parameter Value	(2)	(3)
2	Get	Link Path Size	USINT	0 = No link specified n = Link specified
3	Get	Link Path		(4)
4	Get	Descriptor	WORD	0 = False, 1 = True Bit 1 = Supports ENUMs Bit 2 = Supports scaling Bit 3 = Supports scaling links Bit 4 = Read only Bit 5 = Monitor Bit 6 = Extended precision scaling
5	Get	Data Type	USINT	1 = WORD (16-bit) 2 = UINT (16-bit) 3 = INT (16-bit) 4 = BOOL 5 = SINT 6 = DINT 7 = LINT 8 = USINT
6	Get	Data Size	USINT	(3)
7	Get	Parameter Name String	SHORT_ STRING	(3)
8	Get	Units String	SHORT_ STRING	(3)
9	Get	Help String	SHORT_ STRING	0
10	Get	Minimum Value	(2)	(3)
11	Get	Maximum Value	(2)	(3)
12	Get	Default Value	(2)	(3)
13	Get	Scaling Multiplier	UINT	(3)
14	Get	Scaling Divisor	UINT	(3)
15	Get	Scaling Base	UINT	(3)
16	Get	Scaling Offset	UINT	(3)
17	Get	Multiplier Link	UINT	(3)
18	Get	Divisor Link	UINT	(3)
19	Get	Base Link	UINT	(3)
20	Get	Offset Link	UINT	(3)
21	Get	Decimal Precision	USINT	(3)

(1) Access rule is defined in bit 4 of instance attribute 4. 0 = Get/Set, 1 = Get.

(2) Specified in descriptor, data type, and data size.

(3) Value varies based on parameter instance.

(4) Refer to the CIP Common specification for a description of the connection path.

Parameter Object *(Continued)*

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x01	No	Yes	Get_Attribute_All
0x05	Yes	No	Reset
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x16	Yes	No	Save_Request
0x4B	No	Yes	Get_Enum_String

DPI Device Object

Class Code

Hexadecimal	Decimal
0x92	146

Instances

The number of instances depends on the number of components in the device. The total number of components can be read in Instance 0, Attribute 4.

Number	Description
0	Class Attributes (Drive)
1	Drive Component 1
2	Drive Component 2
↕	↕
16384	Class Attributes (module)
16385	module Component 1
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Family Code	BYTE	0x00 = Communications module 0x30 = PowerFlex 70 0x38 = PowerFlex 700 0x40 = PowerFlex 7000 0xFF = HIM
1	Get	Family Text	STRING[16]	Text identifying the device.
2	Get/Set	Language Code	BYTE	0 = English 1 = French 2 = Spanish 3 = Italian 4 = German 5 = Japanese 6 = Portuguese 7 = Mandarin Chinese 8 = Russian 9 = Dutch
3	Get	Product Series	BYTE	1 = A 2 = B …
4	Get	Number of Components	BYTE	Number of components (e.g., main control board, I/O boards) in the device.
5	Get/Set	User Definable Text	STRING[16]	Text identifying the device with a user-supplied name

DPI Device Object *(Continued)*

Class Attributes (Continued)

Attribute ID	Access Rule	Name	Data Type	Description
6	Get	Status Text	STRING[12]	Text describing the status of the drive.
7	Get	Configuration Code	BYTE	Identification of variations.
8	Get	Configuration Text	STRING[16]	Text identifying a variation of a family device.
9	Get	Brand Code	WORD	0x0001 = Allen-Bradley
11	Get	NVS Checksum	WORD	Checksum of the Non-Volatile Storage in a device.
12	Get	Class Revision	WORD	2 = DPI
13	Get	Character Set Code	BYTE	0 = SCANport HIM 1 = ISO 8859-1 (Latin 1) 2 = ISO 8859-2 (Latin 2) 3 = ISO 8859-3 (Latin 3) 4 = ISO 8859-4 (Latin 4) 5 = ISO 8859-5 (Cyrillic) 6 = ISO 8859-6 (Arabic) 7 = ISO 8859-7 (Greek) 8 = ISO 8859-8 (Hebrew) 9 = ISO 8859-9 (Turkish) 10 = ISO 8859-10 (Nordic) 255 = ISO 10646 (Unicode)
15	Get	Languages Supported	STRUCT of: BYTE BYTE[n]	 Number of Languages Language Codes (See Class Attribute 2)
16	Get	Date of Manufacture	STRUCT of: WORD BYTE BYTE	 Year Month Day
17	Get	Product Revision	STRUCT of: BYTE BYTE	 Major Firmware Release Minor Firmware Release
18	Get	Serial Number	DWORD	Value between 0x00 and 0xFFFFFFFF
19	Get/Set	Language Selected	BYTE	0 = Default (HIM will prompt at start up) 1 = Language was selected (no prompt)
20	Get/Set	Customer-Generated Firmware	STRING[36]	GUID (Globally Unique Identifier) identifying customer firmware flashed into the device.
128	Get	Customization Code	WORD	Code identifying the customized device.
129	Get	Customization Revision Number	WORD	Revision of the customized device.
130	Get	Customization Device Text	STRING[32]	Text identifying the customized device.

DPI Device Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
3	Get	Component Name	STRING[32]	Name of the component
4	Get	Component Firmware Revision	STRUCT of: BYTE BYTE	 Major Revision Minor Revision
5	Get	Component Hardware Change Number	BYTE	0 = Not Available
6	Get	First Flash Object Instance	WORD	Instance in the Flash Object used for the firmware in the component
7	Get	Number of Flash Object Instances	BYTE	Number of segments in memory that can be flashed.
8	Get	Component Serial Number	DWORD	Value between 0x00 and 0xFFFFFFFF

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

DPI Parameter Object

Class Code

Hexadecimal	Decimal
0x93	147

Instances

The number of instances depends on the number of parameters in the device. The total number of parameters can be read in Instance 0, Attribute 0.

