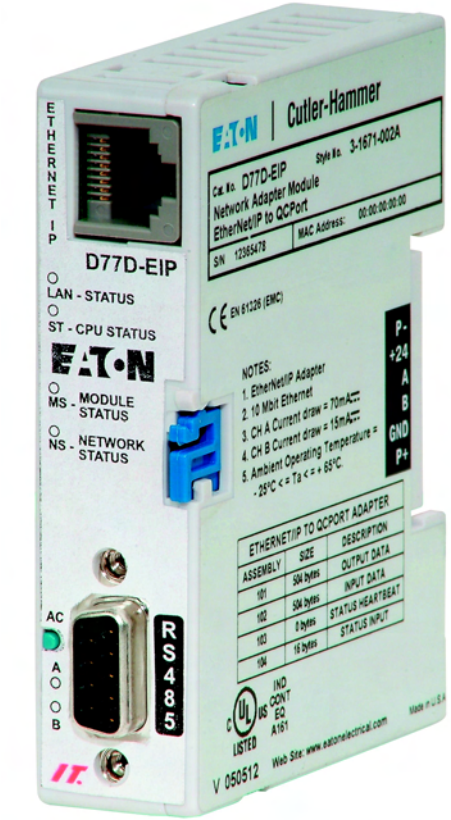
Cutler-Hammer

Intelligent Technologies
EtherNet/IP to QCPort Adapter

Installation and User Manual

June 2005
NEW



June 2005

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Product Overview

Description

Eaton Electrical Intelligent Technologies (*IT*) D77 EtherNet/IP Adapter (D77D-EIP) has greatly increased the functionality of the ***IT.*** communicating products, allowing monitoring and control for ***IT.*** I/O and ***IT.*** motor control devices. The Adapter scans the devices and then concentrates all their data into a single EtherNet/IP node.

To simplify the configuration of the EtherNet/IP Adapter, a simple button press auto configures the system for default operation. This feature automatically configures the I/O data into single assemblies in a convenient scan table.

For more information on the ***IT.*** family of products, visit our web site at: www.eatonelectrical.com

Features and Benefits

The ***IT.*** D77D-EIP includes the following significant features:

- Communications to EtherNet/IP
- Large I/O size of 504 bytes
- Provides for control of all ***IT.*** communicating devices connected to the Adapter
- Single button press auto configures the Adapter, setting up the system for default operation
- Advanced configuration using CH Studio
- Two independent QCPort (communication) channels
- QCPort powers the Adapter; no need for an extra power supply
- Channel B QCPort Isolated
- Status LEDs
- Provides for configuration of QCPort devices from EtherNet/IP
- DIN rail mountable
- Monitoring and configuration of QCPort devices from EtherNet/IP
- 10 Base T connection for EtherNet/IP
- IP address via Bootp, DHCP, or static assignment

Safety

The following safety statements relate to the installation, setup, and operation of the Eaton Electrical ***IT.*** EtherNet/IP Adapter.

Notice

Make sure you read and understand the installation procedures in this manual **before** you attempt to operate or setup the equipment.

⚠ WARNING

This instruction manual should be used for proper installation, setup, and operation of the ***IT.*** Ethernet Adapter. Improperly installing and maintaining this product can result in serious personal injury or property damage. Before attempting installation, setup or operation, read and understand this entire manual.

⚠ WARNING

Only apply 24V DC to the EtherNet/IP Adapter connectors and terminals. Use of any other voltage may result in personal injury, property damage, and damage to the ***IT.*** EtherNet/IP Adapter.

⚠ WARNING

To provide continued protection against fire or shock hazard, the ***IT.*** EtherNet/IP Adapter must be replaced if it becomes inoperative.

Environmental Ratings

Table 1: Environmental Ratings

Description	Specification
Transportation	
Temperature	-50°C to 80°C [-58°F to 176°F]
Humidity	5 – 95% non-condensing
Operating	
Temperature	-25°C to 65°C [-13°F to 131°F]
Humidity	5 – 95% non-condensing
Altitude	Above 2000 meters [6600 feet] consult factory
Shock **IEC 68-2-27**	15G any direction for 11 msecs
Vibration **IEC 68-2-6**	5 – 150 Hz, 5G, 0.7 mm maximum peak-to-peak
Radiated and Conducted Emissions	EN55011 Class A

Approvals/Certifications

Table 2: Approvals/Certifications

Standard	Approval/Certificate
Electrical/EMC	
ESD Immunity (IEC61000-4-2)	+/- 8kV air, +/- 4kV contact
Radiated RF (IEC61000-4-3)	10V/m 80-1000 MHz, 80% amplitude modulation @ 1kHz
Fast Transient (IEC61000-4-4)	+/- 2kV supply and control +/- 1kV communications
Surge (IEC61000-4-5)	+/- 1kV line-to-line +/- 2kV line-to-ground
RF Conducted (IEC61000-4-6)	10V, 0.15 – 80MHz
Magnetic Field (IEC61000-4-8)	30 A/m, 50Hz
Other Standards	
Agency Certifications	UL 508 CE (Low Voltage Directive) CUL (CSA C22.2 No. 14) EtherNet/IP Certified
Ingress Protection	IP20

EtherNet/IP Specifications

Table 3: EtherNet/IP Specifications

EtherNet/IP Communications	10 Base T
Maximum EtherNet/IP I/O Size	504 bytes input and output
EtherNet/IP Baud Rate	10 Megabit

Catalog Numbering System

There is only one catalog number for the ***IT.*** D77 EtherNet/IP Adapter: D77D-EIP.

Physical Features

Physical Description

The following figure illustrates the various features of the ***IT.*** EtherNet/IP Adapter (D77DPNA).

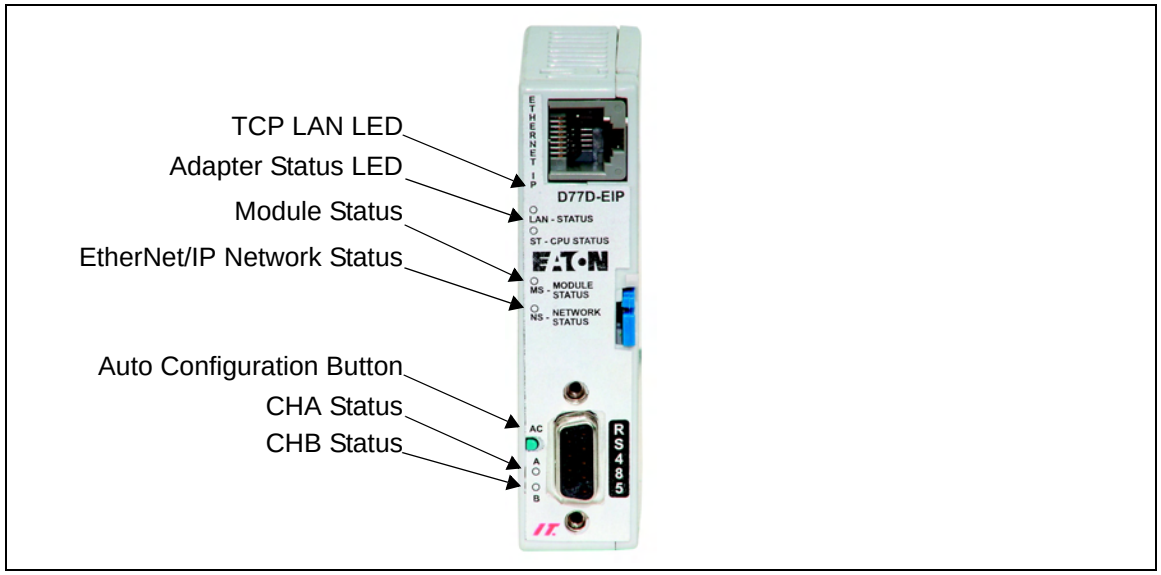

Figure 1: EtherNet/IP Adapter (D77D-EIP) Front Features

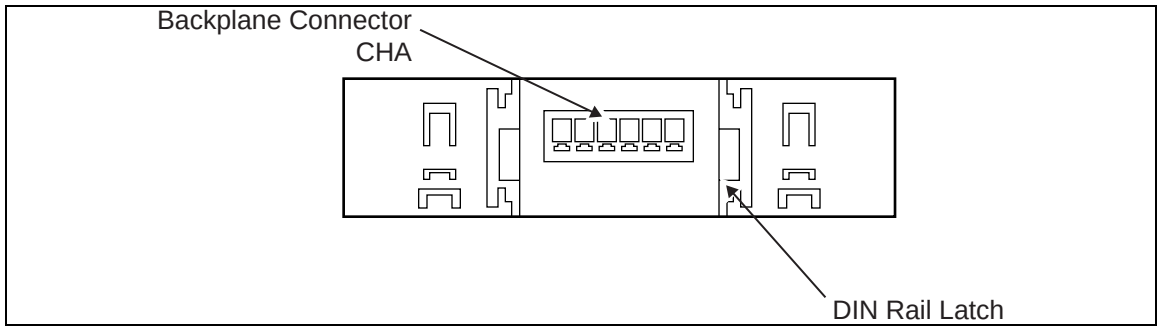

Figure 2: EtherNet/IP Adapter (D77D-EIP) Back Features

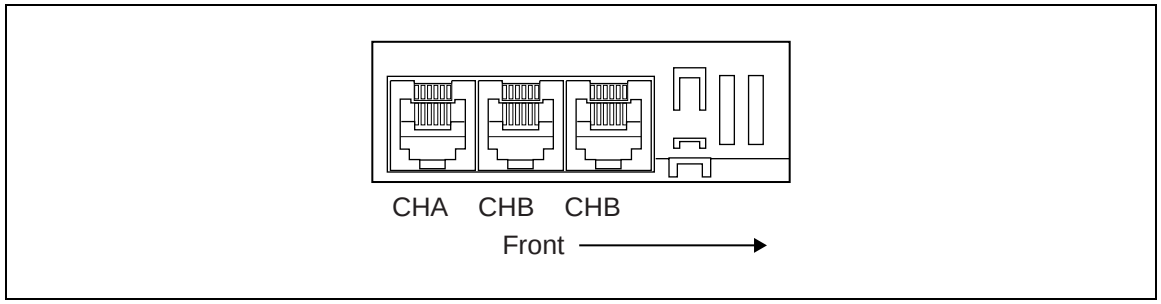

Figure 3: EtherNet/IP Adapter (D77D-EIP) Bottom Features

Dimensions

The following figures illustrate the dimensions of the ***IT.*** EtherNet/IP Adapter and ventilation space requirements for the device.

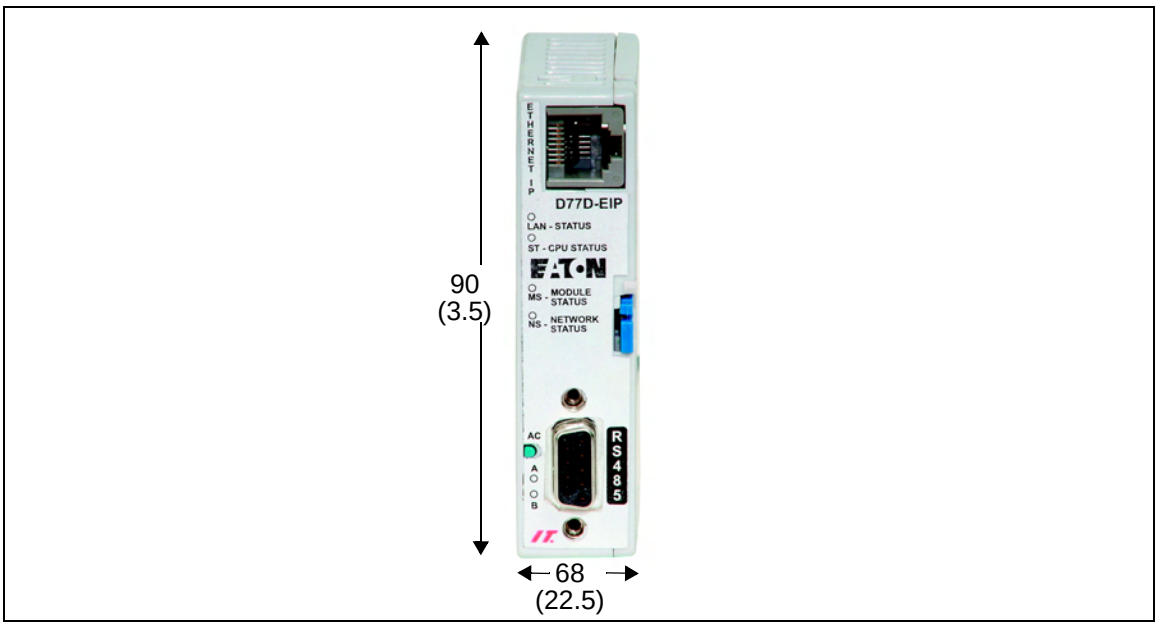

Figure 4: EtherNet/IP Adapter (D77D-EIP) Dimensions, mm [in]

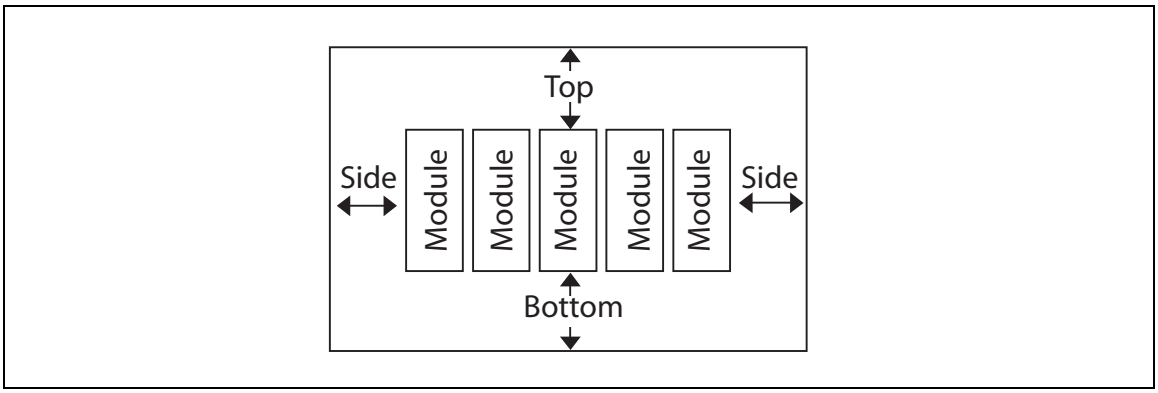

Figure 5: Device Ventilation

Notice

Allow a minimum of 50mm (2 in) of ventilation space on the top and bottom of each device and to each side of a grouping of devices.

