



MYNAHSM

IOD-5101 and IOD-5201 PLC I/O Interface (PIO) Subsystem
GE Genius

USERS MANUAL

December 21, 2007

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Introduction

This user's manual contains information required to install, configure, and use the Type IOD-5101 and IOD-5201 PLC I/O Interface (PIO) Subsystem.

1.1 Audience

The manual is written for the engineer/technician who is familiar with control systems.

1.2 Product Discussed

This document deals with IOD-5101 and IOD-5201 PLC I/O Interface Subsystem:

GE Genius I/O (IOD-5101 and IOD-5201)

Other related Subsystems are:

Allen Bradley 1771 RIO (IOD-5102) and IOD-5202)

Schneider Electric Modicon S908 RIO (IOD-5103 and IOD-5203)

1.3 CE Statement

This manual describes installation and maintenance procedures for products, which have been tested to be in compliance with appropriate CE directives. To maintain compliance, these products must be installed and maintained according to the procedures described in this document. Failure to follow the procedures may compromise compliance.

1.4 How to Use This Manual

This manual is written to help technicians at most levels of experience. The comprehensive table of contents should provide ease of access to the material for reference.

1.5 Manual Contents

The contents of this document are listed below, with additional detail shown in the Table of Contents.

Section 1 - Introduction: includes the purpose of the document, the intended audience, and related documents.

Section 2 – Installation: Type IOD-5101 and IOD-5201 PLC I/O Interface; product description and specifications.

Section 3 – DeltaV Programmable Serial Card

Section 4 – Table Set Definitions

Section 5 – Serial Card Configuration

Section 6 – Automated Configuration Utility

Section 7 – Operational Check

Section 8 – Technical Support

1.6 Related Documents

GE Genius I/O System & Communications, GEK90486F–1, November 1994.

1.6.1.1 Manual Conventions

The following conventions are used in this document:

Acronyms and Abbreviations - Standard abbreviations and symbols are used throughout this manual. Instances where non-standard abbreviations or acronyms are used will be explained at the first usage.

Revision Control - The title page of each document lists the printing date and any supersede notice.

Cross References - References to other documents for additional information list the document name and number.

1.7 Warnings, Cautions and Notes

Warnings, Cautions, and Notes attract attention to essential or critical information in this manual. The types of information included in each are explained in the following:



Warning

All warnings have this form and symbol.

Do not disregard warnings. They are installation, operation, or maintenance procedures, practices, conditions, statements, and so forth, which if not strictly observed, may result in personal injury or loss of life.



Caution

All cautions have this form and symbol.

Do not disregard cautions. They are installation, operation, or maintenance procedures, practices, conditions, statements, and so forth, which if not strictly observed, may result in damage to, or destruction of, equipment or may cause a long term health hazard.



Note

Notes have this form and symbol.



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Notes contain installation, operation, or maintenance procedures, practices, conditions, statements, and so forth that alert you to important information, which may make your task easier or increase your understanding.

2 Installation

The PLC I/O Interface (PIO) Module is din-rail mounted as shown below. The recommended communication cable between the DeltaV Programmable Serial Interface Card (PSIC) and the I/O module is BELDEN 3108A. This cable has 3 twisted-pairs, 22 AWG, and shielded for RS-485 communications. The maximum distance between the DeltaV PSIC and the module is 200ft (60m). Each port communicates at 500K baud, with an effective bandwidth of 1M baud over both ports.

The DeltaV PSIC for GE Legacy Remote I/O runs in simplex or redundant modes. In Simplex mode, both ports of the PSIC are used to connect to a single PIO Module. The factory default address for the PIO in simplex mode is 31.

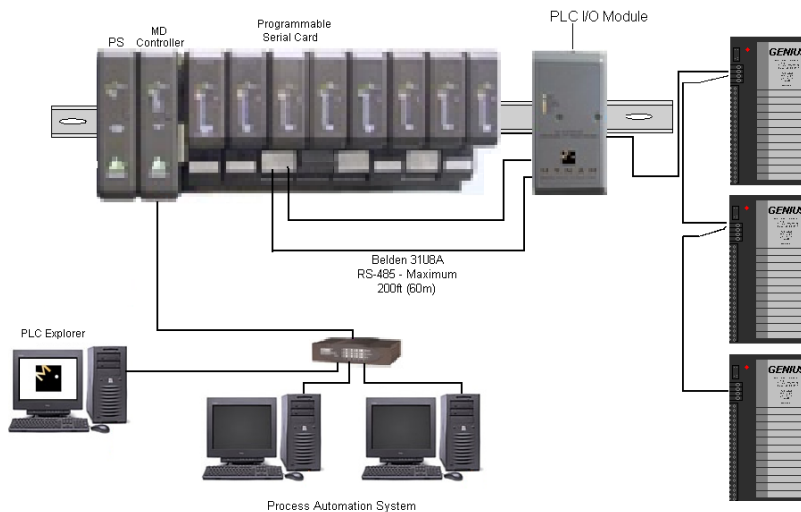


Figure 2.0a PLC I/O Simplex PSIC

The Mynah VIM Controller connection also runs in simplex or redundant modes. In Simplex mode, one of the four emulated serial cards is used to connect to a single PIO Module.

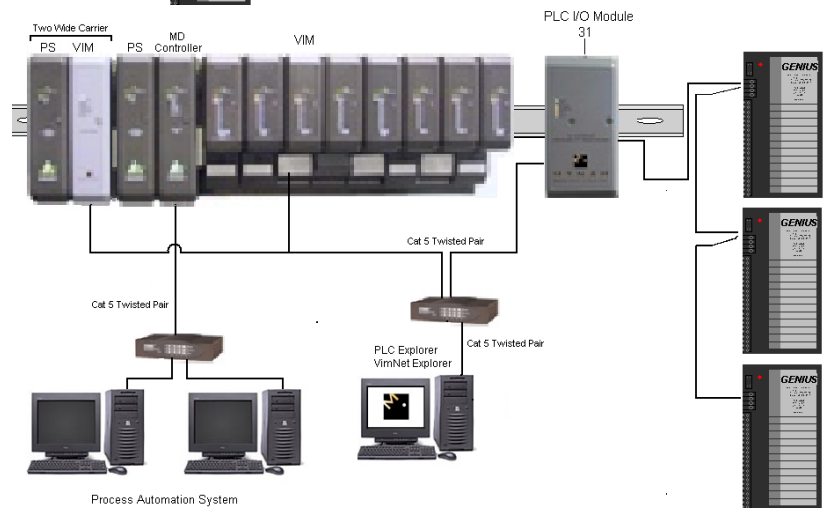


Figure 2.0b PLC I/O Simplex PSIC

In redundant mode, two PSICs are used, each connected to an individual PIO module. Two types of redundant architectures can be used, i.e., 30/31 addressing, and BSM (Bus Switching Module).

The GE Genius blocks accept two bus controllers (i.e., PIO Modules) on each bus. These must each have different addresses (defaults are 31 for the primary bus controller and 30 for the secondary). The GE strategy for these units allows both units to continuously receive inputs from all blocks on the bus.

This schema also allows the bus controllers to send outputs to the associated blocks. The blocks are configured for redundancy and determine which outputs to respond to. By default the blocks will respond to outputs from address 31. However, if no outputs are received from address 31 for 3 bus scans, then the blocks will use those supplied by the bus controller at address 30.

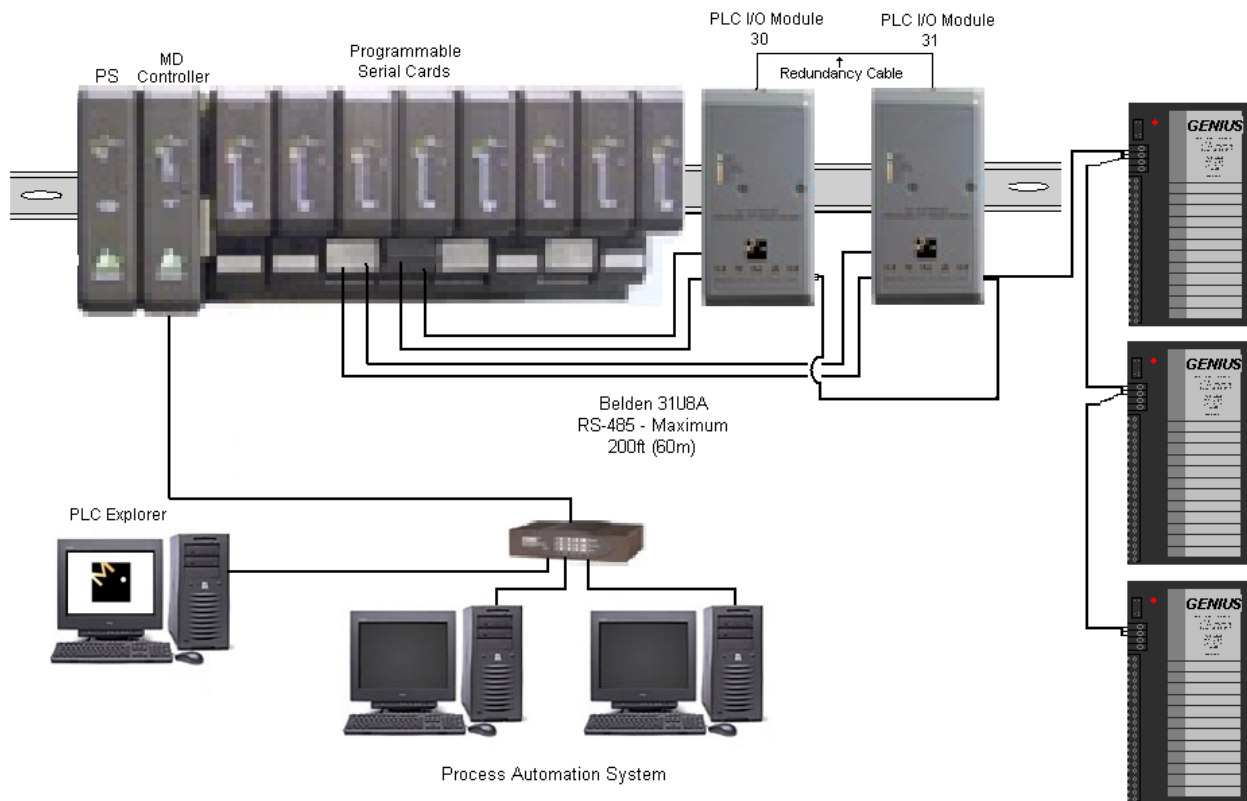


Figure 2.0c PLC I/O 30/31 Redundancy

A second redundancy schema uses a Bus Switching Module (BSM) to allow two bus controllers with the same address to be used for redundancy. In this schema, only one bus controller is actively on the IO bus at any one time. The BSM will switch between the modules (to secondary) if there is a failure of the primary communications link. In this case, the secondary module does not maintain the up to date data tables that the previous redundancy method uses. An inter-process communications link may be used to enable the update of these tables (from the primary) when the module is in secondary mode.

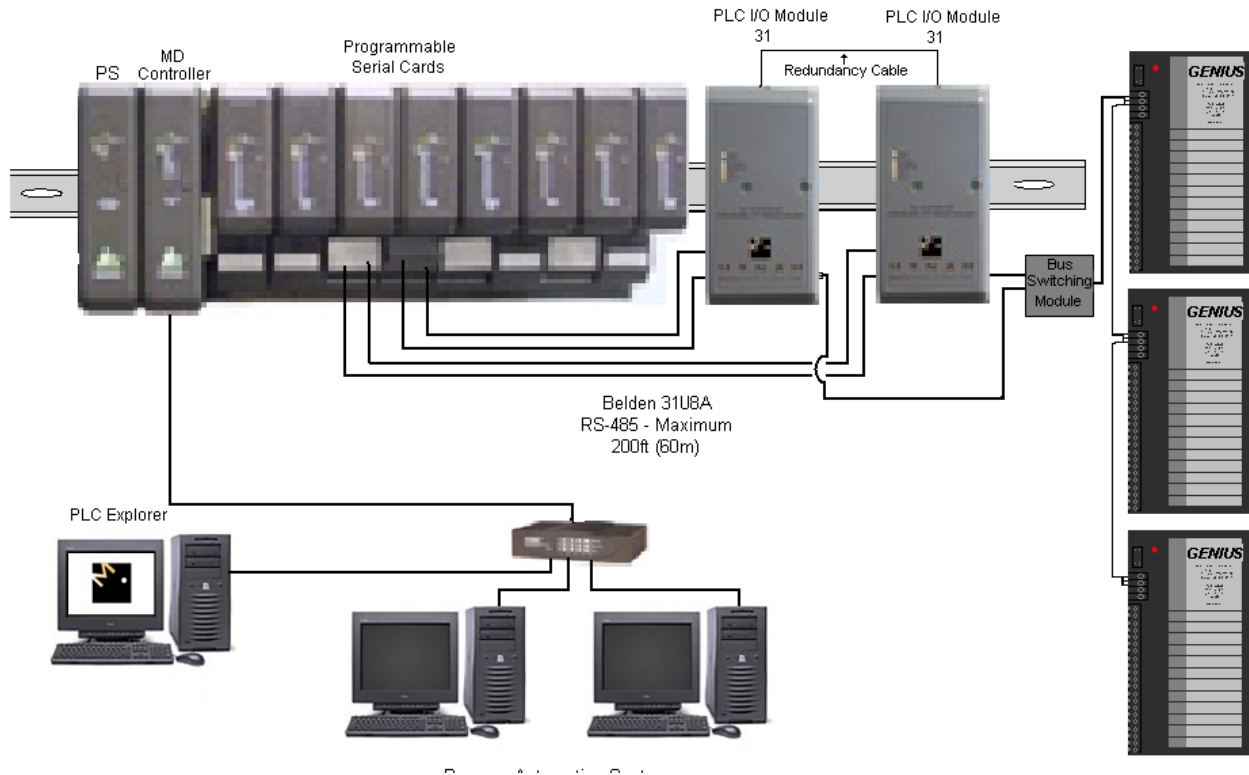


Figure 2.0d PLC I/O Redundancy with BSM

2.1 Interface Module

The PIO module comprises 2 parts. The base component has mounting screws for the din-rail. The PIO enclosure, which fits on top of the base, has 1 screw, which secures it to the base. The second visible screw (along the right edge) is not used for securing the enclosure and should not be moved.

The base is 3 5/16 inches wide (8.41cm) and 6 1/2 inches tall (16.5 cm). The following illustrates this:

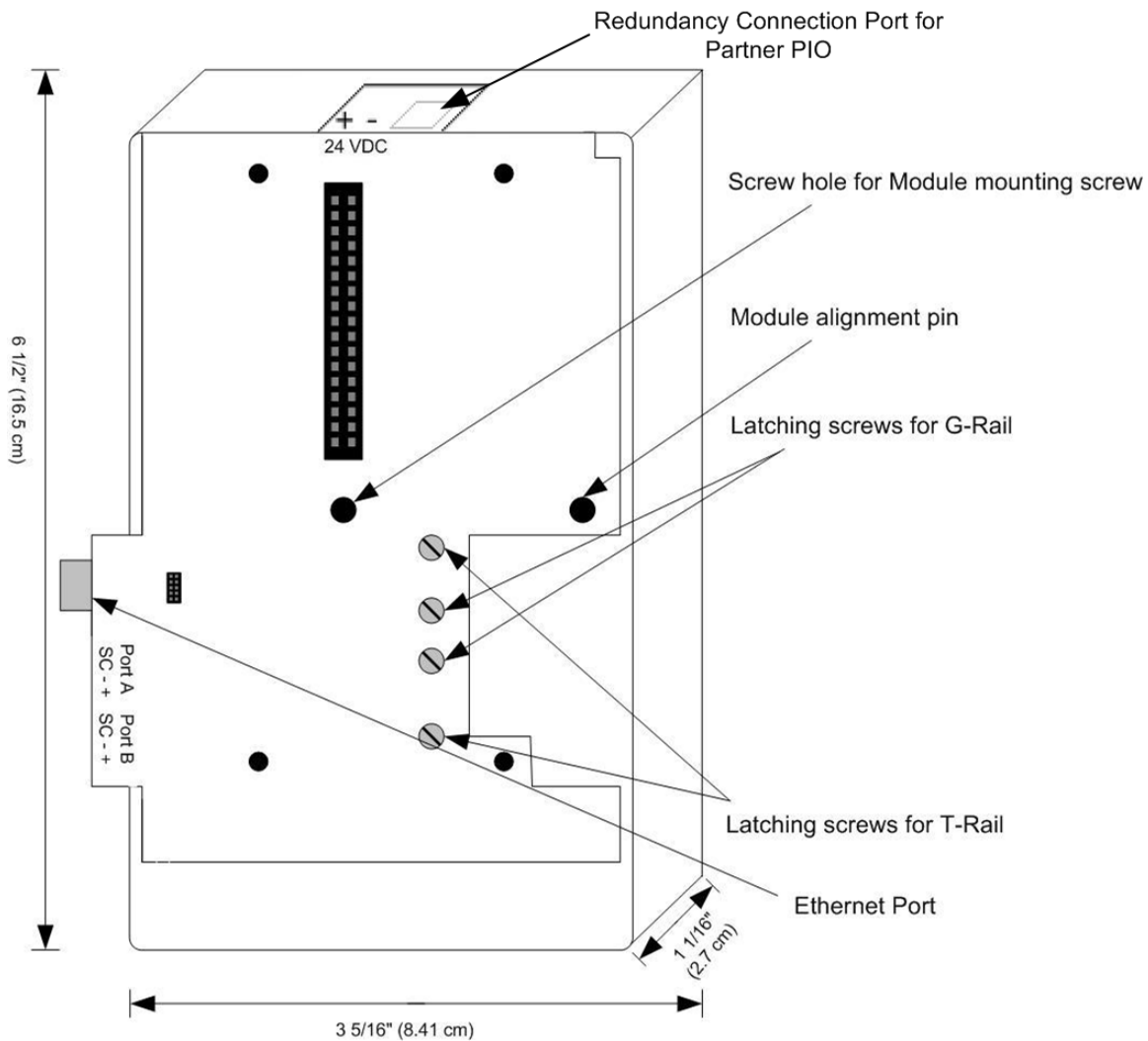


Figure 2-1 PLC I/O Module Base

The PIO Enclosure is 4 3/8 inches wide (11.11cm) and 6 1/2 inches tall (16.5 cm). The following illustrates this:

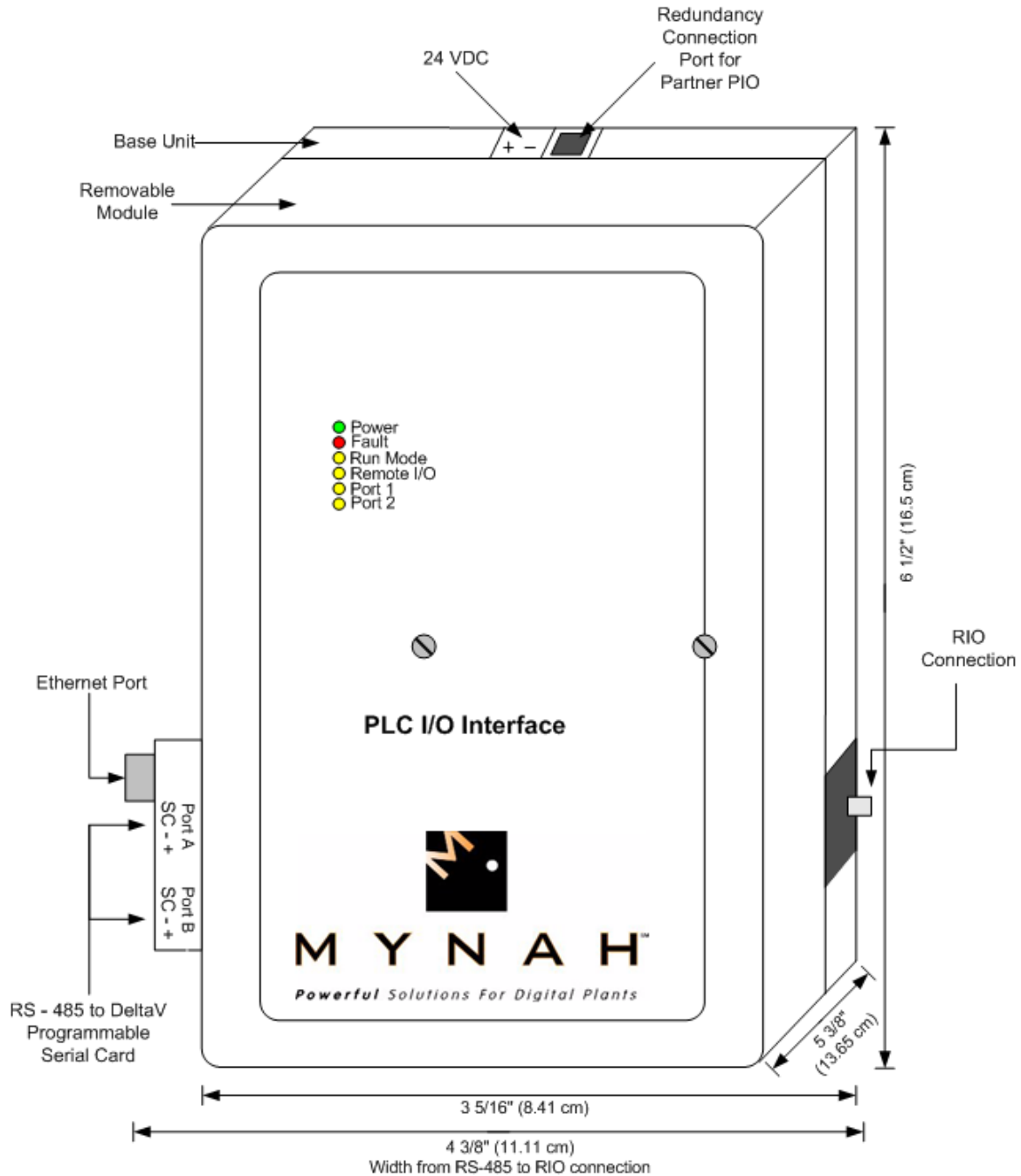


Figure 2-2 – PLC I/O Module Enclosure

2.2 Specification

The PIO module requires 9-28VDC, 0.35Amps.
The Ambient operating temperature is 50°C, Maximum.

2.3 Cables

The PLC I/O (PIO) Interface requires four types of cables. These are:

1. +/- 24VDC Power Cable;
2. RS-485 Communications Cable;
3. CAT 5 twisted pair Ethernet cable,
4. Genius Bus Cable; and
5. Redundancy Connection Cable (if used as redundant pair).

The +/- 24VDC power cable uses a 2-pin Weidmuller plug connector. This is supplied with the module. Power source for the PIO can be the same as signal power for DeltaV I/O modules. Alternatively, you can use a standalone 24VDC power supply, e.g., SOLA SCP30S 24-DN or SOLA SDN 2.5-24-100.

The RS-485 communications cable is designed for 2 ports. The recommended cable is BELDEN 3108A. This cable has 3 twisted pairs. Two pairs are used for Signal +/- (1 for each port). For the ground connection, each port uses one conductor from the third pair. The communications cable connects to the PIO Interface using 2 3-pin Weidmuller connectors (supplied), and is terminated inside the Module. No external terminating resistors are required. The opposite end of the communications cable connects directly to the DeltaV Serial cards termination block. The maximum length of this cable is 200ft (60m). The Figure 2-3b illustrates the pin connections.

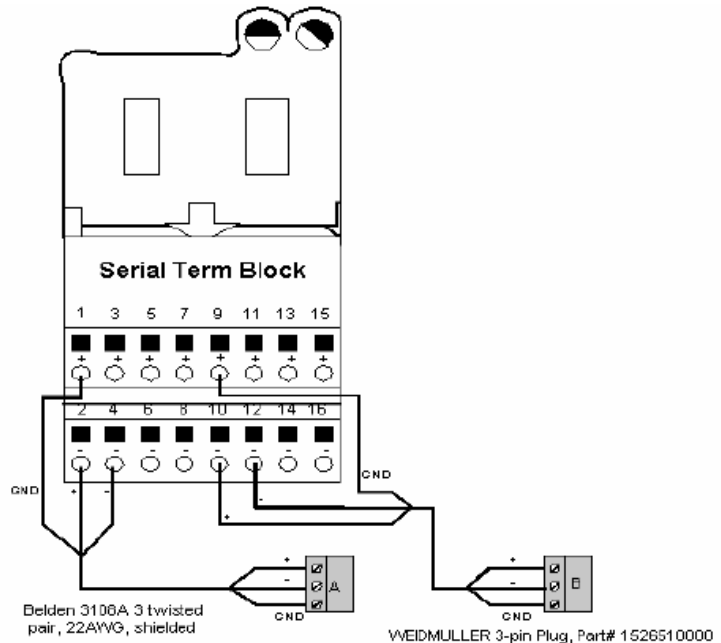


Figure 2-3a – Cable Pinout

This view shows the connectors screws up and to the left for attaching the wires, note the top wire is the positive connection.