Number	Description
0	Class Attributes (Drive)
1	Drive Parameter 1 Attributes
2	Drive Parameter 2 Attributes
↕	↕
16384	Class Attributes (module)
16385	module Parameter 1 Attributes
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Number of Instances	WORD	Number of parameters in the device
1	Get/Set	Write Protect Password	WORD	0 = Password disabled n = Password
2	Set	NVS Command Write	BYTE	0 = No Operation 1 = Store values in active memory to NVS 2 = Load values in NVS to active memory 3 = Load default values to active memory
3	Get	NVS Parameter Value Checksum	WORD	Checksum of all parameter values in a user set in NVS
4	Get	NVS Link Value Checksum	WORD	Checksum of parameter links in a user set in NVS
5	Get	First Accessible Parameter	WORD	First parameter available if parameters are protected by passwords. A “0” indicates all parameters are protected.
7	Get	Class Revision	WORD	2 = DPI
8	Get	First Parameter Processing Error	WORD	The first parameter that has been written with a value outside of its range. A “0” indicates no errors.
9	Set	Link Command	BYTE	0 = No Operation 1 = Clear All Parameter Links (This does not clear links to function blocks.)

DPI Parameter Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
7	Get	DPI Online Read Full	STRUCT of: BOOL[32] CONTAINER (1) CONTAINER CONTAINER CONTAINER WORD WORD STRING[4] UINT UINT UINT INT BYTE[3] BYTE STRING[16]	 Descriptor (Refer to pages C-10 – C-11) Parameter value Minimum value Maximum value Default value Next parameter Previous parameter Units (e.g., Amp, Hz) Multiplier (2) Divisor (2) Base (2) Offset (2) Link (source of the value) (0 = no link) Always zero (0) Parameter name
8	Get	DPI Descriptor	BOOL[32]	Descriptor (Refer to pages C-10 – C-11)
9	Get/Set	DPI Parameter Value	Various	Parameter value in NVS. (3)
10	Get/Set	DPI RAM Parameter Value	Various	Parameter value in temporary memory.
11	Get/Set	DPI Link	BYTE[3]	Link (parameter or function block that is the source of the value) (0 = no link)
12	Get	Help Object Instance	WORD	ID for help text for this parameter
13	Get	DPI Read Basic	STRUCT of: BOOL[32] CONTAINER CONTAINER CONTAINER CONTAINER STRING[16] STRING[4]	 Descriptor (Refer to pages C-10 – C-11) Parameter value Minimum value Maximum value Default value Parameter name Units (e.g., Amp, Hz)
14	Get	DPI Parameter Name	STRING[16]	Parameter name
15	Get	DPI Parameter Alias	STRING[16]	Customer supplied parameter name. Only supported by PowerFlex 700S at time of publication.
16	Get	Parameter Processing Error	BYTE	0 = No error 1 = Value is less than the minimum 2 = Value is greater than the maximum

(1) A CONTAINER is a 32-bit block of data that contains the data type used by a parameter value. If signed, the value is sign extended. Padding is used in the CONTAINER to ensure that it is always 32-bits.

(2) This value is used in the formulas used to convert the parameter value between display units and internal units. Refer to Formulas for Converting on page C-11.

(3) Do NOT continually write parameter data to NVS. Refer to the attention on page 5-10.

DPI Parameter Object *(Continued)*

Descriptor Attributes

Bit	Name	Description
0	Data Type (Bit 1)	Right bit is least significant bit (0). 000 = BYTE used as an array of Boolean 001 = WORD used as an array of Boolean 010 = BYTE (8-bit integer) 011 = WORD (16-bit integer) 100 = DWORD (32-bit integer) 101 = TCHAR (8-bit (not unicode) or 16-bits (unicode)) 110 = REAL (32-bit floating point value) 111 = Use bits 16, 17, 18
1	Data Type (Bit 2)	
2	Data Type (Bit 3)	
3	Sign Type	0 = unsigned 1 = signed
4	Hidden	0 = visible 1 = hidden
5	Not a Link Sink	0 = Parameter can sink a link 1 = Parameter cannot sink a link
6	Not Recallable	0 = Recallable from NVS 1 = Not Recallable from NVS
7	ENUM	0 = No ENUM text 1 = ENUM text
8	Writable	0 = Read only 1 = Read/write
9	Not Writable When Enabled	0 = Writable when enabled (e.g., drive running) 1 = Not writable when enabled
10	Instance	0 = Parameter value is not a Reference to another parameter 1 = Parameter value refers to another parameter
11	Reserved	Must be zero
12	Decimal Place (Bit 0)	Number of digits to the right of the decimal point. 0000 = 0 1111 = 15
13	Decimal Place (Bit 1)	
14	Decimal Place (Bit 2)	
15	Decimal Place (Bit 3)	
16	Extended Data Type (Bit 1)	Right bit is least significant bit (16). 000 = Reserved 001 = DWORD used as an array of Boolean 010 = Reserved 011 = Reserved 100 = Reserved 101 = Reserved 110 = Reserved 111 = Reserved
17	Extended Data Type (Bit 2)	
18	Extended Data Type (Bit 3)	

DPI Parameter Object *(Continued)*

Descriptor Attributes (Continued)

Bit	Name	Description
19	Parameter Exists	Reserved
20	Not Used	Reserved
21	Formula Links	Reserved
22	Access Level (Bit 1)	Reserved
23	Access Level (Bit 2)	Reserved
24	Access Level (Bit 3)	Reserved
25	Writable ENUM	Reserved
26	Not a Link Source	0 = Parameter can be a source for a link 1 = Parameter cannot be a source for a link
27	Enhanced Bit ENUM	Reserved
28	Enhanced ENUM	Reserved
29	Not Used	Reserved
30	Not Used	Reserved
31	Not Used	Reserved

Formulas for Converting

Display Value = ((Internal Value + Offset) x Multiplier x Base) / (Divisor x $10^{\text{Decimal Places}}$)

Internal Value = ((Display Value x Divisor x $10^{\text{Decimal Places}}$) / (Multiplier x Base)) - Offset

Object Specific Services

Service Code	Service Name
0x4B	Get_Attributes_Scattered (1)
0x4C	Set_Attributes_Scattered (1)

(1) The instance and attribute are ignored for these services.

