PowerFlex PROFINET Single- and Dual-port Option Modules

Catalog Numbers 20-750-PNET and 20-750-PNET2P

AB QUALITY

Allen-Bradley

by **ROCKWELL AUTOMATION**

Important User Information

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

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

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

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

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

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

⚠	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

⚠	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

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

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

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

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

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

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Appendix A

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Logic Command/Status Words: PowerFlex 750-Series Products

About This Publication

This manual provides information about the 20-750-PNET PROFINET Single-port and 20-750-PNET2P PROFINET Dual-port option modules for network communication. Information is also provided about how to use these modules with PowerFlex 750-Series products.

Download Firmware, AOP, EDS, and Other Files

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

Summary of Changes

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

Topic	Page
Added information about the 20-750-PNET2P option module	throughout
Added information about compatibility with PowerFlex® 755TL drives, PowerFlex 755TR drives, and PowerFlex 755TM drive systems	throughout
Modified instructions regarding PROFINET network configuration and removed references to specific PROFINET configuration tools	33
Added tables of PROFINET index ranges	44, 45
Revised messaging examples to reflect using Studio 5000 Logix Designer® application	46, 48
Changed description of *Device* **Parameters 19** and **20** to Reserved. Added new *Device* **Parameter 21 [DL Byte Order]**	63

DriveExplorer and DriveExecutive Software

Connected Components Workbench™ software and the Studio 5000 Logix Designer® application are the recommended tools for configuring the 20-750-PNET and the 20-750-PNET2P option modules. Although DriveExecutive™ and DriveExplorer™ software can still be used, this manual provides specific instructions for the recommended tools only. Additional information about DriveExplorer and DriveExecutive software is provided in the following sections.

DriveExplorer Software (version 6.01 or later)

DriveExplorer software, version 6.01 or later is discontinued and available only as freeware at rok.auto/pcdc. No future updates to the tool are planned. The download is provided 'as is' for users who have lost their DriveExplorer CD or need to configure legacy products not supported by Connected Components Workbench software. DriveExplorer is not compatible with PowerFlex 755TL drives, PowerFlex 755TR drives, and PowerFlex 755TM systems.

DriveExecutive Software (version 5.06 or later)

A Lite version of DriveExecutive software shipped with RSLogix 5000®, RSNetWorx™ MD, FactoryTalk® AssetCentre, and IntelliCENTER® software. All other versions are purchasable items:

- 9303-4DTE01ENE Drive Executive software
- 9303-4DTS01ENE DriveTools™ SP Suite (includes DriveExecutive and DriveObserver™ software)
- 9303-4DTE2S01ENE DriveExecutive software upgrade to DriveTools SP Suite (adds DriveObserver software)

DriveExecutive software updates can be obtained at rok.auto/pcdc. It is highly recommended that you periodically check for and install the latest update.

Conventions Used in This Manual

The following conventions are used throughout this manual:

- Parameter names are shown in the format *Device* **Parameter xx [*]** or *Host* **Parameter xx [*].** The xx represents the parameter number. The * represents the parameter name—for example *Device* **Parameter 01 [Port Number].**
- The firmware revision number (FRN) is displayed as FRN *X.xxx*, where '*X*' is the major revision number and '*xxx*' is the minor revision number.
- The dialog box images in this manual resulted from using the following software:
  - Connected Components Workbench, release 12.00
  - Studio 5000 Logix Designer application, version 31.00.00

Different versions of the software may have dialog boxes that vary in appearance, and differences in procedures.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Network Communication Option Module Installation Instructions, publication 750COM-IN002	Information on the installation of PowerFlex 750-Series Network Communication modules
PROFINET Installation Guideline for Cabling and Assembly website http://www.profinet.com/	Information about PROFINET Cables.
PROFINET Standard http://www.profinet.com/	Information about PROFINET technology, networks, and products.
Connected Components Workbench website and online help http://rok.auto/ccw	Information on the Connected Components Workbench software tool—and includes a link for free software download.
PowerFlex 750-Series Drive Installation Instructions, publication 750-IN001	Provides detailed information on how to install PowerFlex 750-Series AC drives.
PowerFlex 750-Series AC Drives Programming Manual, publication 750-PM001	Provides detailed information on I/O, control, and feedback options; parameters and programming; faults, alarms, and troubleshooting.
PowerFlex 20-HIM-A6 and 20-HIM-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001	Provides detailed information on HIM components, operation, and features.
PowerFlex 750-Series AC Drives Technical Data, publication 750-TD001	Provides technical data about PowerFlex 750-Series Drives
PowerFlex 750-Series Products with TotalFORCE® Control Technical Data, publication 750-TD100	Provides detailed technical data, specifications, ratings, fuse/circuit breaker sizing and option information for IP20/IP54 enclosed PowerFlex 755T products.
PowerFlex 750-Series Products with TotalFORCE Control Installation Instructions, publication 750-IN100	Provides procedures for the handling, installation, and electrical wiring of IP20/IP54 enclosed PowerFlex 755T products.
PowerFlex 755TM IP00 Open Type Kits Technical Data, publication 750-TD101	Provides detailed technical data, specifications, ratings, fuse/circuit breaker sizing and option information for IP00 open type PowerFlex 755T drive system products.
PowerFlex 755TM IP00 Open Type Kits Installation Instructions, publication 750-IN101	Provides procedures for the handling, installation, and electrical wiring of IP00 open type PowerFlex 755T drive system products.
PowerFlex Drives with TotalFORCE Control Programming Manual, publication 750-PM100	Provides detailed parameter descriptions, configuration settings, and fault/alarm troubleshooting.
PowerFlex 750-Series Products with TotalFORCE Control Hardware Service Manual, publication 750-TG100	Provides detailed troubleshooting, maintenance, component testing, and hardware service instructions for PowerFlex 750T drives and bus supplies.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Notes:

Getting Started

The 20-750-PNET and 20-750-PNET2P option modules are intended for installation into a PowerFlex® 750-Series product. They are used for network communication. In this manual, the term PowerFlex 750-Series product is used to describe the following Architecture Class AC drives, bus supplies, and common bus inverters:

- PowerFlex 753 drives
- PowerFlex 755 drives
- PowerFlex 755TL drives
- PowerFlex 755TR drives
- PowerFlex 755TM drive systems

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Components
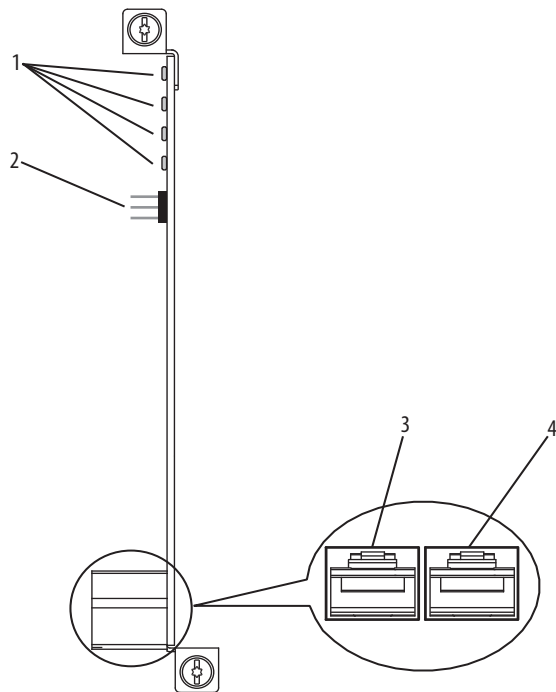
Item	Part	Description
1	Status Indicators	Four status indicators that indicate the status of the option module and network communication. See Chapter 6, Troubleshooting.
2	IP Address Selection Jumper	Sets the source used for the network address. See Setting the IP Address Selection Jumper on page 17.
3	Port 1 PROFINET Connector	RJ45 connection for a PROFINET network cable.
4	Port 2 PROFINET Connector	RJ45 connection for a PROFINET network cable (20-750-PNET2P only).

Features

The features of the option modules include the following:

- Captive screws to secure and ground the option module to the PowerFlex 750-Series product.
- An IP Address Selection Jumper to set the source of the network address for the option module before applying power to the product. By setting the jumper on pins 2 and 3, the network address can be configured using option module parameters or the default IP address. By selecting pins 1 and 2, the network address can be configured by using a PROFINET controller with DCP capability or a DHCP server.
- Compatibility with the following configuration tools to configure the option module and host product:
  - PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM (Human Interface Module) on the product, if available
  - Connected Components Workbench™ software

    Connected Components Workbench is the recommended standalone software tool for use with PowerFlex 750-Series products. You can obtain a free copy at: http://rok.auto/ccw

  - Third-party PROFINET controlling and monitoring software
- Status indicators that report the status of the option module and network communication. They are visible when the product cover is removed.
- Parameter-configured 32-bit Datalinks in the I/O to meet application requirements (16 Datalinks to write data from the network to the product, and 16 Datalinks to read data to the network from the product).
- Acyclic Messaging support.

- Leader-follower hierarchy that can be configured so that the option module and product transmit data to and from a PROFINET controller on the network.
- User-defined fault actions to determine how the option module and connected product respond to the following:
  - I/O messaging communication disruptions (Comm Flt Action)
  - Controllers in Idle mode (Idle Flt Action)
- Access to the PowerFlex 750-Series product and its connected peripherals on the network to which the option module is connected.

Table 1 - Software Compatibility Matrix

Product	Firmware Revision	Connected Components Workbench Software Version[1]	DriveTools™ SP Software Version[1]	DriveExplorer™ Software Version
PowerFlex 753	1.005 or later	1.02 or later	5.06 or later	6.04 or later
PowerFlex 755	1.009 or later 2.003 or later, Frames 8…10			
PowerFlex 755T [2],[3]	6.001 or later	11.00 or later	Not supported	Not supported

Product	Firmware Revision	Studio 5000 Logix Designer® Application Version	RSLogix 5000® Software Version
PowerFlex 753	1.010 or later	21.00 or later	16.00 or later
PowerFlex 755	1.009 or later 2.003 or later, Frames 8…10		
PowerFlex 755T [2], [3]	6.001 or later	21.00[4] or later	20.00[4] or later

(1)   Rockwell Automation recommends the use of the latest available AOP for the drive being used.
(2)   PowerFlex 755T products do not support DriveExecutive™ or DriveExplorer.
(3)   20-750-PNET and 20-750-PNET2P firmware revision 3.1 or later is required for compatibility with PowerFlex 755T products.
(4)   Only with version 5.02 Add-on Profiles.

Understanding Parameter Types

The option module has two types of parameters:

- *Device* parameters are used to configure the option module to operate on the network.
- *Host* parameters are used to configure the option module Datalink transfer and various fault actions with the PowerFlex 750-Series product.

You can view option module *Device* parameters and *Host* parameters with any of the following configuration tools:

- PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM—use the [4◄] or [►6] key to scroll to the port in which the module resides, press the [📁] (Folders) key, and use the [4◄] or [►6] key to scroll to the DEV PARAM or HOST PARAM folder.
- Connected Components Workbench software—click the tab for the option module at the bottom of the window, click the Parameters icon in the toolbar, and click the *Device* or *Host* Parameters tab.

Compatible Products

At the time of publication, the option modules are compatible with the following products:

- PowerFlex 753 drives (all firmware revisions)
- PowerFlex 755 drives (all firmware revisions)
- PowerFlex 755T products (firmware revisions 6.001 and later)

Required Equipment

Some of the equipment that is required for use with the option module is shipped with the module, but some you must supply yourself.

Equipment Shipped with the Option Module

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

- One 20-750-PNET PROFINET single-port option module or one 20-750-PNET2P PROFINET dual-port option module
- One Network Communication Option Module Installation Instructions, publication 750COM-IN002

User-Supplied Equipment

To install and configure the option module, you must supply:

- A small screwdriver
- A PROFINET cable. See PROFINET Installation Guideline for Cabling and Assembly for details.
- One field-terminable RJ45 PROFINET connector with CAT.5e performance

IMPORTANT	PROFINET connectors are available from a variety of sources and in various sizes. As such, there may be mechanical limitations that prohibit the use of some connectors. We recommend the LAPP GROUP connector part number 21700540 for use with PowerFlex-750 Series products.

- Drive and option module configuration tools, such as the following:
  - PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM
  - Connected Components Workbench is the recommended standalone software tool for use with PowerFlex-750 Series products. See http://rok.auto/ccw for more information and to download a free version.
  - Third-party PROFINET configuration software
- A computer connection to the PROFINET network

Safety Precautions

Please read the following safety precautions carefully.

ATTENTION: Risk of injury or death exists. The PowerFlex product may contain high voltages that can cause injury or death. Remove all power from the PowerFlex product, and then verify power has been discharged before installing or removing an option 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 drive using the option module. Failure to comply may result in injury and/or equipment damage.

ATTENTION: Risk of equipment damage exists. The option module contains electrostatic discharge (ESD) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the option module. If you are unfamiliar with static control procedures, see Guarding Against Electrostatic Damage, publication 8000-4.5.2.

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

ATTENTION: Risk of injury or equipment damage exists. *Host* **Parameters 33 [Comm Flt Action]** and **34 [Idle Flt Action]** let you determine the action of the option module and connected drive if I/O communication is disrupted, the controller is idle, or Acyclic messaging for drive control is disrupted. By default, these parameters fault the drive. You can set these parameters so that the drive continues to run, however, precautions should be taken to verify that the settings of these parameters do not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable or a controller in idle state).

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 does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

Quick Start

This section is provided to help experienced users quickly start using the option module. If you are unsure how to complete a step, refer to the referenced chapter.

	Action	
1	Review the safety precautions for the option module.	Throughout this manual
2	Verify that the PowerFlex 750-Series product is properly installed.	PowerFlex 750-Series AC Drive Installation Instructions, publication 750-IN001 PowerFlex 750-Series Products with TotalFORCE® Control, publication 750-IN100
3	Install the option module. Verify that the PowerFlex 750-Series product is not powered. Set the source for the option module network address with the IP Address Selection Jumper (Figure 1 on page 18). Insert the option module in Port 4, 5, or 6. Use the captive screws to secure and ground the option module to the product. Connect the option module to the network with a PROFINET Cable. **Important**: When another module (I/O, encoder, communication, and so forth) resides in the adjacent port to the **left** of the 20-750-PNET2P option module—and the lower mounting screw of that module is a larger T15 Torx head screw, perform additional steps from 2a through 2c on page 18.	Network Communication Option Module Installation Instructions, publication 750COM-IN002, and Chapter 2, Installing the Option Module
4	Apply power to the option module. Verify that the option module is installed correctly. The option module receives power from the PowerFlex 750-Series product. Apply power to the product. The status indicators should be green. If they flash red, there is a problem. See Chapter 6, Troubleshooting. Configure and verify key parameters.	Chapter 2, Installing the Option Module
5	Configure the option module for your application. Set option module parameters for the following functions as required by your application: Network Address I/O configuration Leader-Follower hierarchy Fault actions	Chapter 3, Configuring the Option Module
6	Configure the PROFINET controller to communicate with the option module. Use a controller configuration tool to configure the PROFINET controller on the PROFINET network to recognize the option module and product.	See the appropriate PROFINET documentation for your PROFINET controller.
7	Configure the I/O. Use a controller configuration tool such as PROFINET Commander that enables you to control the option module and connected product using the I/O.	Chapter 4, Using the I/O

Installing the Option Module

This chapter provides instructions for installing the option module in a PowerFlex® 750-Series product.

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Preparing for an Installation

Before installing the option module, do the following:

- Read the PROFINET Installation Guideline for Cabling and Assembly.
- Verify that you have all required equipment. See Required Equipment on page 14.

> ⚠ **ATTENTION:** Risk of equipment damage exists. The option module contains electrostatic discharge (ESD) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the option module. If you are unfamiliar with static control procedures, see Guarding Against Electrostatic Damage, publication 8000-4.5.2.

Setting the IP Address Selection Jumper

The IP Address Selection Jumper (Figure 1) determines the source of the IP address for the option module. When the jumper is placed on Pins 2 and 3, either the default network address is used or the network address may be configured with option module parameters.