Installed view (screws are to back, ground wire is on top)

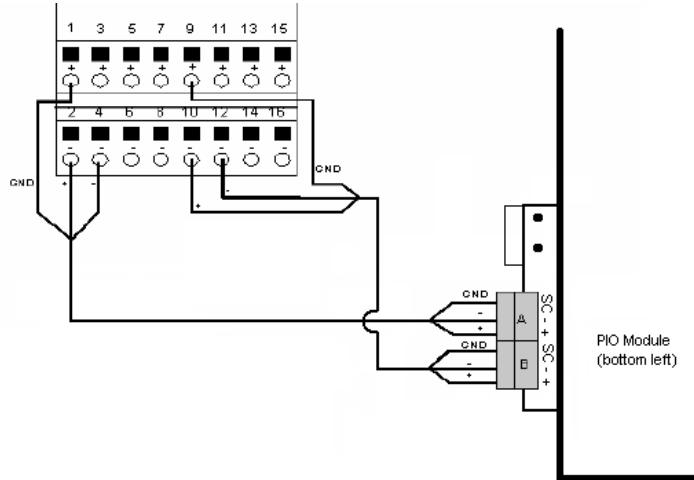


Figure 2-3b – Cable Pinout connected

The Genius Bus uses a 3-conductor cable. The cable is wired to a 6-pin Weidmuller plug connector (supplied). The cable connects to the plug as follows. Note that the screws are facing you in the diagram below.

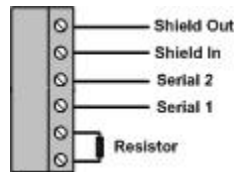


Figure 2-3c – Genius Bus Cable Wiring

For more details regarding GE Genius block wiring, please refer to GE Genius I/O Systems & Communications Manual.

The Redundancy Cable (supplied) has RJ11 connectors on both ends. It plugs into the top port (next to the power supply plug) of the PIO Module. The cable has 6 conductors and is fabricated as a crossover cable. Specifically, Pin 6 connects to Pin 1; Pin 5 connects to Pin 2, etc.

The following diagram illustrates the cable connections.

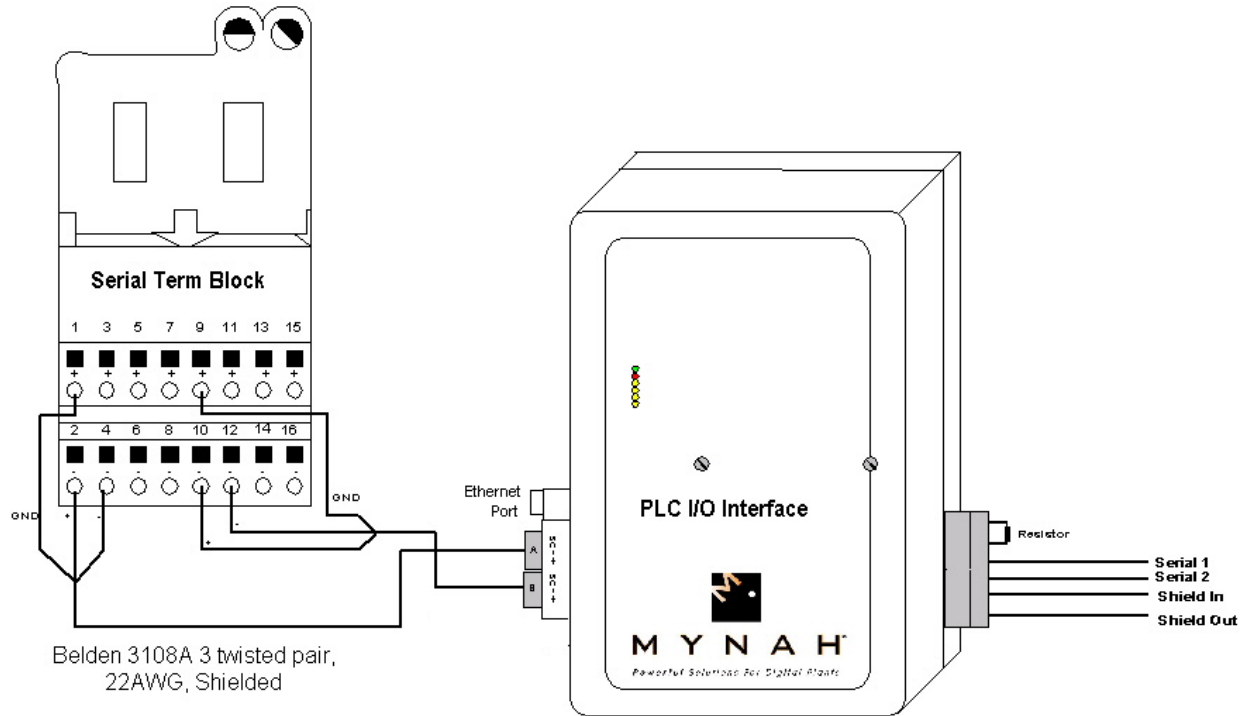
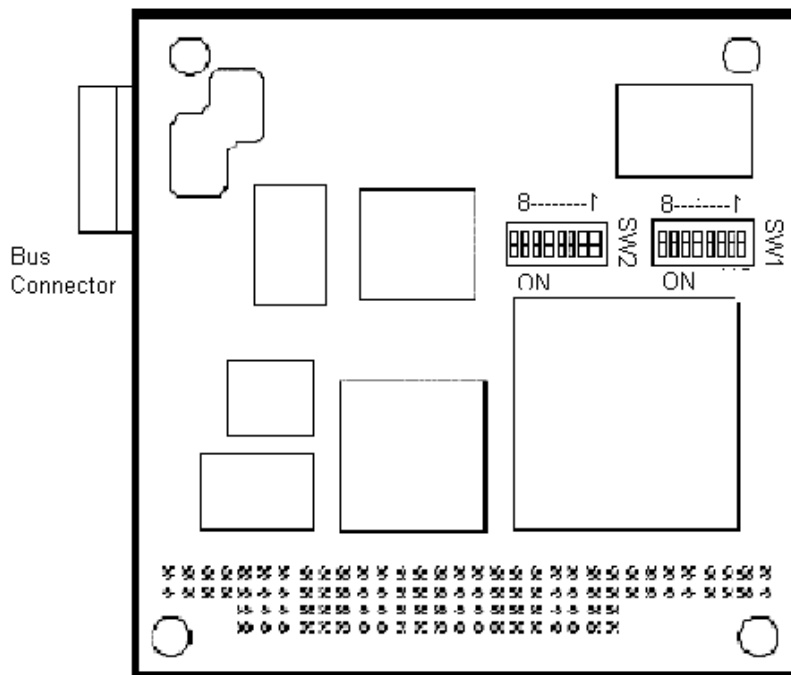


Figure 2-4 – Cable Connections. Note the Genius Bus connector shown with screws to the back.

2.4 Genius Bus Interface Board

The Genius Bus Interface Board handles the communications over the GE Genius bus. The board initial boot up status is set with 2 dip switch blocks and 5 link switches. The board has an initial address (either primary or redundant) and the default bus baud rate set (switch 1). Outputs (switch 1) are initially disabled; these will be enabled when firmware loads.

2.4.1 DIP Switch Locations



2.4.2 Switch #1

SW1 sets the initial default IO cards bus address, connection baud rate and output state.

Selection	Legacy Default setting	Switch							
		1	2	3	4	5	6	7	8
Bus Address	Primary controller (31)	OFF	OFF	OFF	OFF	OFF			
	Redundant controller (30)	ON	OFF	OFF	OFF	OFF			
Serial Bus Baud Rate	153.6 std						OFF	OFF	
	153.6 Extended (8 bit skip)						ON	ON	
	76.8						ON	OFF	
	38.4						OFF	ON	
Outputs Enabled on startup	Disabled								OFF

The board normally has Bus address set to 31, or 30. Other addresses are not recommended because the GE blocks expect one of these addresses for the bus controller (31), or backup bus controller (30). However; other addresses may be used to monitor the block status.

Selection	Legacy Default setting	Switch							
		1	2	3	4	5	6	7	8
Bus Address	Primary controller (31)	OFF	OFF	OFF	OFF	OFF			
	Redundant controller (30)	ON	OFF	OFF	OFF	OFF			
	29	OFF	ON	OFF	OFF	OFF			
	28	ON	ON	OFF	OFF	OFF			
	27	OFF	OFF	ON	OFF	OFF			
	26	ON	OFF	ON	OFF	OFF			
	25	OFF	ON	ON	OFF	OFF			
	24	ON	ON	ON	OFF	OFF			
	23	OFF	OFF	OFF	ON	OFF			
	22	ON	OFF	OFF	ON	OFF			
	21	OFF	ON	OFF	ON	OFF			
	20	ON	ON	OFF	ON	OFF			
	19	OFF	OFF	ON	ON	OFF			
	18	ON	OFF	ON	ON	OFF			
	17	OFF	ON	ON	ON	OFF			
	16	ON	ON	ON	ON	OFF			
	15	OFF	OFF	OFF	OFF	ON			
	14	ON	OFF	OFF	OFF	ON			
	13	OFF	ON	OFF	OFF	ON			
	12	ON	ON	OFF	OFF	ON			
	11	OFF	OFF	ON	OFF	ON			
	10	ON	OFF	ON	OFF	ON			
	9	OFF	ON	ON	OFF	ON			
	8	ON	ON	ON	OFF	ON			
	7	OFF	OFF	OFF	ON	ON			
	6	ON	OFF	OFF	ON	ON			
	5	OFF	ON	OFF	ON	ON			
	4	ON	ON	OFF	ON	ON			
	3	OFF	OFF	ON	ON	ON			
	2	ON	OFF	ON	ON	ON			
	1	OFF	ON	ON	ON	ON			
	0	ON	ON	ON	ON	ON			

2.4.3 Switch #2

SW2 sets IO port, shared memory address, and watchdog timer state. Do not modify this switch.

Selection	Legacy Default setting	Switch							
		1	2	3	4	5	6	7	8
Shared Memory Location	C800 (Used with Pegasus)	ON	ON	ON	OFF				
IO Port Address	3E0					OFF	OFF	ON	
Watch Dog Timer Enable/Disable	Disabled								ON

2.5 Operational Overview

The PIO has 6 LED's, which are used to indicate the operating state of the interface module. The first four are the same for both types of connections, the last 2 (Port1 and Port 2) are different. From top to bottom, these are as follows:

LED	Color	Meaning	
		Serial Connection	Ethernet (Modbus/TCP) connection
Power	Green	PIO has Power	Same
Fault	Red	Fault – Process thread is not running – When this is lit, the remaining LED's are not valid.	Same
Mode	Amber	On Solid – The PIO is in Run Mode/Redundant Primary Off – The PIO is in Program Mode Blinking – The PIO is Redundant Secondary	Same
RIO Status	Amber	On Solid - RIO Configuration and Communications are good in both Run and Program Modes. Blinking – RIO Configuration mismatched or field Communications have errors (timeouts, invalid blocks, etc).	Same
Port 1	Amber	On Solid – Port 1 Communications with DeltaV are good. Blinking – Port 1 Communications with DeltaV are bad.	On Solid – TCP connection open with DeltaV. OFF or Blinking– TCP connection failed (communications with DeltaV are bad).
Port 2	Amber	On Solid – Port 2 Communications with DeltaV are good. Blinking – Port 2 Communications with DeltaV are bad.	Blinks on receipt of Modbus/TCP message.

2.5.1 Reset Operating State

The PIO enters the Reset state when power is applied or after a reset (hardware, software or watchdog timer reset). Upon entering the Reset operating state, the PIO will load the system; and transition to the power-up operating state. During this phase the Red LED will be lit and all Amber LED's will be in an undefined state.

2.5.2 Power-Up Operating State

The PIO enters the Power-Up operating state from the Reset state once the hardware and operating system have been initialized. In the Power-Up operating state, the PIO firmware will be initialized and all hardware self-tests performed. If the self-test fails then the PIO firmware will re-enter the Reset operating state. While in the Power-Up operating state, no field I/O data communication functions or DeltaV RS-485 communication functions will be performed. The PIO will initialize the serial ports and the field interface hardware. Upon successful completion, the PIO will transition to the un-configured operating state. During this phase the Red LED will be lit and all Amber LEDs will be in an undefined state.

2.5.3 Un-configured Operating State

The un-configured operating state is entered after power-up and successful completion of the power-up self-tests. The PIO firmware will load an empty configuration (if powered up for the very first time), or reload the last saved configuration from system non-volatile memory. Upon successful completion, the Red Fault LED will go off and the Amber Run Mode and RIO Configuration LEDs will be lit. If no configuration is present (first time startup), the PIO will be in run mode but no remote I/O communication will be occurring.

2.5.4 Active Operating State

The active operating state is the state in which the PIO has active communication with the field I/O bus on one side, and DeltaV PSIC on the other side. In this state, the Amber Run mode LED should be lit. If the Amber RIO LED is on solid, this indicates we have a matching configuration and good communication with the field. Alternatively, if the Amber RIO LED is blinking, this indicates we have communication errors with the field.

On the DeltaV side, for RS-485 communications, if both PSIC ports are communicating, then the two Amber port LEDs will be on solid. If there are communication errors with the PSIC on any port, the corresponding port LED will blink on a 1/2 second on, 1/2 second off basis. If the Mynah VIM is used for communications, then the top Port (1) LED will be solid ON if there is a TCP connection between the Controller and the PIO. The bottom port (2) LED will flash on each Modbus/TCP message received by the PIO.

This state is the normal operating state for the PIO. While in this state, the PIO can be placed in Program mode by the user. In Program mode, the Amber Run mode LED will be unlit. All field communication will be active; however the DeltaV PSIC will no longer be accessing the field information. This mode is used to transfer a new field configuration into the PIO. Configuration download is discussed in detail in Section 4.0. After receiving a new configuration download from DeltaV PSIC (or direct from configuration PC), the PIO transitions into the Power-up operating state.

During normal operating state, if the PIO detects a communication failure with a block, the Amber RIO LED will start blinking. In this state, all outputs in this block will go to their fail-safe state. The outputs return to last valve when communications are restored.

If the PIO detects a communication failure with either of the DeltaV PSIC (or Mynah VIM) ports, all blocks on that port will be forced into their fail-safe state. The outputs return to last valve when communications are restored.



2.5.5 Power Failure

A power failure involving the entire I/O subsystem will cause all outputs to go into their respective configured fail-safe states. The fail-safe state/action is user configured and downloaded into the Output module during power-up. When power is restored, a full power up sequence will be performed and the outputs will be set to the configured power up states.

2.5.6 Power Recovery

When power is restored after a total subsystem power failure, a full power up sequence will be performed and the outputs will be set to the power up configured state.

The block configuration information stored in PIO non-volatile memory will be downloaded to each module. This step takes place automatically without user intervention or any other downloads from DeltaV.

If a particular module in a block returns from power failure (module is pulled out of the block and then plugged back in), the PIO will automatically download its stored configuration, and make it operational without any user intervention.

3 DeltaV Programmable Serial Card

This section describes operation of the DeltaV Series 2 Programmable Serial Interface Card (PSIC) and the GE Legacy serial communication driver firmware; it provides information required to install, configure, and maintain the driver firmware. The reader should be familiar with Emerson Process Management's DeltaV and GE Legacy RIO equipment.

The following table lists the minimum system requirements for the GE Legacy Driver:

Table 3-1: System Specifications

Firmware	GE Legacy RIO Driver Firmware (P1.10 or later)
Software Requirements	<ol style="list-style-type: none"> 1. DeltaV System Software (Release 6.3 or later) installed on a hardware-appropriate Windows workstation configured as a ProfessionalPlus for DeltaV. 2. Serial Interface Port License (VE4102) for 2 ports.
Minimum DeltaV Hardware Requirements	<ol style="list-style-type: none"> 1. DeltaV Serial Module, PN: 12P2506X022 2. DeltaV MD Controller, Power Supply and 8 wide controller carrier 3. Simplex Term Block PN: 12P0921X012 4. Redundant Term Block PN: 12P565X012

As part of the serial interface port license, a standard Modbus protocol is installed on the DeltaV PSIC prior to customization. The PSIC needs to be flash upgraded from the Modbus protocol to the GE Legacy RIO firmware before operation.

The PSIC supports RS-232, RS-422/RS-485 Half Duplex and RS-422/RS-485 Full Duplex communication with external devices. For communication with PIO devices, only RS-485 Half Duplex will be utilized. The required cables are described in Section 2.3.

The RS-485 communication settings must be configured properly to ensure accurate communication between the PSIC and PIO Devices. These are described in Section 3.2.

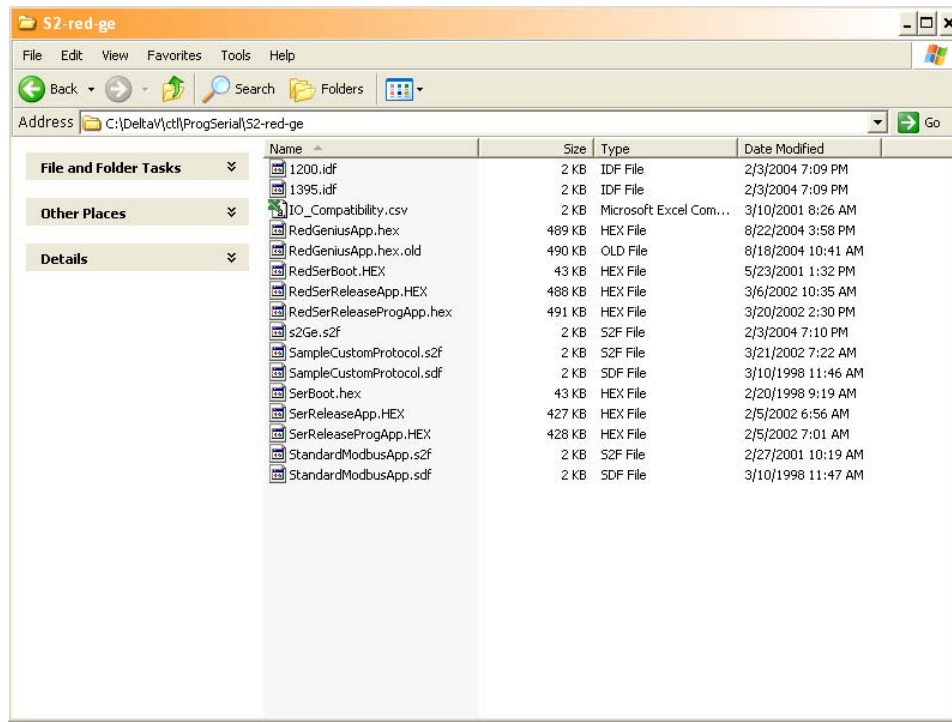
The GE Legacy driver (Simplex and Redundant) runs in Master Mode only. The PSIC uses both ports to communicate with a single PIO device. The communication baud rate is 500K on each port, providing an effective rate of 1M baud.

3.1 Downloading the Firmware

The driver software comprises 15 files, distributed on a CD. These files must be copied to the DeltaV directory on your ProPlus Workstation. The path is:

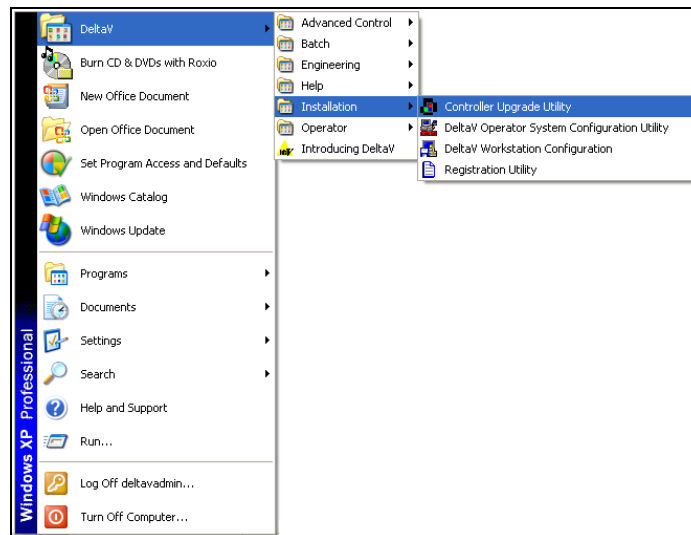
\\DeltaV\ctl\ProgSerial\S2-Genius

The following shows a completed copy operation:

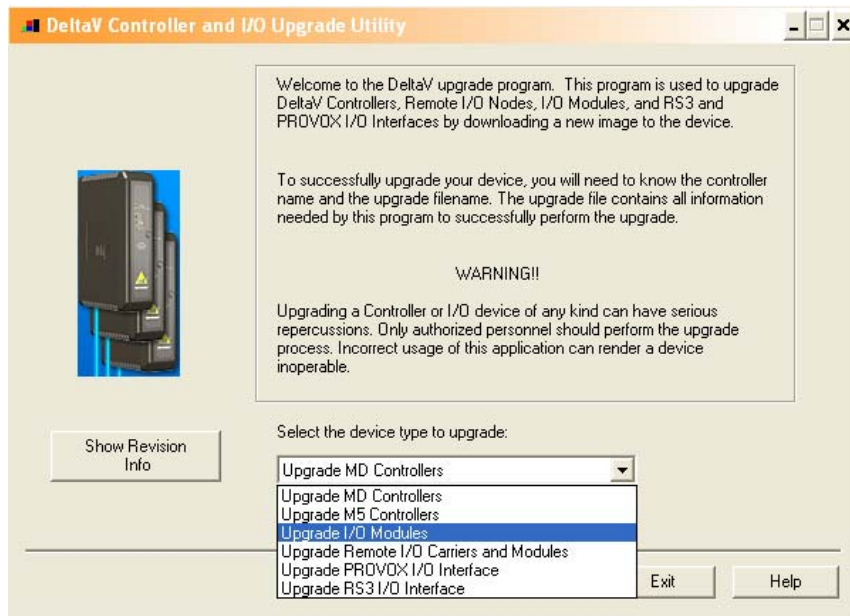


After copy completion, you are ready to program (or upgrade) the Programmable Serial Card with the supplied custom driver software. The steps are as follows:

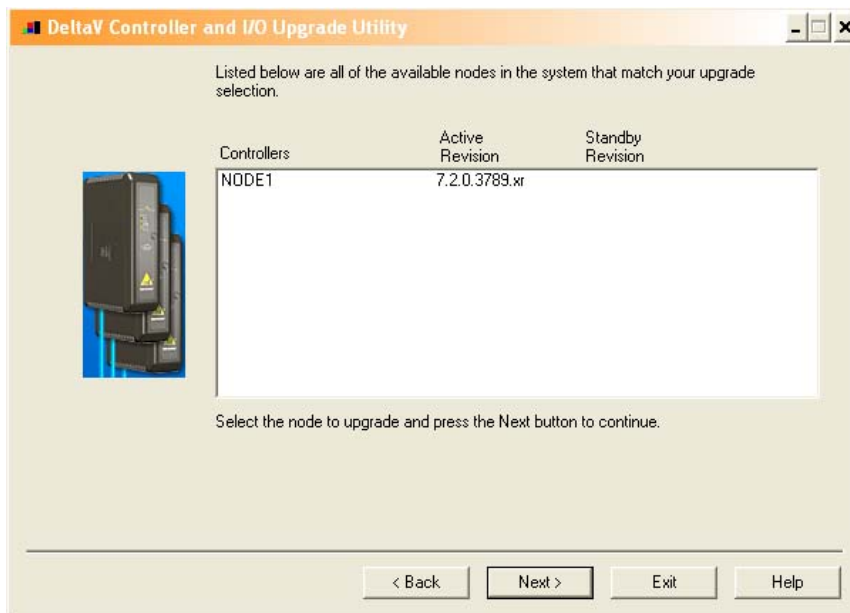
1. Click on the Start button and select DeltaV-> Installation-> Controller Upgrade Utility as shown below:



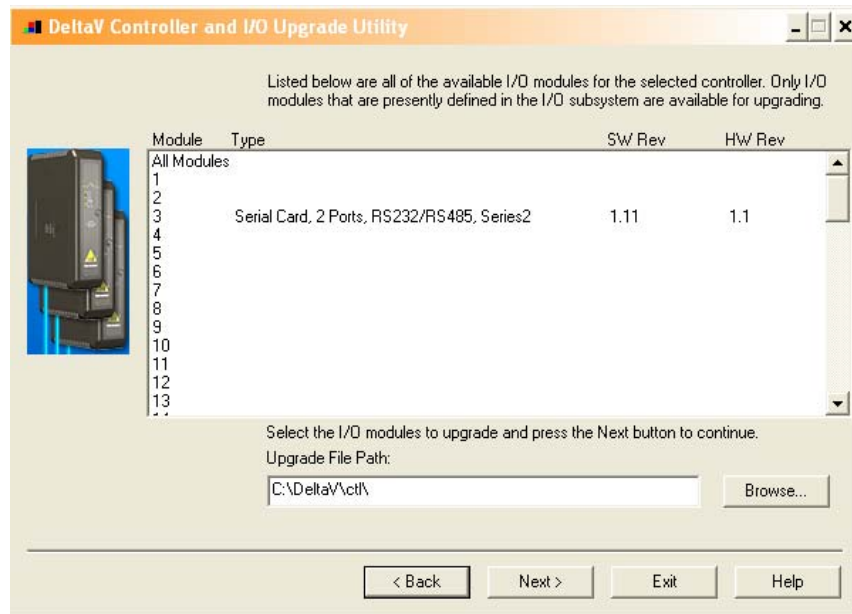
and the following dialog will appear:



2. Select the Upgrade I/O Modules option as shown above, and then click Next.



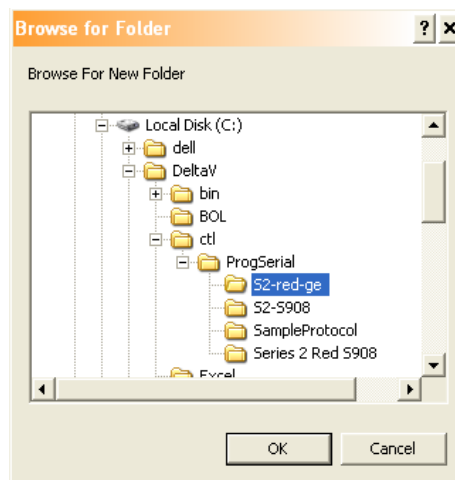
3. The above dialog will appear, listing all the available Controllers in your network.
4. From this dialog, select the appropriate Controller and then Click Next. The dialog with all configured I/O modules will appear as shown below. Your list will be different.