The table below lists the parameters for the Get_Attributes_Scattered and Set_Attributes_Scattered object-specific service:

Name	Data Type	Description
Scattered Parameters	STRUCT of	
Parameter Number	WORD	Parameter to read or write
Parameter Value LSW	WORD	Low word of Parameter value to read or write (zero when reading)
Parameter Value MSW	WORD	High word of Parameter value to read or write (zero when reading)

Important: The STRUCT may repeat up to 36 times in a single message.

DPI Fault Object

Class Code

Hexadecimal	Decimal
0x97	151

Products such as PowerFlex drives use this object for faults. Modules use this object for events.

Instances

The number of instances depends on the maximum number of faults or events supported in the queue. The maximum number of faults/events can be read in Instance 0, Attribute 2.

Number	Description
0	Class Attributes (Drive)
1	Most Recent Drive Fault/Event
2	Second Most Recent Drive Fault/Event
↕	↕
16384	Class Attributes (module)
16385	Most Recent module Fault/Event
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Class Revision	WORD	Revision of object
2	Get	Number of Instances	WORD	Maximum number of faults/events that the device can record in its queue
3	Set	Fault Command Write	BYTE	0 = No Operation 1 = Clear Fault/Event 2 = Clear Fault/Event Queue 3 = Reset Device
4	Get	Fault Trip Instance Read	WORD	Fault that tripped the device. For modules, this value is always 1 when faulted.
5	Get	Fault Data List	STRUCT of: BYTE BYTE WORD[n]	Reserved
6	Get	Number of Recorded Faults	WORD	Number of faults/events in the queue. A “0” indicates the fault queue is empty.
7	Get	Fault Parameter Reference	WORD	Reserved

DPI Fault Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Full/All Information	STRUCT of: WORD STRUCT of BYTE BYTE STRING[16] STRUCT of LWORD BOOL[16] WORD CONTAINER[n]	 Fault code Fault source DPI port DPI Device Object Fault text Fault time stamp Timer value (0 = Timer not supported) BOOL[0]: (0 = invalid data, 1 = valid data) BOOL[1]: (0 = elapsed time, 1 = real time) BOOL[2 - 15]: Not used Reserved Reserved
1	Get	Basic Information	STRUCT of: WORD STRUCT of BYTE BYTE STRUCT of LWORD BOOL[16]	 Fault code Fault source DPI port DPI Device Object Fault time stamp Timer value (0 = Timer not supported) BOOL[0]: (0 = invalid data, 1 = valid data) BOOL[1]: (0 = elapsed time, 1 = real time) BOOL[2 - 15]: Not used

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

DPI Alarm Object

Class Code

Hexadecimal	Decimal
0x98	152

Products such as PowerFlex drives use this object for alarms or warnings. Modules do not support this object.

Instances

The number of instances depends on the maximum number of alarms supported by the queue. The maximum number of alarms can be read in Instance 0, Attribute 2.

Number	Description
0	Class Attributes
1	Most Recent Alarm
2	Second Most Recent Alarm
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Class Revision	WORD	Revision of object
2	Get	Number of Instances	WORD	Maximum number of alarms that the device can record in its queue
3	Set	Alarm Command Write	BYTE	0 = No Operation 1 = Clear Alarm 2 = Clear Alarm Queue 3 = Reset Device
4	Get	Fault Data List	STRUCT of: BYTE BYTE WORD[n]	Reserved
5	Get	Number of Recorded Alarms	WORD	Number of alarms in the queue. A “0” indicates the alarm queue is empty.

DPI Alarm Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Full/All Information	STRUCT of: WORD STRUCT of BYTE BYTE STRING[16] STRUCT of LWORD BOOL[16] WORD CONTAINER[n]	 Alarm code Alarm source DPI port DPI Device Object Alarm text Alarm time stamp Timer value (0 = Timer not supported) BOOL[0]: (0 = invalid data, 1 = valid data) BOOL[1]: (0 = elapsed time, 1 = real time) BOOL[2 - 15] Reserved Reserved Reserved
1	Get	Basic Information	STRUCT of: WORD STRUCT of BYTE BYTE STRUCT of LWORD BOOL[16]	 Alarm code Alarm source DPI port DPI Device Object Alarm time stamp Timer value (0 = Timer not supported) BOOL[0]: (0 = invalid data, 1 = valid data) BOOL[1]: (0 = elapsed time, 1 = real time) BOOL[2 - 15] Reserved

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

DPI Time Object

Class Code

Hexadecimal	Decimal
0x9B	155

Instances

The number of instances depends on the number of timers in the device. Instance 1 is always reserved for a real time clock although a device may not support it. The total number of timers can be read in Instance 0, Attribute 2.