Power Supply Requirements

QC Port channel B is isolated from QC Port Channel A and needs to be supplied with power if used. The EtherNet/IP port operates from power supplied on QCPort Channel A. Isolation between QCPort and Ethernet is performed by the EtherNet/IP transformer.

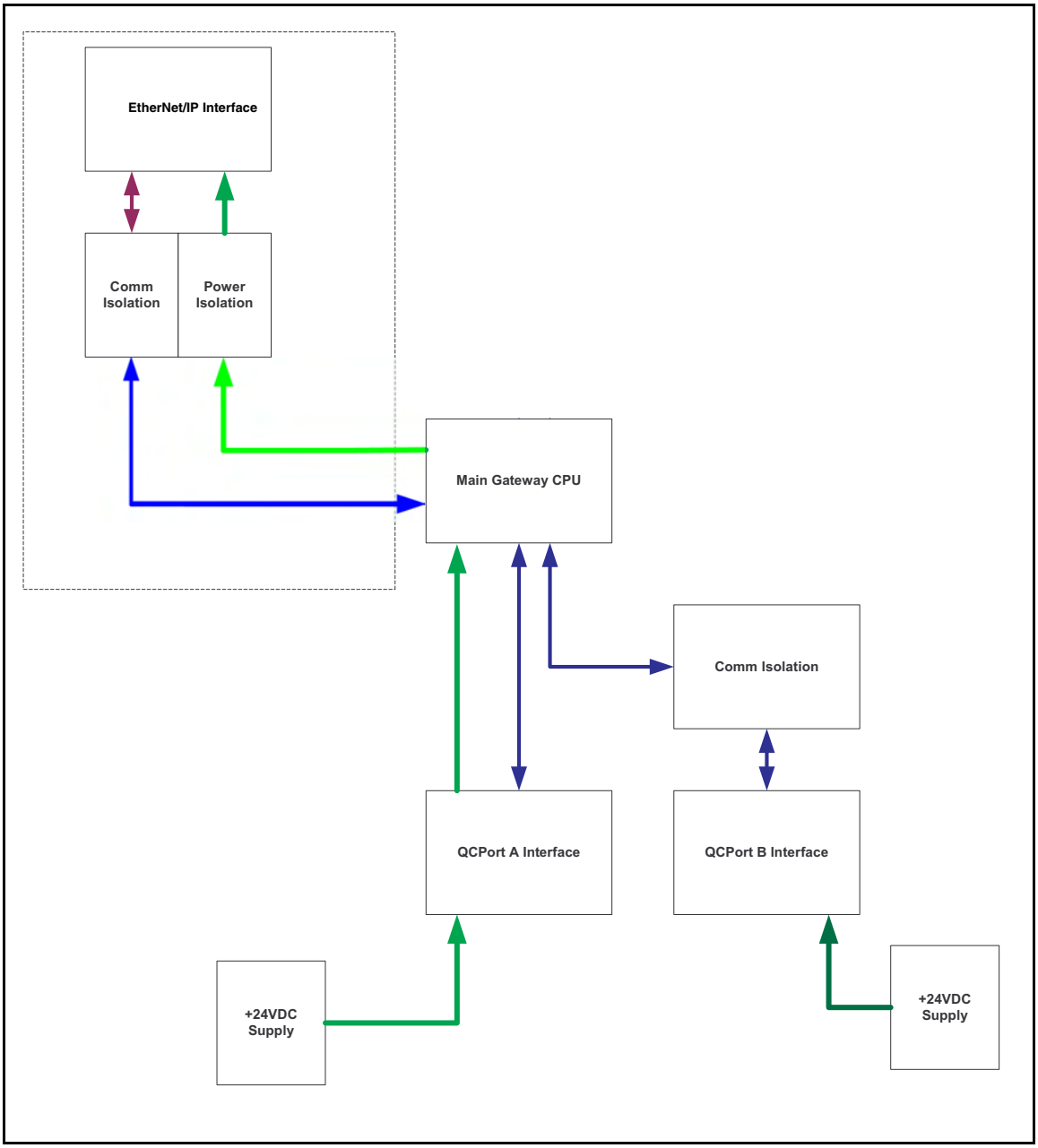

Figure 6: EtherNet/IP Adapter (D77D-EIP) Power Isolation

Auto Configuration

Overview

When you perform an auto configuration, the D77D-EIP assembles the I/O data into input and output assemblies for the devices on QCPort channels CHA and CHB. QCPort channel assembles the data in ascending order by device Group ID (address switch setting on device) using the default I/O assemblies for each device. For further assistance on the I/O size and how data is mapped within the assembles, refer to the user manual for that device or to CH Studio for on-line help.

Once the QCPort system is assembled, powered and properly addressed, you can perform one of two types of auto configuration. The procedure for performing a Soft Configuration or Hard Configuration starts on **Page 11**. No additional configuration of the D77D-EIP is required for normal operation.

Notice

Use CH Studio when you need to configure enhanced features.

Preparation

Prior to performing an auto configuration procedure, take the following steps to ensure a properly assembled system.

- Verify that all QCPort devices are set to a unique Group ID (QCPort address). For Group ID settings above the Group ID switch range, CH Studio is required.
- Verify the sizing of the power supply.
- Check that QCPort is properly wired and properly terminated.
- Refer to MN05001002E *(QCPort System Installation and Planning Guid*e) for further information on QCPort System design.

When the system is powered properly and EtherNet/IP is connected properly, the status LEDs should be in the following state:

Table 4: Proper State of LEDs

LED	State
LAN - STATUS	Amber
ST - CPU STATUS	LED Blinking Green
MS - MODULE STATUS	Solid Green or Flashing Green
NS - NETWORK STATUS	Solid Green or Flashing Green
CHA	Off or Intermittent Flash
CHB	Off or Intermittent Flash

For more information on the LED state meanings, refer to the **Status LEDs** section.

Soft Configuration

Performing a soft configuration reconfigures the internal QCPort scan list to match all physically-connected devices on CHA and CHB. It generates the assembly mappings that contain the I/O information for these connected devices. It is possible to disable the AC button so not to accidentally auto configure a QCPort system after commissioning. The software tool CH Studio provides the ability to disable the button as does any EtherNet/IP configuration tool.

Soft Configuration:

- Erases the old QCPort scan list and creates a new scan list.
- Erases the old EtherNet/IP assemblies and creates new EtherNet/IP assemblies.
- Leaves the QCPort device's parameters unchanged.

Notice

If you need to reconfigure an active network, the EtherNet/IP scan of the specific D77D-EIP must cease and you must clear the scan bits for Channel A and Channel B. If you press the Auto Configuration button while the EtherNet/IP network scanning of the D77D-EIP, configuration does not occur.

Soft Configuration Procedure

1. Set each QCPort device to a unique non-zero Group ID (per QCPort channel) using the manual Group ID switches. To set the Group ID to an extended address greater than the setting on the switch, use CH Studio.
2. Apply power to each QCPort channel that has QCPort devices on it. This ensures that each device is powered and that the D77D-EIP is powered.
3. Use a pointed tool (such as a ball point pen), to lightly press the Auto Configuration button and hold it for five seconds. During this time, the D77D-EIP status LED turns on solid green. After three seconds, the D77D-EIP status LEDs all turn on, then blink three times in one second and then go off, signaling the start of the Soft Configuration process.
4. Release the AC button.

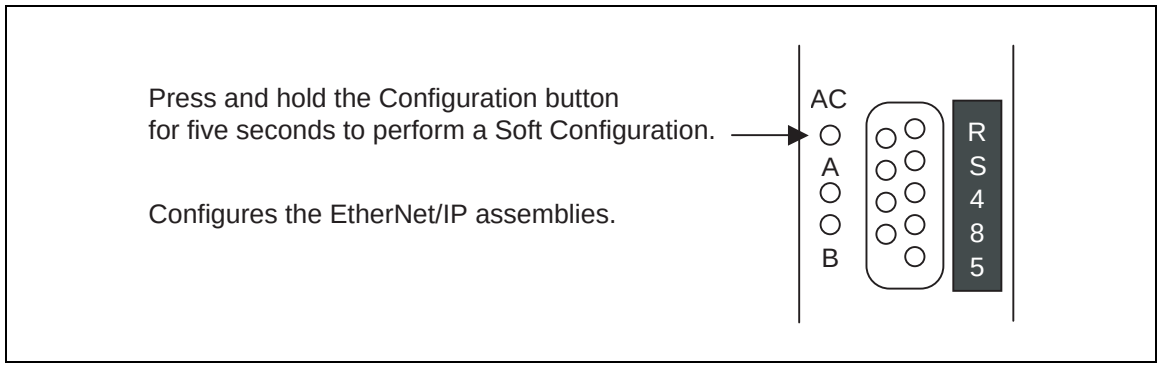

Figure 7: Soft Configuration

None of the QCPort devices may be faulted while performing an I/O Configuration. To verify that the devices are not faulted, check status LED for each device. The status LED for most devices is in upper left of most products and may not be marked. A faulted state has an LED flash of 500 milliseconds on, 500 milliseconds off.

Notice

If, for any reason, the system is not configured properly, when you press the Auto Configuration button, the MS LED goes to solid red or flashing red. This indicates that further configuration is required. For example, this occurs if two devices on the same QCPort channel have the same Group ID.

Hard Configuration

Performing a Hard Configuration reconfigures the internal QCPort scan list to match all physically-connected devices on CHA and CHB. It generates the EtherNet/IP I/O assemblies that contain the input/output information for these connected devices. In addition, the QCPort device parameters for all devices on QCPort CHA and CHB are set to "factory default."

Hard Configuration:

- Sets all QCPort device parameters to their "factory default" settings.
- Erases the old QCPort scan list and creates a new scan list.
- Erases the old EtherNet/IP I/O assemblies and creates new EtherNet/IP I/O assemblies.

⚠ WARNING

If you have custom configured any connected device, a Hard Configuration returns the device's parameters to "factory default."

Hard Configuration Procedure

1. Set each QCPort device to a unique, non-zero Group ID (per QCPort channel) using the manual Group ID switches. To set the Group ID to an extended address greater than the setting on the switch, use CH Studio.
2. If you are using Channel B, apply power to that channel so that the devices on Channel B are active when the configuration takes place.
3. Use a pointed tool (such as a ball point pen), to lightly press the Auto Configuration button **while applying power to CHA and the D77D-EIP**. You must hold the AC button during the power-up for a minimum of 5 seconds to begin the Auto Configure process. During this time, the D77D-EIP Status LED is solid green. Once you see that the Status LEDs on the QCPort devices change from fast flashing to a slow flash (mostly off), you can release the AC button.

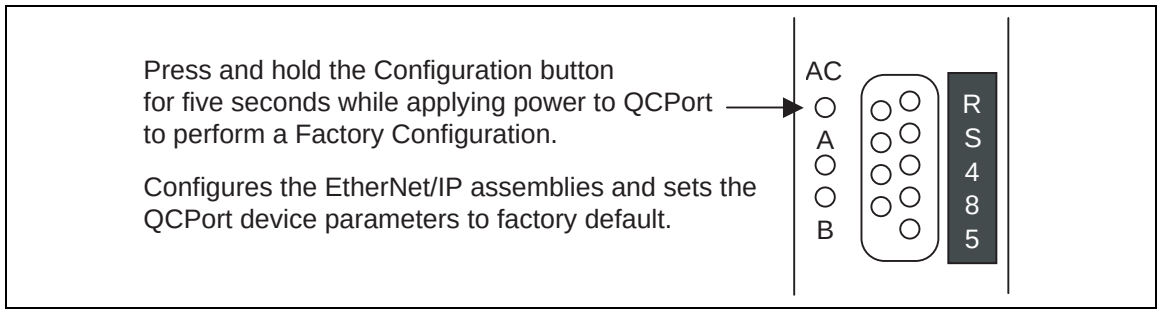

Figure 8: Hard Configuration

None of the QCPort devices may be faulted while performing an I/O Configuration. To verify that the devices are not faulted, check status LED for each device. The status LED for most devices is in upper left of most products and may not be marked. A faulted state has an LED flash of 500 milliseconds on, 500 milliseconds off.