Note

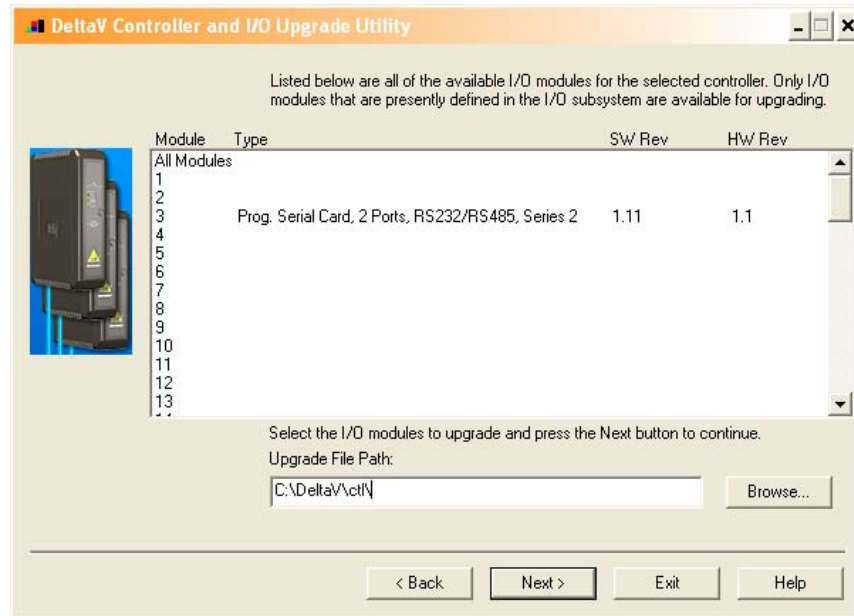
The first time a standard Serial card is upgraded to the GE Legacy firmware, the dialog will be as shown above. When upgrading an existing Programmable Serial Card, skip Steps 5 and 6, and go to Step 7.

- Click the Browse button and select the DeltaV path as shown below. Note that the disk drive could be C or D.



- Select the Serial module and then click Next. Go to Step 9.

7. If you are upgrading an existing Programmable Serial Card, the dialog will be as shown below. From this dialog, select the Programmable Serial Card I/O Module in the list.



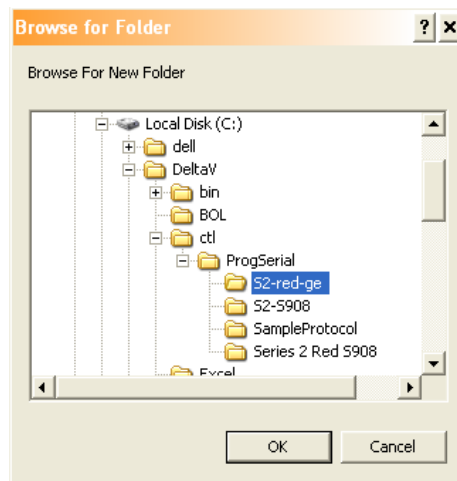
For example, we will select I/O Module 1. This will give you a dialog, from which you will select the file path to where the driver software is located. This path will be:

\DeltaV\ctf\ProgSerial\S2-red-GE.

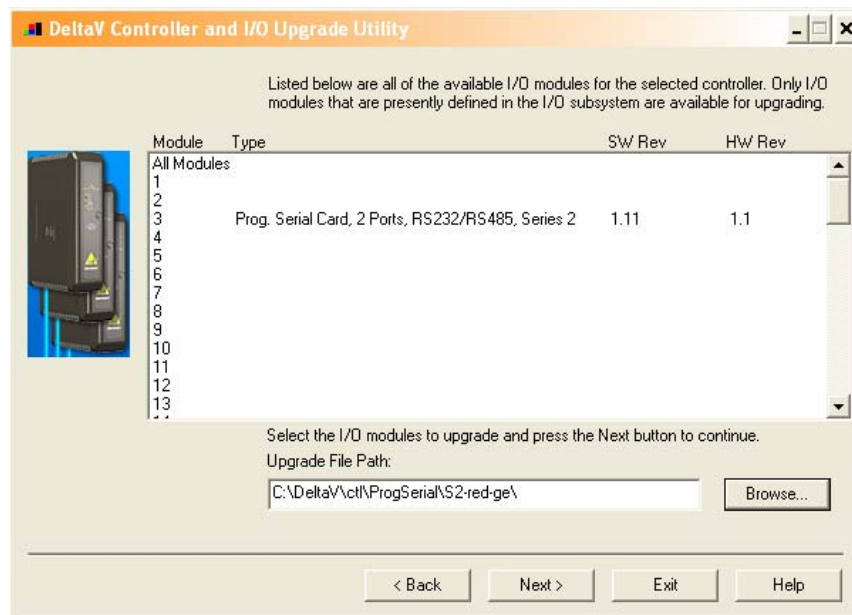
Once you are in the specified directory, you will need to select the following file:

S2Ge.S2F

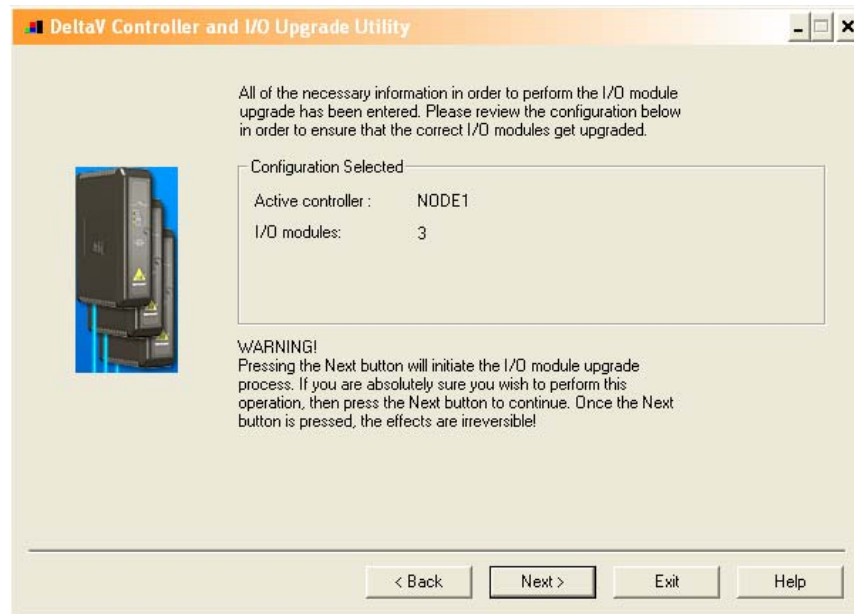
This is shown in the following dialog.



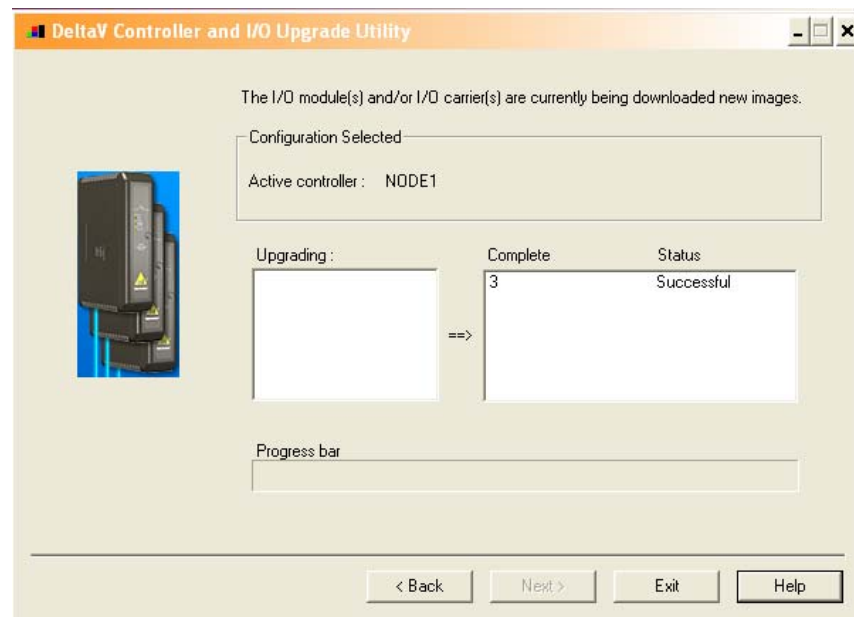
- After selecting the .S2F file, Click on Open. This dialog will close and you will be back to the following:



- In this dialog, Click Next again. You will get the following dialog, confirming the Controller and I/O Module to program.



10. Click Next and the I/O Module upgrade process will begin. After completion, you will receive the following dialog, indicating success.



11. This completes the I/O Module upgrade process.

4 GE Legacy Table Set Definitions

The PIO module holds data in table sets. These are transferred to DeltaV datasets via either the Programmable serial card (PSIC) or MYNAH VIM module. This section presents the formats for both connection. The ModusTCP via the MYNAH VIM may be configured to duplicate that of the PSIC.

There are three types of tables created in the PIO:

1. The Global Status;
2. The I/O Tables, containing only data pertinent to a specific I/O type; and
3. The Configuration Table.

The purposes and organization of these groups is described in this section.

4.1 Global Status Sets (Table 1)

The PIO has a global table with up to 4 sets for each IO port. These table sets contain the driver status words, the RIO card status words, and the Block status and configuration words. Depending on the number of Blocks configured, this table may consist of from 1 to 4 sets.

The port's ID number is displayed in word 4 and the number of Blocks (and the first Block) configured for the port is defined in word 5 of set 1. Starting in word 21 each configured Block has 10 words of configuration/status data. If more than 8 Blocks are configured for the port, a second set is required (Blocks 9-18), and if more than 17 Blocks are configured a third set is required (Blocks 19 to 28), and finally if more that 28 Blocks (max 32) are configure, then a fourth set is require for Blocks 29 to 32.

4.1.1 PSIC layout

Each register is mapped to the specified PIO status register group.

Registers	0x01	0x02	0x03	0x04
1-10	Global Status	Block 9	Block 19	Block 29
11-20		Block 10	Block 20	Block 30
21-30	Block 1	Block 11	Block 21	Block 31
31-40	Block 2	Block 12	Block 22	Block 32
41-50	Block 3	Block 13	Block 23	
51-60	Block 4	Block 14	Block 24	
61-70	Block 5	Block 15	Block 25	
71-80	Block 6	Block 16	Block 26	
81-90	Block 7	Block 17	Block 27	
91-100	Block 8	Block 18	Block 28	

Both serial communications port may specify a number and how many Blocks to display in the ports global table set. This means if 8 Blocks are configure, port 1 may have 5 starting at 1 (Word 5 LSB = 0x05, MSB = 0x01) while port 2 may handle Blocks 6 to 8 (4, setting word 5 LSB = 0x04, MSB = 0x06). In this case words 1 to 20 are the same for both port global table set groups, and the remaining words each represent different Blocks.

4.1.2 Modbus/TCP Address



A dataset may start at any address and hold 100 registers of status data. For Modbus/TCP, the blocks are assigned specific addresses and the block numbers specified below are the actual block associated with the address.

41501-41510	Global Status	
41511-41520		(actual address)
41521-41530	Block 1	Block 0
41531-41540	Block 2	Block 1
41541-41550	Block 3	Block 2
41551-41560-	Block 4	Block 3
41561-41570	Block 5	Block 4
41571-41580	Block 6	Block 5
41581-41590	Block 7	Block 6
41591-41600	Block 8	Block 7
41601-41610	Block 9	Block 8
41611-41620	Block 10	Block 9
41621-41630	Block 11	Block 10
41631-41640-	Block 12	Block 11
41641-41650	Block 13	Block 12
41651-41660	Block 14	Block 13
41661-41670	Block 15	Block 14
41671-41680	Block 16	Block 15
41681-41690	Block 17	Block 16
41691-41700	Block 18	Block 17
41701-41710	Block 19	Block 18
41711-41720	Block 20	Block 19
41721-41730	Block 21	Block 20
41731-41740-	Block 22	Block 21
41741-41750	Block 23	Block 22
41751-41760	Block 24	Block 23
41761-41770	Block 25	Block 24
41771-41780	Block 26	Block 25
41781-41790	Block 27	Block 26
41791-41800	Block 28	Block 27
41801-41810	Block 29	Block 28
41811-41820	Block 30	Block 29
41821-41830	Block 31	Block 30
41831-41840-	Block 32	Block 31

Both serial communications port may specify a starting number and how many blocks to control via the port global table set, however for the Ethernet connection the first block at 41521 is always Block 1 (address 0). This means if blocks are to be addressed; a separate dataset may be generated with the starting Modbus address set to the first block on the port. If 8 Blocks are configure, port 1 may have 5 starting at 1 (starting address of 41501 and accessing 70 registers), while port 2 may handle Blocks 6 to 8 and consist of one global status set (41501 with 20 registers) and one block dataset starting at 40561 and holding 30 registers. In this case words 41501 to 41520 are the same for both port global table set groups, and the remaining words each represent different Blocks.

4.1.3 Global Table Set 1 Layout

This table set contains the global configurations and status data as well as the first eight (8) Block configuration and status words. See DS2 = Blocks 9-18, DS3 = Blocks 19-28, and DS4 = Blocks 29-32

Item		DS Register	Modbus Address	Bits	Description
Driver Status words	Driver Version	1	401501	00-07	Build (1-255)
				08-11	Minor (0-15)
				12-15	Major (1-15)
	Mode	2	401502		Legacy module Mode (1= running, 0= program) display only, set in Table 5 (configuration table)
	Sync Byte	3	401503	00-07	Sync Byte Incremented by driver each IO scan (0-255)
				08-15	Status Byte
Port ID	4	401504		Port identification (1 or 2)	
Drops	5	401505	00-07	First drop (1-32)	
			08-15	Drops (1-32)	
			00-07	RIO card status bits	
Card Status Word	6	401506	08-15	Incremented every 100 ms while card is running (0-255 w/rollover)	
Card Timer			00-07	Transmit count (0-255 w/rollover)	
Card Communications	7	401507	08-15	Receive count (0-255 w/rollover)	
			00-07	Incremented on invalid CRC	
Card Errors	8	401508		Incremented on invalid CRC	
Card Watchdog Time	9	401509		Watchdog timer in 10 ms units (0=OFF or 1-65535)	
Process Time Max/Last	10	401510	00-07	Reserved	
			08-15		
Active Drops (1-16)	11	401511		Bit array identifies active communicating drops	
Active Drops (17-32)	12	401512			
Reserved	13	401513			
Reserved	14	401514			
Configured Drops (1-16)	15	401515		Bit array identifies configured drops (download from PLC Explorer)	
Configured Drops (17-32)	16	401516			
Holdup Time	17	401517			
Comm Method/Connections	18	401518	00-07	Communications channel (0=Modbus/TCP, 1=RS-485)	
			08-15	Number of connections (if Modbus/TCP)	
Reserved	19	401519			
Reserved	20	401520			

See Next Page for Block Configuration / Status info



Item		DS Register	Modbus Address	Bits	Description
Block 1 Configurati on / Status	Block ID	21	401521	00-07	Module ID (number) of block assigned to this block number
	Block Address			08-15	Block bus address accessed (0-31)
	Present	22	401522	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled			08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	23	401523		IO Address to store data (from block)
	Broadcast length	24	401524	00-07	Length of broadcast messages from this block
	Directed data length			08-15	Length of directed data messages from this block
	Block Fault Status	25	401525	00-07	Returned in fault messages, this block status varies by type:
	Block Configuration			08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	26	401526	01-15	Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	27	401527	01-15	Fault status of second 16 circuits (17-32) in the specified block
	Datagram Command	28	401528	00-15	Datagram command/response for block
	Block Cfg bits	29	401529	00-15	Dynamically accessible block configuration bits
	Redundancy	30	401530	00-07	Device update ID
	08-15			Redundant block present	
Block 2 Configurati on / Status	Block ID	31	401531	00-07	Module ID (number) of block assigned to this block number
	Block Address			08-15	Block bus address accessed (0-31)
	Present	32	401532	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled			08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	33	401533		IO Address to store data (from block)
	Broadcast length	34	401534	00-07	Length of broadcast messages from this block
	Directed data length			08-15	Length of directed data messages from this block
	Block Fault Status	35	401535	00-07	Returned in fault messages, this block status varies by type:
	Block Configuration			08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	36	401536	01-15	Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	37	401537	01-15	Fault status of second 16 circuits (17-32) in the specified block
	Datagram Command	38	401538	00-15	Datagram command/response for block
	Block Cfg bits	39	401539	00-15	Dynamically accessible block configuration bits
	Redundancy	40	401540	00-07	Device update ID
	08-15			Redundant block present	
...					
Block 8 Configurati on / Status	Block ID	91	401591	00-07	Module ID (number) of block assigned to this block number
	Block Address			08-15	Block bus address accessed (0-31)
	Outputs Enabled	92	401592	00-07	Time to wait for message from Block (in 100 ms units)
	Present			08-15	Block is present (on-line = 1), or not (0)
	Reference Address	93	401593		IO Address to store data (from block)
	Broadcast length	94	401594	00-07	Length of broadcast messages from this block
	Directed data length			08-15	Length of directed data messages from this block
	Block Fault Status	95	401595	00-07	Returned in fault messages, this block status varies by type:
	Block Configuration			08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	96	401596	00-15	Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	97	401597	00-15	Fault status of second 16 circuits (17-32) in the specified block
	Datagram Command	98	401598	00-15	Datagram command/response for block
	Block Cfg bits	99	401599	00-15	Dynamically accessible block configuration bits
	Redundancy	100	401600	00-07	Device update ID
	08-15			Redundant block present	

4.1.3.1 Driver Status Words

This group is designed to display the current status of the GE Genius Legacy RIO PIO firmware.

Item		DS Register	Modbus Address	Bits	Description	
Driver Status words	Driver Version	1	401501	00-07	Build (1-255)	
				08-11	Minor (0-15)	
				12-15	Major (1-15)	
	Status/Sync word	2	401502	00-07	Sync Byte Incremented by driver each IO scan (0-255). Resetting this byte to 0, then reading the value back can be used to time IO scans between accesses.	
				08-15	Status byte displays the legacy module status. The bits are set sequentially as the driver loads. When the driver is running normally the value should be 0x7F	
				08	Module DLL initializing	
				09	RIO card memory assigned and driver loaded	
				10	Last module configuration loaded	
				11	Process thread started (valid check bytes)	
				12	Process thread card communications OK (cleared on WD timeout)	
				13	RIO card driver watchdog timer timed out, unit is in off-line (0x82) mode.	
	Mode	3	401503	00-07	Legacy module Mode (1= running, 0= program) display only, set in Table 5 (configuration table)	
				08-15	Redundancy status (0x00=non-redundant, 0x01=active, 0x02=standby, 0x82=off-line), set by Query command only	
	RIO Status	4	401504	00-07	Module RIO Status	
					Bit	Description
0					Legacy module not running (check High byte of register 2 for reason)	
1					RIO Board timed out, must reboot legacy module	
2					RIO board not on-line	
3					RIO board not communicating on bus	
4					Legacy module off-line	
5					Legacy module in standby mode	
08-15				Redundant Partner RIO Status (0xFF = Not configured, or not communicating)		
				Bit	Description	
				0	Legacy module not running (check High byte of register 2 for reason)	
				1	RIO Board timed out, must reboot legacy module	
				2	RIO board not on-line	
				3	RIO board not communicating on bus	
				4	Legacy module off-line	
6	Legacy module in standby mode					
7	Legacy module in program mode					
7	RIO card not present, must reboot					
Blocks	5	401505	00-07	First Block (1-32)		
			08-15	Number Blocks (1-32, (maximum (32 – First Block) + 1		

4.1.3.2 Card Status Words

This group of register displays the current status of the RIO card. Except for the Incremented CRC error value, these values are read only (cannot be changed).