Number	Description
0	Class Attributes
1	Real Time Clock (Predefined) (Not always supported)
2	Timer 1
3	Timer 2
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Class Revision	WORD	Revision of object
2	Get	Number of Instances	WORD	Number of timers in the object, excluding the real time clock that is predefined.
3	Get	First Device Specific Timer	WORD	Instance of the first timer that is not predefined.
4	Set	Time Command Write	BYTE	0 = No Operation 1 = Clear all timers (Does not clear the real time clock or read only timers)

DPI Time Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Read Full	STRUCT of: STRING[16], LWORD or STRUCT BOOL[16]	 Name of the timer Elapsed time in milliseconds unless timer is a real time clock (See attribute 2) See Attribute 3
1	Get	Timer Text	STRING[16]	Name of the timer
2	Get/Set	Timer Value	LWORD -OR- STRUCT of: WORD BYTE BYTE BYTE BYTE BYTE BYTE	Elapsed time in milliseconds unless the timer is a real time clock. Real Time Clock Data: Milliseconds (0 – 999) Seconds (0 – 59) Minutes (0 – 59) Hours (0 – 23) Days (1 – 31) Months (1 = January, 12 = December) Years (since 1972)
3	Get	Timer Descriptor	BOOL[16]	BOOL[0]: (0 = invalid data, 1 = valid data) BOOL[1]: (0 = elapsed time, 1 = real time) BOOL[2 - 15]: Not used

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

Notes:

SCANport Objects

Appendix D presents information about the SCANport objects that can be accessed using Explicit Messages. The SCANport objects can only be accessed when the channel being used is connected to a SCANport-enabled drive.

For information on the format of Explicit Messages and example ladder logic programs, refer to the appropriate chapter:

- Chapter 5, MicroLogix 1500 Ladder Example Program
- Chapter 6, CompactLogix Ladder Example Program
- Chapter 7, ControlLogix w/1769-ADN DeviceNet Ladder Example Program

SCANport Device Object

Class Code

Hexadecimal	Decimal
0x92	146

Instances

The number of instances depends on the number of components in the device. The total number of components can be read in Instance 0, Attribute 4.

Number	Description
0	Class Attributes (Drive)
1	Drive Component 1
2	Drive Component 2
↕	↕
16384	Class Attributes (module)
16385	module Component 1
↕	↕

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Family Code	BYTE	0x00 = Communications module 0x30 = PowerFlex 70 0x38 = PowerFlex 700 0x40 = PowerFlex 7000 0xFF = HIM
1	Get	Family Text	STRING[16]	Text identifying the device.
2	Get/Set	Language Code	BYTE	0 = English 1 = French 2 = Spanish 3 = Italian 4 = German 5 = Japanese 6 = Portuguese 7 = Mandarin Chinese 8 = Russian 9 = Dutch
3	Get	Product Series	BYTE	1 = A 2 = B …
4	Get	Number of Micro's	BYTE	Number of microprocessors in the device.

SCANport Device Object *(Continued)*

Class Attributes (Continued)

Attribute ID	Access Rule	Name	Data Type	Description
5	Get/Set	User Definable Text	STRING[16]	Text identifying the device with a user-supplied name
6	Get	Status Text	STRING[12]	Text describing the status of the drive.
7	Get	Configuration Code	BYTE	Identification of variations.
8	Get	Configuration Text	STRING[16]	Text identifying a variation of a family device.
9	Get	Brand Code	WORD	0x0001 = Allen-Bradley
11	Get	NVS Checksum	WORD	Checksum of the Non-Volatile Storage in a device.

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Microprocessor Text String	STRING[8]	Name of the microprocessor
1	Get	Firmware Version	WORD	Major/Minor firmware version number
2	Get	Module/ Language Version	WORD	Major/Minor language module version

Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

SCANport Pass-Through Parameter Object

Class Code

Hexadecimal	Decimal
0x93	147

The SCANport Pass-Through Parameter Object lets you perform a scattered read or write.

Class Attributes

None

Instance Attributes

None

Common Services

None

Object-Specific Services

Service Code	Service Name
0x32	Scattered_Parameter_Value_Read (1)
0x34	Scattered_Parameter_Value_Write (1)

(1) The instance and attribute are ignored for these services.

The table below lists the parameters for the Scattered_Parameter_Value_Read and Scattered_Parameter_Value_Write object specific services:

Name	Data Type	Description
Scattered Parameters	STRUCT of	
Parameter Number	WORD	Parameter to read or write
Parameter Value	WORD	Parameter value to write (zero when reading)

Important: The STRUCT may repeat up to 55 times in a single message.

SCANport Pass-Through Fault Object

Class Code

Hexadecimal	Decimal
0x97	151

The SCANport Pass-Through Fault Object provides information on the Host's fault queue.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Write Fault Command	BYTE	1 = Clear Faults 2 = Clear Fault Queue 3 = Reset Product
1	Get	Read Number of Fault Queue Entries	BYTE	Reads the number of fault queue entries.
2	Get	Read Fault Queue Trip Index	BYTE	Reads the index of the fault that tripped the product.

SCANport Pass-Through Fault Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Read Fault Queue Entry Full/All Info	STRUCT of	
		Fault Text	ARRAY of BYTE	16 character string (no length information, no terminating null).
		Fault Code	WORD	Fault Code
		Fault Time Stamp (1)	STRUCT	
			BYTE	1/100 Second (0 - 99)
			BYTE	Second (0 - 59)
			BYTE	Minute (0 - 59)
			BYTE	Hour (0 - 23)
			BYTE	Day of Week (0 - 6) (2)
			BYTE	Date (1 - 31)
			BYTE	Month (1 - 12)
			BYTE	Year (0 - 99) (3)
128	Get	Fault Code and Time Stamp	STRUCT of	
		Fault Code	WORD	Fault Code
		Fault Time Stamp (1)	STRUCT of	
			BYTE	1/100 Second (0 - 99)
			BYTE	Second (0 - 59)
			BYTE	Minute (0 - 59)
			BYTE	Hour (0 - 23)
			BYTE	Day of Week (0 - 6) (2)
			BYTE	Date (1 - 31)
			BYTE	Month (1 - 12)
			BYTE	Year (0 - 99) (3)
129	Get	Read Fault Text String Only	ARRAY of BYTE	16 character string (no length information, no terminating null).

