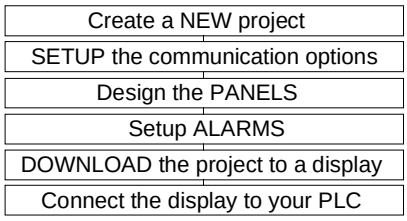
Communications User's Manual for QuickDesigner

Communications

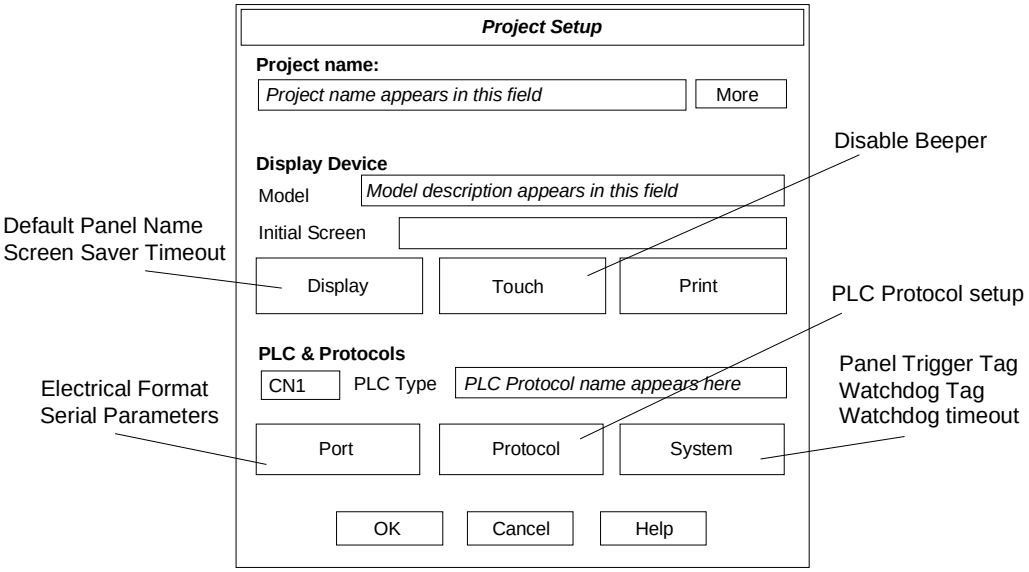
Introduction

The communications manual is part of the documentation set for QUICKDESIGNER software.

The process of designing panels, loading the panels into a display device and connecting the display to a PLC is simple. The following diagram shows the basic steps.



The first step is to create a new project by selecting a project name then selecting the display device. The next step is to select the communications options for your type of PLC. The diagram illustrates the Project Setup dialog box.



Many of the selections are options and are not necessary for a basic configuration. Most of the selections have default settings, which are typical settings for most projects. All of the Project Setup selections are outlined in the following sections.

Once the setup is complete, the panels for the project are created. The panels contain the push buttons, pilot lights, and other panel objects. When the panels are completed, they are downloaded into the target display, along with the driver for your PLC type. The PLC is then connected to the display and the project is complete.

Communication Protocols

There are several steps required to set up communications between the target display and a PLC. The target display must be loaded with a driver that is specific to your PLC. The display must also be loaded with information about how the PLC is configured for serial data transmission with the target display. This section will give you an overview of the required steps.

NOTE

This manual documents the PLC protocols that are supported by the QuickDesigner and QuickPanel products. PLC model types that are used in this manual are listed as examples only and not necessarily a limitation on the PLC types that are supported by the software.

If a particular PLC model is not listed or detailed in this manual, please consult your PLC vendor or Total Control Technical Support to verify if a listed QuickDesigner protocol can be used.

Display Device Setup

The target display must have a PLC protocol downloaded to it so it knows what kind of PLC it is talking to. The PLC protocol file that is downloaded is called an *executable file*. *QUICKDESIGNER* software has a download routine called *QUICKCOURIER* that is used to make the connection to the target display and handle the download operation. To start *QUICKCOURIER*, you click the **Download** button.

Target Display Condition

Beginning with version 1.06 software, *QUICKCOURIER* has the ability to read the display device status and determine which protocol, if any, has been loaded. Once *QUICKCOURIER* reads the status, it can automatically download a new application, including a new display device executable file if necessary.

NOTE

If you are upgrading to a new version software, you must download a new display device executable file. A test for the latest version is done automatically when you download a new project.

New factory units do not have a display device driver installed. When you apply power to a new unit, it will display a message indicating it is ready to receive a display device executable file.

QUICKDESIGNER Software

The *QUICKDESIGNER* software running in your computer is used to configure a target display for operation with your PLC. The configuration information includes the name of the panel that appears after a power cycle, screen saver timeout, the serial port parameters, and other option settings. Without the proper configuration information, the target display will not communicate with your PLC.

The *QUICKDESIGNER* software is also used to design panels that will be displayed on the target display. Panels contain operators such as push buttons, pilot lights and bar graphs. The download operation is used to send panel designs and configuration information to a target display.

For each PLC there is a unique protocol driver. You must have the correct protocol driver loaded into the target display in order to communicate with your PLC. The protocol file is called a display device executable file. The condition of your target display will determine if the download operation will include sending the display device executable file.

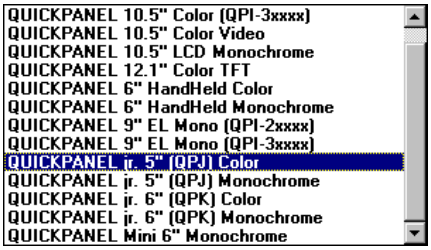
Creating a New Project

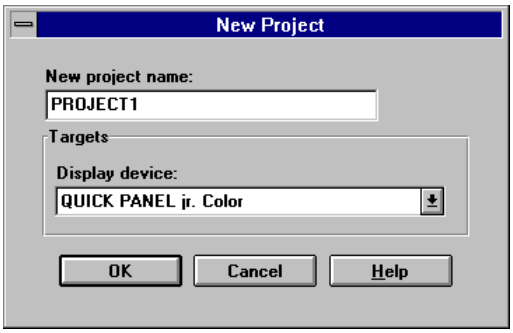
The following sections illustrate all the dialog boxes and option selections necessary for a project. Remember that some of the selections are optional and are not necessary for a basic project. A good tip is to start with a simple project, then add the options after you have tested the simple project and are satisfied it is working properly.

New Project Dialog Box

Enter the New Project name in the New Project dialog box. The project name will allow you to easily identify it later. Select a target display device and click the OK button when done.

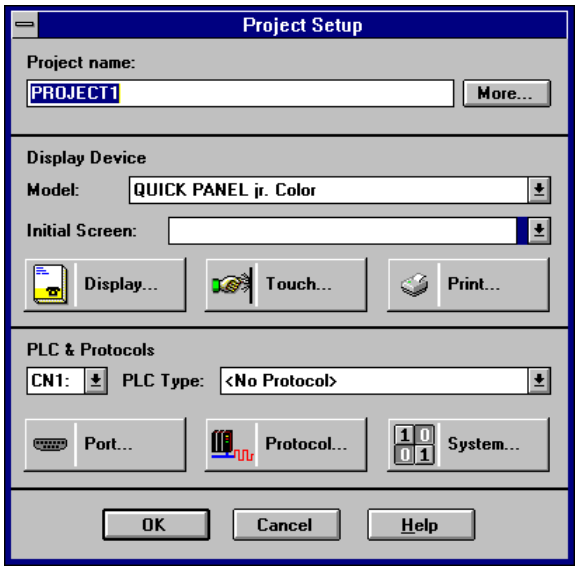
The product label contains the model number and serial number. Below is a sample list of models.





Project Setup Dialog Box

The Project Setup dialog box can be displayed by clicking the Setup button. It will automatically appear when you start a new project and click the OK button. The dialog box is divided into three major sections.



Project Name

The *Project name* section displays the project name in a text field at the top of the dialog box. If you click the More button, the Additional Project Setup dialog box will appear. This additional section is used to keep project notes and the project author.

Model

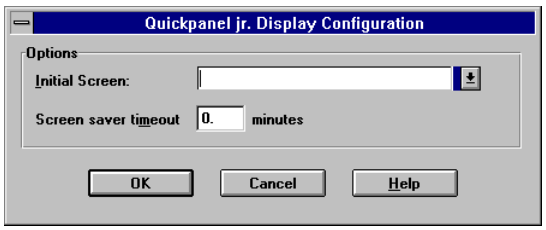
The *Display Device Model* list box will indicate which display model you selected for the current project. You can change the display model by clicking the down arrow next to the Model text field and selecting a new model from the drop down list.

Initial Screen List Box

This is the panel that will appear after a power cycle has occurred on the target display. See Initial Screen on page 5.

Display Button

Clicking the display button will bring up the Display Configuration dialog box.



Initial Screen

This is the panel that will appear after a power cycle has occurred on the target display. When you first begin a project, this list box is empty. If you know the name of the power-up screen, enter it now. A good tip is to come back to this dialog box after all your panels are completed and select one of the panel names from the list box. If you leave the *Initial Screen* entry blank, the target display will display the panel with ID = 1.

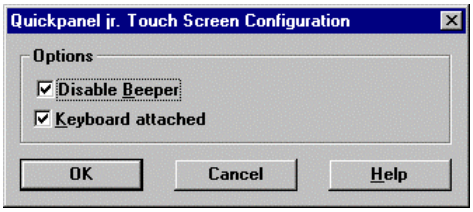
NOTE If the initial screen name does not match a name in the drop-down list box, the display screen will go black after the panels are downloaded. Choose the initial screen name from the list box to insure you have the correct name.

Screen Saver Timeout

The screen saver feature will turn off the screen after a selected time period. The timer is restarted each time the screen is touched. When the screen is off, touch the screen to turn the display back on. The touch will not affect panel operators. Enter the timeout period in minutes. The range is 1 to 255 minutes.

Touch Button

Clicking the Touch Button will bring up the Touch Screen Configuration dialog box.



Disable Beeper

The beeper sounds each time an active screen operator is touched. You can disable the beep by checking the Disable Beep checkbox. You may want to disable the beeper when working in an office environment.

Keyboard Attached

If you have installed an optional keypad such as the HMI-KPN-20x, click the checkbox.

Print Button

This button brings up the printer setup dialog box.

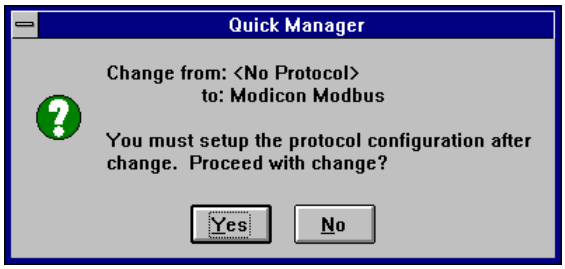
PLC Port

There is currently only one active PLC interface port. The port is usually labeled CN1/SIO.

PLC Type

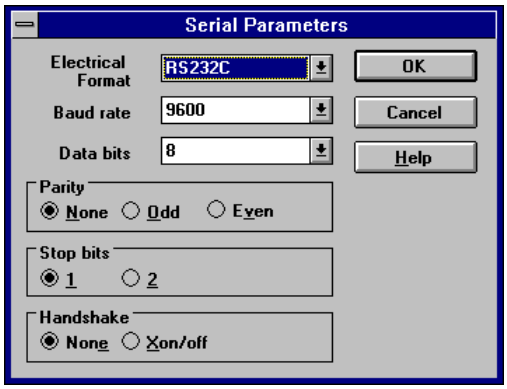
The *PLC Type* section will indicate which PLC protocol you selected for the current project. You can change the PLC type by clicking the down arrow next to the PLC Type text field and selecting a new type from the drop down list. The protocol selected here will determine the dialog box that will be displayed when you click the Protocol button.

If you select a protocol different from the current protocol shown in the list box, the following prompt is displayed. The prompt reminds you that the protocol you have just selected must be setup after the change. Click Yes to acknowledge the prompt.



Port Button

Click the Port button to display the Serial Parameters dialog box.



Serial Parameters

The Serial Parameters dialog box is used to change target display serial communication parameters, such as Baud rate, data bits, etc. Make sure the target display and PLC have the same communication parameters. A majority of interface problems are related to improper communication settings and cables.

Select the Electrical Format for your application. The options are RS232, RS422/485 Half or Full Duplex. This is the format for the display serial port.

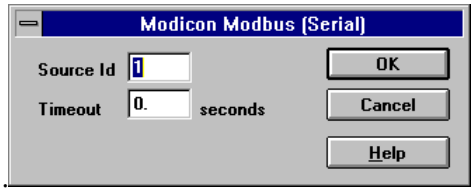
Verify the default settings for the serial port are the same as those required by your communication link. A typical default setting might be 9600 Baud, 8 Data Bits, no parity, 1 Stop Bit and no handshake.

Click the OK button to close the dialog box and return to the Project setup dialog box.

Protocol Button

This button will display the dialog box that is associated with the selected PLC type. Each PLC has certain setup requirements that must be selected before it will communicate properly with the display device.

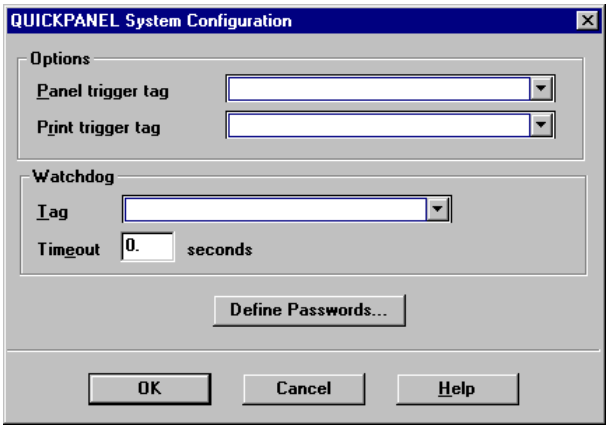
The drawing shows the setup dialog box for Modicon Modbus. You can change the Source ID and the Timeout. Other protocols have different options. Each PLC type has a dedicated chapter in this manual. Verify the settings in the setup dialog box are correct and click the OK button.



NOTE Each PLC protocol has a dedicated chapter in this manual. In each chapter there is a configuration page that will guide you in selecting the proper dialog box entries. Make sure you select the proper display type and PLC type in the New Project menu.

System Button

This button will display the System Configuration dialog box, which is used to select the panel trigger tag and setup the watchdog register. The Define Passwords button displays the password settings dialog box, which is used to establish passwords and password levels.



Panel Trigger Tag

The *Panel trigger tag* is a register in the PLC that can be used to select a panel for display. Each panel has a unique ID number which is displayed when you save or open a panel. See Menu commands in the *QUICKDESIGNER* section.

When the panel ID number is put in the PLC trigger register, the selected panel will be displayed. The panel change occurs ONLY when the value in the register changes and the change overrides anything else being displayed. If you leave *Panel trigger tag* blank, panel selection is done using the GOTO PANEL operator.

You can use a combination of Panel trigger tag and GOTO PANEL operators. The operator can select different panels by pressing a GOTO PANEL button, and the PLC can select a panel by changing the panel ID number in the Panel trigger register. In this situation, the GOTO PANEL operator will write the panel ID number to the Panel trigger register to initiate the panel change. The important point to remember is that a new panel is displayed when a change occurs in the PLC trigger register.

NOTE If you use Panel Trigger Tag, you should also select a Default Panel. If the Panel Trigger Tag register in your PLC is equal to 0 or an unused panel ID number, and you don't use a Default Panel, the display screen will be blank.

Print Trigger Tag

The *Printl Trigger tag* is a register in the PLC that can be used to print the current screen when the PLC tag bit goes high. This operation will be invisible to the user. The printer tag is set to zero after a print is completed.

Watchdog Tag

The Watchdog tag selection is a register in the target PLC that is written to in intervals determined by the Timeout setting. The target display will write this register in the selected time period. Your PLC requires additional logic to examine and test the data in order to determine if a communication fault has occurred.

For example, if the time period is set to 60 (1 min), the display will write (FF) to the designated PLC register. The PLC logic should first test to see if there is a value in the register. If the register is loaded with some value, then set it to 0 and wait for a time period longer than the timeout. Check the register again. If the comm link is good, there should be a value in the register again. If the register is still equal to 0, then you can assume the comm link has a fault.

Hardware Reference

This section contains information about the serial interface port and the download port. For additional hardware reference data, please see the Hardware Reference manual.

Serial Interface Port

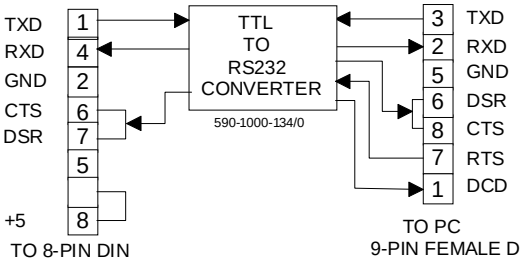
The serial interface port connects the *QUICKPANEL*™ to your PLC. Factory cables are cut to approximately 12', which is suitable for most applications. If you need a longer cable, you can order one from Total Control Products, Inc. or fabricate your own. Cable diagrams can be found in the Hardware Reference manual and in each PLC chapter. Remember that RS232 cables are reliable up to approximately 50'. The serial interface pin assignments are shown in the following table.

PIN #	NAME	PIN #	NAME
1	FG Frame Ground	14	Reserved
2	TXD Transmit Data	15	TXB Sending Data -
3	RXD Receive Data	16	RXB Receiving Data -
4	RTS Request to Send	17	No connection
5	CTS Clear to Send	18	CTSB Clear to Send -
6	Reserved	19	DTRB Request to Send -
7	GND Signal Ground	20	DTR Data Terminal Ready
8	CD Carrier Detect	21	CTSA Clear to Send +
9	TRMX Terminator RXA	22	DTRA Request to Send +
10	RXA Receiving Data +	23	Reserved (BUZZGND)
11	TXA Sending Data +	24	Reserved
12	No connection	25	Reserved (BUZZOC)
13	No connection		

Download Port

The download port, also known as the Tool/CN3 port, has two functions. The primary use is to download application files from a computer to the target display. The secondary use is to print alarm messages to a serial printer. The printer option in the configuration menu is used to enable the download port (Port 1) as a printer port. The download port uses TTL signal levels and requires conversion to RS232. The HMI-CAB-C49 cable, which is used for downloading files, will convert the TTL signals to RS232. The HMI-CAB-C105 cable is used to connect a printer to the download port. Both cables are equipped with a 9-pin D connector that is AT compatible. The download port connector is an 8-pin mini-DIN style. The port settings are fixed at 9600 Baud, 8 bits, no parity. The pin assignments for the C49 cable are shown in the following drawing.

HMI-CAB-C49



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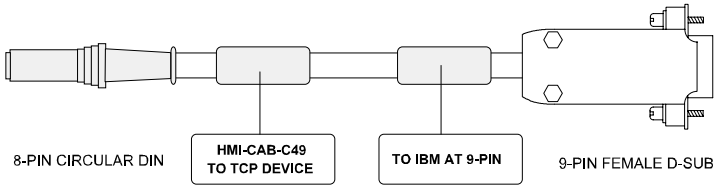
Download

The download process involves connecting your computer to a target display and transferring communication and panel information to the target display. The download operation is done after you have selected the PLC protocol, setup the communication options, and designed at least one panel. Once the download operation is complete, the display is connected to your PLC and the display becomes the operator interface.

HMI-CAB-C49 Cable

This cable connects your computer to the circular DIN connector on the target display. This cable is used to download files created by *QUICKDESIGNER* software in your computer to the target display.

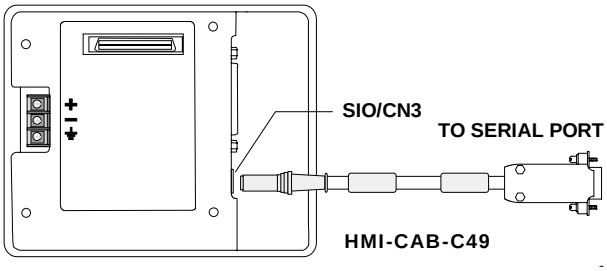
The 9-pin AT connector housing contains an electronic circuit that makes the signals from both devices compatible. Most cable drawings in this manual include a wiring diagram. Since this cable also includes custom electronics, no wiring diagram is supplied.



HMI-CAB-C49

C49 Cable Connection

The HMI-CAB-C49 cable is connected to the circular DIN connector port on the target display as shown below. The 9-pin connector is attached to a serial port on your AT compatible computer.



Allen-Bradley

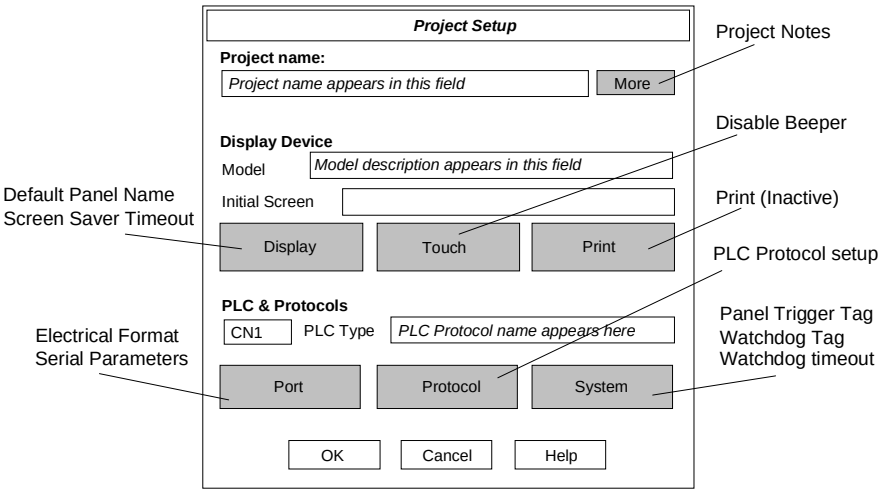
Allen-Bradley SLC 500

Setup for using an A-B SLC 500

Use the following procedure to ensure your target device is setup properly for the Allen-Bradley SLC 500. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB SLC DH485).** See PLC Type on page 5.

Port Button

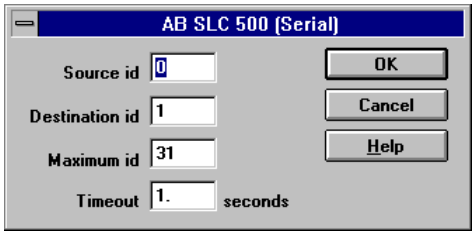
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **AB SLC DH485.**

Elect. Format	RS422 Half Duplex (When using the HMI-CAB-C83 Cable)
or	
Elect. Format	RS232 (When using the HMI-CAB-C84 Cable)
Baud Rate	19200
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

The Source ID is the target display address on the DH485 network. The Destination ID is the PLC address where the target display will get variable data. The Maximum node ID is the highest available address on the DH485 network. The maximum ID should be set to the lowest possible number. Enter Timeout in seconds. Click OK to return to the Project Setup dialog box.



Protected Files

Processor files with Owner set cannot be written to by QUICKPANEL™

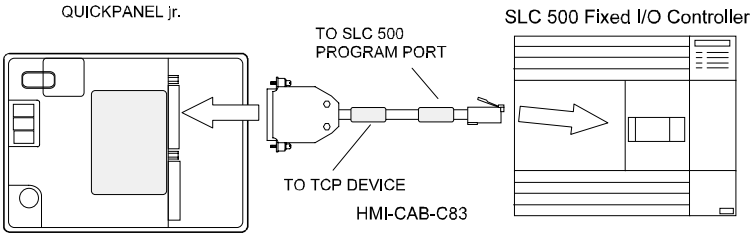
The Set and Clear Owner function allows a terminal to "own" one or more processor files on the network. Ownership means that as long as the owner is active on the network, other terminals can not access the on-line functions of the owned processor files. Note that only a programmer can own a node.

In the following example, station 1 is owned by node 0. Notice station node 1 has a max. address 31 followed by a forward slash and then the ownership node. If you see this on the display, a *QUICKPANEL*™ cannot write to that station. You must clear the owner.

0 TCP (31)
1 5/02 (31/0)
2 Term (31)
3

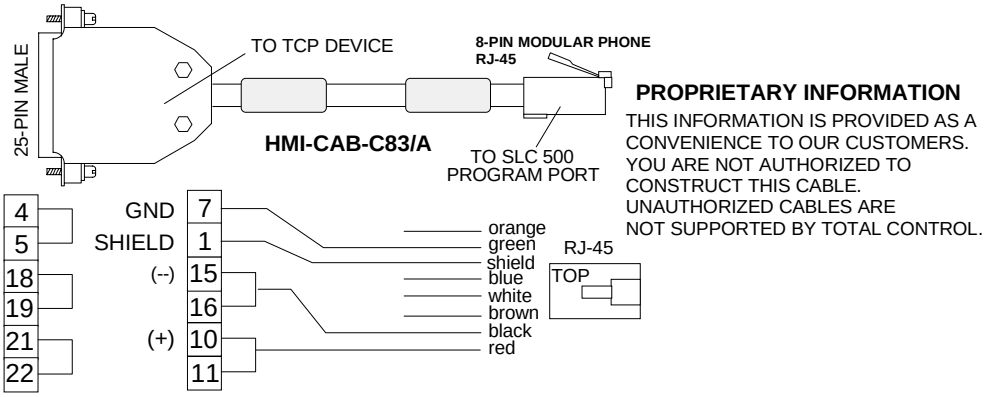
Connecting to the SLC 500

A single point connection is simply one target display connected directly to the program port of a single SLC 500. This connection is made using the HMI-CAB-C83 cable.



HMI-CAB-C83 Cable

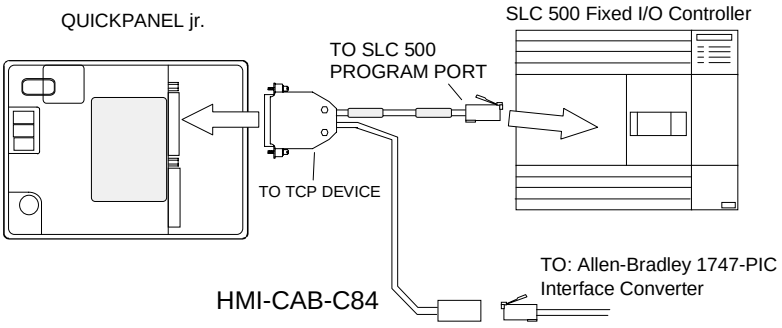
This cable connects the target display serial port to the Allen-Bradley SLC 500 Programming Port.



SLC 500 Network Connection for Programming Equipment (DH485)

This connection allows two devices to be connected to the PLC. In this case, a programming terminal can be connected to the PLC using a 1747-PIC Interface Converter connected to the HMI-CAB-C84 cable.

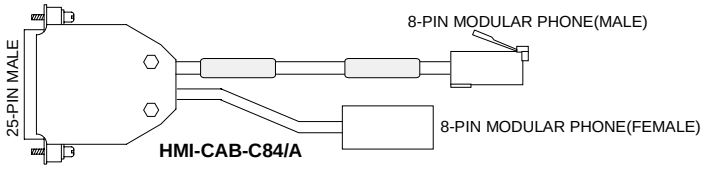
The drawing shows the connections for adding a second device to the network connection.

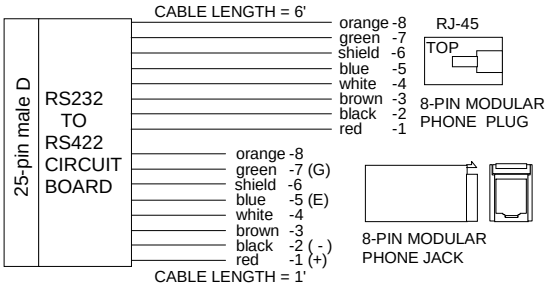


HMI-CAB-C84 Cable

This cable connects the target display serial port to the Allen-Bradley SLC 500 Programming Port. The cable is designed to allow connection to additional devices such as an Allen-Bradley 1747-PIC Interface Converter.

Warning: The maximum length of this cable is 6 feet. Do not attempt to make it longer.





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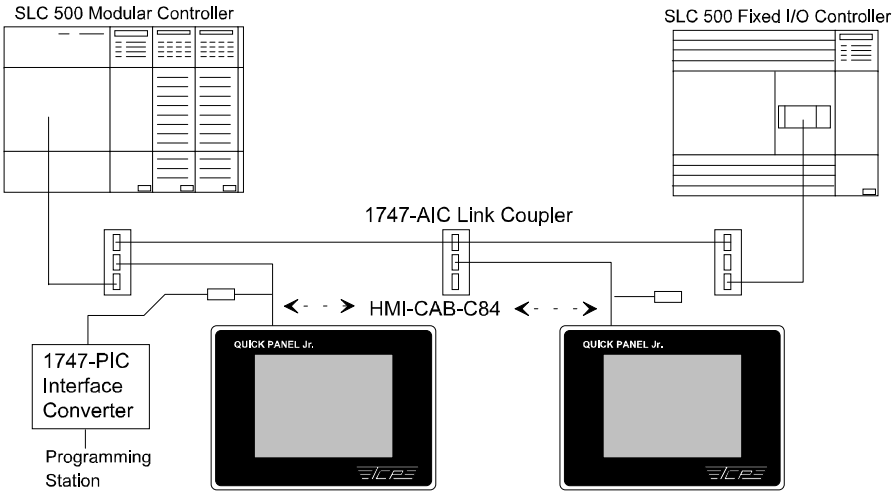
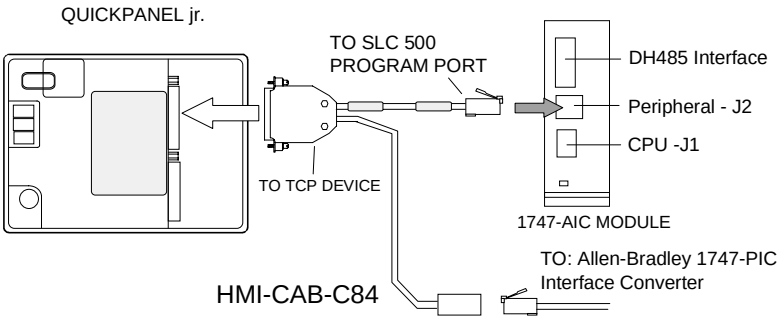
THE RS232 CONVERTER CIRCUITS ARE CONTAINED ON A CIRCUIT BOARD WITHIN THE 25-PIN D-SHELL. THE ELECTRONIC CIRCUIT PROVIDES NETWORK CONTROL. THE CIRCUIT DIAGRAM IS PROPRIETARY INFORMATION. THE CABLE IS LICENSED FROM ALLEN-BRADLEY.

SLC 500 Network Connection using 1747 AIC Link Couplers (DH485)



Connecting to a 1747 AIC Module (DH485)

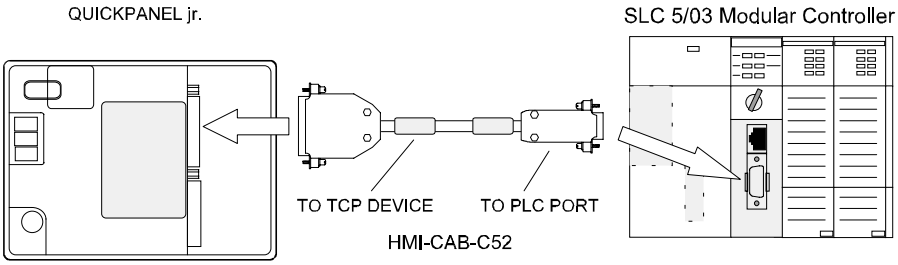
Connect the HMI-CAB-C84 cable to the 1747 AIC Module as shown below.



SLC 5/03 and SLC 5/04 Channel 0 Connection

The SLC 5/03 and SLC 5/04 processors let you operate DF1 communication protocol by means of the RS-232 communication port, channel 0. In addition, the SLC 5/03 and SLC 5/04 processors support DH485 communication via channel 0.

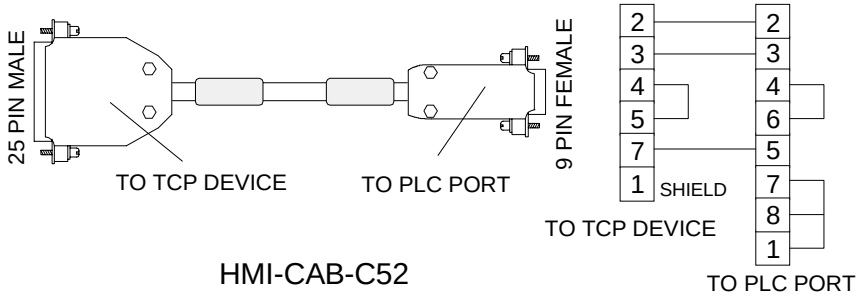
The 9-Pin connector on the SLC 5/03 and SLC 5/04 processors is programmable. The SLC 5/03 and SLC 5/04 processors can be configured for port-to-port connection using the HMI-CAB-C52 cable. Channel 0 must be set up as a DH485 master. This configuration can only read/write variables in the local PLC. Since it is not dependent on network loading, this configuration will provide quick display updates.



HMI-CAB-C52 Cable

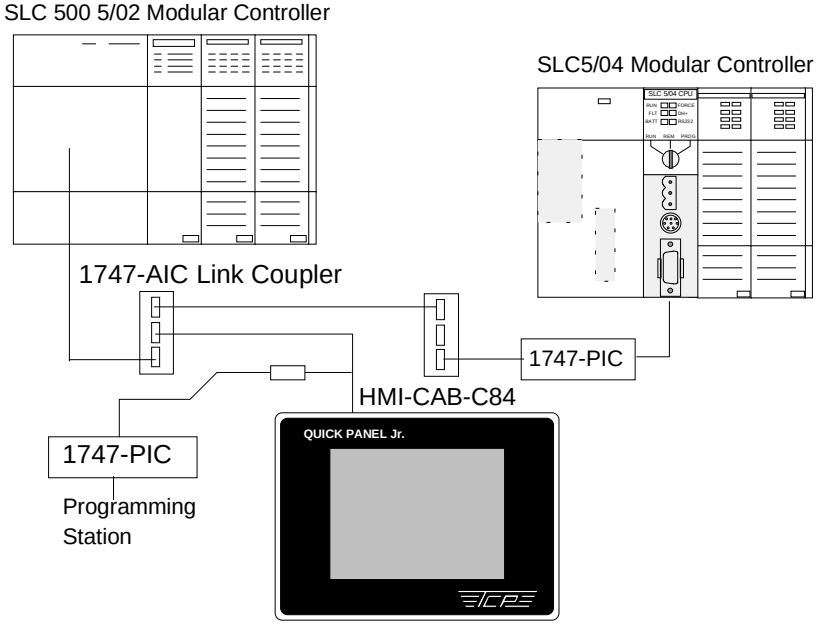
This cable is used to connect the target display to a SLC 5/03 and SLC 5/04 RS232 Channel 0 Port.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



SLC 5/03 and SLC 5/04 DH485 Connections

You can connect channel 0 of the SLC 5/03 and SLC 5/04 modules to the 1747-PIC to make a connection to the DH485 network.



Setup for using a SLC 5/03 and SLC 5/04 Channel 0

The procedure for setup of an AB SLC 5/03 Channel 0 is basically the same as for SLC500 DH485. The *Electrical Format* must be set to RS232.

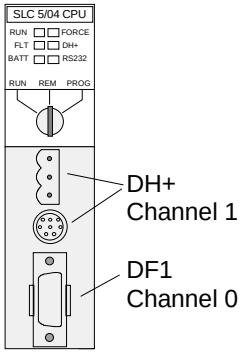
SLC 5/04 Data Highway Plus

Data Highway Plus implements peer-to-peer communication with a token-passing scheme to rotate link mastership among a maximum of 64 nodes. Since this method does not require polling, it helps provide time-efficient reliable data transport.

The SLC 5/04 processor lets you operate DH+ communication protocol by means of the DH+ communication channel 1. The SLC 5/04 also supports full-duplex DF1 protocol using the DF1 channel 0.

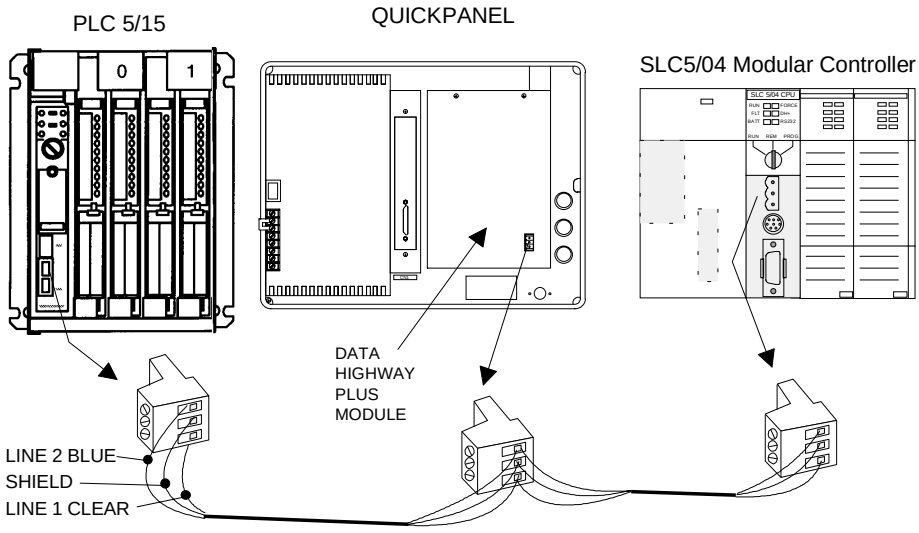
The 3-pin connector is for actual DH+ communication and the 8-pin connector is for monitoring DH+ communication.