When the jumper is in this position, the setting for *Device* **Parameter 18 - [DHCP]** does not have any effect.

The default network address is:

- IP Address 192.168.0.1
- Subnet Mask 255.255.255.0
- Gateway Address 192.168.0.1

If the jumper is on Pins 1 and 2—or there is no jumper—the network address is configured by DCP/DHCP. If *Device* **Parameter 18 [DHCP]** is set to '0' (Disabled), the network address is configured by using a PROFINET controller with DCP capability. If *Device* **Parameter 18 [DHCP]** is set to '1' (Enabled), the network address is configured from a DHCP server.

Figure 1 - Setting the IP Address Selection Jumper

Pins 1 and 2 (DCP-DHCP setting) to use DCP capability or a DHCP server
Pins 2 and 3 (CONFIG setting) to use option module parameters
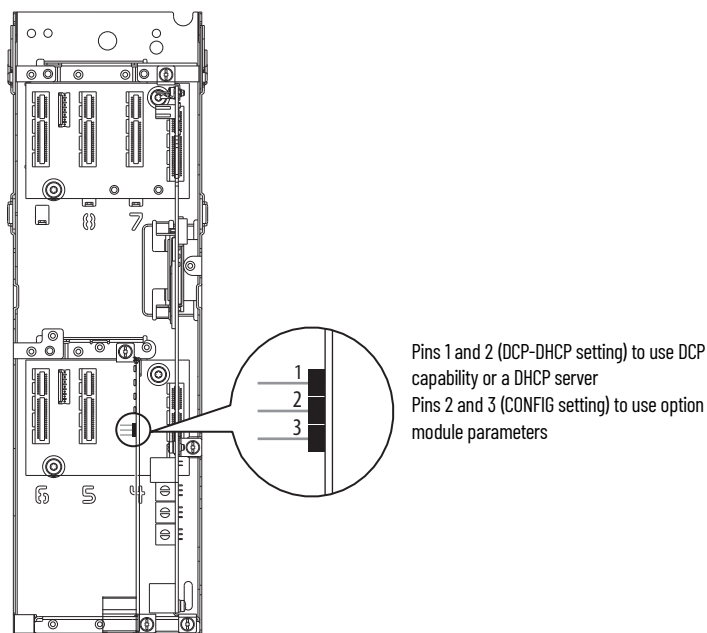
Connecting the Option Module to the PowerFlex 750-Series Product

IMPORTANT	Remove power from the product before installing the option module in the control pod.

1. Insert the option module into Port 4, 5, or 6 and tighten the module mounting screws into the pod mounting bracket. To properly ground the module to the drive, torque both mounting screws to 0.45...0.67 N•m (4.0...6.0 lb•in).

2. When another module (I/O, encoder, communication, and so forth) resides in the adjacent port to the **left** of the 20-750-PNET2P option module—and the lower mounting screw of that module is a larger T15 Torx head screw, perform additional steps 2a through 2c. If the port is empty or the adjacent module already uses the smaller T8 Torx head mounting screws, save this spare screw for future use.

The 20-750-PNET2P option module is shipped with a small bag containing a spare T8 Torx head mounting screw. The larger T15 Torx head mounting screw on the adjacent **left** module may mechanically interfere with the clips on the PROFINET cable connector when attached to the PROFINET module. This may cause problems connecting or removing the connector. To prevent this, perform the following steps.

a. Remove the adjacent module's lower mounting screw, the T15 Torx head screw closest to the bottom of the pod mounting bracket.

To remove the captive T15 Torx head screw, the module must be removed to back the screw out of the mounting clip.

b. Replace the larger T15 Torx head screw with the smaller spare T8 Torx head mounting screw.

c. Tighten the mounting screw to the pod mounting bracket to properly ground the adjacent module to the product. Torque the screw to 0.45...0.67 N•m (4.0...6.0 lb•in).
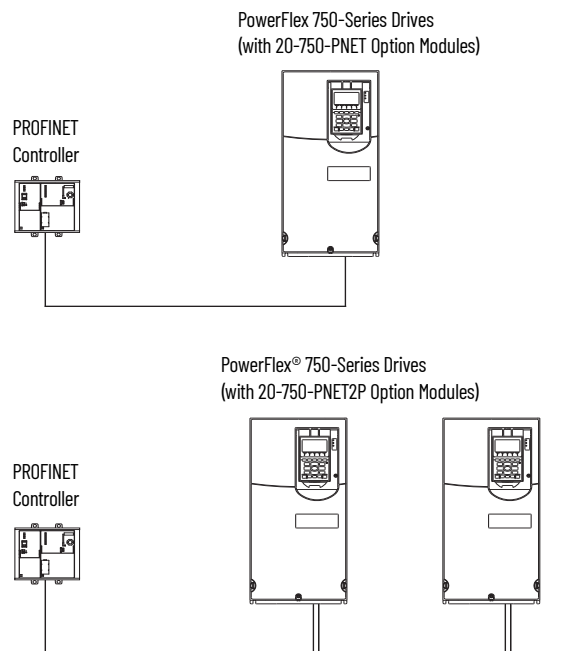
Connecting the Option Module to the Network

> ⚠️ **ATTENTION:** Risk of injury or death exists. The PowerFlex 750-Series product may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before connecting the option module to the network.

1. Remove power from the product.
2. Remove the product cover and lift up the drive HIM bezel to its open position to access the control pod.
3. Use static control precautions.
4. Connect one end of the PROFINET cable to the network. See Figure 2 for an example of wiring to a PROFINET network.

Figure 2 - PROFINET Wiring Example

5. Route the other end of the PROFINET cable from the network through the bottom of the drive and insert its cable plug into the mating option module connector.

> **IMPORTANT** PROFINET connectors are available from a variety of sources and in various sizes. As such, there may be mechanical limitations that prohibit the use of some connectors. We recommend the LAPP GROUP connector part number 21700540 for use with PowerFlex 750-Series products.

Using MRP (Media Redundancy Protocol) for Ring Topology

A Ring network is a single-fault tolerant network intended for interconnection of automation devices. MRP (Media Redundancy Protocol), a simple and deterministic protocol, when enabled in a PROFINET network connected in Ring Topology achieves reconfiguration time of 200 ms. A maximum of 50 devices can be connected in a ring network by using MRP.

When enabled in ring topology, MRP offers the following advantages:

- Media redundancy
- Higher communication availability
- Reduced number of network components

- Fast network fault detection and reconfiguration
- Resiliency of a single-fault tolerant network
- Easy implementation without any additional hardware requirements

The 20-750-PNET2P option module can only be connected as MRC (Media Redundancy Client) and will not work as MRM (Media Redundancy Manager). An MRM capable device needs to be present in the network to achieve the media redundancy. See Figure 3 for typical connection having MRM and MRC in a ring network.

Figure 3 - Network Connection for an MRP Switch/PLC in Ring Network
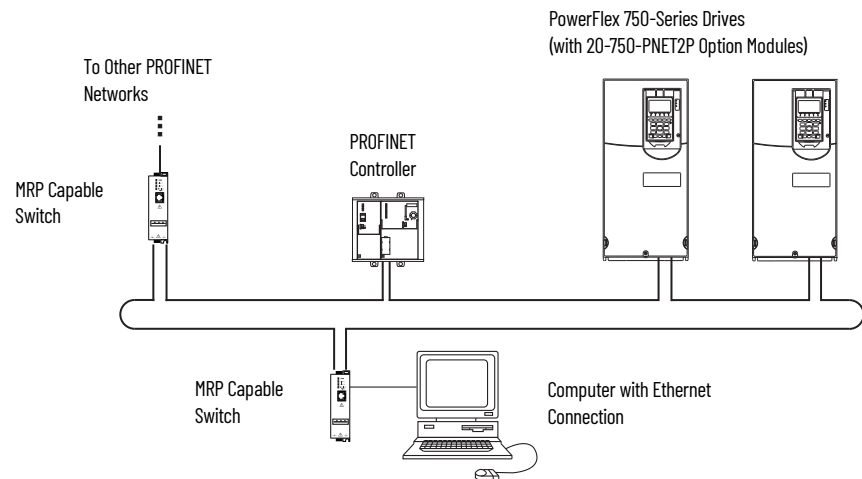
The following settings need to be considered for an MRP capable switch/PLC connected in a ring network:

- Cycle Time: 128 ms
- MRM functionality: Enabled
- Ring ports to be defined

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 or product.

Apply power to the PowerFlex 750-Series product. The option module receives its power from the product. When you apply power to the option module for the first time, its topmost 'PORT' status indicator should be steady green or flashing green after an initialization. If it is red, there is a problem. See Chapter 6, Troubleshooting.

Startup Status Indications

After power has been applied, the STS (status) indicator can be viewed on front of the PowerFlex 750-Series product and the option module status indicators can be viewed with the cover open or removed (Figure 4). Possible start-up status indications are shown in Table .

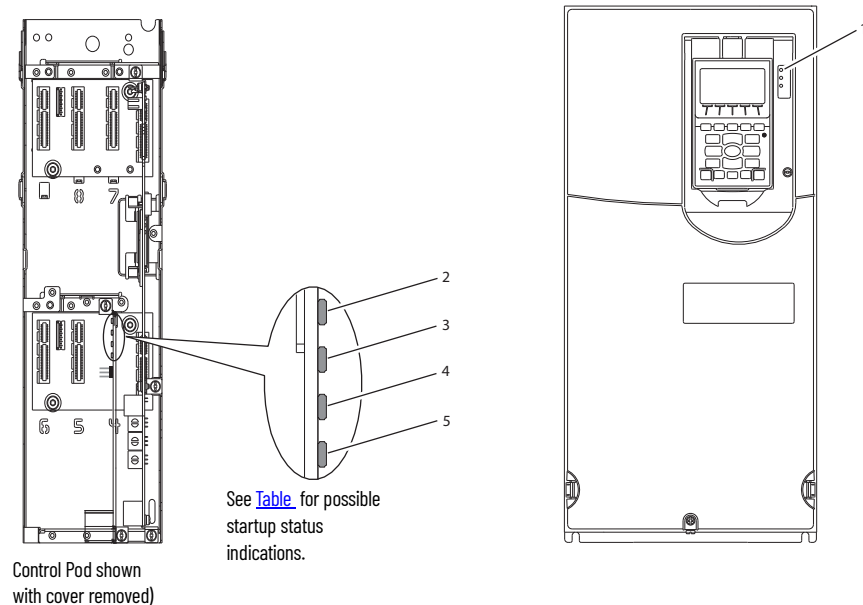**Figure 4 - Drive and Option Module Status Indicators**

Control Pod shown
with cover removed)

See Table for possible
startup status
indications.

Table 2 - Drive and Option Module Startup Status Indications

Item	Name	Color	State	Description
				STS Indicator
1	STS (Status)	Green	Flashing	Drive ready but not running, and no faults are present.
			Steady	Drive running, no faults are present.
		Yellow	Flashing	When running, a type 2 (non-configurable) alarm condition exists – drive continues to run. When stopped, a start inhibit condition exists and the drive cannot be started. PowerFlex 753/755: See *Drive* **Parameter 0:933 [Start Inhibits]** for more information. PowerFlex 755T: See *Drive* **Parameter 0:603 [Start Inhibits]** for more information.
			Steady	A type 1 (user configurable) alarm condition exists, but the drive continues to run.
		Red	Flashing	A major fault has occurred. Drive will stop. Drive cannot be started until fault condition is cleared.
			Steady	A non-resettable fault has occurred.
		Red/Yellow	Flashing Alternately	A minor fault has occurred. If not enabled, acts like a major fault. When running, the drive continues to run. System is brought to a stop under system control. The fault must be cleared to continue.
		Yellow/Green	Flashing Alternately	When running, a type 1 alarm exists.
		Green/Red	Flashing Alternately	Drive firmware is updating.
				Option Module Status Indicators
2	PORT	—	Off	The option module is not powered or connected properly to the drive.
		Red	Flashing	The option module is not receiving any communication from drive.
			Steady	The option module detected a duplicate or invalid port ID.
		Green	Flashing	Normal operation. The option module is establishing communication with drive. It will turn steady green or red.
			Steady	Normal operation. The option module is properly connected and communicating with the drive.
		Yellow	Steady	Option is not compatible with product.

Table 2 - Drive and Option Module Startup Status Indications (Continued)

Item	Name	Color	State	Description
3	MOD	—	Off	The option module is not powered or connected properly to the drive.
		Red	Flashing	The option module has failed the firmware test or a firmware update is in progress.
			Steady	The option module has failed the hardware test.
		Green	Flashing	Normal operation. The option module is operating but is not transferring I/O data to a controller.
			Steady	The option module is operating and is transferring I/O data.
4 5	NET A NET B[(1)]	—	Off	The option module cannot establish network communication or has experienced a communication timeout.
		Red	Flashing	The option module has detected a network configuration error.
			Steady	The option module has experienced an internal network controller error (ERTEC 200 Self-Test failure).
		Green	Steady	Normal operation. The option module is properly connected and communicating on the network.

(1)   NET B available only on 20-750-PNET2P option module.

After verifying correct operation, swing down the HIM bezel to its closed position and install the cover. For more details on status indicator operation, see .

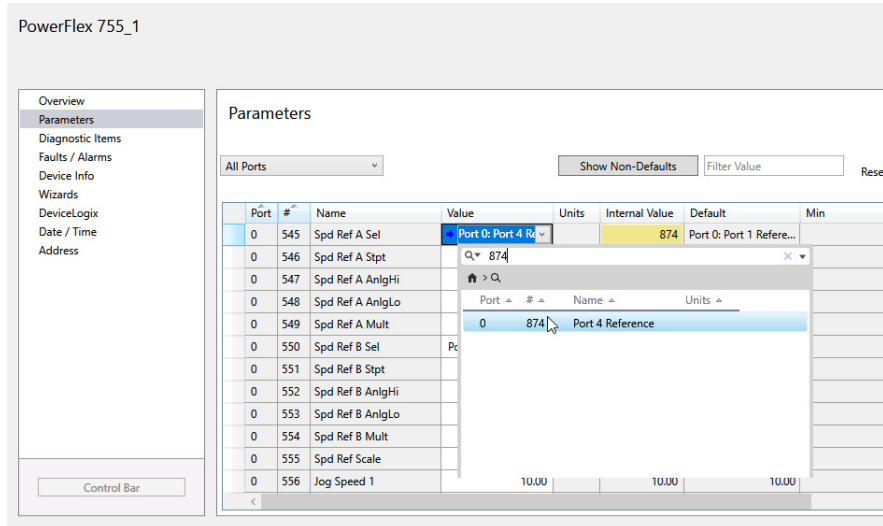## Configuring and Verifying Key Parameters

PowerFlex 750-Series products can be separately configured for the control and Reference functions in various combinations. For example, you could set the product to receive control commands from a peripheral or terminal block, with the Reference coming from the network. You could also set the product to receive its control from the network with the Reference coming from another peripheral or terminal block. Or you could set the product to receive both its control and Reference from the network.

The steps in this section assume that the product will receive the Logic Command and Reference from the network. In this process, you will associate the port where the PROFINET option module is installed with the applicable speed reference or velocity reference parameter. In this example, the screen captures reflect Connected Components Workbench and Port 4 is used. The process for other configuration tools will vary. This process is not applicable to bus supplies.
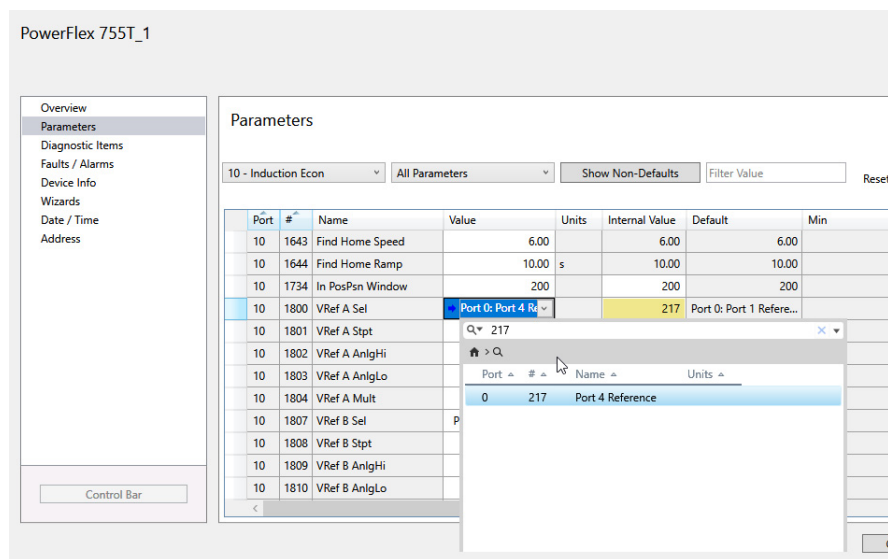
1. **753/755** - Verify that **Parameter 0:301 [Access Level]** is set to '1' (Advanced) or '2' (Expert) to access the required parameters in this procedure.