Item	DS Register	Modbus Address	Bits	Description																																																										
Revision Number	6	401506	00-07	Revision number of the Genius I/O Card software running on the RIO board																																																										
			08-15	Reserved																																																										
Hardware Status	7	401507	00-07	Genius I/O Card runs self-tests periodically as part of normal operation. If an error occurs during one of these self-tests, the Genius I/O Card immediately stops all processing. Individual bits in this byte indicate the type of error that has occurred. If any of these bits are set, the Genius I/O Card OK bit (see 'Genius I/O Card OK Status', above) is cleared and the processor halts, which allows the watchdog timer to reset the board.																																																										
				<table border="1"> <thead> <tr> <th>Bit</th> <th>Status</th> </tr> </thead> <tbody> <tr><td>0</td><td>RAM Fault</td></tr> <tr><td>1</td><td>EPROM Fault</td></tr> <tr><td>2</td><td>Processor Fault</td></tr> <tr><td>3</td><td>Communication Hardware Fault</td></tr> <tr><td>4</td><td>Host Heartbeat Fault</td></tr> <tr><td>5</td><td>Excessive Bus Errors</td></tr> <tr><td>6</td><td>HMI Present</td></tr> <tr><td>7</td><td>WD Heartbeat enabled*</td></tr> </tbody> </table>	Bit	Status	0	RAM Fault	1	EPROM Fault	2	Processor Fault	3	Communication Hardware Fault	4	Host Heartbeat Fault	5	Excessive Bus Errors	6	HMI Present	7	WD Heartbeat enabled*																																								
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Card Watchdog Time			08-15	Watchdog timer in 50 ms units: 0=OFF, or 4-20 (200 to 1000 ms)																																																										
Buss Errors	8	401508		Integer count of the total bus errors. At power-up, this count is 0. If any bus errors occur, The Genius I/O Card increments this count. As errors occur over multiple bus scans, the total count increases to a maximum of 65535. If this total is reached, the count wraps back to 0. If a hand-held is attached but 'OFF', then this error count will continually increment.																																																										
Card Bus Communications Time	9	401509		Integer representation of the bus scan-time. This milliseconds value is updated each bus scan. It represents the amount of time between the Genius I/O Card's two previous turns on the bus. If the Genius I/O Card cannot access the bus, the value is set to 65535 (FFFFH). The host can monitor this location to verify that the Genius I/O Card is communicating on the bus.																																																										
Board Setup	10	401510	00-07	Board setup byte (read only, values are set with dipswitch in module)																																																										
			00-04	Block address (normal should be 31, or 30). Other addresses are not recommended, the blocks expect one of these addresses for the bus controller (31), or backup bus controller (30). Other addresses may be used to monitor the block status.																																																										
				<table border="1"> <thead> <tr> <th>Bit Pattern</th> <th>Value(s)</th> </tr> </thead> <tbody> <tr><td>11111</td><td>31</td></tr> <tr><td>11110</td><td>30</td></tr> <tr><td>11101</td><td>29</td></tr> <tr><td>11100</td><td>28</td></tr> <tr><td>11011</td><td>27</td></tr> <tr><td>11010</td><td>26</td></tr> <tr><td>11001</td><td>25</td></tr> <tr><td>11000</td><td>24</td></tr> <tr><td>10111</td><td>23</td></tr> <tr><td>10110</td><td>22</td></tr> <tr><td>10101</td><td>21</td></tr> <tr><td>10100</td><td>20</td></tr> <tr><td>10011</td><td>19</td></tr> <tr><td>10010</td><td>18</td></tr> <tr><td>10001</td><td>17</td></tr> <tr><td>10000</td><td>16</td></tr> <tr><td>01111</td><td>15</td></tr> <tr><td>01110</td><td>14</td></tr> <tr><td>01101</td><td>13</td></tr> <tr><td>01100</td><td>12</td></tr> <tr><td>01011</td><td>11</td></tr> <tr><td>01010</td><td>10</td></tr> <tr><td>01001</td><td>9</td></tr> <tr><td>11000</td><td>8</td></tr> <tr><td>00111</td><td>7</td></tr> <tr><td>00110</td><td>6</td></tr> <tr><td>00101</td><td>5</td></tr> <tr><td>00100</td><td>4</td></tr> </tbody> </table>	Bit Pattern	Value(s)	11111	31	11110	30	11101	29	11100	28	11011	27	11010	26	11001	25	11000	24	10111	23	10110	22	10101	21	10100	20	10011	19	10010	18	10001	17	10000	16	01111	15	01110	14	01101	13	01100	12	01011	11	01010	10	01001	9	11000	8	00111	7	00110	6	00101	5	00100	4
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Item	DS Register	Modbus Address	Bits	Description	
				00011	3
				00010	2
				00001	1
				00000	0
			05-06	Bus Baud rate, the communications speed on the bus. If modules do not communicate at the speed here, this bus controller will not see them.	
				00	153.6 Extended (8 bit skip)
				01	38.4 (8 bit skip)
				10	76.8 (8 bit skip)
				11	153.6 Standard (4 bit skip)
			07	Module Outputs Enabled on startup	
				0	Disabled at startup
				1	Enabled at startup
		08-15	The length of each buffer in the block I/O Tables. The default buffer length is 128 bytes. Shortening the buffer length (all buffers are the same length), shortens the entire I/O Table. The buffer length may be 1 to 128 bytes. The length selected must be long enough to accommodate any block's inputs and outputs (including Global Data and Directed Control Inputs data). The Genius I/O Card will not log in any block that sends or receives more data than will fit into its I/O Table buffer.		
Module Identification	11	401511	00-07	Module identifier number, this is configured with the module configuration utility (PLC Explorer), should be a unique number (1-255)	
			08-15	Redundant partner ID (Set in the partner using the PLC Explorer utility (1-255) or 0 if no partner is communicating.	
Module Configuration Word	12	401512	This is a copy of the current module configuration word from the configuration dataset		
			Bit(s)	Description	
			0	GE Genius Bus, the bus on which this module is communicating (0=A, 1=B). This may only be set in program mode (in active module)	
			1	Redundant Bus, this is the Bus to switch to if this module fails (0=A, 1=B). This read-only bit will not match bit 0 (current bus), it is automatically set to the opposite state.	
			2	Disable (1) Alternate BSM, standby BSM will be opposite from primary (i.e, if not set, and Primary is A, partner will be B, if set (1), primary and partner are the same)	
			3	Automatically send reset for any fault (1) or require manual (0) resets.	
			4	Block IO polling datagrams enabled (1) for any block that is capable (and enabled) to respond to this message, input data length will be increased to allow this data.	
			5	Reserved	
			6	Outputs enabled after first write in standby (0). This is used to allow the output table to be written to prior to establishing communications with block (used to prevent writing default zeros (0) outputs to block when module cycles from program to run (or on a cold reboot), this is disabled if this bit is set to 1 (outputs will always be enabled).	
			7	All outputs are enabled (this allows module to be recognized by all blocks). This may be used prior to starting an auto-configuration sequence to allow BSM enabled blocks to be switched to the unit for detection.	
			8	Standby poll of output values from active enabled (0) or Disabled (1)	
			9	Standby poll of parameters values from active enabled (0) or Disabled (1)	
			10	Controller communications (RS485/Modbus/TCP) watchdog timer disabled (1) to allow communication by configuration utility even when no controller is communicating with the module. When this bit transitions from 1 to 0, the current configuration (if modified) is written to flash (if modified).	
			11	Reserved	
			12	Configuration status being captured (1) (read only)	
			13	Configuration capture initialized (1) or not (0)	
14	Configuration utility bit (set by configuration utility, this prevents timeouts on Controller communications link (1), and when transitions from 1 to 0 triggers configuration write (if not already written). Also sets fail bits in RIO status word (Global word 4) so controller will not trigger status changes during configuration process.				
15	LED's being flashed to identify unit				



Item	DS Register	Modbus Address	Bits	Description	
Datagram Command Block	13	401513	00-07	Reserved	
			08-15	Reserved	
Controller Communications	14	401514	00-07	Number of Modbus TCP/IP connections currently active with legacy module	
			08-15	Primary path of communications, 0 = Modbus TCP/IP, 1 = RS-485. This is the path that determines the pattern of the communications lights on the legacy module. If RS-485, each light specifies the status of one of the 485 communications ports (Steady if OK, flashing if no communications on the port). If 0 (Modbus TCP/IP), then the top communications light is lit if there is an open connection (00-07 > 0), the lower LED flashes on each message..	
Genius I/O Card Ports	15	401515	00-07	Reserved	
			08-15	Reserved	
Active block table	17	401517	00-07	Set bits reflect blocks communicating with this module (inputs and status values are valid)..	
			08-15		Blocks 1-8 (low bit represents block 1 (bus address 0))
	18	401518	00-07		Blocks 9-16
	08-15	401518	00-07		Blocks 17-24
Redundant block table	19	401519	00-07	Set bits reflect blocks communicating with this module via the redundant unit (inputs and status values are valid).	
			08-15		Blocks 1-8
	20	401520	00-07		Blocks 9-16
			08-15		Blocks 17-24
				Blocks 25-32	

Watchdog is enabled (bit 7 set (1)) if shared memory locations 0x0ABB is 0x47 and 0x0ABC is 0x45, otherwise watchdog is disabled (bit = 0)

4.1.3.3 Block Status Words

Each configured Block (see Block word in the command word section) contains 10 status words. These words display the current status of the Block.

Item	Word Offset	Bits	Description		
Block ID	1	00-07	Module ID (number) of block assigned to this block number		
Block Number		08-15	Block bus address (communications address 0-31)		
Present	2	00-07	Block is present (on-line = 0x01), or not (0x00)		
Outputs Enabled		08-15	Control communications with block (0x00 = module will communicate with block if present, 0x01 will not). Should always be 0x00.		
Reference Address	3		IO Address to store data (from block)		
Broadcast length	4	00-07	Length of broadcast messages from this block (0-128 bytes)		
Directed data length		08-15	Length of directed data messages from this block (0-128 bytes)		
Block Configuration	5	00-07	Block configuration words (holds data types)		
			Bit(s)	Description	
			00-01	Describes whether the block is an input only, output only, or combination I/O block. Values are: 01 = Input only, 10 = Output only, 11 = combination IO. 00 is not used. This is read from block.	
			02	Configuration "changed" bit 1= changed. After handling response, writing 0 to this bit allows it to be tripped on the next change.	
			03	Configuration matches (reset prior to calling compare block configuration below)	
			04	Pulse Test Complete (reset when a pulse command is issued below)	
			05	BSM Controller enabled (0=No, 1=Yes)	
			06	Current BSM Status (valid if block is BSM enabled) 0=Bus A., 1=Bus B	
07	BSM Forced by HHM (0-No, 1=Yes)				
Block Fault Status		08-15	Returned in fault messages, this block status varies by type: Writing a zero (0) to this byte will trigger a "Reset-ALL" message to the block.		
			Type	Bit	Status
			Discrete	11	Terminal Assembly EPROM Fault
			Analog, RTD, Thermocouple	11	Terminal Assembly EPROM Fault
				13	Electronic Assembly EPROM fault (calibration error)
			High Speed Counter	15	Internal circuit fault
11	Terminal Assembly EPROM Fault				
		15	Internal circuit fault		
Circuit Faults (1-16)	6	01-15	Status bits for circuits 1 to 16 on block, 0 = OK, 1 = Faulted (examine individual circuit status byte in IO data table section for block for details on status). Writing the bit(s) for the faulted block will trigger a reset circuit message to the specified block(s).		
Circuit Faults (17-32)	7	01-15	Status bits for circuits 17 to 32 on block, 0 = OK, 1 = Faulted (examine individual circuit status byte in IO data table section for block for details on status). Writing the bit(s) for the faulted block will trigger a reset circuit message to the specified block(s).		
Block Cmd Register	8	0-7	This is the response byte for the datagram command byte for the specified block. This byte is read-only, when the command byte is zeroed, this byte is reset. Write a command byte containing one command bit (and bus bit for bus switch), and then wait for the response in this byte.		
			Bit	Description	
		00	Read configuration complete (1=yes, 0=no)		

Item	Word Offset	Bits	Description
		01	Writing configuration complete (1=yes, 0=no)
		02	Diagnostic Read complete (1=yes, 0=no)
		03	Block IO complete
		04	Pulse Test running (reset prior to calling pulse test datagram command below)
		05	
		06	Bus switching (set to bus selected before sending message), When message is completed, bus bit in configuration byte will match that selected in the command byte.
		07	Datagram command error (this is set when a datagram fails to complete, or returns an error status). This bit before writing to the datagram command register (this is also reset when the datagram command register is set to 0).
		8-15	This command byte should be zero (0x00) when not sending datagram to block. This allows a command to be triggered by simply setting the appropriate bit. Bits may be cleared when response byte matches an expected pattern (or bit 15 is set [error]). Response is cleared when the zero command is set.
		Bit	Description
		08	Read configuration from block (complete configuration is read, CRC is updated). 1=read
		09	Write current configuration to block (complete configuration is written). 1=write
		10	Read Diagnostics
		11	
		12	Pulse test (transition to 1 initializes a pulse test, reset to 0 when test complete (or prior to initializing) to enable setting for another test.
		13	Block IO Poll datagram successful (1) or faulted/not enabled or running (0)
14	Set Bus (1=Set, 0=leave as is), reset (set to 0 when bus in response byte = expected value).		
15	Bus value (0=bus A, 1=bus B)		
Block configuration bits	9	0-7	Dynamically accessible block configuration bits
		Bit	Description
		0	Initialize block IO polling, if the block is capable and enabled (see block configuration in configuration section).
		1-7	Reserved
		8-15	Status Bits
		Bit	Description
		8	IO block IO. Successful (1) or fault (0) read of Polled IO on blocks with block IO data. This is different from normal IO reads through the IO table in shared memory, although the normal data is included in this. This is currently limited to blocks that support the "Read Block IO" datagram; this will be expanded later to support blocks with the "Read IO Map" datagram.
		9-15	Reserved
Redundancy status	10	00-07	Device ID (sequence number of current Input data transfer)
		08-15	Redundant block present, sent when block receives input data from its redundant partner, reset when a timeout occurs, or block communications becomes active

4.1.4 Global Tables Sets 2 to 4 Layouts

The global status table sets 2 to 4 are required only if the status/configuration words for Blocks contained in them are required. The number of Blocks per port is specified in the configuration table (5), the current number is displayed in the global table set 1 word 5. Set 2 is required if more than 9 Blocks are configured for global table set group accessed, Set 3 for more than 19, and Set 4 if more than 29.

Block (relative or abs)	Description	Set Word	Set 2 Register	Set 3 Register	Set 4 Register	Bits	Detail explanation
Block 9 /19/29 Configuration / Status	Block ID	1	401601	401701	401801	00-07	Module ID (number) of block assigned to this block number
	Block Number					08-15	Block Number Accessed (1-32)
	Present	2	401602	401702	401802	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled					08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	3	401603	401703	401803		IO Address to store data (from block)
	Broadcast length	4	401604	401704	401804	00-07	Length of broadcast messages from this block
	Directed data length					08-15	Length of directed data messages from this block
	Block Fault Status	5	401605	401705	401805	00-07	Returned in fault messages, this block status varies by type
	Block Configuration					08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	6	401606	401706	401806		Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	7	401607	401707	401807		Fault status of second 16 circuits (17-32) in the specified block
	DataGram Command	28	401608	401708	401808	00-15	Datagram command/response for block
	Block Cfg bits	29	401609	401709	401809	00-15	Dynamically accessible block configuration bits
	Redundancy	8-10	401610	401710	401810	00-07	Device ID
					08-15	Redundant block present	



Block (relative or abs)	Description	Set Word	Set 2 Register	Set 3 Register	Set 4 Register	Bits	Detail explanation
Block 10/20/30 Configuration / Status	Block ID	11	401611	401711	401811	00-07	Module ID (number) of block assigned to this block number
	Block Number					08-15	Block Number Accessed (1-32)
	Present	12	401612	401712	401812	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled					08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	13	401613	401713	401813		IO Address to store data (from block)
	Broadcast length	14	401614	401714	401814	00-07	Length of broadcast messages from this block
	Directed data length					08-15	Length of directed data messages from this block
	Block Fault Status	15	401615	401715	401815	00-07	Returned in fault messages, this block status varies by type
	Block Configuration					08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	16	401616	401716	401816		Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	17	401617	401717	401817		Fault status of second 16 circuits (17-32) in the specified block
	DataGram Command	28	401618	401718	401818	00-15	Datagram command/response for block
	Block Cfg bits	29	401619	401719	401819	00-15	Dynamically accessible block configuration bits
	Redundancy		18-20	401620	401720	401820	00-07
08-15							Redundant block present
...							
Block 12/22/32 Configuration / Status	Block ID	41	401641	401741	401841	00-07	Module ID (number) of block assigned to this block number
	Block Number					08-15	Block Number Accessed (1-32)
	Present	42	401642	401742	401842	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled					08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	43	401643	401743	401843		IO Address to store data (from block)
	Broadcast length	44	401644	401744	401844	00-07	Length of broadcast messages from this block
	Directed data length					08-15	Length of directed data messages from this block
	Block Fault Status	45	401645	401745	401845	00-07	Returned in fault messages, this block status varies by type
	Block Configuration					08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	46	401646	401746	401846		Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	47	401647	401747	401847		Fault status of second 16 circuits (17-32) in the specified block
	DataGram Command	28	401648	401748	401848	00-15	Datagram command/response for block
	Block Cfg bits	29	401659	401749	401849	00-15	Dynamically accessible block configuration bits
	Redundancy		48-50	401650	401750	401850	00-07
08-15							Redundant block present
...							
Block 13/23 Configuration / Status	Block ID	51	401651	401751	401851	00-07	Module ID (number) of block assigned to this block number
	Block Number					08-15	Block Number Accessed (1-32)
	Present	52	401652	401752	401852	00-07	Block is present (on-line = 1), or not (0)
	Outputs Enabled					08-15	Time to wait for message from Block (in 100 ms units)
	Reference Address	53	401653	401753	401853		IO Address to store data (from block)
	Broadcast length	54	401654	401754	401854	00-07	Length of broadcast messages from this block
	Directed data length					08-15	Length of directed data messages from this block
	Block Fault Status	55	401655	401755	401855	00-07	Returned in fault messages, this block status varies by type
	Block Configuration					08-15	Block configuration words (holds data types)
	Circuit Faults (1-16)	56	401656	401756	401856		Fault status of first 16 circuits in the specified block
	Circuit Faults (17-32)	57	401657	401757	401857		Fault status of second 16 circuits (17-32) in the specified block
	DataGram Command	28	401658	401758	401858	00-15	Datagram command/response for block
	Block Cfg bits	29	401659	401759	401859	00-15	Dynamically accessible block configuration bits
	Redundancy		58-60	401660	401760	401860	00-07
08-15							Redundant block present
...							
Block 18/28 Configuration / Status	Block ID	91	401691	401791	401891	00-07	Module ID (number) of block assigned to this block number
	Block Number					08-15	Block Number Accessed (1-32)



Block (relative or abs)	Description	Set Word	Set 2 Register	Set 3 Register	Set 4 Register	Bits	Detail explanation	
	Present	92	401692	401792	401892	00-07	Block is present (on-line = 1), or not (0)	
	Outputs Enabled					08-15	Time to wait for message from Block (in 100 ms units)	
	Reference Address	93	401693	401793	401893		IO Address to store data (from block)	
	Broadcast length	94	401694	401794	401894	00-07	Length of broadcast messages from this block	
	Directed data length					08-15	Length of directed data messages from this block	
	Block Fault Status	95	401695	401795	401895	00-07	Returned in fault messages, this block status varies by type	
	Block Configuration					08-15	Block configuration words (holds data types)	
	Circuit Faults (1-16)	96	401696	401796	401896		Fault status of first 16 circuits in the specified block	
	Circuit Faults (17-32)	97	401697	401797	401897		Fault status of second 16 circuits (17-32) in the specified block	
	DataGram Command	28	401698	401798	401898	00-15	Datagram command/response for block	
	Block Cfg bits	29	401699	401799	401899	00-15	Dynamically accessible block configuration bits	
	Redundancy		98-100	401600	401800	401900	00-07	Device ID
							08-15	Redundant block present

4.2 IO Data Table Sets (Tables 2-4)

There are four I/O tables. Each of the tables may contain from 1 to 15 sets, depending on the number that are required for capturing RIO module IO (data and status). This method allows up to 1500 words (or 3000 bytes) of data for each IO type (DI, DO, AI, and AO).

Group	Table ID	Sets	Modbus Address
DI table	1	1-15*	43501-45000 100001-125600
DO table	2	1-15*	42001-43500 1-25600
AI table	3	1-15*	30001-31500
AO table	4	1-15*	40001-41500
Global data / configuration	0	1-4	41501-41900
Module Configuration Table	5	1	41901-42000

* Total (sum of tables 1-5) is 28 to 32 depending on the number assigned to the global (0) group

Modules are assigned addresses in the IO data tables to hold their IO data. Inputs and Outputs are assigned separately. All address start on word boundaries. The controller specifies the address. This may be formatted with spaces between data to allow the global formatting of IO data so all modules will have IO data beginning at predefined addresses, or may be “packed” to optimize communications bandwidth. Modbus TCP/IP communications is rapid (10 to 100 MB), while RS-485 operates at 1 MB and should have packed data to optimize its communications rate.

4.2.1 IO Data bytes

All standard IO data from all GE Genius IO blocks is available at all times the bus controller is “on-line”. This data is captured by the Genius IO card into shared memory. A portion of this memory is organized into two IO buffers, each holding blocks of 33 registers. One of these buffers holds all input data that each GE block sends each bus scan. The other buffer holds the output data that will be sent to the IO blocks (again each IO scan). The Legacy module does not simply map the IO buffers into the IO tables; instead, it allows the controller to configure the starting location for each IO block data to be stored. The number of bytes actually assigned depends on the module definition associated with the block. This allows the maximum of flexibility in assigning addresses. See the discussion of configuration of the legacy module.

4.2.2 Circuit status bytes

Modules may also be assigned “Status” bytes to hold the status information returned for each circuit. These extra bytes data are assigned to the input data table. These hold the module status (or fault) information, based on the type of block. These bytes are assigned to the AI or DI table (depending on the table selected for IO data).

Each block will be associated with at least one byte of status data. This data contains the status of the legacy driver, the mode of the driver, and the block present bit status, as well as block status bits returned from the block (if communicating). This byte should be zero (0) if communication is occurring and block is functioning correctly. If a failure occurs, the byte will be non-zero, with the bit(s) signifying the fault.

Bit	Description
0	Legacy Module RIO driver Failed, ignore remaining bits
1	Legacy module in program mode
2	
3	Block not communicating (both active present and redundant present flags are 0 (block is not communicating with either active or redundant module. Inputs are not valid).
4	Terminal assembly EPROM fault, shifted from that returned by block
5	Electronics assembly EEPROM fault (calibration error), for some blocks, shifted from that returned by block
6	Internal circuit fault, shifted from that returned by block
7	Block present bit

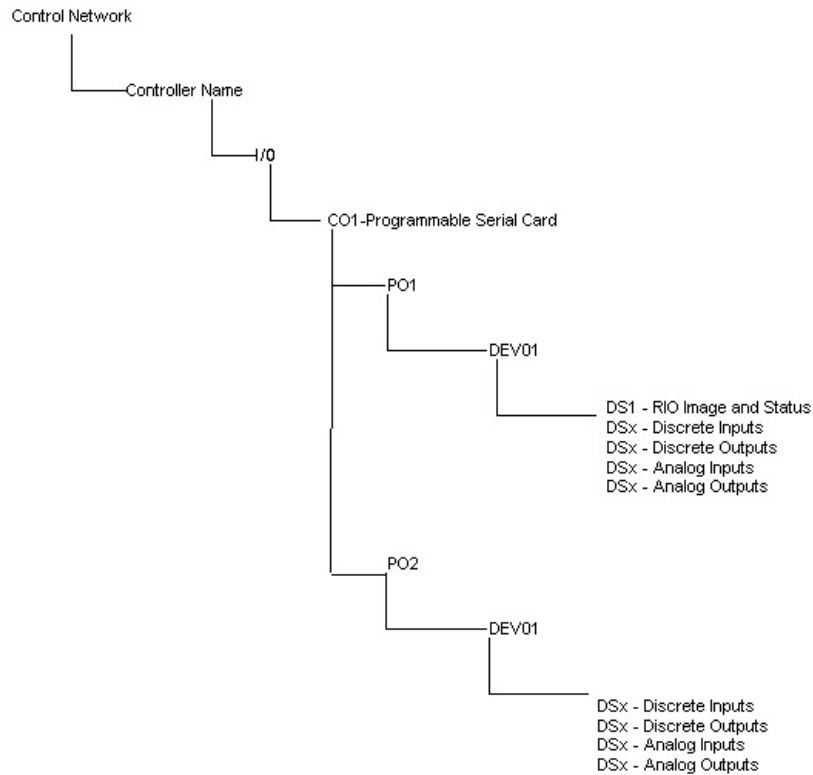
Fault status is supplied as a datagram from each block, triggered when a block faults, after a reset (if block is still faulted), or in response to a read diagnostics datagram from bus controller. The report fault message (and read diagnostics response) messages all have a 4 byte header which includes the block type (model number) in byte 0 and the software revision of the block in byte 1. Then next 2 bytes include the block diagnostic data (byte 2 is currently defined for the blocks, byte 3 is not used. Byte 2 (block diagnostics) is displayed in the block status group (word 5) in the global status table. The remaining bytes in the message hold fault data for each of the circuits in the block as described below.

5 DeltaV Serial Card Configuration

This section describes the steps necessary to manually configure the DeltaV Serial cards and datasets both for the Programmable Serial Card (PSIC) and Mynah VIM module. The VIM emulates four PSIC cards (57-60 or 61-64). An Automated configuration utility is supplied with the PIO. Using this automated utility is recommended, please refer to Section 6. **Using the automated configuration utility is recommended.**

Each Serial Card in the I/O subsystem contains two channels or ports. Each port will be enabled or disabled individually and each port will contain some port specific configuration parameters. These are defined below. Both ports must be configured identically. You may, choose to use only one port. In this case, use port 1.

The DeltaV Explorer view of a configuration containing a Serial Card will be as follows, where C01 has a card type of Programmable Serial Card, P01 and P02 are the ports on the card, DEV01 a generic device with configured datasets representing Status, 0X, 1X, 3X, and 4X tables.



All I/O data read from the field, or written from DeltaV to the field will be stored in these datasets.

As detailed above, in the PIO there are a maximum of 4 global status table sets, and a maximum of 15 table sets for each I/O type, i.e., DI, DO, AI, and AO. Any table set may be assigned to any dataset in the serial port. The table below gives two possible alternatives for laying out the I/O access, although the access may be split into any grouping.

Port	Dataset	One possible table assignments		An alternative possible table assignments		
1	1	01	Global (port 1)	01	Global (port 1)	
	2	11	DI (1600 pts)	02	DI (3200 pts)	
	3	21	DO (1600 pts)	11		
	4	31	AI (700 pts)	12	DO (1600 pts)	
	5	32		21		
	6	33		31		AI (1200 pts)
	7	34		32		
	8	35	33			
	9	36	34			
	10	37		35		
	11	41	AO (500 pts)	36		
	12	42		37		
	13	43		38		
	14	44		39		
	15	45		3A		
	16		Not used	3B		
1.1. 2	1	01	Global (port 2)	3C		
	2	12	DI (1600 pts)	01	Global (port 2)	



	3	22	DO (1600 pts)	41	AO (1400 pts)
	4	38	AI (500 pts)	42	
	5	38	AI's continued	43	
	6	39		44	
	7	3A		45	
	8	46	AO (900 pts)	46	
	9	46	AO's continued	47	
	10	48		48	
	11	49		49	
	12	4A		4A	
	13	4B		4B	
	14	4C		4C	
	15	4D		4D	
	16	4E		4E	

The following sections detail Port, Device and Dataset parameters.

5.1 Port Configuration

For a Programmable serial card, specify the Port type. The Port type will always be RS-422/485 Half Duplex. The Baud Rate must be configured as 300. This baud rate internally maps to 500K (since 500k is not a listed option). Configure the parity as None, 8 data bits and 1 stop bit. No other port parameters are supported.

For Ethernet, the port should be set as “master” with timeout (number of retries times timeout value) matching the timeout configured in the PIO module. The communications tab is not used, and the values may be left at their defaults.

5.2 Device Configuration

Specify a generic device with any address. The address is not used in communications. The device is configured only as a place holder. Configure datasets under the Device as follows.