Notice

If, for any reason, the system is not configured properly, when you press the Auto Configuration button, the MS LED goes to solid red or flashing red. This indicates that further configuration is required. For example, this occurs if two devices on the same QCPort channel have the same Group ID.

Configuration Using CH Studio

CH Studio Component Manager

Pressing the Auto Configuration button performs a basic setup of the D77D-EIP and connected devices that is sufficient for most applications. When an application requires parameters be modified from default, use CH Studio Component Manager.

Use the CH Studio tool for configuration, maintenance and monitoring of Eaton Electrical nodes and QCPort devices. After going on-line using CH Studio, the Studio Explorer displays the Eaton Electrical nodes on EtherNet/IP and allows you to drill down through the D77D-EIP to view and configure the QCPort devices.

Part of the setup of the TCP/IP network is to select the range of temporary IP addresses to assign devices and the setup of the subnet mask and default gateway. For most users, you do not need to modify these settings from default, since CH Studio uses current network settings to preconfigure the TCP/IP network settings. Once these parameters are set up, press the Go Online button to allow CH Studio to search for Eaton Electrical nodes on EtherNet/IP.

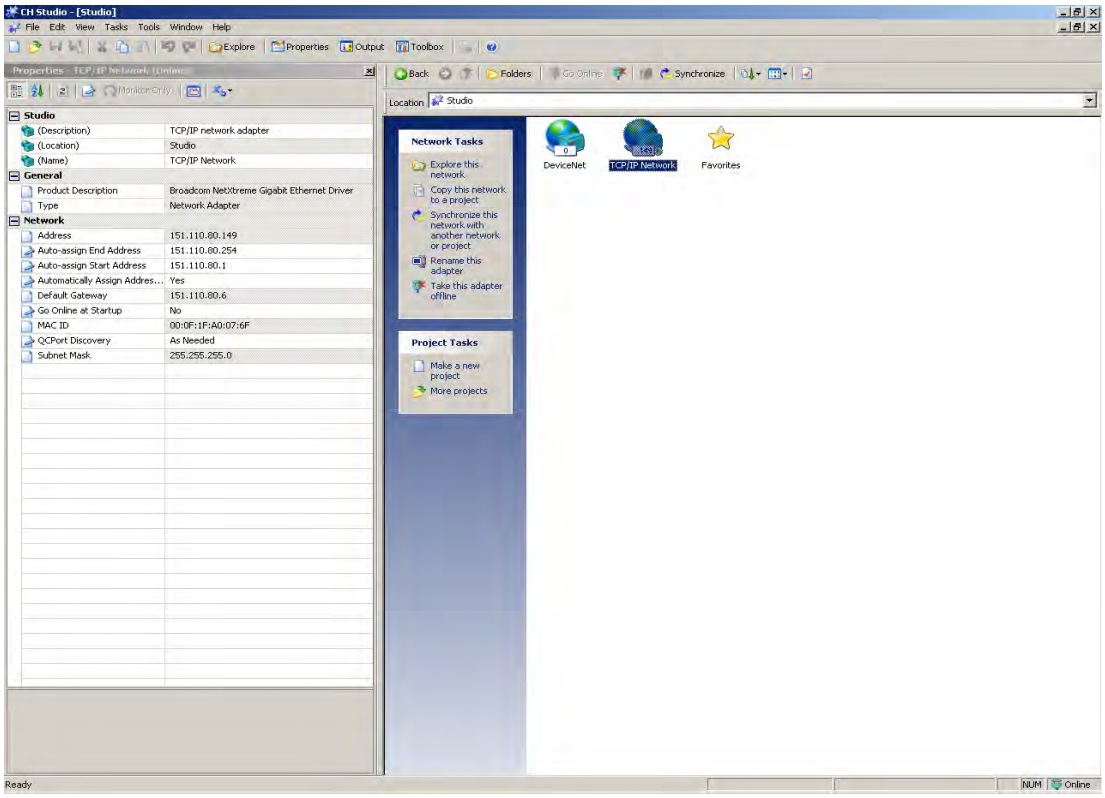

Figure 9: TCP/IP Setup

An unconfigured D77D-EIP without an IP address is visible from CH Studio due to a feature called Discovery that is built into each Eaton Electrical Ethernet Node. Once the node shows up on the explorer within CH Studio, a temporary IP address is assigned to the D77D-EIP from the range of IP addresses in the TCP/IP network setup.

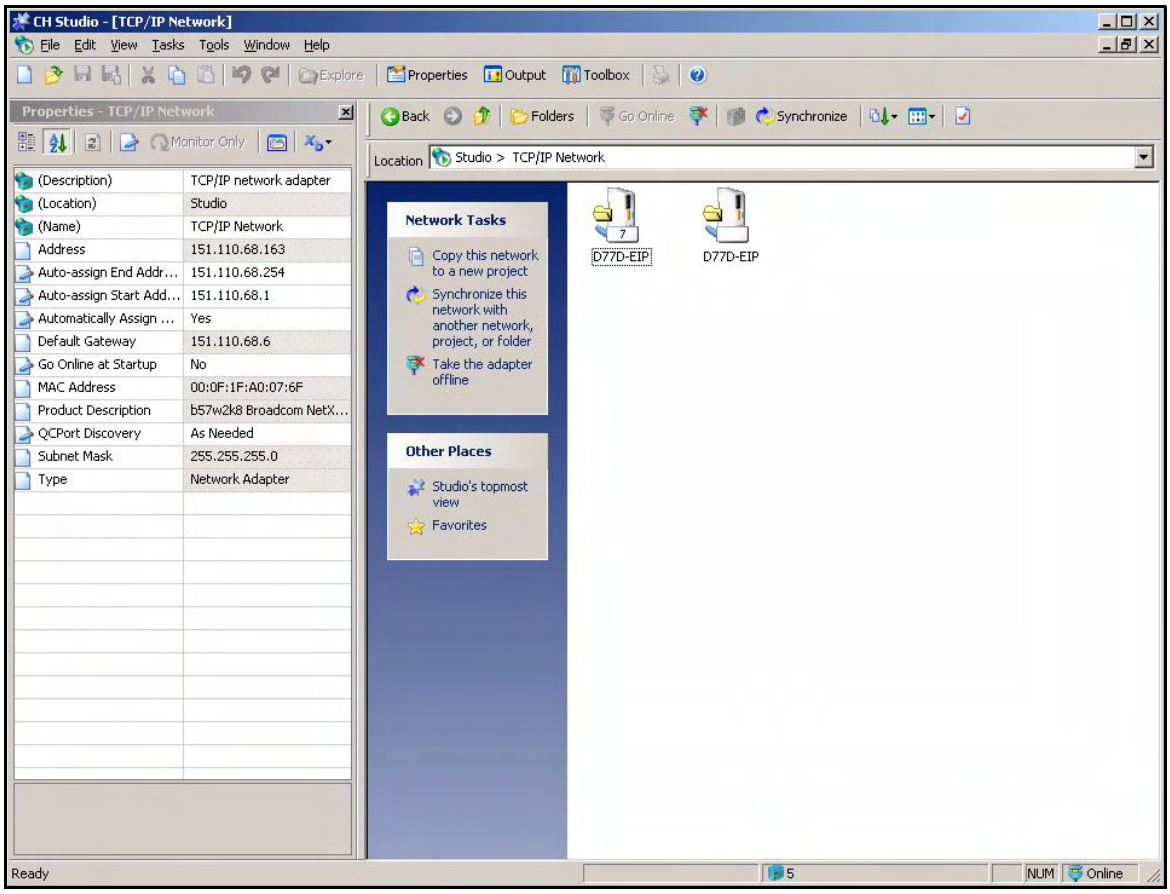

Figure 10: Studio Explorer (Docked View)

General Tab

Once an EtherNet/IP node or QCPort device is selected, the Properties Window displays the attributes and parameters of that device. From this window, you can view and modify node/device parameters. You can also view this information on the Property Pages by selecting View, Property Pages (Shift + F4) from the toolbar.

You can directly modify the parameters, such as the IP address, address mode and other D77D-EIP parameters. You also can drill down into the QCPort channels to configure the QCPort devices once an IP address has been set on the D77D-EIP. The general tab provides the ability to set a static IP address or assign the IP address using BootP, DHCP, and set the other network parameters. When setting the D77D-EIP addressing for DHCP, it is important to set the host name. Use CH Studio or another EtherNet/IP tool to set this attribute.

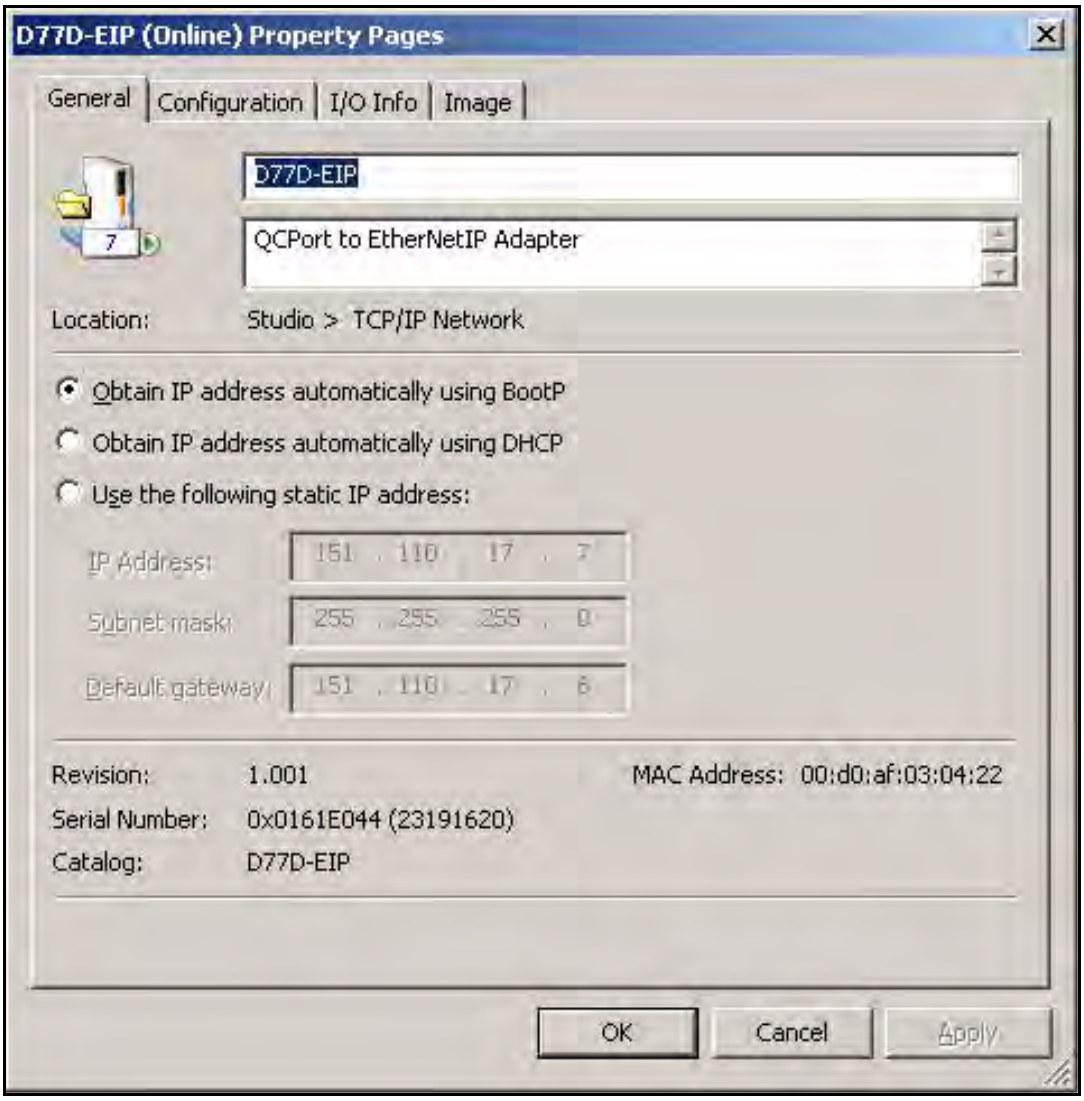

Figure 11: General Tab

Configuration Tab

The configuration tab is used to configure the DDA (Dynamic Device Addition) feature. For more on how to implement DDA, refer to the Dynamic Device Addition (DDA) section location on **Page 18**.