The DH+ LED provides an indication of the condition of the network communication. The color can be green or red. A steady on condition indicates the processor is actively communicating on the network. Flashing green indicates there are no active nodes on the network. Flashing red indicates there are duplicate nodes on the link with the same node address.



SLC 5/04 DH+ Connection

The drawing shows a possible configuration for DH+.



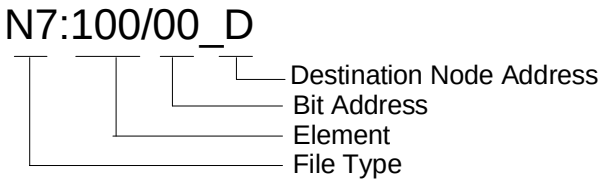
SLC 500 Tag Variables for DH485 Protocol

The following chart lists the legal tag variable names that can be used with the SLC 500 series. The target display talks to the SLC500 using the DH485 protocol. The DH485 protocol requires each device to have a node address. The Source ID is the target display node address and the Destination ID is the node address for the SLC. (See the "Setup for using an AB SLC 500 PLC" section for details about entering the source and destination ID's).

When there is a single point connection between a target display and a SLC500, the destination ID (node address for SLC) becomes the default address for all variables. That is, if you use the tag variable N7:100, the target display knows that this variable is located at the destination node address.

When the target display is connected to a DH485 network that includes multiple SLC nodes, there is an optional variable naming element that will allow you to read information from any SLC node. The additional element is _D, where the underscore D indicates a node address other than the Destination ID node address.

In this example, the Source ID (target display address) has been set to 0 and the Destination ID (SLC node address) has been set to 1. There is an additional SLC on the DH485 network located at node address 3. To read information from node address 1, the variable would be N7:100. Remember that the Destination ID is the default node address. To read information from node address 3, the variable would be N7:100_3. The general format for tag variables is shown below.



SLC 500 Tag Variables for DH+ Protocol

The DH+ tag variables are the same as the PLC5 tag variables except for the following items.

1. You cannot read or write Input (I) or Output (O) variables in the SLC 5/04.
2. The SLC 5/04 can read/write string variables (ST) while the PLC 5 cannot.

Tag Variable Table

File Type	File #	Element	Bit Range	Write	Value
O0:00	0	0-255 (dec)	/0 - /15	Y	-32768 to 32767
OD:00	0	0-255 (dec)	/0 - /15	Y	-32768 to 32767
OO:00	0	0-377 (oct)	/0 - /17	Y	-32768 to 32767
I1:00	1	0-255 (dec)	/0 - /15	N	-32768 to 32767
ID:00	1	0-255 (dec)	/0 - /15	N	-32768 to 32767
IO:00	1	0-377 (oct)	/0 - /17	N	-32768 to 32767
S2:00 or S:	2	0-15 5/01(1)	/0 - /15	N	-32768 to 32767
		0-32 5/02(1)			
		0-83 5/03(1)			
B3: or Bn:	n:=9-255	0-255	/0 - /15	Y	-32768 to 32767
T4: or Tn:	n:=9-255	0-255.ACC		Y	0-32767
		0-255.PRE		Y	0-32767
		0-255.EN		Y	0-1
		0-255.TT		Y	0-1
		0-255.DN		Y	0-1
C5: or Cn:	n:=9-255	0-255.ACC		Y	-32768 to 32767
		0-255.PRE		Y	-32768 to 32767
		0-255.DN		Y	0-1
		0-255.CU		Y	0-1
		0-255.CD		Y	0-1
		0-255.OV		Y	0-1
		0-255.UN		Y	0-1
		0-255.UA		Y	0-1
R6: or Rn:	n:=9-255	0-255.LEN		Y	-32768 to 32767
		0-255.POS		Y	-32768 to 32767
		0-255.DN		Y	0-1
		0-255.EN		Y	0-1
		0-255.ER		Y	0-1
		0-255.UL		Y	0-1
		0-255.IN		Y	0-1
		0-255.FD		Y	0-1
N7: or Nn:	n:=9-255	0-255	/0 - /15	Y	-32768 to 32767
ND7: or NDn:	n:=9-255	0-255		Y	-2147M to 4294M
NL7: or NLn:	n:=9-255	0-255		Y	-2147M to 4294M
F8: or Fn:	n:=9-255	0-255	NS	Y	-2147M to 4294M
D9: or Dn:	n:=9-255	0-255	NS	Y	0-9999
A9: or An:	n:=9-255	0-255	NS	Y	Null - ASCII
ST9: or STn:		1-9999	NS	Y	0-65535

Note 1: File numbers other than the default value shown are 9-255. Ex: B5:0 would be invalid.
Note 2: Address range for I and O are in decimal as maped in the M files.
Note : Address Max for S is dependent on the PLC.
Note: Bits may wrap into other words. Ex: B3:5/41 = B3:7/9
Note: Integer types (range –32768 to 32767) may be configured as unsigned (range 0 to 65535)
Note: Node ID Max. is 254 for the SLC DF1 and 31 for the SLC 485.
Note 6: For NL7:0, N7:0 is the MSB and N7:1 is the LSB. For ND7:0, N7:1 is the MSB and N7:0 is the LSB.

Additional Information

Network Performance

The following are major configuration factors that have a significant effect on network performance:

- The number of nodes on the link
- The addresses of those nodes
- The maximum node address selection

The number of nodes on the link directly affects the data transfer time between nodes. Unnecessary nodes slow the data transfer rate. The maximum number of nodes on the link is 32.

The best link performance occurs when node addresses start at 0 and are assigned in sequential order. Also, initiators such as personal computers should be assigned the lowest numbered addresses to minimize the time required to initialize the link. If all nodes are expected to be connected at all times, this is really all you need to do.

The maximum node address parameter should be set as low as possible. This minimizes the amount of time used in soliciting successors when initializing the link. If all nodes are addressed in sequence from 0, and the maximum node address is equal to the address of the highest addressed node, the token rotation will improve by the amount of time required to transmit a solicit successor packet plus the slot timeout value.

NOTE - The SLC500 processors set the maximum node address to 31 when power is cycled increasing initialization and response time of the link.

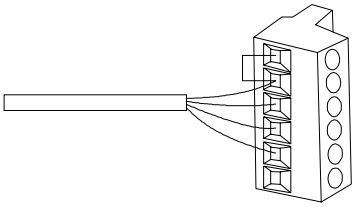
DH-485 Cable

The suggested DH-485 communication cable is BELDEN #9842 cable. The cable is jacketed and shielded with two twisted wire pair and a drain wire.

DH-485 Connections

One (only one) of the Link Couplers at the end of the link must have Terminals 1 and 2 of the link connector jumpered together. This provides an Earth Ground connection for the shield of the communications cable.

Link Couplers at both ends of the link must have Terminals 5 and 6 of the link connectors jumpered together. This connects the termination impedance that is built into each link coupler as required by the DH-485 specification.

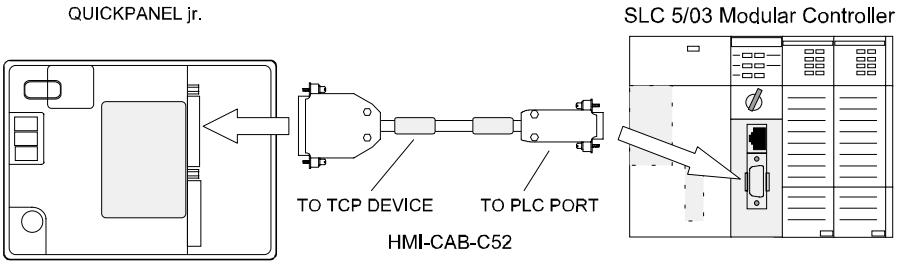


Allen-Bradley SLC 500 DF1

CAUTION Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

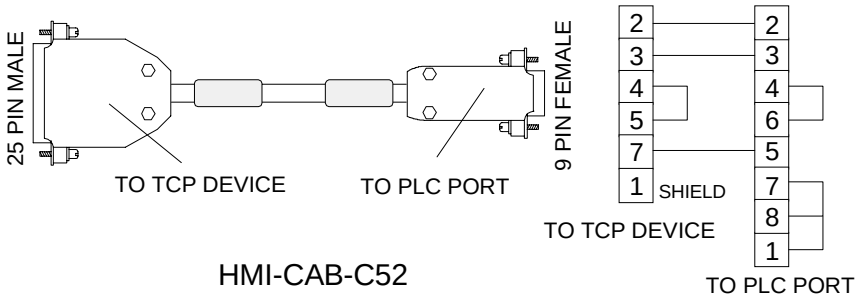
The SLC 5/03 and SLC 5/04 processors let you operate DF1 communication protocol by means of the RS-232 communication port, channel 0.

The 9-Pin connector on the SLC 5/03 and SLC 5/04 processors is programmable. The SLC 5/03 and SLC 5/04 processors can be configured for port-to-port connection using the HMI-CAB-C52 cable. Channel 0 must be set up for DF1 communication. This configuration can only read/write variables in the local PLC. Since it is not dependent on network loading, this configuration will provide quick display updates.



HMI-CAB-C52 Cable

This cable is used to connect the target display to a SLC 5/03 and SLC 5/04 RS232 Channel 0 Port. Make sure the port is set to DF1 protocol.

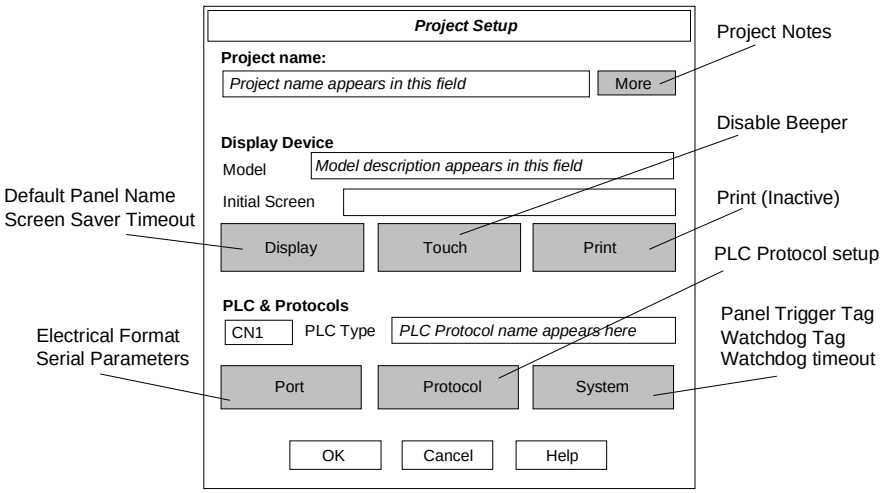


Setup for using an A-B SLC 500 DF1

Use the following procedure to ensure your target device is setup properly for the Allen-Bradley SLC 500 DF1. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB SLC DF1).** See PLC Type on page 5.

Serial Port Parameters

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **AB SLC DF1.**

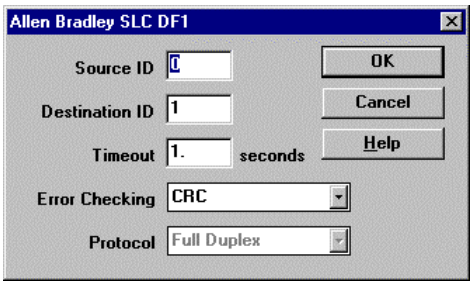
Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

The Source ID is the target display address. The Destination ID is the PLC address where the target display will get variable data. Enter Timeout in seconds. Select error checking (CRC or BCC) to match the PLC. Note the Protocol is currently fixed at Full Duplex. Click OK to return to the Project Setup dialog box.

The drawing shows the setup dialog box for A-B SLC500 DF1.



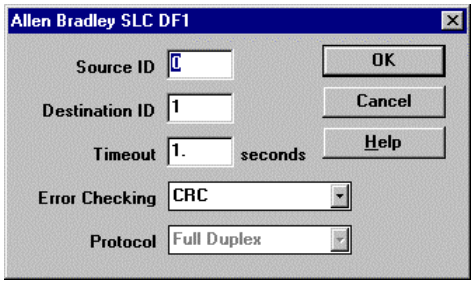
Tag Variable Table

The general format for the tag variables is found on page 18. See the tag variable table on page 19.

Allen-Bradley MicroLogix 1000

The MicroLogix 1000 has an RS-232-C communication port configurable for DF1 protocol for direct connection to a programming device or operator interface. In this configuration, the MicroLogix 1000 is identical to the SLC500 DF1 protocol. To connect a QuickPanel to a MicroLogix 1000 PLC, use the SLC 500 DF1 protocol selection and an HMI-CAB-C106 cable.

The drawing shows the setup dialog box for A-B SLC500 DF1.



The Source ID is the target display address. The Destination ID is the PLC address where the target display will get variable data. Enter Timeout in seconds. Select error checking (CRC or BCC) to match the PLC. Note the Protocol is currently fixed at Full Duplex. Click OK to return to the Project Setup dialog box.

Serial Port Parameters

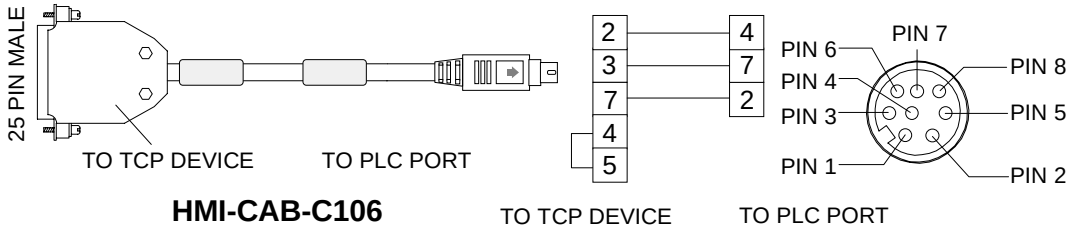
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **AB SLC DF1.**

Elect. Format	RS232
Baud Rate	9600
Data Bits 8	
Parity	None
Stop Bits 1	
Handshake	None

HMI-CAB-C106 Cable

This cable is used to connect the target display to a MicroLogix 1000.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



HMI-CAB-C106 TO TCP DEVICE TO PLC PORT

NOTE: The 8-pin DIN connector requires precise pin alignment before pressing the connector into the housing on the MicroLogix 1000. This is a TIGHT fit and requires some force.

Advanced Interface Converter AIC+

The AIC+ (Advanced Interface Converter, 1761-NET-AIC) provides a simplified, cost effective solution for connecting RS-232 devices to DH-485 networks. Use the AIC+ for communications connectivity with the MicroLogix 1000 DH-485 networking series controller. The AIC+ is also a good choice for providing point-to-point RS-232 isolation.

The AIC+ can replace the 1747-PIC/1747-AIC combination when using channel 0 of an SLC 5/03 or SLC 5/04 processor to access DH-485 or DF1 master-slave networks.

When connecting a QuickPanel to the AIC+ DH485 Port3, you must use the AB SLC DH485 protocol. The drawing shows the setup dialog box for A-B SLC DH485

The Source ID is the target display address. The Destination ID is the PLC address where the target display will get variable data. Enter Timeout in seconds. Click OK to return to the Project Setup dialog box.

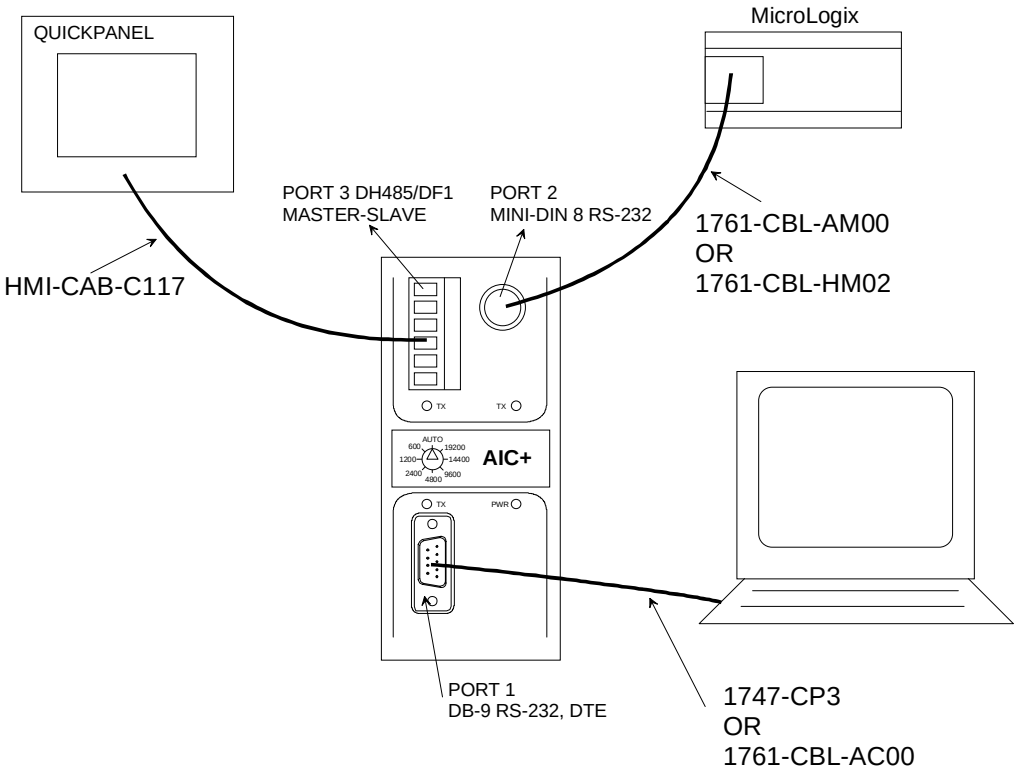
Port 3 Example

This example shows a 3-Node network (not expandable). The QuickPanel is connected to the DH-485 network on the AIC Port 3 using the HMI-CAB-C117 cable.

Serial Port Parameters for Port 3 Setup

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **AB SLC DH485.**

Elect. Format	RS422/485 Half Duplex
Baud Rate	19200
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None



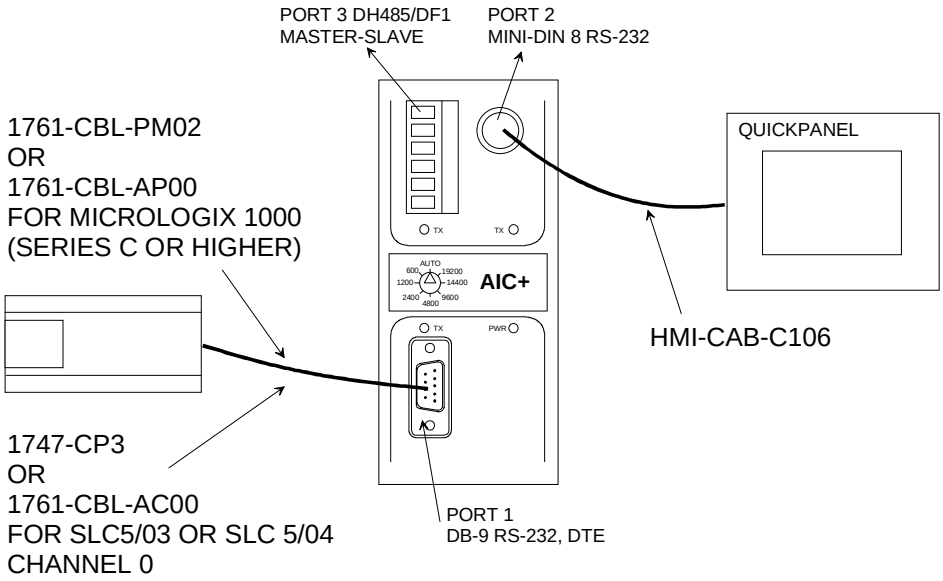
Port 2 Example

This example shows the AIC module as a point-to-point isolator. Here the QuickPanel is connected using RS-232 to Port 2 on the AIC module. A MicroLogix 1000 (Series C or Higher) can be connected to the AIC RS-232 Port 1, or you can connect a SLC 5/03 or SLC 5/04 Channel 0 port to Port 1 on the AIC module.

Serial Port Parameters for Port 2 Setup

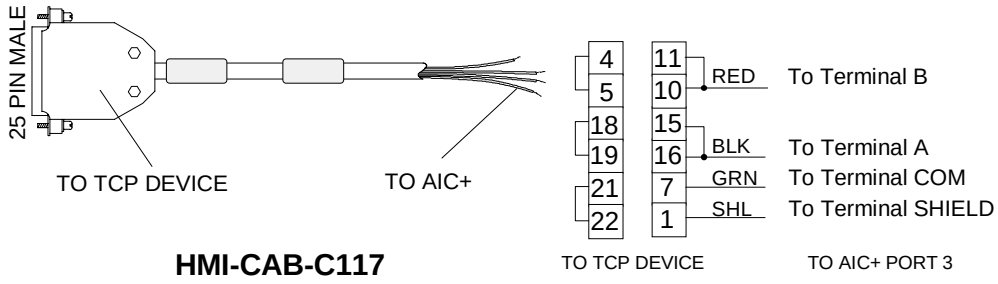
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **AB SLC DH485.**

Elect. Format	RS232
Baud Rate	19200
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None



HMI-CAB-C117 Cable

The AIC+ can connect a QuickPanel through the Port 3 DH-485/DF1 Phoenix Plug using the HMI-CAB-C117 cable.



HMI-CAB-C117

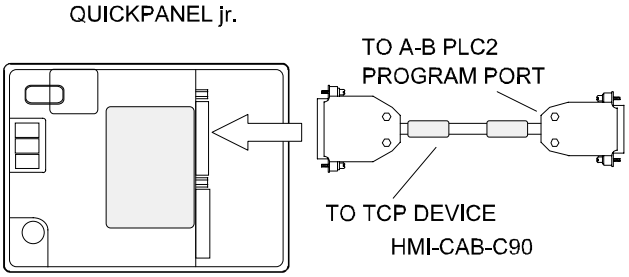
Tag Variable Table

File Type	File #	Element	Bit Range	Write	Value
O0:00	0	0-255 (dec)	/0 - /15	Y	-32768 to 32767 (DELETE)
OD:00	0	0-255 (dec)	/0 - /15	Y	-32768 to 32767 (DELETE)
OO:00	0	0-377 (oct)	/0 - /17	Y	-32768 to 32767 (DELETE)
I1:00	1	0-255 (dec)	/0 - /15	N	-32768 to 32767 (DELETE)
ID:00	1	0-255 (dec)	/0 - /15	N	-32768 to 32767 (DELETE)
IO:00	1	0-377 (oct)	/0 - /17	N	-32768 to 32767 (DELETE)
S2:00 or S:	2	0-15 5/01(1)	/0 - /15	N	-32768 to 32767
		0-32 5/02(1)			
		0-83 5/03(1)			
B3: or Bn:	n:=9-255	0-255	/0 - /15	Y	-32768 to 32767
T4: or Tn:	n:=9-255	0-255.ACC		Y	0-32767
		0-255.PRE		Y	0-32767
		0-255.EN		Y	0-1
		0-255.TT		Y	0-1
		0-255.DN		Y	0-1
C5: or Cn:	n:=9-255	0-255.ACC		Y	-32768 to 32767
		0-255.PRE		Y	-32768 to 32767
		0-255.DN		Y	0-1
		0-255.CU		Y	0-1
		0-255.CD		Y	0-1
		0-255.OV		Y	0-1
		0-255.UN		Y	0-1
		0-255.UA		Y	0-1
R6: or Rn:	n:=9-255	0-255.LEN		Y	-32768 to 32767
		0-255.POS		Y	-32768 to 32767
		0-255.DN		Y	0-1
		0-255.EN		Y	0-1
		0-255.ER		Y	0-1
		0-255.UL		Y	0-1
		0-255.IN		Y	0-1
		0-255.FD		Y	0-1
N7: or Nn:	n:=9-255	0-255	/0 - /15	Y	-32768 to 32767
ND7: or NDn:	n:=9-255	0-255		Y	-2147M to 4294M
NL7: or NLn:	n:=9-255	0-255		Y	-2147M to 4294M
F8: or Fn:	n:=9-255	0-255	NS	Y	-2147M to 4294M
D9: or Dn:	n:=9-255	0-255	NS	Y	0-9999
A9: or An:	n:=9-255	0-255	NS	Y	Null - ASCII
ST9: or STn:		1-9999	NS	Y	0-65535

Note 1: File numbers other than the default value shown are 9-255. Ex: B5:0 would be invalid. (DELETE)
Note 2: Address range for I and O are in decimal as maped in the M files. (DELETE)
Note 1: Address Max for S is dependent on the PLC.
Note: Bits may wrap into other words. Ex: B3:5/41 = B3:7/9
Note: Integer types (range –32768 to 32767) may be configured as unsigned (range 0 to 65535)
Note: Node ID Max. is 254 for the SLC DF1 and 31 for the SLC 485.

Allen-Bradley PLC2

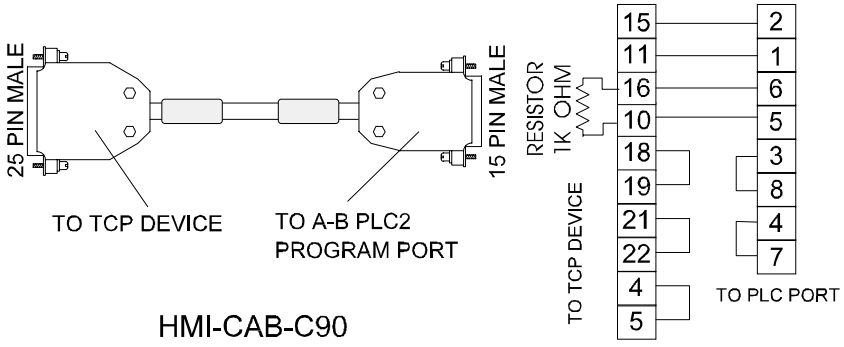
Connecting to a PLC-2 Program Port



HMI-CAB-C90

This cable is used to connect the target display to an Allen-Bradley PLC-2 PLC.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.

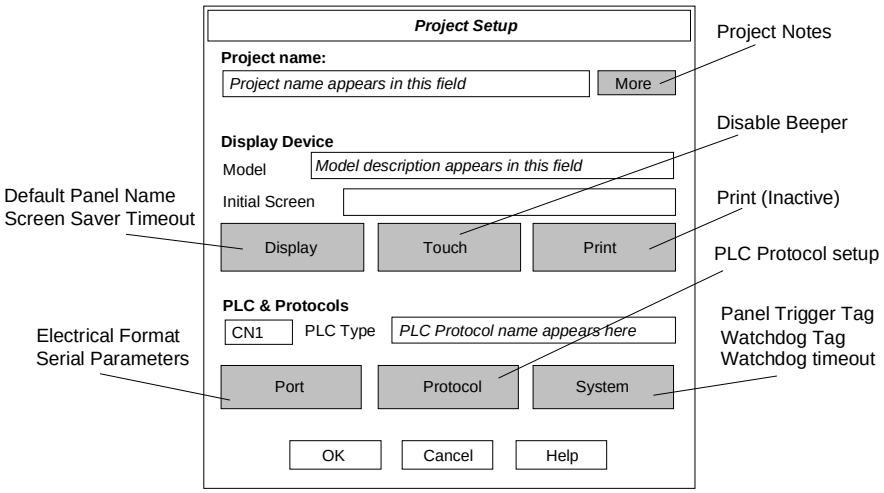


Setup for using an A-B PLC-2 Program Port

Use the following procedure to ensure your target device is setup properly for the Allen-Bradley PLC2. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Each button is described below. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB PLC2 Prog. Port).** See PLC Type on page 5.

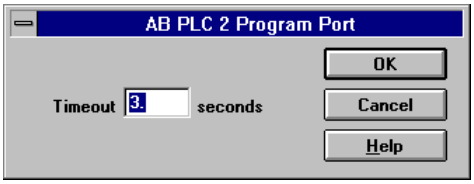
Port Button

Click the Port button to display the Serial Parameters dialog. See Serial Parameters on page 6. The following settings are recommended for **AB PLC2 Prog. Port.**

Elect. Format	RS422/485 Full Duplex
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.



Enter Timeout in seconds. Click OK to return to the Project Setup dialog box.

PLC2 Variable Names

Format	Variable Type	Range
WUBa_d	Word Unsigned Binary	0 to 65535
WUBa/00-07_d WUBa/10-17_d	Bit Read	0 to 1
WUB200/00-07_d WUB200/10-17_d	Bit Read/Write (above 200 ONLY)	0 to 1
WSDa_d	Word Signed Decimal	-999 to 999
WUDa_d	Word Unsigned Decimal	0 to 9999
WSOa_d	Word Signed Octal	-4095 to 4095
WTCa_d	Word Timer Counter	0 to 999
LSDa_d	Long Signed Decimal	-999999 to 999999
LSDFa_d	Long Signed Decimal Fixed Point	-999.999 to 999.999
MSGa_d	ASCII Message String	0 to 65535
LHDa_d	Extended Precision BCD	-79999999 to +79999999

In the above table, "a" is a one to five digit octal address that specifies the address in the data table. The "_d" is the PLC Destination Address on the Data Highway.

WUB - Word Unsigned Binary

A WUB variable type is used to read an unsigned binary word from the PLC data table, which is converted to a decimal value between 0 and 65535. The WUB variable is used to read input, output and control relay points. All sixteen I/O or control points are read at one time.

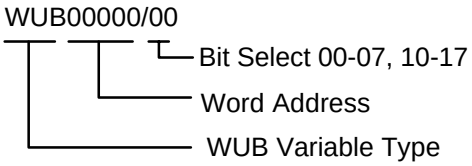
Example:

The following binary value is present in a PLC2/15 at address 250.

17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Reading this variable would result in the value 21845 because this is the decimal equivalent of the binary value shown in the example.

The WUB variable type can be used to read bits by adding the backslash character to the variable name. The format for the variable is shown below. Any WUB variable can be read as a bit type. *ONLY* the WUB variable has the bit read option.



Example: To read bit 05 from word 300, the variable name would be WUB300/05.

Example: To read a variable from a PLC address on the Data Highway, you must include the PLC address. To read bit 05 from word 300 in a PLC-2 located at address 5, the variable would be WUB300/05_5.

The WUB variable type can also be used to write bits, but *ONLY* to addresses above 200. Remember that addresses below 200 are reserved for I/O. The format for writing bits is the same as for reading bits.

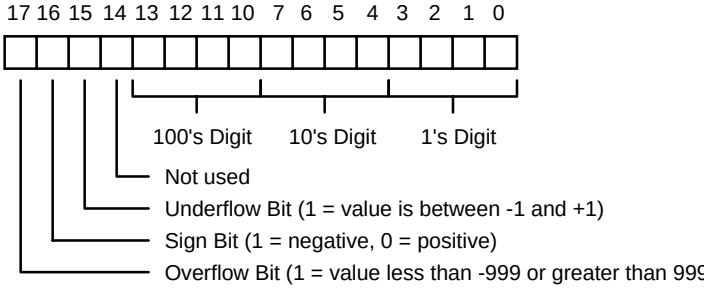
Example: To write bit 12 of word address 230, the variable would be WUB230/12.

WARNING

Writing bits in the areas above address 200 requires three operations. (1) the entire 16 bit word is read, (2) the individual bit is modified, (3) the modified word is written back to the PLC. Therefore, **DO NOT** associate any ladder logic with words used for bit addressing.

WSD - Word Signed Decimal (BCD)

The WSD variable type will read a signed three digit BCD value from a word in the PLC. The format of the word is shown below.



Example:

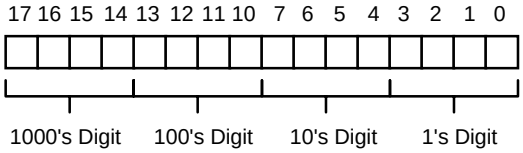
The following binary value is present in a PLC2/15 at address 250.

17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Reading this variable would result in the value -555 because the sign bit of the word was set, and the digits each contained the BCD value of 5. Note that although the data in the word was the same as used in the WUB example, the result obtained by reading the value as a WSD variable is not.

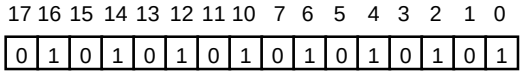
WUD - Word Unsigned Decimal (BCD)

The WUD variable type is very similar to the WSD type. The only difference is that the number does not have any sign, overflow or underflow bits associated with it. Instead, the number has four BCD digits instead of three. The format of the WUD variable is shown below.



Example:

The following binary value is present in a PLC2/15 at address 250.



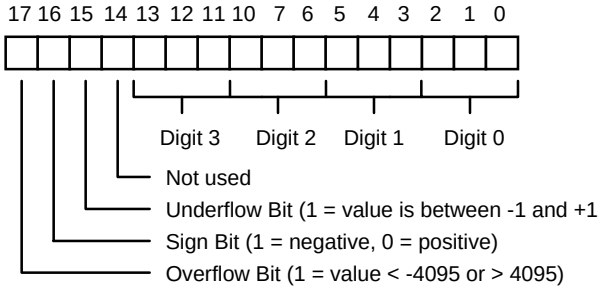
Reading this variable would result in the value 5555 because all the digits contain the BCD value of 5. Note that although the data in the word was the same as used in the WUB and WSD examples, the result obtained by reading the value as a WUD variable is not.

LHD - Extended Precision (BCD)

A LHD variable type is used to read an extended precision BCD type with a range of -79999999 to +79999999. Two words are required.

WSO - Word Signed Octal

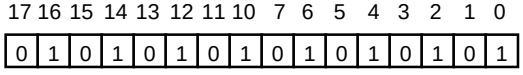
A WSO variable type is used to read a word as a four-digit octal number. This is the same thing as a 12-bit binary number , since each octal digit represents exactly three binary bits. A WSO variable also includes overflow, underflow, and sign bits, in the same manner as a WSD variable.



When the number is read, its sign will be returned from the sign bit while the overflow and underflow bits are ignored.

Example:

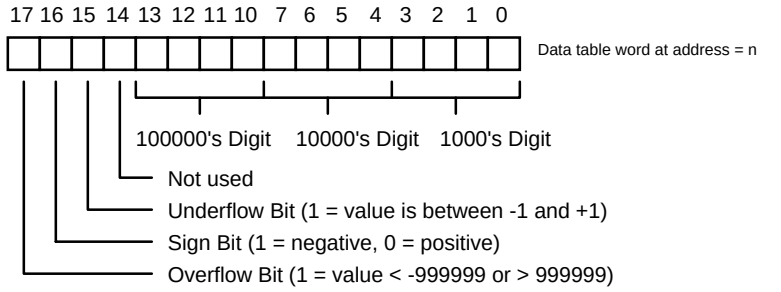
The following binary value is present in a PLC2/15 at address 250.

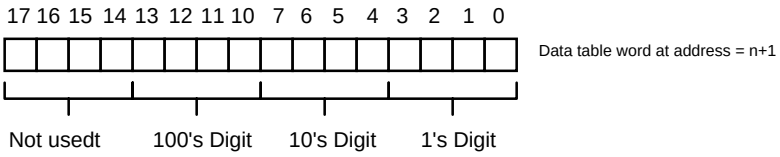


Reading this variable would result in the value -1365 because the sign bit was set and the octal number in the register was 2525 or 1365 decimal. Note that although the data in the word was the same as used in the WUB and WSD examples, the result obtained by reading the value as a WSO variable is not.

LSD - Long Word Signed Decimal

The LSD variable is similar to the WSD format. The LSD format requires two words from the data table, which consist of six BCD digits. The two words in the data table must be consecutive, and the high order BCD digits, as well as the sign, overflow, and underflow bits are contained in the first (lower numbered address) word used in the data table. The format is shown below.

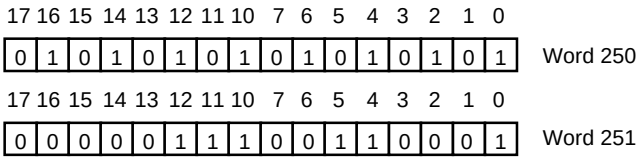




When the number is read, its sign will be returned from the sign bit while the overflow and underflow bits are ignored.

Example:

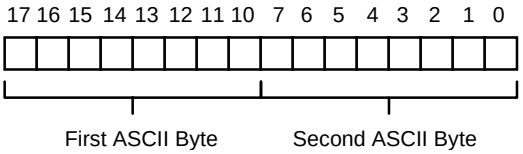
The following binary value is present in a PLC2/15 at address 250 and 251.



Reading this variable would result in the value -555321 because the sign bit was set and the octal number in register 250 is 555 and the octal number in register 251 is 321.