5.3 Global Status Dataset

The first dataset contains the PIO and drop status information. This dataset is required regardless of the block configurations. Different parameters are required for the programmable serial card datasets (PSIC) and Ethernet port (Modbus/TCP). These are given below with their values.

Parameter	PSIC Value	Modbus/TCP Value
Data Direction	Input	Output w/read-back
DeltaV Data Type	16-bit UINT with Status	16-bit UINT with Status
Device Data Type	0 (Global Status)	3**
Start Address	0	0 (401501-401600)
Number of Values	100	100
Special Data 1	0*	0
Special Data 2	0	0
Special Data 3	0	200***
Special Data 4	0	0
Special Data 5	0	0

* Special Data 1 is used to specify the Table Set in the PIO. Valid values are 1-4. A value of 0 translates to Set 1.

** All values are held in Modbus holding (40000) registers; the device data type specifies this with the value of "3". The starting address is the offset into the 40000 table (0), and the number of value is 100 to read the global status and first 8 drop status groups.

*** Special Data 3 (200 * 5 ms = 1000 ms between updates) specifies an update interval. This interval will allow the capture specific datasets (such as those containing discrete IO data) at a higher rate than this status data (the global status datasets will change on every read as some of the values are tickers for watch-dog type determinations).

All data is transmitted as 16-bit unsigned integer values, so this is the type that should be selected as the DeltaV data type.

5.4 Dataset X Configuration

Datasets 2-16 contain I/O and module status information. Various parameters are required. These are given below with their values.

5.4.1 Discrete Input Type

Parameter	PSIC Value	Modbus/TCP Value
Data Direction	Input	Output w/read-back
DeltaV Data Type	16-bit UINT with Status	16-bit UINT with Status
Device Data Type	1 (Discrete Input)	3 - read holding registers
Start Address	0	3510 (43501-43600)
Number of Values	100	100
Special Data 1	0*	0
Special Data 2	0	0
Special Data 3	0	0**
Special Data 4	0	0
Special Data 5	0	0

* Special Data 1 is used to specify the Table Set in the PIO. Valid values are 1-15. A value of 0 translates to Set 1.

** Special Data 3 is used to specify a update interval, for discrete values this is left 0 for fastest updates.

5.4.2 Discrete Output Type

Parameter	PSIC Value	Modbus/TCP Value
Data Direction	Output	Output w/read-back
DeltaV Data Type	16-bit UINT with Status	16-bit UINT with Status
Device Data Type	2 (Discrete Output)	3 - read holding registers
Start Address	0	2000 (42001-42100)
Number of Values	100	100
Special Data 1	0*	0
Special Data 2	0	0
Special Data 3	0	0**

Special Data 4	0	0
Special Data 5	0	0

* Special Data 1 is used to specify the Table Set in the PIO. Valid values are 1-15. A value of 0 translates to Set 1.

** Special Data 3 is used to specify a update interval, for discrete values this is left 0 for fastest updates.

5.4.3 Analog Input Type

Parameter	PSIC Value	Modbus/TCP Value
Data Direction	Input	Output w/read-back
DeltaV Data Type	16-bit UINT with Status	16-bit UINT with Status
Device Data Type	3 (Analog Input)	4 - read input registers
Start Address	0	0 (30001-30100)
Number of Values	100	100
Special Data 1	0*	0
Special Data 2	0	0
Special Data 3	0	40**
Special Data 4	0	0
Special Data 5	0	0

* Special Data 1 is used to specify the Table Set in the PIO. Valid values are 1-15. A value of 0 translates to Set 1.

** Special Data 3 is used to specify a update interval, analogs default to 40 (update at 200 ms intervals to give discrete priority)

5.4.4 Analog Output Type

Parameter	Value	Modbus/TCP Value
Data Direction	Output	Output w/read-back
DeltaV Data Type	16-bit UINT with Status	16-bit UINT with Status
Device Data Type	4 (Analog Output)	4 - read input registers
Start Address	0	0 (40001-40100)
Number of Values	100	100
Special Data 1	0*	0
Special Data 2	0	40**
Special Data 3	0	0
Special Data 4	0	0
Special Data 5	0	0

* Special Data 1 is used to specify the Table Set in the PIO. Valid values are 1-15. A value of 0 translates to Set 1.

** Special Data 3 is used to specify a update interval, analogs default to 40 (update at 200 ms intervals to give discrete priority)

6 Automated Configuration Utility

The PLC Explorer (or Explorer) is a Windows application, which allows the end user to configure the PIO device. The configuration comprises specifying the DeltaV PSIC card used, and the GE/TRIO Blocks for each port.

The configuration is then exported as FHX files, based on predefined templates. The generated FHX files are imported into DeltaV and form a base level layer of interface modules, which represent, by specific names, the GE Legacy I/O attached to the PIO device. A DeltaV OPC server is required for FHX export functionality, specifically to determine the version of DeltaV on the system.

A configuration download function is provided, which allows users to download the configuration to the PIO directly via the Ethernet port.

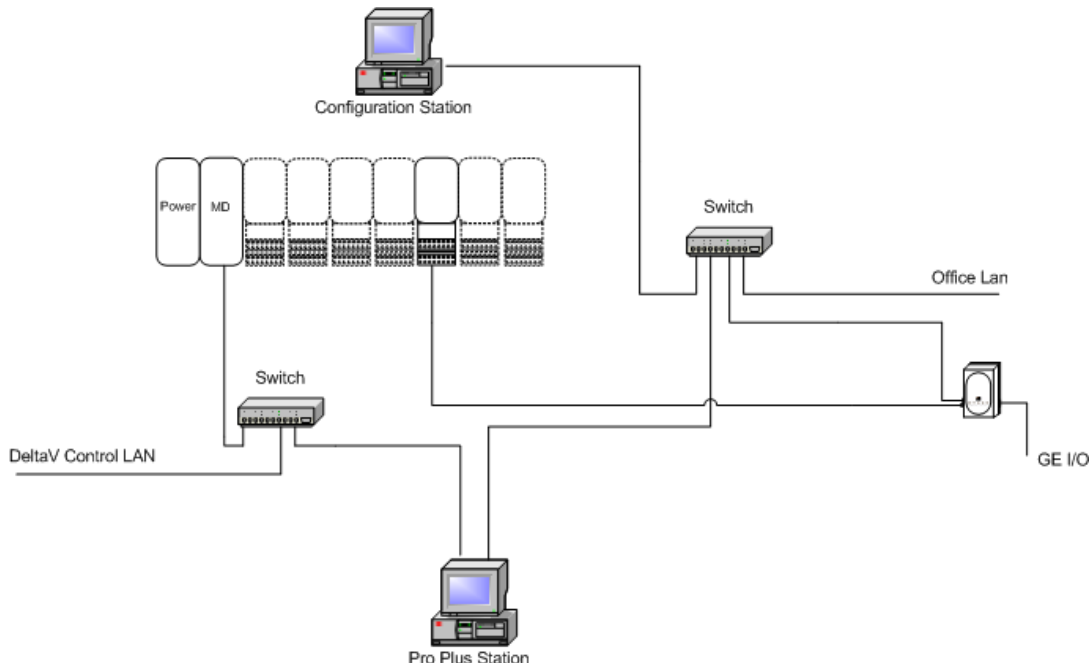
In this document, we present the following:

- Installing the Configuration Utility;
- Adding a PSIC card;
- Using Automated Configuration for Blocks
- Saving the PIO Configuration;
- Exporting/Importing FHX files; and
- Downloading the Configuration



Note

In this document, PIO, Legacy Module, and Legacy Unit are interchangeable and refer to the Remote I/O Interface Hardware



6.1 Installing the Configuration Utility

The configuration utility is distributed on a CD. Place the CD in the CD-ROM drive and use the File Explorer to open directory titled "Utility". Launch the setup.exe program located in this directory, and follow the installation steps. You will be asked to enter the directory where the files should be installed. Either select the default provided, or browse to select a different location. The remainder of the installation process is automated and does not require any user input.

The utility is licensed software, and is shipped along with the PSIC driver, and the PIO device. You may install it on any number of PC's in your system; however, to access the PIO, the PC must be on the same network as the PIO. If setting up new PLC units, see **Appendix C** for configuration information.

6.2 Launching the PLC Explorer

1. Launch the PLC Explorer by selecting:
Start->Programs-> PLC Explorer ->PLC Explorer.
2. The first time you launch the software the program will launch the following dialog. Enter the IP Address of the NIC (network interface card) that connects the PC to the PIO Ethernet Network. When you are finished click OK.

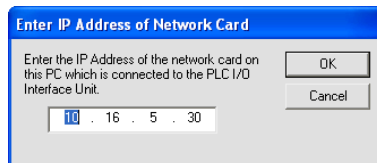


Figure 6-1 : NIC Address Dialog

3. After Clicking OK, the program will display its main dialog. The top-most object in the list will be called PLC_IO. Right-mouse click on PLC-IO and a menu will be presented. From this menu, you may add, delete, or paste a controller.

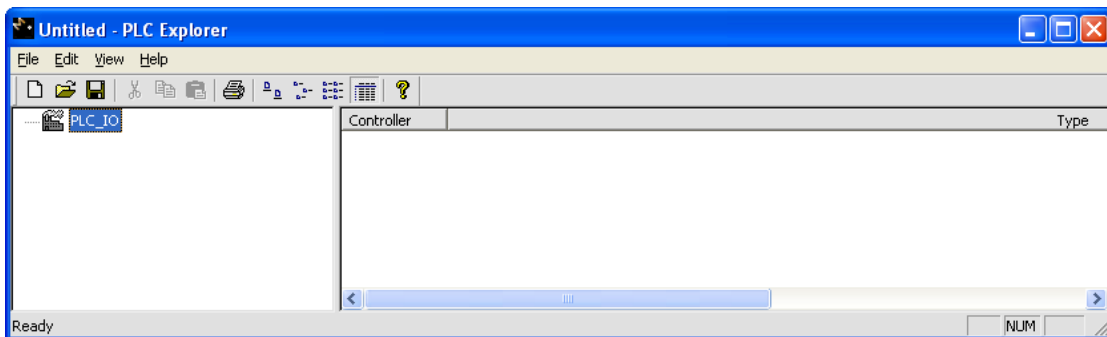


Figure 6-2 : Initial PLC Explorer Display

4. From this menu you may also specify/modify the IP Address of the NIC (network interface card) which connects the PC to the PIO Ethernet Network.
5. To specify an IP Address right click on the PLC_IO and from the menu select Specify IP Address. The following dialog will appear:

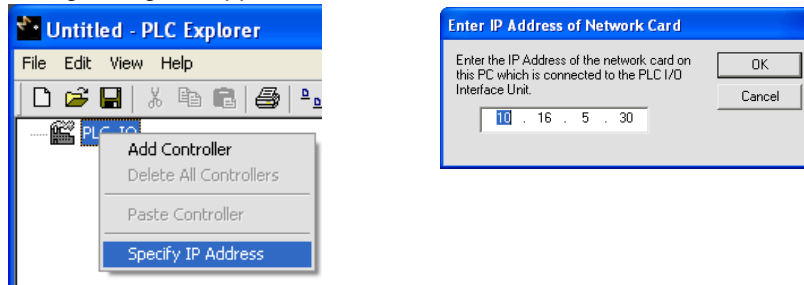


Figure 6-3 Edit Network Interface Card address

6. Enter the IP Address for your computer's NIC (network interface card) IP Address that connects your computer to the PIO Ethernet Network. Click OK to return to previous screen.

6.3 Add Controller

1. To add a Controller right click on the PLC_IO icon and click Add Controller. The controller will be added under the PLC_IO icon as shown in the following picture. This controller must have the same name as your controller in the DeltaV Explorer. This is critical, or else you will not be able to correctly import generated FHX files, or download to the correct PIO

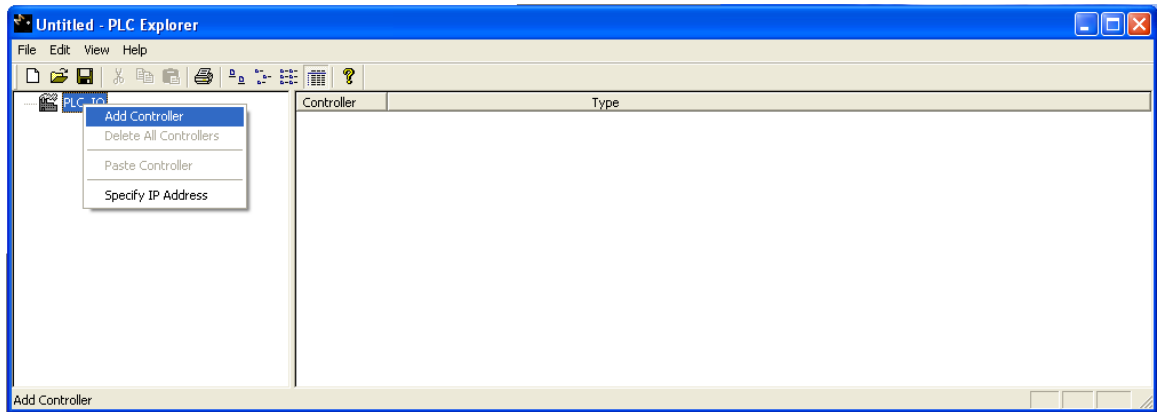


Figure 6-4 :: PLC Explorer Root Level Context Menu

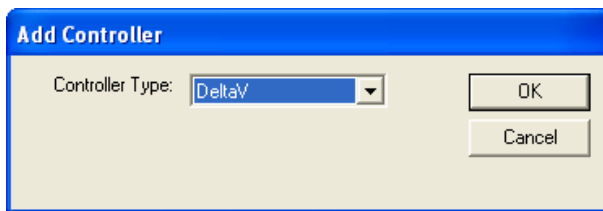


Figure 6-5 :: PLC Explorer Controller Selection Dialog

2. The default name used is NODEx, however, you may simply rename this by doing a Right mouse click and selecting Rename menu option.

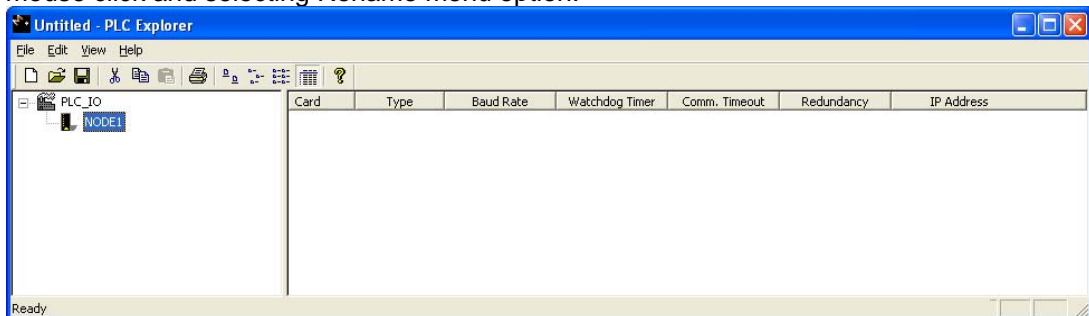


Figure 6-6:: PLC Explorer Display With Controller

This controller must have the same name as your controller in the DeltaV Explorer. This is critical, otherwise you will not be able to correctly import generated FHX files, or download to the correct PIO.



Note

All functions to Add, Delete, Rename, etc, are available by doing a Right-Mouse Click on an object.

6.4 Adding a GE PIO card

1. Right-mouse click on the Controller object. From the menu presented, select the Add Card and then the card type.

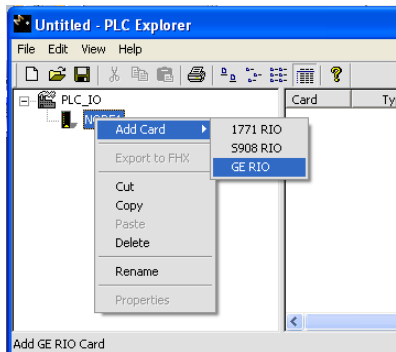


Figure 6-7:: PLC Card Selection menu

2. Select the GE RIO card type. This will launch the Add DeltaV card dialog as follows:
3. Select the DeltaV I/O card number (1-64) from this dialog. For ModbusTCP connections this must be from 57-64. This is the Programmable Serial Card, which will be generated by the utility.

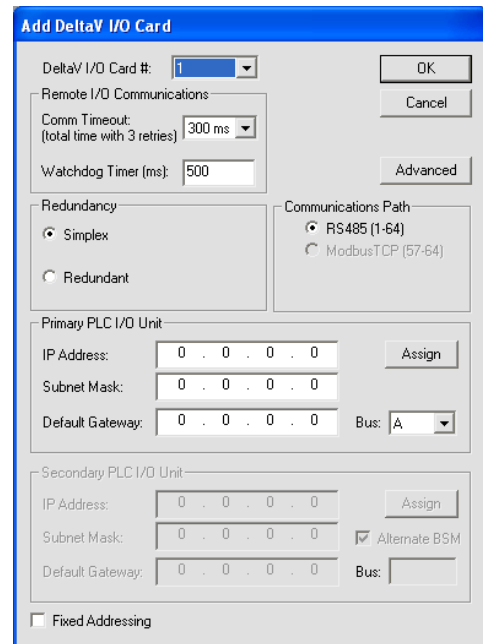


Figure 6-8:: PLC Card Properties Dialog

4. Select the RIO Watchdog Timer. This is the time between the field I/O interface and the PIO firmware. The default (minimum recommended) rate is 500 milliseconds.
5. Also select the PIO Comm Timeout. This is the maximum message interval between the Controller and PIO module. The default (minimum recommended) rate is 300 milliseconds. This must match the DeltaV timeout set on the card ports (timeout interval times number of retries). Click Ok and the card will be added under the Controller.

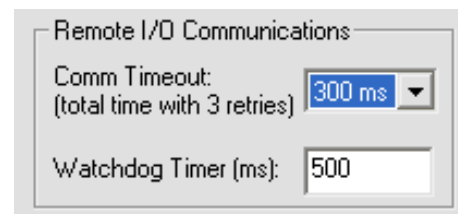


Figure 6-9: Communications Timeouts

6. For ModbusTCP Vim communications (only available on cards 57-64), select the ModbusTCP check box. This enables a combo-box to select the device address for this card. This address must match the device number assigned in VimNet Explorer.

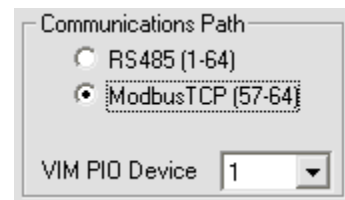
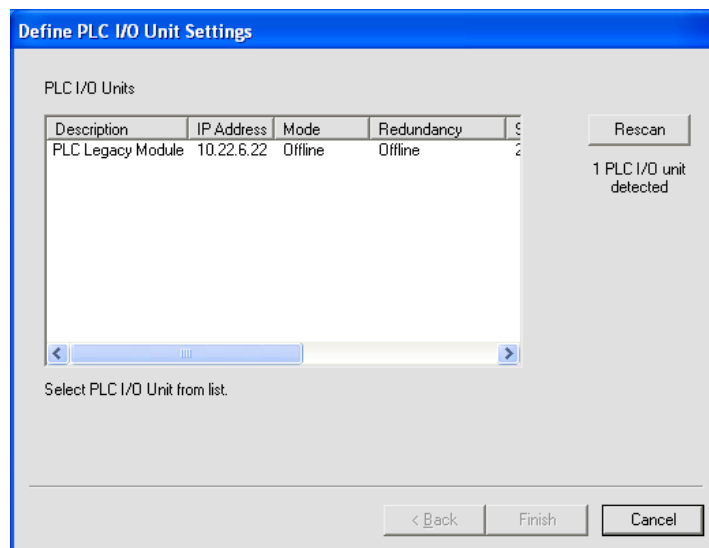


Figure 6-10: Communications Path

7. The Comm Timeout refers to DeltaV communication with PIO units. This is the total timeout time assuming 3 retries. For example if 300 ms is selected, this comprises 3 tries with 100 ms timeout for each. Whatever setting is selected here, the port timeout value in DeltaV must be equal (retries * time) The Watchdog Timer refers to the RIO Communication Board with the PIO Unit's Process. If the Process does not communication with the RIO Board within the specified time, the RIO Interface will terminate.
8. Select if you will be running in Simplex or Redundant mode. If operating in Simplex mode, leave Primary PLC I/O Unit set to Bus A. In redundant mode, two PSICs are used, each connected to an individual PIO module. Two types of redundant architectures can be used, i.e., 30/31 addressing, and BSM (Bus Switching Module). When working in 30/31 mode, make be sure Alternate BSM is NOT selected. Leave the Bus set to A. When operating with a BSM, select Alternate BSM and select which Bus the primary unit is connected. The secondary unit will be set to the free Bus.

NOTE: Currently the VIM connection only supports simplex connections to the PIO, redundant firmware for the VIM added in the future.

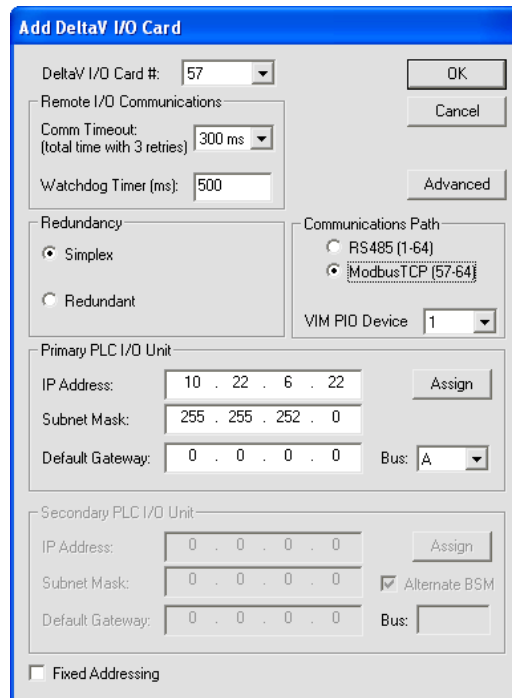
9. The PLC Explorer features Ethernet download and an auto-detection system to detect the blocks attached to your GE Legacy unit. To Begin click Assign to assign the Primary Legacy Unit's IP address. The following Dialog will appear. If your legacy units do not appear within a few seconds, click rescan. If the unit still does not appear check your wiring and PC and PIO NIC subnet and addresses (see PIOWho).



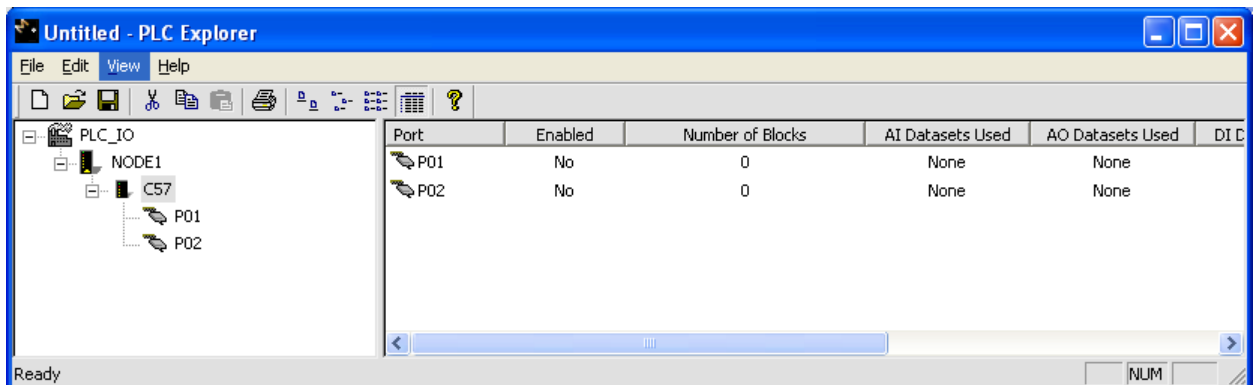
10. Select your Module and click finish. You will return to the following dialog and the IP Address for your Legacy Unit will be inserted as shown.

11. If card 57-64 is selected, the Modbus/TCP checkbox is enabled, if this is selected, then the VIM PIO Device box is enabled. Select the device address that will be used in the VIM to identify the PIO address to use, this must match the VIM ID or communications will not be established
12. Each PIO is shipped with factory default IP Address of 10.16.6.1. It is recommended that the PIO unit(s) be in a private network, not shared with DeltaV or other users on the office LAN. See Appendix C. To configure the network settings and Mode of a PLC, click Advanced and select the appropriate Unit.

13. From this dialog you can change the Description and Module number. The hardware's IP Address, Subnet Mask, and Default Gateway can also be changed. The Controller Communication Link will change the method the Module uses to connect to DeltaV or other controller. From this dialog the Legacy Module can also be set Online or Offline. Finally, the module's watchdog timer can be disabled to prevent any communication timeouts from halting the PLC I/O unit. More information can be found in Appendix C



14. Click OK to accept your changes. The program will return to the following with the added card and ports:



15. At any time you may modify the card properties by right-click on the Card object. This will present a menu for Download Config., Delete, or Properties.