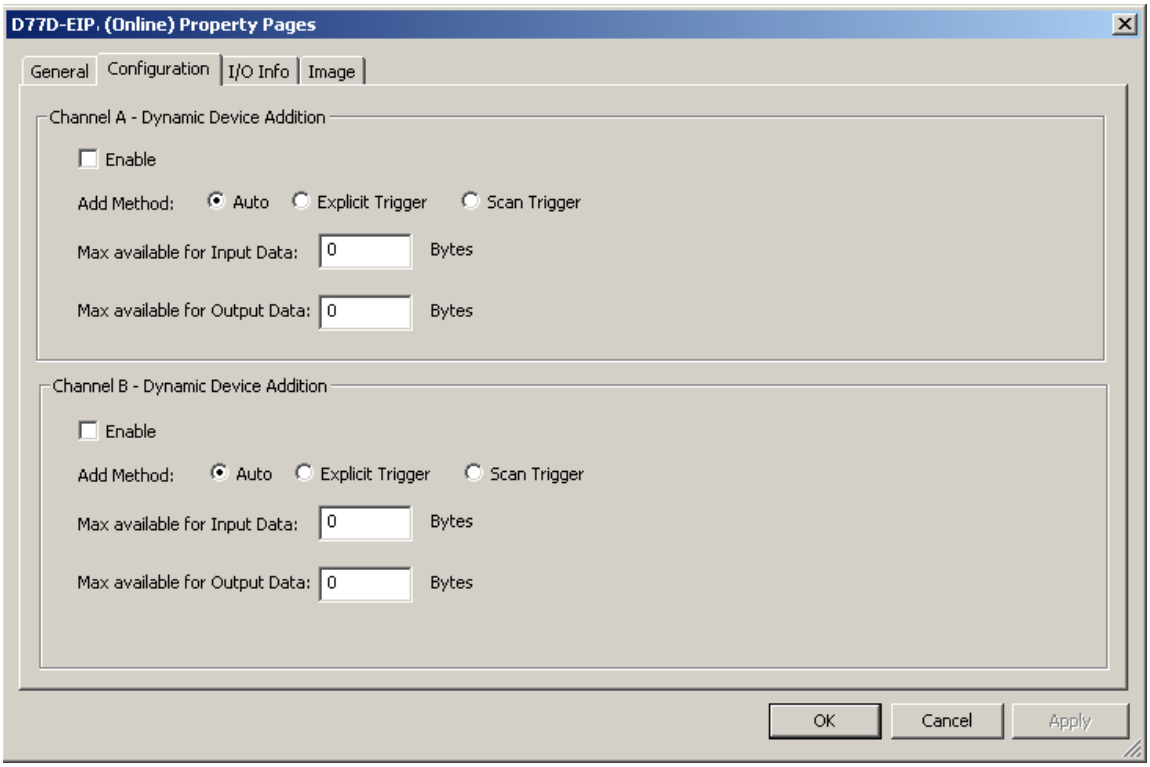

Figure 12: Configuration Tab

Monitor Tab

Once you have configured the D77D-EIP, view the Monitor Tab to gain nformation as to the state of the D77D-EIP.

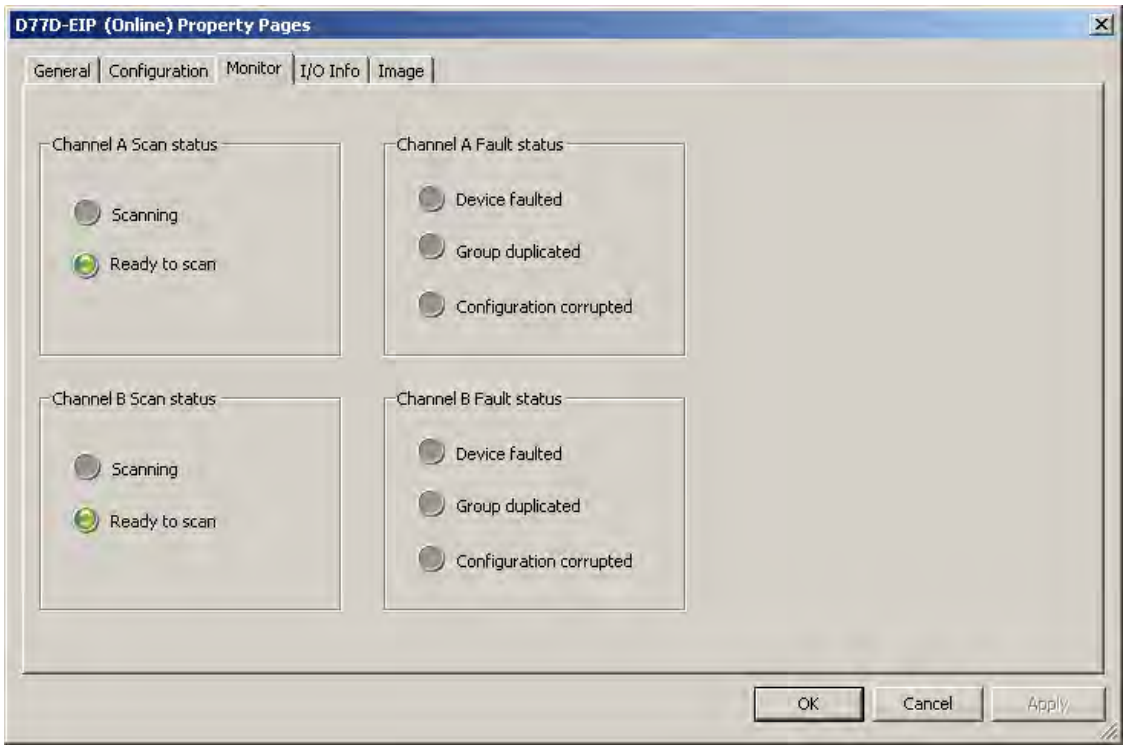

Figure 13: Monitor Tab

I/O Info Tab

The I/O Info Tab provides all the information as to the I/O assembly mapping of the connected QCPort devices. Not only does it give the order of the mapped I/O data, but also the assembly information for the QCPort inputs and outputs.

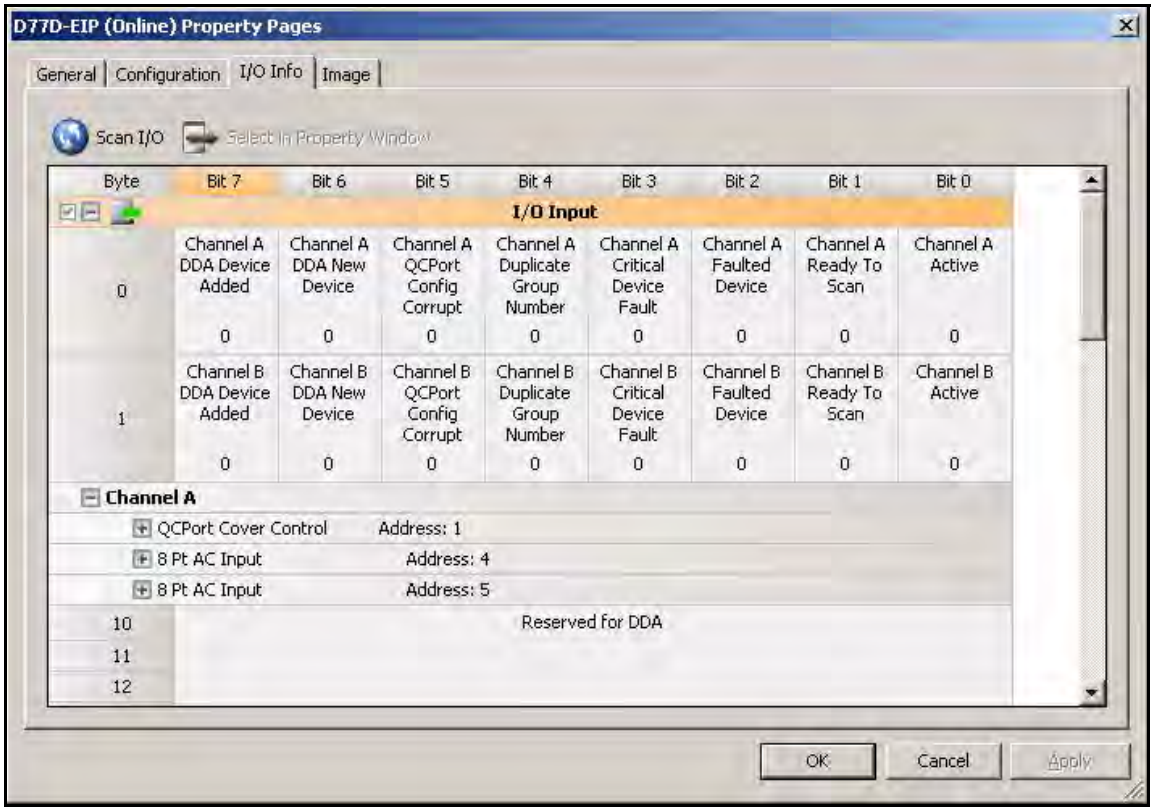

Figure 14: I/O Info Tab

Using Another Configuration, Tool

To properly configure QCPort devices, CH Studio is required. For configuration of the D77D-EIP, either CH Studio or an EtherNet/IP tool can be used since an EDS file is available on the Eaton web site. Visit www.eatonelectrical.com and search for EtherNet/IP.

Dynamic Device Addition (DDA)

You can automatically add devices to QCPort without affecting the I/O assemblies. A feature called Dynamic Device Addition (DDA) allows you to preconfigure the size of the QCPort scan list for CHA and CHB to allow for future additions. For example, the system may be commissioned with 25 devices connected to QCPort but, in the future, there will be more devices added. Using DDA, you can set up the max I/O size that is expected to be used in the future so that when the devices are added, the D77D-EIP will not require a soft or hard configuration and the PLC scanner will not have to be reconfigured for the change in I/O assemblies size.

Using CH Studio, select the I/O Info tab from the D77D-EIP Property Page to enable DDA and to set the required I/O size. This is also where you chose the Add method.

Scanning

The EtherNet/IP Adapter is a scanner for the QCPort devices. The scan places QCPort input assemblies and sets the QCPort outputs from output assemblies. The CPU prevents data tearing by letting QCPort or EtherNet/IP gain access to the shared memory at a given time.

The QCPort scan is master/slave poll request/response. Since the slave devices only talk when talked to, collisions are eliminated, providing for a deterministic scan time. Both channels are independent and the EtherNet/IP Adapter scans each channel simultaneously, asynchronously and in a deterministic fashion.

Once an EtherNet/IP connection is established, the D77D-EIP starts to scan the QCPort devices once the scan control bit is set for the selected channel. Refer to **Table 5** on **Page 21** for more information.

Notice

A minor recoverable fault may occur if the system controller stops QCPort scanning and then re-initiates it in less then 3 seconds from when the scan was stopped. The fault indicates that not all the QCPort devices are on line. This fault self-clears as the devices are brought back into the scan list. If the time between stopping scanning and starting scanning is greater than 3 seconds, this fault does not occur.

Adding or Removing Devices from QCPort

When not using DDA or removing it at any time devices are added or removed from QCPort, you need to revise the I/O assemblies using the Soft Configuration procedure or CH Studio. When you perform a Soft Configuration, it erases the old assembly mappings and creates new ones based on the remapped information from QCPort CHA and CHB.

⚠ WARNING

When adding or removing a device and performing the Soft Configure procedure, the I/O assemblies mappings are erased and recompiled. Because of this, data in the controller registers may be different than prior to re-configuration. Be sure to verify the assembly mapping before bringing the controller/D77D-EIP back on-line.

When you add a new device to QCPort, it is important to change the I/O assemblies as little as possible (to minimize PLC programming changes). To achieve this, add the new device at a Group ID that is larger than the largest ID currently on CHA (when only CHA is used); when both channels are used, add to CHB. This adds the device to the end of the I/O assembly mapping, minimizing the programming changes within the controller.

When you remove a device from QCPort, you need to reprogram the I/O data in the controller. Remove the device and perform a soft configuration. This remaps all assembly data within the Adapter.

Replacing an Existing Device on QCPort

You can replace a QCPort device with a like device when the system is scanning and active, using a feature called “Hot Swap.” There are only a few rules to follow, they are:

- The new device must have the same product code as the replaced device (same type of device). For example, if you are replacing an MCC bucket (Cover Control), the new MCC bucket must have the same device type (Cover Control) as the old one. You cannot replace non-like type of products without performing a soft configuration. For example, an S811 soft start cannot replace an S751 soft start with a cover control.
- The new device must have the same I/O configuration as the replaced device. If you change the I/O configuration from default (look in user manual for that device), then you need a tool to reconfigure the I/O configuration to match.

⚠ WARNING

Configuration parameters such as communication loss action, debounce times, initial state, thresholds and fault/warnings enable/disable are not required to match. Once the system is running, it is strongly suggested that you use a tool to synchronize the old device settings to the new device. The hot swap feature is designed to bring a system back up and running as quickly as possible with minimal user intervention and may cause limited functionality.

Typical Application

The following figure illustrates a typical EtherNet/IP Adapter application for a motor control center (MCC). In this application, the motor control (cover control units) is located on CHA.

This application has many devices (not shown) on EtherNet/IP, and the EtherNet/IP Adapter is a single node on that network. The EtherNet/IP Adapter presents the QCPort devices on CHA and CHB as assemblies on EtherNet/IP so the controller can monitor and control the I/O and motor control connected to the EtherNet/IP Adapter. In an effort to simplify the graphic, the power supply and terminating resistors for QCPort are not shown in this example.