MSG - ASCII Text Message

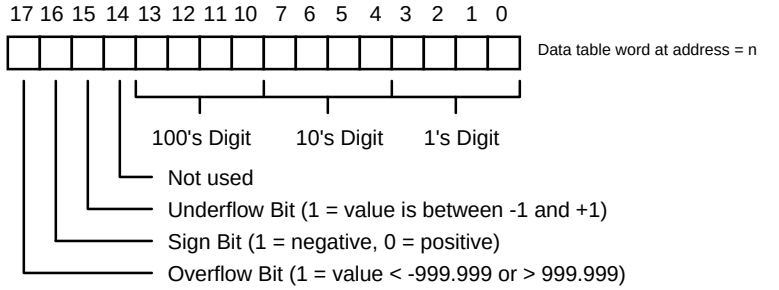
The MSG variable is used to receive text messages and display them in a text field. The message is assembled as two bytes from one PLC data word. The format of a MSG word is shown below.

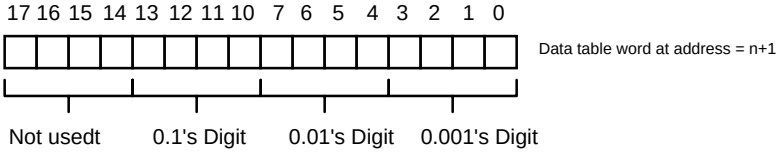


LSDF - Long Word Signed Decimal Fixed Point

The LSDF variable is similar to the LSD variable. There is always an implied decimal place between the third and fourth BCD digit, so a number always has the format xxx.yyy.

The LSDF format requires two words from the data table, which consist of six BCD digits. The two words in the data table must be consecutive, and the high order BCD digits, as well as the sign, overflow, and underflow bits are contained in the first (lower numbered address) word used in the data table. The format is shown below.

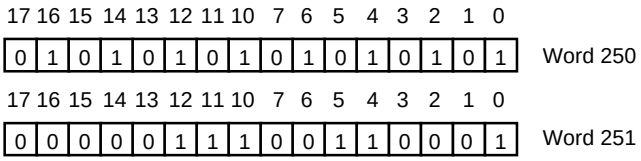




When the number is read, its sign will be returned from the sign bit while the overflow and underflow bits are ignored.

Example:

The following binary value is present in a PLC2/15 at address 250 and 251.



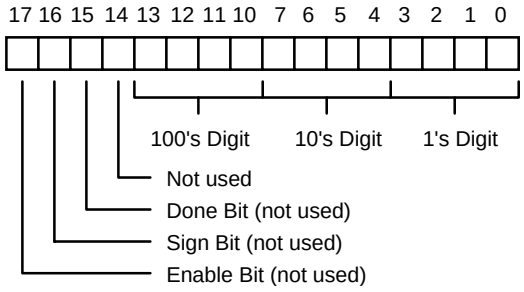
Reading this variable would result in the value -555.321 because the sign bit was set and the octal number in register 250 is 555 and the octal number in register 251 is 321.

When using the LSDF variable types with the Numeric Data Entry tool, the default range is set from -999 to 999. However, when you change the decimal position from 0 to 1, 2, or 3 in the data format dialog box, your available range decreases accordingly. For example, if you set the decimal position to 3, your range changes from -.999 to .999.

NOTE: When using the LSDF variable types with the Numeric Data Entry tool, the default range is set from -999 to 999. However, when you change the decimal position from 0 to 1, 2, or 3 in the data format dialog box, your available range decreases accordingly. For example, if you set the decimal position to 3, your range changes from -.999 to .999.

WTC - Word Timer Counter

A WTC variable type is used to read a signed three digit BCD value from a timer counter word in the PLC. The format of this word is shown below.



Example:

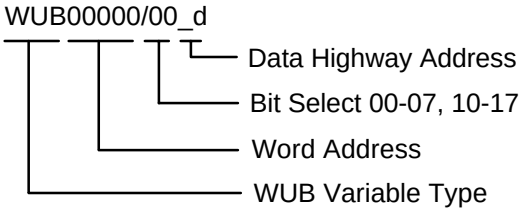
The following binary value is present in a PLC2/15 at timer 30, addressed as WTC30.

17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0
0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	1

Reading this variable would result in the value 321 because the octal number in register 30 is 321.

Reading PLC-2 Data Highway Variables

The following illustration shows the format for reading variables from the Data Highway. The Data Highway Address is a decimal value.



When using the Data Highway, the following addresses are valid destination addresses, so long as a PLC (not another computer) is at the destination address:

8 through 63 and 72 through 254 decimal
010 through 077 and 110 through 376 octal

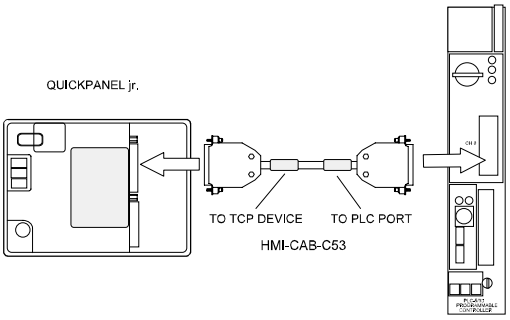
The choice of addresses on the Data Highway greatly influences its speed of operation. Be sure to read the Allen-Bradley documentation on the Data Highway, particularly those sections pertaining to selection of module addresses and the polling scheme used on the Data Highway. In general, it is a good practice to number Data Highway addresses consecutively.

Allen-Bradley PLC5

PLC-5 DF1 Single Point Connection

A single point connection is simply one target display connected directly to the Channel 0 port of a single PLC 5.

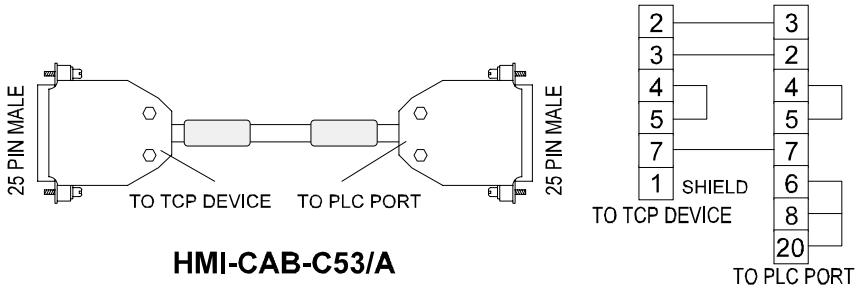
To connect a target display to a PLC-5/30 Channel 0, use an HMI-CAB-C53 RS232 cable, connected as shown below.



HMI-CAB-C53/A RS232 Cable

This cable is used to connect the target display to Channel 0 on an Allen-Bradley PLC-5/30 PLC.

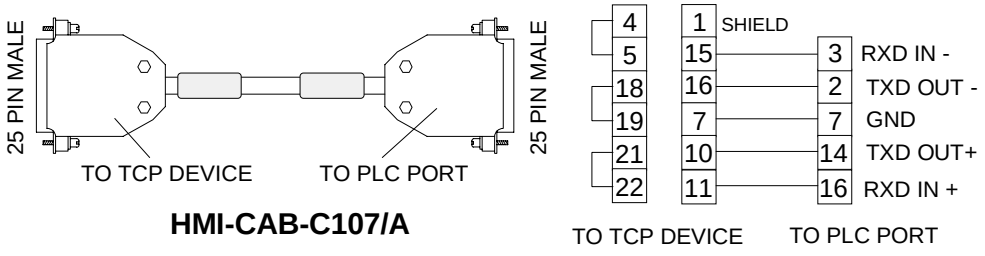
A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



HMI-CAB-C53/A

HMI-CAB-C107 RS422 Cable

Use the following cable for RS422 connections to Channel 0.



HMI-CAB-C107/A

A-B Channel 0 Setup

The configuration for Channel 0 must be set to “Point-to-Point” using the following communication parameters. Do NOT set Channel 0 to SLAVE, MASTER or USER.

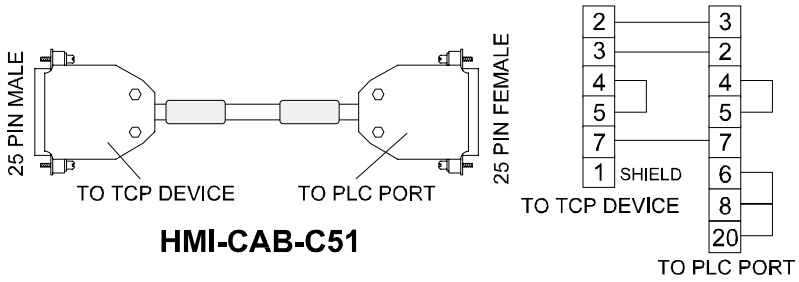
Baud Rate: 9600 or 19.2K	Error Detect: BCC
Parity: None	ACK Timeout (20ms): 50 (possible greater)
Stop Bits: 1	NAK receive: 3
Diag. File: 0 (any unused file)	DF1 ENQS: 3
Duplicate detect: ON	Control Line: NO HANDSHAKING

Connecting to A-B 1770 KF2 Module

Use the HMI-CAB-C51 Cable to connect to the 'Computer' port on the 1770 KF2 Data Highway Communication Interface module.

HMI-CAB-C51 Cable

You can make your own cable using the following wiring diagram.



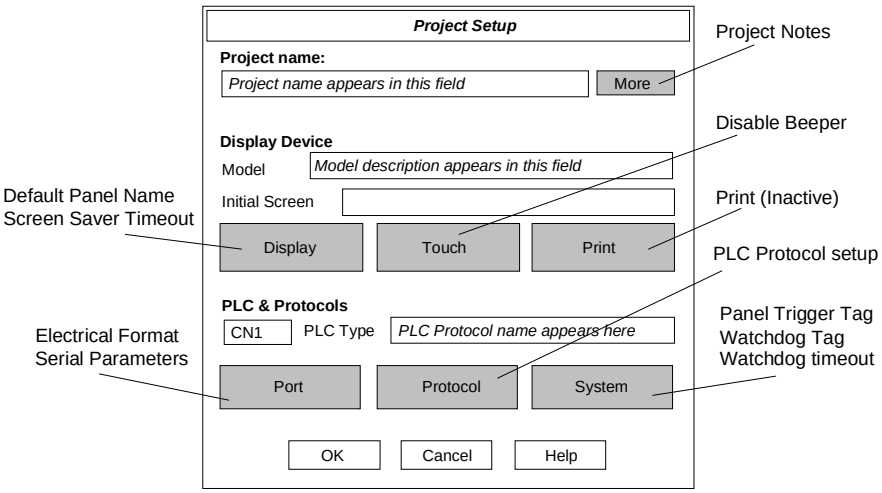
HMI-CAB-C51

Setup for using an AB PLC5 DF1

Use the following procedure to ensure your target device is setup properly for the Allen-Bradley PLC5 DF1. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB PLC5 DF1)** See PLC Type on page 5.

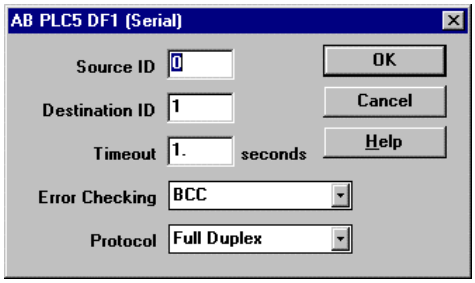
Port Button

Click the Port button to display the Serial Parameters dialog. See Serial Parameters on page 6. The following settings are recommended for **(AB PLC5 DF1)**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.



Note:

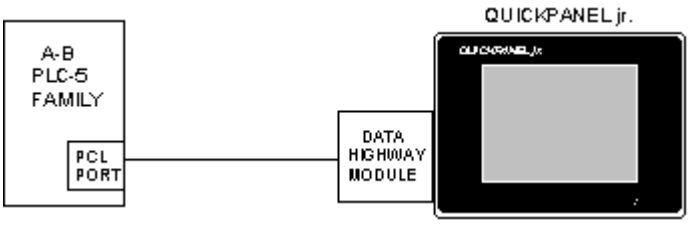
The format for tag variables for the PLC-5 is:Xf:e.s/_d, where the _d is defined as the destination address. However, the destination address is not supported in Full Duplex protocol. The destination address is ignored because it's talking to the program port. Half Duplex does support the _d destination address.

Just as a reminder, when working with Full Duplex, you have to set up the PLC Channel 0 to Point-to-Point. For Half Duplex, Channel 0 must be set to System (Slave).

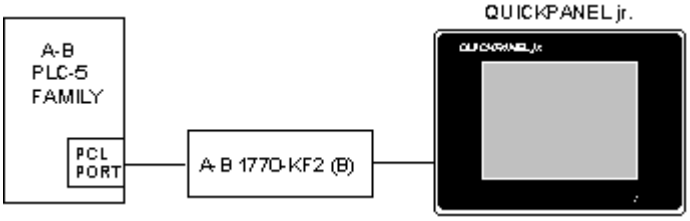
A-B PLC-5 DATA HIGHWAY PLUS

A target display can communicate on the Data Highway Plus Local Area Network (LAN) through a serial port connection to an external Data Highway Plus Module or through a Data Highway Plus Module attached to the target display.

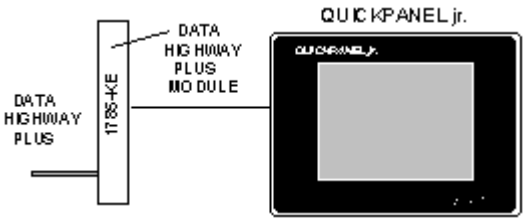
The following drawing illustrates a Data Highway Plus connection between a target display equipped with an optional Data Highway Plus Module and a PLC-5.



The following drawing illustrates a Data Highway Plus connection between a target display, a 1770-KF2/B and a PLC-5. The target display utilizes a serial connection to an A-B 1770-KF2 Interface Module. Some models of the PLC-5, such as the PLC-5/30, have a DF1 port that can be used for direct connection to the target display. (See PLC-5 DF1 in a previous section.)

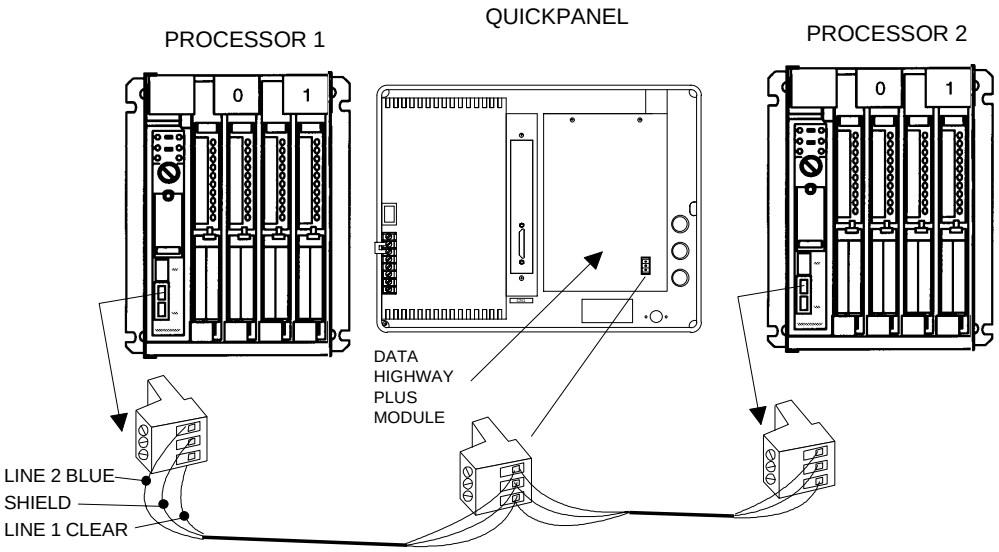


The following drawing illustrates a connection between a target display, a 1785-KE Module and a Data Highway Plus link.



Connection to Data Highway Plus

The following drawing shows a *QUICKPANEL* connected to two PLC-5 processors on a Data Highway Plus network.

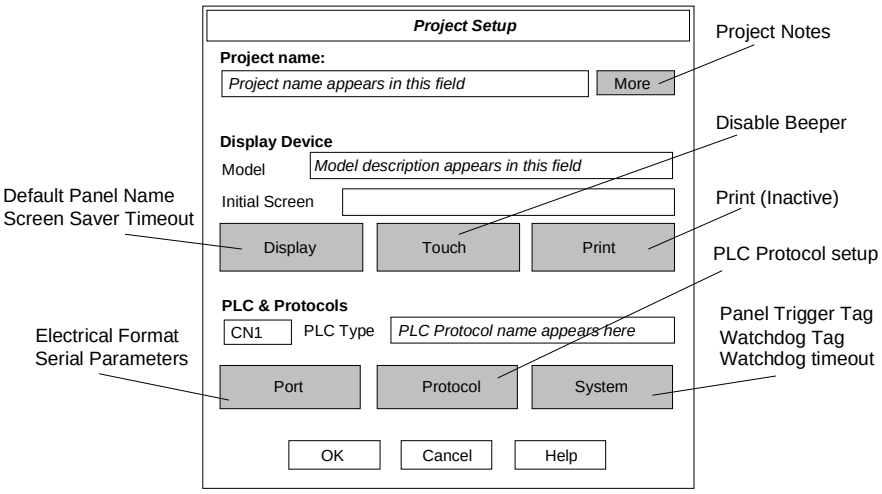


Setup for using Data Highway Plus

Use the following procedure to ensure your target device is setup properly for the Data Highway Plus. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB Data Highway Plus).** See PLC Type on page 5.

Port Button

The AB Data Highway Plus module does not require a port setup because it does not utilize the serial interface port.

Protocol Button

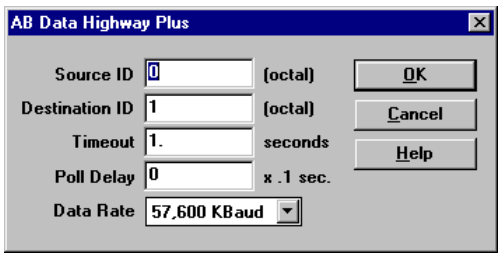
Click the Protocol button to display the dialog box associated with the selected PLC.

Enter the Source ID (target display address). Enter the Destination ID (PLC address).

Note that the Source ID and Destination ID are in octal. Enter Timeout in seconds.

The Data Highway Plus module will continuously poll the PLC for data. With many QuickPanels on the network, this may tend to slow the response to other devices on the network. You can introduce a delay for each QuickPanel by adding a Poll Delay. The Poll Delay is set to increments of 1/10 of a second. Adding a delay will reduce the time the QuickPanel is requesting data from the network.

Click OK to return to the Project Setup dialog box.



Configuring dipswitches on the 1770-KF2, Series B Modules

The serial port on the target display is connected to the "Computer Port" on the KF2 module with the HMI-CAB-C51 cable. The Data Highway port on the KF2 module is connected to the PCL port on a PLC-5. Each PLC-5 must have a unique station address, which is set with the DIP switches on top of the PLC-5. The Destination Station Address should be set to match the station address of the PLC that you will be communicating with the most. The Source Station Address should be set to match the address set on the KF2 module's dip switches (SW2-SW4).

SWITCH	POS	STATE	COMMENTS
RS422A	1	Open (off)	RS422 Communications Disabled
RS232C	2	Closed (on)	RS232 Communications Enabled

SWITCH	POS	STATE	COMMENTS
SW1	1	Open (off)	Parity = None (Recommended)
SW1	2	Open (off)	Disable embedded responses
SW1	3	Open (off)	Accept all messages
SW1	4	Open (off)	Ignore handshaking signals
SW1	5	Open (off)	Use full duplex protocol

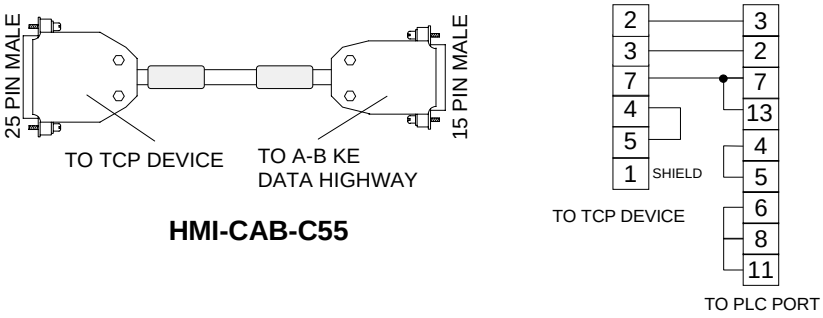
Set the Source Station address using switches SW2, SW3 and SW4. SW2 is the most significant octal digit and SW4 is the least significant octal digit. Valid addresses are from 000 through 377 octal.

SWITCH	POS	STATE	COMMENTS
SW5 SW5	1 2	Closed (on) Closed (on)	Peer Comm Link Baud Rate. Both switches set to ON = 57.6 kbps.
SW6 SW6 SW6	1 2 3	Open (off) Closed (on) Closed (on)	Computer port baud rate. As shown = 9600 Baud.
SW6	4	Closed (on)	Execute any received diagnostic commands.
SW7 SW7	1 2	Closed (on) Open (off)	Data Highway to PCL Communication Protocol Conversion Enabled

Please refer to PLC-2 or PLC-5 sections for valid register names.

Configuring dipswitches on the 1785-KE Series B Module

The serial port on the target display is connected to the KE module with the HMI-CAB-C55 cable.



Set the dipswitches on the KE module as follows:

SWITCH	POS	STATE	COMMENTS
SW1	1	Closed (on)	Full duplex, BCC Error Check
SW1	2	Open (off)	Even Parity
SW1	3	Open (off)	No embedded responses
SW1	4	Open (off)	Accept duplicate message
SW1	5	Open (off)	Ignore handshake signals
SW1	6	Open (off)	Pass through diagnostic commands

Set the Data Highway Plus address of this module with switch SW2. Position 1 and 2 are the octal digit 0, position 3, 4, and 5 are the octal digit 1, and position 6, 7, and 8 are the octal digit 2.

SWITCH	POS	STATE	COMMENTS
SW3 SW3	1 2	Closed (on) Closed (on)	Data Highway Plus Baud Rate. Both switches set to ON = 57.6 kbps.
SW3 SW3 SW3	3 4 5	Closed (on) Closed (on) Closed (on)	Computer port baud rate. All three set to ON = 19200 Baud.
SW3	6	Closed (on)	Local Address

SW4 is a reserved switch. Leave all settings Open (off).

These settings are not mandatory, but recommended. Be sure to set the *QUICKPANEL*™ port for RS232, 19200 Baud, even parity, 8 data bits, 1 stop bit, handshaking (XON/XOFF) disabled.

Configuring dipswitches on the 1771-KE or 1771-KF Module

The switch positions shown in the following table are for software revisions **REV A through G**.

SWITCH	POS	STATE	COMMENTS
SW1	1	Open (off)	Use full duplex protocol
SW1	2	Open (off)	Disable embedded responses
SW1	3	Open (off)	Accept all messages
SW1	4	Open (off)	Defeat RS232 handshake on computer port
SW1	5	Closed (on)	Execute remote diagnostics

The switch positions shown in the following table are for software revision **REV H**.

SWITCH	POS	STATE	COMMENTS
SW1	1	Open (off)	Parity = None (Recommended)
SW1	2	Open (off)	Disable embedded responses
SW1	3	Open (off)	Defeat RS232 handshake on computer port
SW1	4	Open (off)	Accept all messages
SW1	5	Open (off)	Use full duplex protocol
SW6	4	Open (off)	Pass through diagnostic commands

Set the Data Highway address of this module on switches SW2, SW3 and SW4. SW2 is the most significant octal digit and SW4 is the least significant octal digit. Valid addresses are from 010 through 077 octal and 110 through 376 octal.

SWITCH	POS	STATE	COMMENTS
SW5	1	Closed (on)	Data Highway Baud Rate. Both
SW5	2	Closed (on)	switches set to ON = 57.6 kbps.
SW6	1	Closed (on)	Computer port baud rate.
SW6	2	Closed (on)	All three set to ON = 19200 Baud.
SW6	3	Closed (on)	
SW6	4	Open (off)	Parity = None (Recommended)

In the above example, the Data Highway module is configured for 19200 Baud, no parity. These settings are not mandatory, but recommended. Be sure to set the target display port for RS232, 19200 Baud, no parity, 8 data bits, 1 stop bit, handshaking (XON/XOFF) disabled.

A-B PLC-5 Tag Variables

The format for legal tag variables for the PLC-5 is: **Xf:e.s/_d**

X = **File Type**

B = Bit C = Counter F = Floating Point I = Input(not SLC 5/04)
N = Integer R = Control S = Status O = Output(not SLC 5/04)
T = Timer A = ASCII* D = BCD*

* for display only

f = File Type Number

* The first 8 file numbers have a fixed File Type

0 = output 1 = input 2 = status 3 = bit 4 = timer
5 = counter 6 = control 7 = integer 8 = floating point
8 to 999 = file storage of any File Type

: = Colon delimiter separates file type and element numbers.

e = Elements number (see Note 2)

0 - 317 Octal for I/O files
0 - 999 Decimal for all other file types

. s= Period delimiter and **Subelement mnemonic** is used only with Timer, Counter or Control file types. For example, T4:12.PRE. The "PRE" portion of the variable is the subelement mnemonic. (Mnemonic is pronounced "nemonic.")

Word Addresses:

Timers and Counters = .PRE (preset) and .ACC (accumulated)
Registers = .LEN (length) and .POS (position)

/ b = Slash delimiter and Bit number

0 - 15 Decimal for I/O file types (Add a leading 'o' to the bit addres to designate octal address. EX: I1:2/o17 is the same as I1:2/15).
0 - 15 Decimal for all other file types
optional 0 - 15,999 Decimal for bit type files when not specifying the element number.

Bit Addresses:

Bit#	Timer	Counter	Control
15	.EN enable	.CU up enable	.EN enable
14	.TT timing	.CD down enable	.EU unload enable
13	.DN done	.DN done	.DN done
12		.OV overflow	.EM empty
11		.UN underflow	.ER error
10			.UL unload
09			.IN inhibit
08			.FD found

* Only the above bit numbers or mnemonics can be read for Timer, Counter or Control file types. No other bit numbers or mnemonics are allowed. For example, C5:8.CU and C5:8/15 are the same address. C5:8.ACC/00 is a legitimate address.

_d = Destination address on the Data Highway. Example: N7:100_2 will read N7:100 from PLC address 2 on the Data Highway. This feature allows addressing a destination address different than the one entered as the Destination ID in the AB Data Highway Plus dialog box. Remember that the destination address is in octal format. Node address range is 0-377 (octal).

I/O Addressing

The format for I/O addressing differs from the general format. The format is described as: **X:rg/00-17**

X = I (input) or O (output)
r = assigned rack number
g = I/O group number
00 - 15 = terminal (bit) number (decimal), 00 - 17 = terminal (bit) number (octal)

Example: O:12/03 = Output, rack 1, group 2, bit 03
Example: I:02/10 = Input, rack 0, group 2, bit 10

Status File Addressing

The format for Status File addressing differs from the general format. The format is described as: **S:e/b**

S = Status
e = element number (0-999)
b = bit number (0-15)

Example: S:4/5 = Status register, element 4, bit 05.

A-B PLC-5 Tag Variable Table

For ABDH+ and PLC5 DF1

File Type	FileType # Min	FileType # Max (1)	Element (2) (Format Qualifier)	Bit Range (3)	Read/ Write	Value Range (4)
O0: or O:	0	0	0-377 (octal) (7)	/0 - /15 (6)	Y	-32768 to +32767
OD	0	0	0-255 (dec)	/0-/15	Y	-32768 to +32767
OO	0	0	0-377 (octal)	/0 - /17	Y	-32768 to +32767
I1: or I:	1	1	0-377 (octal) (7)	/0 - /15 (6)	N	-32768 to +32767
ID	1	1	0-255 (dec)	/0-/15	N	-32768 to +32767
IO	1	1	0-377 (octal)	/0 - /17	N	-32768 to +32767
S2:00 or S:	2	2	0-999	/0 - /15	Y (5)	-32768 to +32767
B3:000 or Bn:000	3	999	0-999	/0 - /15	Y	-32768 to +32767
T4:000. or Tn:000.	4	999	0-999 (.ACC, .PRE, .EN, .TT, .DN)		Y	0 to +32767
C5:000. or Cn:000.	5	999	0-999 (.ACC, .PRE, .DN, .CU, .CD, .OV, .UN, .UA)		Y	-32768 to +32767
R6:000. or Rn:000.	6	999	0-999 (.LEN, .POS, .DN, .EN, .ER, .UL, .IN, .FD)		Y	-32768 to +32767
N7:000 or Nn:000	7	999	0-999	/0 - /15	Y	-32768 to +32767
ND (Double)	7	999	0-999		Y	-2147M to 4294M
NL (Long)	7	999	0-999		Y	-2147M to 4294M
D8 or Dn:	8	999	0-999		Y	0 to 9999
F8 or Fn:	8	999	0-999		Y	-2147M to 4294M
A8 or An:	8	999	0-999		Y	Null - ASCII
ST	8	999	0-999		Y	Null - ASCII

Note 1: File Type ranges other than the default value shown in 'File Type # Min' are 8-999.
Note 2: Address range for I & O are in rrg (rr=rack num., g=group num.) Address Max for S is dependent on the PLC.
Note 3: Bits may wrap into other words. EX: B3:5/41 = B3:7/9 Bit format is Decimal.
Note 4: Integer types (range –32768 to 32767) may be configured as unsigned (range 0 – 65535). Data format is 16 bit Decimal.
Note 5: These are system variables. Use caution when writing to S variable types.
Note 6: O and I bits can use octal addressing by adding 'o' to the bit address. EX: I1:2/o17.
Note 7: Default format for I/O is Octal words and Decimal Bits

Allen-Bradley Remote I/O

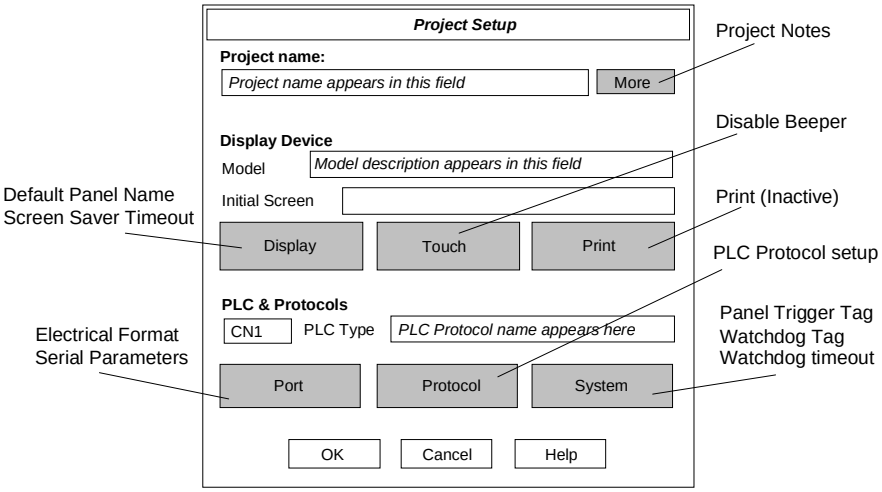
See the *QUICKPANEL* Family Hardware Reference manual for hardware installation information. The RIO module for *QUICKPANEL jr.* (models QPJ-1D100-L2P and QPJ-1D100-S2P) is NOT a field upgrade.

Setup for A-B Remote I/O

Use the following procedure to ensure your target device is setup properly for the Allen-Bradley RIO. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(AB Remote I/O)** See PLC Type on page 5.

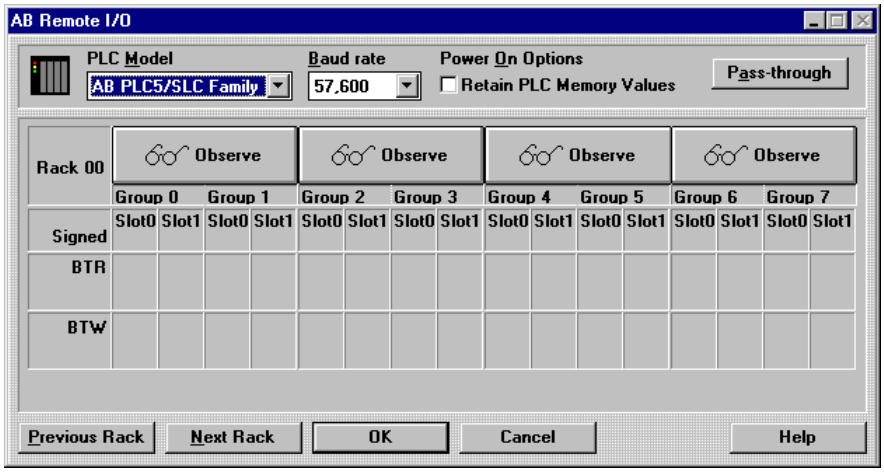
Port Button

No serial port is used. The Remote I/O option module connects to a special internal bus.

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

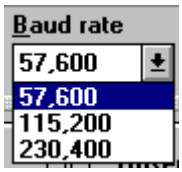
The following dialog box represents one full rack of I/O. Note the two list boxes at the top of the AB Remote I/O dialog box. Note also that all rack sections are in the Observe mode. To view other racks, click the Next Rack and Previous Rack buttons located at the bottom of the dialog box.



Select the PLC Model from the list box located at the top of the AB Remote I/O dialog box. Different PLC models have different rack addressing ranges. In some cases, a PLC can address only four racks. You should be aware of the limitations of your PLC and the configuration of the Remote I/O before attempting to configure the Remote I/O in the target display. In some instances, a dialog box will display all available racks, even though your configuration limits their access. The PLC models shown in the list box cover a broad range of rack options available for that family. A sample PLC model list is shown below.

Select the Baud rate for the Remote I/O network. This selection must match that of the intended network.

Early versions of the QPI-ABR-001 RIO modules are not capable of operating at 230K Baud.



To retain the data values of inputs and Block Transfer Reads (BTR), click the checkbox for Retain PLC Memory Values. The data retention feature is available ONLY for QPI-ABR-201 and QPJ-ABR-201 Remote I/O modules. If the box is not checked, all data values will be set to 0 when power is cycled.

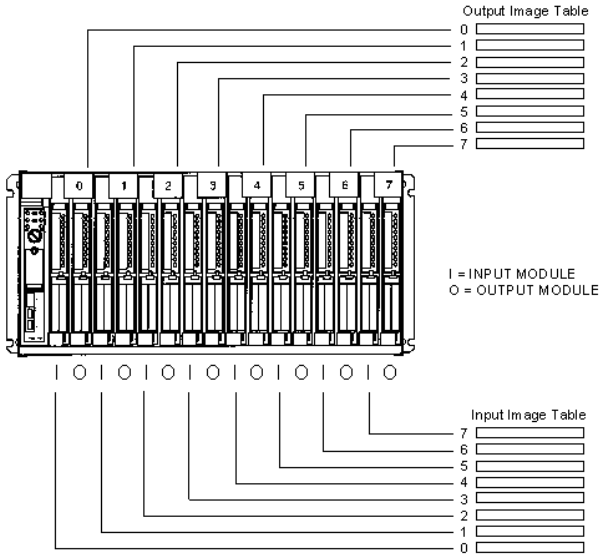
Before you click any more buttons or check boxes, read the sections concerning Observation mode and Emulation mode.

Observation Mode

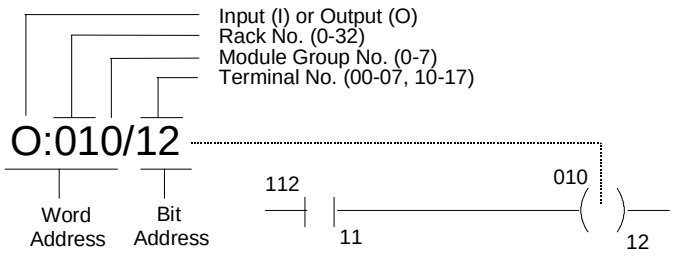
When you first start a project using Remote I/O, all racks are in OBSERVE mode, which means the target display can listen to all discrete I/O transfers on the Remote I/O link.

An Allen-Bradley rack corresponds to 128 input bits and 128 output bits of defined PLC data table memory. In the PLC memory, a 'data table' sets aside 128 bits for input and 128 bits for output. This data table allows the PLC to communicate with other devices. No matter what I/O scheme you are using, 1, 1/2, or 1/4 slot addressing, the limit per rack is 128 bits.

When you select 2-slot addressing, each pair of slots is assigned to the corresponding pair of words in the input and output image tables. You assign one I/O rack number to eight I/O groups. The following drawing shows a rack of I/O set up using 2-slot addressing.



In a ladder diagram, the input or output instruction address is associated with a particular I/O terminal and identified by a 6-digit address.



The discrete I/O address must be translated into tag variable addresses. For example, the discrete address 0:010/12 becomes the tag variable address O:10/12. You can use the tag variable address to operate pilot lights. See the tag table in the next section.

You do not have to make any more selections if you just want to listen to the Remote I/O link. If you want to emulate an unused rack or transfer data using Block Transfers, then you need to change from observation mode to emulate mode.