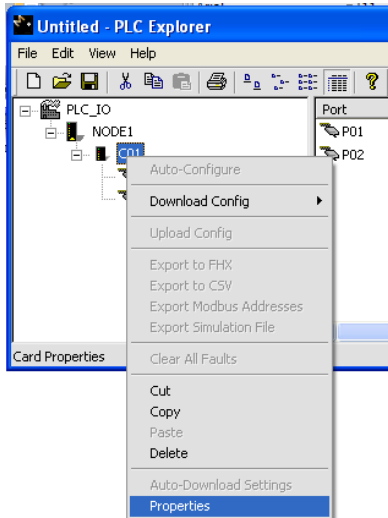
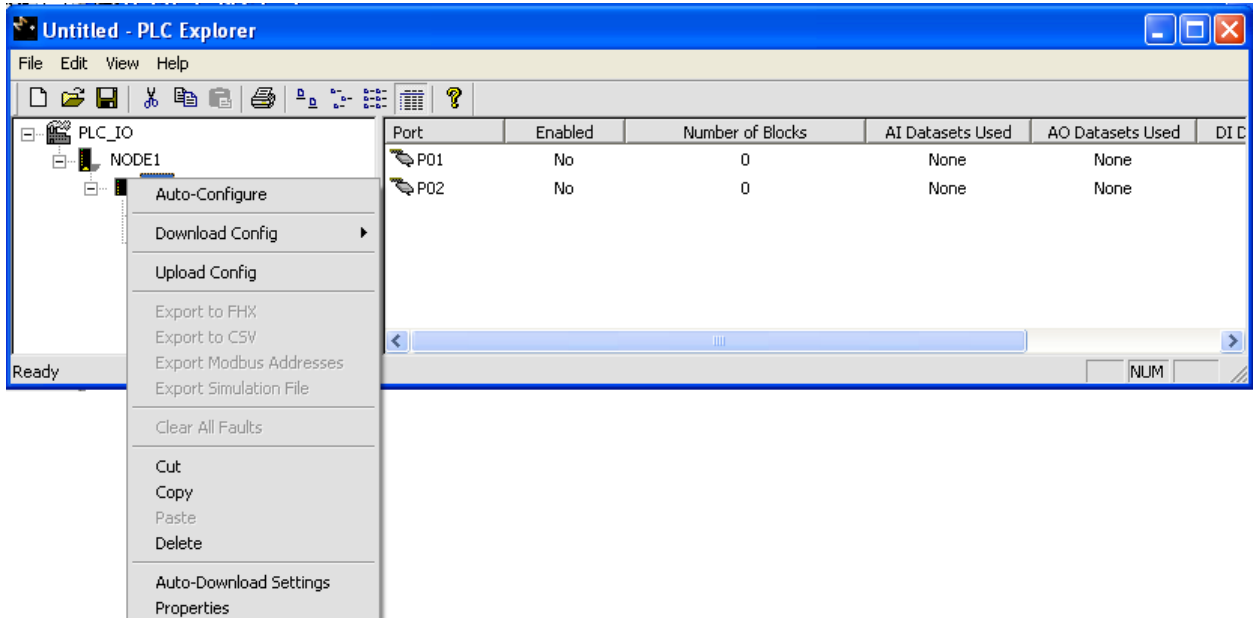
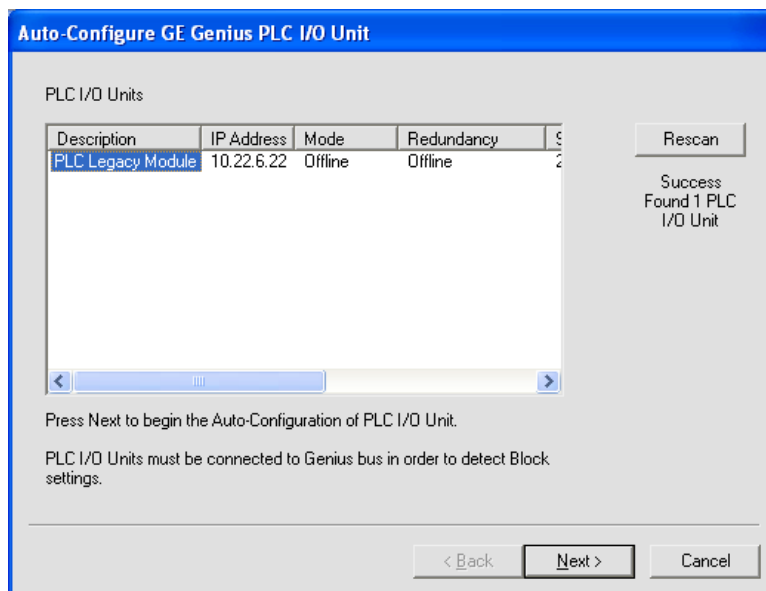


Figure 6-11 : Card Properties Menu Item

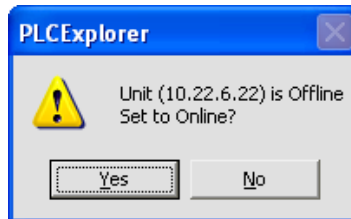
6.5 Auto-Configure to capture on-line blocks



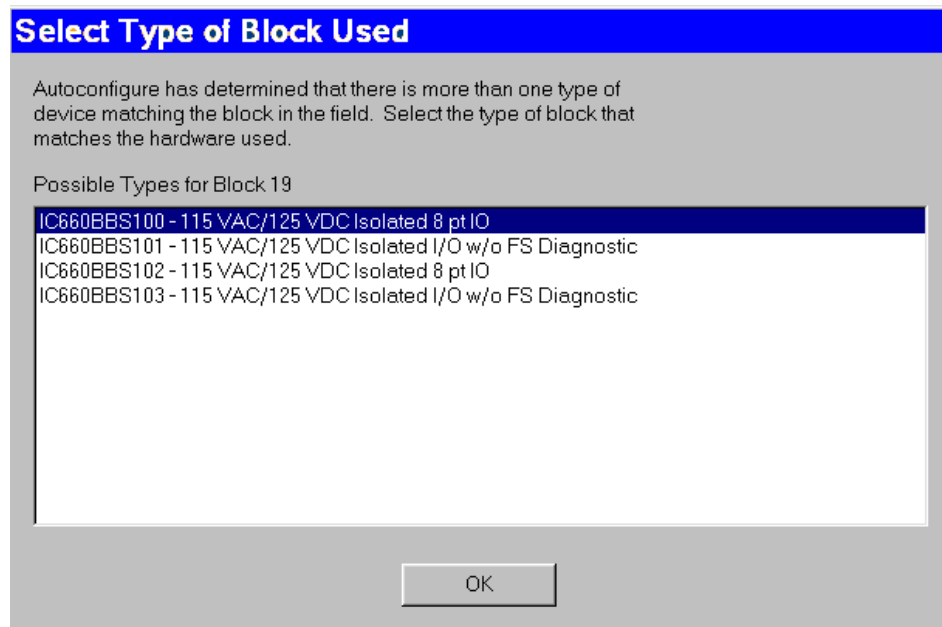
1. To automatically setup attached blocks, select Auto-Configure. This will present the following dialog:

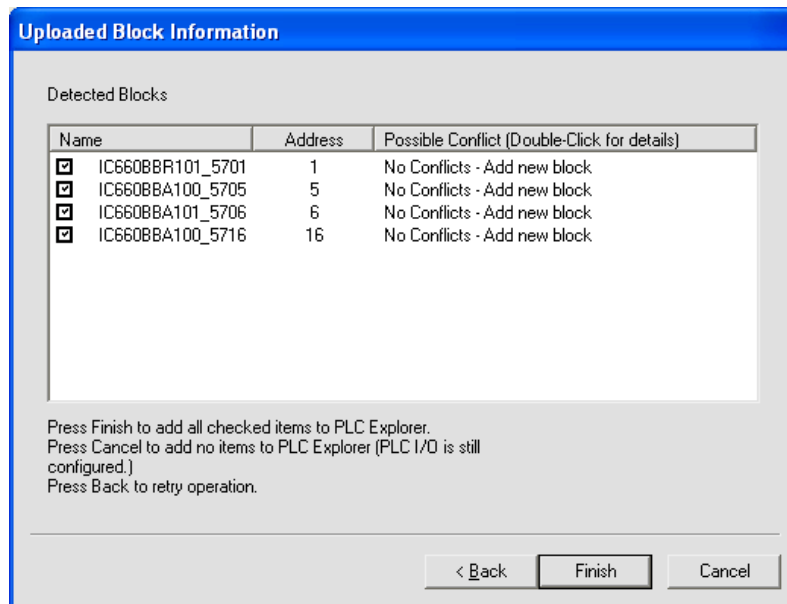


- The Legacy Unit selected in step 5 should appear above. Click on the Unit and hit Next. If the Module is offline, the following dialog will pop up requesting to switch the unit online. Click Yes to Set Online

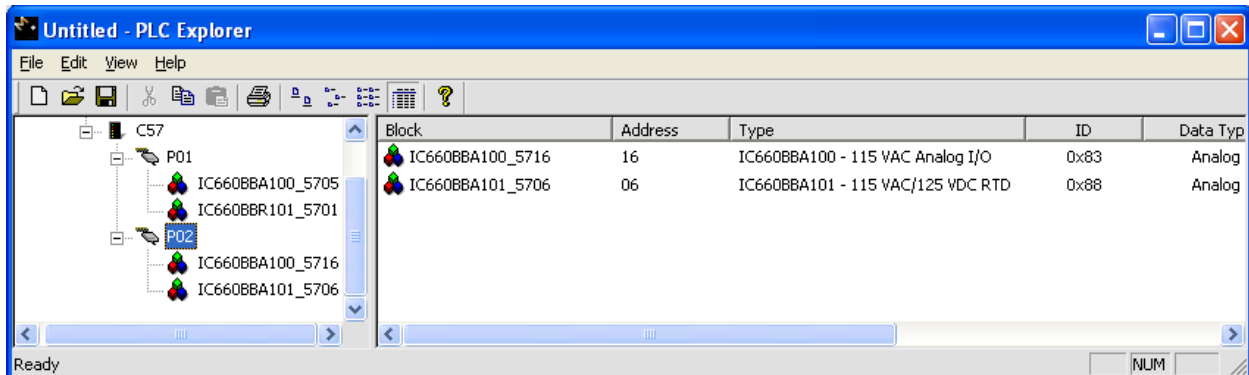


- The program will search each Bus address for a device. Modules of certain types have similar signatures and require you to select from a list the actual module connected. The dialog looks similar to below. Simply select the correct module and click OK.
- After a few moments the program will show the following with a summary of your attached blocks:



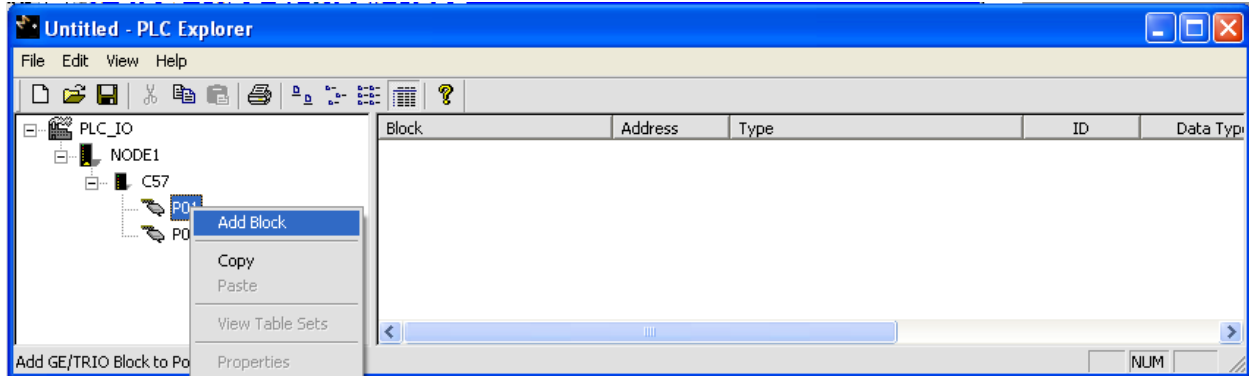


5. All blocks are selected by default. If you do not wish to add a specific block, click the check box under Name. Details regarding each block can be accessed by double clicking on the block. After you have selected the blocks you wish to add, click Finish.
6. The program will now update the configuration as shown below: Nothing more needs to be added at this level.

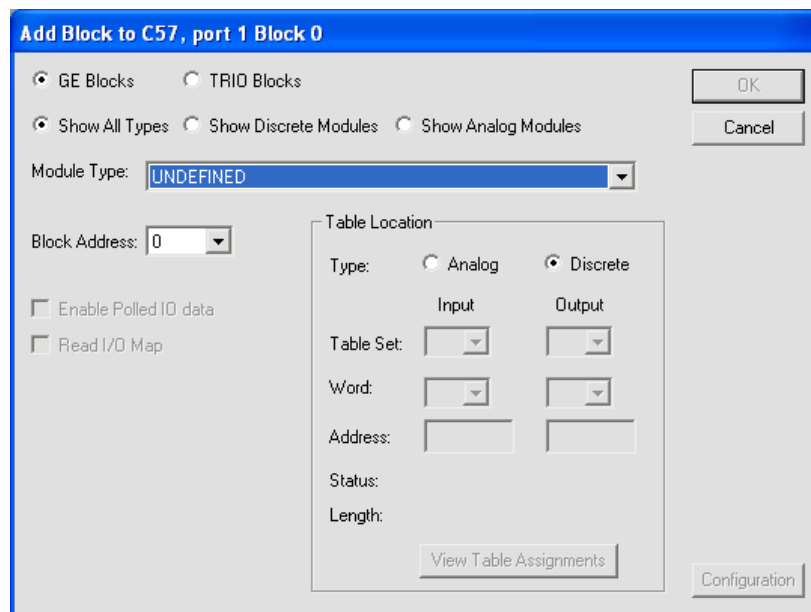


6.6 Manually Adding Blocks

1. Right-mouse click on the port. This will present a menu from which you can add a block.

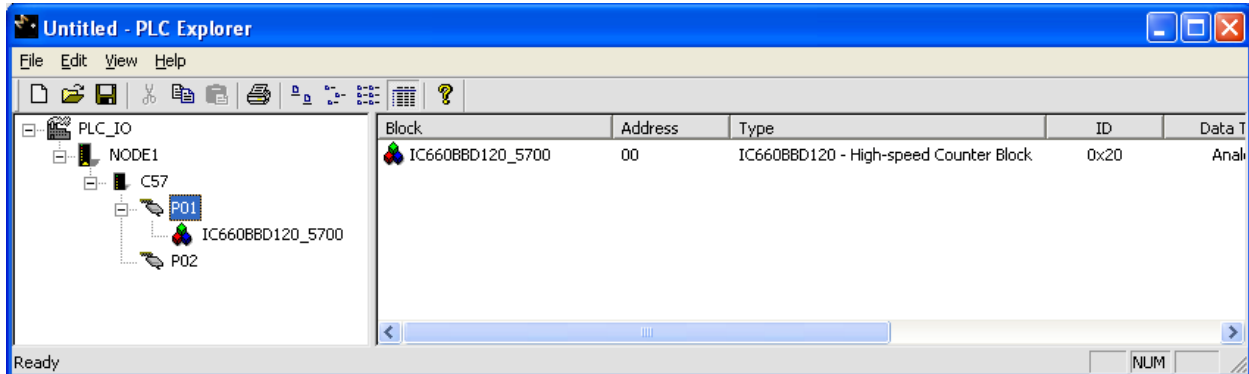


2. Select Add Block to display the following dialog window.



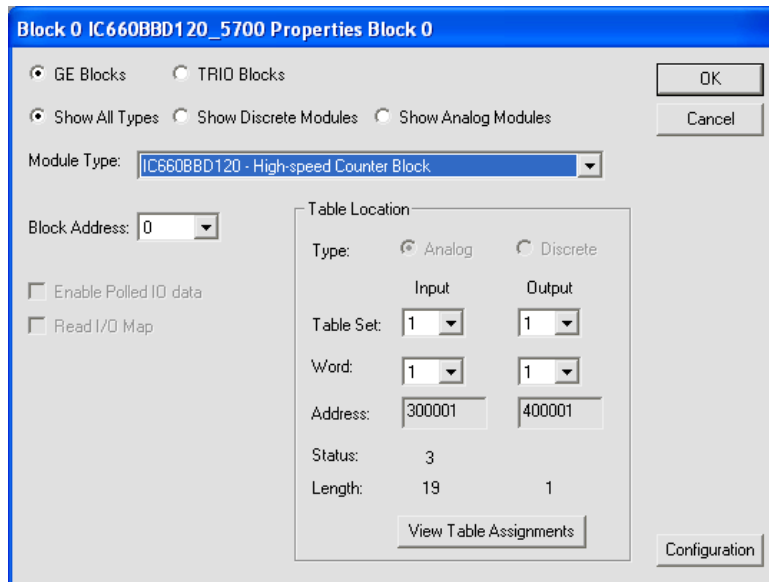
3. The buttons at the top labeled GE Blocks & TRIO Blocks will show the modules listed using the GE and TRIO names respectively. The buttons below allow you to filter the type of modules shown in the drop down box.
4. The Block address is user selectable. By default, the next available address is automatically presented, and can be selected without any further configuration requirements. You should change this value to match your hardware configuration if you are adding blocks in a different order.

- Click on the Drop down box 'Module Type:' to select the block you want to add. A list of supported modules can be found at the end of this manual in Appendix A. To configure a block, select it in the drop down menu and click the Configuration button in the bottom right corner. This will launch a separate dialog window unique to each block type. When you are finished, press OK to return to the PLC Explorer window. The block should appear under the port as shown below.



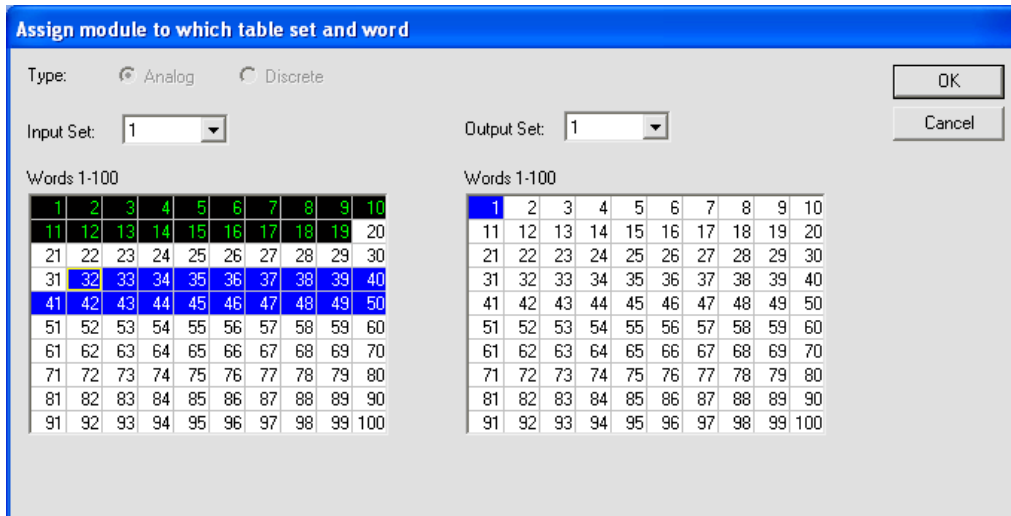
6.6.1 Manually Adding Discrete I/O

- From the Add a Block window, select a discrete IO as shown below



- Choose the Block Address that corresponds with the Discrete IO's physical slot.
- The Enable Polled IO data is disabled for all Discrete Modules.
- You can view the table set assignments by clicking the View Table Assignment button. This is a convenient way to view the data location of each configured I/O modules. Furthermore, it allows you to override the default assignment and customize the table set and register location for your

I/O modules. When you click on the View Table Assignment button, the following dialog will be displayed:



5. This is a view of the first discrete input and output table sets. The black/white cells are unused; and the green/black cell color indicates that module(s) are already configured on these cells. The white/blue cell color indicates that this is the target location for the current module (from which the View Table Assignment was launched). To determine which module is assigned to a register (or group of registers), place the mouse pointer on the register number. A pop-up will be displayed, as shown, indicating the module type.
6. As stated above, the white/blue cell color indicates the target location of the current module. This location is automatically calculated by the utility. However, you can change the assignment by simply clicking on a new, unused cell, and assign the current module to it by clicking Ok.



Add Block to C57, port 1 Block 0

GE Blocks TRIO Blocks

Show All Types Show Discrete Modules Show Analog Modules

Module Type:

Block Address:

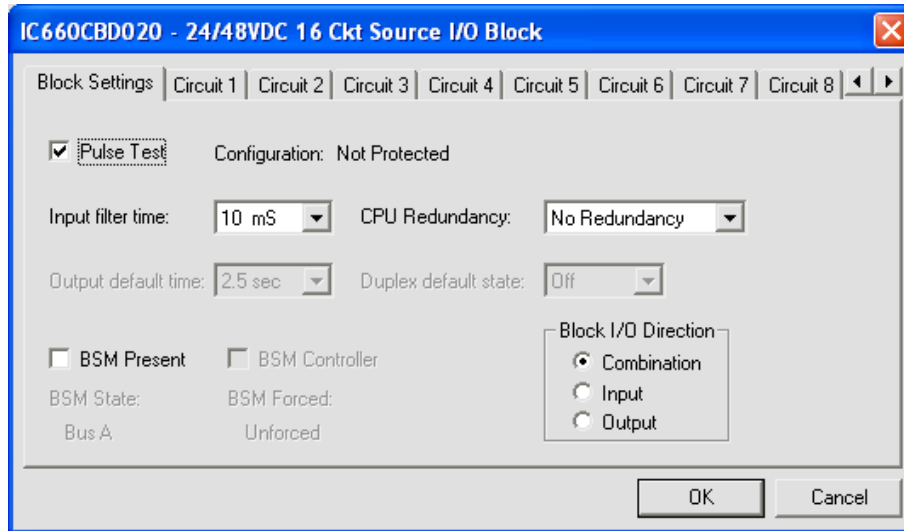
Enable Polled IO data
 Read I/O Map

Table Location

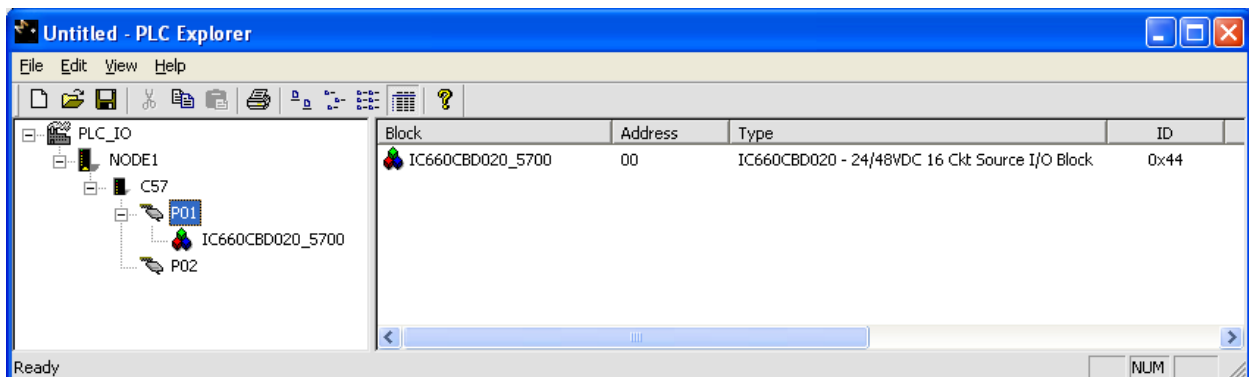
Type: Analog Discrete

	Input	Output
Table Set:	<input type="text" value="1"/>	<input type="text" value="1"/>
Word:	<input type="text" value="1"/>	<input type="text" value="1"/>
Address:	<input type="text" value="100001"/>	<input type="text" value="1"/>
Status:	9	
Length:	10	1

Each Discrete I/O block will have specific configuration requirements. To access these, click on the Configuration button. A module specific dialog will be launched. For IC660BBD020, this is as follows with default parameters selected:

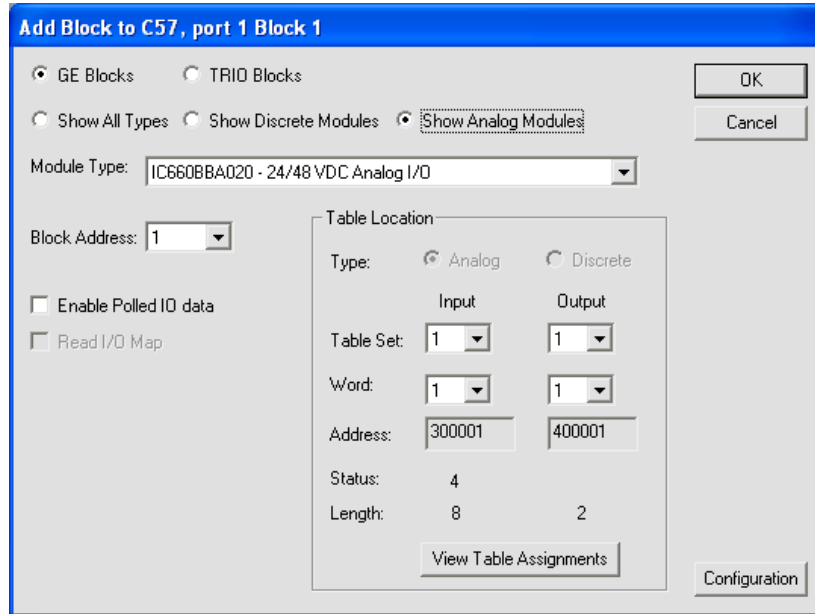


7. The specific parameters for the modules are outside the scope of this manual, but can be found in.
8. Click Ok to accept and close the module configuration dialog.
9. Click Ok to accept and close the Add module dialog. This will add the IC660BBD020 to the configuration database.