    755T - Verify that **Parameter 0:30 [Access Level]** is set to '1' (Advanced) or '2' (Expert) to access the required parameters in this procedure.

2. **753/755** - Select the Value column for **Parameter 0:545 [Speed Ref A Sel]**, type **874** in the **Search** field, then double-click the **Port 4 Reference** parameter to select it. See the PowerFlex 750-Series Programming Manual, publication 750-PM001, for the numeric value to use for other ports.

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	Port	#	Name	Value	Units	Internal Value	Default	Min
	0	545	Spd Ref A Sel	Port 0: Port 4 Re		874	Port 0: Port 1 Refere...	
	0	546	Spd Ref A Stpt	874				
	0	547	Spd Ref A AnlgHi					
	0	548	Spd Ref A AnlgLo					
	0	549	Spd Ref A Mult					
	0	550	Spd Ref B Sel	Po				
	0	551	Spd Ref B Stpt					
	0	552	Spd Ref B AnlgHi					
	0	553	Spd Ref B AnlgLo					
	0	554	Spd Ref B Mult					
	0	555	Spd Ref Scale					
	0	556	Jog Speed 1	10.00		10.00	10.00	

Search home: Port | # | Name | Units : 0 | 874 | Port 4 Reference

755T - Select the Value column for **Parameter 10:1800 [VRef A Sel]**, type **217** in the **Search** field, then double-click the **Port 4 Reference** parameter to select it. See PowerFlex Drives with TotalFORCE® Control Programming Manual, publication 750-PM100, for the numeric value to use for other ports.

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10 - Induction Econ / All Parameters / Show Non-Defaults / Filter Value / Reset

	Port	#	Name	Value	Units	Internal Value	Default	Min
	10	1643	Find Home Speed	6.00		6.00	6.00	
	10	1644	Find Home Ramp	10.00	s	10.00	10.00	
	10	1734	In PosPsn Window	200		200	200	
	10	1800	VRef A Sel	Port 0: Port 4 Re		217	Port 0: Port 1 Refere...	
	10	1801	VRef A Stpt	217				
	10	1802	VRef A AnlgHi					
	10	1803	VRef A AnlgLo					
	10	1804	VRef A Mult					
	10	1807	VRef B Sel	P				
	10	1808	VRef B Stpt					
	10	1809	VRef B AnlgHi					
	10	1810	VRef B AnlgLo					

Search home: Port | # | Name | Units : 0 | 217 | Port 4 Reference

3.   **753/755**: Verify that **Parameter 0:930 [Speed Ref Source]** is reporting that the source of the Reference to the drive (Port 0) is the port in which the option module is installed (for example, Port 4 Reference).

This ensures that any Reference commanded from the network can be monitored by using drive **Parameter 0:002 [Commanded SpdRef]**. If a problem occurs, this verification step provides the diagnostic capability to determine whether the drive/option module or the network is the cause.

755T: Verify that **Parameter 10/11:350 [VRef Source]** is reporting that the source of the Reference to the drive (Port 0) is the port in which the option module is installed (for example, Port 4 Reference).

This ensures that any Reference commanded from the network can be monitored by using **Parameter 10/11:1914 [VRef Commanded]**. If a problem occurs, this verification step provides the diagnostic capability to determine whether the drive/option module or the network is the cause.

4. If hard-wired discrete digital inputs are not used to control the drive, verify that all unused digital input drive parameters are set to '0' (Not Used).

Configuring the Option Module

This chapter provides instructions and information for setting the parameters to configure the option module.

Topic	Page
Configuration Tools	25
Using the PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM to Access Parameters	26
Setting the IP Address, Subnet Mask, and Gateway Address	26
Setting a Leader-Follower Hierarchy (Optional)	28
Setting a Fault Action	30
Resetting the Option Module	31
Restoring Option Module Parameters to Factory Defaults	32
Viewing the Option Module Status Using Parameters	32
Updating the Option Module Firmware	33
Configure the Option Module on Your PROFINET Network	33

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

Configuration Tools

The option module stores parameters and other information in its own nonvolatile storage (NVS) memory. You must, therefore, access the option module to view and edit its parameters. The following are the recommended tools to access the option module parameters.

Tool	See
PowerFlex® 20-HIM-A6 or 20-HIM-C6S HIM	page 26
Connected Components Workbench™ software	Connected Components Workbench software website and online help http://rok.auto/ccw

> **IMPORTANT** For the HIM screens shown throughout this chapter, the option module was installed in Port 4. If your option module is installed in a different port, that port would appear instead of Port 4.

Using the PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM to Access Parameters

If your drive has an enhanced PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM, it can be used to access parameters in the option module.

1. Display the Status screen, which is shown on HIM power-up.

2. Use the ⁴◄ or ►⁶ key to scroll to the Port in which the option module is installed.

3. Press the PAR# *soft key* to display the Jump to Param # entry popup box.

4. Use the numeric keys to enter the desired parameter number, or use the ▲ or ▼ *soft key* to scroll to the desired parameter number.

For details on viewing and editing parameters, see the PowerFlex 20-HIM-A6/-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001.

Setting the IP Address, Subnet Mask, and Gateway Address

If the IP Address Selection Jumper is on Pins 1 and 2—or there is no jumper—the option module is configured to set its IP address, subnet mask, and gateway address using a DCP-DHCP server. If you want to establish the network settings using a PROFINET controller or tool such as ProfinetCommander, you must first disable DHCP and then set these network address parameters in the option module.

Using DCP

By default, the option module is configured to use a PROFINET controller with DCP capability to establish the IP address settings for the module.

1. Verify that IP Address Selection Jumper is on Pins 1 and 2. Also, set the and the value of *Device* **Parameter 04 [Net Addr Src]** is '0' (DCP-DHCP).

2. Set the value of *Device* **Parameter 18 [DHCP]** to '0' (Disabled).
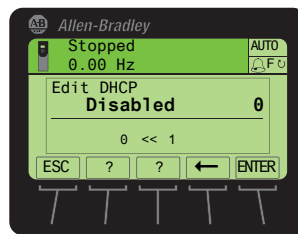
Value	Setting
0	Disabled
1	Enabled (Default)

3. Reset the option module; see Resetting the Option Module on page 31.

Using DHCP

The option module can be configured to use a DHCP server to establish the IP address settings for the module.

1. Verify that IP Address Selection Jumper is on Pins 1 and 2 and the value of *Device* **Parameter 04 [Net Addr Src]** is '0' (DCP-DHCP).

2. Set the value of *Device* **Parameter 18 [DHCP]** to '1' (Enabled) to select the DHCP server as the source for the IP address.

3. Reset the option module; see Resetting the Option Module on page 31.
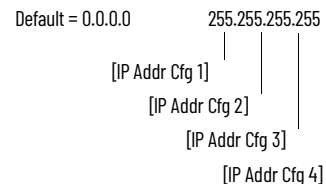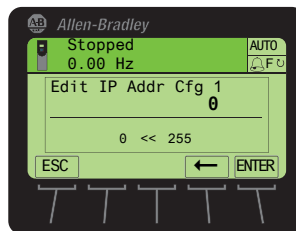
Using Option Module Parameters

If the IP Address Selection Jumper is on Pins 2 and 3, the network address can be configured using option module parameters or the default network address, which is:

- IP Address 192.168.0.1
- Subnet Mask 255.255.255.0
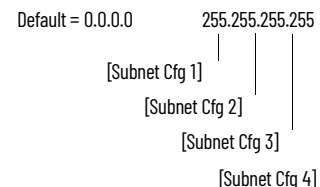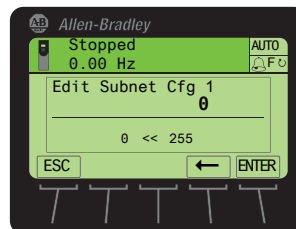- Gateway Address 192.168.0.1

Set the IP Address

1. Verify that IP Address Selection Jumper is on Pins 2 and 3 and the value of *Device* **Parameter 04 [Net Addr Src]** is '1' (Config).
2. Set the value of *Device* **Parameters 06 [IP Addr Cfg 1]… 09 [IP Addr Cfg 4]** to a unique IP address.

3. Reset the option module; see Resetting the Option Module on page 31.

Set the Subnet Mask

1. Verify that IP Address Selection Jumper is on Pins 2 and 3 and the value of *Device* **Parameter 04 [Net Addr Src]** is '1' (Config).
2. Set the value of *Device* **Parameters 10 [Subnet Cfg 1]…13 - [Subnet Cfg 4]** to the desired value for the subnet mask.

3. Reset the option module; see Resetting the Option Module on page 31.

Set the Gateway Address

1. Verify that IP Address Selection Jumper is on Pins 2 and 3 and the value of *Device* **Parameter 04 [Net Addr Src]** is '1' (Config).
2. Set the value of *Device* **Parameters 14 [Gateway Cfg 1]…17 [Gateway Cfg 4]** to the IP address of the gateway device.
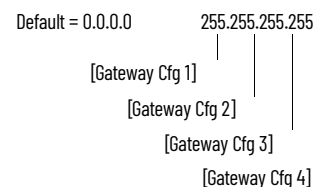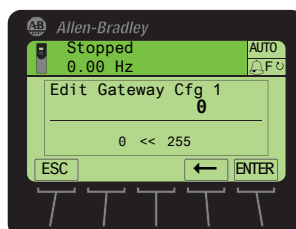
3. Reset the option module; see Resetting the Option Module on page 31.

Setting a Leader-Follower Hierarchy (Optional)

This procedure is only required if Datalinks are used to write or read data of the drive or its connected peripherals. In a Leader-Follower hierarchy, the option module exchanges data with a PROFINET controller to allow PROFINET communication.

Enable Datalinks To Write Data

The controller output image (controller outputs-to-drive) can have 0...16 additional 32-bit parameters (Datalinks). The data type of the Datalink can be either a 32-bit REAL (floating point) or a 32-bit integer. The number of Datalinks actively used in the controller is determined by the number of Datalinks installed in the hardware configuration.

IMPORTANT	Always use the Datalink parameters in consecutive numerical order, starting with the first parameter. For example, use *Host* Parameters 01, 02, and 03 to configure three Datalinks to write data. Otherwise, the network I/O connection will be larger than necessary, which needlessly increases controller response time and memory usage.

When using a PLC, configure the Datalink parameters now as described in this section.

Host **Parameters 01 [DL From Net 01]**...**16 [DL From Net 16]** control which parameters in the drive, option module, or any other connected peripheral receive the values from the network. You can use the PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM, or another drive configuration tool such as Connected Components Workbench software to select the drive or peripheral by port number and the parameter by name. As an alternate method, the parameter value can be set manually by number using this formula:

$$\text{From Net Parameter Value} = (10000 * \text{port number}) + (\text{Destination Parameter Number})$$

For example, suppose you want to use *Host* **Parameter 01 [DL From Net 01]** to write to Parameter 03 of an optional encoder module plugged into drive Port 5. Using the formula, the value for *Host* **Parameter 01 [DL From Net 01]** would be $(10000 * 5) + (3) = 50003$.

Follow these steps to enable Datalinks to write data.

1. Set the values of only the required number of contiguous controller-to-drive Datalinks needed to write data to the drive and that are to be included in the network I/O connection.
2. Reset the option module; see .
3. Since the Logic Command and Reference is always used in the option module, configure parameters in the PowerFlex 750-Series product to accept the Logic Command and Reference from the option module.
4. **753/755**: When using the controller for speed reference via the option module, set **Parameter 0:545 [Speed Ref A Sel]** to reflect the port where the option module is installed (typically Port 4, which has a value of 874).

   755T: When using the controller for velocity reference via the option module, set **Parameter 10:1800 [VRef A Sel]** to reflect the port where the option module is installed (typically Port 4, which has a value of 217).

5. **753/755**: Verify that the mask parameters (for example, **Parameter 0:324 [Logic Mask]**) are configured to receive the desired logic from the option module. See the PowerFlex 750-Series product documentation for details.

   755T: Verify that the mask parameters (for example, **Parameter 0:41 [Logic Mask]**) are configured to receive the desired logic from the option module. See the PowerFlex 750-Series product documentation for details.

The option module now is ready to receive input data and transfer status data to the PROFINET Scanner (controller). Next, configure the controller to recognize and transmit I/O to the option module.

Enable Datalinks To Read Data

The controller input image (drive-to-controller inputs) can have 0...16 additional 32-bit parameters (Datalinks). They are configured using *Host* **parameters 17 [DL To Net 01]...32 [DL To Net 16]**. The number of Datalinks actively used in the controller is determined by the number of Datalinks installed in the hardware configuration. See the controller example sections in <u>Chapter 4</u> for more information on setting the hardware configuration.

IMPORTANT	Always use the Datalink parameters in consecutive numerical order, starting with the first parameter. For example, use *Host* Parameters 17, 18, 19, 20, and 21 to configure five Datalinks to read data. Otherwise, the network I/O connection will be larger than necessary, which needlessly increases controller response time and memory usage.

When using a PLC, configure the Datalink parameters now as described in this section.

Host **Parameters 17 [DL To Net 01]...32 [DL To Net 16]** configure which parameters in the drive, option module, or any other connected peripheral send the values to the network. You can use the PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM, or another drive configuration tool such as Connected Components Workbench™ software to select the drive or peripheral by port number and the parameter by name. As an alternate method, the parameter value can be set manually by number using this formula:

To Net Parameter Value = (10000 * Port Number) + (Origination Parameter Number)

For example, suppose you want to use *Host* **Parameter 17 [DL To Net 01]** to read Parameter 2 of an optional I/O module plugged into drive Port 6. Using the formula, the value for *Host* **Parameter 17 [DL To Net 01]** would be (10000 * 6) + (2) = 60002.

Follow these steps to enable Datalinks to read data.

1. Set the values of only the required number of contiguous drive-to-controller Datalinks needed to read data from the drive and that are to be included in the network I/O connection.
2. Reset the option module; see <u>Resetting the Option Module on page 31</u>.

The option module is configured to send output data to the scanner (controller). You must now configure the controller to recognize and transmit I/O to the option module.

Setting a Fault Action

By default, when communication is disrupted (for example, the network cable is disconnected) or the scanner is idle, the drive responds by faulting if it is using I/O from the network. You can configure a different response to these faults:

- Disrupted I/O communication by using *Host* **Parameter 33 [Comm Flt Action].**
- An idle controller by using *Host* **Parameter 34 [Idle Flt Action]**.

> ⚠ **ATTENTION:** Risk of injury or equipment damage exists. *Host* **Parameters 33 [Comm Flt Action]** and **34 [Idle Flt Action]** let you determine the action of the option module and connected drive if communication is disrupted or the scanner is idle. By default, these parameters fault the drive. You may configure these parameters so that the drive continues to run, however, precautions should be taken to verify that the settings of these parameters do not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected network cable or controller in idle state).

Changing the Fault Action

Set the values of *Host* **Parameters 33 [Comm Flt Action]** and **34 [Idle Flt Action]** to an action that meets your application requirements.

Value	Action	Description
0	Fault	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted.
2	Zero Data	The drive is sent '0' values for data. This does not command a stop.
3	Hold Last	The drive continues in its present state.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters (*Host* **Parameters 37 [Flt Cfg Logic]**, **38 [Flt Cfg Ref]**, and **39 [Flt Cfg DL 01]** ...**54 [Flt Cfg DL 16]**).