Remote I/O Tag Variable Table

Device Prefix	Address Range	Bit delimiter	Bit Range	Data Range Min.	Data Range Max.	Data Width	Read / Write	Description & Notes
Words								
I:	0-377	/	0-17	-32768	32767	16	Both	Inputs
O:	0-377	/	0-17	-32768	32767	16	Read	Outputs
Doubles								
AI:	0-376	n/a	n/a	0	99999999	32	Both	Double Inputs BCD
AO:	0-376	n/a	n/a	0	99999999	32	Read	Double Outputs BCD
LI:	0-376	n/a	n/a	-99999999	99999999	32	Both	Long Inputs
LO:	0-376	n/a	n/a	-99999999	99999999	32	Read	Long Outputs
ABR@	0.0-3771.63	n/a	n/a	0	99999999	32	Both	Double BTR-1
ABW@	0.0-3771.63	n/a	n/a	0	99999999	32	Read	Double BTW-1
LBR@	0.0-3771.63	n/a	n/a	-99999999	99999999	32	Both	Long BTR-1
LBW@	0.0-3771.63	n/a	n/a	-99999999	99999999	32	Read	Long BTW-1

The device prefix and address delimiter are shown together. Example, AO: where AO is the prefix and : is the delimiter. Note the delimiter for the BTR and BTW types is the @.
The address syntax is rrgs.oo (rr = rack (octal), g = group, s = slot, oo = offset (decimal))
Double block transfer variables require proper setup of the actual block transfer in the protocol setup.

Emulate Mode

The emulate mode allows the display device to look like an unused rack. The rack assignment is determined by the unused rack locations existing in your installation.

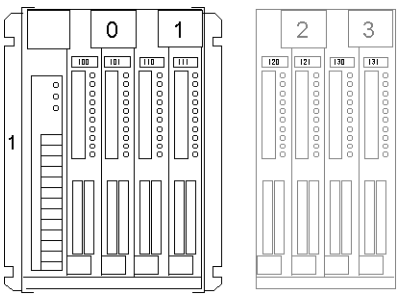
Make sure you do not try to emulate a rack that already exists on the Remote I/O link.

The target display can handle Block Transfer Reads and Block Transfer Writes. Block transfers allow you to send and receive large blocks of data over the Remote I/O link.

Emulation is handled in quarter rack increments, with each quarter rack containing two groups (0 and 1), and each group having two slots (0 and 1). Each slot would normally occupy a word in the input or output image table in the PLC. With Block Transfers, each slot can be assigned up to 64 words of read and 64 words of write data.

Let's take a look at a fictitious PLC layout and see how the display device can emulate an unused rack. In the following drawing, a Remote I/O drop occupies only a quarter rack and is addressed as Rack 1. The rack contains a total of four modules, two in each group. When the display device is in Observe mode, it can listen to all remote I/O data on the link, including the data sent and received by the scanner in rack 1.

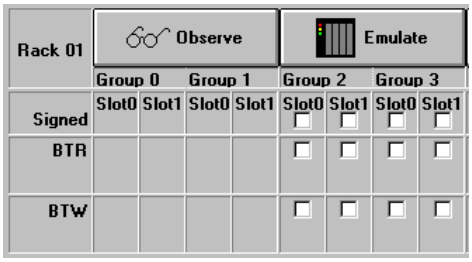
For this example, there is an unused quarter rack at Rack 1, Group 2 and 3. The display device will emulate the unused quarter rack.



Using Emulate Mode

The rack number is shown in the upper left corner of the dialog box. Use the Previous Rack and Next Rack buttons located at the bottom of the dialog box to select the rack where you know for certain there are unused quarter racks.

There are four quarter rack sections for each rack displayed. Select which quarter rack you want to emulate. Click the Observe button to change the quarter rack from Observe mode to Emulate mode. For this example, the second quarter rack, consisting of Group 2 and Group 3, will be changed to emulate mode. When the mode changes to emulate, check boxes appear in all slot locations.



Rack Addresses

A rack is the I/O rack number of the I/O chassis in which you placed the target I/O module. For rack emulation, the target I/O module is the emulated rack. The valid ranges for rack numbers are shown below.

You cannot do a block transfer to a rack above address 37.

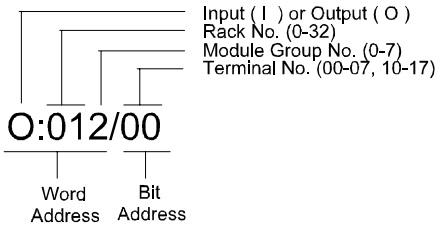
PROCESSOR	Maximum Racks	Valid Range (octal)
PLC-5/10, -5/12, -5/15	4	00-03
PLC-5/25, -5/30	8	00-07
PLC-5/40, -5/40L	16	00-17
PLC-5/60, -5/60L	24	00-27
PLC 5/80	72	00-37

Discrete I/O or Block Transfer

At this point, you can decide to use the display device to emulate a rack for discrete I/O only, or go on to configure the display device to work with Block Transfer read and write operations.

If you want to use Block Transfer Read and Block Transfer Write operations, go to 'Configuring for Block Transfer Operations' in the next section.

If you do NOT intend on using Block Transfer operations, select all the racks you wish to emulate then click the OK button to return to the Project Setup dialog box. In this example, the display device will be configured to emulate the quarter rack addressed as Rack 1, Group 2 and 3. This will allow you to design panels with discrete I/O. You can have 32 input and 32 output devices on each quarter rack. The following diagram shows how hardware rack addresses are converted into variable names.



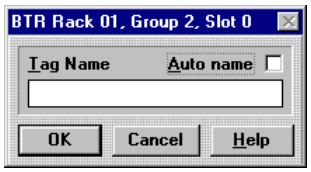
Since we are emulating a quarter rack, consisting of Group 2 and 3, the input bit addressing is from I:012/00 to I:012/17 and I:013/00 to I:013/17. The output bit addressing is from O:012/00 to O:012/17 and O:013/00 to O:013/17. You also have two input words I:012 and I:013, and two output words O:012 and O:013.

Configuring for Block Transfer Operations

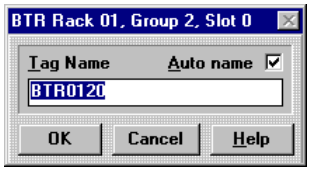
You now have the choice of selecting any of the four slots and each slot can be a Block Transfer Read (BTR), Block Transfer Write (BTW) or both. For this example, both BTW and BTR for Group 2, Slot 0 will be used.

First, we set up the BTR by clicking the check box in Group 2, Slot 0. The following menu will appear.

Always use this tool for building RIO tags. Do NOT attempt to build these tags while creating panels in the Panel Editor.



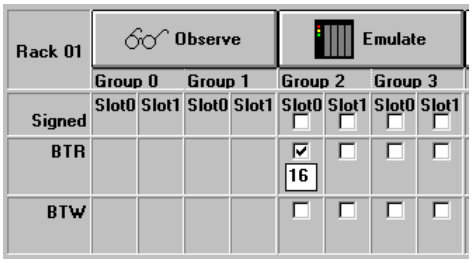
If you click the Auto name check box, the tag name will be generated by the system and appear in the Tag name field. Note that the tag name is cryptic, it describes the variable as a BTR, located at rack 01, Group 2, slot 0. The naming scheme will help you remember the racks that are in emulation mode. See the following example.



Click the OK button to accept the Tag Name. The check box now appears with a check mark inside, indicating it has been checked.

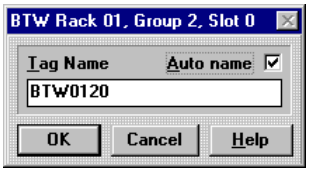
A new information box will appear below the check box. This information box indicates how many words will be transferred by the Block Transfer. You can change the number, up to a maximum of 64 words. To change the number, double click in the number box to highlight the number, then type the new number.

All of the words in a Block Transfer Write can be read as signed numbers by clicking the Signed checkbox.

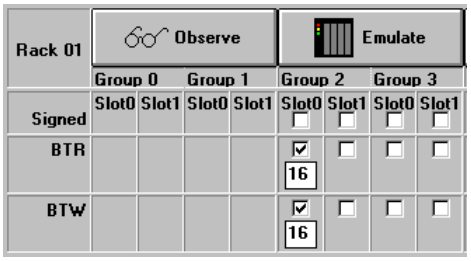


Below the array of check boxes is the Edit Tag button. Next to the button is a message line indicating the last slot address selected. When you click in any of the number boxes, the Tag Edit message will reflect the new selection. The Edit Tag button is used to recall the Tag Name dialog box so you can change the Tag Name.

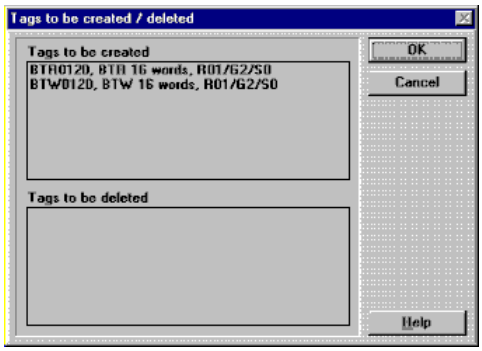
In the example, we have checked the BTR box in Rack 1, Group 2, Slot 0. To continue the example, the BTW box in the same slot will be checked. Click the Auto name checkbox and the Tag Name will appear as BTW0120.



Click the OK button and observe that both check boxes in Slot 0 are checked and both are set to transfer 16 words.



Click the OK button and the following dialog box is displayed. This dialog lists the tags that will be created when you click the OK button. The list shows the tag name, the block transfer type and number of words, and the rack address being emulated.



Click OK if the information is correct. The system will now build the tags required to support Remote I/O.

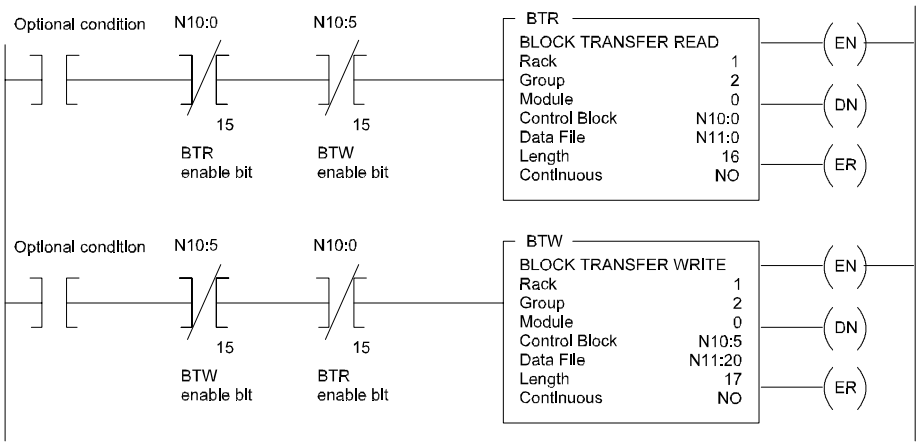
NOTE: You have to create your block transfer tags using the A-B Remote I/O protocol setup dialog box. You cannot go to the panel editor and drop down a tool and assign a tag of "BTR0100."

Review steps:

- select the PLC type
- select the baud rate
- select the rack number
- click the observe button to change a quarter rack to emulate mode
- click the check box in the desired group and slot, either BTR or BTW.
- select the Tag Name or click Auto name
- select the desired number of words
- click OK. Verify the Tag names, transfer mode and number of words.
- click OK. Done!

Block Transfer Operations

In order to read or write block transfer data, your PLC must be programmed to initiate a Block Transfer Write or Block Transfer Read to an emulated rack address. With a non-continuous block transfer, the entire block of data is updated each time the processor runs the block transfer instruction. The non-continuous mode is used to control when or the number of times the block transfer occurs. The following diagram shows a bi-directional alternating Block Transfer for a PLC-5/VME.



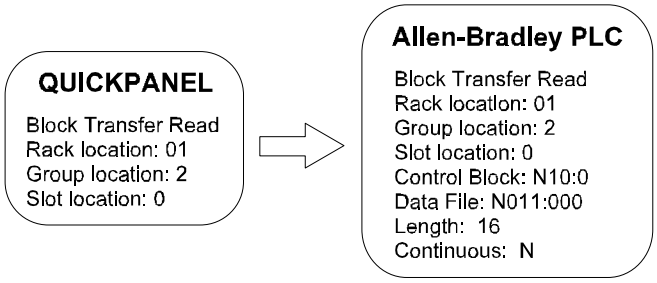
When the rung goes true, the BTW instruction tells the processor to write data stored in the PLC data file to the specified rack/group/module address. The BTW rack/group/module address is the BTW emulated address in the target display.

The BTR instruction tells the processor to read data from the rack/group/module address and store it in the PLC data file. The BTR rack/group/module address is the BTR emulated address in the target display. The BTR or BTW instruction writes values into its control block address when the instruction is entered. The processor uses these values to execute the transfer.

Block Transfer Files

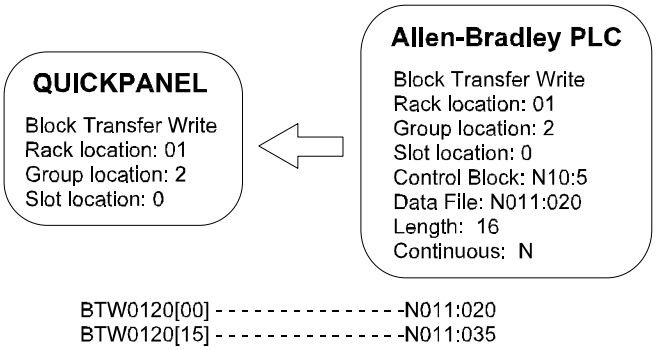
In the *Using Remote I/O* section, you were shown how to assign a Tag Name. Tag names were automatically selected as BTR0120 and BTW0120. These tag names are used to identify the data files where the Block transfer information is stored in the target display. Remember that the automatically assigned tag names also identify the type of block transfer and the rack assignment.

The following drawing shows how a Block Transfer Read function in the PLC reads data from the BTR0120 file in the target display. Since the Length was set to 16, there will be 16 words read from the target display into the PLC.



BTR0120[00] - - - - - - - - - - - - - - -N011:000
BTR0120[15] - - - - - - - - - - - - - - -N011:015

The following drawing shows how a Block Transfer Write function writes data from the PLC to the BTW0120 file in the target display. Since the Length was set to 16, there will be 16 words written from the PLC to the target display.



Reading Word Data in BTW Files

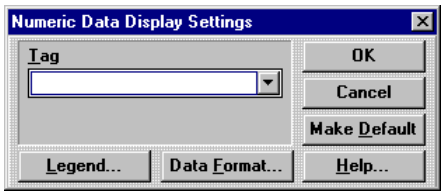
The PLC uses BTW functions to send data to remote modules. This section describes how to use Block Transfer Tag names to read word data from BTW data files in the target display.

To read word information in a data file, you need to specify the name of the data file and the word within the file. The command format used to specify the data is FILENAME[word]. Example: BTW0120[02]. In the following example, the name of the data file is BTW0120 and the size of the file is 16 words. The example illustrates several Tag Names and their relationship to the data file.

BTW0120

Tag Name	Data File Location
BTW0120[00]	Word 0
BTW0120[01]	Word 1
BTW0120[02]	**Word 2**
BTW0120[14]	Word 14
BTW0120[15]	Word 15

This command format allows you to assign a word from the data file to an operator such as a Numeric Data Display. For example, when creating a numeric data display, you are presented with a setting menu that requests a Tag name. If you entered BTW0120[7], the target display would read word 7 from the data file labeled BTW0120 and display it in a numeric field.



Reading Bit Data in BTW Files

This section describes how to use Block Transfer Tag names to read bit data from BTW data files in the target display.

To read bit information in a data file, you need to specify the name of the data file, the word within the file and a bit specifier. The command format used to specify bit data is FILENAME[word]/bit. Example: BTW0120[07]/04. In the following example, the name of the data file is BTW0120 and the size of the file is 16 words. The example illustrates several Tag Names and their relationship to the data file.

BTW0120

Tag Name	Data File Location	Bit Location
BTW0120[00]/00	Word 0	Bit 00
BTW0120[01]/02	Word 1	Bit 02
BTW0120[07]/04	**Word 7**	**Bit 04**
BTW0120[14]/12	Word 14	Bit 12
BTW0120[15]/15	Word 15	Bit 15

Writing Word Data to BTR Files

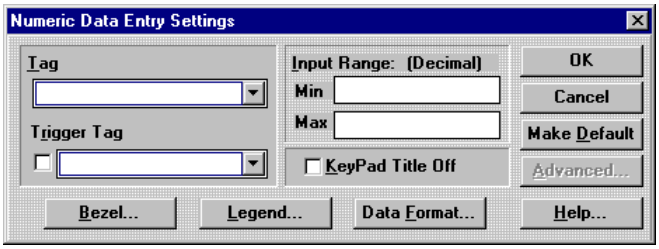
The PLC uses BTR functions to read data from remote modules. This section describes how to use Block Transfer Tag names to write word data to BTR data files in the target display.

To write word information to a data file, you need to specify the name of the data file and the word within the file. The command format used to specify the data is FILENAME[word]. Example: BTR0120[02]. In the following example, the name of the data file is BTR0120 and the size of the file is 16 words. The example illustrates several Tag Names and their relationship to the data file.

BTR0120

Tag Name	Data File Location
BTR0120[00]	Word 0
BTR0120[01]	Word 1
BTR0120[02]	**Word 2**
BTR0120[14]	Word 14
BTR0120[15]	Word 15

This command format allows you to write a word to the data file using an operator such as Numeric Data Entry. For example, when creating a numeric data entry, you are presented with a setting menu that requests a Tag name. If you entered BTR0120[2], the target display would write the data entered from the data entry panel to word 2 in the data file labeled BTR0120.



Writing Bit Data to BTR Files

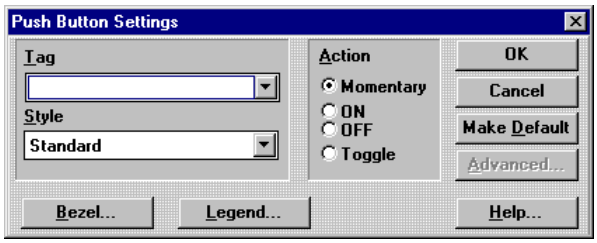
This section describes how to use Block Transfer Tag names to write bit data to BTR data files in the target display.

To write bit information to a data file, you need to specify the name of the data file, the word within the file and a bit specifier. The command format used to specify bit data is FILENAME[word]/bit. Example: BTW0120[07]/04. In the following example, the name of the data file is BTW0120 and the size of the file is 16 words. The example illustrates several Tag Names and their relationship to the data file.

BTR0120

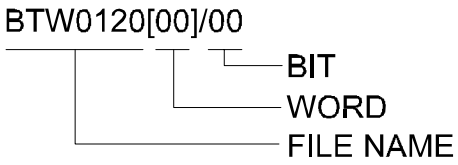
Tag Name	Data File Location	Bit Location
BTR0120[00]/00	Word 0	Bit 00
BTR0120[01]/02	Word 1	Bit 02
BTR0120[07]/04	**Word 7**	**Bit 04**
BTR0120[14]/12	Word 14	Bit 12
BTR0120[15]/15	Word 15	Bit 15

This command format allows you to write a bit to the data file using an operator such as a push button. For example, when creating a push button, you are presented with a setting menu that requests a Tag name. If you entered BTR0120[7]/04, the target display would write bit 4 of word 7 in the data file labeled BTR0120.



Block Transfer Tag Name Summary

The format for block transfer tag names is described below.



Optional Data File Names

The data file names used in previous examples were automatically generated by the software. These names were coded to indicate the rack/group/module address and the type of block transfer. For example, the data file name BTR0120 indicates that the data file is a block transfer read and the emulated slot address is rack 1, group 2, module 0. You have the option of naming these data files anything you want, we just tried to make it easier for you. You can name them BUTTONS, or VALVES, or whatever. The format of the tag name remains the same. The word specifier must be contained in brackets and the bit specifier must be designated by a slash (/). Therefore, VALVES[00]/01 is word 00, bit 01 of data file named VALVES.

There are some precautions when using your own naming system. It becomes difficult to remember what kind of block transfer is associated with optional file names. For example, is VALVES a BTR or BTW file name? We suggest you adopt a naming convention that includes a reference to the type of block transfer. This will prevent you from trying to write a bit to a block transfer read data file.

The name of the data file can be up to 31 characters, so you can be creative with naming conventions. Instead of VALVES, perhaps VALVES(BTW) would better indicate the type of file.

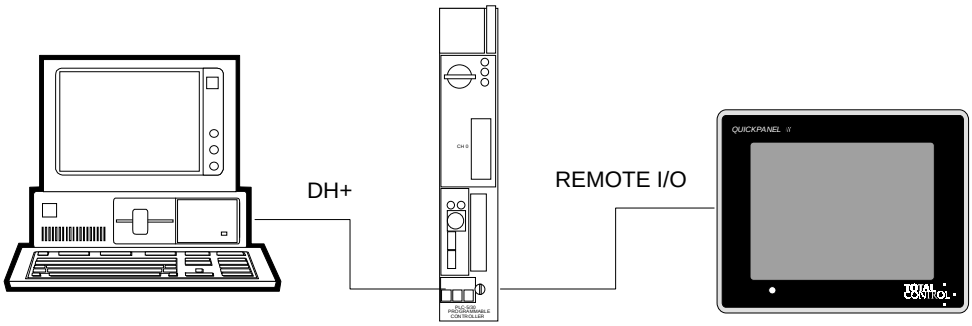
There is also a caution about using automatically named files. Make sure the rack/group/module you pick to emulate will not be needed later on. If you are forced to give up that rack/group/module location, you will be stuck with many operators that now have the wrong file name. For example, if you start out using the file name BTR0120, and you must release rack 01, group 2, module for a real rack, you will be stuck with operators assigned to that file name. You can assign a new rack by turning off the automatic name feature and use the old name, but now it will be very confusing. If you assign your own file names, it will always be easy to remember what the file names are for and how they are used.

Error Codes

The error code table is now as follows:
(02:C0) Fatal error, Detected wrong or missing I/O card
(02:C1) Fatal error, I/O card failed to initialize & start
(02:C2) Fatal error, Invalid configuration (rack, BTR, or BTW)
(02:C3) Fatal error, undefined
(02:C4) I/O card error, command error
(02:C5) I/O card error, status error
(02:C6) I/O card error, watchdog failure
(02:C7) I/O card error, memory failure
(02:C8) I/O card error, passthrough error
(02:C9) I/O card error, Invalid command
(02:CA) I/O card error, undefined
(02:CB) Com error, S1 file failed to open
(02:CC) Com error, I/O link error
(02:CD) Com error, undefined
(02:CE) Com error, undefined
(02:CF) Com error, Timeout (also fe & ff)
(02:FB) Data memory table overflow
(02:FC) Protocol error
(02:FD) Data error
(02:FE) RX timeout
(02:FF) TX timeout or SIO error

Pass Through Mode

QUICKDESIGNER Advanced supports the downloading of application files over the Allen-Bradley Data Highway +, using the PLC-5 Remote I/O Pass-Through feature. The QuickPanel (QP2) is connected as a remote I/O device to the PLC-5. This feature allows the customer to download application files to the QuickPanel without changing cabling, and without having to go from QuickPanel to QuickPanel with a personal computer for direct downloading. The current Pass-Through release of QUICKDESIGNER Advanced requires the use of an S-S technologies Data Highway + card in the personal computer.



AB Data Highway plus (DH+) is the means by which Programmable Logic Controllers and Programming Stations are linked together so that program and status information can be shared among stations on the network.

AB Remote I/O (RIO) is a PLC network that allows control of external racks of I/O via a 2 wire mechanism.

A Rack is a physical and virtual location on the RIO network that contains up to 16 slots. (8 groups, 2 slots/group)

A Slot is both a physical and virtual card location in the Rack that typically holds inputs and outputs, and can hold function modules such as Basic modules. These function modules can contain program data which it gets from the PLC via the Block Transfer mechanism.

Block Transfer is a mechanism by which a PLC can transfer 64 words (128 bytes) of information in one packet to a single slot location via the RIO network.

The Quick Panel can emulate a full set of racks on the AB RIO network. Utilizing Quick Designer configuration software, a Quick Panel can be configured to emulate inputs and outputs (relay closures and sensor inputs) and function module I/O (analog values) and the block transfers associated with them.

The standard download feature uses a serial protocol to send application files directly from a PC to a single Quick Panel. The Pass Through mode is an enhancement to the download operation, which allows files to be sent to a Quick Panel that is already part of an active RIO network application. The user selects a PLC location along with a card and slot information. The application file is sent to the PLC on the Data Highway Plus network. The PLC then uses Block Transfers to send the file out to the rack and slot location on the RIO network.

Pass Through Setup

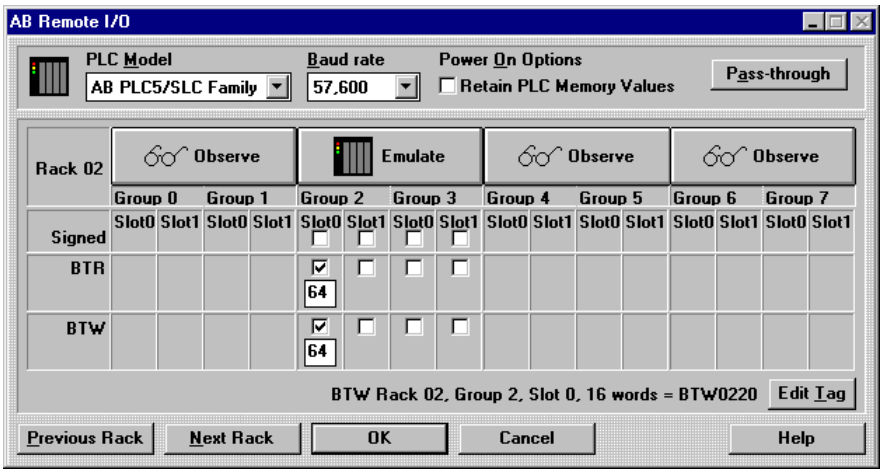
Go to the Project Setup dialog box and select AB Remote I/O as the PLC. Click the Protocol button to display the AB Remote I/O configuration dialog box. Select the PLC type and the Baud rate of the network.

Each Quick Panel on the RIO can emulate one or more quarter racks. For Pass Through to work properly, each Quick Panel must be assigned to its own full quarter rack. No other Quick Panel can share emulation of a rack.

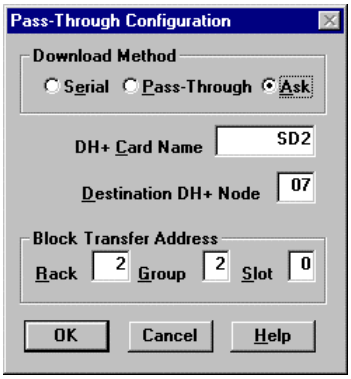
Select an unused rack and select a quarter rack for emulation by clicking the Observe button. Select a BTW and a BTR for a single slot location and assign both to a length of 64. The slot is now setup for a Block Transfer operation, which can be assigned to Pass Through.

Make sure the PLC does not use any BTW or BTR for the selected slot.

In the following example, Rack 2 has been selected. The second quarter rack, consisting of Group 2 and Group 3, has been selected for emulation. Slot 0 has been configured for a BTR of 64 and a BTW of 64.



Click the Pass-through button to display the Pass Through dialog box.



Download Method

Select Serial download to use the standard method of connecting a PC directly to a Quick Panel using an HMI-CAB-C49 cable. Select Pass-Through to download the application file through the Data Highway Plus and Remote I/O network. If you select Ask, the download operation will stop and ask you to select Serial or Pass-Through.

The first time you create a pass through application, it must be downloaded to the QuickPanel using serial download. Subsequent downloads can then be done using pass through.

DH+ Card Name

Name of the card type used for access to the Data Highway Plus. The following name is the default name found in the PT.INI setup file.

SD2 (Sutherland and Shultz)

The PT.INI file contains the Sutherland and Shultz DH+ card setup information. See the PT.INI section for more information.

Destination DH+ Node

This is the node address of the destination PLC.

Note: The node address of the DH+ card in the PC is set to the default address of 61. This address is set in the PT.INI file.

Block Transfer Address

This must be the same address selected as the quarter rack emulation. In the previous example, Rack 2, Group 2, Slot 0 was selected as the slot to use for the Block Transfer operations. Therefore:

Rack = 2
Group = 2
Slot = 0

At this point, Pass Through is assigned to a BTW/BTR. Click Ok to accept the settings and close the dialog box. Click OK in the AB Remote I/O dialog box to complete the setup.

PT.INI File

This file contains setup information for the Sutherland and Shultz DH+ card. The default settings are shown in the following listing. To change the node address of the SD2 card, you must edit the PT.INI file. A download operation will read the file for DH+ card setup information.

Note: If you are running QD3 and other PLC programming software on the same system, make sure only one program is running at a time. If other PLC programming software uses the DH+ card assigned to QD3, then the PT.INI file should be modified to match the settings for the other software. This will allow the card to always appear the same way on the network.

[SD2] *(DH+ Card Name)*

;SourceNode, this is an octal #, DH+ node # of the SD2 card.

SourceNode=61

;BoardAddress, this is a hexadecimal #, address segment of the SD2 card.

BoardAddress=C800 *(see CONFIG.SYS section to configure this address)*

;IOport, this is a hexadecimal #, IO port required by the SD2 card.

IOport=250

;TeminalName is any string, the DH+ name assigned to the SD2 terminal.

TeminalName=TCPpt

CONFIG.SYS

The Sutherland and Shultz DH+ card requires an address segment from C800 to CFFF. This is handled by a command line in the CONFIG.SYS file. For example:

DEVICE=C:\EMM386 X=D000-D7FF

If you are running Windows 95, you can reserve resources by opening the Control Panel\System\Device Manager\Properties\Reserve Resources. Click the Memory button. Add C8000-CFFFF to Settings.

DOWNLOAD

Before the Pass Through operation will work with a unit on the Remote I/O network, a new executable file, and an application file containing the Pass Through Remote I/O setup information must be downloaded to the QuickPanel using the standard serial download. All subsequent downloads can then use the pass through feature on the Remote I/O network.

To change the Rack/Group/Slot assignment for pass through, a new application file must be downloaded to the display using serial download.

To upgrade or reload the device executable, you must use serial download.

Critical faults during a download may require a new device executable file and application file be loaded into the display using serial download.

Aromat

Aromat FP1 (MEWNET)

CAUTION Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Tag Variable Table

Name	Address range	Value range	Writeable	Type
WX,	0-999,	0-65535,	N	integer
WY,	0-999,	0-65535,	Y	integer
WR,	0-875,	0-65535,	Y	integer
WR,	900-999,	0-65535,	N	integer
WL,	0-999,	0-65535,	Y	integer
EV,	0-9999,	0-65535,	Y	integer
SV,	0-9999,	0-65535,	Y	integer
DT,	0-9999,	0-65535,	Y	integer
LD,	0-9999,	0-65535,	Y	bit
FL,	0-65535,	0-65535,	Y	integer
Xaaab,	0000-999F,	0-1,	N	bit
Yaaab,	0000-999F,	0-1,	Y	bit
Raaab,	0000-875F,	0-1,	Y	bit
Raaab,	9000-999F,	0-1,	N	bit
Laaab,	0000-999F,	0-1,	Y	bit
Taaab,	0-9999,	0-1,	N	bit
Caaab	0-9999	0-1,	N	bit

Note: For the bit type variables **aaa** means the address range and **b** the bit specifier from 0-F.

Note: Register 2, bit 2 is R0202, not R202. Use leading 0 for numbers less than 100.

CONFIGURATION

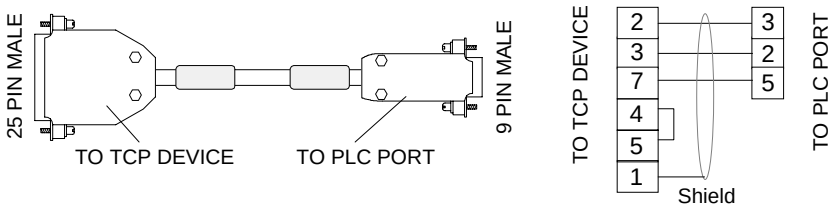
FP1 - Using Quick Designer, click on Setup. Click on Protocol, in Destination ID type 1. Click on Port and set to RS232C, 19200 baud rate, 8 data bits, odd parity, 1 stop bit and none handshake, click OK. Make sure that in the PLC switch the 19200 baud rate is selected.

Remember to select the appropriate target in Display Device Model. The PLC manual and/or programming software may be required to determine the PLC port settings.

Connect the Quick Panel SIO port to the PLC port using the cabling described in the CABLE section.

Cable

This cable connects to a FP1 Smart Cable P/N AFP15201-US9. The FP1 Smart Cable can be obtained from Aromat.

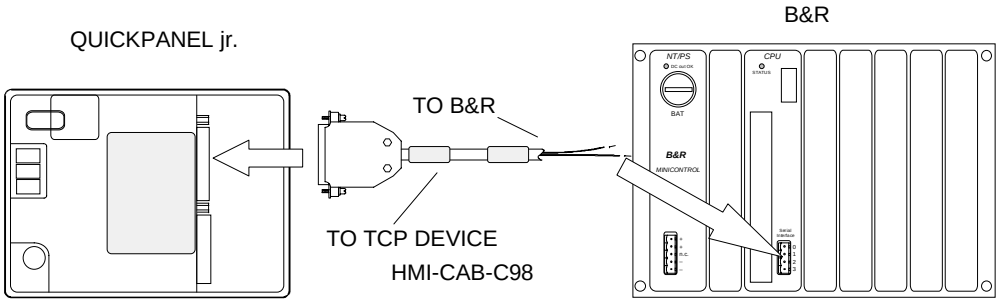


HMI-CAB-C111

B&R

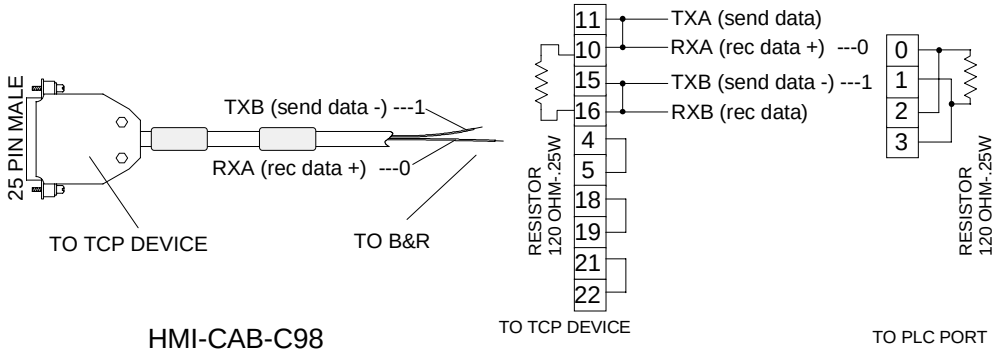
MCCP30, MCCP31, MCCP32

Connecting a target display to a B&R Minicontrol



HMI-CAB-C98 Cable

The HMI-CAB-C98 cable has two wires; one marked 0 and the other marked 1. Make sure the wire marked 0 connects to the 0 terminal and the wire marked 1 connects to the 1 terminal. Jumper 0 to 2 and jumper 1 to 3 on the Phoenix connector. Add a 120 ohm, 1/4 watt resistor between 0 and 1 on the Phoenix connector.

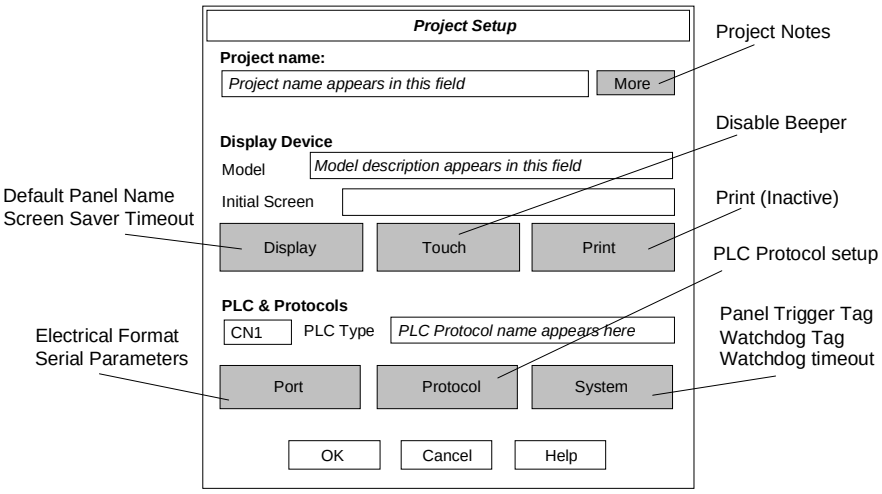


Setup for using a B&R Minicontrol

Use the following procedure to ensure your target device is setup properly for the B&R Minicontrol PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(B&R Minicontrol).** See PLC Type on page 5.

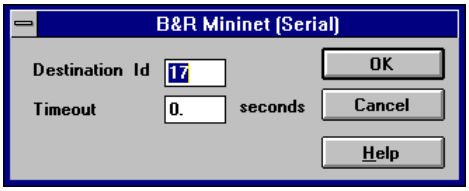
Port Button

Click the Port button to display the Serial Parameters dialog. See Serial Parameters on page 6. The following settings are recommended for **B&R Minicontrol.**

Elect. Format	RS422/485 Half Duplex
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.



Enter the Destination ID (PLC address). Enter Timeout in seconds. Click OK to return to the Project Setup dialog box.

B&R Tag Variable Table

Format: R[A][F]{L}{.#}{_#}

A - address (0 - 7167 in bytes)
F - format
- D - decimal
- B - binary
- T - ascii
- I - integer
- F - floating point

L - length number of bytes
.# - bit number (0 - 7)
_# - station number (0x11 - 0x 1F)

NOTE: Address range 800-1200 is used by the PLC and should not be written to.