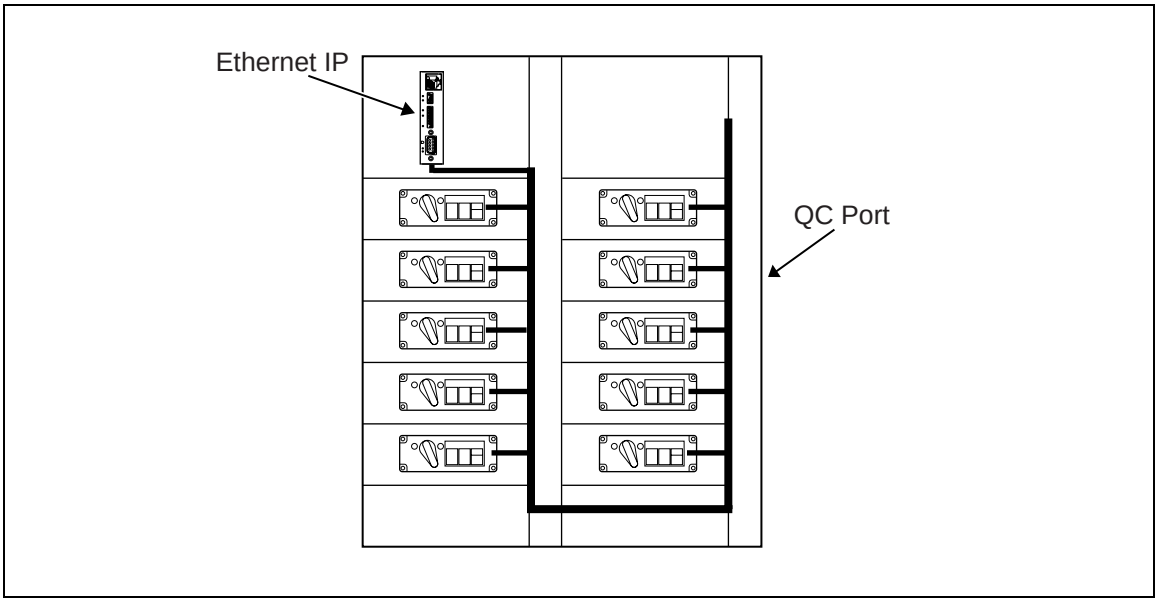

Figure 15: Typical EtherNet/IP Adapter (D77D-EIP) Application

Due to the way the EtherNet/IP assemblies are created, each device's data (I/O) parameters are located in a unique byte or word. For a device that has multiple parameters, each parameter is located in a byte or word that is adjacent to the next parameter. An example is given in a later section.

Channel Scan Control Bytes (Read/Write)

After a connection is made to the EtherNet/IP, the PLC will have to write to bit 0 of byte 0 and 1 to initialize QCPort scanning. Refer to the following tables for details on the scan control bytes. The scan control has been combined into a single bit within the word. Also, the ability to include or exclude this word from the data exchange assembly is a selectable feature.

Table 5: Scan Control Bytes

Bit		Name	Description
Byte 0 Channel A	**Byte 1 Channel B**		
0	0	Active Scan	0 – I/O scan will not occur on the selected channel and all devices exhibit their communication loss action and are offline.
			1 – I/O scan will occur on the selected channel, the devices are online and operating in an online state.
1-3	1-3	Reserved	
4	4	DDA Add	When scan trigger is chosen for DDA add method, setting of this bit will evoke the DDA behavior.
5-7	5-7	Reserved	

Notice

These bits must be set to active from your control program.

Channel Status Bytes (Read)

For feedback on the status of the QCPort channels, refer to the following tables. The first two bytes of the input data will contain this data.

Table 6: Input Control Bytes

Bit	Name	Description
Byte 0 Channel A		
0	Channel A Active	0 – Selected channel not scanning.
		1 – Selected channel scanning.
1	Channel A Ready to Scan	0 – Selected channel scan list registry requirements have been met.
		1 – Selected channel scan list registry requirements have not been met.
2	Faulted Device Channel A	0 – Selected channel does not have any faulted devices.
		1 – Selected channel has at least one faulted device.
3	Reserved	
4	Duplicate Group ID Channel A	1 – A duplicate Group ID exists on Channel A.
5	QCPort Config Corrupt Channel A	0 – Selected channel has a valid registry.
		1 – Selected channel has a corrupt registry.
6	DDA Device Available	
7	DDA Device Added	
Byte 1 Channel B		
0	Channel B Active	0 – Selected channel not scanning.
		1 – Selected channel scanning.
1	Channel B Ready to Scan	0 – Selected channel scan list registry requirements have been met.
		1 – Selected channel scan list registry requirements have not been met.
2	Faulted Device Channel B	0 – Selected channel does not have any faulted devices.
		1 – Selected channel has at least one faulted device.
3	Reserved	
4	Duplicate Group ID Channel B	1 – A duplicate Group ID exists on Channel B.
5	QCPort Config Corrupt Channel B	0 – Selected channel has a valid registry.
		1 – Selected channel has a corrupt registry.
6	DDA Device Available	
7	DDA Device Added	

Notice

Your control program uses this information to detect fault conditions.

I/O Assembly Mapping

Sample EtherNet/IP I/O Assembly Mapping

When an auto configuration is completed, the device data is located in concurrent bytes within the input and output data assemblies. The device data starts with the first device (lowest ID) and finishes at the last device with all the I/O data one right after another.

Following are some very simple rules that govern how the I/O data registers are constructed:

- All device parameters are located in a unique word or byte.
- An 8-bit parameter is in a single byte.
- A 16-bit parameter is in two concurrent bytes.
- A 32-bit parameter uses four concurrent bytes.

Example 1

Example 1 illustrates a typical MCC with factory I/O configuration. For this example, the MCC has two buckets (cover control) of addresses 1 and 2. Each device has the following I/O parameters.

Cover Control Data

Table 7: Default Cover Control I/O Data

Byte	Data
Cover Control Produced Data	
0	Fault Word Low Byte (word)
1	Fault Word High Byte
2	% FLA Word Low Byte (word)
3	% FLA Word High Byte
4	% Thermal Memory (byte)
5	Motor Status Byte
Cover Control Consumed Data	
0	Motor Control Byte

EtherNet/IP Assemblies

Table 8: Input Assembly

Byte	Description	Device Address
Input Bytes		
0	QCPort Channel A Status	N/A
1	QCPort Channel B Status	N/A
2	Fault Word (low byte)	1
3	Fault Word (high byte)	1
4	% FLA (low byte)	1
5	% FLA (high byte)	1
6	% Thermal Memory	1
7	Motor Status Byte	1
8	Fault Word (low byte)	2
9	Fault Word (high byte)	2
10	% FLA (low byte)	2
11	% FLA (high byte)	2
12	% Thermal Memory	2
13	Motor Status Byte	2
14		
Output Assembly		
0	QCPort Channel A Control	N/A
1	QCPort Channel B Control	N/A
2	Motor Control Byte	1
3	Motor Control Byte	2

Example 2

Example 2 illustrates a typical MCC with user-defined I/O configuration. For this example, the MCC has two buckets (cover control) of addresses 1 and 2, and one 8-point input module at address 3. Each device has the following I/O parameters.

Cover Control Data

Table 9: Cover Control I/O Data

Byte	Data
Cover Control Produced Data	
0	Application Status Low Byte (word)
1	Application Status High Byte
2	RMS Scaled Current Low Byte (word)
3	RMS Scaled Current High Byte
4	Breaker Status (byte)
5	% Thermal Memory (byte)
6	Motor Status Byte (byte)

8-point Input Module Produced Data

0	I 7	I 6	I 5	I 4	I 3	I 2	I 1	I 0

Cover Control Consumed Data

0	Motor Control Byte

EtherNet/IP Assemblies

Table 10: Input Assembly

Register	Description	Device Address
Input Assemblies		
0	QCPort Channel A Status	N/A
1	QCPort Channel B Status	N/A
2	Application Status (low byte)	1
3	Application Status (high byte)	1
3	RMS Scaled Current (low byte)	1
5	RMS Scaled Current (high byte)	1
6	Breaker Status	1
7	% Thermal Memory	1
8	Motor Status Byte	1
9	Pad Byte	1
10	Application Status (low byte)	2
11	Application Status (high byte)	2
12	RMS Scaled Current (low byte)	2
13	RMS Scaled Current (high byte)	2
14	Breaker Status	2
15	% Thermal Memory	2
16	Motor Status Byte	2
17	8-Point Input Status	3
Output Assemblies		
0	QCPort Channel A Control	N/A
1	QCPort Channel B Control	N/A
2	Motor Control Byte	1
3	Motor Control Byte	2

Status LEDs

The status LEDs are located along the left of the EtherNet/IP Adapter, as pictured in Figure 1. The LED's status changes depending on the state of the EtherNet/IP Adapter.

The following table lists and describes the various states of the LAN, EtherNet/IP Adapter Status LEDs, EtherNet/IP Module Status, EtherNet/IP Network Status and QCPort Channels.

Table 11: Status LED

LED State	Meaning
LAN LED	
Amber	Flashes to signal network transmission or reception
CPU Status LED	
Flashing	The adapter is healthy.
On Solid	CPU Fault.
Off	No Power or CPU Fault.
Module Status LED (MS)	
Off	There is no power to the device.
Green	Device is operating normally.
Flashing Green	Adapter needs commissioning (minor or soft fault).
Flashing Red	A recoverable fault has been detected See Appendix D EtherNet/IP Adapter Fault List.
	A QCPort device is missing from the scan list.
Red	A non-recoverable fault has been detected, the device may need to be replaced.
Flashing Green-Red	The device is performing a self test.
Network Status LED (NS)	
Off	IF the MS LED is on or flashing, then the D77D-EIP does not have a valid IP address.
Flashing Green	Has a valid IP address, unconnected.
Green	A Connection has been established.
Red	Device cannot communicate on the network (may have a duplicate IP address).
Flashing Green-Red	Self Test.
Flashing Red	Network connection error or timeout.
QC Port CHA/CHB Status LED	
Off	No Power on QCPort or no communication taking place on that channel.
Solid Amber	A Connection has been established to all devices.
Flashing	One or more of the devices have a fault and the D77D-EIP can't scan QCPort.
	The D77D-EIP is in idle mode (not scanning).
	The D77D-EIP is looking for a faulted device.
	The D77D-EIP is attempting a Hot Swap.
	Indicates QCPort traffic.

Notice

The CHA and CHB status LED is an indication of the traffic on each of the channels. When a message is sent or received, the LED is lit. A solid LED, or one that is mostly solid, indicates healthy QCPort activity.

Installation

This section provides details about the following features and aspects of D77D-EIP Installation:

- Installation on a DIN Rail
- Replace Existing Module
- Connect to Devices
  - Connections/Interconnects

Installation on a DIN Rail

Use one of the following two procedures to install the Adapter on a DIN rail:

- Install on a DIN Rail (no backplane)
- Install on DIN a Rail with backplane

Install on a DIN Rail (No Backplane)

Prepare Module for Installation

The DIN rail locking tab is on the right middle of the EtherNet/IP Adapter. When installing the EtherNet/IP Adapter on a DIN rail, verify that the slide of the DIN Rail Lock is extended to the unlocked position.

Insert a screwdriver under the DIN rail locking tab and lift up to unlock the locking tab.

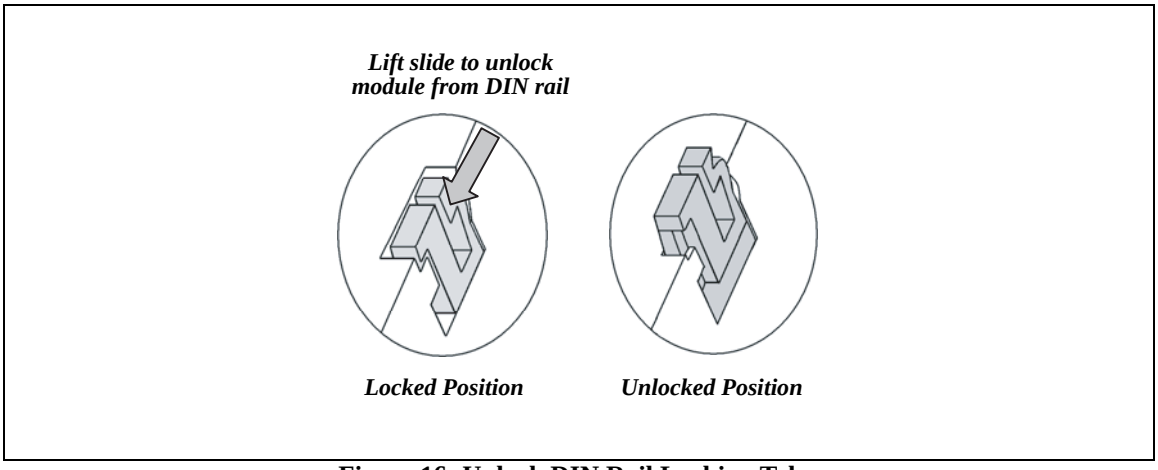

Figure 16: Unlock DIN Rail Locking Tab

Install Module

The module is now ready for installation on the DIN rail.