Figure 5 - Edit Fault Action HIM Screens
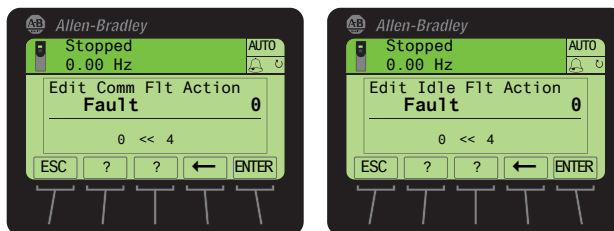
Changes to these parameters take effect immediately. A reset is not required.

If communication is disrupted and then is re-established, the drive will automatically receive commands over the network again.

Setting the Fault Configuration Parameters

When setting *Host* **Parameters 33 [Comm Flt Action]** and **34 [Idle Flt Action]** to 'Send Flt Cfg', the values in the following parameters are sent to the drive after a communication fault and/or idle fault occurs. You must set these parameters to values required by your application.

Option Module *Host* Parameter	Description
Parameter **37 [Flt Cfg Logic]**	A 32-bit value sent to the drive for Logic Command.
Parameter **38 [Flt Cfg Ref]**	A 32-bit REAL (floating point) value sent to the drive for Reference.
Parameter **39 [Flt Cfg DL 01]** ... **54 [Flt Cfg DL 16]**	A 32-bit integer value sent to the drive for a Datalink. If the destination of the Datalink is a REAL (floating point) parameter, you must convert the desired value to the binary representation of the REAL value. (An internet search of 'hex to float' provides a link to a tool to do this conversion.)

Changes to these parameters take effect immediately. A reset is not required.
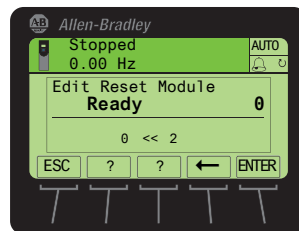
Resetting the Option Module

Changes to the jumper setting and some option module parameters require you to reset the option module before the new settings take effect. You can reset the option module by power cycling the drive or by using *Device* **Parameter 05 [Reset Module]**.

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

Set *Device* **Parameter 05 [Reset Module]** to '1' (**Reset Module**).

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

When you enter '**1' (Reset Module)**, the option module will be immediately reset. An alternate method to reset the module is by power cycling the drive. When you enter '**2' (Set Defaults)**, the option module will set **all** of its *Device* **and** *Host* parameters to their factory default values. (This is the same as pressing the ALL *soft key* when using the MEMORY folder method described in .)

> **IMPORTANT** When performing a Set Defaults, the drive may detect a conflict and then not allow this function to occur. If this happens, first resolve the conflict and then repeat a Set Defaults action. Common reasons for a conflict include a drive running or a leader in Run mode.
>
> After performing a Set Defaults, you must enter '1' (Reset Module) or power cycle the drive so that the new values take effect. Thereafter, this parameter will be restored to a value of '**0' (Ready)**.

If your application allows, you can also reset the option module by cycling power to the drive (resetting the drive) or by using the HIM's Reset Device function located in the drive's DIAGNOSTIC folder.

Restoring Option Module Parameters to Factory Defaults

As an alternate reset method, you can restore the option module parameters by using a MEMORY folder menu item instead of using *Device* **Parameter 05 [Reset Module]** described in [Resetting the Option Module on page 31](#). The MEMORY folder method provides two ways to restore the option module *Device* **and** *Host* parameters:

- ALL—restores ALL option module *Device* and *Host* parameters to their factory default values.
- MOST—restores MOST option module *Device* and *Host* parameters— except the following, which are used for network setup:
  - *Device* **Parameters 06...09 [IP Addr Cfg 1...4]**
  - *Device* **Parameters 10...13 [Subnet Cfg 1...4]**
  - *Device* **Parameters 14...17 [Gateway Cfg 1...4]**
  - *Device* **Parameter 18 [DHCP]**

Follow these steps to restore option module *Device* and *Host* parameters to their factory default values.

1. Access the Status screen, which is displayed on HIM power-up.
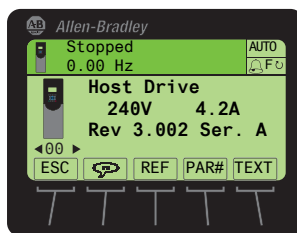
2. Use the [4 ◄] or [► 6] key to scroll to the Port in which the option module is installed.

3. Press the [📁] key to display its last-viewed folder.

4. Use the [4 ◄] or [► 6] key to scroll to the MEMORY folder.

5. Use the [▼ 2] or [8 ▲] key to select **Set Defaults**.

6. Press the [5] (Enter) key to display the Set Defaults popup box.

7. Press the [5] (Enter) key again to display the warning popup box to reset *Device* and *Host* parameters to their factory default values.

8. Press the MOST *soft key* to restore MOST *Device* and *Host* parameters to factory defaults, or press the ALL *soft key* to restore ALL parameters. Or press the ESC *soft key* to cancel.

IMPORTANT	When performing a Set Defaults, the drive may detect a conflict and then not allow this function to occur. If this happens, first resolve the conflict and then repeat this Set Defaults procedure. Common reasons for a conflict include a drive running or a leader in Run mode.

9. Reset the option module using *Device* **Parameter 05 [Reset Module]** or by cycling power to the drive so that the restored parameters take effect.

Viewing the Option Module Status Using Parameters

The following parameters provide information about the status of the option module. You can view these parameters at any time.

Option Module *Device* Parameter	Description
02 [DLs From Net Act]	The number of controller-to-drive Datalinks that are included in the network I/O connection (controller outputs).
03 [DLs To Net Act]	The number of drive-to-controller Datalinks that are included in the network I/O connection (controller inputs).
04 [Net Addr Src]	Displays the source from which the option module network address is taken. It is either the values of configured option module parameters or from DCP-DHCP.

Updating the Option Module Firmware

The option module firmware can be updated over the network through a direct connection from a computer to the option module Port 1 connector. You can use ControlFLASH™ or ControlFLASH Plus™ software tools to perform the update.

To obtain a firmware update for this option module, go to rok.auto/pcdc. This website contains all firmware update files and associated Release Notes that describe the following items:

- Firmware update enhancements and anomalies
- How to determine the existing firmware revision
- How to update the firmware

IMPORTANT	To update the option module, the IP Address Selection Jumper must be connected across pins 2 and 3. This can be easily verified by viewing the value of read-only *Device* **Parameter 04 [Net Addr Src]**, which must be '1' (Config). If the value is '0' (DCP-DHCP), you must change the IP Address Selection Jumper from being across pins 1 and 2 to being across pins 2 and 3.

Configure the Option Module on Your PROFINET Network

Use the following procedure to configure the option module on your PROFINET network.

1. Configure your PROFINET gateway.

   You have to configure a PROFINET network with a gateway before you can add and configure your option module. Consult the user manual for your controller and gateway for information on setting up your products and establishing a PROFINET network.

2. Download the GSDML file for your option card from the PCDC.

   You will require the corresponding GSDML file to obtain basic configuration information about the PROFINET device you add to the network. The GSDML configuration files identify the device's capabilities so that the PROFINET controller can communicate with it correctly.

3. Import the GSDML file into your PROFINET project by using your chosen configuration tool.

4. Using the configuration tool, add your option card to your PROFINET network and configure it as a slave device.

   You can configure up to 16 Datalinks for the option card.

5. Save and download your project to the PROFINET Gateway.

Notes:

Using the I/O

This chapter provides information and examples that explain how to control, configure, and monitor a PowerFlex® 750-Series drive using PROFINET I/O messaging.

Topic	Page
About I/O Messaging	35
Understanding the PROFINET Scanner I/O Image	36
Using Logic Command/Status	36
Using Reference/Feedback	36
Using Datalinks	37

> ⚠️ **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 does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

About I/O Messaging

PROFINET I/O messaging is used to transfer the data that controls the PowerFlex drive and sets its Reference. I/O messaging can also be used to transfer data to and from Datalinks, which are mapped to parameters in the PowerFlex 750-Series drive.

The option module includes the Logic Command, Logic Status, Reference, and Feedback (all as 32-bit words) in the controller's I/O image. This basic I/O must always be configured by the PROFINET configuration tool to the option module, enabling the ability to control and monitor the PowerFlex 750-Series drive.

Additional I/O if needed, can be configured using up to 16 Datalinks to write data and/or up to 16 Datalinks to read data. When using any combination of these Datalinks, add one 32-bit word for **each** Datalink to the basic I/O Input Size and/or Output Size.

Chapter 3, Configuring the Option Module discusses how to configure the option module for the required I/O. See the documentation for your PROFINET devices for information about how to configure the controller and the network. This chapter discusses how to use I/O after you have configured the option module and controller.

Understanding the PROFINET Scanner I/O Image

The terms 'input' and 'output' are defined from the controller's point of view. Therefore, output I/O is data that is produced by the controller and consumed by the option module. Input I/O is status data that is produced by the option module and consumed as input by the controller. The I/O image will vary based on how many of the drive's 32-bit Datalinks (*Host* **Parameters DL From Net 01...16** and *Host* **Parameters DL To Net 01...16**) are used.

The I/O image can be configured based upon the number of Datalinks required. Table 3 shows the I/O image when using all of the 32-bit Datalinks.

Table 3 - PROFINET Scanner I/O Image for PowerFlex 750-Series Drives (32-bit Logic Command/Status, Reference/Feedback, and Datalinks)

DINT	Output I/O	DINT	Input I/O
0	Logic Command	0	Logic Status
1	Reference	1	Feedback
2	DL From Net 01	2	DL To Net 01
3	DL From Net 02	3	DL To Net 02
4	DL From Net 03	4	DL To Net 03
5	DL From Net 04	5	DL To Net 04
6	DL From Net 05	6	DL To Net 05
7	DL From Net 06	7	DL To Net 06
8	DL From Net 07	8	DL To Net 07
9	DL From Net 08	9	DL To Net 08
10	DL From Net 09	10	DL To Net 09
11	DL From Net 10	11	DL To Net 10
12	DL From Net 11	12	DL To Net 11
13	DL From Net 12	13	DL To Net 12
14	DL From Net 13	14	DL To Net 13
15	DL From Net 14	15	DL To Net 14
16	DL From Net 15	16	DL To Net 15
17	DL From Net 16	17	DL To Net 16

Using Logic Command/ Status

The *Logic Command* is a 32-bit word of control data produced by the controller and consumed by the option module. The *Logic Status* is a 32-bit word of status data produced by the option module and consumed by the controller.

- Logic Command word is always the first 32-bit word in the output image.
- Logic Status word is always the first 32-bit word in the input image.

This manual contains the bit definitions for compatible products available at the time of publication in Appendix C, Logic Command/Status Words: PowerFlex 750-Series Products.

Using Reference/Feedback

The *Reference* is a 32-bit REAL (floating point) word of control data produced by the controller and consumed by the option module. The *Feedback* is a 32-bit REAL (floating point) word of status data produced by the option module and consumed by the controller.

- Reference word is always the second 32-bit word in the output image.
- Feedback word is always the second 32-bit word in the input image.

This section provides an example of using reference/feedback with PowerFlex 753/755 drives. A similar procedure could also be used with PowerFlex 755T drives, although different parameters would be required.

The Reference and Feedback 32-bit REAL values represent drive speed. The scaling for the speed Reference and Feedback is dependent on *Drive* **Parameter 300 [Speed Units]**. For example, if Parameter 300 is set to Hz, a 32-bit REAL Reference value of '30.0' would equal a Reference of 30.0 Hz. If Parameter 300 is set to RPM, a 32-bit REAL Reference value of '1020.5' would equal a Reference of 1020.5 RPM. Note that the commanded maximum speed can never exceed the value of *Drive* **Parameter 520 [Max Fwd Speed]**. Table 4 shows example References and their results for a PowerFlex 750-Series drive that has its:

- **Parameter 300 [Speed Units]** set to Hz.
- **Parameter 37 [Maximum Freq]** set to 130 Hz.
- **Parameter 520 [Max Fwd Speed]** set to 60 Hz.

When **Parameter 300 [Speed Units]** is set to RPM, the other parameters are also in RPM.

Table 4 - PowerFlex 753 and 755 Drive Example Speed Reference/Feedback Scaling

Network Reference Value	Speed Command Value [1]	Output Speed	Network Feedback Value
130.0	130 Hz	60 Hz [2]	60.0
65.0	65 Hz	60 Hz [2]	60.0
32.5	32.5 Hz	32.5 Hz	32.5
0.0	0 Hz	0 Hz	0.0
-32.5 [3]	32.5 Hz	32.5 Hz	32.5

(1)   For this example, *Drive* **Parameter 300 [Speed Units]** is set to Hz.
(2)   The drive runs at 60 Hz instead of 130 Hz or 65 Hz because *Drive* **Parameter 520 [Max Fwd Speed]** sets 60 Hz as the maximum speed.
(3)   The effects of values less than 0.0 depend on whether the PowerFlex 750-Series drive uses a bipolar or unipolar direction mode. See the drive documentation for details.

Using Datalinks

A Datalink is a mechanism used by PowerFlex products to transfer data to and from the controller. Datalinks allow a drive parameter value to be read or written to without using a PROFINET Acyclic Messaging Service. When enabled, each Datalink occupies one 32-bit word in a controller.

The following rules apply when using PowerFlex 750-Series drive Datalinks:

- The target of a Datalink can be any *Host* parameter, including those of a peripheral. For example, drive Parameter 535 [Accel Time 1] can be the target of any or all option modules installed in the drive.
- The data passed through the drive's Datalink mechanism is determined by the settings of *Host* **Parameters 01…16 [DL From Net 01…16]** and *Host* **Parameters 17…32 [DL To Net 01…16]**.

> **IMPORTANT**   A reset is always required after configuring Datalinks so that the changes take effect.

- When an I/O connection that includes Datalinks is active, those Datalinks that are being used are locked and cannot be changed until that I/O connection becomes idle or inactive.
- When you use a Datalink to change a value, the value is **not** written to the Nonvolatile Storage (NVS) memory. 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.

Datalinks for PowerFlex 750-Series peripherals (such as the embedded EtherNet/IP™ adapter and option modules such as an encoder or a communication module) are locked when the peripheral has an I/O connection with a controller. When a controller has an I/O connection to the drive, the drive does not allow a reset to defaults, configuration download or anything else that could change the makeup of the I/O connection in a running system. The I/O connection with the controller must first be disabled to allow changes to the respective Datalinks.

Depending on the controller being used, the I/O connection can be disabled by doing the following:

- Putting the controller in Program mode
- Placing the scanner in idle mode
- Disconnecting the drive from the network

DeviceLogix™ Datalinks are also locked while the DeviceLogix program is running. The DeviceLogix program must first be disabled to allow changes to the Datalinks. Set *DeviceLogix* **Parameter 53 [DLX Operation]** to 'DisableLogic' to disable the logic (the parameter value will then change to 'LogicDisabld').

Acyclic Messaging

This chapter provides information and examples that explain how to use PROFINET Acyclic Messaging to configure and monitor PowerFlex® 750-Series drive products through the option module.

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PROFINET Acyclic Messaging	41
Example Messaging	41

⚠ **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 does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

⚠ **ATTENTION:** Risk of equipment damage exists. If Acyclic Messages are programmed to write parameter data to Nonvolatile Storage (NVS) frequently, the NVS will quickly exceed its lifecycle and cause the drive to malfunction. Do not create a program that frequently uses Acyclic Messages to write parameter data to NVS. Datalinks do not write to NVS and should be used for frequently changed parameters.

About Acyclic Messaging

Acyclic messaging is used to transfer data that does not require continuous updates to the PowerFlex 750-Series product through the option module. PROFINET acyclic messaging is used to configure and monitor the drive parameters on a PROFINET network as well as peripheral *Host* **and** *Device* parameters. For a full list of drive parameters, see the PowerFlex 750-Series AC Drives Programming Manual, publication 750-PM001, and the PowerFlex Drives with TotalFORCE® Control Programming Manual, publication 750-PM100.