(1) Not available in all products.

(2) Sunday is a value of zero.

(3) Year is an offset from 1990.

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

SCANport Pass-Through Warning Object

Class Code

Hexadecimal	Decimal
0x98	152

The SCANport Pass-Through Warning Object provides information on the Host's warning queue.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Write Warning Command	BYTE	Write Warning Command. 1 = Clear Warnings 2 = Clear Warning Queue 3 = Reset Product
1	Set	Read Number of Warning Queue Entries	BYTE	

SCANport Pass-Through Warning Object *(Continued)*

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Read Warning Queue Entry Full/All Info	STRUCT of	
		Warning Text	ARRAY of BYTE	16 character string (no length information, no terminating null)
		Warning Code	WORD	Fault Code
		Warning Time Stamp (Time Stamps not available in all products)	STRUCT	
			BYTE	1/100 Second (0 - 99)
			BYTE	Second (0 - 59)
			BYTE	Minute (0 - 59)
			BYTE	Hour (0 - 23)
			BYTE	Day of Week (0 - 6) (1)
			BYTE	Date (1 - 31)
			BYTE	Month (1 - 12)
			BYTE	Year (0 - 99) (2)
128	Get	Warning Code and Time Stamp (Time Stamps not available in all products)	STRUCT of	
		Warning Code	WORD	Fault Code
		Warning Time Stamp (Time Stamps not available in all products)	STRUCT of	
			BYTE	1/100 Second (0 - 99)
			BYTE	Second (0 - 59)
			BYTE	Minute (0 - 59)
			BYTE	Hour (0 - 23)
			BYTE	Day of Week (0 - 6) (2)
			BYTE	Date (1 - 31)
			BYTE	Month (1 - 12)
			BYTE	Year (0 - 99) (3)
129	Get	Read Warning Text String Only	ARRAY of BYTE	16 character string (no length information, no terminating null).

(1) Sunday is a value of zero.

(2) Year is an offset from 1990.

SCANport Pass-Through Warning Object *(Continued)*

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

SCANport Pass-Through Link Object

Class Code

Hexadecimal	Decimal
0x99	153

The SCANport Pass-Through Link Object lets you perform a scattered read or write of a number of links or a single read or write of a link.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Link Command	BYTE	1 = Clear all links.
1	Set	NVS Link Diagnostic Value	WORD	Checksum.

Instance Attributes

An instance in this class is the number of a parameter that is to get its value from another parameter.

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Parameter Link Reference (1)	WORD	

(1) The Parameter Link Reference value is the number of the parameter whose value is to be transferred.

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

Object-Specific Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x32	Yes	No	Scattered_Link_Reference_Value_Read (1)
0x34	Yes	No	Scattered_Link_Reference_Value_Write (1)

(1) Must be directed to Attribute 0, Instance 0.

SCANport Pass-Through Link Object *(Continued)*

The table below lists parameters for Scattered_Link_Reference_Read and Scattered_Link_Reference_Write object-specific services.

Name	Data Type	Description
Scattered Link Read/Write	STRUCT of	
Parameter Number	WORD	Parameter to read or write
Parameter Link Reference	WORD	Parameter value to write (zero when reading)

Important: The STRUCT may repeat up to 55 times in a single message.

Notes:

Logic Command/Status Words

Appendix E provides the definitions of the Logic Command/Logic Status words that are used for some drives that can be connected to the 1769-SM1. If your product is not included here, refer to its documentation.

PowerFlex 7-Class Drives (except PowerFlex 700S)

Logic Command Word

Logic Bits																	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	**Command**	**Description**
															x	Stop [1]	0 = Not Stop 1 = Stop
														x		Start [1][2]	0 = Not Start 1 = Start
													x			Jog	0 = Not Jog 1 = Jog
												x				Clear Faults	0 = Not Clear Faults 1 = Clear Faults
										x	x					Direction	00 = No Command 01 = Forward Command 10 = Reverse Command 11 = Hold Direction Control
									x							Local Control	0 = No Local Control 1 = Local Control
								x								MOP Increment	0 = Not Increment 1 = Increment
						x	x									Accel Rate	00 = No Command 01 = Accel Rate 1 Command 10 = Accel Rate 2 Command 11 = Hold Accel Rate
				x	x											Decel Rate	00 = No Command 01 = Decel Rate 1 Command 10 = Decel Rate 2 Command 11 = Hold Decel Rate
	x	x	x													Reference Select [3]	000 = No Command 001 = Ref. 1 (Ref A Select) 010 = Ref. 2 (Ref B Select) 011 = Ref. 3 (Preset 3) 100 = Ref. 4 (Preset 4) 101 = Ref. 5 (Preset 5) 110 = Ref. 6 (Preset 6) 111 = Ref. 7 (Preset 7)
x																MOP Decrement	0 = Not Decrement 1 = Decrement

(1) A “0 = Not Stop” condition (logic 0) must first be present before a “1 = Start” condition will start the drive. The Start command acts as a momentary Start command. A “1” will start the drive, but returning to “0” will not stop the drive.

(2) This Start will not function if a digital input (parameters 361-366) is programmed for 2-Wire Control (option 7, 8 or 9).

(3) This Reference Select will not function if a digital input (parameters 361-366) is programmed for “Speed Sel 1, 2 or 3” (option 15, 16 or 17). Note that Reference Select is “Exclusive Ownership” - see drive User Manual for further information.