⚠ WARNING

Do not "rock" the EtherNet/IP Adapter module onto the DIN rail. The rocking action could damage the module.

1. You must always insert the module perpendicular to the DIN rail. **Push the module straight back** onto the DIN rail.
2. Depress the locking tab to secure the module to the DIN rail.

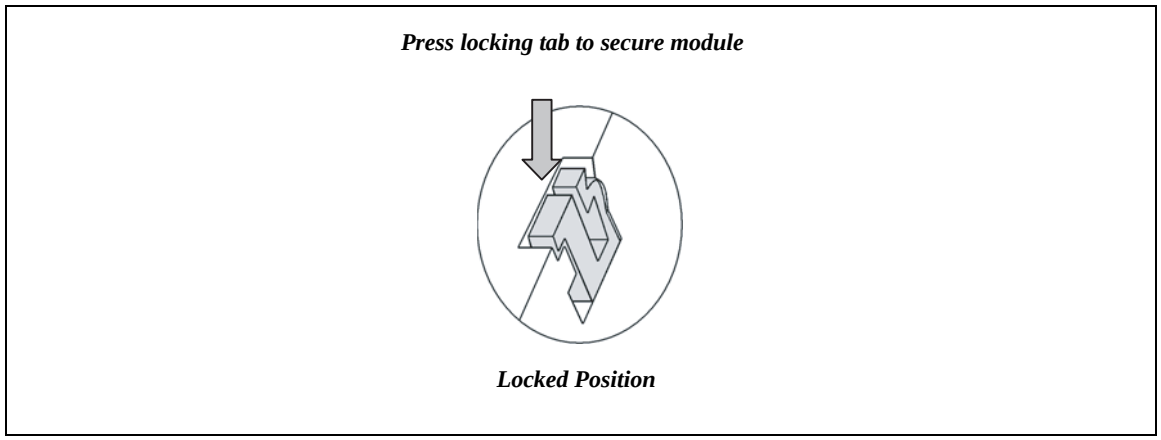

Figure 17: Lock DIN Rail Locking Tab

Notice

After the EtherNet/IP Adapter is installed, you need to install interconnects; see the QCPort *System Install and User Manual* (Publication MN05001002E for more information.

Install on DIN Rail with Backplane

Prepare Module for Installation

The DIN rail locking tab is on the right middle of the EtherNet/IP Adapter. When installing the EtherNet/IP Adapter on a DIN rail, verify that the slide of the DIN Rail Lock is extended to the unlocked position.

Insert a screwdriver under the DIN rail locking tab and lift up to unlock the locking tab.

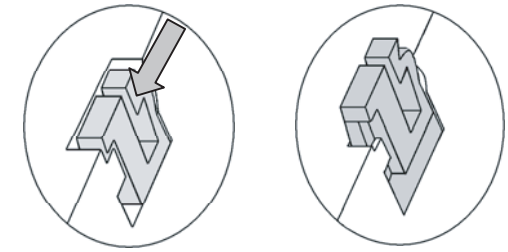

Figure 18: Unlock DIN Rail Locking Tab

Install Module

The module is now ready for installation on the DIN rail.

⚠ WARNING

Do not "rock" the EtherNet/IP Adapter module onto the DIN rail. The rocking action could damage the module.

1. Line the center of the module up with the backplane connector on the DIN rail. Ensure the backplane connector is installed with the arrows up. You must always insert the module perpendicular to the DIN rail.

Figure 19: Adapter Installation on a Backplane

2. Push the module straight back onto the DIN rail and backplane connector.
3. Depress the locking tab to secure the module to the DIN rail.

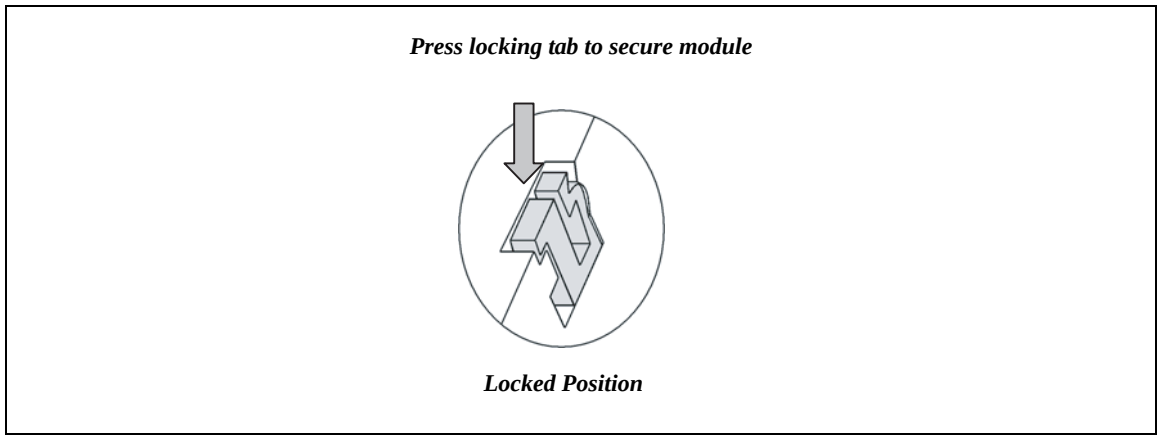

Figure 20: Lock DIN Rail Locking Tab

Replace Existing Module

To replace an existing EtherNet/IP Adapter, first remove the old one.

1. Remove all connectors (EtherNet/IP and QCPort) from the Adapter.
2. Insert a screwdriver under the DIN rail locking tab and lift up to unlock the locking tab.

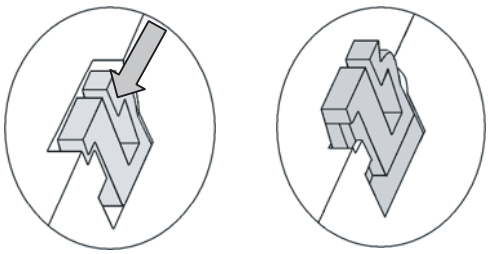

Figure 21: Unlock DIN Rail Locking Tab

3. Remove the old module by pulling straight off the DIN rail.
4. Align the new module where the old one was removed. You must always insert the module perpendicular to the DIN rail. **Push the module straight back** onto the DIN rail.
5. Depress the locking tab to secure the module to the DIN rail.

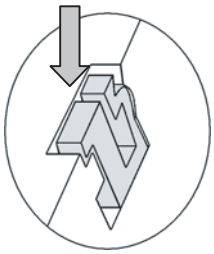

Figure 22: Lock DIN Rail Locking Tab

6. Reconnect the EtherNet/IP and QCPort connectors.
7. Reconfigure the device according to the I/O Configure procedure in *Operation* or with a configuration tool, as described in Advanced Configuration.

Connect to Devices

Connections/Interconnects

Connecting the EtherNet/IP Adapter and other ***IT.*** family products involves using one or more of the QCPort interconnects. The EtherNet/IP Adapter employs two types of connectors — one is the backplane interconnect and the other is the short run interconnect. These interconnects provide the QCPort products with both power and communications.

The backplane interconnect fits within the DIN rail and has plugs on it that connect one module to another module seated on the DIN rail. The backplane interconnect supports the power and communication for QCPort and is a passive device. The short run interconnect uses the RJ style connectors that are ordered in standard lengths.

For more information on making interconnects and applying interconnects, refer to the *QCPort System Install and User Manual* (Publication MN05001002E).

Connections to the QCPort Channels

The EtherNet/IP Adapter has two independent QCPort channels: CHA and CHB. CHA has connections on the backplane (plug) and the RJ12 port closest to the back of the EtherNet/IP Adapter. CHB has two RJ12 connections, the two closest to the front of the EtherNet/IP Adapter.

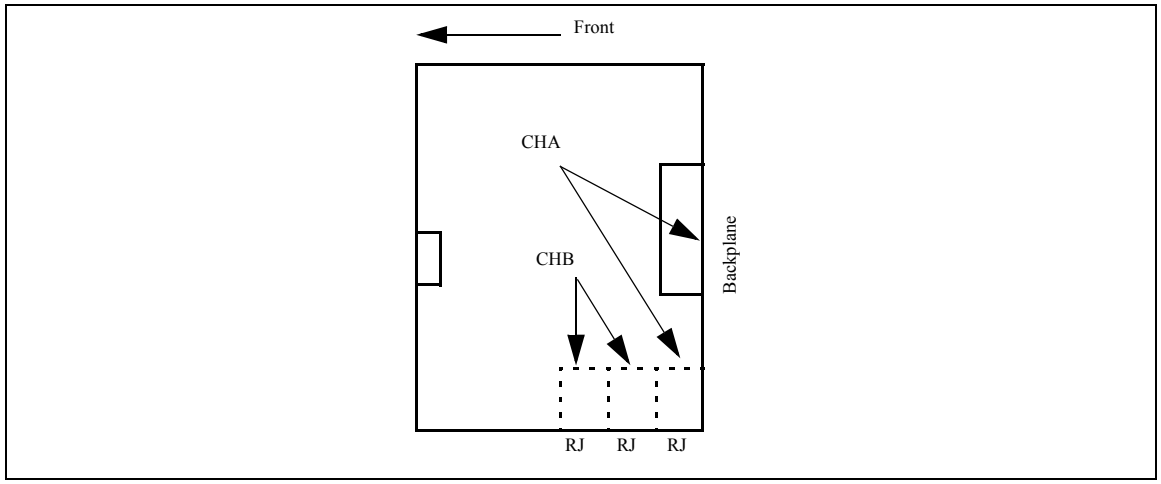

Figure 23: QCPort Channels

Backplane Interconnect

Use the backplane interconnect when connecting an EtherNet/IP Adapter and I/O products on a DIN rail. The interconnect fits inside the channel of the DIN rail and provides for connection of power and communication to the EtherNet/IP Adapter and I/O products.

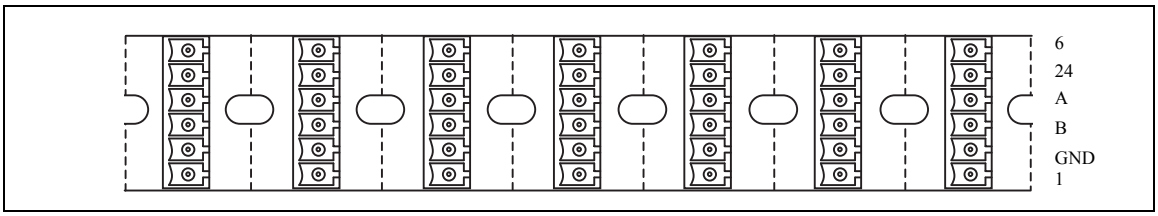

Figure 24: Backplane Interconnect

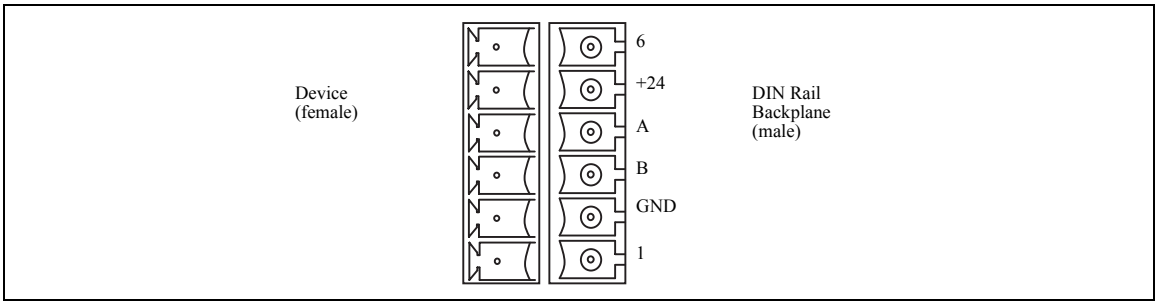

Figure 25: Device/Backplane Interconnect

Short Run Interconnect

To connect the EtherNet/IP Adapter to devices without using a backplane, use the RJ style connectors located at the bottom of the D85 I/O module. There are two connections located next to each other that are parallel with each other. This allows daisy chaining using Pre-Manufactured cables. There are standard sizes for the Pre-Manufactured cables. These sizes are listed in the **Renewal Parts** portion of *Troubleshooting and Maintenance*.

When making this interconnect, refer to the *QCPort System Install and User Manual* (Publication MN05001002E) for the recommended cable and connections.