For a list of option module *Host* and *Device* Parameters, see Appendix . To use acyclic messaging read and write services, you need the values of the slot and index to which a parameter is associated. Value ranges for slot and index are shown in Table 5 and Table 6.

Table 5 – PROFINET Index for PowerFlex 753/755 Drive and Option Module Parameters

Device	PROFINET Index Range (Dec.)
Host Drive (Port 0)	0 ...8191
Option Module	8192...8703
Port 1 Parameters	8704... 9215
Port 2 Parameters	9216... 9727
Port 3 Parameters	9728...10239

Table 5 – PROFINET Index for PowerFlex 753/755 Drive and Option Module Parameters

Device	PROFINET Index Range (Dec.)
Port 4 Parameters	10240...10751
Port 5 Parameters	10752...11263
Port 6 Parameters	11264...11775
Port 7 Parameters	11776...12287
Port 8 Parameters	12288...12799
Port 9 Parameters	12800...13311
Port 10 Parameters	13312...13823
Port 11 Parameters	13824...14335
Port 12 Parameters	14336...14847
Port 13 Parameters	14848...15359
Port 14 Parameters	15360...15871
Reserved	15872...16383
Reserved	16384...24575
Option Host Parameters	24576...25087
Port 1 Host Parameters	25088...25599
Port 2 Host Parameters	25600...26111
Port 3 Host Parameters	26112...26623
Port 4 Host Parameters	26624...27135
Port 5 Host Parameters	27136...27647
Port 6 Host Parameters	27648...28159
Port 7 Host Parameters	28160...28671
Port 8 Host Parameters	28672...29183
Port 9 Host Parameters	29184...29695
Port 10 Host Parameters	29696...30207
Port 11 Host Parameters	30208...20719
Port 12 Host Parameters	30720...31231
Port 13 Host Parameters	31232...31743
Port 14 Host Parameters	31744...32255
Reserved	32256...32767

Table 6 – PROFINET Index for PowerFlex 755T Product and Option Module Parameters

Device	PROFINET Index Range (Dec.)
Host Drive (Port 0)	0…4095
Port 1 Parameters	4096…4351
Port 2 Parameters	4352…4607
Port 3 Parameters	4608…4863
Port 4 Parameters	4864…5119
Port 5 Parameters	5120…5375
Port 6 Parameters	5376…5631
Port 7 Parameters	5632…5887
Port 8 Parameters	5888…6143
Port 9 Parameters	6144…6399
Port 10 Parameters	6400…6655
Port 11 Parameters	6656…6911
Port 12 Parameters	6912…7167
Port 13 Parameters	7168…7423
Port 14 Parameters	7424…7679
Port 1 Host Parameters	7680…7935
Port 2 Host Parameters	7936…8191
Port 3 Host Parameters	8192…8447
Port 4 Host Parameters	8448…8703
Port 5 Host Parameters	8704…8959
Port 6 Host Parameters	8960…9215
Port 7 Host Parameters	9216…9727
Port 8 Host Parameters	9728…10239
Port 9 Host Parameters	10240…12287
Port 10 Host Parameters	12288…16383
Port 11 Host Parameters	16384…20479
Port 12 Host Parameters	20480…24575
Port 13 Host Parameters	24576…28671
Port 14 Host Parameters	28672…32767

PROFINET Acyclic Messaging

The option module provides the following PROFINET Acyclic Services:

- READ: This service is used to read a PowerFlex 750-Series drive parameter or option module parameter.
- WRITE: This service is used to modify a PowerFlex 750-Series drive parameter or option module parameter.

Example Messaging

Examples of using PROFINET acyclic messaging to read and write to a drive parameter are described in this section. These examples use a PLX82-EIP-PNC Communication Gateway from ProSoft Technology, Inc., with the Studio 5000 Logix Designer® application, to perform acyclic messaging. See Chapter 3 in the PLX82-EIP-PNC User Manual for more information on using the PLX82-EIP-PNC Gateway with the Studio 5000 Logix Designer application.

Read Example for 755T Port 10: Parameter 407 [Motor Poles]

1. Go Online using the Studio 5000 Logix Designer application in Run Mode.
2. In Controller Tags, open the PLX82.ACYCLIC.Read.Request section.

3. Enter the DeviceID, SlotNumber, SubSlotNumber and Index as shown in the following figure.

- DeviceID is 0 because it assumes the first device in the network.
- SlotNumber is 0 and SubSlotNumber is 1 as they refer to the 20-750-PNET/20-750-PNET2P module.
- Index = 12288 (offset from Port 10 Host Parameters in Table 6) + 407 (Motor Poles) = 12695.

4. Under PLX82.Control Section, set AcyclicRead to 1.

- This will trigger the Acyclic Read message request.

5. View the results in the PLX82.ACYCLIC.Read.Response section, in the Data field.

Name	Value	Force Mask	Style
▷ PLX82_MSG_ACYCLIC_WRITE	{...}	{...}	
▷ PLX82_MSG_ACYCLIC_READ	{...}	{...}	
▲ PLX82	{...}	{...}	
▲ PLX82.CONTROL	{...}	{...}	
PLX82.CONTROL.AcyclicRead	0		Decimal
PLX82.CONTROL.AcyclicWrite	0		Decimal
▲ PLX82.ACYCLIC	{...}	{...}	
▲ PLX82.ACYCLIC.Read	{...}	{...}	
▷ PLX82.ACYCLIC.Read.Request	{...}	{...}	
▲ PLX82.ACYCLIC.Read.Response	{...}	{...}	
▷ PLX82.ACYCLIC.Read.Response.SequenceNumber	1		Decimal
▷ PLX82.ACYCLIC.Read.Response.MessageStatus	1		Decimal
▷ PLX82.ACYCLIC.Read.Response.DeviceID	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.SlotNumber	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.SubSlotNumber	1		Decimal
▷ PLX82.ACYCLIC.Read.Response.Index	12695		Decimal
▷ PLX82.ACYCLIC.Read.Response.API_Code	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.DataLength	4		Decimal
▲ PLX82.ACYCLIC.Read.Response.Data	{...}	{...} Decimal	
▷ PLX82.ACYCLIC.Read.Response.Data[0]	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.Data[1]	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.Data[2]	0		Decimal
▷ PLX82.ACYCLIC.Read.Response.Data[3]	4		Decimal

Write Example for 755T Port 12: Parameter 57 [OfstEvent Thresh]

1. Go Online using the Studio 5000 Logix Designer application in Run Mode.
2. In Controller Tags, open the PLX82.ACYCLIC.Write.Request section.
3. Enter the DeviceID, SlotNumber, SubSlotNumber, Index, Length, and Data as shown in the following figure.

- DeviceID is 0 because it assumes the first device in the network.
- SlotNumber is 0 and SubSlotNumber is 1 as they refer to the 20-750-PNET/20-750-PNET2P module.
- Index = 20480 (offset from Port 10 Host Parameters in) + 57 (OfstEvent Thresh) = 20537.
- Length = Length in bytes of value of parameter (32-bit value) = 4.
- Data = 200. The hex value for 200 is 0xC8.

Name	Value	Force Mask	Style
▷ PLX82_MSG_ACYCLIC_WRITE	{...}	{...}	
▷ PLX82_MSG_ACYCLIC_READ	{...}	{...}	
▲ PLX82	{...}	{...}	
▲ PLX82.CONTROL	{...}	{...}	
PLX82.CONTROL.AcyclicRead	0		Decimal
PLX82.CONTROL.AcyclicWrite	0		Decimal
▲ PLX82.ACYCLIC	{...}	{...}	
▷ PLX82.ACYCLIC.Read	{...}	{...}	
▲ PLX82.ACYCLIC.Write	{...}	{...}	
▲ PLX82.ACYCLIC.Write.Request	{...}	{...}	
▷ PLX82.ACYCLIC.Write.Request.DeviceID	0		Decimal
▷ PLX82.ACYCLIC.Write.Request.SlotNumber	0		Decimal
▷ PLX82.ACYCLIC.Write.Request.SubSlotNumber	1		Decimal
▷ PLX82.ACYCLIC.Write.Request.Index	20537		Decimal
▷ PLX82.ACYCLIC.Write.Request.API_Code	0		Decimal
▷ PLX82.ACYCLIC.Write.Request.DataLength	4		Decimal
▲ PLX82.ACYCLIC.Write.Request.Data	{...}	{...} Decimal	
▷ PLX82.ACYCLIC.Write.Request.Data[0]	16#00		Hex
▷ PLX82.ACYCLIC.Write.Request.Data[1]	16#00		Hex
▷ PLX82.ACYCLIC.Write.Request.Data[2]	16#00		Hex
▷ PLX82.ACYCLIC.Write.Request.Data[3]	16#c8		Hex

4. Under PLX82.Control Section, set AcyclicWrite to 1.

•   This will trigger the Acyclic Write message request.

5. View the results in the PLX82.ACYCLIC.Write.Response section, in the Data field.

Troubleshooting

This chapter provides information for diagnosing and troubleshooting potential problems with the option module and network.

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NET B Status Indicator	47
Viewing Option Module Diagnostic Items	47
Viewing and Clearing Events	50

Understanding the Status Indicators

The option module has three or four status indicators. They can be viewed with the drive cover removed.
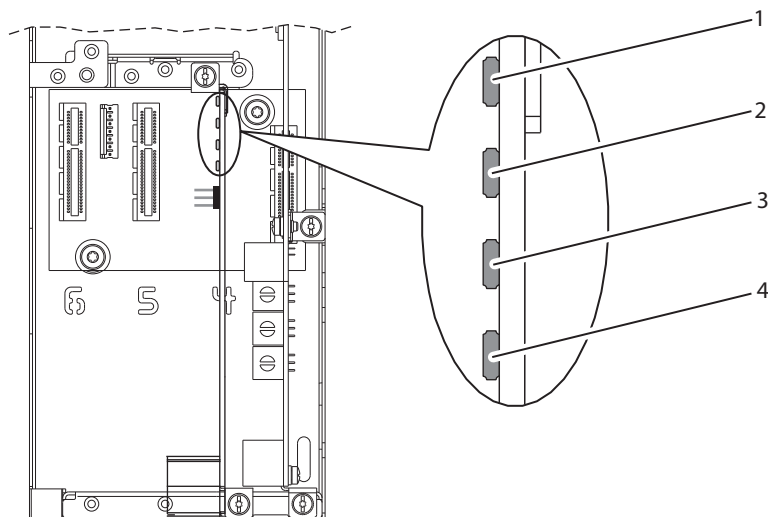
Item	Status Indicator	Description	Page
1	PORT	DPI™ Connection Status	46
2	MOD	Option Module Status	46
3	NET A	PROFINET Network A Status	46
4[1]	NET B	PROFINET Network B Status	47

(1) Only on 20-750-PNET2P module.

PORT Status Indicator

This red/green bicolor LED indicates the status of the option module's connection to the drive as shown in the following table.

Status	Cause	Corrective Action
Off	The option module is not powered or is not properly connected to the drive.	Securely connect and ground the option module to the drive by fully inserting it into the drive port and tightening its two captive screws to the recommended torque. Apply power to the drive.
Flashing Red	The option module is not receiving any communication from the drive.	Verify that the option module is properly inserted in the drive port. Cycle power to the drive.
Steady Red	The option module detected a duplicate or invalid port ID.	**Important:** Cycle power to the drive after making any of the following corrections: Securely connect and ground the option module to the drive by fully inserting it into the drive port and tightening its two captive screws to the recommended torque. Configure the option module and drive to use a Datalink that is not already being used by another peripheral.
Flashing Green	The option module is establishing communication with the drive.	No action required. This status indicator will turn steady green or red.
Steady Green	The option module is properly connected and is communicating with the drive.	No action required.
Steady Yellow	Option module is not compatible with product.	Connect the option module to a compatible product with a compatible firmware revision. PowerFlex® 755T products require firmware revision 6.001 and later.

MOD Status Indicator

This red/green bicolor LED indicates the status of the option module as shown in the following table.

Status	Cause	Corrective Action
Off	The option module is not powered or is not properly connected to the drive.	Securely connect and ground the option module to the drive by fully inserting it into the drive port and tightening its two captive screws to the recommended torque. Apply power to the drive and network.
Flashing Red	The option module has failed the firmware test.	Cycle power to the drive. Parameter settings may have been changed. Clear faults in the option module. If cycling power does not correct the problem, the option module parameter settings may have been corrupted. Reset defaults and reconfigure the option module. If resetting defaults does not correct the problem, update the option module with the latest firmware revision.
Steady Red	The option module has failed the hardware test.	Cycle power to the drive. Replace the option module.
Flashing Green	The option module is operational, but is not transferring I/O data.	Place the Client in RUN mode. Configure the option module for the program in the controller. Program the controller to recognize and transmit I/O to the option module. Normal behavior if no I/O is being transferred.
Steady Green	The option module is operating and is transferring I/O data to the controller.	No action required.

NET A Status Indicator

This red/green bicolor LED indicates the status of the PROFINET network A connection to the option module as shown in the following table.

Status	Cause	Corrective Actions
Off	The option module is not using network A, or not properly connected to network A.	Securely connect the option module to the drive and connect it to network A using a PROFINET cable. Correctly connect the PROFINET cable to the Port 1 PROFINET connector. Apply power to the drive.
Flashing Red	An error has occurred in network A configuration.	Reconfigure the PROFINET module for network A.
Steady Red	An initialization error has occurred for network A in ERTEC 200.	Cycle power to the drive. Reconfigure the PROFINET controller.
Steady Green	The option module is properly connected and communicating on network A.	No action required.

NET B Status Indicator

This red/green bicolor LED indicates the status of the PROFINET network B connection to the option module as shown in the following table. This status indicator is available only on the 20-750-PNET2P module.

Status	Cause	Corrective Actions
Off	The option module is not using network B, or not properly connected to network B.	Securely connect the option module to the drive and connect it to network B using a PROFINET cable. Correctly connect the PROFINET cable to the Port 2 PROFINET connector. Apply power to the drive.
Flashing Red	An error has occurred in network B configuration.	Reconfigure the PROFINET module for network B.
Steady Red	An initialization error has occurred for network B in ERTEC 200.	Cycle power to the drive. Reconfigure the PROFINET controller.
Steady Green	The option module is properly connected and communicating on network B.	No action required.

Viewing Option Module Diagnostic Items

If you encounter unexpected communications problems, the option module's diagnostic items may help you or Rockwell Automation personnel troubleshoot the problem. Option module diagnostic items can be viewed with any of these drive configuration tools:

- PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM
- Connected Components Workbench™ software

For details on viewing diagnostic items with the HIM, see the PowerFlex 20-HIM-A6/-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001.

Table 7 - Option Module Diagnostic Items

No.	Name	Description
1	Common Logic Cmd	The present value of the Common Logic Command being transmitted to the drive by this option module.
2	Prod Logic Cmd	The present value of the Product Logic Command being transmitted to the drive by this option module.
3	Reference	The present value of the Reference being transmitted to the drive by this option module.
4	Common Logic Sts	The present value of the Common Logic Status being received from the drive by this option module.
5	Prod Logic Sts	The present value of the Product Logic Status being received from the drive by this option module.
6	Feedback	The present value of the Feedback being received from the drive by this option module.
7	Input Size	The size of the input image in bytes transferred from the network to the drive.
8	Output Size	The size of the output image in bytes transferred from the drive to the network.
9	DL Fr Net Avail	The number of *Host* **DL From Net xx** Datalinks currently available to the option module.
10	DL To Net Avail	The number of Host **DL To Net xx** Datalinks currently available to the option module.