PowerFlex 7-Class Drives (except PowerFlex 700S)
(Continued)

Logic Status Word

Logic Bits																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	**Status**	**Description**
															x	Ready	0 = Not Ready 1 = Ready
														x		Active	0 = Not Active 1 = Active
													x			Command Direction	0 = Reverse 1 = Forward
												x				Actual Direction	0 = Reverse 1 = Forward
											x					Accel	0 = Not Accelerating 1 = Accelerating
										x						Decel	0 = Not Decelerating 1 = Decelerating
									x							Alarm	0 = No Alarm 1 = Alarm
								x								Fault	0 = No Fault 1 = Fault
							x									At Speed	0 = Not At Reference 1 = At Reference
				x	x	x										Local Control [1]	000 = Port 0 (TB) 001 = Port 1 010 = Port 2 011 = Port 3 100 = Port 4 101 = Port 5 110 = Port 6 111 = No Local
x	x	x	x													Reference	0000 = Ref A Auto 0001 = Ref B Auto 0010 = Preset 2 Auto 0011 = Preset 3 Auto 0100 = Preset 4 Auto 0101 = Preset 5 Auto 0110 = Preset 6 Auto 0111 = Preset 7 Auto 1000 = Term Blk Manual 1001 = DPI 1 Manual 1010 = DPI 2 Manual 1011 = DPI 3 Manual 1100 = DPI 4 Manual 1101 = DPI 5 Manual 1110 = DPI 6 Manual 1111 = Jog Ref

[1] See “Owners” in drive User Manual for further information.

PowerFlex 700S Drives

Logic Command Word

Logic Bits																Command	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
															x	Normal Stop	0 = Not Normal Stop 1 = Normal Stop
														x		Start (1)	0 = Not Start 1 = Start
													x			Jog 1	0 = Not Jog using [Jog Speed 1] 1 = Jog using [Jog Speed 1]
												x				Clear Fault (2)	0 = Not Clear Fault 1 = Clear Fault
										x	x					Unipolar Direction	00 = No Command 01 = Forward Command 10 = Reverse Command 11 = Hold Direction Control
									x							Reserved	
								x								Jog 2	0 = Not Jog using [Jog Speed 2] 1 = Jog using [Jog Speed 2]
							x									Current Limit Stop	0 = Not Current Limit Stop 1 = Current Limit Stop
						x										Coast Stop	0 = Not Coast to Stop 1 = Coast to Stop
					x											Reserved	
				x												Reserved	
			x													Spd Ref Sel0 (3)	000 = Spd Ref A 001 = Spd Ref B 010 = Preset 2 011 = Ref. 3 (Preset 3) 100 = Ref. 4 (Preset 4) 101 = Ref. 5 (Preset 5) 110 = Ref. 6 (Preset 6) 111 = Ref. 7 (Preset 7)
		x														Spd Ref Sel1 (3)	
	x															Spd Ref Sel2 (3)	
x																Reserved	

(1) A “Not Stop” condition (logic bit 0 = 0, logic bit 8 = 0, and logic bit 9 = 0) must first be present before a “1 = Start” condition will start the drive.

(2) To perform this command, the value must switch from “0” to “1.”

(3) This command is available only for PowerFlex 700S drives with Phase II Control. For drives with Phase I Control, Logic Command bits 12, 13, and 14 are reserved.

PowerFlex 700S Drives *(Continued)*

Logic Status Word

Logic Bits																Status	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
															x	Active [1]	0 = Not Active 1 = Active
														x		Running	0 = Not Running 1 = Running
													x			Command Direction	0 = Reverse 1 = Forward
												x				Actual Direction	0 = Reverse 1 = Forward
											x					Accel	0 = Not Accelerating 1 = Accelerating
										x						Decel	0 = Not Decelerating 1 = Decelerating
									x							Jogging	0 = Not Jogging 1 = Jogging
								x								Fault	0 = No Fault 1 = Fault
							x									Alarm	0 = No Alarm 1 = Alarm
						x										Flash Mode	0 = Not in Flash Mode 1 = In Flash Mode
					x											Run Ready	0 = Not Ready to Run 1 = Ready to Run
				x												At Limit [2]	0 = Not At Limit 1 = At Limit
			x													Tach Loss Sw	0 = Not Tach Loss Sw 1 = Tach Loss Sw
		x														At Zero Spd	0 = Not At Zero Speed 1 = At Zero Speed
	x															At Setpt Spd	0 = Not At Setpoint Speed 1= At Setpoint Speed
x																Enable On [3]	0 = Not Enabled 1 = Enable On

(1) For PowerFlex 700S drives with Phase I Control, Logic Status bit 0 is called “Enabled.”

(2) See parameter 304 - [Limit Status] in the PowerFlex 700S drive User Manual for a description of the limit status conditions.

(3) This Logic Status bit is available only for PowerFlex 700S drives with Phase II Control. For drives with Phase I Control, Logic Status bit 15 is reserved.