Name	Address Range	number of Bytes	Bit suffix Range	Writes supported	Value Range	Sample(s)	Notes:
R#D#	0 - 7167 0 - 7166	1 - 2	NA	yes	0-255 0- 65535	R0D1 R100D2	Caution: Each address is a byte, words should use every other address.
R#B	0 - 7167	Not applicable	0 - 7	yes	0 - 255 0-1	R34B R16B.1	Because only a length of 1 byte is applicable length is not specified.
R#T	0 - 7167	Not applicable	NA	yes	0 - 255 ascii character	R1T	Because only a length of 2 bytes is applicable length is not specified.
R#I#	0 - 7167 0 - 7166	1 - 2	NA	yes	-128 - 127 -32768-32767	R1734I R2	Caution: Each address is a byte, words should use every other address.
R#F	0 - 7164	Not applicable	NA	yes		R200F	Because only a length of 4 bytes is applicable length is not specified. Caution: Each address is a byte, floats should use every fourth address.

CANopen

CAN is a serial bus system especially suited for networking "intelligent" devices as well as sensors and actuators within a system or sub-system.

CAN is a serial bus system with multi-master capabilities, that is, all CAN nodes are able to transmit data and several CAN nodes can request the bus simultaneously. In CAN networks there is no addressing of subscribers or stations in the conventional sense, but instead, prioritized messages are transmitted. A transmitter sends a message to all CAN nodes (broadcasting). Each node decide on the basis of the identifier received whether it should process the message or not. The identifier also determines the priority that the message enjoys in competition for bus access.

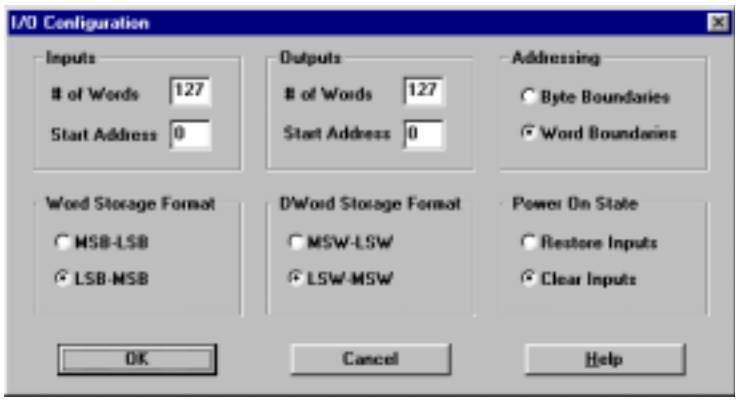
Additional information can be obtained from the www.can-cia.de web site.

Protocol Setup

The Project Setup dialog box can be displayed by clicking the Setup button in the main menu. In the Project Setup dialog box, go to the PLC &Protocols section. Select CANopen from the PLC Type list box. Click the Protocol button to display the following dialog box.

Configure I/O

Click the Configure I/O button to display the following dialog box.



Inputs

Enter the number of Input words up to a maximum of 127 words (254 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same CANopen address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the CANopen Protocol dialog box. The Start Address is provided so that the user can align the tag address entered in Quick Designer with the mapped address in the PLC or host device.

Outputs

Enter the number of Output words up to a maximum of 127 words (254 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same CANopen address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the CANopen Protocol dialog box.

Addressing

Some PLCs use Byte addressing while others use Word addressing. Select Addressing on Byte Boundaries or Word Boundaries, based on your PLC type. The range of valid addresses will be displayed in the CANopen Protocol dialog box, which appears when you close the configuration dialog box.

Word Storage Format

This option allows selecting the way bytes are arranged into words. Selecting MSB-LSB will arrange bytes from the MSB (Most Significant Byte) to the LSB (Least Significant Byte). Selecting LSB-MSB will arrange bytes from the LSB (Least Significant Byte) to the MSB (Most Significant Byte. MSB-LSB will store the MSB in the current address byte and the LSB will be stored in the next byte. LSB-MSB is stored in the opposite order.

Double Word Storage Format

This option allows selecting the way words are arranged into double words. Selecting MSW-LSW will arrange words from the MSW (Most Significant Word) to the LSW (Least Significant Word). Selecting LSW-MSW will arrange words from the LSW (Least Significant Word) to the MSW (Most Significant Word). MSW-LSW will store the MSW in the current address word and the LSW will be stored in the next word. LSW-MSW is stored in the opposite order.

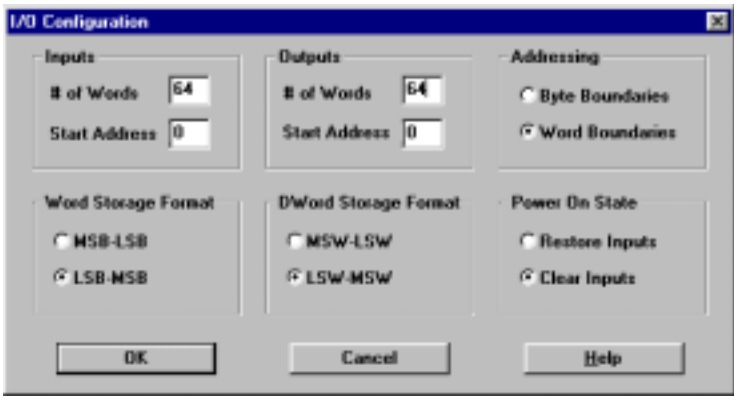
Power On State

A Series B module contains a Battery Backup RAM circuit that maintains a copy of the inputs. The input states can be restored (Restore Inputs) or cleared (Clear Inputs) when power is applied.

Note: ***ONLY*** Series B modules contain the Battery Backup RAM circuit. Series B modules can be identified by the model number on the product label. Example: MODEL: QPI-DVN-202 SERIES B

Example 1:

In this configuration example, Input Words are set to 64, Output Words are set to 64 and Addressing is set to Word Boundaries.

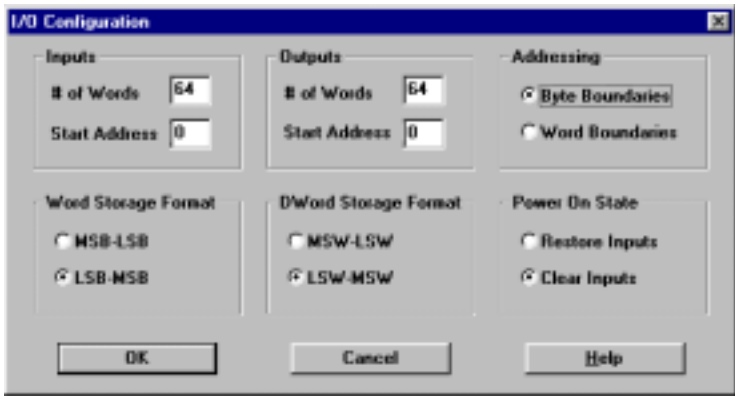


When the OK button is clicked, the following CANopen Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

The number of Input and Output words selected will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 64. The variable name for Input Words is IW and the range for 64 words is IW0 to IW63. Output Words are also set to 64, so the variable name is QW and the range is QW0 to QW63.

Example 2:

In this configuration example, Input Words are set to 64, Output Words are set to 64 and Addressing is set to Byte Boundaries.



When the OK button is clicked, the following CANopen Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

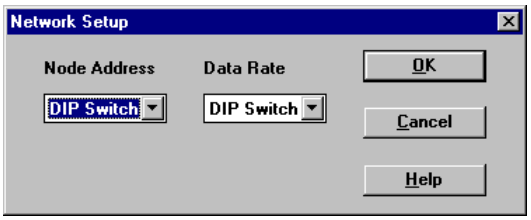
When byte addressing is selected, the valid address ranges appear in a different format in the CANopen Protocol dialog box.

The number of words selected will determine the range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 64. The variable name for Input Bits is I and the range for 64 words is I0.0 to I127.7. Output Words are also set to 64, so the variable name for bit Outputs is Q, with the range of Q0.0 to Q127.7.

A byte is 8 bits, therefore the addressing method is to use a period as the bit delimiter in the addressing format. For example, I0.0 is bit 0 of Word 0, and I0.7 is bit 7 of Word 0.

Setup Network

Click the Setup Network button to display the following dialog.



Select the Node Address from the list box. You can choose the Switch(s) on the CANopen module or an address from the list. The switches are labeled Address Lo and Address High.

Select the Data Rate from the list box. You can choose to use the Switch on the CANopen module or force the data rate to one of the selections in the list.

Tag Variables

Valid tag variable names and address ranges are shown in the CANopen Protocol dialog box when you configure the protocol.

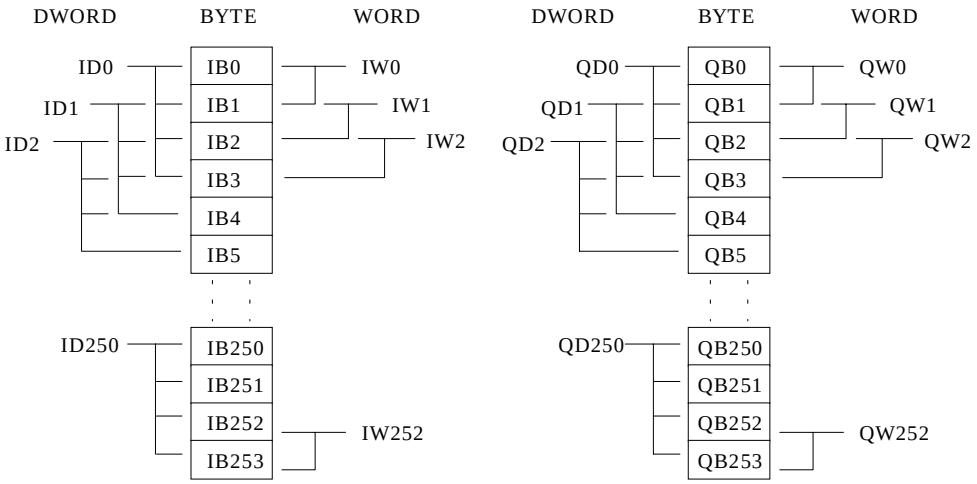
The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type.

Byte Addressing

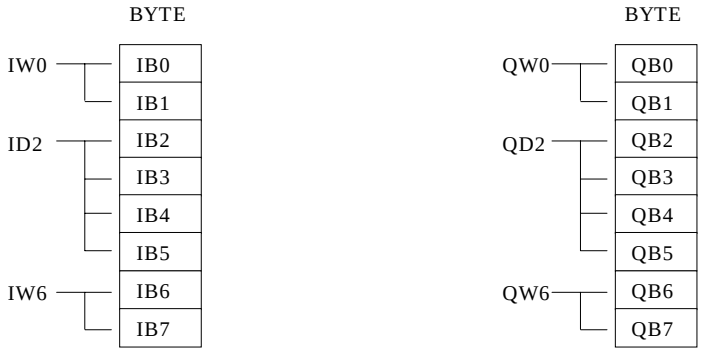
Byte Addressing: Input Words = 127, Output Words = 127, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I253.7	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q253.7	0 to 1	N	Bit
IB (Input Byte)	IB0 to IB253	0 to 255	Y	Byte
QB (Output Byte)	QB0 to QB253	0 to 255	N	Byte
IW (Input Word)	IW0 to IW252	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW252	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID250	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD250	-999999999 to 999999999	N	Dword

Byte Addressing Layout



For the combination of a W, DW, W, the following example shows the layout.

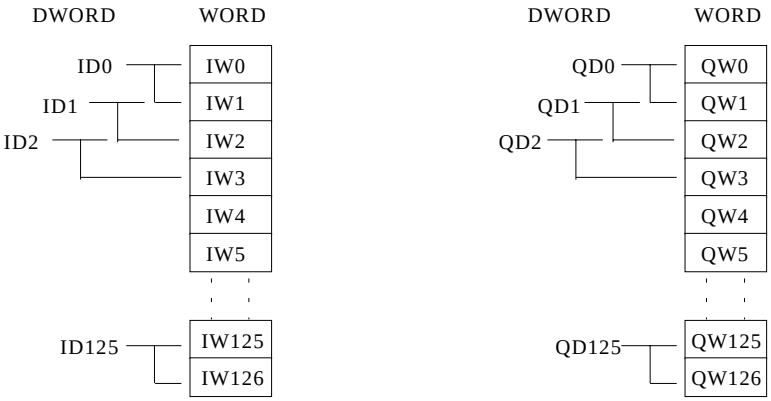


Word Addressing

Word Addressing: Input Words = 127, Output Words = 127, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I126.15	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q126.15	0 to 1	N	Bit
IW (Input Word)	IW0 to IW126	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW126	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID125	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD125	-999999999 to 999999999	N	Dword

Word Addressing Layout



For the combination of a W, DW, W, the following example shows the layout.

Examples

Format	Example	Byte Addressing Description	Word Addressing Description
Iaa.b **	I37.7	Input bit 7 of byte 37 (LSB of word 18)	Input bit 7 of word 37
Qaa.b **	Q37.7	Output bit 7 of byte 37 (LSB of word 18)	Output bit 7 of word 37
IBaa.b	IB37	Input byte at byte 37 (LSB of word 18)	n/a
QBaa.b	QB37	Output byte at byte 37 (LSB of word 18)	n/a
IWaa.bb	IW37	Input word starting at byte 37 (LSB of word 18)	Input word starting at word 37 (byte 74)
QWaa.bb	QW37	Output word starting at byte 37 (LSB of word 18)	Output word starting at word 37 (byte 74)
IDaa.bb	ID37	Input Dword starting at byte 37 (LSB of word 18)	Input Dword starting at word 37 (byte 74)
QDaa.bb	QD37	Output Dword starting at byte 37 (LSB of word 18)	Output Dword starting at word 37 (byte 74)

PLC Comm Errors

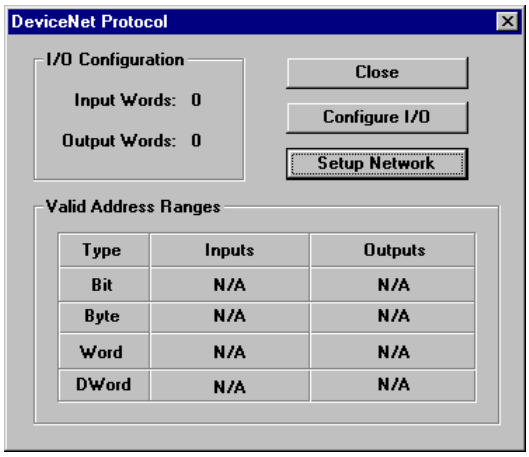
In the event of a communication problem, error messages are displayed on a status line at the bottom of the display.

Error Displayed	Definition
PLC COMM ERROR (02:C0)	Detected wrong or missing I/O card
PLC COMM ERROR (02:C1)	I/O card failed to initialize and start
PLC COMM ERROR (02:C2)	Invalid configuration, must match master
PLC COMM ERROR (02:C3)	Undefined
PLC COMM ERROR (02:C4)	Startup error, S1 file failed to open
PLC COMM ERROR (02:C5)	Startup error, watchdog failure
PLC COMM ERROR (02:C6)	Startup error, memory failure
PLC COMM ERROR (02:C7)	Startup error, undefined
PLC COMM ERROR (02:C8)	I/O Card error, command error
PLC COMM ERROR (02:C9)	I/O Card error, status error
PLC COMM ERROR (02:CA)	I/O Card error, Link Inactive
PLC COMM ERROR (02:CB)	I/O Card error, BBRAM error
PLC COMM ERROR (02:CC)	Comm error, PLC not responding
PLC COMM ERROR (02:CD)	Comm error, I/O Link error
PLC COMM ERROR (02:CE)	Comm error, Improper or invalid response
PLC COMM ERROR (02:CF)	Comm error, undefined

DeviceNet

Protocol Setup

The Project Setup dialog box can be displayed by clicking the Setup button in the main menu. In the Project Setup dialog box, go to the PLC &Protocols section. Select DeviceNet from the PLC Type list box. Click the Protocol button to display the following dialog box.



Configure I/O

Click the Configure I/O button to display the following dialog box.

Inputs

Enter the number of Input words up to a maximum of 32words (64 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same DeviceNet address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the DeviceNet Protocol dialog box. The Start Address is provided so that the user can align the tag address entered in Quick Designer with the mapped address in the PLC or host device.

Outputs

Enter the number of Output words up to a maximum of 32 words (64 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same DeviceNet address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the DeviceNet Protocol dialog box.

Addressing

Some PLCs use Byte addressing while others use Word addressing. Select Addressing on Byte Boundaries or Word Boundaries, based on your PLC type. The range of valid addresses will be displayed in the DeviceNet Protocol dialog box, which appears when you close the configuration dialog box.

Word Storage Format

This option allows selecting the way bytes are arranged into words. Selecting MSB-LSB will arrange bytes from the MSB (Most Significant Byte) to the LSB (Least Significant Byte). Selecting LSB-MSB will arrange bytes from the LSB (Least Significant Byte) to the MSB (Most Significant Byte. MSB-LSB will store the MSB in the current address byte and the LSB will be stored in the next byte. LSB-MSB is stored in the opposite order.

Double Word Storage Format

This option allows selecting the way words are arranged into double words. Selecting MSW-LSW will arrange words from the MSW (Most Significant Word) to the LSW (Least Significant Word). Selecting LSW-MSW will arrange words from the LSW (Least Significant Word) to the MSW (Most Significant Word). MSW-LSW will store the MSW in the current address word and the LSW will be stored in the next word. LSW-MSW is stored in the opposite order.

Power On State

A Series B module contains a Battery Backup RAM circuit that maintains a copy of the inputs. The input states can be restored (Restore Inputs) or cleared (Clear Inputs) when power is applied.

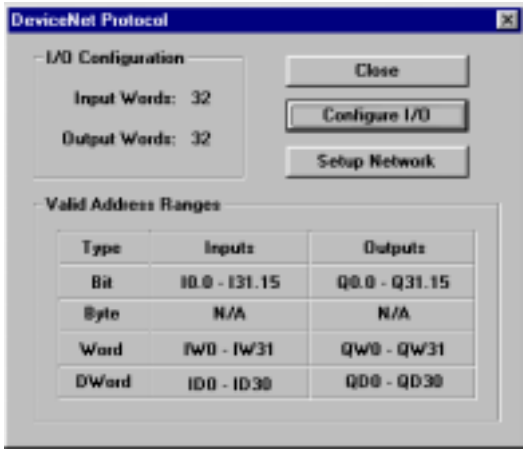
Note: ***ONLY*** Series B modules contain the Battery Backup RAM circuit. Series B modules can be identified by the model number on the product label. Example: MODEL: QPI-DVN-202 SERIES B

Word Addressing

In this configuration example, Input Words are set to 32, Output Words are set to 32 and Addressing is set to Word Boundaries.

When the OK button is clicked, the following DeviceNet Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

The number of Input and Output words selected will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 32. The variable name for Input Words is IW and the range for 32 words is IW0 to IW31. Output Words are also set to 32, so the variable name is QW and the range is QW0 to QW31.



Byte Addressing

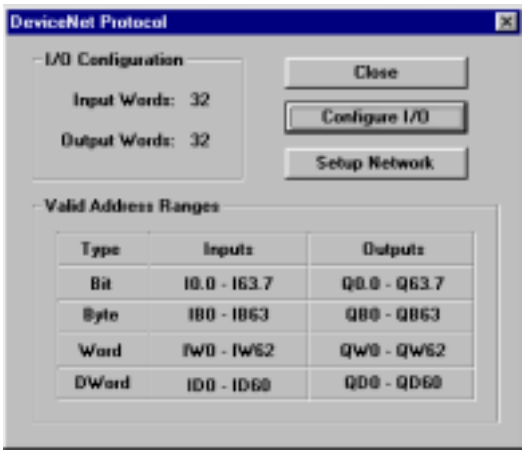
In this configuration example, Input Words are set to 32, Output Words are set to 32 and Addressing is set to Byte Boundaries.

When the OK button is clicked, the following DeviceNet Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

When byte addressing is selected, the valid address ranges appear in a different format in the DeviceNet Protocol dialog box.

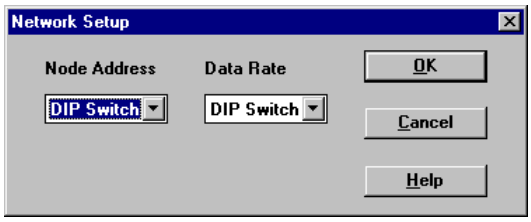
The number of words selected will determine the range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 32. The variable name for Input Bits is I and the range for 64 words is I0.0 to I63.7. Output Words are also set to 32, so the variable name for bit Outputs is Q, with the range of Q0.0 to Q63.7.

A byte is 8 bits, therefore the addressing method is to use a period as the bit delimiter in the addressing format. For example, I0.0 is bit 0 of Word 0, and I0.7 is bit 7 of Word 0.



Setup Network

Click the Setup Network button to display the following dialog.



Select the Node Address from the list box. You can choose the DIP Switch on the Device Net module or an address from the list.

Select the Data Rate from the list box. You can choose to use the DIP Switch on the DeviceNet module or force the data rate to 125, 250 and 500 Kbaud.

Tag Variables

Valid tag variable names and address ranges are shown in the DeviceNet Protocol dialog box when you configure the protocol.

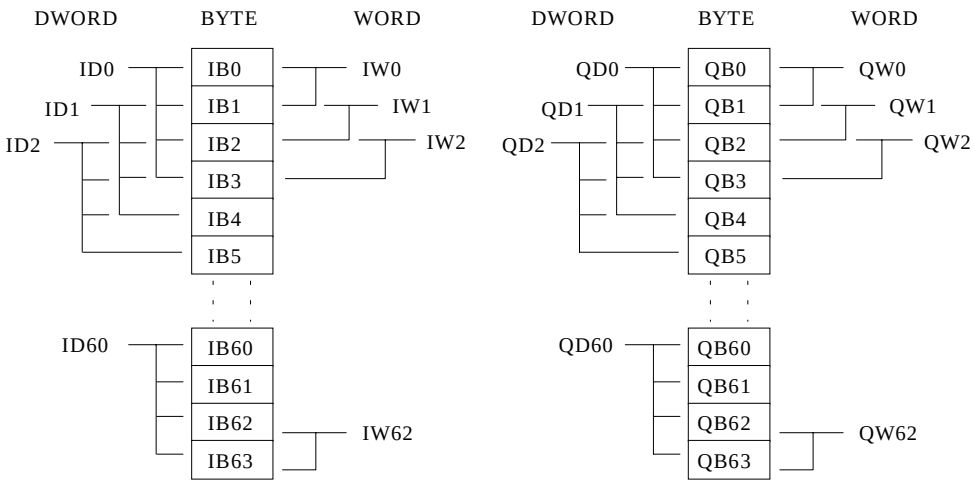
The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type.

Byte Addressing Example

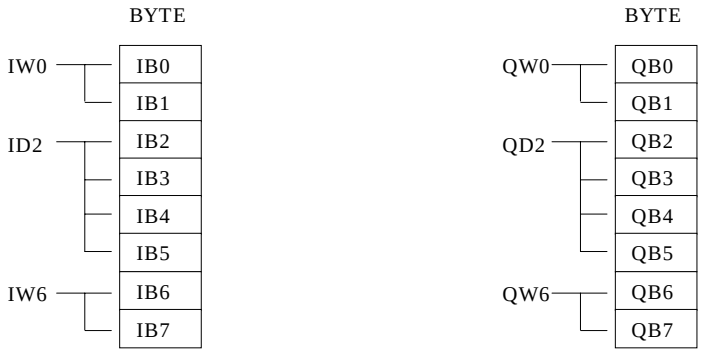
Input Words = 32, Output Words = 32, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I63.7	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q63.7	0 to 1	N	Bit
IB (Input Byte)	IB0 to IB63	0 to 255	Y	Byte
QB (Output Byte)	QB0 to QB63	0 to 255	N	Byte
IW (Input Word)	IW0 to IW62	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW62	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID60	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD60	-999999999 to 999999999	N	Dword

Byte Addressing Layout



For the combination of a W, DW, W, the following example shows the layout.

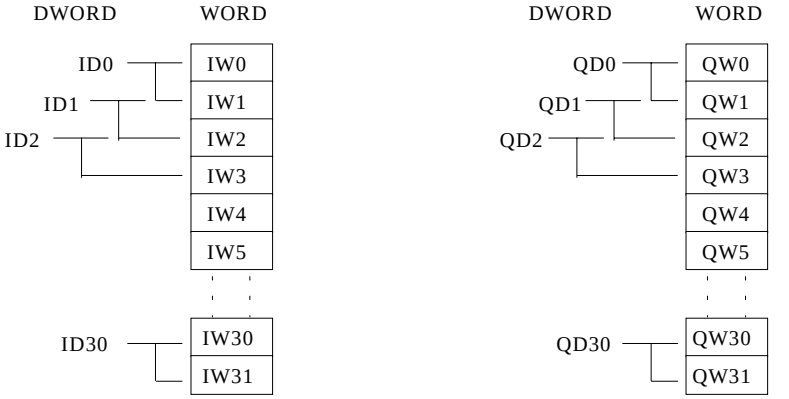


Word Addressing Example

Input Words = 32, Output Words = 32, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I31.15	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q31.15	0 to 1	N	Bit
IW (Input Word)	IW0 to IW31	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW31	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID30	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD30	-999999999 to 999999999	N	Dword

Word Addressing Layout



For the combination of a W, DW, W, the following example shows the layout.

EDS File

The DeviceNet specification defines an *Electronic Data Sheet* (EDS) which is a simple file format that allows product-specific information to be made available by vendors for all other vendors. This makes possible user-friendly configuration tools that can be easily updated without having to constantly revise the configuration software tool. The EDS file is sent on diskette with each DeviceNet module. The diskette part number is 510-1000-054.

PLC Comm Errors

In the event of a communication problem, error messages are displayed on a status line at the bottom of the display.

02:FF:A0 Error initializing Anybus module

02:FF:01 Incorrect Anybus module ID

02:FF:02 Anybus module watchdog time-out (module lockup)

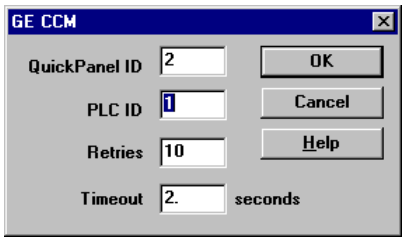
02:FF:03 Network Error - Network not connected

02:FF:10 The timestamp in BBRAM does not match timestamp downloaded. Since the BBRAM is invalid, the inputs will be cleared. This is a non-critical error and it will only be displayed for 2 seconds after power up or reboot. Note that it is normal for this error to be displayed after downloading a new project since a new time stamp is included in the download. If this error is displayed after a reboot or power-cycle, the BBRAM in the unit may be defective.

02:FF:11 The BBRAM has a checksum error. Since the BBRAM is invalid, the inputs will be cleared. This is a non-critical error and it will only be displayed for 2 seconds after power up or reboot. It is possible that the power was lost or the QP was rebooted at the exact instance we were updating the BBRAM and therefore the data in the BBRAM is invalid. However, if this error occurs often, the BBRAM in the unit may be defective.

GECCM

The following picture shows the GE CCM setup dialog box. Enter the QuickPanel ID number and the PLC ID. The default setting for Timeout and Retries is correct for most applications. Click OK to return to Project Setup.



Tag Variable Table

Device Prefix	Address Range Read / Write	Data Range	Data Format	Data Width	Bit write (y/n/rmw)		
32 bit types							
RD	1-65535	-99999999 to 99999999		S	32	n/a	R/W
RF	1-65535	-2147M to 4294M	F	32	n/a	R/W	
Words							
R	1-65535	-32768 to 32767	S(1)	16	y	R/W	
Note 1							
Bits							
I	1-1024	0 - 1	n/a	1	y	R/W	
O	1-1024	0 - 1	n/a	1	y	R/W	

Note: Address Format for the above tag variables is Decimal.
Note 1: The bit delimiter for R Words is a periord (.). The bit range is 0-15 (decimal).

The following are Auxiliary and Channel I/O. This data is mapped to the Register memory. Refer to the Data Comm User Manual Appendix B for more information.

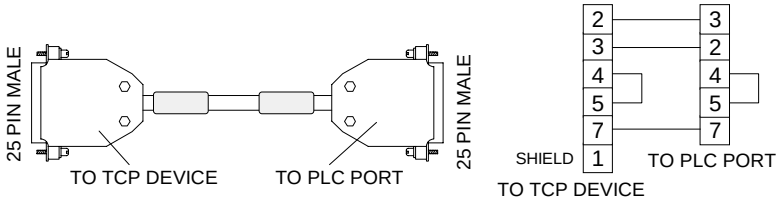
Device Prefix	Channel Range Read / Write	Channel Format	Address Delimiter		Data Width		Bit write (y/n/rmw)
AI	n/a	n/a	n/a	1	y	R/W	
AO	n/a	n/a	n/a	1	y	R/W	
I	1-F	HEX	+	1	y	R/W	
O	1-F	HEX	+	1	y	R/W	
I	0-F	HEX	-	1	y	R/W	
O	0-F	HEX	-	1	y	R/W	

Note: Address Format for the above tag variables is Decimal.
The Node ID delimiter for all variables is an underscore (_). The Node ID Range is 1-90 (decimal).
The Address Range for the Auxiliary and Channel I/O variables is 1-1024.
The Data Range for the Auxiliary and Channel I/O variables is 0 - 1.

Device Name Format	Example	Description & Notes
RDaaaaa_dd	RD1	Register - Signed Double Word
RFaaaaa_dd	RF1	Register – Float
Raaaaa.bb_dd	R1.10	Register - Signed Word
Iaaaa_bb	I1	Input – Bit
Oaaaa_bb	O1	Output – Bit
AIaaaa_bb	AI1	Auxiliary Input – Bit
AOaaaa_bb	AO1	Auxiliary Output – Bit
Ia+bbbb_cc	I1+1	+ Channel Input – Bit
Oa+bbbb_cc	O1+1	+ Channel Output – Bit
Ia-bbbb_cc	I1-1	- Channel Input – Bit
Oa-bbbb_cc	O1-1	- Channel Output - Bit

HMI-CAB-C118 Cable

This cable is used to connect a QuickPanel display to a GE CCM PLC.



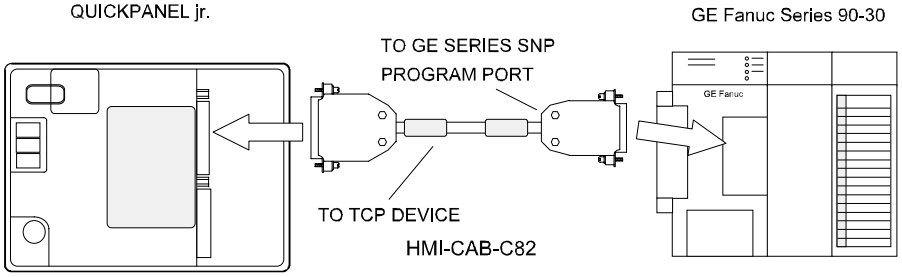
HMI-CAB-C118

GE Fanuc SNP

GE Fanuc 90-30, 90-70

GE Fanuc Single Point Connection (90-30, 90-70)

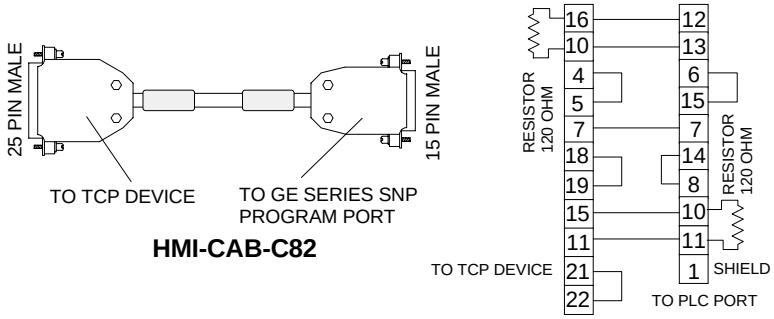
Make sure you connect the target display to the end marked TO TCP DEVICE and connect the GE Series SNP Program Port to the end marked GE SERIES SNP PROGRAM PORT.



HMI-CAB-C82 Cable

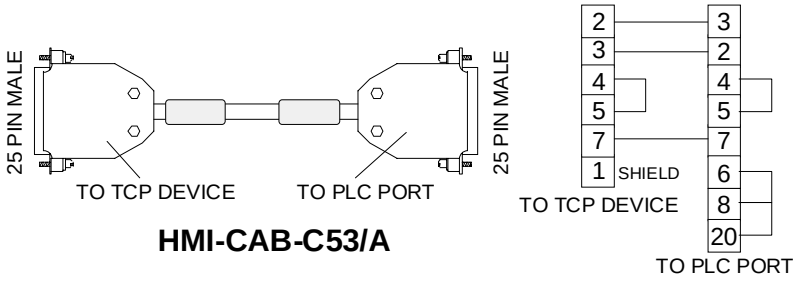
This cable connects the target display CN1 serial port to the GE Series SNP Program Port.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own HMI-CAB-C82 cable using the following wiring diagram.



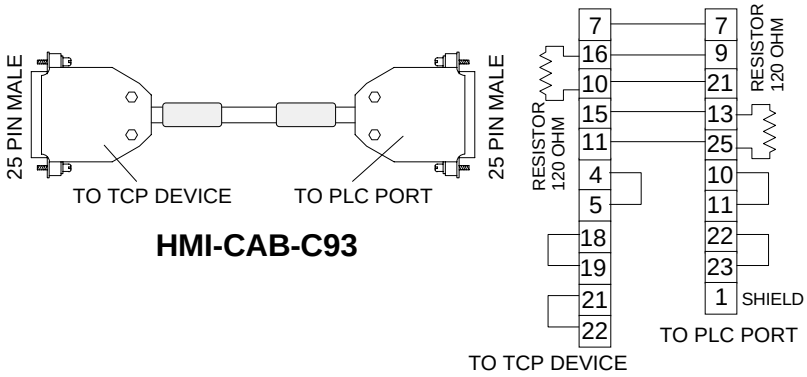
GE 90-30 CMM Module

Use the HMI-CAB-C53 RS232 cable to connect a target display to a GE 90-30 CMM Module RS232 port.



HMI-CAB-C53/A

Use the HMI-CAB-C93 RS485 cable to connect a target display to a GE 90-30 CMM Module RS485 port.



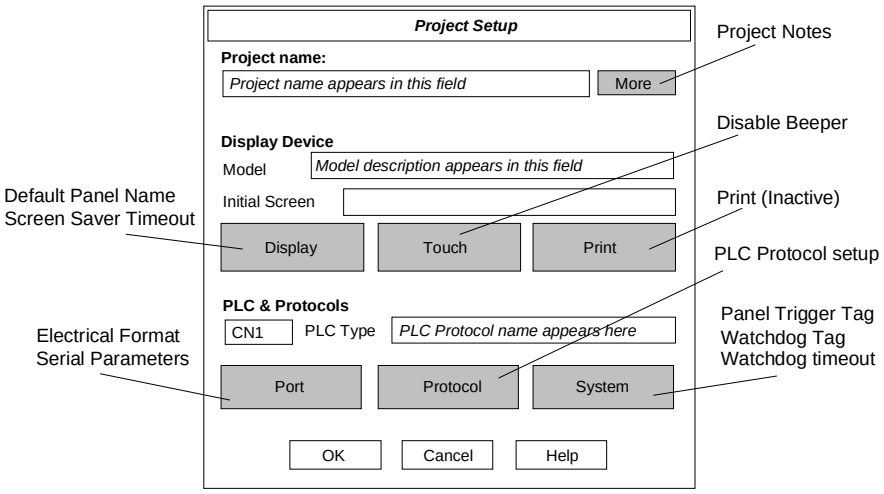
HMI-CAB-C93

Setup for using a GE Fanuc Series 90 PLC

Use the following procedure to ensure your target device is setup properly for the GE Fanuc Series 90 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(GE SNP).** See PLC Type on page 5.

Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **GE SNP**

Elect. Format	RS422/485 Full Duplex (HMI-CAB-C82 or HMI-CAB-C93 Cable)
or	RS232 (HMI-CAB-C53 Cable)
Baud Rate	19200
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

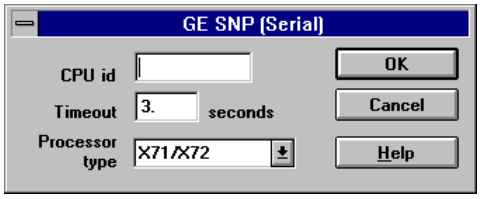
The Port Button for GE SNP has different settings if you are using a State Logic CPU. Change the Parity setting from ODD for the Standard Logic CPU to NONE for the State Logic CPU. Make sure the format is set to RS422/485.

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter the CPU ID. (Match the CPU ID *exactly*, otherwise leave it completely blank.) Enter Timeout in seconds. Select the Processor type from the list box.
X31/X32 = Series 30
X71/X72 = Series 70
X81/X82 = Series 80

Click OK to return to the Project Setup dialog box.



GE 90/30 CMM Module Setup

The following example shows how a CMM Module Port 1 could be configured.