Table 7 - Option Module Diagnostic Items (Continued)

No.	Name	Description
11	DL Fr Net 01 Val	
12	DL Fr Net 02 Val	
13	DL Fr Net 03 Val	
14	DL Fr Net 04 Val	
15	DL Fr Net 05 Val	
16	DL Fr Net 06 Val	
17	DL Fr Net 07 Val	
18	DL Fr Net 08 Val	The present value of respective *Host* **DL From Net xx** parameter being transmitted to the drive by this option module. (If not using a Datalink, its respective value should be zero.)
19	DL Fr Net 09 Val	
20	DL Fr Net 10 Val	
21	DL Fr Net 11 Val	
22	DL Fr Net 12 Val	
23	DL Fr Net 13 Val	
24	DL Fr Net 14 Val	
25	DL Fr Net 15 Val	
26	DL Fr Net 16 Val	
27	DL To Net 01 Val	
28	DL To Net 02 Val	
29	DL To Net 03 Val	
30	DL To Net 04 Val	
31	DL To Net 05 Val	
32	DL To Net 06 Val	
33	DL To Net 07 Val	
34	DL To Net 08 Val	The present value of respective *Host* **DL To Net xx** parameter being received from the drive by this option module. (If not using a Datalink, its respective value should be zero.)
35	DL To Net 09 Val	
36	DL To Net 10 Val	
37	DL To Net 11 Val	
38	DL To Net 12 Val	
39	DL To Net 13 Val	
40	DL To Net 14 Val	
41	DL To Net 15 Val	
42	DL To Net 16 Val	
43	DPI Rx Errs	The present value of the DPI Receive error counter.
44	DPI Rx Errs Max	The maximum value (since reset) of the DPI Receive Error counter.
45	DPI Tx Errs	The present value of the DPI Transmit error counter.
46	DPI Tx Errs Max	The maximum value (since reset) of the DPI Transmit Error counter.
47	Boot Flash Count	Number of times the boot firmware in the option module has been updated.
48	App Flash Count	Number of times the application firmware in the option module has been updated.
49	P1 ID	Indicates port number on option module network port 1.
50	P1 Rx Tot Bytes	Total count of bytes received on option module network port 1.
51	P1 Rx Tot Frms	Total count of frames received on option module network port 1.
52	P1 Rx Good Frms	Count of good frames received on option module network port 1.
53	P1 Rx Unicasts	Count of unicasts received on option module network port 1.
54	P1 Rx Multicst	Count of multicasts received on option module network port 1.
55	P1 Rx Broadcst	Count of broadcasts received on option module network port 1.
56	P1 Rx Unk Mlcst	Count of unknown multicasts received on option module network port 1.
57	P1 Rx Unk Uncst	Count of unknown unicasts received on option module network port 1.
58	P1 Rx Err	Count of receive errors on option module network port 1.
59	P1 Rx Discards	Count of received frames that were discarded on option module network port 1.
60	P1 Tx Tot Bytes	Total count of bytes transmitted on option module network port 1.
61	P1 Tx Tot Frms	Total count of frames transmitted on option module network port 1.

Table 7 - Option Module Diagnostic Items (Continued)

No.	Name	Description
62	P1 Tx Unicasts	Count of unicasts transmitted on option module network port 1.
63	P1 Tx Multicst	Count of multicasts transmitted on option module network port 1.
64	P1 Tx Broadcst	Count of broadcasts transmitted on option module network port 1.
65	P1 Tx Collision	Count of transmitted frames in which there was a collision on option module network port 1.
66	P1 Tx Err	Count of transmit errors on option module network port 1.
67	P1 Tx Discards	Count of transmitted frames that were discarded on option module network port 1.
68	P2 ID	Indicates port number on option module network port 2.
69	P2 Rx Tot Bytes	Total count of bytes received on option module network port 2.
70	P2 Rx Tot Frms	Total count of frames received on option module network port 2.
71	P2 Rx Good Frms	Count of good frames received on option module network port 2.
72	P2 Rx Unicasts	Count of unicasts received on option module network port 2.
73	P2 Rx Multicst	Count of multicasts received on option module network port 2.
74	P2 Rx Broadcst	Count of broadcasts received on option module network port 2.
75	P2 Rx Unk Mlcst	Count of unknown multicasts received on option module network port 2.
76	P2 Rx Unk Uncst	Count of unknown unicasts received on option module network port 2.
77	P2 Rx Err	Count of receive errors on option module network port 2.
78	P2 Rx Discards	Count of received frames that were discarded on option module network port 2.
79	P2 Tx Tot Bytes	Total count of bytes transmitted on option module network port 2.
80	P2 Tx Tot Frms	Total count of frames transmitted on option module network port 2.
81	P2 Tx Unicasts	Count of unicasts transmitted on option module network port 2.
82	P2 Tx Multicst	Count of multicasts transmitted on option module network port 2.
83	P2 Tx Broadcst	Count of broadcasts transmitted on option module network port 2.
84	P2 Tx Collision	Count of transmitted frames in which there was a collision on option module network port 2.
85	P2 Tx Err	Count of transmit errors on option module network port 2.
86	P2 Tx Discards	Count of transmitted frames that were discarded on option module network port 2.
87	HW Addr 1	Decimal value of each byte in the option module's hardware address. This is configured during factory production and it cannot be changed by the user.
88	HW Addr 2	
89	HW Addr 3	255:255:255:255:255:255
90	HW Addr 4	[HW Addr 1]
91	HW Addr 5	[HW Addr 2]
92	HW Addr 6	[HW Addr 3] [HW Addr 4] HW Addr 5] [HW Addr 6]
93	P1-HW Addr1	
94	P1-HW Addr2	
95	P1-HW Addr3	Decimal value of each byte in the option module's Port 1 hardware address. This is configured during factory production and it cannot be changed by the user.
96	P1-HW Addr4	
97	P1-HW Addr5	
98	P1-HW Addr6	
99	P2-HW Addr1	
100	P2-HW Addr2	
101	P2-HW Addr3	Decimal value of each byte in the option module's Port 2 hardware address. This is configured during factory production and it cannot be changed by the user.
102	P2-HW Addr4	
103	P2-HW Addr5	
104	P2-HW Addr6	

Table 7 - Option Module Diagnostic Items (Continued)

No.	Name	Description
105	IP Addr Act 1	Value of each byte in the option module's present IP address. A value of '0' appears if the option module does not currently have an IP address.
106	IP Addr Act 2	
107	IP Addr Act 3	255.255.255.255
108	IP Addr Act 4	[IP Addr Act 1] [IP Addr Act 2] [IP Addr Act 3] [IP Addr Act 4]
109	Subnet Act 1	Value of each byte in the option module's present subnet mask. A value of '0' appears if the option module does not currently have a subnet mask.
110	Subnet Act 2	
111	Subnet Act 3	255.255.255.255
112	Subnet Act 4	[Subnet Act 1] [Subnet Act 2] [Subnet Act 3] [Subnet Act 4]
113	Gateway Act 1	Value of each byte in the option module's present gateway address. A value of '0' appears if the option module does not currently have a gateway address.
114	Gateway Act 2	
115	Gateway Act 3	255.255.255.255
116	Gateway Act 4	[Gateway Act 1] [Gateway Act 2] [Gateway Act 3] [Gateway Act 4]

Viewing and Clearing Events

The option module has an event queue to record significant events that occur in the operation of the module. When such an event occurs, an entry consisting of the event's numeric code and a timestamp is put into the event queue. You can view the event queue with any of these drive configuration tools:

- PowerFlex 20-HIM-A6 or 20-HIM-C6S HIM
- Connected Components Workbench software

For details on viewing and clearing events with the HIM, see the PowerFlex 20-HIM-A6/-C6S HIM (Human Interface Module) User Manual, publication 20HIM-UM001.

The event queue can contain up to 32 entries, which are stored in an EEPROM chip—making the event queue nonvolatile. Eventually the event queue will become full, since its contents are retained through option module power cycles and resets. At that point, a new entry replaces the oldest entry. Only an event queue clear operation or the corruption of the EEPROM group containing the event queue will clear the event queue contents. In the latter case, the option module will not generate a fault to indicate that the event queue was corrupted.

Resetting the option module to defaults has no effect on the event queue, other than to log a Code 58 'Module Defaulted' event.

Many events in the event queue occur under normal operation. If you encounter unexpected communication problems, the events may help you or

Allen-Bradley personnel troubleshoot the problem. The following events may appear in the event queue.

Table 8 - Option Module Events

Code	Event Text	Description
		Option Module Events
1	No Event	Text displayed in an empty event queue entry.
2	Device Power Up	Power was applied to the option module.
3	Device Reset	The option module was reset.
4	EEPROM CRC Error	The EEPROM checksum/CRC is incorrect, which limits option module functionality. Default parameter values must be loaded to clear this condition.
5	App Updated	The option module application firmware was updated.
6	Boot Updated	The option module boot firmware was updated.
7	Watchdog Timeout	The software watchdog detected a failure and reset the option module.
		DPI Events
8	DPI Bus Off	A bus-off condition was detected on DPI. This event may be caused by noise.
9	DPI Ping Timeout	A ping message was not received on DPI within the specified time.
10	DPI Port Invalid	The option module was not connected to a valid port on a DPI product.
11	DPI Port Changed	The DPI port changed after start-up.
12	DPI Host Reset	The drive sent a reset event message.
13	DPI Baud 125kbps	The option module detected that the drive was communicating at 125 Kbps.
14	DPI Baud 500kbps	The option module detected that the drive was communicating at 500 Kbps.
15	DPI Host Invalid	The option module was connected to an incompatible product.
16	DPI Dup Port	Another peripheral with the same port number is already in use.
17	DPI Type 0 Logon	The option module has logged in for Type 0 control.
18	DPI Type 0 Time	The option module has not received a Type 0 status message within the specified time.
19	DPI DL Logon	The option module has logged into a Datalink.
20	DPI DL Error	The drive rejected an attempt to log in to a Datalink because the Datalink is not supported or is used by another peripheral.
21	DPI DL Time	The option module has not received a Datalink message within the specified time.
22	DPI Ctrl Disable	The option module has sent a 'Soft Control Disable' command to the drive.
23	DPI Ctrl Enable	The option module has sent a 'Soft Control Enable' command to the drive.
24	DPI Msg Timeout	A Client-Server message sent by the option module was not completed within 1 second.
25	DPI Manual Reset	The option module was reset by changing its Reset Module parameter.
		SI Events
26	SI Online	The option module has logged into the Serial Interface Communications.
27	SI Logon Error	The option module failed to log into the Serial Interface.
28	SI Comm Fault	The Serial Interface Communications has faulted.
		Network Events
29	Net Link Up	A network link was available for the option module.
30	Net Link Down	The network link was removed from the option module.
31	Net Dup Address	The option module uses the same address as another device on the network.
32	Net Comm Fault	The option module detected a communications fault on the network.
33	Net Sent Reset	The option module received a reset from the network.
34	Net IO Close	An I/O connection from the network to the option module was closed.
35	Net Idle Fault	The option module received 'idle' packets from the network.
36	Net IO Open	An I/O connection from the network to the option module has been opened.
37	Net IO Timeout	An I/O connection from the network to the option module has timed out.
38	Net IO Size Err	The option module received an incorrectly sized I/O packet.
39	PCCC IO Close	The device sending PCCC Control messages to the option module has set the PCCC Control Timeout to zero.
40	PCCC IO Open	The option module has begun receiving PCCC control messages (the PCCC Control Timeout was previously set to a nonzero value).
41	PCCC IO Timeout	The option module has not received a PCCC Control message for longer than the PCCC Control Timeout.
42	Msg Ctrl Open	The timeout attribute in either the CIP Register or Assembly Object was written with a nonzero value, allowing control messages to be sent to the option module.
43	Msg Ctrl Close	The timeout attribute in either the CIP Register or Assembly Object was written with a zero value, disallowing control messages to be sent to the option module.

Table 8 - Option Module Events (Continued)

Code	Event Text	Description
44	Msg Ctrl Timeout	The timeout attribute in either the CIP Register or Assembly object elapsed between accesses of those objects.
45	Peer IO Open	The option module received the first Peer I/O message.
46	Peer IO Timeout	The option module has not received a Peer I/O message for longer than the Peer I/O Timeout.
47...54	Reserved	—
55	DHCP Response	The option module received a response to its DHCP request.
57	Option Card Flt	Internal option module faults.
58	Module Defaulted	The option module has been set to defaults.
59	PN WD Timeout	A watchdog is detected in the PROFINET ASIC.
60	No MAC Addr	MAC address has not been assigned, or invalid MAC address.
61	P1 - Net Link Up	A network link is available at Port 1 of the option module.
62	P1 - Net Link Down	The network link is removed from Port 1 of the option module.
63	P2 - Net Link Up	A network link is available at Port 2 of the option module.
64	P2 - Net Link Down	The network link is removed from Port 2 of the option module.

Specifications

This appendix presents the specifications for the option module.

Topic	Page
Communication	53
Electrical	53
Mechanical	53
Environmental	54
Regulatory Compliance	54

Communication

Category	Specification

Network
    Protocol
    Data Rates
    Media
	
	PROFINET
	10/100 Mbps
	PROFINET Cable

Drive
    Protocol
    Data Rates
	
	DPI™
	500 Kbps

Electrical

Consumption	Specification
Drive	250 mA at 14V DC supplied by the host drive
Network	None

Mechanical

Category	Specification

Dimensions
    Height
    Length
    Width
	
	16 mm (0.64 inches)
	130 mm (5.12 inches)
	83 mm (3.27 inches)

Weight	60 g (2 oz.)

Environmental

Category	Specification
Temperature 　Operating 　Storage	–5…+65 °C (30…149 °F) -40…+85 °C (-40…+185 °F)
Relative Humidity 　Operating 　Nonoperating	5…80% noncondensing 5…95% noncondensing
Shock (Operating)	15 g peak acceleration
Vibration 　Operating 　Non-Operating	2 g at 55…512 Hz 5 g at 5 Hz…2 kHz
Atmosphere	**Important:** The option module **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors, or dust. If the option 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.

Regulatory Compliance

Certification	Specification
UL	UL508C
c-UL	CAN / CSA C22.2 No. 14-2010
CE	EN 61800-3
C-Tick	EN 61800-3
PI	EN 61158

This is a product of category C2 according to IEC 61800-3. In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.

Option Module Parameters

This appendix provides information about the option module parameters.

Topic	Page
Parameter Types	55
About Parameter Numbers	55
How Parameters Are Organized	56
Device Parameters	56
Host Parameters	58

Parameter Types

The option module has two types of parameters:

- *Device* parameters are used to configure the option module to operate on the network.
- *Host* parameters are used to configure the option module Datalink transfer and various fault actions with the drive.

You can view option module *Device* parameters and *Host* parameters with any of the following drive configuration tools:

- PowerFlex® 20-HIM-A6 or 20-HIM-C6S HIM—use the `4 ◄` or `► 6` key to scroll to the drive port in which the module resides, press the `📁` (Folders) key, and use the `4 ◄` or `► 6` key to scroll to the DEV PARAM or HOST PARAM folder.
- Connected Components Workbench™ software—click the tab for the option module at the bottom of the window, click the Parameters icon in the toolbar, and click the *Device* or *Host* Parameters tab.

About Parameter Numbers

Each parameter set is independently and consecutively numbered.

Configuration Tool	Numbering Scheme
• HIM • Connected Components Workbench software	The *Device* parameters and *Host* parameters begin with parameter 01. For example, *Device* **Parameter 01 - [Port Number]** and *Host* **Parameter 01 - [DL From Net 01]** are parameter 01 as indicated by this manual.
• Acyclic Messaging	See Chapter 5, Acyclic Messaging for details.

How Parameters Are Organized

The *Device* Parameters and *Host* Parameters are separately displayed in a **Numbered List** view order.

Device Parameters

Parameter		
No.	**Name and Description**	**Details**
01	**[Port Number]** Displays the drive port into which the option module is installed. Typically, this will be Port 4, 5, or 6.	Min: 4 Max: 6 Type: Read-only
02	**[DLs From Net Act]** Displays the number of controller-to-drive Datalinks that the drive is using based on the I/O connection opened by the controller.	Min: 0 Max: 16 Type: Read-only
03	**[DLs To Net Act]** Displays the number of drive-to-controller Datalinks that the controller is using based on the I/O connection opened by the controller.	Min: 0 Max: 16 Type: Read-only
04	**[Net Addr Src]** Displays the source from which the option module network address is taken. It is either the values of configured option module *Device* parameters or from a DCP-DHCP server.	Values: 0 = DCP-DHCP 1 = Config Type: Read-only

05	**[Reset Module]**
	No action if set to '0' (Ready). Resets the option module if set to '1' (Reset Module). Restores the option module to its factory default settings if set to '2' (Set Defaults). This parameter is a command. It will be reset to '0' (Ready) after the command has been performed. When performing a Set Defaults, the drive may detect a conflict. If this occurs, the drive will not allow a Set Defaults action. You must resolve the conflict before attempting a Set Defaults action for the option module.
		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 option module is transmitting I/O that controls the drive, the drive may fault when you reset the option module. Determine how your drive will respond before resetting the option module.	