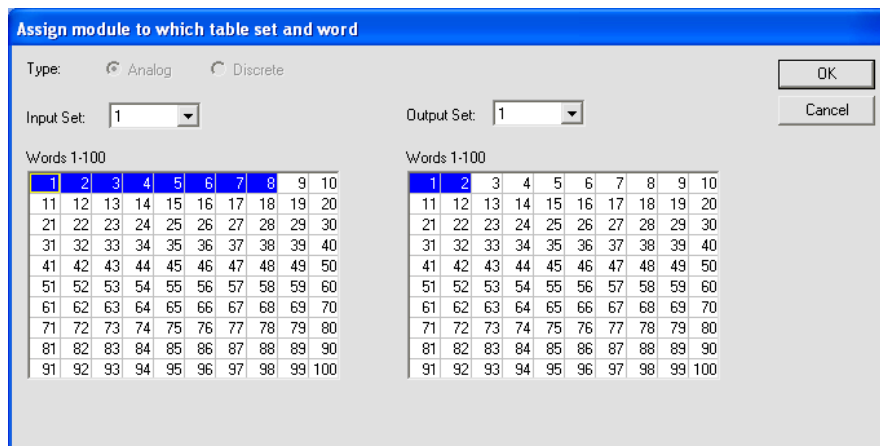


6.6.2 Manually Adding Analog I/O

1. From the Add a Block window, select an analog IO as shown below

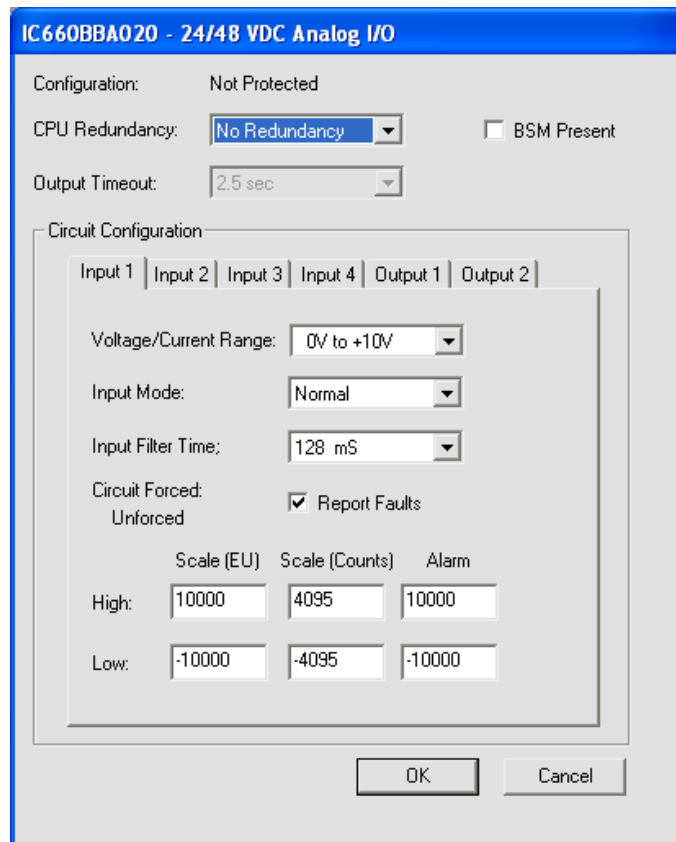


2. Choose the Block Address that corresponds with the Analog IO's physical slot.
3. The Enable Polled IO data causes block to report more data to PLC IO. Notice the length of the Input will increase upon enabling this option.
4. You can view the table set assignments by clicking the View Table Assignment button. This is a convenient way to view the data location of each configured I/O modules. Furthermore, it allows you to override the default assignment and customize the table set and register location for your I/O modules. When you click on the View Table Assignment button, the following dialog will be displayed:



5. This is a view of the first discrete input and output table sets. The black/white cells are unused; and the green/black cell color indicates that module(s) are already configured on these cells. The white/blue cell color indicates that this is the target location for the current module (from which the View Table Assignment was launched). To determine which module is assigned to a register (or group of registers), place the mouse pointer on the register number. A pop-up will be displayed, as shown, indicating the module type.
6. As stated above, the white/blue cell color indicates the target location of the current module. This location is automatically calculated by the utility. However, you can change the assignment by simply clicking on a new, unused cell, and assign the current module to it by clicking Ok.

7. Each Analog I/O block will have specific configuration requirements. To access these, click on the Configuration button. A module specific dialog will be launched. For IC660BBA020, this is as follows with default parameters selected:

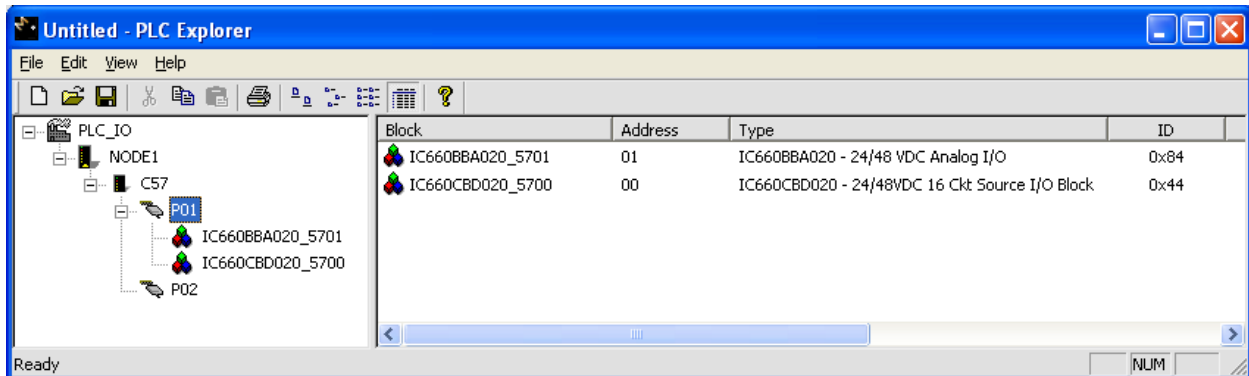


8. The specific parameters for the modules are outside the scope of this manual.
9. Click Ok to accept and close the module configuration dialog.
10. Click Ok to accept and close the Add module dialog. This will add the IC660BBA020 to the configuration database.



Note

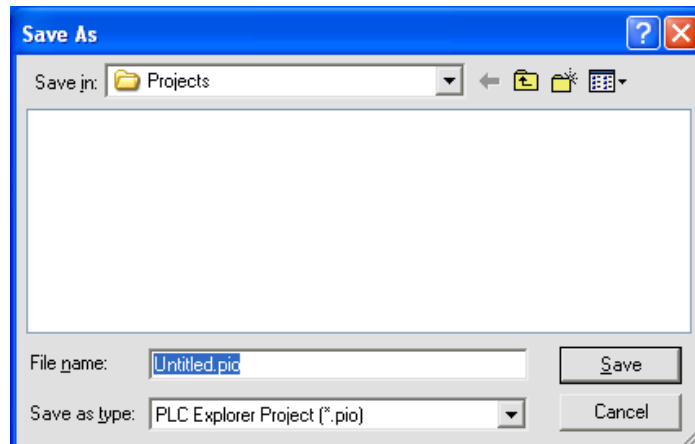
In DeltaV, the analog data read for the field is presented as scaled based on selected EU High and Low. Furthermore, the data may have the most significant bit set if the value is negative. User must handle the sign bit in DeltaV.



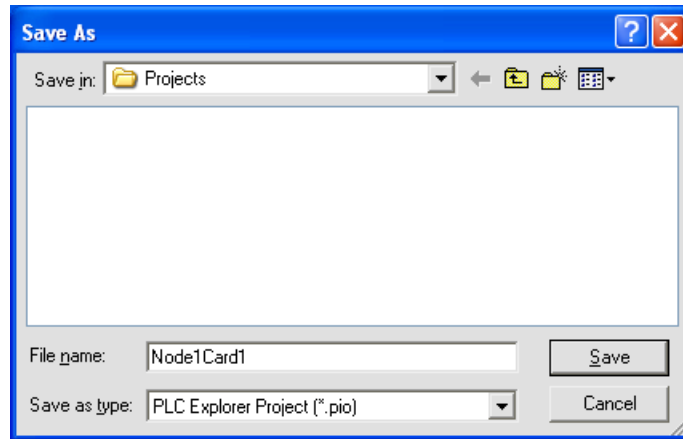
6.7 Saving the Configuration

All new configuration files have the title of “Untitled”. This is visible on the top-left corner of the Explorer. To save a configuration, use the File->Save or File-Save As menu option. New configurations should be saved with the Save As option. If this is not a new configuration, you can also easily save it by clicking on the toolbar save button.

The following dialog will be launched when the Save As option is selected.



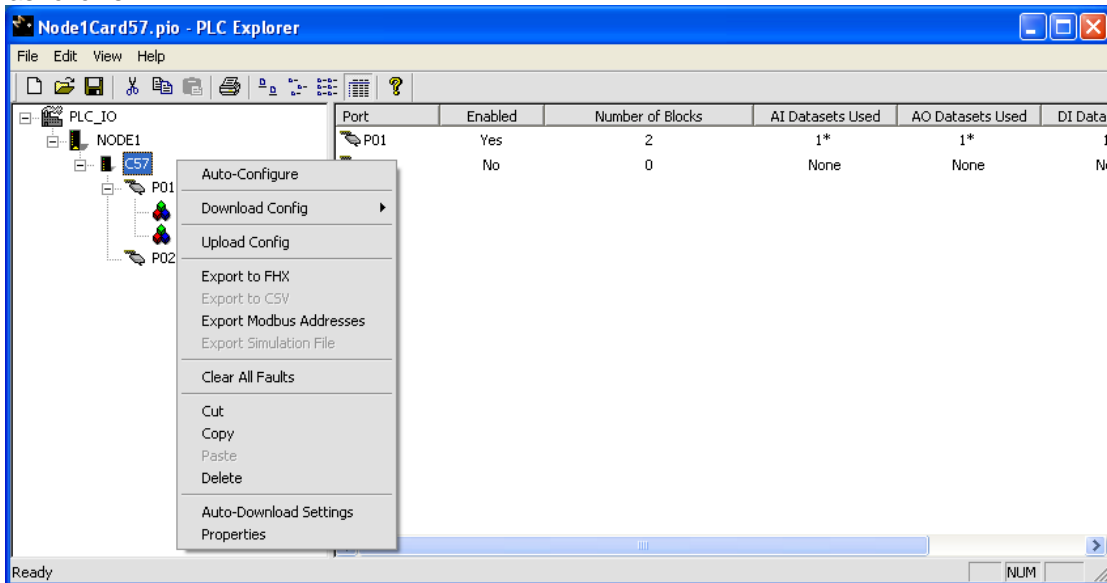
The default save directory presented will be \Projects. You can, however, save the file anywhere in the system. The file may be saved as “untitled”, or you can specify another name that uniquely identifies it. For example, see below:



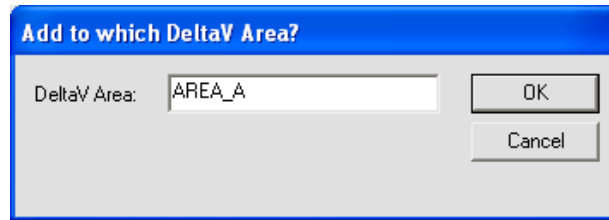
6.8 Exporting/Importing FHX files

In the current release of the Explorer, the FHX export functionality is only available at the DeltaV Card level. In future releases, this will be changed to allow greater granularity.

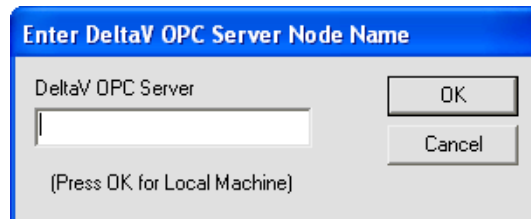
1. To export the FHX file, Right-mouse click on the Card and select the Export to FHX menu option as follows:



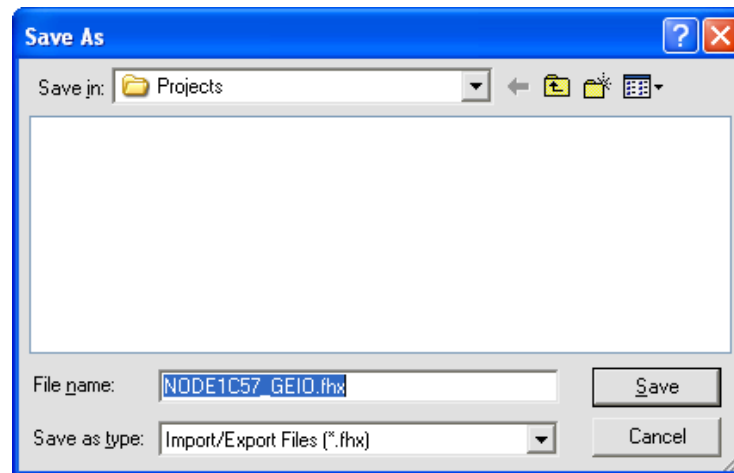
2. This will launch a dialog asking for the DeltaV Plant Area to which the generated modules will belong. This is as follows:



3. The default plant area is AREA_A. You can change this as necessary and click Ok to accept. This will launch a dialog asking for the FHX file name to use. A default file name is presented and can be accepted.
4. Next you must enter a ProPlus Node name as shown above. Click OK to use the local machine.



5. This will start the FHX generation process, and save the file in the selected directory.



6. After generation completes, the FHX files are ready for import into DeltaV.

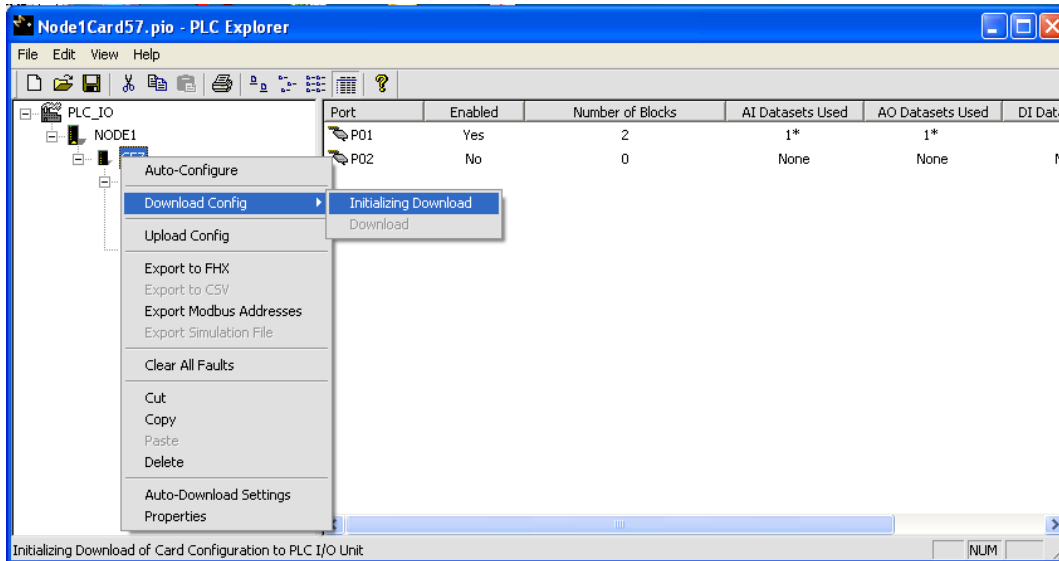


Note

The generated FHX files must be correctly imported into DeltaV and downloaded to the selected Controller before proceeding to the PIO configuration download process.

6.9 Downloading the Configuration

1. Right-mouse click on the card object. This will present the menu as shown below:



2. Select Download Config and then Select Initializing Download. This will first initialize the PIO database and then send the current configuration.
3. The download process begins by first reading the current mode. Then the unit is set into program mode. The system then downloads the current configuration. On completion, the program returns the unit to read mode.



Caution

This suspends all normal communications with the field I/O, until download completes and the PIO unit returns to Run mode.

7 Operational Check

The following sections provide some assistance to ensure the interface is working properly.

Verify Hardware and Software Version Number

The user can verify that the GE Legacy RIO driver has been installed using the DeltaV Diagnostics tool. The Diagnostics tool will show the Hardware Revision No. (HwRev) and the Software Revision No. (SwRev).

To begin the DeltaV Diagnostic tool select Start-> DeltaV-> Operator-> Diagnostics. In the Diagnostics tool expand the Controller, I/O and then double click on the Programmable Serial Interface Card that has the driver installed.

The following information will be displayed:

HwRev	:	Hardware Revision	:	2.3	(or later)
SwRev	:	Software Revision	:	P1.10	(or later)

7.1 Verify Configuration

Verify port configuration: The serial port must be enabled. User needs to make sure communication settings such as baud rate, parity, and number of data bits matches the settings described above.

Verify dataset configuration: The datasets configured must be as shown above.

7.1.1.1.1.1.1 Verify I/O Communication With Control Studio

User can create I/O modules in the control studio to verify correct values are read from the PSIC. For AO and DO data, the values should be changed in DeltaV and verified that the new data are correctly sent out to the field module. Similarly, verify that the AI and DI data is being read correctly from the field and reported to DeltaV. Another methodology to verify correct I/O communications is to use the View Dataset Registers option in Diagnostics.

7.2 Using Diagnostics

- Verify PSIC communication: Select the PSIC on Diagnostics and press the right mouse button. Select Display Real -Time Statistics from the drop down menu. If the Programmable Serial Interface Card is functioning then the user will see the Valid Responses counter and the Async and/or Sync Transactions counters incrementing. There will not be any error counting up.
- Verify port statistics: Select the Port on the Programmable Serial Interface Card and press the right mouse button. Then select Display Port Statistics form the drop down

menu. Verify that the port communications statistics are being displayed properly and are counting as expected.

- Verify dataset values: Select a dataset and press the right mouse button. Select View Dataset Registers from the Drop down window. Verify that the dataset values are displayed as expected.

7.3 LED Indication

The Yellow LED for the port should be on solid when all communications on that port are valid. The Yellow LED should be blinking if there is some valid communications and some communications with errors on that port. The Yellow LED should be OFF if there are no valid communications on that port.

8 Technical Support

For technical support or to report a defect, please give Mynah Technologies a call at (636) 681-1555. If a defect is discovered, please document it in as much detail as possible and then fax your report to us at (636)-681-1660.

For all driver and related questions, you can also send us an e-mail. Our address is: support@mynah.com

Thank you for using DeltaV.



9 Appendix A – List of Supported Modules

GE Part #	TRIO Part #	Block Description
IC660BBA020*	6230BP10810	24/48 VDC Analog I/O
IC660BBA021*	6233BP10810	24/48 VDC RTD
IC660BBA023*	6232BP10810	24/48 VDC Thermocouple
IC660BBA024	6231BP10810	24/48 VDC Current source Analog 4 In/2 Out
IC660BBA025	6236BP10810	24/48 VDC Current source Analog 6 Out
IC660BBA026	6235BP10810	24/48VDC Current-source Analog Input
IC660BBA100*	6230BP10710	115 VAC Analog I/O
IC660BBA101*	6233BP10910	115 VAC/125 VDC RTD
IC660BBA103*	6232BP10710	115 VAC/125 VDC Thermocouple
IC660BBA104	6231BP10910	115 VAC/125 VDC Current source Analog 4 In/2 Out
IC660BBA105	6236BP10910	115 VAC/125 VDC Current source Analog 6 Out
IC660BBA106	6235BP10910	115VAC/125VDC Current-source Analog In
IC660BBD020*	6240BP10811	16 Circuit DC Input/Output (3 wire)
IC660BBD021*	6240BP10812	16 Circuit DC Input/Output (3 wire)
IC660BBD022*	6240BP10411	16 Circuit DC Input/Output (2 or 3 wire)
IC660BBD023*	6240BP10412	16 Circuit DC Input/Output (2 or 3 wire)
IC660BBD024	6241BP10411	32 Circuit 12/24 VDC Source
IC660BBD025	6241BP10812	32 Circuit 5/12/24 VDC Sink
IC660BBD101	6245BP10710	115 VAC 8 Grouped IO
IC660BBD110	6247BP10710	115 VAC 16 Input
IC660BBR100*	6248BP10812	115V or 230V AC Relay Output Relays NC
IC660BBR101*	6248BP10811	115V or 230V AC Relay Output Relays NO
IC660BBS100*		115 VAC/125 VDC Isolated 8 pt IO
IC660BBS101*	6246BP10810	115 VAC/125 VDC Isolated I/O w/o FS Diagnostic
IC660BBS102	6246BP10811	115 VAC/125 VDC Isolated 8 pt IO
IC660BBS103		115 VAC/125 VDC Isolated I/O w/o FS Diagnostic
IC660BBD100*		115VAC 2A 8 Ckt Grouped I/O Block (Phase B)
IC660BBD120*	6234BP10910	High-speed Counter Block
IC660BPM100*		PowerTRAC Block
IC660CBA100		115VAC 4 In/2 Out Voltage/Current Analog Block
IC660CBA020		24/48VDC 4 In/2 Out Voltage/Current Analog Block
IC660CBD100		115VAC 8 Ckt Grouped I/O Block
IC660CBS100		115VAC/125VDC 8 Ckt Isolated I/O Block
IC660CBD021		24/48VDC 16 Ckt Sink I/O Block
IC660CBD020		24/48VDC 16 Ckt Source I/O Block

Note



Modules with * next to them have been tested as of 8/18/04. For all other modules, please consult Mynah Technical Support.