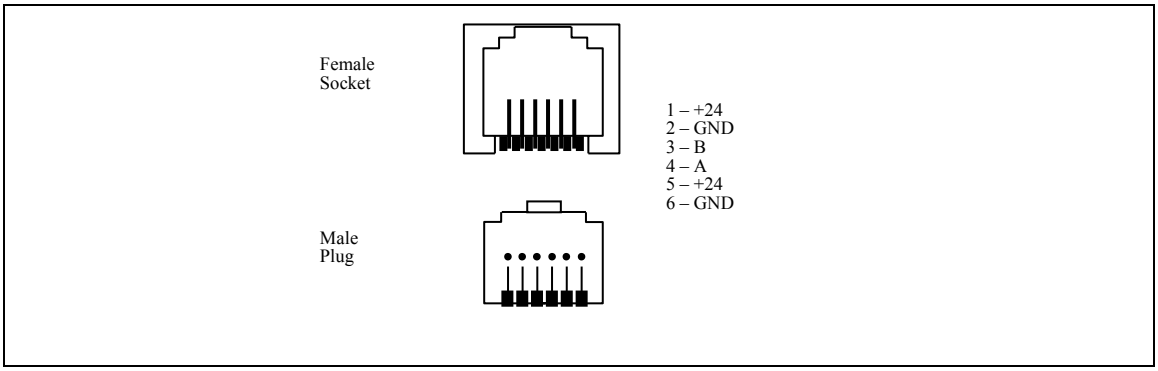

Figure 26: RJ Connector

Troubleshooting and Maintenance

Renewal Parts

There are no renewal parts on the EtherNet/IP Adapter (D77D-EIP); the only related parts are the following accessories.

Table 12: Accessories

Part Number	Description
D77E-BP7	Expansion Backplane for 7 slots
D77E-BP12	Expansion Backplane for 12 slots
D77E-BP25	Expansion Backplane for 25 slots
D77E-QPLR	Terminator and Power Tap for QCPort
D77E-TERRJ	Terminator for QCPort RJ Style
D77E-QPIP25 25 CM	QCPort Interconnect Cable
D77E-QPIP100 1 M	QCPort Interconnect Cable
D77E-QPIP200 2 M	QCPort Interconnect Cable
D77E-QPIP300 3 M	QCPort Interconnect Cable
D77E-PS1	85 – 260 VAC input 24 VDC@1A output Power Supply
D77A I/O	Products Remote I/O Products
97-190x-42	Cover Control Products for Motor Control Center Product Line
D77B SNAP Products	Starter Network Adapter Products for the ***IT.*** Starters

Appendix A: Supported EtherNet/IP Objects

Table 13: Objects

Object	Name	Page
0x01	Identity	**37**, **39**, **42**
0x03	DeviceNet	**44**
0x04	Assembly	**44**
0x05	Connection	**43**
0x8F	QCPort Backplane Interface Control	**45**
0x90	QCPort Data Association	**47**
0x91	Assembly/Register Data Association	**48**

Note: A value of [0xYZ] is always a HEX value.

Table 14: DeviceNet Object Common Services

Service Code	Implemented for Class Instance		Service Name
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x18	Yes	No	Get_Member
0x4B	No	Yes	Allocate_Master/Slave_Connection_Set
0x4C	No	Yes	Release_Master/Slave_Conection_Set

Reset Service

To perform a reset on the D77D-EIP, perform a reset service on instance one of the Identity object.
Service – 0x05 Instance – 0x01
Class – 0x01 Data – See Below

Table 15: Reset Actions

Reset Service Data	Action Performed to D77D-EIP and QCPort
0 [0x00]	Simulates performing a power cycle to the D77D-EIP.
1 [0x01]	Causes all Non-Volatile memory attributes to be reset to the factory defaults and simulates a power cycle.
100 [0x64]	Refreshes the data of the currently registered QCPort devices. Causes the current device list in the registry to be updated with the information of the devices WITHOUT any power cycle.
101 [0x65]	Refreshes the data of the currently registered QCPort devices. Causes the current device list in the registry to be updated with the information of the devices AFTER the devices are power cycled.
102 [0x66]	**Soft Configuration** – Erases the QCPort device registry and rebuilds it with information gathered from devices currently on the network.
103 [0x67]	**Hard Configuration** – Erases the QCPort device registry and rebuilds it with information gathered from devices currently on QCPort AFTER each of the devices have their parameters returned to default state.

Identity Object: 0x01 — Instance 0

Table 16: Instance 0

#	Access	Data Type	Name	Description/Value
101 [0x65]	Get	Array of BYTE[16]	Status Indicators	See "Status Indicators" Below

Status Indicators

The **Status Indicators** class attribute is a linear array of bits. Each bit represents the last known status of an instance of Identity. The instance of identity will be FALSE for a non-faulted state of that identity and TRUE for a faulted state of that identity.

Table 17: Instance of Identity

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Instance 8	Instance 7	Instance 6	Instance 5	Instance 4	Instance 3	Instance 2	Reserved
1	Instance 16	Instance 15	Instance 14	Instance 13	Instance 12	Instance 11	Instance 10	Instance 9
2	Instance 24	Instance 23	Instance 22	Instance 21	Instance 20	Instance 19	Instance 18	Instance 17
3	Instance 32	Instance 31	Instance 30	Instance 29	Instance 28	Instance 27	Instance 26	Instance 25
4	Instance 40	Instance 39	Instance 38	Instance 37	Instance 36	Instance 35	Instance 34	Instance 33
5	Instance 48	Instance 47	Instance 46	Instance 45	Instance 44	Instance 43	Instance 42	Instance 41
6	Instance 56	Instance 55	Instance 54	Instance 53	Instance 52	Instance 51	Instance 50	Instance 49
7	Instance 64	Instance 63	Instance 62	Instance 61	Instance 60	Instance 59	Instance 58	Instance 57
8	Instance 71	Instance 70	Instance 69	Instance 68	Instance 67	Instance 66	Instance 65	Reserved
9	Instance 79	Instance 78	Instance 77	Instance 76	Instance 75	Instance 74	Instance 73	Instance 72
10	Instance 87	Instance 86	Instance 85	Instance 84	Instance 83	Instance 82	Instance 81	Instance 80
11	Instance 95	Instance 94	Instance 93	Instance 92	Instance 91	Instance 90	Instance 89	Instance 88
12	Instance 103	Instance 102	Instance 101	Instance 100	Instance 99	Instance 98	Instance 97	Instance 96
13	Instance 111	Instance 110	Instance 109	Instance 108	Instance 107	Instance 106	Instance 105	Instance 104
14	Instance 119	Instance 118	Instance 117	Instance 116	Instance 115	Instance 114	Instance 113	Instance 112
15	Instance 127	Instance 126	Instance 125	Instance 124	Instance 123	Instance 122	Instance 121	Instance 120

Each instance will represent one device on a QCPort system with the first instance (instance 2) being the first logical device in the D77D-EIP scan list. Each D77D-EIP scan list is capable of connecting to 63 devices, therefore the **Status Indicators** attribute will hold the status for each QCPort device on a fully loaded D77D-EIP (126 devices). CHA devices will be represented in bits 1 to 63 and CHB devices will be represented in bits 65 to 127.

An example of a scan list and the corresponding instances is described in the following figure.

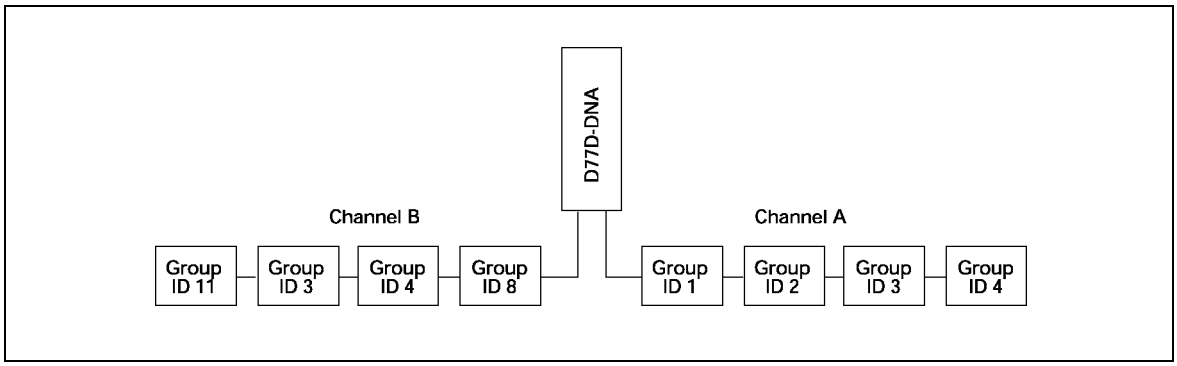

Figure 27: Scan List Example

On each channel there are 4 devices, on one channel the devices start at Group ID 1 and sequentially increment by one, on the other channel the devices do not start at 1 and are not sequential. When a scan list is created, corresponding instances will be created to represent the scan list. The scan list will be the following.

Table 18: Example Scan List

Channel	Group ID	Instance
A	1	2
A	2	3
A	3	4
A	4	5
B	3	65
B	4	66
B	8	67
B	11	68

Within each of the instances of Identity will be data that represents that device including serial number, firmware version, product name and many more. Please refer to the Identity Class Instance 2 – 127 on **Page 42**.

The Status Indicators attribute will represent the current configuration as follows.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
0	0	0	0	ID 4	ID 3	ID 2	ID 1	0	Channel A
1	0	0	0	0	0	0	0	0	
8	0	0	0	ID 11	ID 8	ID 4	ID 3	0	Channel B
9	0	0	0	0	0	0	0	0	

Identity Object: 0x01 — Instance 1

Table 19: Instance 1

#	Access	Data Type	Name	Description/Value
1 [0x01]	Get	UINT	Vendor ID	Identification of each vendor by number The constant 68.
2 [0x02]	Get	UINT	Device Type	Indication of general type of product The constant 102.
3 [0x03]	Get	UINT	Product Code	Identification of a particular product of an individual vendor; 4096 [0x1000]
4 [0x04]	Get	STRUCT of:	Revision	Revision of the item the Identity Object represents The QCPort device's Firmware revision will be visible in this attribute.
		USINT	Major Revision	
		USINT	Minor Revision	
5 [0x05]	Get	WORD	Status	Summary status of device See "**Status**" on **Page 40**
6 [0x06]	Get	UDINT	Serial Number	Serial number of device
7 [0x07]	Get	SHORT_ STRING	Product Name	Human readable identification
8 [0x08]	Get	USINT	State	Present state of the device as represented by the state transition diagram 0 = Nonexistent 1 = Device Self Testing 2 = Standby 3 = Operational 4 = Major Recoverable Fault 5 = Major Unrecoverable Fault
9 [0x09]	Get	UINT	Configuration Consistency Value	
102 [0x66]	Get	Struct of	Earliest Significant Error	
		USINT		Class ID
		USINT		Instance ID
		USINT		Error Code; see **Table 21** on **Page 41**
		USINT		Additional Code
103 [0x67]	Get	UINT	QCPort Device Adrs	QCPort Device ID
104 [0x68]	Get	UINT	CH Vendor ID	1 = Cutler Hammer
105 [0x69]	Get	Semaphore	Structure Of	Access Synchronization Semaphore
		Client Electronic Key	UINT	Vendor Number
			UDINT	Client Serial Number
		Semaphore Timer	ITIME	Millisecond Timer
176 [0xB0]	Get/Set	SHORT_ STRING	User Label (Tag Name)	User Defined ASCII string of 16 characters. Must perform an apply Service [0x0D] to QCPort Backplane Object [0x8F] Instance 0x01 to save to nonvolatile memory.
178 [0xB2]	Get	USINT	Internal State Variable	

Table 20: Status — Instance 1 to 127

This attribute represents the current status of the entire device. Its value changes as the state of the device changes. The Status attribute is a WORD, with the following bit definitions:

Bit(s):	Called:	Definition
0	Owned	0
1		Reserved, set to 0
2	Configured	0 = No device attached to instance 1 = Valid device attached to instance
3		Reserved, set to 0
4	Reserved	Set to zero.
5	User Fault	This bit is set when some type of fault condition exists that is caused by a user's actions. For the D77D-EIP – this bit shall be set TRUE (1) if a configuration error is detected.
6	Device Fault	This bit is set when some type of fault is known to exist with respect to the QCPort device associated with this instance of Identity.
7	System Fault	This bit is set when some system wide systemic fault exists with respect to the QCPort device identified by this instance of Identity.
8	Minor Recoverable Fault	TRUE indicates the device detected a problem with itself, which is thought to be recoverable. The problem does not cause the device to go into one of the faulted states.
9	Minor Unrecoverable Fault	TRUE indicates the device detected a problem with itself, which is thought to be unrecoverable. The problem does not cause the device to go into one of the faulted states.
10	Major Recoverable Fault	TRUE indicates the device detected a problem with itself, which caused the device to go into the "Major Recoverable Fault" state.
11	Major Unrecoverable Fault	TRUE indicates the device detected a problem with itself, which caused the device to go into the "Major Unrecoverable Fault" state.
12, 13		Reserved, set to 0
14, 15		Reserved, set to 0

Table 21: Error Code: Instance 1

Code	Description
0	NO Fault
51	Too Many Devices on Channel A
52	Too Many Devices on Channel B
53	Duplicate Group ID on Channel A
54	Duplicate Group ID on Channel B
55	Device Fail to Respond on Channel A
56	Device Fail to Respond on Channel B
57	Device Configuration CRC on Channel A
58	Device Configuration CRC on Channel B
59	Scan Fail to Respond on Channel A
60	Scan Fail to Respond on Channel B
61	Configuration Error on Channel A
62	Configuration Error on Channel B
66	OS Mailbox Fault
67	Duplicate Group ID
68	Invalid Group ID
69	Power Fail
72	No QCPort Devices Found
73	Too Much Consumption Data
74	Too Much Production Data
75	FRAM Read Timeout Fault
76	FRAM Read Status Timeout Fault
77	FRAM Wire Enable Timeout Fault
78	FRAM Write Status Timeout Fault
79	FRAM Write Timeout Fault
80	FRAM SPI Wait Timeout Fault
81	Critical Internal System Fault
82	Max Fault

Identity Object: 0x01 — Instance 2 to 127

Table 22: Instance 2 to 127

Secondary instances of the Identity Object are used to publicize the identity of each device "discovered" on QCPort.