06
07
08
09
	[IP Addr Cfg 1]
	[IP Addr Cfg 2]
	[IP Addr Cfg 3]
	[IP Addr Cfg 4]
	Sets the IP address bytes for the option module's network address.
	
	255.255.255.255
	[IP Addr Cfg 1]
	   [IP Addr Cfg 2]
	      [IP Addr Cfg 3]
	         [IP Addr Cfg 4]
	
	Important: To set the IP address using these parameters, the IP Address Selection Jumper ([Figure 1 on page 18](#)) must be on Pins 2 and 3.
		Default: 192
		Default: 168
		Default: 0
		Default: 1
		Min: 0
		Max: 255
		Type: Read/Write
		Reset Required: Yes

Parameter		
No.	**Name and Description**	**Details**

10
11
12
13
	[Subnet Cfg 1]
	[Subnet Cfg 2]
	[Subnet Cfg 3]
	[Subnet Cfg 4]
	Sets the subnet mask bytes for the option module's network address.
	
	 255.255.255.255
	[Subnet Cfg 1]
	  [Subnet Cfg 2]
	    [Subnet Cfg 3]
	      [Subnet Cfg 4]
	
	Important: To set the subnet mask using these parameters, the IP Address Selection Jumper (<u>Figure 1 on page 18</u>) must be on Pins 2 and 3.
		Default: 255
		Default: 255
		Default: 255
		Default: 0
		Min: 0
		Max: 255
		Type: Read/Write
		Reset Required: Yes

14
15
16
17
	[Gateway Cfg 1]
	[Gateway Cfg 2]
	[Gateway Cfg 3]
	[Gateway Cfg 4]
	Sets the gateway address bytes for the option module's network address.
	
	 255.255.255.255
	[Gateway Cfg 1]
	  [Gateway Cfg 2]
	    [Gateway Cfg 3]
	      [Gateway Cfg 4]
	
	Important: To set the gateway address using these parameters, the IP Address Selection Jumper (<u>Figure 1 on page 18</u>) must be on Pins 2 and 3.
		Default: 192
		Default: 168
		Default: 0
		Default: 1
		Min: 0
		Max: 255
		Type: Read/Write
		Reset Required: Yes

18	**[DHCP]** Enables/disables the Dynamic Host Configuration Protocol server for setting the IP address, subnet mask, and gateway address of the option module.	Default: 0 = Disabled Values: 0 = Disabled 1 = Enabled Type: Read/Write Reset Required: Yes
19 20	Reserved	
21	**[DL Byte Order]** Display if the datalinks are displayed in little endian or big endian format.	Default: 0 Values: 0 = Little Endian 1 = Big Endian

Host **Parameters**

Parameter		
No.	**Name and Description**	**Details**
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	**[DL From Net 01]** **[DL From Net 02]** **[DL From Net 03]** **[DL From Net 04]** **[DL From Net 05]** **[DL From Net 06]** **[DL From Net 07]** **[DL From Net 08]** **[DL From Net 09]** **[DL From Net 10]** **[DL From Net 11]** **[DL From Net 12]** **[DL From Net 13]** **[DL From Net 14]** **[DL From Net 15]** **[DL From Net 16]** Sets the port number and parameter number to which the selected Datalinks should connect. Each selected port/ parameter will be written with data received from the network. These are parameters written by the controller (outputs from the controller). If setting the value manually, the parameter value = (10000 * port number) + (destination parameter number). For example, suppose you want to use *Host* **Parameter 01 [DL From Net 01]** to write to Parameter 01 of an optional encoder module plugged into drive *Port* 5. The value for *Host* **Parameter 01 [DL From Net 01]** would be 50001 [(10000 * 5) +1].	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Min: 0 Max: 159999 Type: Read/Write Reset Required: No
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	**[DL To Net 01]** **[DL To Net 02]** **[DL To Net 03]** **[DL To Net 04]** **[DL To Net 05]** **[DL To Net 06]** **[DL To Net 07]** **[DL To Net 08]** **[DL To Net 09]** **[DL To Net 10]** **[DL To Net 11]** **[DL To Net 12]** **[DL To Net 13]** **[DL To Net 14]** **[DL To Net 15]** **[DL To Net 16]** Sets the port number and parameter number to which the selected Datalinks should connect. Each selected port/ parameter will be read and their values transmitted over the network to the controller. These are parameters read by the controller (inputs to the controller). If setting the value manually, the parameter value = (10000 * port number) + (origination parameter number). For example, suppose you want to use *Host* **Parameter 17 [DL To Net 01]** to read Parameter 02 of an optional I/O module plugged into drive *Port* 6. The value for *Host* **Parameter 17 [DL To Net 01]** would be 60002 [(10000 * 6) + 2].	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Min: 0 Max: 159999 Type: Read/Write Reset Required: No

	Parameter	
No.	**Name and Description**	**Details**

33	**[Comm Flt Action]**
	Sets the action that the option module and drive will take if the option module detects that I/O communication has been disrupted. This setting is effective only if I/O that controls the drive is transmitted through the option module. When communication is re-established, the drive will automatically receive commands over the network again.
		Default: 0 = Fault
		Values: 0 = Fault
		                   1 = Stop
		                   2 = Zero Data
		                   3 = Hold Last
		                   4 = Send Flt Cfg
		Type: Read/Write
		Reset Required: No

	⚠ **ATTENTION:** Risk of injury or equipment damage exists. *Host* **Parameter 33 [Comm Flt Action]** lets you determine the action of the option module and connected drive if I/O communication is disrupted. By default, this parameter faults the drive. You may configure this parameter so that the drive continues to run, however, precautions should be taken to verify that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).	

34	**[Idle Flt Action]**
	Sets the action that the option module and drive will take if the option module detects that the controller is in program mode or faulted. This setting is effective only if I/O that controls the drive is transmitted through the option module. When the controller is put back in Run mode, the drive will automatically receive commands over the network again.
		Default: 0 = Fault
		Values: 0 = Fault
		                   1 = Stop
		                   2 = Zero Data
		                   3 = Hold Last
		                   4 = Send Flt Cfg
		Type: Read/Write
		Reset Required: No

	⚠ **ATTENTION:** Risk of injury or equipment damage exists. *Host* **Parameter 34 [Idle Flt Action]** lets you determine the action of the Option Module and connected drive when the controller is idle. By default, this parameter faults the drive. You may configure this parameter so that the drive continues to run, however, precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a controller in idle state).	
35	**[Peer Flt Action]** This parameter is functional. However, since the option module does not support peer I/O, any entered value is not used.	Reserved
36	**[Msg Flt Action]** The option module does not support this functionality. Any entered value is not used.	Reserved

Parameter		
No.	**Name and Description**	**Details**

37	**[Flt Cfg Logic]**
	Sets the Logic Command data that is sent to the drive if any of the following is true:
	Host **Parameter 33 [Comm Flt Action]** is set to '4' (Send Flt Cfg) and I/O communication is disrupted.
	Host **Parameter 34 [Idle Flt Action]** is set to '4' (Send Flt Cfg) and the controller is idle.
	Important: The bit definitions in the Logic Command word for PowerFlex 750-Series drives are shown in <u>Appendix</u> .
		Default: 0000 0000 0000 0000
		          0000 0000 0000 0000
		Min: 0000 0000 0000 0000
		          0000 0000 0000 0000
		Max: 1111 1111 1111 1111
		          1111 1111 1111 1111
		Type: Read/Write
		Reset Required: No

38	**[Flt Cfg Ref]** Sets the Reference data that is sent to the drive if any of the following is true: *Host* **Parameter 33 [Comm Flt Action]** is set to '4' (Send Flt Cfg) and I/O communication is disrupted. *Host* **Parameter 34 [Idle Flt Action]** is set to '4' (Send Flt Cfg) and the controller is idle.	Default: 0 Min: -3.40282×10^{38} Max: 3.40282×10^{38} Type: Read/Write Reset Required: No
39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	**[Flt Cfg DL 01]** **[Flt Cfg DL 02]** **[Flt Cfg DL 03]** **[Flt Cfg DL 04]** **[Flt Cfg DL 05]** **[Flt Cfg DL 06]** **[Flt Cfg DL 07]** **[Flt Cfg DL 08]** **[Flt Cfg DL 09]** **[Flt Cfg DL 10]** **[Flt Cfg DL 11]** **[Flt Cfg DL 12]** **[Flt Cfg DL 13]** **[Flt Cfg DL 14]** **[Flt Cfg DL 15]** **[Flt Cfg DL 16]** Sets the data that is sent to the Datalink in the drive if any of the following is true: *Host* **Parameter 33 [Comm Flt Action]** is set to '4' (Send Flt Cfg) and I/O communication is disrupted. *Host* **Parameter 34 [Idle Flt Action]** is set to '4' (Send Flt Cfg) and the controller is idle.	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Min: 0 Max: 4294967295 Type: Read/Write Reset Required: No

Logic Command/Status Words: PowerFlex 750-Series Products

This appendix presents the definitions of the Logic Command and Logic Status words that are used for PowerFlex® 750-Series products.

Drive Products

Here are the logic command and logic status words for PowerFlex 755TM common-bus inverters, PowerFlex 755TR drives, and PowerFlex 755TL drives.

Logic Command Word

Table 9 - Logic Command Word

Logic Bit	Command	Description	
		753/755	**755T**
0	Normal Stop	0 = Not Normal Stop 1 = Normal Stop	
1	Start [1]	0 = Not Start 1 = Start	
2	Jog 1 [2]	0 = Not Jog 1 1 = Jog 1 (speed set in 0:556)	0 = Not Jog 1 1 = Jog 1 (speed set in 10/11:1894)
3	Clear Fault [3]	0 = Not Clear Fault 1 = Clear Fault	
4, 5	Unipolar Direction	00 = No Command 01 = Forward Command 10 = Reverse Command 11 = Hold Direction Control	
6	Manual	0 = Not Manual 1 = Manual	
7	Reserved		
8,9	Accel Time	00 = No Command 01 = Use Accel Time 1 (0:535) 10 = Use Accel Time 2 (0:536) 11 = Use Present Time	00 = No Command 01 = Use Accel Time 1 (10/11:1915) 10 = Use Accel Time 2 (10/11:1916) 11 = Use Present Time
10,11	Decel Time	00 = No Command 01 = Use Decel Time 1 (0:537) 10 = Use Decel Time 2 (0:538) 11 = Use Present Time	00 = No Command 01 = Use Decel 1 (10/11:1917) 10 = Use Decel 2 (10/11:1918) 11 = Use Present Time
12 13 14	Ref Select	000 = No Command 001 = Ref A Select (0:545) 010 = Ref B Select (0:550) 011 = Preset Speed 3 (0:573) 100 = Preset Speed 4 (0:574) 101 = Preset Speed 5 (0:545) 110 = Preset Speed 6 (0:546) 111 = Preset Speed 7 (0:577)	000 = No Command 001 = Ref A Select (10/11:1800) 010 = Ref B Select (10/11:1807) 011 = Preset Speed 3 (10/11:1816) 100 = Preset Speed 4 (10/11:1817) 101 = Preset Speed 5 (10/11:1818) 110 = Preset Speed 6 (10/11:1819) 111 = Preset Speed 7 (10/11:1820)
15	Emerg OVRD	0 = Not Emergency Override 1 = Emergency Override	

Table 9 - Logic Command Word (Continued)

Logic Bit	Command	Description	
		753/755	**755T**
16	Coast Stop	0 = Not Coast to Stop 1 = Coast to Stop	
17	Current Limit Stop	0 = Not Current Limit Stop 1 = Current Limit Stop	
18	Run [4]	0 = Not Run 1 = Run	
19	Jog 2 [2]	0 = Not Jog 2 1 = Jog 2 (speed set in 0:557)	0 = Not Jog 2 1 = Jog 2 (speed set in 10/11:1895)
20	Reserved		
21	Energy Pause	0 = Energy Resume	0 = Energy Resume 1 = Energy Pause[5]
22…31	Reserved		

(1) A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Start condition will start the drive.
(2) A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Jog 1/Jog 2 condition will jog the drive. A transition to a '0' will stop the drive.
(3) To perform this command, the value must switch from '0' to '1'.
(4) A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Run condition will run the drive. A transition to a '0' will stop the drive.
(5) Bit 1, Energy Pause, available on PowerFlex 755T products only.

Logic Status Word

Table 10 - Logic Status Word

Logic Bit	Command	Description	
		753/755	**755T**
0	Run Ready	0 = Not Ready to Run 1 = Ready to Run	
1	Active	0 = Not Active 1 = Active	
2	Command Direction	0 = Reverse 1 = Forward	
3	Actual Direction	0 = Reverse 1 = Forward	
4	Accelerating	0 = Not Accelerating 1 = Accelerating	
5	Decelerating	0 = Not Decelerating 1 = Decelerating	
6	Alarm	0 = No Alarm 1 = Alarm(0:959 and 0:960)	0 = No Alarm 1 = Alarm (10/11:465…10/11:467)
7	Fault	0 = No Fault 1 = Fault (0: 952 and 0:953)	0 = No Fault 1 = Fault (10/11:461 and 10/11:462)
8	At Setpt Spd	0 = Not at Setpoint Speed 1 = At Setpoint Speed	
9	Manual	0 = Manual Mode Not Active 1 = Manual Mode Active	

Table 10 - Logic Status Word (Continued)

Logic Bit	Command	Description	
		753/755	**755T**
10	Spd Ref ID	00000 = Reserved	00000 = Reserved
11		00001 = Auto Ref A (0:545)	00001 = Auto Ref A (10/11:1800)
12		00010 = Auto Ref B (0:550)	00010 = Auto Ref B (10/11:1807)
13		00011 = Auto Preset Speed 3 (0:573)	00011 = Auto Preset Speed 3 (10/11:1816)
14		00100 = Auto Preset Speed 4 (0:574)	00100 = Auto Preset Speed 4 (10/11:1817)
		00101 = Auto Preset Speed 5 (0:575)	00101 = Auto Preset Speed 5 (10/11:1818)
		00110 = Auto Preset Speed 6 (0:576)	00110 = Auto Preset Speed 6 (10/11:1819)
		00111 = Auto Preset Speed 7 (0:577)	00111 = Auto Preset Speed 7 (10/11:1820)
		01000 = Reserved	01000 = Reserved
		01001 = Reserved	01001 = Reserved
		01010 = Reserved	01010 = Reserved
		01011 = Reserved	01011 = Reserved
		01100 = Reserved	01100 = Reserved
		01101 = Reserved	01101 = Reserved
		01110 = Reserved	01110 = Reserved
		01111 = Reserved	01111 = Reserved
		10000 = Man Port 0	10000 = Man Port 0
		10001 = Man Port 1	10001 = Man Port 1
		10010 = Man Port 2	10010 = Man Port 2
		10011 = Man Port 3	10011 = Man Port 3
		10100 = Man Port 4	10100 = Man Port 4
		10101 = Man Port 5	10101 = Man Port 5
		10110 = Man Port 6	10110 = Man Port 6
		10111 = Reserved	10111 = Reserved
		11000 = Reserved	11000 = Reserved
		11001 = Reserved	11001 = Reserved
		11010 = Reserved	11010 = Reserved
		11011 = Reserved	11011 = Reserved
		11100 = Reserved	11100 = Reserved
		11101 = Man Port 13 (embedded ENET) (0:877)	11101 = Man Port 13 (embedded ENET)(0:211)
		11110 = Man Port 14 (DriveLogix™) (0:878)	11110 = Reserved
		11111 = Alternate Man Ref Sel (0:328)	11111 = Alternate Man Ref Sel (10/11:1835)
15	Emerg OVRD	0 = No Command 1 = Emergency Override	
16	Running	0 = Not Running 1 = Running	
17	Jogging	0 = Not Jogging 1 = Jogging (0:556 and 0:557)	0 = Not Jogging 1 = Jogging (10/11:894 and 10/11:895)
18	Stopping	0 = Not Stopping 1 = Stopping	
19	DC Brake	0 = Not DC Brake 1 = DC Brake	
20	DB Active	0 = Not Dynamic Brake Active 1 = Dynamic Brake Active	
21	Speed Mode	0 = Not Speed Mode 1 = Speed Mode (0:309)	0 = Not Speed Mode 1 = Speed Mode (10/11:30)
22	Position Mode	0 = Not Position Mode 1 = Position Mode (0:309)	0 = Not Position Mode 1 = Position Mode (10/11:30)
23	Torque Mode	0 = Not Torque Mode 1 = Torque Mode (0:309)	0 = Not Torque Mode 1 = Torque Mode (10/11:30)
24	At Zero Speed	0 = Not at Zero Speed 1 =At Zero Speed	
25	At Home	0 = Not at Home 1 = At Home	
26	At Limit	0 = Not at Limit 1 = At Limit	
27	Current Limit	0 = Not at Current Limit 1 = At Current Limit	
28	Bus Freq Reg	0 = Not Bus Freq Reg 1 = Bus Freq Reg	

Table 10 - Logic Status Word (Continued)

Logic Bit	Command	Description	
		753/755	**755T**
29	Enable On	0 = Not Enable On 1 = Enable On	
30	Motor Overload	0 = Not Motor Overload 1 = Motor Overload	
31	Regen	0 = Not Regen 1= Regen	

Bus Supply Products

Here are the logic command and logic status words for PowerFlex 755TM bus supplies.