1305, 1336 PLUS, and 1336 PLUS II Drives

Logic Command Word

Logic Bits																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	**Command**	**Description**
															x	Stop	0 = Not Stop 1 = Stop
														x		Start	0 = Not Start 1 = Start
													x			Jog	0 = Not Jog 1 = Jog
												x				Clear Faults	0 = Not Clear Faults 1 = Clear Faults
										x	x					Direction	00 = No Command 01 = Forward Command 10 = Reverse Command
									x							Local	0 = Multiplexed 1 = Local
								x								MOP Increment	0 = Not Increment 1 = Increment
						x	x									Accel Rate	00 = No Command 01 = Accel Rate 1 Command 10 = Accel Rate 2 Command
				x	x											Decel Rate	00 = No Command 01 = Decel Rate 1 Command 10 = Decel Rate 2 Command
	x	x	x													Reference Select	000 = No Command 001 = External Ref. 1 (Par 5) 010 = External Ref. 2 (Par 6) 011 = Preset 3 100 = Preset 4 101 = Preset 5 110 = Preset 6 111 = Preset 7
x																MOP Decrement	0 = Not Decrement 1 = Decrement

1305, 1336 PLUS, and 1336 PLUS II Drives *(Continued)*

Logic Status Word

Logic Bits																	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	**Status**	**Description**
															x	Enabled	0 = Not Enabled 1 = Enabled
														x		Running	0 = Not Running 1 = Running
													x			Command Direction	0 = Reverse 1 = Forward
												x				Actual Direction	0 = Reverse 1 = Forward
											x					Accel	0 = Not Accelerating 1 = Accelerating
										x						Decel	0 = Not Decelerating 1 = Decelerating
									x							Warning	0 = No Warning 1 = Warning
								x								Fault	0 = No Fault 1 = Fault
							x									At Speed	0 = Not At Reference 1 = At Reference
				x	x	x										Local	000 = Terminal I/O has Local 001 = Port 1 has Local 010 = Port 2 has Local 011 = Port 3 has Local 100 = Port 4 has Local 101 = Port 5 has Local 110 = Port 6 has Local 111 = Multiplexed Control
x	x	x	x													Reference	0000 = External Reference 1 0001 = Preset 1 0010 = Preset 2 0011 = Preset 3 0100 = Preset 4 0101 = Preset 5 0110 = Preset 6 0111 = Preset 7 1000 = External Reference 2 1001 = Port 1 Direction 1010 = Port 2 Direction 1011 = Port 3 Direction 1100 = Port 4 Direction 1101 = Port 5 Direction 1110 = Port 6 Direction 1111 = Jog Reference

C

CIP (Common Industrial Protocol)

CIP is the transport and application layer protocol used for messaging over DeviceNet. The protocol is for implicit messaging (real-time I/O) and explicit messaging (configuration, data collection, and diagnostics).

Classes

A class is defined by the DeviceNet specification as “a set of objects that all represent the same kind of system component. A class is a generalization of an object. All objects in a class are identical in form and behavior, but may contain different attribute values.”

Controller

A controller, also called programmable logic controller, is a solid-state control system that has a user-programmable memory for storage of instructions to implement specific functions such as I/O control, logic, timing, counting, report generation, communication, arithmetic, and data file manipulation. A controller consists of a central processor, input/output interface, and memory. See also Scanner.

D

Data Rate

The data rate is the speed at which data is transferred on the DeviceNet network. The available data rates depend on the type of cable and total cable length used on the network:

	Maximum Cable Length		
Cable	**125 K**	**250 K**	**500 K**
Thick Trunk Line	500 m (1,640 ft.)	250 m (820 ft.)	100 m (328 ft.)
Thin Trunk Line	100 m (328 ft.)	100 m (328 ft.)	100 m (328 ft.)
Maximum Drop Length	6 m (20 ft.)	6 m (20 ft.)	6 m (20 ft.)
Cumulative Drop Length	156 m (512 ft.)	78 m (256 ft.)	39 m (128 ft.)

Each device on a DeviceNet network must be set for the same data rate. You can set the DeviceNet module to 125 K, 250 K, or 500 K. You can set it to Autobaud if another device on the network has set the data rate.

Datalinks

A Datalink is a type of pointer used by some PowerFlex drives to transfer data to and from the controller. Datalinks allow specified parameter value(s) to be accessed or changed without using explicit messages. When enabled, each Datalink consumes either four bytes or eight bytes in both the input and output image table of the controller. The drive determines the size of Datalinks.

DeviceNet Network

A DeviceNet network uses a producer/consumer Controller Area Network (CAN) to connect devices (for example, controllers, drives, and motor starters). Both I/O and explicit messages can be transmitted over the network. A DeviceNet network can support a maximum of 64 devices. Each device is assigned a unique node address and transmits data on the network at the same data rate.

A cable is used to connect devices on the network. It contains both the signal and power wires. Devices can be connected to the network with drop lines, in a daisy chain connection, or a combination of the two.

General information about DeviceNet and the DeviceNet specification are maintained by the Open DeviceNet Vendor's Association (ODVA). ODVA is online at http://www.odva.org.

DPI (Drive Peripheral Interface)

DPI is a second generation peripheral communication interface used by various Allen-Bradley drives and power products, such as PowerFlex 7-Class drives. It is a functional enhancement to SCANport.

DPI Peripheral

A device that provides an interface between DPI and a network or user. Peripheral devices are also referred to as "modules" and "adapters." The 1203-SSS converter and PowerFlex 7-Class HIMs (20-HIM-xxx) are examples of DPI peripherals.

DPI Product

A device that uses the DPI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a PowerFlex 7-Class drive is a DPI product. In this manual, a DPI product is also referred to as "drive" or "host."

DriveExplorer Software

DriveExplorer software is a tool for monitoring and configuring Allen-Bradley products and modules. It can be run on computers running various Microsoft Windows operating systems. DriveExplorer (version 2.xx or higher) can be used to configure this module and connected PowerFlex drives. Information about DriveExplorer software and a free lite version can be accessed at http://www.ab.com/drives/driveexplorer.

DriveTools SP Software

A software suite designed for running on various Microsoft Windows operating systems. This software suite provides a family of tools that you can use to program, monitor, control, troubleshoot, and maintain Allen

Bradley products. DriveTools SP (version 1.xx or higher) can be used with Allen-Bradley drives. Information about DriveTools SP can be accessed at http://www.ab.com/drives/drivetools.