10 Appendix B – Access Restrictions for each Block

10.1.1.1 GE Genius: 8, 16, & 32 Circuit Discrete I/O Blocks (Except Isolated blocks & 16-Circuit 115VAC Input)

The following restrictions apply for:

- IC660CBD100 [64] 115VAC 8 Ckt Grouped I/O Block
- IC660BBD100 [69] 115VAC 2A 8 Ckt Grouped I/O Block (Phase B)
- IC660BBD101 [82] 115VAC Low-Leakage 8 Ckt Grouped Block
- IC660CBD021 [67] 24/48VDC 16 Ckt Sink I/O Block
- IC660CBD020 [68] 24/48VDC 16 Ckt Source I/O Block
- IC660BBD020 [72] 24/48VDC 16 Ckt Sink I/O Block (Phase B)
- IC660BBD023 [72] 24VDC 16 Ckt Sink I/O Block (Phase B)
- IC660BBD021 [73] 24/48VDC 16 Ckt Source I/O Block (Phase B)
- IC660BBD022 [73] 12/24VDC 16 Ckt Source I/O Block (Phase B)
- IC660BBR101 [79] Normally-open Relay Block
- IC660BBR100 [80] Normally-closed Relay Block
- IC660BBD025 [74] 5/12/24VDC 32 Ckt Sink I/O Block
- IC660BBD024 [75] 12/24VDC 32 Ckt Source I/O Block

Description	Access
Block Configuration	
Pulse Test	Read / Write
Input Filter Time code	Read / Write
Configuration Protect (Read Only)	Read Only
Duplex default state	Read / Write
Output default time	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read / Write
BSM Forced (Read Only)	Read / Write
Circuits: Circuit Configuration	
Type	Read / Write
Overload Shutdown	Read / Write
Output Hold Last State	Read / Write
Output default state	Read / Write
No Load Detection	Read / Write
Point Forced (Read Only)	Read Only
Report Faults	Read / Write

10.1.1.2 GE Genius: 8-Circuit Discrete I/O Blocks (Isolated blocks only)

The following restrictions apply for:

- IC660BBS100 [70] 115VAC/125VDC 8 Ckt Isolated Block (Phase B)
- IC660BBS101 [70] 115VAC/125VDC 8 Ckt Isolated Block w/o Failed Switch Diagnostic
- IC660BBS102 [70] 115 VAC/125 VDC Isolated 8 pt IO
- IC660BBS103 [70] 115 VAC/125 VDC Isolated I/O w/o FS Diagnostic
- IC660CBS100 [65] 115VAC/125VDC 8 Ckt Isolated I/O Block

Description	Access
Block Configuration	
Pulse Test	Read / Write
Input Filter Time code	Read / Write
Configuration Protect (Read Only)	Read Only
AC/DC Selection	Read / Write
Duplex default state	Read / Write
Output default time	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Circuits: Circuit Configuration	
Type	Read / Write
Overload Shutdown	Read / Write
Output Hold Last State	Read / Write
Output default state	Read / Write
No Load Detection	Read / Write
Point Forced (Read Only)	Read Only
Report Faults	Read / Write

10.1.1.3 GE Genius: 16-Circuit 115VAC Discrete I/O Blocks Only

The following restrictions apply for:

- IC660BBD110 [81] 115 VAC 16 Input,

Description	Access
Block Configuration	
Configuration Protect (Read Only)	Read Only
CPU Redundancy	Read / Write
BSM Present	Read / Write
Circuits: Circuit Configuration	
Short Detection	Read / Write
Open Wire Detection	Read / Write
Point Forced (Read Only)	Read Only
Report Faults	Read / Write
Input Filter Times (Circuits 1-8)	Read / Write
Input Filter Times (Circuits 9-16)	Read / Write
Open/Off Threshold % (Points 1-8)	Read / Write
On/Off Threshold % (Points 1-8)	Read / Write
Open/Off Threshold % (Points 9-16)	Read / Write
On/Off Threshold % (Points 9-16)	Read / Write



10.1.1.4 GE Genius: Voltage/Current 4 input/2 Output Analog Blocks

The following restrictions apply for:

- IC660BBA100 131
- IC660BBA020 132
- IC660CBA100 128
- IC660CBA020 129

Description	Access
Block Configuration	
Configuration Protect (Read Only)	Read Only
Output Timeout	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
Inputs: Circuit Configuration	
Voltage/Current Range	Read / Write
Input Mode	Read / Write
Circuit Forced	Read Only
Report Faults	Read / Write
Input Filter Time	Read / Write
High Alarm	Read / Write
Low Alarm	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write
Outputs: Circuit Configuration	
Voltage/Current Range	Read / Write
Hold Last State	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
Default value	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write



10.1.1.5 GE Genius: Current-Source Analog 4 Input/2 Output Blocks

The following restrictions apply for:

- IC660BBA104 [140] 115VAC/125VDC
- IC660BBA024 [141] 24/48VDC

Description	Access
Block Configuration	
Input Filter Time	Read / Write
Configuration Protect (Read Only)	Read Only
Output Timeout	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Inputs: Circuit Configuration	
Voltage/Current Range	Read / Write
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
High Alarm	Read / Write
Low Alarm	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write
Output2: Circuit Configuration	
Voltage/Current Range	Read / Write
Feedback Testing	Read / Write
Hold Last State	Read / Write
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
Output Settling Time	Read / Write
Default value	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write



10.1.1.6 GE Genius: Current-Source Analog 6-Output Blocks

The following restrictions apply for:

- IC660BBA105 [142] 115VAC/125VDC
- IC660BBA025 [143] 24/48VDC

Description	Access
Block Configuration	
Configuration Protect (Read Only)	Read Only
Output Timeout	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Outputs: Circuit Configuration	
Voltage/Current Range	Read / Write
Feedback Testing	Read / Write
Hold Last State	Read / Write
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
Output Setting Time	Read / Write
Default value	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write



10.1.1.7 GE Genius: Current-Source Analog 6-Input Blocks

The following restrictions apply for:

- IC660BBA106 [144] 115VAC/125VDC
- IC660BBA026 [145] 24/48VDC

Description	Access
Block Configuration	
Input Filter Time	Read / Write
Configuration Protect (Read Only)	Read Only
Output Timeout	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Inputs: Circuit Configuration	
Voltage/Current Range	Read / Write
Input Mode	Read / Write
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
High Alarm	Read / Write
Low Alarm	Read / Write
High Scale(EU)	Read / Write
High Scale(Counts)	Read / Write
Low Scale(EU)	Read / Write
Low Scale(Counts)	Read / Write



10.1.1.8 GE Genius: Thermocouple 6-Input Blocks

The following restrictions apply for:

- IC660BBA103 [134]115VAC/125VDC
- IC660BBA023 [135]24/48VDC

Description	Access
Block Configuration	
Engineering Units	Read / Write
Configuration Protect (Read Only)	Read Only
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Inputs: Circuit Configuration	
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
Thermocouple Type	Read / Write
Cold Junction Compensation	Read / Write
High Alarm	Read / Write
Low Alarm	Read / Write
User-Def Cold-Junction Comp	Read / Write
Field offset	Read / Write



10.1.1.9 GE Genius: RTD 6-Input Blocks

The following restrictions apply for:

- IC660BBA101 [136] 115VAC/125VDC
- IC660BBA021 [137] 24/48VDC

Description	Access
Block Configuration	
Input Filter	Read / Write
Engineering Units	Read / Write
Configuration Protect (Read Only)	Read Only
CPU Redundancy	Read / Write
BSM Present	Read / Write
Inputs: Circuit Configuration	
Channel Active	Read / Write
Circuit Forced (Read Only)	Read Only
Report Faults	Read / Write
Linearization	Read / Write
High Alarm	Read / Write
Low Alarm	Read / Write
Nom. RTD resistance 10th of Ohm	Read / Write
Alpha: Ohms per Ohm Deg C	Read / Write
Offset: Hundredths of Ohm	Read / Write



10.1.1.10 GE Genius: High-speed Counter Block, Type A (4 up or down counters)

The following restrictions apply for:

1. IC660BBD120 [32]

Counter type specifies whether the High Speed Counter Block will be this type (A) or one of the other types, so this field must be specified first.

Description	Access
Block Configuration	
Pulse test outputs at power-up	Read / Write
Output 1 faults reported	Read / Write
Output 2 faults reported	Read / Write
Output 3 faults reported	Read / Write
Output 4 faults reported	Read / Write
Configuration Protected (Read Only)	Read Only
Enable Outputs at power-up	Read / Write
Frequency Divider	Read / Write
CPU Redundancy	Read / Write
Counter Input Threshold	Read / Write
Control Input Threshold	Read / Write
Counter Type	Read / Write
Forced output states Read Only	
Output 1 Forced	Read Only
Output 2 Forced	Read Only
Output 3 Forced	Read Only
Output 4 Forced	Read Only
Output 1 Forced State	Read Only
Output 2 Forced State	Read Only
Output 3 Forced State	Read Only
Output 4 Forced State	Read Only
Oscillator Frequency Divider (1-255)	Read / Write
Counters	
Configuration	
Strobe Edge	Read / Write
Count Mode	Read / Write
Count Direction	Read / Write
Filter selection	
Count Input Filter	Read / Write
Preload Input Filter	Read / Write
Strobe Effect	Read / Write
Strobe Mode	Read / Write
Time base (1-65535mS)	Read / Write
High count limit	Read / Write
Low count limit	Read / Write
On Preset	Read / Write
Off Preset	Read / Write
Preload value	Read / Write

10.1.1.11 GE Genius: High-speed Counter Block, Type B (2 up/down counters)

The following restrictions apply for:

2. IC660BBD120 [32]

Counter type specifies whether the High Speed Counter Block will be this type (B) or one of the other types, so this field must be specified first.

Description	Access
Block Configuration	
Pulse test outputs at power-up	Read / Write
Output 1 faults reported	Read / Write
Output 2 faults reported	Read / Write
Output 3 faults reported	Read / Write
Output 4 faults reported	Read / Write
Configuration Protected (Read Only)	Read Only
Enable Outputs at power-up	Read / Write
Frequency Divider	Read / Write
CPU Redundancy	Read / Write
Counter Input Threshold	Read / Write
Control Input Threshold	Read / Write
Counter Type	Read / Write
Forced output states Read Only	
Output 1 Forced	Read Only
Output 2 Forced	Read Only
Output 3 Forced	Read Only
Output 4 Forced	Read Only
Output 1 Forced State	Read Only
Output 2 Forced State	Read Only
Output 3 Forced State	Read Only
Output 4 Forced State	Read Only
Oscillator Frequency Divider (1-255)	Read / Write
Counters	
Configuration	
Strobe #1 Edge	Read / Write
Strobe #2 Edge	Read / Write
Strobe 1.1 and 2.1 Linkage	Read / Write
Count Mode	Read / Write
Count signals	Read / Write
Filter selection	
Count Input Filter	Read / Write
Preload Input Filter	Read / Write
'Disable' Input Filter	Read / Write
Strobe Mode	Read / Write
Time base (1-65535mS)	Read / Write
High count limit	Read / Write
Low count limit	Read / Write
On Preset #1	Read / Write



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Description	Access
Off Preset #1	Read / Write
On Preset #2	Read / Write
Off Preset #2	Read / Write
Preload value	Read / Write



10.1.1.12 GE Genius: High-speed Counter Block, Type C (1 counter up or down and differential)

The following restrictions apply for:

- 3. IC660BBD120 [32]

Field 13 Counter type specifies whether the High Speed Counter Block will be this type (C) or one of the other types. , so this field must be specified first

Table with 2 columns: Description and Access. Rows include Block Configuration, Pulse test outputs at power-up, Output 1 faults reported, Output 2 faults reported, Output 3 faults reported, Output 4 faults reported, Configuration Protected (Read Only), Enable Outputs at power-up, Frequency Divider, CPU Redundancy, Counter Input Threshold, Control Input Threshold, Counter Type, Forced output states Read Only, Output 1 Forced, Output 2 Forced, Output 3 Forced, Output 4 Forced, Output 1 Forced State, Output 2 Forced State, Output 3 Forced State, Output 4 Forced State, Oscillator Frequency Divider (1-255), Counter 1 Configuration, Strobe #1 Edge, Strobe #2 Edge, Strobe #3 Edge, Count Mode, Count signals #1, Count signals #2, Filter selection, Count Input #1 Filter, Count Input #2 Filter, Preload Input #1 Filter, Preload Input #2 Filter, 'Disable' Input Filter, Strobe Mode.



Description	Access
Time base (1-65535mS)	Read / Write
High count limit	Read / Write
Low count limit	Read / Write
On Preset #1	Read / Write
Off Preset #1	Read / Write
On Preset #2	Read / Write
Off Preset #2	Read / Write
On Preset #3	Read / Write
Off Preset #3	Read / Write
On Preset #4	Read / Write
Off Preset #4	Read / Write
Preload value #1	Read / Write
Preload value #2	Read / Write
Home Position	Read / Write



10.1.1.13 GE Genius: PowerTRAC Block

The following restrictions apply for:

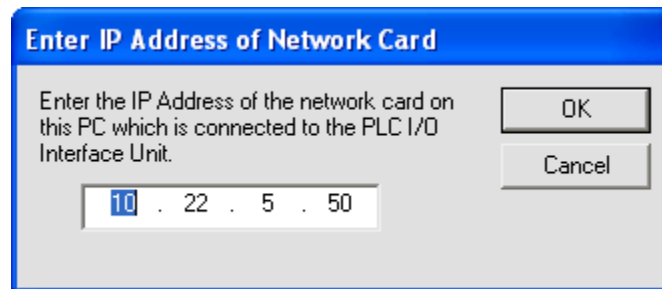
- 4. IC660BPM100 [127]

Description	Access
Block Configuration	
Configuration Protect (Read Only)	Read Only
Output Timeout	Read / Write
CPU Redundancy	Read / Write
BSM Present	Read / Write
BSM Controller	Read / Write
BSM actual state (Read Only)	Read Only
BSM Forced (Read Only)	Read Only
Input Data length (bytes): always 38	Read / Write
Output Data length (bytes): always 2	Read / Write
Configuration Data length (bytes): always 26	Read / Write
Diagnostic Data length (bytes): always 4	Read / Write
Potential Transformer Connection	Read / Write
Number of Potential Transformers [1-3]	Read / Write
Number of Current Transformers [1-3]	Read / Write
Power Units	Read / Write
PT Turns Ratio (1.0 to 2730.0[:1])	Read / Write
CT Turns Ratio (1 to 6550[:1])	Read / Write
NCT Turns Ratio (1 to 655[:1])	Read / Write
Overcurrent Level (1 to 32767A)	Read / Write
Aux. Overcurrent Level (1 to 4600A)	Read / Write
Sign for VARS and Power Factor	Read / Write
Send Extra Calculated Data	Read / Write

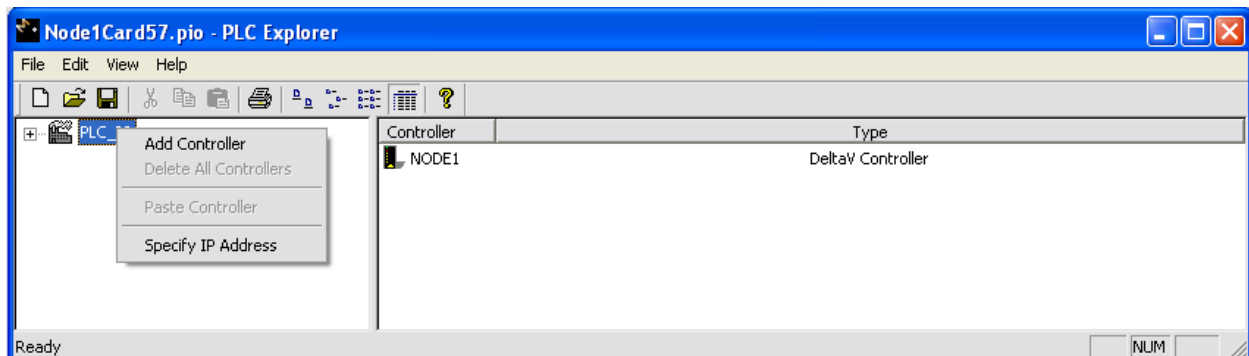
11 Appendix C – Setting up New PLC IO Unit

Before using a new PLC IO unit, the device must be configured using a private network. The factory defaults for each unit are as follows:

- IP Address: 10.16.6.1
 - Subnet Mask: 255.255.252.0
 - Default Gateway: 0.0.0.0
1. Before starting, a private network must be set up. This network must contain a computer with IP Address 10.16.6.100.
 2. Each PLC unit must be configured separately. Only one unit should be powered on while connected to the network.
 3. Launch the PLC Explorer by selecting:
Start->Programs-> PLC Explorer ->PLC Explorer.
 4. The first time you launch the software the program will launch the following dialog. Enter the IP Address of the NIC (network interface card) which connects the PC to the PIO Ethernet Network. During setup, the computer's NIC card must be 10.16.6.100, therefore enter this into the dialog and press OK. If this is not your first time starting PLC Explorer read the next step for how to specify/modify your NIC's IP Address.

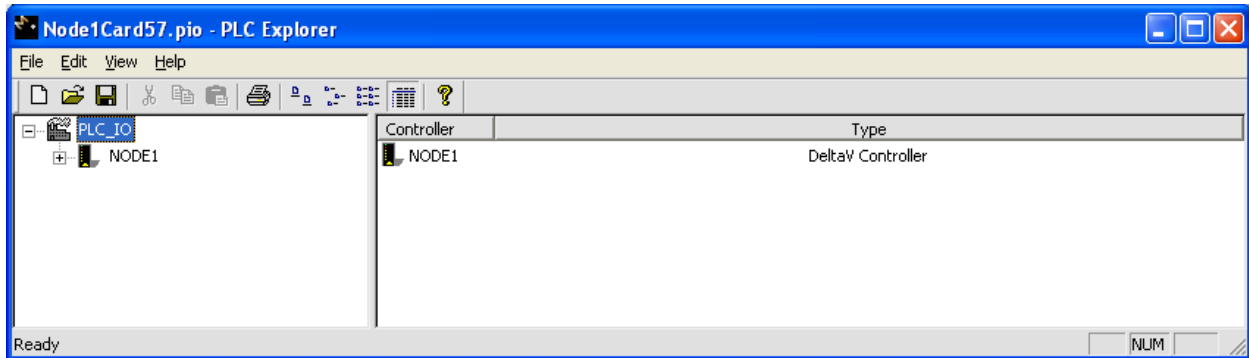


5. After Clicking OK, the program will display its main dialog.

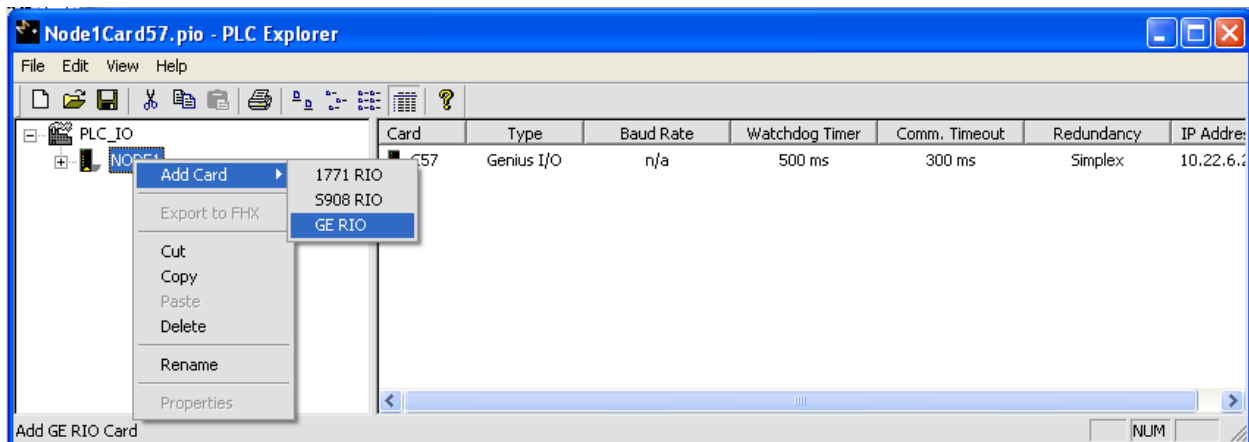


6. By Right Clicking on the PLC_IO Icon, a menu will be displayed currently showing to available options. The first option is to Add a Controller and the second option will allow you to specify/modify the IP Address of the NIC card which connects the PC to the PIO network as shown in step 4.

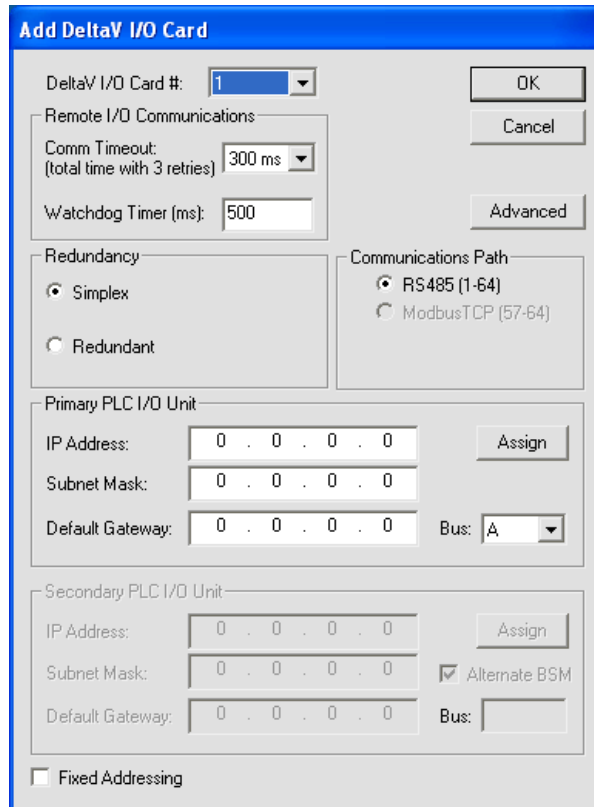
- At this point you should have your IP Address set correctly to 10.16.6.100. Next, right mouse click on PLC_IO and click Add Controller. The controller will be added under the PLC_IO icon as shown in the following picture. For now, leave the name as NODE1.



- Right-mouse click on the Controller object (NODE1). From the menu presented, select the Add Card and then the card type.



- Select the GE-RIO card type. This will launch the Add DeltaV card dialog as follows:



Add DeltaV I/O Card

DeltaV I/O Card #: 1

Remote I/O Communications

Comm Timeout: (total time with 3 retries) 300 ms

Watchdog Timer (ms): 500

Redundancy

Simplex

Redundant

Communications Path

RS485 (1-64)

ModbusTCP (57-64)

Primary PLC I/O Unit

IP Address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Default Gateway: 0 . 0 . 0 . 0

Bus: A

Secondary PLC I/O Unit

IP Address: 0 . 0 . 0 . 0

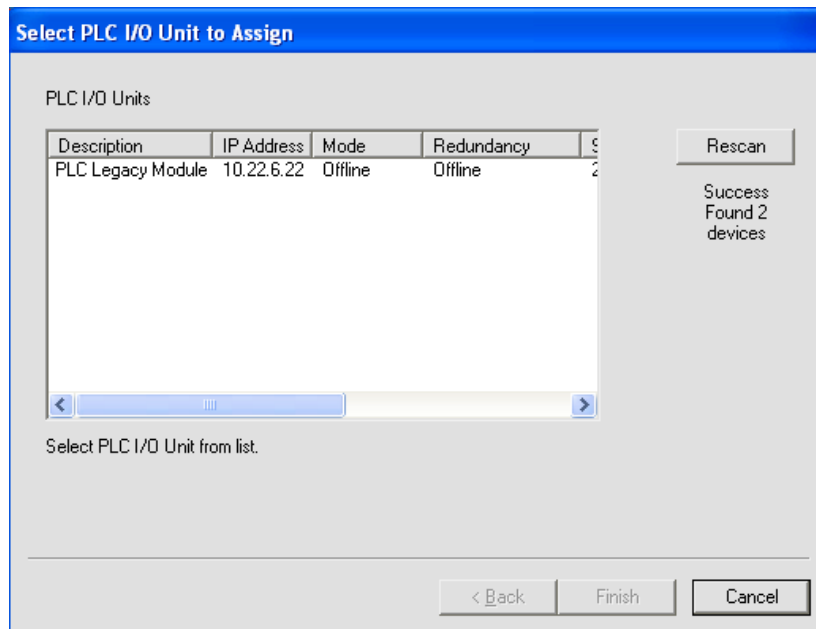
Subnet Mask: 0 . 0 . 0 . 0

Default Gateway: 0 . 0 . 0 . 0

Bus:

Fixed Addressing

10. Click the Advanced button to launch the following Dialog.



Select PLC I/O Unit to Assign

PLC I/O Units

Description	IP Address	Mode	Redundancy	Serial
PLC Legacy Module	10.22.6.22	Offline	Offline	2

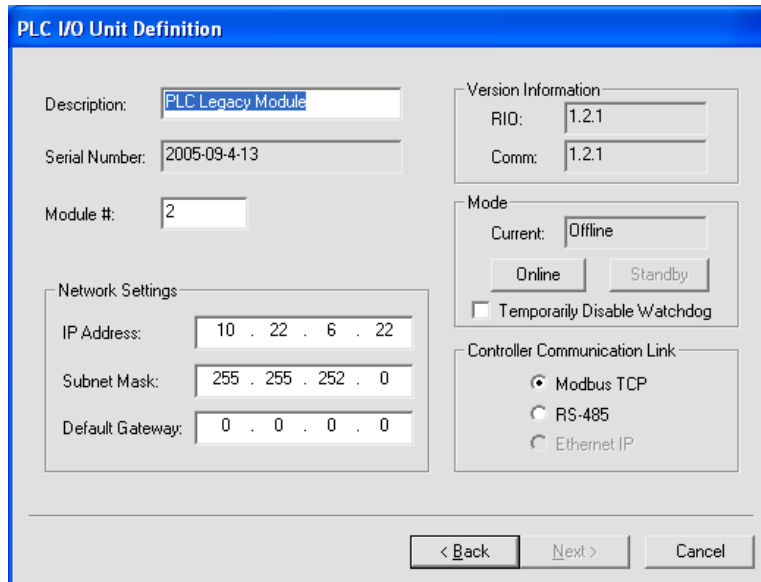
Rescan

Success Found 2 devices

Select PLC I/O Unit from list.

< Back Finish Cancel

11. Select the Module to modify and click Next.



PLC I/O Unit Definition

Description:

Serial Number:

Module #:

Version Information

RID:

Comm:

Mode

Current:

Temporarily Disable Watchdog

Network Settings

IP Address: . . .

Subnet Mask: . . .

Default Gateway: . . .

Controller Communication Link

Modbus TCP

RS-485

Ethernet IP

12. During this initial configuration, temporarily disable the watchdog time by clicking the corresponding check box. Read the Warning, and click OK. The Description and Module # are used only for the user to distinguish PLC Units. Next change the Controller Communication Link to RS-485. Finally change the Network Settings to match the network settings of the network intended to implement the PLC Unit. When you are finished click Apply. The PLC Unit will reboot and finalize your configuration settings.

13. To Configure another PLC Unit, connect another PLC Unit to the network and return to step 10.