Logic Command Word

Table 11 - Logic Command Word, PowerFlex 755TM Bus Supplies

Logic Bit	Command	Description
0	Normal Stop	0 = Not Normal Stop 1 = Normal Stop
1	Start[1]	0 = Not Start 1 = Start
2	Reserved	
3	Clear Faults [2]	0 = Not Clear Faults 1 = Clear Faults
4...17	Reserved	
18	Run[3]	0 = Not Run 1 = Run
19...31	Reserved	

(1) A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Start condition starts the bus supply modulation.
(2) To perform this '0' command, the value must switch from '0' to '1'.
(3) A Not Stop condition (logic bit 0 = 0) must first be present before a 1 = Run condition runs the bus supply modulation. A transition to a '0' stops the modulation.

Logic Status Word

Table 12 - Logic Status Word, PowerFlex 755TM Bus Supplies

Logic Bit	Status	Description
0	Ready	0 = Not Ready to Run 1 = Ready to Run
1	Reserved	
2	Auto Restart Active	0 = Auto Restart not active 1 = Auto Restart active
3	Auto Restart Countdown	0 = Auto Restart not counting downtime 1 = Auto Restart counting downtime before attempting restart
4	Heatsink Fan On	0 = Heatsink fan off 1 = Heatsink fan on
5	Autotuning	0 = Autotune not active 1 = Autotune active

Table 12 - Logic Status Word, PowerFlex 755TM Bus Supplies (Continued)

6	Alarm	0 = No Alarm 1 = Alarm
7	Fault	0 = No Fault 1 = Fault
8	At DC Reference	0 = DC Bus voltage not within 1% of reference 1 = DC Bus voltage within 1% of reference
9...14	Reserved	
15	Start Inhibit	0 = No condition inhibiting start 1 = Condition is inhibiting start
16	Running	0 = Line-side converter not modulating 1 = Line-side converter modulating
17...20	Reserved	
21	AC Ridethrough	0 = Not riding through a power disturbance 1 = Riding through a power disturbance
22	Input Phase Loss	0 = Input phase loss is not occurring 1 = Input phase loss is occurring
23	AC Line Synchronized	0 = Line-side converter that is not synchronized with incoming power frequency and phase 1 = Line-side converter that is synchronized with incoming power frequency and phase
24	kVAR Only Active	0 = Line-side converter not commanding only reactive current 1 = Line-side converter commanding only reactive current
25	In Precharge	0 = Not executing a precharge 1 = Executing a precharge
26	At Limit	0 = Output is not being limited 1 = Output is being limited (13/14:226).
27	Cur Limit	0 = Current is not being limited 1 = Current is being limited
28	Converter Bus Regulating	0 = Not actively regulating DC Bus voltage 1 = Actively regulating DC Bus voltage
29	Enable On	0 = Converter is not being enabled by digital input 1 = Digital input is configured to enable the line-side converter, and the digital input is set
30	Motoring	0 = Not modulating to draw power from AC line 1 = Modulating to draw power from AC line
31	Regenerating	0 = Not modulating to send power to AC line 1 = Modulating to send power to AC line

Notes:

The following terms and abbreviations are used throughout this manual. For definitions of terms not listed here, refer to the Allen-Bradley Industrial Automation Glossary, publication AG-7.1.

Acyclic Messaging PROFINET acyclic messages are used to transfer data that does not require continuous updates. Typically the read and write services used for acyclic messaging are used to configure, monitor, and diagnose devices over the PROFINET network.

Connected Components Workbench™ software The recommended tool for monitoring and configuring Allen-Bradley® products and network communication adapters. It can be used on computers running various Microsoft Windows operating systems. You can obtain a free copy of Connected Components Workbench software at http://www.ab.com/support/abdrives/webupdate/software.html.

ControlFLASH Plus™ Software A free software tool used to electronically update the firmware of Allen-Bradley products and network communication adapters. Microsoft Windows ControlFLASH Plus software is downloaded automatically when the firmware revision file for the product being updated is downloaded from the Allen-Bradley updates website to your computer.

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.

Data Rate The speed at which data is transferred on the PROFINET network (fixed at 100 Mbps).

Datalinks A Datalink is a type of pointer used by PowerFlex® 750-Series drives to transfer data to and from the controller. Datalinks allow specified parameter values to be accessed or changed without using acyclic messages. When active, each 32-bit Datalink in a PowerFlex 750-Series drive consumes 4 bytes in the input image table and/or 4 bytes in the output image table of the controller.

DCP (Discovery Configuration Protocol) A communications protocol within the PROFINET standard that allows an IO Controller or Supervisor to commission every PROFINET IO device on a subnet.

DHCP (Dynamic Host Configuration Protocol) DHCP lets the option module configure itself dynamically at restart if the network has a DHCP server. The DHCP server assigns the option module a preconfigured IP address, a subnet mask, and a gateway address; therefore, you do not have to configure these using the parameters in the option module. DHCP can make it easier to administer a PROFINET network. A free version of the Rockwell Software® BOOTP-DHCP server can be obtained at rok.auto/pcdc.

DPI™ (Drive Peripheral Interface) A second-generation peripheral communication interface used by various Allen-Bradley drives and power products, such as PowerFlex 7-Class drives.

DriveExplorer™ Software   A tool for monitoring and configuring Allen-Bradley products and network communication adapters. It can be used on computers running various Microsoft Windows operating systems. DriveExplorer software, version 6.xx or later, can be used to configure this adapter and connected drive. This software tool has been discontinued and is now available as freeware at rok.auto/pcdc. There are no plans to provide future updates to this tool and the download is being provided 'as-is' for users that lost their DriveExplorer CD, or need to configure legacy products not supported by Connected Components Workbench software.

DriveTools™ SP Software   This software suite provides a family of tools, including DriveExecutive software, that you can use to program, monitor, control, troubleshoot, and maintain Allen-Bradley products. DriveTools SP software, version 1.01 or later, can be used with PowerFlex 750-Series, PowerFlex 7-Class, and PowerFlex 4-Class drives, and also legacy drives that implement a SCANport™ communication interface.

Fault Action   A fault action determines how the option module and connected drive act when a communication fault (for example, a disconnected cable) occurs or when the controller is switched out of run mode. The former uses a communication fault action, and the latter uses an idle fault action.

Fault Configuration   When communication is disrupted (for example, a cable is disconnected), the option module and PowerFlex 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 option module. 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 Datalinks.

GSDML File   The GSDML (Generic Station Description Markup Language) file is an XML (eXtensible Markup Language) file that describes the expected implementation of a PROFINET IO device. The file is normally registered in the PROFINET configuration tool for a device, and is supplied with the device via removable media or on the internet as a download. It can be accessed at rok.auto/pcdc.

Gateway   A device on a network that connects an individual network to a system of networks. When a node needs to communicate with a node on another network, a gateway transfers the data between the two networks. You need to configure the address for the gateway device in the option module if you want the option module to communicate with devices that are not on its network.

Hardware Address   Each Ethernet device has a unique hardware address (sometimes called a MAC address) that is 48 bits. The address appears as six digits separated by colons (for example, xx:xx:xx:xx:xx:xx). Each digit has a value between 0 and 255 (0x00 and 0xFF). This address is assigned in the hardware and cannot be changed. It is required to identify the device if you are using a DCP-DHCP server.

HIM (Human Interface Module)   A device that can be used to configure and control a drive. The Power Flex 20-HIM-A6 or 20-HIM-C6S HIM can be used to configure Power Flex 750-Series drives and their connected peripherals.

Hold Last When communication is disrupted (for example, a cable is disconnected), the option module and PowerFlex drive can respond by holding last. Hold last results in the drive receiving the last data received via the network connection before the disruption. If the drive was running and using the Reference from the option module, it will continue to run at the same Reference.

Idle Action An idle action determines how the option module and connected drive act when the controller is switched out of run mode.

I/O Data I/O data, sometimes called 'implicit messages' or 'input/output', is time-critical data such as a Logic Command and Reference. The terms 'input' (To Net) and 'output' (From Net) are defined from the controller's point of view. Output is produced by the controller and consumed by the option module. Input is produced by the option module and consumed by the controller.

IP Address A unique IP address identifies each node on the PROFINET network. An IP address consists of 32 bits that are divided into four segments of one byte each. It appears as four decimal integers separated by periods (xxx.xxx.xxx.xxx). Each 'xxx' can have a decimal value from 0 to 255. For example, an IP address could be 192.168.0.1.

An IP address has two parts: a network ID and a host ID. The class of network determines the format of the address.
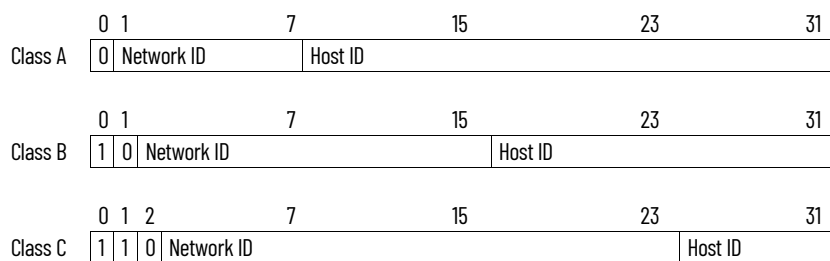
The number of devices on your PROFINET network will vary depending on the number of bytes that are used for the network address. In many cases you are given a network with a Class C address, in which the first three bytes contain the network address (subnet mask = 255.255.255.0). This leaves 8 bits or 256 addresses on your network. Because two addresses are reserved for special uses (0 is an address for the network usually used by the router, and 255 is an address for broadcast messages to all network devices), you have 254 addresses to use on a Class C address block.

To ensure that each device on the PROFINET network has a unique address, contact your network administrator or PROFINET Service Provider for unique fixed IP addresses. You can then set the unique IP address for the option module by using a DHCP server or by manually configuring parameters in the option module. The option module reads the values of these parameters only at powerup.

Logic Command/Logic Status The Logic Command is used to control the PowerFlex 750-Series drive (for example, start, stop, and direction). It consists of one 32-bit word of output to the option module from the network. The definitions of the bits in this word are shown in Appendix C.

The Logic Status is used to monitor the PowerFlex 750-Series drive (for example, operating state and motor direction). It consists of one 32-bit word of input from the option module to the network. The definitions of the bits in this word are shown in Appendix C.

Leader-Follower Hierarchy   An option module configured for a leader-follower hierarchy exchanges data with the leader device. Usually, an automation network has one scanner which is the leader device, and all other devices (for example, drives connected to PROFINET option modules) are follower devices.

On a network with multiple scanners (called a multi-leader hierarchy), each follower device must have a scanner specified as a leader.

NVS (Nonvolatile Storage)   NVS is the permanent memory of a device. Devices such as the option module and drive store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called 'EEPROM'.

Option Module   Devices such as drives, controllers, and computers usually require a network communication option module to provide a communication interface between them and a network such as PROFINET. An option module reads data on the network and transmits it to the connected device. It also reads data in the device and transmits it to the network.

The 20-750-PNET2P PROFINET Dual-port option module connects PowerFlex 750-Series drives to a PROFINET network. Option modules are sometimes also called 'adapters', 'cards', 'embedded communication options', or 'peripherals'. On PowerFlex 750-Series drives, option modules can also be I/O modules, encoder modules, safety modules, and so forth.

PCCC (Programmable Controller Communications Command)   PCCC is the protocol used by some controllers to communicate with devices on a network. Some software products (for example, DriveExplorer and DriveExecutive software) also use PCCC to communicate.

Ping   A message that is sent by a DPI product to its peripheral devices. Pings are used to gather data about the product, including whether it can receive messages and if they can log in for control.

PowerFlex 750-Series (Architecture Class) Drives   Allen-Bradley PowerFlex 750-Series drives are part of the PowerFlex 7-Class family of drives.

PROFINET Network   PROFINET is the open industrial Ethernet standard of PROFIBUS International (PI) for automation. PROFINET uses TCP/IP and IT standards, and is, in effect, real-time Ethernet. The PROFINET network is designed for industrial communications, where both I/O and acyclic messages can be transmitted over the network to communicate with industrial automation equipment. The number of devices that a PROFINET network can support depends on the class of network it is installed in. For example, a network with a Class C IP address can have 254 nodes.

General information about PROFINET standards and the PROFINET specification are maintained by PROFIBUS & PROFINET International (PI). See http://www.profinet.com/.

Reference/Feedback The Reference is used to send a setpoint (for example, speed, frequency, and torque) to the drive. It consists of one 32-bit word of output to the option module from the network.

Feedback is used to monitor the speed of the drive. It consists of one 32-bit word of input from the option module to the network.

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 option modules connected to a network. See also [Controller](#).

SI (Serial Interface) A next generation communication interface used by various Allen-Bradley drives, such as PowerFlex 750-Series drives.

Status Indicators LEDs that are used to report the status of the option module, network, and drive. They are on the option module and can be viewed when the drive is powered and its cover is removed.

Stop Action When communication is disrupted (for example, a cable is disconnected), the option module and drive can respond with a stop action. A stop action results in the drive receiving zero as values for Logic Command, Reference, and Datalink data. If the drive was running and using the Reference from the option module, it will stay running but at zero Reference.

Subnet Mask An extension to the IP addressing scheme that lets you use a single network ID for multiple physical networks. A bit mask identifies the part of the address that specifies the network and the part of the address that specifies the unique node on the network. A '1' in the subnet mask indicates the bit is used to specify the network. A '0' in the subnet mask indicates that the bit is used to specify the node.

For example, a subnet mask on a network may appear as follows: 11111111 11111111 11111111 11000000 (255.255.255.192). This mask indicates that 26 bits are used to identify the network and 6 bits are used to identify devices on each network. Instead of a single physical Class C network with 254 devices, this subnet mask divides it into four networks with up to 62 devices each.

Update The process of updating firmware in a device. The option module can be updated using various Allen-Bradley software tools. See [Updating the Option Module Firmware on page 33](#).

Zero Data When communication is disrupted (for example, a cable is disconnected), the option module and drive can respond with zero data. Zero data results in the drive receiving zero as values for Logic Command, Reference, and Datalink data. If the drive was running and using the Reference from the option module, it will stay running but at zero Reference.

Rockwell Automation Support

Use these resources to access support information.

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

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Waste Electrical and Electronic Equipment (WEEE)

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

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

Connect with us.