SNP ENABLE:	YES	STOP BITS:	1
SNP MODE:	SLAVE	FLOW CONTROL:	NONE
BAUD RATE:	19200	TIME OUT:	LONG
PARITY:	ODD	TURN-A-ROUND:	NONE

GE SNP Tag Variables

Format: Gnfffaaa:bb
The leading 'G' may be substituted with a '%'
n is the memory type of the variable
fff is the data type of the variable
aaa is the address of the variable (range 1--??? Decimal)
:bb is the bit number of the variable (supported only where specified)

Tag variable names are combinations of memory type names and data type modifiers. For example, the tag name RI is the memory type R and the data type I or Integer. This R register is read as an Integer. The % sign that precedes each tag name is a requirement of the protocol. Therefore, to read an R register as an Integer, define the tag variable as %RI. Example, %RI200 is register 200 read as an integer.

Tag variable names are combinations of register names and modifiers. For example, the tag name RI is the register name R and the modifier I or Integer. This R register is read as an Integer. The % sign that precedes each tag name is a requirement of the protocol. Therefore, to read an R register as an Integer, define the tag variable as %RI. Example, %RI200 is register 200 read as an integer.

When using the Text Display, make sure the tag variable is a %RA. Only 32 characters at a time can be displayed. Make sure the character length is set to a value of 32 or less. Use the tag editor to modify the tag attributes.

%RBT is the only word variable that supports bit reading. The format is %RBT:bb where :bb is the bit number 0-15. For example, %RBT100:06 is register word 100, bit 6. %RBT is read only with no optional destination ID supported.

Device Prefix	Address Range Min./Max.	Data Range Min./Max.	Write	Description & Notes
%RA	1-65536	0 - 65535	Yes	Register ASCII
%RBT(1)	1-65536	0 - 1	No	Register Bit
%RBD4	1-65536	0 - 9999	Yes	Register BCD
%RI	1-65536	-32768 to 32767	Yes	Register Integer
%RUI	1-65536	0 - 65535	Yes	Register Unsigned Integer
%RLI(2)	1-65535	-99999999 to 99999999	Yes	Register Long Integer
%RLUI(2)	1-65535	0 - 99999999	Yes	Register Long Unsigned Integer
%RR(2)	1-65535	-99999999 to 99999999	Yes	Register Real
%AII	1-65536	-32768 to 32767	Yes	Analog Input Integer
%AIUI	1-65536	0 - 65535	Yes	Analog Input Unsigned Integer
%AIR(2)	1-65535	-99999999 to 99999999	Yes	Analog Input Real
%AQI	1-65536	-32768 to 32767	No	Analog Output Integer
%AQUI	1-65536	0 - 65535	No	Analog Output Unsigned Integer
%AQR(2)	1-65535	-99999999 to 99999999	No	Analog Output Real
%IBY	1-8192	0 - 255	Yes(3)	Discrete Input Byte
%IBI	1-65536	0 - 1	Yes(3)	Discrete Input Bit
%QBY	1-8192	0 - 255	No	Discrete Output Byte
%QBI	1-65536	0 - 1	No	Discrete Output Bit
%TBY	1-8192	0 - 255	Yes	Temporary Byte
%TBI	1-65536	0 - 1	Yes	Temporary Bit
%MBY	1-8192	0 - 255	Yes	Internal Byte
%MBI	1-65536	0 - 1	Yes	Internal Bit
%SXBY	1-512	0 - 255	No	Discrete System Register Byte
%SXBI	1-4096	0 - 1	No	Discrete System Register Bit
%SABY	1-512	0 - 255	No	Discrete System Register A Byte
%SABI	1-4096	0 - 1	No	Discrete System Register A Bit
%SBBY	1-512	0 - 255	No	Discrete System Register B Byte
%SBBI	1-4096	0 - 1	No	Discrete System Register B Bit
%SCBY	1-512	0 - 255	No	Discrete System Register C Byte
%SCBI	1-4096	0 - 1	No	Discrete System Register C Bit
%GBY	1-8192	0 - 255	Yes	Global Byte
%GBI	1-65536	0 - 1	Yes	Global Bit

Note 1: Bit specification required
Note 2: Uses 2 registers
Note 3: Input points may only be written to if they are not assigned to physical inputs in the PLC's I/O configuration.

GE Fanuc SNPX

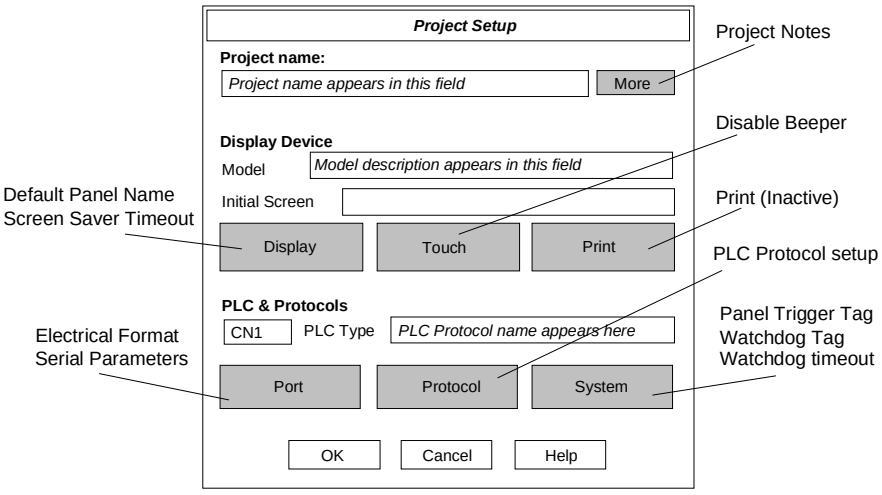
GE SNPX protocol provides multi-drop capabilities for GE Series 90 PLC Processors.

Setup for using a GE Fanuc Series 90 PLC:

The following procedure outlines the typical default settings of the GE SNP program port of the GE series 90 PLC. NOTE: This setup procedure DOES NOT guarantee that your PLC is configured similarly. This is the QuickPanel's default communication setting. These setting were selected because of the default settings of the PLC. Please check communication settings on the PLC to ensure trouble-free communication.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(GE SNPX)**

Port Button

Click on the port button to display the serial parameters dialog box. The port values are automatically set to standard PLC default values. **NOTE:** This setup procedure DOES NOT guarantee that your PLC is configured similarly. This is the QuickPanel's default communication setting. These setting were selected because of the default settings of the PLC. Please check communication settings on the PLC to ensure trouble-free communication.

The following settings are recommended for **GE SNPX** protocol

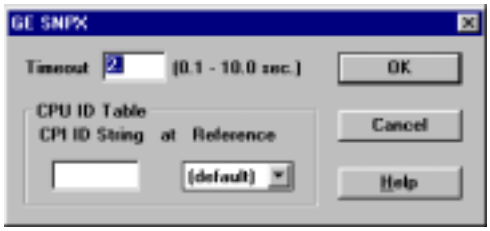
Elect. Format	RS232C (use C53 cable to CMM Module port 1) RS485 half duplex (use C82 cable to SNP port) RS485 half duplex (use C93 cable to CMM Module port 2)
Baud Rate	19200
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

Note: The C82 cable uses a 15-pin male connector. The C93 cable uses a 25-pin male connector.

Note: The SNP port supports multi-drop only on the 90/30, not the 90/70 processors.

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.



Time out:

The time out value (in sec.) is the time used by the protocol to reconnect to the QuickPanel if the QuickPanel did not respond during communications. This value can range from .2 to 10.0 seconds (tenth of second is supported).

CPU ID String:

The CPU ID string area allows up to 6 alphanumeric characters to be entered. This area specifies the PLC address the QuickPanel will communicate to. Up to 27 PLC addresses can be assigned including a [default] address. A blank in the CPU ID string indicates a [NULL] address selection in the PLC. **Note:** With the GE 90-30, the string variable must be in all capitals to function (ex. abcd is not valid and will not communicate. ABCD is a valid address).

Reference:

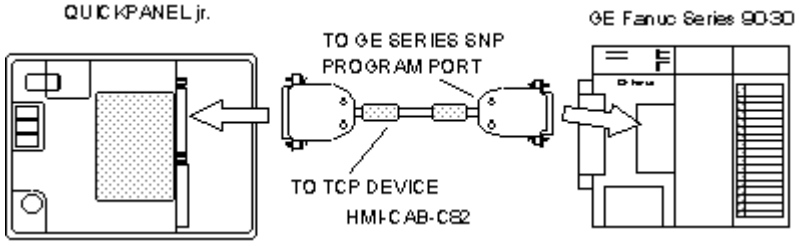
The reference section of the CPU ID sets up the address variable that will be used throughout your QuickPanel project. The Reference is associated with the CPU ID String by selecting the reference letter (_A, _B, _C, etc.) then typing in the 6-character address of the PLC (or leave blank for a NULL PLC address).

The [default] setting for Reference is used when there is no _[letter] specified in the object tag address.

Click OK to save all changes in the SNPX protocol and return to the Project Setup dialog box.

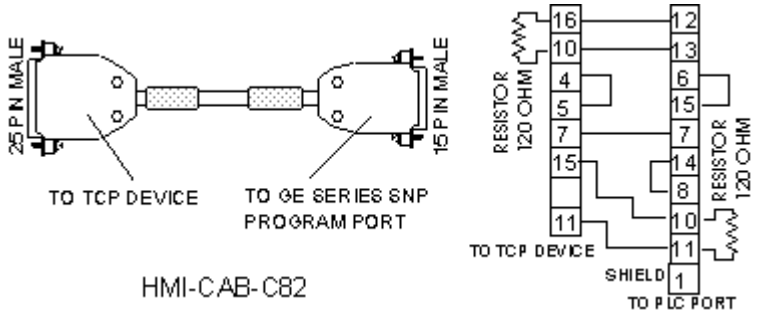
Connecting a target display to GE SERIES SNP

Make sure you connect the target display to the end marked TO TCP DEVICE and connect the GE Series SNP Program Port to the end marked GE SERIES SNP PROGRAM PORT.



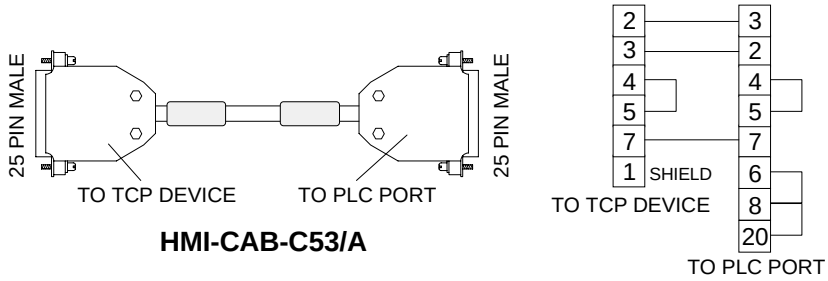
HMI-CAB-C82 Cable

This cable connects the target display serial port to the GE Series 90 SNP Program Port.

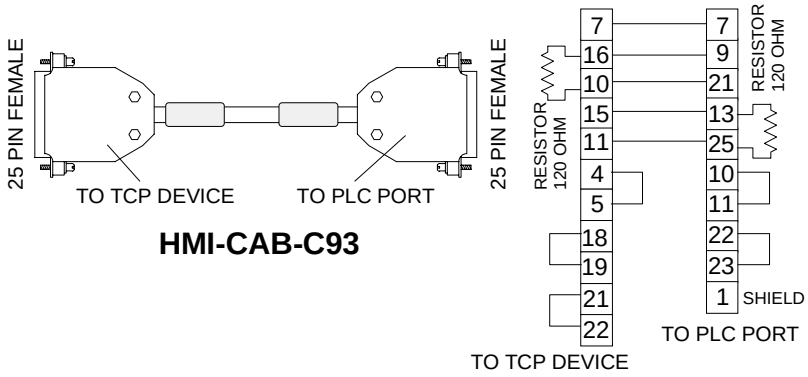


GE 90-30 CMM Module

Use the HMI-CAB-C53 RS232 cable to connect a target display to a GE Series 90 CMM Module RS232 port.

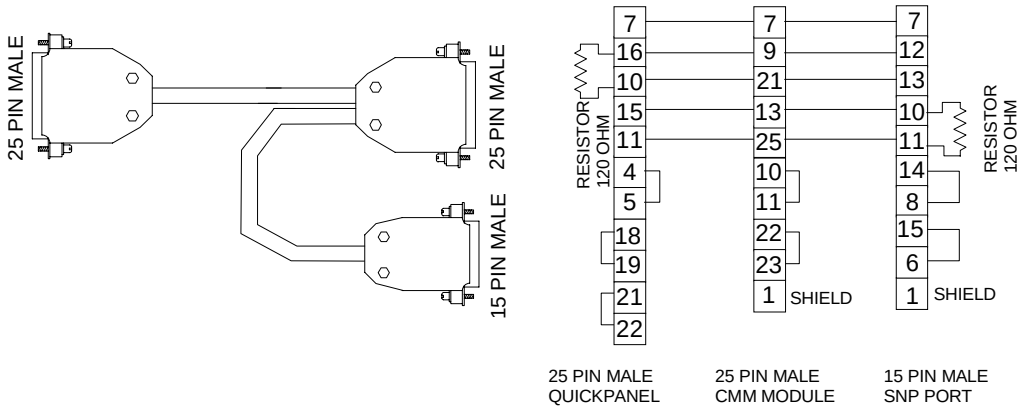


Use the HMI-CAB-C93 RS485 cable to connect a target display to a GE Series 90 CMM Module RS485 port.



Multi-Drop Cable Connection

Because Total Control does not provide a multi-connection cable for the SNPX protocol, the user must make the connection cable. The diagram below should help you make a multiple connection cable. This *sample* cable could be used to connect a QuickPanel to a CMM module and to a SNP port. The actual cable will depend on your system configuration. See tag variable description for multi-connection addressing



Tag Variable Table

GE SNPX Tag Variables:

Format: Gnfffaaa:bb\p_?
The leading 'G' may be substituted with a '%'
n is the memory type of the variable
fff is the data type of the variable
aaa is the address of the variable (range 1--??? Decimal)
:bb is the bit number of the variable (supported only where specified)
_? Is the address of the PLC where data will be sent and/or read

Addressing example:

%RUI300 This address will communicate to the PLC address specified as [default]

%IBI25_D This address will communicate with the PLC specified in Reference address D

%AQI100_ABCD This address will not communicate with any PLC because direct PLC addressing is not allowed

%MBY_abcd This address will not communicate with any PLC because direct PLC addressing is not allowed and the address must be in all capitals

Tag variable names are combinations of memory type names and data type modifiers. For example, the tag name RI is the memory type R and the data type I or Integer. This R register is read as an Integer. The % sign that precedes each tag name is a requirement of the protocol. Therefore, to read an R register as an Integer, define the tag variable as %RI. Example, %RI200 is register 200 read as an integer.

When using the Text Display, make sure the tag variable is a %RA. Only 32 characters at a time can be displayed. Make sure the character length is set to a value of 32 or less. Use the tag editor to modify the tag attributes.

%RBT is the only word variable that supports bit reading. The format is %RBT:bb where :bb is the bit number 0-15. For example, %RBT100:06 is register word 100, bit 6. %RBT is read only with no optional destination ID supported.

Device Prefix	Address Range Min./Max.	Data Range Min./Max.	Write	Description & Notes
%RA	1-65536	0 - 65535	Yes	Register ASCII
%RBT(1)	1-65536	0 - 1	No	Register Bit
%RBD4	1-65536	0 - 9999	Yes	Register BCD
%RI	1-65536	-32768 to 32767	Yes	Register Integer
%RUI	1-65536	0 - 65535	Yes	Register Unsigned Integer
%RLI(2)	1-65535	-99999999 to 99999999	Yes	Register Long Integer
%RLUI(2)	1-65535	0 - 99999999	Yes	Register Long Unsigned Integer
%RR(2)	1-65535	-99999999 to 99999999	Yes	Register Real
%AII	1-65536	-32768 to 32767	Yes	Analog Input Integer
%AIUI	1-65536	0 - 65535	Yes	Analog Input Unsigned Integer
%AIR(2)	1-65535	-99999999 to 99999999	Yes	Analog Input Real
%AQI	1-65536	-32768 to 32767	No	Analog Output Integer
%AQUI	1-65536	0 - 65535	No	Analog Output Unsigned Integer
%AQR(2)	1-65535	-99999999 to 99999999	No	Analog Output Real
%IBY	1-8192	0 - 255	Yes(3)	Discrete Input Byte
%IBI	1-65536	0 - 1	Yes(3)	Discrete Input Bit
%QBY	1-8192	0 - 255	No	Discrete Output Byte
%QBI	1-65536	0 - 1	No	Discrete Output Bit
%TBY	1-8192	0 - 255	Yes	Temporary Byte
%TBI	1-65536	0 - 1	Yes	Temporary Bit
%MBY	1-8192	0 - 255	Yes	Internal Byte
%MBI	1-65536	0 - 1	Yes	Internal Bit
%SXBY	1-512	0 - 255	No	Discrete System Register Byte
%SXBI	1-4096	0 - 1	No	Discrete System Register Bit
%SABY	1-512	0 - 255	No	Discrete System Register A Byte
%SABI	1-4096	0 - 1	No	Discrete System Register A Bit
%SBBY	1-512	0 - 255	No	Discrete System Register B Byte
%SBBI	1-4096	0 - 1	No	Discrete System Register B Bit
%SCBY	1-512	0 - 255	No	Discrete System Register C Byte
%SCBI	1-4096	0 - 1	No	Discrete System Register C Bit
%GBY	1-8192	0 - 255	Yes	Global Byte
%GBI	1-65536	0 - 1	Yes	Global Bit

Note 1: Bit specification required
Note 2: Uses 2 registers
Note 3: Input points may only be written to if they are not assigned to physical inputs in the PLC's I/O configuration.

GE GENIUS

GE GENIUS Information

CAUTION

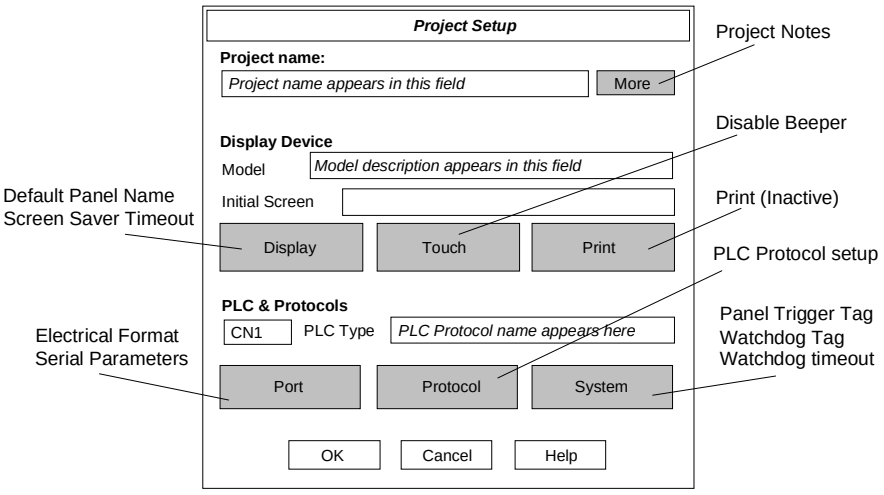
Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 or QP3 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Setup for using a GE GENIUS Option Module

Use the following procedure to ensure your target device is setup properly for the GE GENIUS. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

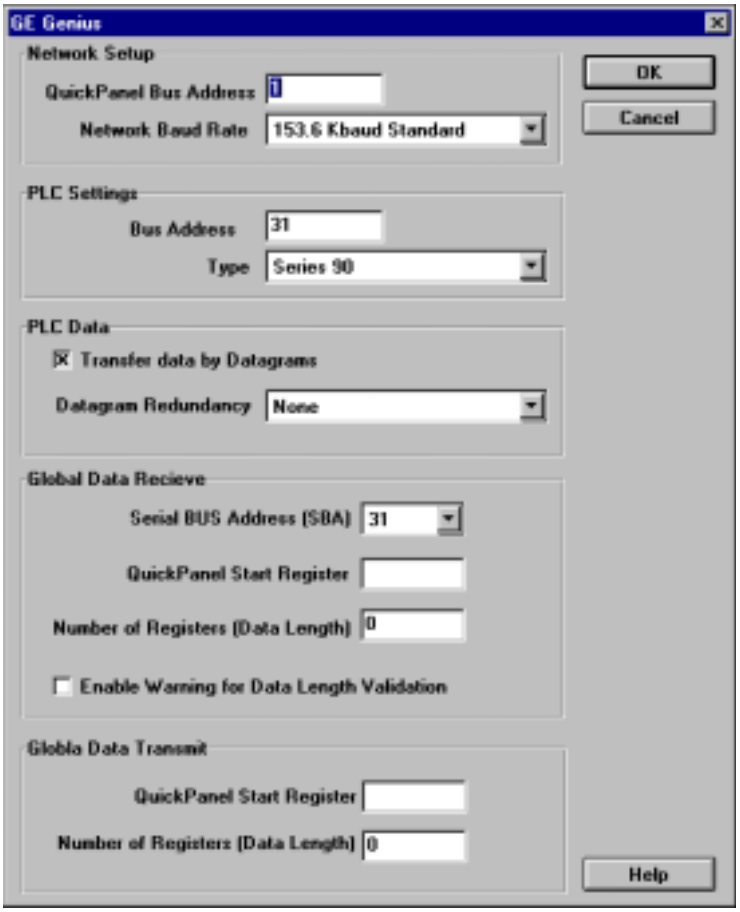
Select the PLC type from the list box. **(GE GENIUS).** See PLC Type on page 5.

Port Button

No settings are required since GE GENIUS communication parameters are controlled by the option module.

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.



Network Setup

Quick Panel Bus Address

This is the QuickPanel Bus Address number on the Genius bus. It must be unique. This means that no other device can have the same Genius bus ID number. Valid bus ID numbers are 0 – 31.

Network Baud Rate

This is the speed at which the Genius bus is communicating. The available settings are:

38.4 Kbaud

76.8 Kbaud

153.6 Kbaud Std (Standard)

153.6 Kbaud Ext (Extended)

PLC Settings

Bus Address

This is the node number of the Genius Bus controller. It must be unique. This means that no other device can have the same Genius bus ID number. Valid bus ID numbers are 0 – 31.

Type

There are two types of PLC that the QuickPanel can be configured to work with. The options are:

Series 6

Series 90

PLC Data

Transfer data by Datagrams

If no global data is being transmitted between the Quick Panel and PLC, datagrams must be enabled to transfer information between them. If global data is being used for the transfer of information, datagrams can be enabled to read or write panel tag variables that are not part of the global data receive or send tables in the QuickPanel. All QuickPanel tag variables will be updated from the global data receive table unless they are not included within the table, then a datagram will be sent to the PLC to obtain the status of the tag variable.

Datagram Redundancy

If no global data is being transmitted between the QuickPanel and PLC, datagram redundancy may be used. The first two settings in the Combo-box provided require the use of **Trimation's HBR30 Hot Backup Redundant System** which is activated by PLC address %M1020 or %M1008. The third utilizes the **Power-loss** system.

Global Data Receive

It is possible to configure the QuickPanel to receive data from multiple sources on the GENIUS bus. All data sources for the QuickPanel are configured in this section of the Protocol setup menu.

Serial BUS Address (SBA)

This setting is used to select the PLC that you wish to receive data from.

QuickPanel Start Register

A block of registers will be sent from the PLC data table to the QuickPanel at this starting address. If no global data is being transmitted from the PLC to the QuickPanel leave this section blank.

Valid PLC variable address	
Series 6	%R
Series 90/XX	%AI, %AQ, %I, %Q, %G, %R

Number of Registers (Data Length)

The number of words in the data block to be received by the QuickPanel. Valid values for this entry are 1 through 64.

Enable Warning for Data Length Validation

Checking this box will cause the QuickPanel to display an error when the Data Length that it receives from the PLC does not match the Data Length that is configured within the Number of Registers field.

Global Data Transmit

QuickPanel Start Register

A block of information will be transmitted from the QuickPanel to the PLC data table at this starting address. If no global data is being transmitted from the Quick Panel to the PLC leave this section blank.

Valid PLC variable address

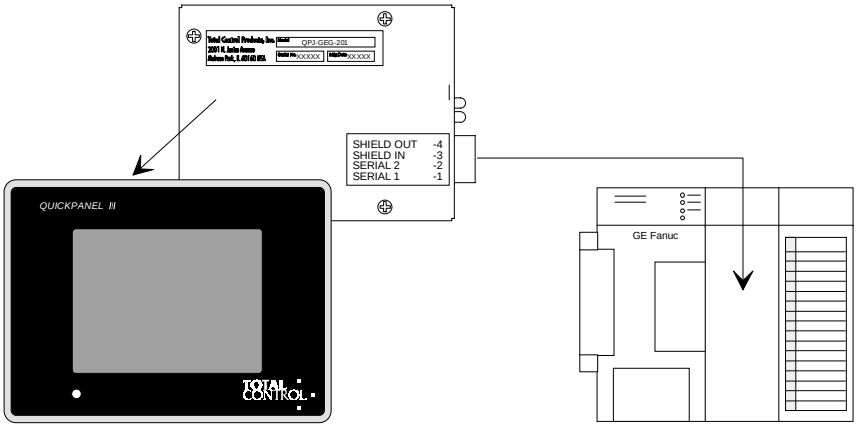
Series 6	%R
Series 90/XX	%AI, %AQ, %I, %Q, %G, %R

Number of Registers (Data Length)

The number of words in the data block to be transmitted by the QuickPanel. Valid values for this entry are 1 through 64.

Cable Connection

Using the cable type selected for the application, connect the devices as shown in the following figure.

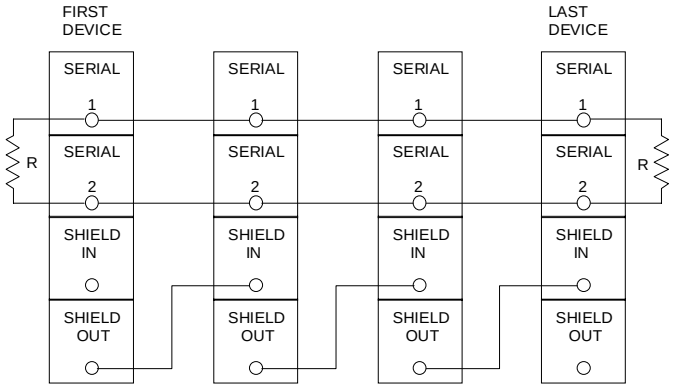


QUICKPANEL jr. GE Fanuc Series 90-30

CAUTION

The bus shield wires are not insulated; do not permit them to touch other wires or terminals. Spaghetti tubing should be used to cover these wires.

Connect Serial 1 terminals of adjacent devices and the Serial 2 terminals of adjacent devices. Connect Shield In to the Shield Out terminal of the previous device. (For the first device on the bus, Shield In is not connected.)Connect Shield Out to the Shield In terminal of the next device. (For the last device on the bus, Shield Out is not connected.)



Tag Variable Table

Format: Gnfffaaa:bb\p_?

The leading 'G' may be substituted with a '%'

n is the memory type of the variable

fff is the data type of the variable

aaa is the address of the variable (range 1--??? Decimal)

:bb is the bit number of the variable (supported only where specified)

_? Is the address of the PLC where data will be sent and/or read

Addressing example:

%RUI300 This address will communicate to the PLC address specified as [default]

%IBI25_D This address will communicate with PLC 'D' where 'D' is a valid address from 1 – 31

Tag variable names are combinations of register names and modifiers. For example, the tag name RI is the register name R and the modifier I or Integer. This R register is read as an Integer. The % sign that precedes each tag name is a requirement of the protocol. Therefore, to read an R register as an Integer, define the tag variable as %RI. Example, %RI200 is register %R200 read as an integer.

When using the Text Display, make sure the tag variable is a %RA. Only 32 characters at a time can be displayed. Make sure the character length is set to a value of 32 or less. Use the tag editor to modify the tag attributes.

%RBT is the only word variable that supports bit reading. The format is %RBT:bb where :bb is the bit number 0-15. For example, %RBT100:06 is register word 100, bit 6. %RBT is read only with no optional destination ID supported.

Device Prefix	Address Range Min./Max.	Data Range Min./Max.	Write	Description & Notes
%RA	1-65536	0 - 65535	Yes	Register ASCII
%RBT(1)	1-65536	0 - 1	No	Register Bit
%RBD4	1-65536	0 - 9999	Yes	Register BCD
%RI	1-65536	-32768 to 32767	Yes	Register Integer
%RUI	1-65536	0 - 65535	Yes	Register Unsigned Integer
%RLI(2)	1-65535	-99999999 to 99999999	Yes	Register Long Integer
%RLUI(2)	1-65535	0 - 99999999	Yes	Register Long Unsigned Integer
%RR(2)	1-65535	-99999999 to 99999999	Yes	Register Real
%AII	1-65536	-32768 to 32767	Yes	Analog Input Integer
%AIUI	1-65536	0 - 65535	Yes	Analog Input Unsigned Integer
%AIR(2)	1-65535	-99999999 to 99999999	Yes	Analog Input Real
%AQI	1-65536	-32768 to 32767	No	Analog Output Integer
%AQUI	1-65536	0 - 65535	No	Analog Output Unsigned Integer
%AQR(2)	1-65535	-99999999 to 99999999	No	Analog Output Real
%IBY	1-8192	0 - 255	Yes	Discrete Input Byte
%IBI	1-65536	0 - 1	Yes	Discrete Input Bit
%QBY	1-8192	0 - 255	No	Discrete Output Byte
%QBI	1-65536	0 - 1	No	Discrete Output Bit
%TBY	1-8192	0 - 255	Yes	Temporary Byte
%TBI	1-65536	0 - 1	Yes	Temporary Bit
%MBY	1-8192	0 - 255	Yes	Internal Byte
%MBI	1-65536	0 - 1	Yes	Internal Bit
%SXBY	1-512	0 - 255	No	Discrete System Register Byte
%SXBI	1-4096	0 - 1	No	Discrete System Register Bit
%SABY	1-512	0 - 255	No	Discrete System Register A Byte
%SABI	1-4096	0 - 1	No	Discrete System Register A Bit
%SBBY	1-512	0 - 255	No	Discrete System Register B Byte
%SBBI	1-4096	0 - 1	No	Discrete System Register B Bit
%SCBY	1-512	0 - 255	No	Discrete System Register C Byte
%SCBI	1-4096	0 - 1	No	Discrete System Register C Bit
%GBY	1-8192	0 - 255	Yes	Global Byte
%GBI	1-65536	0 - 1	Yes	Global Bit

Note 1: Bit specification required
Note 2: Uses 2 registers

As the **GE Genius driver** has been revised to allow for data to be received from more than one node on the **GE Genius Bus** when using **Global Data**, any **Global Data Receive** addresses which are transmitted from a Node other than the one set in the **PLC Settings** area of the **Protocol** setup of a QuickDesigner project will require a node identifier which consists of an underscore followed by the address of that node. For example if your default address is set to 31 and you wish to receive data from address 19 and placed in address **%RI5** of the QuickPanel you will need to create the tag **%RI5_19**. In order for this to function properly the **Global Data Receive** area of the **Protocol** setup must be updated by clicking on the Combo-Box provided, selecting the correct node address (19) and entering the correct **QuickPanel Start Register** (%R5) and **Data Length** (1).

Datagrams can also be sent to, and received from, multiple nodes on the network. If the basic addressing scheme (e.g. **%RI10**) is being used for datagrams they will be sent to the node entered in the **PLC Settings** area of the **Protocol** setup of the QuickDesigner project. Any datagrams that are to be sent to other node addresses must be entered the same as the **Global Data** addresses using the node delimiter (e.g. **%RI10_25**).

Series 6 or 90/XX PLC's

Series 6 and 90/XX PLC's can communicate with a QuickPanel equipped with the optional GE Genius bus interface module. This module can support both datagrams and global data.

Datagrams are messages that are sent to a specific device and this device responds only to the sending device.

- Datagrams generated by a QuickPanel on a Genius bus are sent to the PLC and the PLC responds directly back to that single QuickPanel.
- The PLC can only process one datagram per scan. Panel update speed will vary depending upon the number of datagrams that need to be sent to update a single panel.
- Different variable types displayed will each require a separate datagram
- Multiple QuickPanels on the same Genius bus will each generate there own datagrams to update the currently displayed panel. The more QuickPanels on the bus the slower the update time.

Global Data is sent as a "broadcast" by each connect device for all connected devices to hear once per bus cycle.

- Automatically sent each bus scan.
- Broadcast to all other devices on the Genius bus.
- Global data adds to the Genius bus scan time
- PLC scan time will increase.
- A single variable type is monitored, and a single variable type can be written.
- QuickPanel panel update is maximized

Summary

For the fastest panel update use global data. To display a large amount of data, or a variety of data types use datagrams. You can use both global data and datagrams on a single project. Datagrams can be turned on/off in the GE Genius setup menu of the QD software.

Global data operational specifications

The GE PLC can be programmed to broadcast a portion of it's data table onto the GE Genius bus. The selection of this data is controlled by configuring the bus controller module in the 90/XX, while in the Series 6 it requires a DPREQ function to be implemented. Examples of both setups will follow. When the PLC Genius bus controller receives the bus token a broadcast is made of selected data that all the QuickPanels can hear. Each of the QuickPanels will accept the data and move it into a receive data table. The bus token will be passed to a QuickPanel on the Genius bus and it will broadcast its send data table. This data table will be received and routed to the proper data table in the PLC. The bus token is passed to the next QuickPanel on the bus and it will broadcast it's send data table to the PLC. This data table is received and routed to the proper data table in the PLC. When a QuickPanel broadcasts its send data table other QuickPanels on the Genius bus will ignore this information. The following table assumes two QuickPanels (QP-A and QP-B) are on a Genius bus with a PLC.

Bus token at	Global Data sent by	Global data accepted
PLC	PLC	QP-A and QP-B
QP-A	QP-A	PLC
QP-B	QP-B	PLC

Connecting two QuickPanels and a Series 6 PLC

Set up is the key in getting this system operational. The Series 6 PLC predates the Genius bus link and attention to detail is important in creating a working system. Details for setting up the Series 6 bus controller module can be found in the GE Fanuc Automation, Series Six Bus Controller User's Manual, document GFK-071. Chapter 7 of that document discusses Global Data.

The goal is to have the PLC broadcast 10 registers of data (since a Series 6 can only send R data). This data will be contained in R0331 through R0340. QP-A will broadcast 5 registers of data that the PLC will store in R0341 through R0345, and QP-B will broadcast 7 registers of data that the PLC will store in R0346 through R0352.

PLC configuration

In order to get the Genius bus controller operating a series of steps dealing with hardware must be resolved:

- Determine which slot in the I/O chassis the Genius bus controller will be installed, and set up the hardware address of for this module by configuring the backplane dipswitch. Refer to GE Fanuc manual number GFK-0171 for details. In our example the hardware address is 1
- Baud rate default setting is 153.6. This can be changed based on hardware, cable length and type, and system requirements.
- Terminating impedance will be required if this is the end of a Genius bus communication link.
- Is expanded I/O addressing enabled. Refer to GFK-0171.
- Device number defaults to 31. If there is no other Genius bus controller than this number need not be changed.
- CPU shutdown mode allows a Genius bus controller failure to shutdown the CPU scan. This requirement should be determined by the system designer.

Software requirements

The next step is to program a DPREQ instruction directly connected to the power rail into the PLC. Details of this can be found in chapter 7 of the GE Fanuc document GFK-0171.

```
R0290
|-[DPREQ]
```

This example uses R0290 as the starting address of the command. The registers have the following values:

R0290 = 1001 because the I/O hardware address in our example is 1

R0291 = 3 is the write configuration command number.

R0292 = leave blank, PLC will write status information into this register.

R0293 = 1 in our example. This is the I/O reference of the bus controller. This is the same as R0290 above, except that 1000 is not added to the D DPREQ.

R0294 = 301 the pointer value of the first register where the configuration data for the bus controller begin.

Since the pointer value in R0294 is 301 we must set up the information in registers R0301 through R0323. Registers R0301 through R0321 are used for configuration data for the command 3 of register R0291 and are not important to this example.

Register R0322 and R0323 are important to this example.

R0322 = 331 because global data will be sent from the starting register R0331.

R0323 = 20 because in this example we want to broadcast 10 registers of data. The value 20 represents the number of bytes that need to be sent. Each register is 2 bytes, so 10 registers * 2 bytes/register = 20 bytes.

The PLC and bus controller are now configured to broadcast as global data the contents of R0331 through R0340.

Setting up the QuickPanels

Now you need to configure QP-A and QP-B to accept the data. Go to the setup function and go to the "Receive global data" area. For Receive Reference Address enter %R0331 and for length enter 10. This way the global data received by the QuickPanels will be 10 registers (20 bytes long) and referenced in the receive data table of the QuickPanel as %R0331 through %R0340. Please note that both QuickPanels use the same reference address and length. Remember that the bus controller is "broadcasting" the values and that all QuickPanels connected to the wire are receiving the same data.