#	Access	Data Type	Name	Description/Value
1 [0x01]	Get	UINT	Vendor ID	Identification of each vendor by number The constant 68.
2 [0x02]	Get	UINT	Device Type	Indication of general type of product The constant 102.
3 [0x03]	Get	UINT	Product Code	Identification of a particular product of an individual vendor. See **Table 23** on **Page 43**.
4 [0x04]	Get	STRUCT of:	Revision	Revision of the item the Identity Object represents The QCPort device's Firmware revision will be visible in this attribute.
		USINT	Major Revision	
		USINT	Minor Revision	
5 [0x05]	Get	WORD	Status	Summary status of device See "**Status**" in Instance 1 of the Identity Object
6 [0x06]	Get	UDINT	Serial Number	Serial number of device
7 [0x07]	Get	SHORT_ STRING	Product Name	Human readable identification
8 [0x08]	Get	USINT	State	Present state of the device as represented by the state transition diagram 0 = Nonexistent 1 = Device Self Testing 2 = Standby 3 = Operational 4 = Major Recoverable Fault 5 = Major Unrecoverable Fault
9 [0x09]	Get	UINT	Configuration Consistency Value	
102 [0x66]	Get	Struct of	Earliest Significant Error	
		USINT		Class ID
		USINT		Instance ID
		USINT		Error Code; see See **Table 24** on **Page 43**.
		USINT		Additional Code
103 [0x67]	Get	UINT	QCPort Device Adrs	QCPort Device ID
104 [0x68]	Get	UINT	CH Vendor ID	1 = Cutler Hammer
105 [0x69]	Get	Semaphore	Structure Of	Access Synchronization Semaphore
		Client Electronic Key	UINT	Vendor Number
			UDINT	Client Serial Number
		Semaphore Timer	ITIME	Millisecond Timer
176 [0xB0]	Get	SHORT_ STRING	User Label (Tag Name)	User Defined ASCII string of 16 characters
178 [0xB2]	Get	USINT	Internal State Variable	

Table 23: Product Code — Instance 2 to 127

Product Code	Catalog Number	Description
0x8001	D77A-DI8	8 Pt DC Sink/Source Input
0x8002	D77A-DQ8	8 Pt DC MOSFET Sink Output
0x8003	D77A-IA8	8 Pt AC Input
0x8004	D77A-AQ8	8 Pt AC SSR Output
0x8005	D77A-RQ8	8 Pt Relay Output
0x8011	D77A-DI8DQ8	8 Pt DC In 6 Pt DC MOSFET Output
0x8012	D77A-DI8RQ8	8 Pt DC In 6 Pt Relay Output
0x8813	D77A-AI8AQ8	8 Pt AC In 6 Pt AC SSR Output
0x8814	D77A-AI8RQ8	8 Pt AC In 6 Pt Relay Out
0x800C	D77A-DI16	16 Pt DC Sink/Source Input
0x800D	D77A-DQ16	16 Pt DC MOSFET Sink Output
0x800E	D77A-AI16	16 Pt AC Input
0x8010	D77A-RQ16	16 Pt Relay Output
0x800F	D77A-AQ16	16 Pt AC SSR Output

Table 24: Error Codes Instance 2 to 127

Code	Description
1	Device Responding Incorrectly
2	CRC Incorrect
3	Device Failure To Respond
4	Duplicate Device ID
5	Device Configuration Error
6	Device Duplicate Group ID
7	Device Application Warning
8	Device Application Fault

DeviceNet Object: 0x03

Table 25: Instance 1

#	Access	Data Type	Name	Description/Value
3 [0x03]	Get/Set	BOOL	BOI	Bus-Off Interrupt
4 [0x04]	Get/Set	USINT	Bus–Off Counter	Number of times CAN went to the bus-off state Range 0 – 255

Assembly Object: 0x04

Table 26: Instance 101 [0x65] (Input)

#	Access	Data Type	Name	Description/Value
3 [0x03]	Get	ARRAY of BYTES	Data	Data contained with in the poll response

Table 27: Instance 102 [0x66] (Output)

#	Access	Data Type	Name	Description/Value
3 [0x03]	Get	ARRAY of BYTES	Data	Data contained with in the strobe response

Table 28: Instance 103 [0x67] (Status Response)

#	Access	Data Type	Name	Value
3 [0x03]	Get	ARRAY of BYTES	Data	Heartbeat response

Table 29: Instance 104 [0x68] (Status Trigger)

#	Access	Data Type	Name	Value
3 [0x03]	Get /Set	No data	n/a	Heartbeat trigger

QCPort Backplane Interface Control Object: 0x8F

Table 30: Instance 1 (Channel A) and Instance 2 (Channel B)

#	Access	Data Type	Name	Value
1 [0x01]	Get	USINT	State	1 = Determine Mode 2 = Recall Saved Configuration 3 = Restore Saved Configuration 4 = Soft Configure 5 = Factory Reset 6 = Acquire Device Id 7 = Discovery 8 = Discovery Quiet Time 9 = Configuration Gather Request 10 = Setup Slave Addresses 11 = Save Device Id 12 = Set To MIS Mode 13 = Restart Devices 14 = Get Device Id Tags 15 = Save Autoconfig Info 16 = Idle 17 = Wormhole 18 = Wormhole RS232 19 = Wormhole RS232 Passive 20 = Scantrain 21 = Verify Device CRC 22 = Snooper 23 = New 24 = Reset 25 = Faulted
2 [0x02]	Get	UINT	Device ID	Device ID for QCPort
3 [0x03]	Get	USINT	Device ID Source	Source of the Device ID value 0 = Default Value 1 = Switch Value 2 = Set Value
4 [0x04]	Get/Set	USINT	Baud Rate	Enumerated value of QCPort baud setting 2 = 38.4K 3 = 57.6K (default) 4 = 115.2K 5 = 230.4K 6 = 460.8K
5 [0x05]	Get/Set	BOOL	Access Enable	Explicit control of the scanner function on this subnet 1 = Not Enabled 0 = Access Enabled
6 [0x06]	Get	BOOL	Scanner Running	Exposes the activity of the scanner function on the QCPort subnet 0 = Scanner inactive 1 = Scanner active
7 [0x07]	Get/Set	UDINT	Total Transactions	A count of the number of successful message transmissions on the QCPort subnet Default value = 0
8 [0x08]	Get	UDINT	Collision Count	A count of the number of messages detected to have collided on the QCPort subnet Default = 0

Table 30: Instance 1 (Channel A) (Continued)

#	Access	Data Type	Name	Value
9 [0x09]	Get	UDINT	Framing Error Count	A count of the number of framing errors (or equivalent serial peripheral hardware errors) detected in the QCPort subnet traffic Default = 0
10 [0x0A]	Get	UDINT	CRC Error Count	A count of the number of QCPort subnet messages that are invalid due to CRC calculation faults Default = 0
11 [0x0B]	Get	USINT	Expected Devices Identified	Total number of devices in configuration expected to reside on this subnet Default = Configured number based upon instances of Identity
12 [0x0C]	Get	USINT	Actual Devices Identified	Total Number of devices on this QCPort Default = 0
13 [0x0D]	Get	USINT	Expected Devices In Scan	Count of devices configured on this QCPort Default = Configured number based upon attributes in the QCPort Data Association instances
14 [0x0E]	Get	USINT	Actual Devices In Scan	Total number of devices in scan list Default = 0
15 [0x0F]	Get/Set	USINT	Scan Delay	Time to delay between scans on QCPort in milliseconds
17 [0x11]	Get/Set	UINT	Worm Hole Target Device ID	Default value is 65535
18 [0x12]	Get/Set	ARRAY of BYTE	Worm Hole Consumed Message	Message from DeviceNet to QCPort
19 [0x13]	Get	ARRAY of BYTE	Worm Hole Produced Message	Message from QCPort to EtherNet/IP
20 [0x14]	Get/Set	ARRAY of BYTE	Wormhole Direct Message	Synchronous message from EtherNet/IP to QCPort with response

QCPort Data Association Object: 0x90

The QCPort Data Association Object is the mechanism that allows the associations between the data produced and consumed by each QCPort device to be positioned within the Data Transfer Buffer.

Table 31: Instance 1 D77D-EIP Poll Response

#	Access	Data Type	Name	Value
1 [0x01]	Get/Set	USINT	Consumed Size	Number of Bytes Consumed by Selected Device ID
2 [0x02]	Get	UINT	Consumed Offset	Offset in Data Buffer
3 [0x03]	Get/Set	USINT	Produced Size	Number of Bytes Produced by Selected Device ID
4 [0x04]	Get	UINT	Produced Offset	Offset in Data Buffer

Table 32: Instance 2 to 64 Channel A

#	Access	Data Type	Name	Value
1 [0x01]	Get/Set	USINT	Consumed Size	Number of Bytes Consumed by Selected Device ID
2 [0x02]	Get	UINT	Consumed Offset	Offset in Data Buffer
3 [0x03]	Get/Set	USINT	Produced Size	Number of Bytes Produced by Selected Device ID
4 [0x04]	Get	UINT	Produced Offset	Offset in Data Buffer

Table 33: Instance 65 to 127 Channel B

#	Access	Data Type	Name	Value
1 [0x01]	Get/Set	USINT	Consumed Size	Number of Bytes Consumed by Selected Device ID
2 [0x02]	Get	UINT	Consumed Offset	Offset in Data Buffer
3 [0x03]	Get/Set	USINT	Produced Size	Number of Bytes Produced by Selected Device ID
4 [0x04]	Get	UINT	Produced Offset	Offset in Data Buffer

The Poll Response can have part or all of Status Indicators, **Page 37**, added between the Input Status Word and the I/O data. To add these bytes, modify attribute 3 of Instance 1 of the QCPort Data Association Object [0x90] from the default of 0 to the number of bytes to be added. For example, if there are 26 QCPort devices connected to the D77D-EIP, the Status Indicators will contain useful data in the first 4 bytes.

Table 34: Example Status Indicators

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Instance 8	Instance 7	Instance 6	Instance 5	Instance 4	Instance 3	Instance 2	0
1	Instance 16	Instance 15	Instance 14	Instance 13	Instance 12	Instance 11	Instance 10	Instance 9
2	Instance 24	Instance 23	Instance 22	Instance 21	Instance 20	Instance 19	Instance 18	Instance 17
3	0	0	0	0	0	Instance 27	Instance 26	Instance 25

Note: Once the modification is performed, an Apply to the Backplane Object [0x8F] must be performed to save that information to nonvolatile memory.

Perform an Apply Service to Backplane Object

Apply service – 0x0D

Class – 0x8F

Instance – 0x01

Assembly/Register Data Association Object: 0x91

The Connection Data Association Object is the mechanism that allows the associations between the data produced and consumed by each DeviceNet I/O connection to be positioned within the Data Transfer Buffer.

Table 35: Instance 1

#	Access	Data Type	Name	Value
1 [0x01]	Get	UINT	Poll Consumed Size	Number of Bytes Consumed from Poll Connection Default = 2
2 [0x02]	Get	UINT	Poll Produced Size	Number of Bytes Produced to Poll Connection Default = 2
3 [0x03]	Get	UINT	Status Consumed Size	Number of Bytes Consumed from Status Connection
4 [0x04]	Get	UINT	Status Produced Size	Number of Bytes Produced to Status Connection

Table 36: Instance 1 TCP/IP Interface Objet: 0xF5

#	Access	Data Type	Name	Value
1	Get	DWORD	Status	Interface status
2	Get	DWORD	Configuration Capability	Bit 0 = BootP Bit 2 = DHCP
3	Get/Set	DWORD	Configuration Control	Interface Control Flags
4	Get	Array of STRUCT:	Physical Link Object	Path to Physical Link Object
		UINT	Path size	Size of Path
		EPATH	Path	Logical Segments Identifying the Physical Link Object
5	Get/Set	STRUCT:	Interface Configuration	TCP/IP Network Interface Configuration
		UDINT	IP Address	The Device's IP Address
		UDINT	Network Mask	The Device's Network Mask
		UDINT	Gateway Address	Default Gateway Address
		UDINT	Name Server	Primary Name Server
		UDINT	Name Server 2	Secondary Name Server
		STRING	Domain Name	Default domain name
6	Get/Set	STRING	Host Name	Host name

Table 37: Instance 1 Ethernet Link Object: 0xF6

#	Access	Data Type	Name	Value
1	Get	UDINT	Connection Speed	Speed of the connection
2	Get	DWORD	Connection Duplex	Interface status flags
3	Get	ARRAY of 6 USINTs	MAC Address	MAC layer address

Appendix B: PTO Certification

Technical Support

- For additional information on this product, please call our Customer Support Center at: 1-800-356-1243
- For service or start-up assistance 24 hours/day, 7 days/week, please call: 1-800-498-2678

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