E

EDS (Electronic Data Sheet) Files

EDS files are simple text files that are used by network configuration tools such as RSNetWorx for DeviceNet to describe products so that you can easily commission them on a network. EDS files describe a product device type, revision, and configurable parameters. EDS files for many Allen-Bradley products can be found at http://www.ab.com/networks/eds.

Explicit Messaging

Explicit Messages are used to transfer data that does not require continuous updates. They are typically used to configure, monitor, and diagnose devices over the network.

F

Fault Configuration

When communications are disrupted (for example, a cable is disconnected), the 1769-SM1 and connected DPI or SCANport drive can respond with a user-defined fault configuration. The user sets the data that is sent to the drive using specific fault configuration parameters in the 1769-SM1. When a fault action parameter is set to use the fault configuration data and a fault occurs, the data from these parameters is sent as the Logic Command, Reference, and/or Datalink(s).

Flash Update

The process of updating firmware in a device. The 1769-SM1 can be flash updated using the X-Modem protocol and a 1203-SSS converter (firmware 3.xx or higher), the Allen-Bradley software tool ControlFLASH, or the built-in flash capability of DriveExplorer (version 4.01 or higher).

H

HIM (Human Interface Module)

A device that can be used to configure and control a DPI or SCANport drive. DPI HIMs (20-HIM-xxx) can be used to configure connected DPI peripherals.

Hold Last

When communications are disrupted (for example, a cable is disconnected), the 1769-SM1 and connected drive(s) can respond by holding last. Hold last results in the drive receiving the last data received via the DeviceNet connection before the disruption. If the drive was running and using the Reference from the 1769-SM1, it will continue to run at the same Reference.

I

Idle Action

An idle action determines how the 1769-SM1 and connected product respond when the controller is switched out of run mode.

I/O Data

I/O data, sometimes called “implicit messages” or “input/output,” transmit time-critical data such as a Logic Command and Reference. The terms “input” and “output” are defined from the controller’s point of view. Output is produced by the controller and consumed by the 1769-SM1. Input is produced by the 1769-SM1 and consumed by the controller.

L

Logic Command/Logic Status

The Logic Command is used to control the DPI or SCANport drive (for example, start, stop, direction). It consists of one 16-bit word of output to the 1769-SM1 from the network. The definitions of the bits in this word depend on the drive.

The Logic Status is used to monitor the DPI or SCANport drive (for example, operating state, motor direction). It consists of one 16-bit word of input from the 1769-SM1 to the network. The definitions of the bits in this word depend on the drive.

N

NVS (Non-Volatile Storage)

NVS is the permanent memory of a device. Devices such as the 1769-SM1 and drive(s) store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called “EEPROM.”

O

Objects

The CIP common specification defines an object as “an abstract representation of a particular component within a product.”

P

Ping

A ping is a message that is sent by a DPI or SCANport drive to its peripheral devices. They use the ping to gather data about the product, including whether it can receive messages and whether they can log in for control.

PowerFlex 7-Class (Architecture-Class) Drives

The Allen-Bradley PowerFlex 7-Class (Architecture-Class) family of drives include the PowerFlex 70, PowerFlex 700, PowerFlex 700 Series B, PowerFlex 700H, PowerFlex 700S, and PowerFlex 7000. These

drives can be used for applications ranging from 0.37 kW (0.5 HP) to 3,000 kW (4,000 HP). All PowerFlex 7-Class drives implement DPI.

R

Reference/Feedback

The Reference is used to send a setpoint (for example, speed, frequency, torque) to the drive. It consists of one word of output to the 1769-SM1 from the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

Feedback is used to monitor the speed of the drive. It consists of one word of input from the 1769-SM1 to the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

RSLogix 5/500/5000

RSLogix software is a tool for configuring and monitoring controllers to execute logic and communicate with connected devices. It is a 32-bit application that runs on various Microsoft Windows operating systems. Information about RSLogix software can be found at http://www.software.rockwell.com/rslogix.

RSNetWorx for DeviceNet

RSNetWorx for DeviceNet software is a tool for configuring and monitoring DeviceNet networks and connected devices. It is a 32-bit application that runs on various Microsoft Windows operating systems. Information about RSNetWorx for DeviceNet software can be found at http://www.software.rockwell.com/rsnetworx.

S

Scanner

A scanner is a separate module (of a multi-module controller) or a built-in component (of a single-module controller) that provides communication with 1769-SM1 modules connected to a network. See also Controller.

SCANport

A peripheral communications interface used by various Allen-Bradley drives and power products, such as 1305 and 1336 PLUS II drives.

SCANport Peripheral

A device that provides an interface between SCANport and a network or user. Peripheral devices are also referred to as “modules” and “adapters.” The 1203-SSS converter and HIM are examples of SCANport peripherals.

SCANport Product

A device that uses the SCANport communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a 1336 PLUS II is a SCANport product. In this manual, a SCANport product is also referred to as “drive” or “host.”

Status Indicators

Status indicators are LEDs that are used to report the status of the 1769-SM1 module, drive(s), and network. They are on the 1769-SM1 module and are functional when a connected drive is powered.

T

Type 0/Type 1/Type 2 Control

When transmitting I/O, the module can use different types of messages for control. The Type 0, Type 1, and Type 2 events help Allen-Bradley personnel identify the type of messages that an module is using.

Z

Zero Data

When communications are disrupted (for example, a cable is disconnected), the 1769-SM1 module and connected drive(s) can respond with zero data. Zero data results in the drive(s) receiving zero as values for Logic Command and Reference data. If the drive(s) was running and using the Reference from the 1769-SM1 module, it will stay running but at zero Reference.

E

F

G

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M

S

T

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W

Z

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