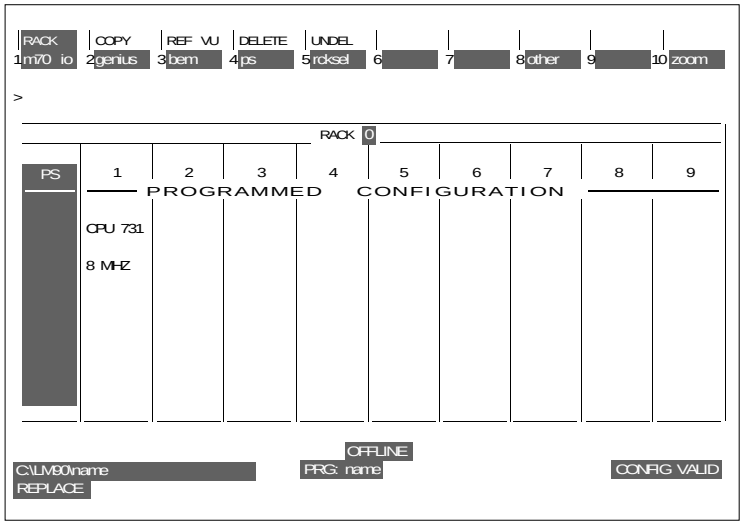
Next you need to configure the QuickPanels to send the data. Each QuickPanel will send data to a different set of data registers in the PLC. In our example QP-A is sending data to R0341 through R0345. In QP-A go to the setup function and go to "Send global data" area. For Send reference address enter %R0341, and for length enter 5. This way the global data sent by QP-A will be received by the PLC as R0341 through R0345. This data is only received by the PLC. This data is not available at QP-B. In like manner we need to configure QP-B. For Send reference address enter %R0346, and for length enter 7. This way the global data sent by QP-B will be received by the PLC as R0346 through R0352.

In this example no datagrams are enabled.

Configuring a GE 90/70

A Bus Controller is configured in the same manner as other rack-mounted Series 90-70 PLC modules. Configuration steps are summarized on the following pages. For more information, see the Series 90-70 Software User's Manual.

The I/O Configuration functions are accessed by selecting VO (Fl) from the Configuration menu. A rack display like the following example appears:

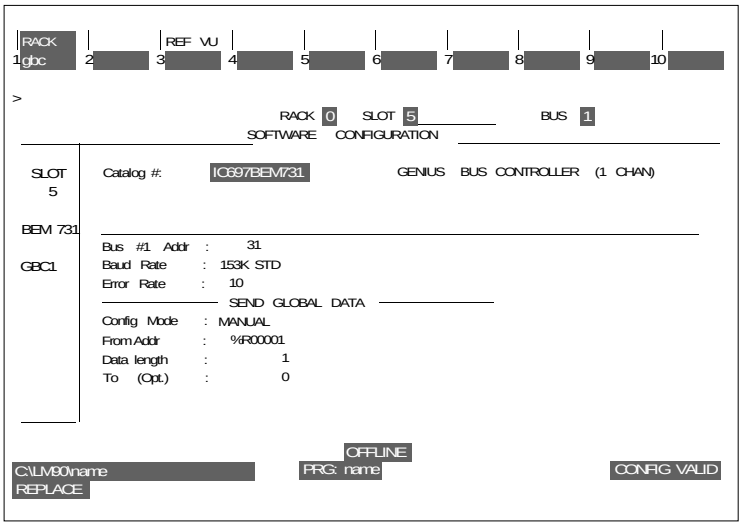


To configure a Bus Controller, the cursor is moved to the slot representation corresponding to the Bus Controller's installed location in the PLC rack. With the cursor correctly positioned, selecting F2 (Genius) displays a module configuration screen. From this screen, pressing Fl (GBC) displays a list of available Bus Controller types. The Bus Controller type that matches the module installed in the slot is selected from this list.

After selecting the Bus Controller type, these characteristics of the Bus Controller are configured:

- its baud rate
- its Device Number
- its response to bus errors
- use of Global Data, and its address and length

Selections are made on the Bus Controller configuration screen:



When the Bus Controller configuration screen appears, some default selections are already displayed.

These selections can be used as is, or changed for the application. Until a valid configuration is stored to the PLC CPU, the Bus Controller will not operate on the Bus, and its Channel OK LED will not light.

Bus Addr: Ordinarily, the Device Number (Bus Address) assigned to a Bus Controller is 31. Any number from 0 to 31 can be used.

Baud Rate: All devices on a bus must use the same baud rate: l53.6 Kbaud standard, 153.6 Kbaud extended, 76.8 Kbaud, or 38.4 Kbaud. Selection of a baud rate depends on the application, as explained in the Genius I/0 System User's Manual.

The selection made on this screen determines the baud rate for the Bus Controller. Other devices on the bus must also have their baud rate set.

Error Rate: This entry determines how the Bus Controller will respond to errors on the bus. If the Bus Controller should drop off the bus when a specified number of errors occur within a 10-second period, enter that number of errors here. If the Bus Controller should remain on the bus when errors occur and try to maintain communications, enter 0 here.

CAUTION

If the bus includes a Bus Switching Module, the Error Rate MUST be set to 0. Otherwise, the Bus Controller may drop off the bus when the BSM is switching a block to the bus.

Configuring the Bus Controller for Global Data

The rest of the entries on this screen are used to set up or disable Global Data.

Config Mode: This entry determines how Global Data will be set up for the Bus Controller. If the Bus Controller will not send or receive Global Data, select NONE. If the Bus Controller will transmit Global Data, select MANUAL to specify a reference address and data length.

From Addr: Since MANUAL is selected, specify the beginning PLC address from which data

will be transmitted on the bus. It can be from %I, %Q, %G, %R, %AI, or %AQ memory.

Data Length: For MANUAL configuration mode, this entry specifies the amount of Global Data to be sent each bus scan.

If bit-oriented memory (%I, %Q, or %G) is selected above, this may be 0 to 1024 bits. It must be a multiple of 8. If you enter a number that is not a multiple of 8, the software will automatically adjust it upward.

If word-oriented memory (%AI, %AQ, or %R) is selected above, this may be 0 to 64 words. If more than 64 words are selected, the Logicmaster 90 software automatically adjusts the length to 64 words.

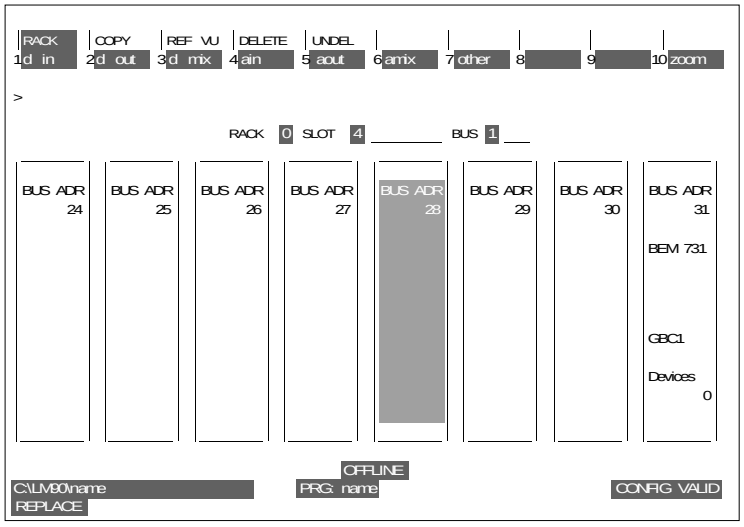
The total amount of memory specified must not exceed the configured memory size for that memory type. For example, for the 731 CPU, the maximum value for %I memory that can be configured is 512.

To (Opt): This information is not used by the QuickPanel.

After selecting the correct configuration for the Bus Controller, use the ESC key to return to the rack display.

Configuring the QuickPanels on a Bus

After configuring the Bus Controller, the QuickPanels on the bus are configured by placing the cursor on the Bus Controller in the rack display, then pressing F10 (Zoom).



Selecting a Device Number

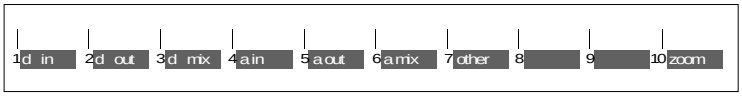
For all QuickPanels on the bus, the first configuration step is to select the Device Number. Each of the 32 potential locations on the bus is represented by a Device Number from 0 to 31.

The Device Number is selected by positioning the cursor at a numbered slot on the bus display, then entering the device type. For example, positioning the cursor as shown above would assign a QuickPanel to Device Number 28.

In this example, the Bus Controller itself has been configured to use Device Number 31.

Selecting the Device Type

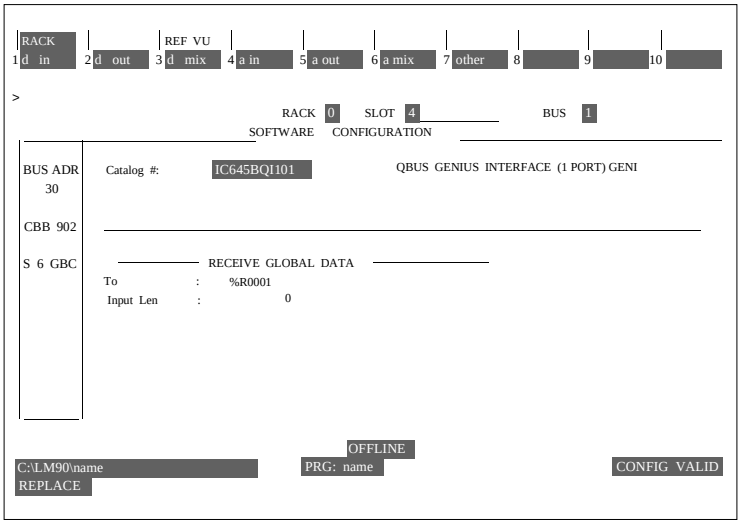
With the cursor positioned at the correct Device Number, press the F7 (other) function key to select a device type.



other (F7):

May represent another Bus Controller, a High-speed Counter block, a Power Monitor Module, a PCIM, GENI or GENA.

From the list of available bus interface modules that appears, select GENI MODULE type with the cursor and press the Enter key. A configuration screen for the GENI module will appear.



Receiving Global Data from a QUICKPANEL

The QuickPanel will be sending Global Data. You select a memory address and length in MANUAL config. mode. Do **NOT** use AUTO mode.

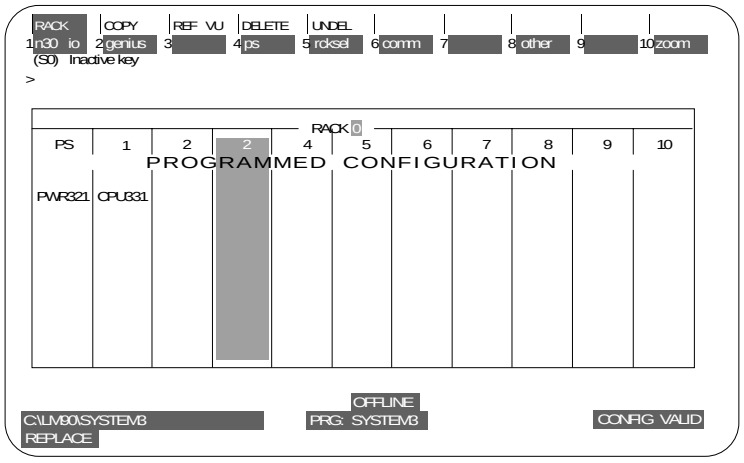
To: This specifies the location where the Series 90-70 CPU will place the data. Enter a beginning address in %I, %Q, %G, %AI, %AQ, or %R memory. When this device broadcasts Global Data, the message includes an identifier that indicates where the message came from.

Input Length: This is the amount of Global Data expected to be received. For bit-oriented data, this is the number of bits. For word-oriented data, it is the number of words. If the expected data length (defined by configuration) and the actual data length (defined by the content of the Read ID Reply message from the module) don't agree, a System Configuration Mismatch fault is registered in the PLC Fault Table.

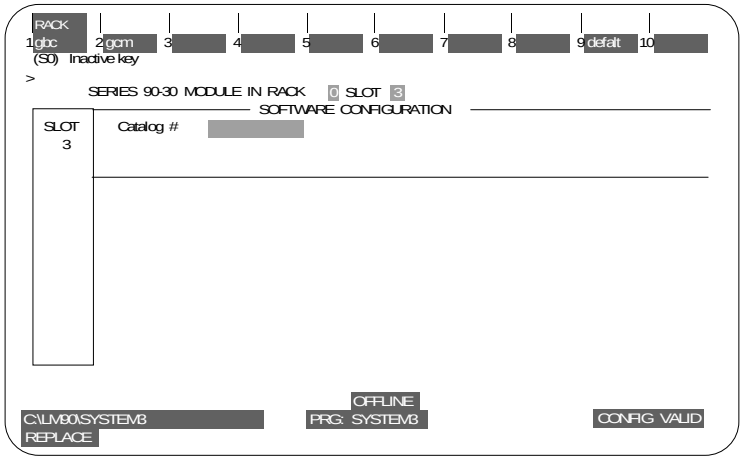
Using the QuickPanel with Series 90/30 PLC

With the GBC installed in its proper rack/slot location, the Logicmaster 90-30 configurator software program (release 5 or later) can be used to configure the module in the off-line mode. Once the complete set of configuration data has been entered, it must then be downloaded to the PLC (in the online mode) to become effective in the GBC Module.

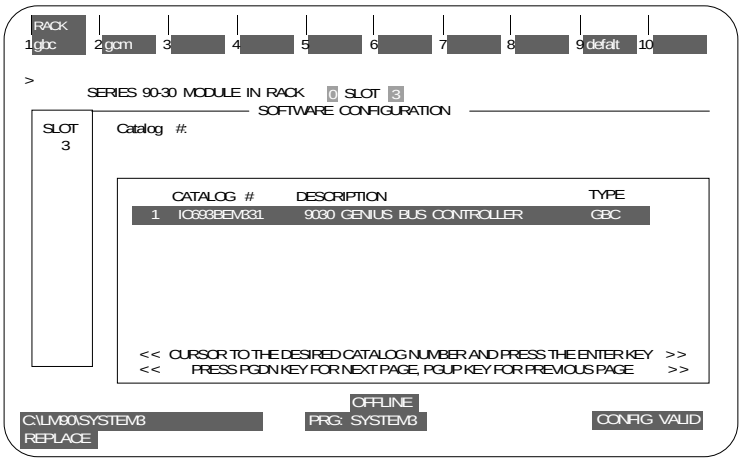
The GBC is configured by completing setup screens in the configurator software. The setup screens that are used for this module are shown and described below. In the VO configuration screen, place the cursor at the slot representation corresponding to the GBC's installed location in the PLC rack.



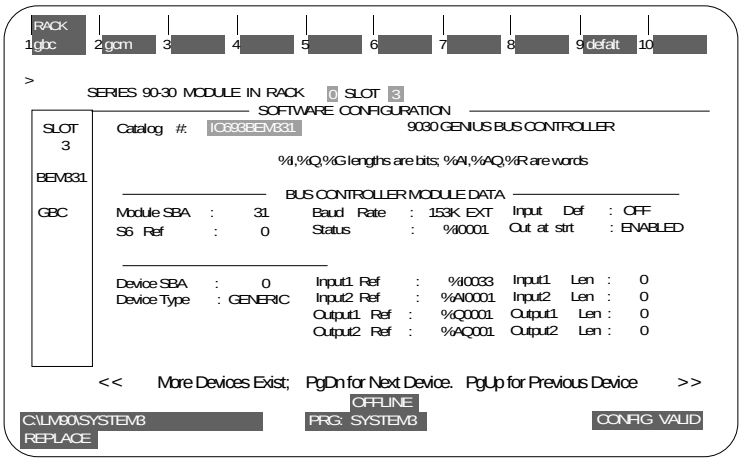
Select F2 (genius). The following screen will appear.



Press F1 (gbc) and then the Enter key to select the GBC. The following screen will appear. (Note that the defalt softkey, F9, is inactive for the GBC module.)



Press the Enter key to select the GBC. Complete the GBC configuration entries in the following screen.



Note that the configuration screen consists of two parts: module-specific data (BUS CONTROLLER MODULE DATA) and device-specific data (DEVICE DATA).

Until a valid configuration is stored to the PLC CPU, the GBC will not operate on the bus, and its Channel OK LED will not light.

Module-specific Data

Module SBA (serial bus address)

Ordinarily, the Device Number (bus address) assigned to a bus controller is 31. Any number from 0 to 31 can be used; however, each must be unique on that Genius bus (no configured device already present at that address). Whenever a Module SBA value is changed to a new value, the DEVICE DATA for the GBC associated with the old address is automatically copied to the new address value and cleared from the old address. Default: 31

Baud Rate

All devices on a bus must use the same baud rate: 153.6 Kbaud standard, 153.6 Kbaud extended, 76.8 Kbaud, or 38.4 Kbaud. Selection of a baud rate depends on the application, as explained in the Genius 1/0 System User's Manual. Usually, the bus length determines the baud rate. The entry made here establishes the baud rate for the GBC only. If the default baud rate (153.6 Kbaud extended) will not be used, the baud rate of other devices on the bus must also be changed.

Series Six (S6) Reference

The S6 reference specifies the register location in a Series Six or a Series Five CPU that should be reserved for the global data that will be transmitted to it by the GBC. A value of zero indicates that no register location should be reserved. The allowed range for Module Series Six Reference is 0 to 16383 inclusive. Default: 0

Status

The S6 reference specifies the register location in a Series Six or a Series Five CPU that should be reserved for the global data that will be transmitted to it by the GBC. A value of zero indicates that no register location should be reserved. The allowed range for Module Series Six Reference is 0 to 16383 inclusive. Default: 0

Input Def

This field contains the starting reference for the 32-bit status area maintained by the GBC. Each bit of this area represents the online/off-line status of a device on the bus. Default: Next available %10001 address

Out at strt

Device outputs can be initially ENABLED or DISABLED when the GBC is powered up. Default: ENABLED

Device-specific Data

A GBC module can support up to 31 devices on its bus. Each device will have the following parameters associated with it.

Device SBA

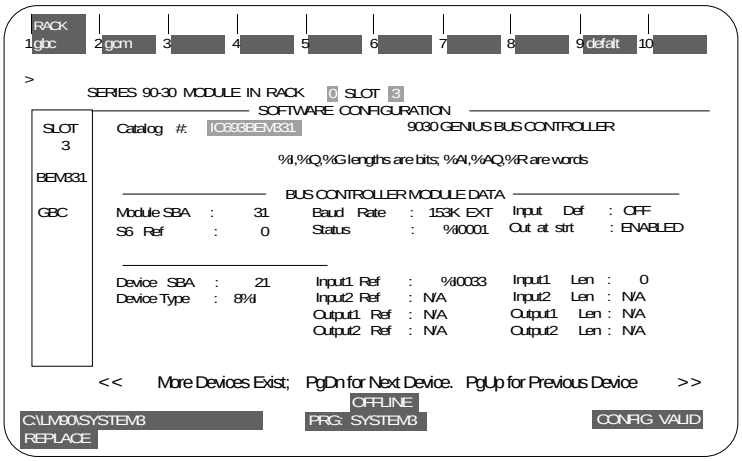
A Device SBA can be between 0 and 31. Select by tabbing through the parameter, or by setting to the desired value. Pressing the PgDn key increments this parameter; pressing the PgUp key decrements this parameter If you enter a Device SBA that is the same as the Module SBA, the input area parameters cannot be filled in and the Device Type will be fixed to CONTROL. Default: 0

To transmit global data, a device must be configured as CONTROL. (Only the SBA of the GBC module itself can be configured as CONTROL.) Set up the output lengths to transmit global data. Up to 128 bytes can be configured for the total of Output1 and Output2 Lengths. Discrete(%Q) data will automatically be adjusted to multiples of 8 for byte alignment.

Device Type (QuickPanel)

Each device is associated with a device type. The device type selection can be tabbed through. Default: GENERIC

For a device to receive global data, configure it as GENERIC and specify memory type and length for the incoming data. Up to 128 bytes can be configured for the total of Input1 Length. Discrete(%I) data will automatically be adjusted to multiples of 8 for byte alignment. Use only one input.



GENERIC Devices

Note: For Input and Output Ref, the allowed memory types are %I, %AI, %Q, %AQ, %G, and %R.

Inputl Ref, Inputl Length

A GENERIC device can be configured with two independent starting locations for input data with associated lengths for each location. The input data received from the device by the GBC is extracted and deposited into the PLC memory areas starting at these specified locations. Default: next available %I reference

Input2 Ref, Input2 Length (Not used for QuickPanel)

Outputl Ref, Outputl Length (Not used for QuickPanel)

Output2 Ref, Output2 Length (Not used for QuickPanel)

Troubleshooting

If your project uses global I/O only and you have created a tag (PLC variable name) that is outside the global range, and datagrams are turned off , then during the compile function an error file ~GENIERR.TXT is created. This file is located in the C:\QUICK2\PCO directory. This file will list the PLC variables that are outside the global range.

To fix this problem do one of the following:

Turn 'Enable Datagrams' ON in the Protocol Setup Dialog. Doing this will cause all tags defined outside of the Global Data tables to be transferred using the Datagram mechanism.

Delete all invalid tags or modify them so that they fall within one of the Global Data tables. When 'Enable Datagrams' is turned OFF all transfers are done using the Global Broadcast mechanism.

PLC error Code	Description
0xC8	Datagram access was requested, user disabled them.
0xC9	PLC is not on the Genius bus
0xCA	Can’t recognize the type code at this node
0xCB	Read datagram failed, cause was not determined
0xCC	Write datagram failed, cause was not determined
0xCD	Micro-geni card failed to power up successfully
0xCE	Can’t find the S1 file
0xCF	A uGeni command timed out during configuration
0xD0	A uGeni command configuration command returned a syntax error
0xD1	A uGeni command configuration returned an unknown response
0xD2	An incoming reference address does not match QuickPanel configuration
0xD3	A BCD table length does not match our configuration
0xD4	Memory type is not valid for this CPU

Hitachi H Series

Hitachi H Series

CAUTION

Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Cabling:

The following chart shows the point-to-point wiring for the interface cable. The QuickPanel end uses a 25 pin male connector while the Hitachi PLC end uses a 15 pin male.

QuickPanel (25 pin Male)		96MFM20AA (15 pin Male)	
TXD	2	3	RD
RXD	3	2	SD
CTS	5	4	RS
GND	7	9	SG
DTR	20	5	CS
		8	PHL
		7	DR
		14	19200 BAUD

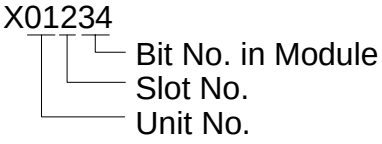
Comm Settings:

19200, 7, 1, E, RS232

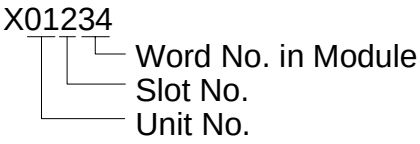
Tag Variables:

Variable Type	Address Range	Data Range
External Bit Input	X00000 - X05A95 (1)	0 - 1
External Bit Output	Y00000 - Y05A95 (1)	0 - 1
Remote Input Relay	X10000 - X49995	0 - 1
Remote Output Relay	Y10000 - Y49995	0 - 1
Internal Bit Output	R000 - R7BF	0 - 1
Bit CPU Link Area 1	L0000 - L3FFF	0 - 1
Bit CPU Link Area 2	L10000 - L13FFF	0 - 1
Internal Coil	M0000 - M3FFF	0 - 1
On Delay Timer	TD000 -TD255	0 - 1
Single Shot Timer	SS000 - SS255	0 - 1
Watch Dog Timer	WDT000 - WDT255	0 - 1
Monostable Timer	MS000 - MS255	0 - 1
Accumulation Timer	TMR000 - TMR255	0 - 1
Up Counter	CU000 - CU511	0 - 1
Ring Counter	RCU000 - RCU511	0 - 1
Up/Down Counter	CT000 - CT511	0 - 1
External Word Input	WX0000 - WX05A7 (2)	0 - 65535
External Word Output	WY0000 - WY05A7 (2)	0 - 65535
Remote Input Relay	WX1000 - WX4997	0 - 65535
Remote Output Relay	WY1000 - WY4997	0 - 65535
Internal Word Register	WR0000 - WRC3FF	0 - 65535
Word CPU Link Area 1	WL000 - WL3FF	0 - 65535
Word CPU Link Area 2	WL1000 - WL13FF	0 - 65535
Internal Coil Word	WM000 - WM3FF	0 - 65535
Timer/Counter Accumulator	TC000 - TC511	0 - 65535

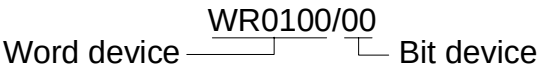
Note 1: Bit Device



Note 2: Word Device



To access the bit, add the bit number to the word address. For example, the first bit of WR0100 would be WR0100/00.



Hitachi S10

CAUTION

Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

The drawing shows the setup dialog box for Hitachi S Protocol. The default setting for **Timeout** is correct for most applications.

Serial Port Parameters for the Display

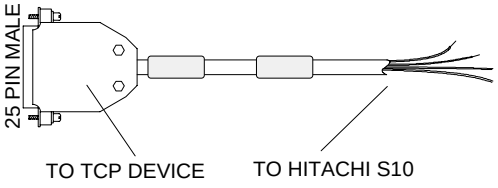
Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Hitachi S Protocol.**

Elect. Format	RS422/485 Half duplex
Baud Rate	19200
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

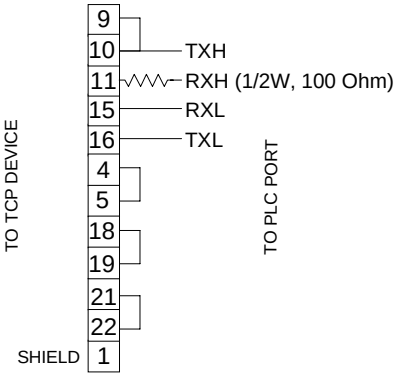
Click OK to return to the Project Setup dialog box.

HMI-CAB-C115 Cable

The target display connects to a Hitachi S PLC using an HMI-CAB-C115 cable. Connect the cable to the PSE port on the PLC.



HMI-CAB-C115



WORKING CONFIGURATION

Setup the Quick Panel to RS422/485 Half Duplex, 19200 baud, 8 data bits, odd parity, 1 stop bit, and none handshake. Connect the HMI-CAB-C115 cable between the I/O port on the Quick panel and the PSE port on the PLC. Verify that the following rotary switches are set as described: MAIN/SUB – 0, CPU NO. – 3, PROT ADDR. – 0, ADDR. – 1 and 0.

Hitachi S10 Tag Variable Table

Device Prefix	Adr Range Min./Max.	Address Format	Data Range Min./Max.		Bit write (y/n/rmw)	Read Write	Description & Notes	Memory Location
WORDS ONLY **(LSD** is for the bit number, it is ignored with word tools & used with bit tools)								
TP	0-1FF**F**	3Hex	0	65535	Yes	Both	On-Delay timer present value	F0000
TS	0-1FF**F**	3Hex	0	65535	Yes	Both	On-Delay timer setup value (2)	63000
UP	0-FF**F**	2Hex	0	65535	Yes	Both	One Shot timer present value	F0400
US	0-FF**F**	2Hex	0	65535	Yes	Both	One Shot timer setup value (2)	63400
CP	0-FF**F**	2Hex	0	65535	Yes	Both	Up/Down Counter present value	F0600
CS	0-FF**F**	2Hex	0	65535	Yes	Both	Up/Down Counter setup value (2)	63600
XW	0-FF**F**	3Hex	0	65535	Yes	Both	Input Relay	E0000
YW	0-FF**F**	3Hex	0	65535	Yes	Both	Output Relay	E0400
RW	0-FF**F**	3Hex	0	65535	Yes	Both	Internal Relay	E0C00
KW	0-FF**F**	3Hex	0	65535	Yes	Both	Keep Relay	E1000
GW	0-FF**F**	3Hex	0	65535	Yes	Both	Global Link	E0800
SW	0-BF**F**	3Hex	0	65535	Yes	Both	System Register (1)	E1E80
EW	0-FF**F**	3Hex	0	65535	Yes	Both	Event	E1C00
TW	0-1F**F**	3Hex	0	65535	Yes	Both	On-Delay timer	E1300
UW	0-F**F**	3Hex	0	65535	Yes	Both	One Shot timer	E1500
CW	0-F**F**	3Hex	0	65535	Yes	Both	Up/Down Counter	E1700
DW	0-FFFF	4Hex	0	65535	Yes	Both	Data Register (2)	61000
FW	0-BFFF	4Hex	0	65535	Yes	Both	Work Register (2)	E2000
MS	0-FFFFF	5Hex	0	65535	Yes	Both	Extended Memory (2)	100000
BITS **(LSD** is for the bit number, 0 - F)		(4)						
D	0-FFFF	4Hex	0	1	Yes	Both	Data Register (2)(3)	61000
F	0-BFFF	4Hex	0	1	Yes	Both	Work Register (2)(3)	E2000
M	0-FFFFF	5Hex	0	1	Yes	Both	Extended Memory (2)(3)	100000
X	0-FF**F**	3Hex	0	1	Yes	Both	Input Relay	A0000
Y	0-FF**F**	3Hex	0	1	Yes	Both	Output Relay	A4000
R	0-FF**F**	3Hex	0	1	Yes	Both	Internal Relay	AC000
K	0-FF**F**	3Hex	0	1	Yes	Both	Keep Relay	B0000
G	0-FF**F**	3Hex	0	1	Yes	Both	Global Link	A8000
S	0-BF**F**	3Hex	0	1	Yes	Both	System Register	BE800
E	0-FF**F**	3Hex	0	1	Yes	Both	Event	BC000
T	0-1F**F**	3Hex	0	1	Yes	Both	On-Delay timer	B3000

U	0-F**F**	3Hex	0	1	Yes	Both	One Shot timer	B5000
C	0-F**F**	3Hex	0	1	Yes	Both	Up/Down Counter	B7000

Notes:

(1) Can't write to all registers of this type, some registers are used for special purpose in the PLC.

(2) Writes to bits, modify the whole word to 0 except for the bit being Set.

(3) Word/bit types have been eliminated. D, F, & M are the bit types for DW, FW, & MS respectively

(4) Bits are 0(msb) to F(lsb) as to follow the convention of Hitachi

Non implemented types

N, NW	E1800
J	A2000
M	AE000
Q	A6000
P	B9000
PW	E1900
Z	BE000
ZW	E1E00
IW	E4000
OW	E6000
BI	E3800
V	BA000
VW	(E1A00 - E1BFF)

EXAMPLE: You wish to write to the 611 th word in the FW table and read it back using the QD's Numeric data entry tool. Because our driver will ignore the final digit, you enter an address of FW6110. Now, suppose you also desire to set and monitor the status of bit # 15 in this same word, using the QD's Illuminated push button tool. You enter this object's address as FW611F.

A) Quick designer bit oriented tools are:
   1) Illuminated Push Buttons (lLPB)
   2) Pilot Lights (PL)
   3) Push Buttons (PB)
   4) Alarm (Bit files)
   5) Selector Switch (SS)

B) Quick Designer word oriented tools are:
   1) Numeric Entry
   2) Numeric display
   3) Alarm(Word files)
   4) Word Button
   5) Bar graph

C) Quick designer tools that support both word and bit modes are:
   1) Local image display (LID)
   2) Local Message display (LMD)

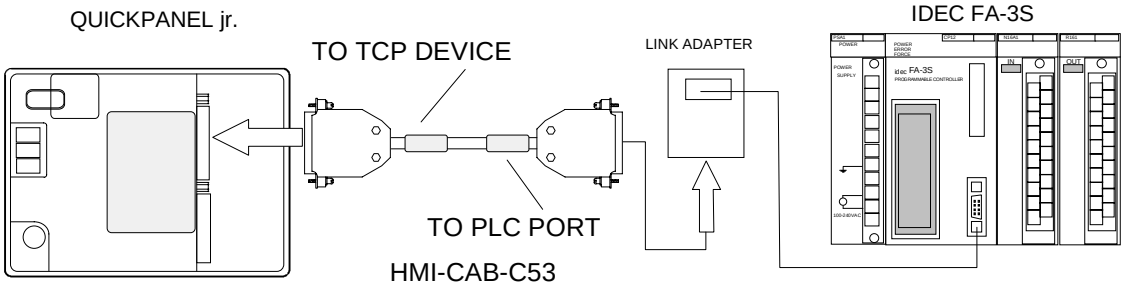
You may use type FW & DW words with Quick designer tools of Type B above by simply giving the "Word" tool's address an extra digit "0" at the end of the address . Likewise, the type A bit tools are usable by specifying the bit number (0 - F) as the last digit in the address.

Type C tools don't work with the FW and DW data types. This is due to the fact that DWs & FWs are double word objects .

IDEC

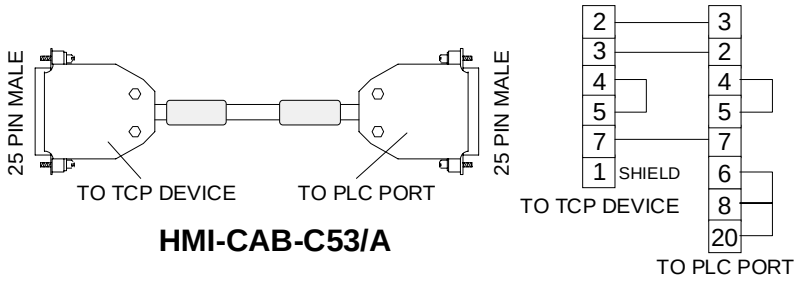
Connecting to an IDEC Link Adapter

The target display connects to an IDEC Micro-1 or FA-3S PLC using an HMI-CAB-C53 cable connected to the IDEC Link Adapter. The FA-3S is shown in the following drawing.



The target display connects to the IDEC Micro-1 PLC using an HMI-CAB-C53 cable connected to the IDEC Link Adapter.

HMI-CAB-C53 Cable

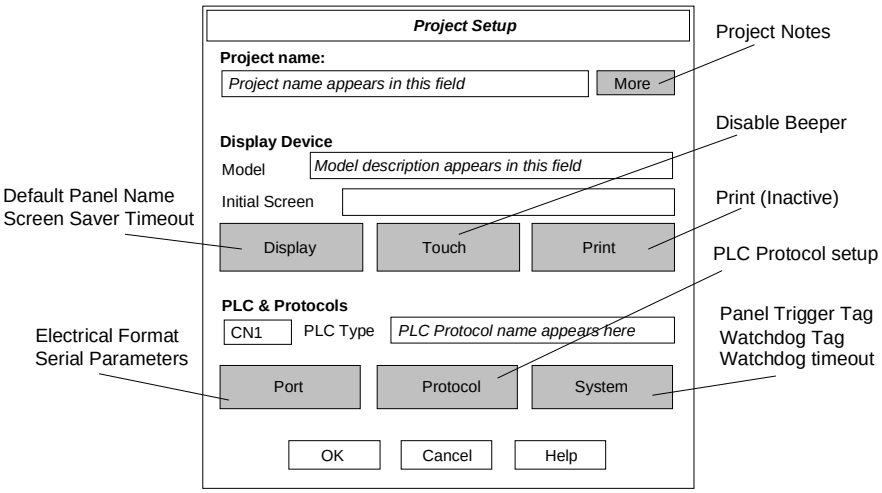


Setup for using an IDEC PLC

Use the following procedure to ensure your target device is setup properly for the IDEC PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(IDEC).** See PLC Type on page 5.

Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **IDEC**

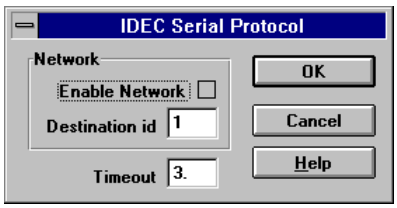
Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

When using the IDEC driver to communicate with the Square-D Model 50 (Same as the IDEC PLC), set the parity to NONE. When connected to an IDEC PLC, set the parity to ODD.

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Check the Enable Network box if the display is connected to a network device. Enter the Destination ID. Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

IDEC Micro-1 Tag Variable Table

PLC Name	Tag Name	Address Range	Bit Range	Support Write	Value Range	Example
Default Memory 800 to 899 1500 to 1655	D	0 - 399 decimal		Y	0-65535	D255 D25515
Default Memory 800 to 899 1500 to 1655	D	0/0 - 399/15 decimal	0 - 15	N	0-1	D0/0 D0/15 D399/0 D399/15
Input bits (bits)	I	00 - 317 octal	0 - 7 (req.)	N	0 - 1	I00 I317
Output bits (bit)	Q	00 - 317 octal	0 - 7 (req.)	Y	0 - 1	Q317
Bit memory (bit)	M	00 - 317 octal	0 - 7 (req.)	Y	0 - 1	M00,M01 M677
Shift register (bit)	R	00 - 157 octal	0 - 7 (req.)	Y	0 - 1	R00, R01 R157
Timer preset, 1000-1079	T	0 - 79 decimal		Y	0-9999	T0 T79
Timer Current 000-157	A	0 - 79 decimal		N	0-9999 (BCD)	A0 A79
Counter preset, 900-944	C	0 - 47 decimal		Y	0-9999	C0 C47
Counter current	B	0 - 47 decimal		N	0-9999 (BCD)	B0 B47
High Speed Timer Value	H	0 - 47 decimal		N	0-9999	H0 H47
Error Register	E			N	0-65535	E
Status Register	S			N	0-F	S

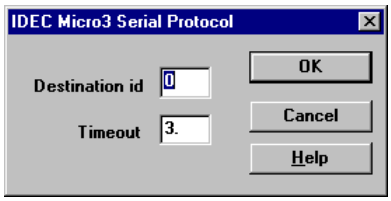
Idec Micro3

Idec Micro3 Serial Protocol

CAUTION

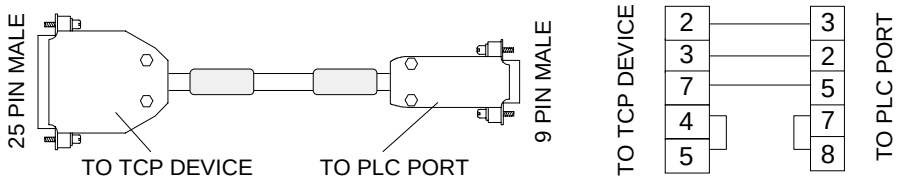
Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

The following dialog box is displayed when you select IDEC Micro3 protocol. The Destination ID is the address of the PLC.



HMI-CAB-C109 Cable

Use the HMI-CAB-C109 cable to connect the target display to the IDEC Micro 3 PLC.



HMI-CAB-C109

IDEC Micro3 Tag Variables

Name	Address range	Value range	Writeable
D	0-99	0-65535	Y
I	0-37	0-1	N
Q	0-37	0-1	Y
M	0-277	0-1	Y
R	0-63	0-1	Y
T	0-31	0-9999	Y
A	0-31	0-9999	N
C	0-31	0-9999	Y
B	0-31	0-9999	N

Interbus-S

INTERBUS Network Description

INTERBUS is an open systems approach to a high performance, ring-based, distributed device network for manufacturing and process control. INTERBUS is a high-efficiency protocol designed for today's high-speed control requirements. An INTERBUS system consists of a controller board installed into a computer (PC, VME, etc.) or PLC that communicates to a variety of I/O devices. INTERBUS is operable with most standard PC software packages and operating systems.

INTERBUS Protocol

The INTERBUS protocol provides the high throughput demanded by today's advanced I/O network requirements. I/O data is transmitted in frames that provide simultaneous and predictable updates to all devices on the network. Secure transmissions are ensured by the protocol's CRC error checking capabilities. Furthermore, comprehensive diagnostics allow you to pinpoint the cause and location of errors. This provides maximum network uptime. An embedded messaging protocol allows you to send complex parameter and message data across the INTERBUS network.

The basic concept of an open bus system is to allow a similar exchange of information between devices produced by different manufacturers. Information includes commands and I/O data that have been defined as a standard profile by which devices operate. Standard profiles are available for drives, encoders, robotic controllers, pneumatic valves, etc. The INTERBUS protocol, DIN 19258, is the communication standard for these profiles. It is an open standard for I/O networks in industrial applications.

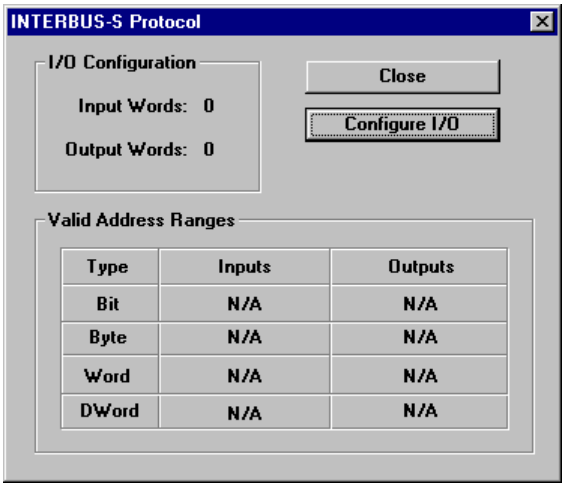
I/O Network Operations

Network for I/O devices on an INTERBUS-S network are automatically determined by their physical position in the network. This eliminates the need for manually setting device addresses. The INTERBUS-S controller board performs an identification cycle (ID) to determine the addresses. The QuickPanel module ID# is 243. After the ID cycle is completed, the host control verifies the network configuration. Once verified, the network is ready for operation.

The INTERBUS-S controller board connects to many types of PLC or computer-based host controllers. The controller board performs all network functions independent of the host controller. Advanced features of the INTERBUS-S controller board include peer-to-peer communications, event processing, and logical addressing.

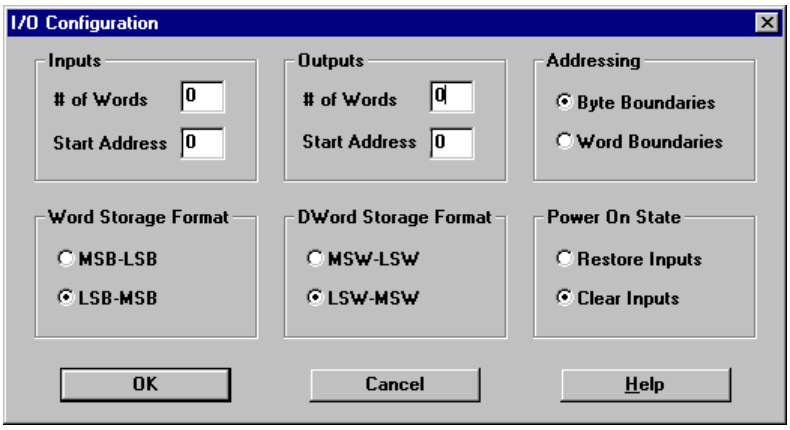
Setup

The drawing shows the setup dialog box for Interbus-S Protocol. Click the Configure I/O button to select the number of Input and Output words.



Configure I/O

Click the Configure I/O button to display the following dialog box.



Inputs

Enter the number of Input words up to a maximum of 240 words (480 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same Interbus-S address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the Interbus-S DP Protocol dialog box. The Start Address is provided so that the user can align the tag address entered in Quick Designer with the mapped address in the PLC or host device.

Outputs

Enter the number of Output words up to a maximum of 100 words (200 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same Interbus-S address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the Interbus-S DP Protocol dialog box.

Addressing

Some PLCs use Byte addressing while others use Word addressing. Select Addressing on Byte Boundaries or Word Boundaries, based on your PLC type. The range of valid addresses will be displayed in the Interbus-S DP Protocol dialog box, which appears when you close the configuration dialog box.

Word Storage Format

This option allows selecting the way bytes are arranged into words. Selecting MSB-LSB will arrange bytes from the MSB (Most Significant Byte) to the LSB (Least Significant Byte). Selecting LSB-MSB will arrange bytes from the LSB (Least Significant Byte) to the MSB (Most Significant Byte. MSB-LSB will store the MSB in the current address byte and the LSB will be stored in the next byte. LSB-MSB is stored in the opposite order.

Double Word Storage Format

This option allows selecting the way words are arranged into double words. Selecting MSW-LSW will arrange words from the MSW (Most Significant Word) to the LSW (Least Significant Word). Selecting LSW-MSW will arrange words from the LSW (Least Significant Word) to the MSW (Most Significant Word). MSW-LSW will store the MSW in the current address word and the LSW will be stored in the next word. LSW-MSW is stored in the opposite order.

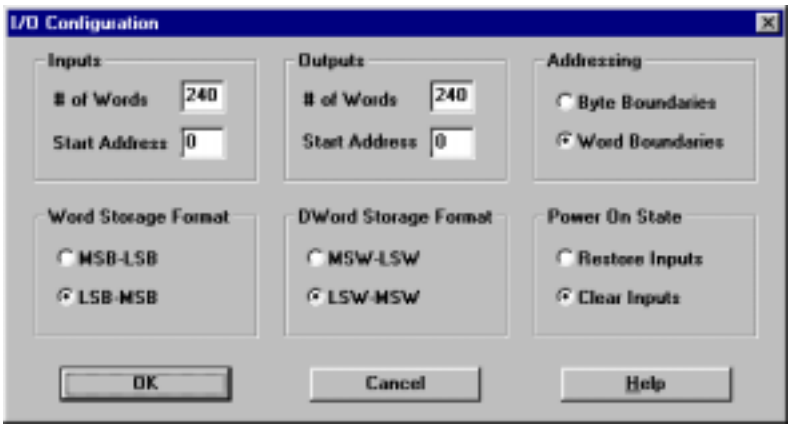
Power On State

A Series B module contains a Battery Backup RAM circuit that maintains a copy of the inputs. The input states can be restored (Restore Inputs) or cleared (Clear Inputs) when power is applied.

Note: ***ONLY*** Series B modules contain the Battery Backup RAM circuit. Series B modules can be identified by the model number on the product label. Example: MODEL: QPI-IBS-202 SERIES B

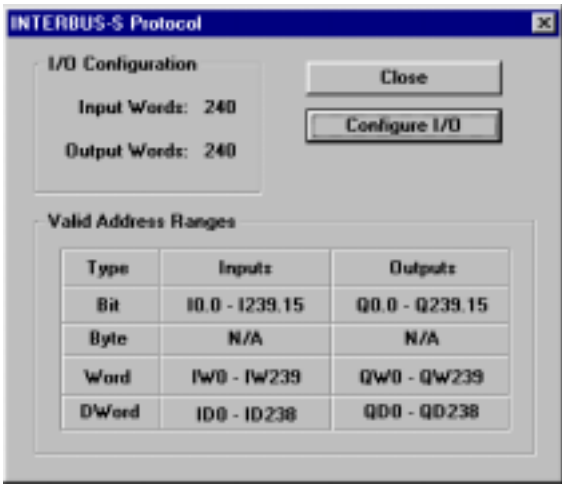
Example 1:

In this configuration example, Input Words are set to 240, Output Words are set to 240 and Addressing is set to Word Boundaries.



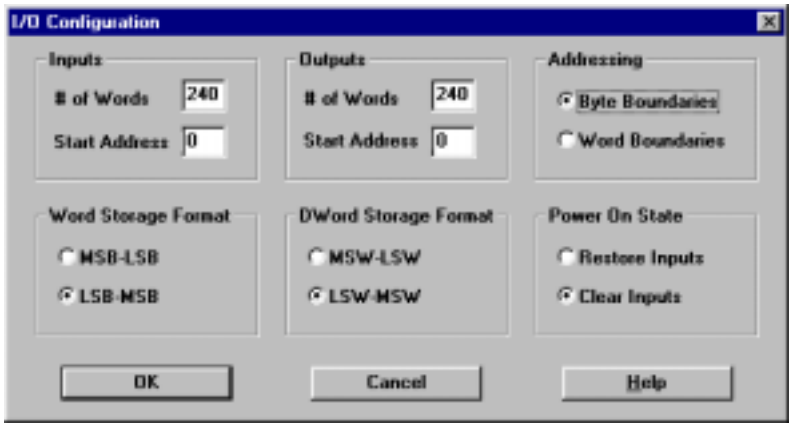
When the OK button is clicked, the following Interbus-S DP Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

The number of Input and Output words selected will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 240. The variable name for Input Words is IW and the range for 240 words is IW0 to IW239. Output Words are also set to 240, so the variable name is QW and the range is QW0 to QW239.



Example 2:

In this configuration example, Input Words are set to 240, Output Words are set to 240 and Addressing is set to Byte Boundaries.

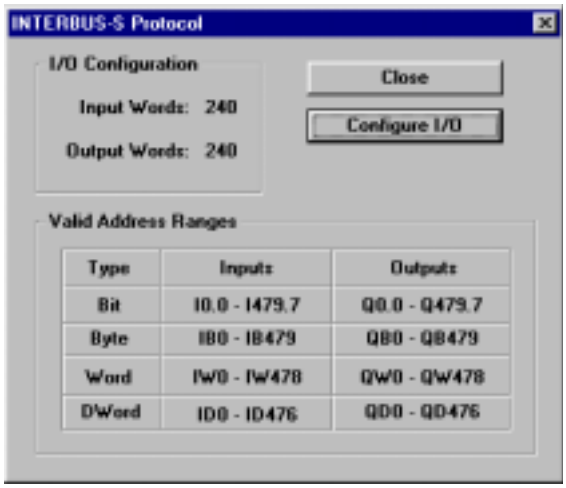


When the OK button is clicked, the following Interbus-S DP Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

When byte addressing is selected, the valid address ranges appear in a different format in the Interbus-S DP Protocol dialog box.

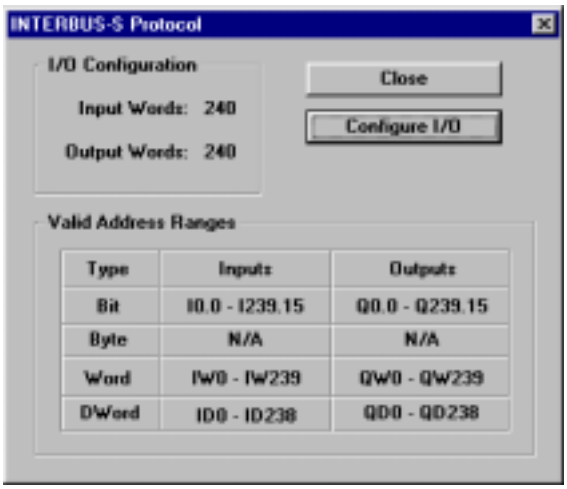
The number of words selected will determine the range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 240. The variable name for Input Bits is I and the range for 240 words is I0.0 to I479.7. Output Words are also set to 240, so the variable name for bit Outputs is Q, with the range of Q0.0 to Q479.7.

A byte is 8 bits, therefore the addressing method is to use a period as the bit delimiter in the addressing format. For example, I0.0 is bit 0 of Word 0, and I0.7 is bit 7 of Word 0.



Interbus-S DP Protocol Dialog Box

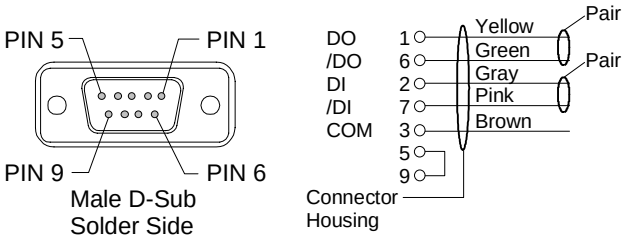
The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. A word addressing example is shown below.



Cables

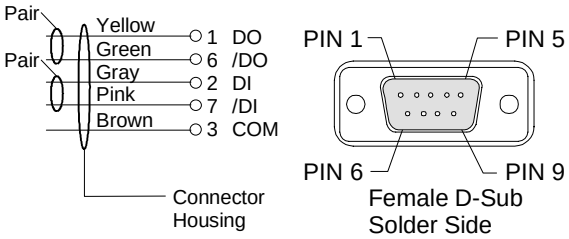
Cable assemblies, cable and connectors can be obtained from several manufacturers. To avoid intermittent communications on the network, always connect DO and /DO via the same twisted pair. Likewise, always connect DI and /DI via the same twisted pair. In addition, always connect both ends of the cable shielding to their prespective connector housings or shield connection. A connection of 24 volts to data lines will permanently damage the module.

Remote Out



REMOTE OUT

Remote In



REMOTE IN

PLC Comm Errors

In the event of a communication problem, error messages are displayed on a status line at the bottom of the display.

Error Displayed	Definition
PLC COMM ERROR (02:FF:A0)	Error initializing Anybus module
PLC COMM ERROR (02:FF:01)	Incorrect Anybus module ID
PLC COMM ERROR (02:FF:02)	Anybus module watchdog time-out (module lockup)
PLC COMM ERROR (02:FF:03)	Network Error - Network not connected

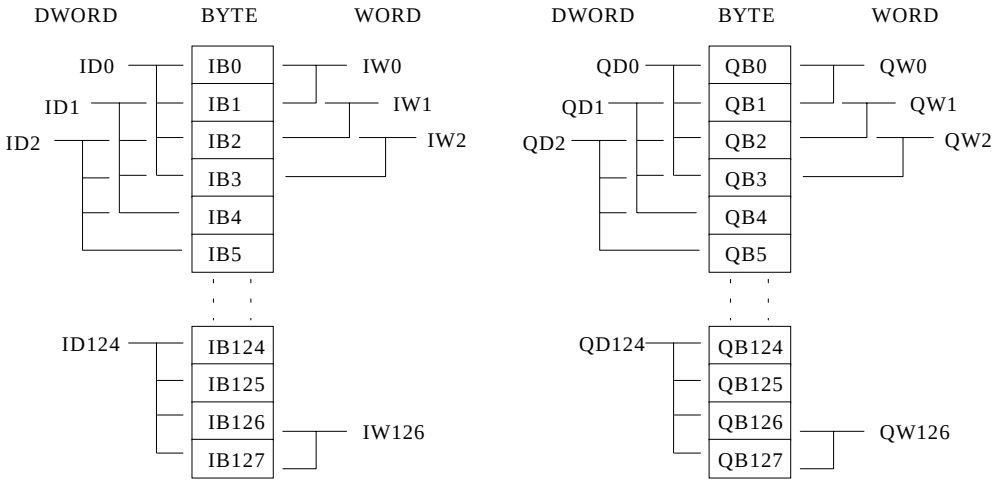
Tag Variables

Valid tag variable names and address ranges are shown in the Interbus-S DP Protocol dialog box when you configure the protocol.

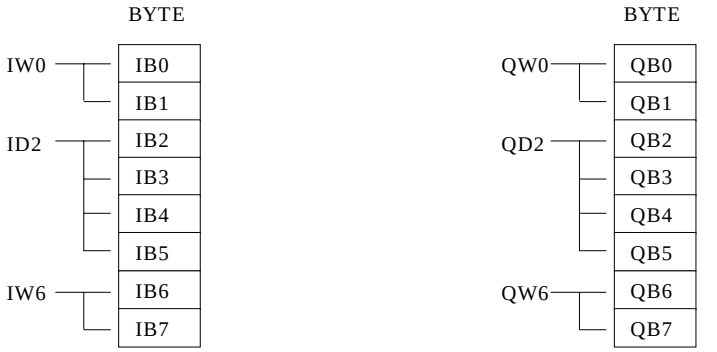
The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type.

Example 3, Byte Addressing: Input Words = 64, Output Words = 64, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I127.7	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q127.7	0 to 1	N	Bit
IB (Input Byte)	IB0 to IB127	0 to 255	Y	Byte
QB (Output Byte)	QB0 to QB127	0 to 255	N	Byte
IW (Input Word)	IW0 to IW126	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW126	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID124	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD124	-999999999 to 999999999	N	Dword

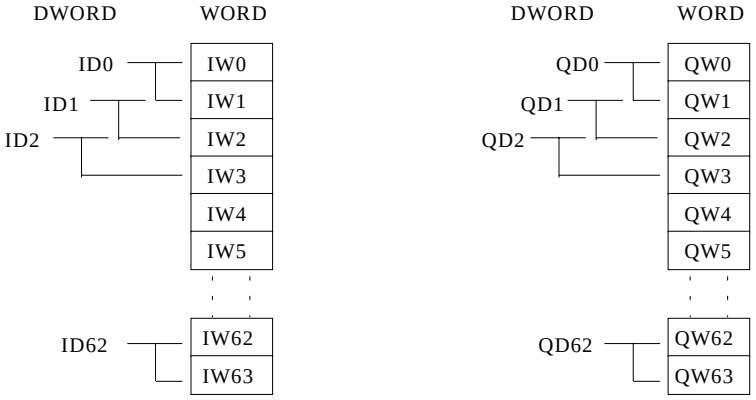


For the combination of a W, DW, W, the following example shows the layout.



Example 4, Word Addressing: Input Words = 64, Output Words = 64, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I63.15	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q63.15	0 to 1	N	Bit
IW (Input Word)	IW0 to IW63	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW63	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID62	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD62	-999999999 to 999999999	N	Dword



For the combination of a W, DW, W, the following example shows the layout.

Keyence Port 1

Keyence KV-L2

CAUTION Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Tag Variable Table

Name	Address range	Value range	Writeable	Type
W	0-69	0-65535	Y	integer
WT	0-249	0-65535	N	integer
WC	0-249	0-65535	N	integer
DM	0-8999	0-65535	Y	integer
TM	0-31	0-65535	Y	integer
abb	000-6915	0-1	Y	integer
T	0-249	0-1	Y	bit
C	0-249	0-1	Y	bit
DMa.bb	0-15	0-1	Y	bit
TMa.bb	0-15	0-1	N	bit

Note: The format **abb** and **a.bb** the **a** represents the address, and **bb** represents two digits bits. For example: for format **abb**, you must type at least one digit for the address and the two last digits represents the bits, i.e. 000 represents in address 0 bit 00; for format **a.bb**, you must type the address, then the **.**, and after that two digits to represents the bits, i.e. DM0.00 represents address 0 bit 00.

CONFIGURATION

Keyence KV-L2 - Setup the Quick Panel to RS232C, 19200 baud, 8 data bits, even parity, 1 stop bit, and none handshake. Click on Protocol and for PLC Station No., type 0. Connect the HMI-CAB-C53 cable between the I/O port on the Quick Panel and Port 1 on the PLC.

Verify the following settings for the switches in one side of the PLC: Interface Switch, select 232C. For Terminator Switch, select OFF. For Station No. Switch, select 0. For Set A Switches: Switches 2 and 4 - ON, Switches 1 and 3 - OFF. For Set B Switches: Switches 3, 4, 5 and 6 - ON, Switches 1, 2, 7 and 8 - OFF.

Cable

Use the HMI-CAB-C53 Cable. A detailed drawing is available in the Hardware Reference Manual and in several locations in the Communications User manual.

Keyence Program Port

Keyence KV-L2, KV-10R

CAUTION Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Tag Variable Table

Tag Name Format	Address Range	Bit Range	Value Range	Type	Read Write	Example	Description & Notes
WTaaaa	0 - 9999	None	0 - 65535	Integer	Read	WT20	Timer Current Value
WCaaaa	0 - 9999	None	0 - 65535	Integer	Read	WC022	Counter Current Value
DMaaaa	0 - 9999	None	0 - 65535	Integer	R/W	DM1	Data Memory
TMaaaa	0 - 9999	None	0 - 65535	Integer	R/W	TM1	Temp Data Memory
aaaabb	0 - 9999	00 - 15	0 - 1	Bit	R/W	500	Input, Output, Utility, Internal, Special
Taaaa	0 - 9999	None	0 - 1	Bit	R/W	T20	Timer Contact
Caaaa	0 - 9999	None	0 - 1	Bit	R/W	C22	Counter Contact
DMaaaa.bb	0 - 9999	00 - 15	0 - 1	Bit	R/W	DM1.1	Data Memory
TMaaaa.bb	0 - 9999	00 - 15	0 - 1	Bit	Read	TM1.1	Temp Data Memory

Note: The format **abb** and **a.bb** the **a** represents the address, and **bb** represents two digits bits. For example: for format **abb**, you must type at least one digit for the address and the two last digits represents the bits, i.e. 000 represents in address 0 bit 00; for format **a.bb**, you must type the address, then the (**.)**, and after that two digits to represents the bits, i.e. DM0**.** 00 represents address 0 bit 00.

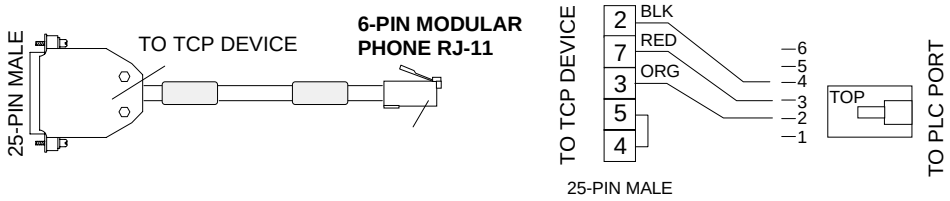
Note: For DMaaaa, registers 9000-9827 are special purpose.

CONFIGURATION

Keyence KV-10R - Setup the Quick Panel to RS232C, 9600 baud, 8 data bits, even parity, 1 stop bit, and none handshake. Connect the cable between the I/O port on the Quick Panel and the programming port on the PLC.

Keyence KV-L2 - Setup the Quick Panel to RS232C, 9600 baud, 8 data bits, even parity, 1 stop bit, and none handshake. Connect the cable between the I/O port on the Quick Panel and Port 1 on the PLC. Verify the following settings for the switches in one side of the PLC: Interface Switch, select 232C. For Terminator Switch, select OFF. For Station No. Switch, select 0. For Set A Switches: Switches 2 and 4 - ON, Switches 1 and 3 - OFF. For Set B Switches: Switches 3, 4, 5 and 6 - ON, Switches 1, 2, 7 and 8 - OFF.

Program Port Cable



HMI-CAB-C112

Memobus

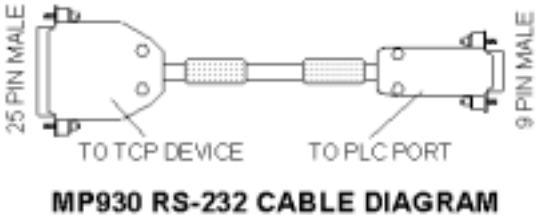
Serial Port Parameters for the Display

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Memobus.**

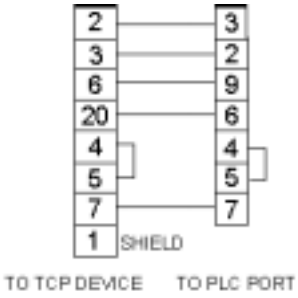
Elect. Format	RS232C
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

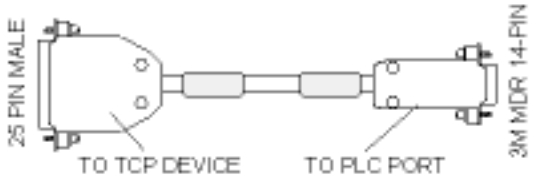
Click OK to return to the Project Setup dialog box.

Cable Diagrams

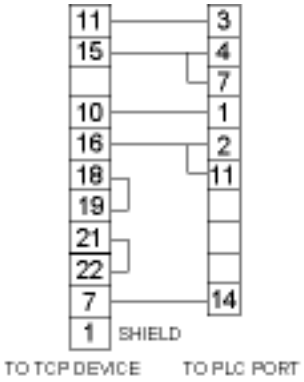


MP930 RS-232 CABLE DIAGRAM





MP940 RS-422 CABLE DIAGRAM



Memobus Tag Variables

The tag variable table for the current Memobus driver is shown below.

Address format is Decimal.

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Frmt	Data Width	Byte Order	Word Order	Bit write (y/n/ rmw)	Read / Write	Device Name Format	Description & Notes
Words											
MW	1-32767	0	65535	UI	16	n/a	n/a	N	R/W	MWaaaaa	Output register
ML	1-32766	0	99999999	LUI	32	n/a	HL	n/a	R/W	MLaaaaa	Out reg. Long
MF	1-32766	-99999999	99999999	FLT	32	n/a	HL	n/a	R/W	MFaaaaa	Out reg, Float
Bits											
MB	1-32767	0	F	Hex	1	n/a	n/a	Y*	R/ W	MBaaaaab	Output Discrete

* Note: This driver supports bit level writes and bit level reads, but the entire word must be either read or write. The reason: to write to a bit, the panel will first read the 16-bit word from the controller, set the bit, and then at the next communication scan write the word back to the controller. A problem could occur if bits are mixed read and write within a 16-bit word – if a bit is changed by the controller during a HMI write cycle, some bits could get over-written due to the conflict. For that reason, it will be necessary to configure each 16-bit word register for either read bits or as write bits, but not mixed. If this is not accounted for, unexpected bit resets may occur within that same word.

If a Selector Switch Object is used, it is important to dedicate a full 16 bit word to that object. Reason: the selector switch action will reset all other bits over-writing any other bit references used in that word.

"I" registers (such as IB, IW, or IL) are not supported.

Examples

MW1 Output register 1
ML1 Output register 1, Long
MF1 Output register 1, Float
MB1F Output Discrete register 1, bit 15

Mitsubishi

Overview

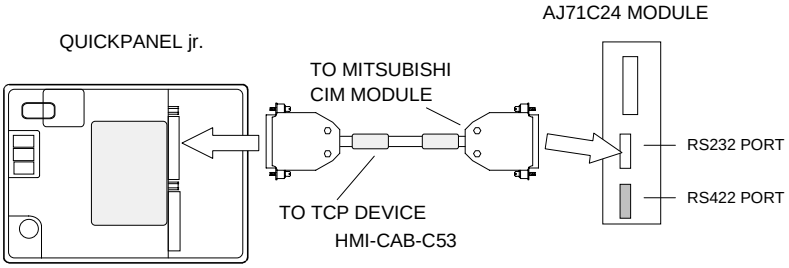
This section describes the operation of a target display with the Mitsubishi series Programmable Logic Controllers. You should be familiar with Mitsubishi products before attempting to connect a target display. The Mitsubishi MELSEC-A and FX series are supported.

Mitsubishi A Series

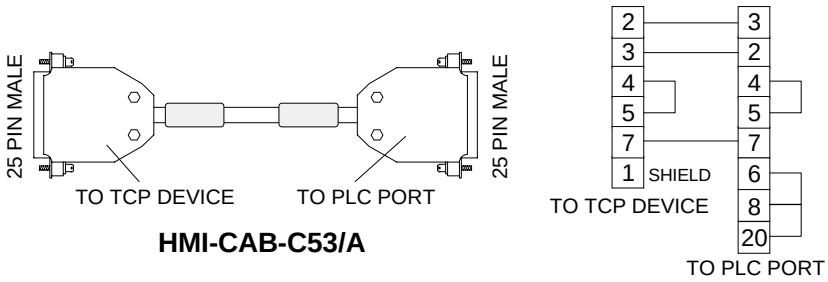
The target display can communicate with a Mitsubishi processor using the AJ71C24 Computer Interface Module in a A1CPU, A2CPU and A3CPU. The Aj71C24 CIM can be used with the following base units: A32B, A35B, A38B, A55B, A58B, A65B, A68B.

The AJ71C24 Computer Interface Module provides RS232C and RS422 interfaces. RS232C is limited to 15 Meters and RS422 is limited to 500 Meters. A typical connection is shown in the following drawing.

The following drawing shows a connection between a *QUICKPANEL jr.*™ and an AJ71C24 Module.



HMI-CAB-C53 Cable



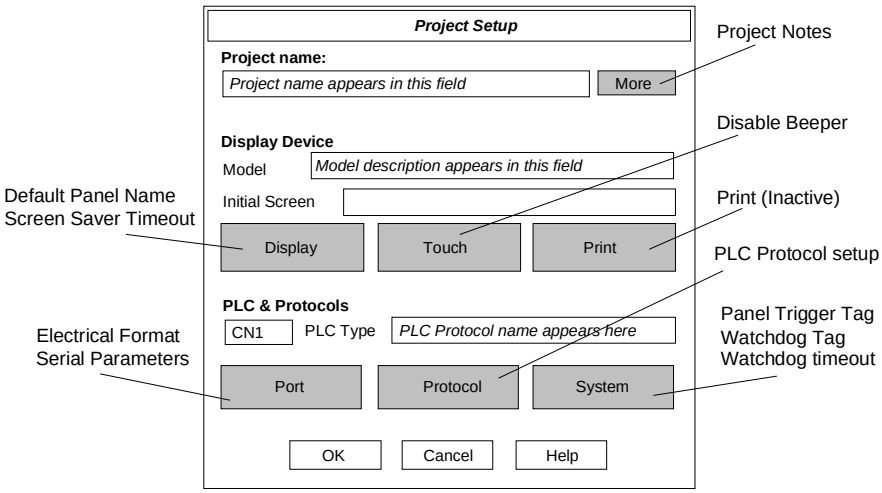
HMI-CAB-C53/A

Setup for using a Mitsubishi A PLC

Use the following procedure to ensure your target device is setup properly for the Mitsubishi A PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Mitsubishi MELSEC A).** See PLC Type on page 5.

Port Button

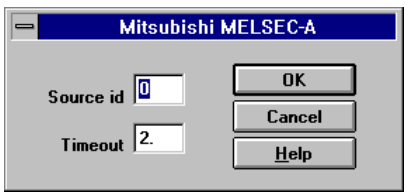
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Mitsubishi MELSEC A.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

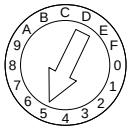
Enter the Source ID (PLC address). Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

Setting the Mitsubishi Transmission Control Protocol

The Mitsubishi Computer Interface Module has multiple protocols available by changing the position of the MODE switch. The target display uses Format 1 which is selected as position 1 for RS232 and position 5 for RS422.



Mitsubishi Serial Communications Parameters

Communication parameters are selected by dip switch settings on the front of the module. Switches are numbered SW11 to SW24.

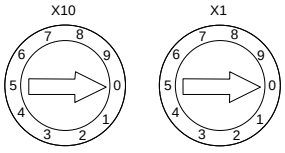
SWITCH	FUNCTION	ON	OFF	SETTING
SW11	Protocol	RS422	RS232C	Off
SW12	Data Length	8 bits	7 bits	On
SW13,14,15	Baud Rate			see table
SW16	Parity Check	Yes	No	Off
SW17	Parity setting	Even	Odd	Off
SW18	Stop bit	2 bits	1 bit	Off
SW21	Sum check	Yes	No	On
SW22	Write during run	Allowed	Disallowed	On
SW23	Send Termination	Present	Absent	On
SW24	Rec Termination	Present	Absent	On

Baud Rate Table

	300	600	1200	2400	4800	9600	19200
SW13	Off	On	Off	On	Off	On	Off
SW14	Off	Off	On	On	Off	Off	On
SW15	Off	Off	Off	Off	On	On	On

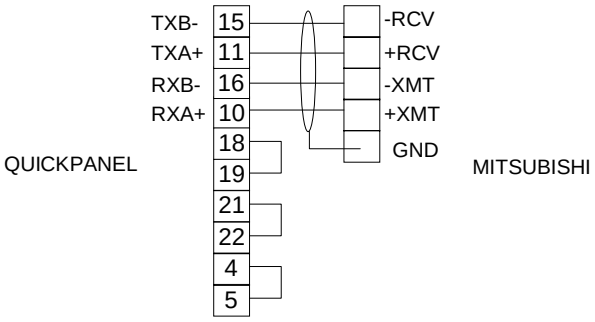
Mitsubishi Station Number

Each Communication Interface Module has a unique station number selected by switches X10 and X1. The range of station numbers is 0 to 31 decimal.



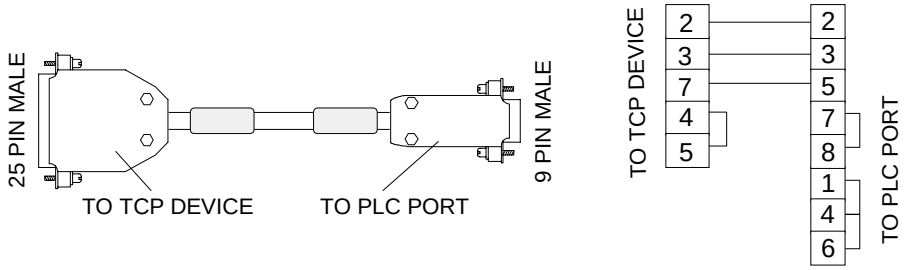
RS422 Cable Drawing

The following drawing is for an RS422 cable.



Mitsubishi A1S Computer Link Module

Use the following cable for the A1S Link Module.



HMI-CAB-C88

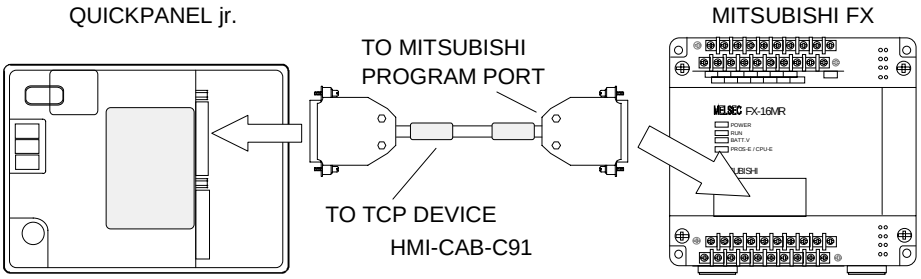
Mitsubishi Tag Variable Names, A Series

PLC Name	Tag Name	Type	Range
Input X	X0000 to X07FF	Hex	0 to 1
Output Y	Y000 to Y07FF	Hex	0 to 1
Internal Relay M	M0000 to M2047	Dec	0 to 1
Latch Relay L	L0000 to L2047	Dec	0 to 1
Link Relay B	B0000 to B03FF	Hex	0 to 1
Annunciator F	F0000 to F0255	Dec	0 to 1
Special Relay M	M9000 to M9255(1)	Dec	0 to 1
Timer (contact) T	TS000 to TS255	Dec	0 to 1
Timer (coil) C	TC000 to TC255	Dec	0 to 1
Counter (contact) C	CS000 to CS255	Dec	0 to 1
Counter (coil) C	CC000 to CC255	Dec	0 to 1
Timer present T	TN000 to TN255	Dec	0 to 65535
Counter present C	CN000 to CN255	Dec	0 to 65535
Data register D	D0000 to D1023	Dec	0 to 65535
Link register W	W0000 to W03FF	Hex	0 to 65535
File register R	R0000 to R8191	Dec	0 to 65535
Special register D	D9000 to D9255(1)	Dec	0 to 65535
ASCII	ASCII	ASCII	1-999

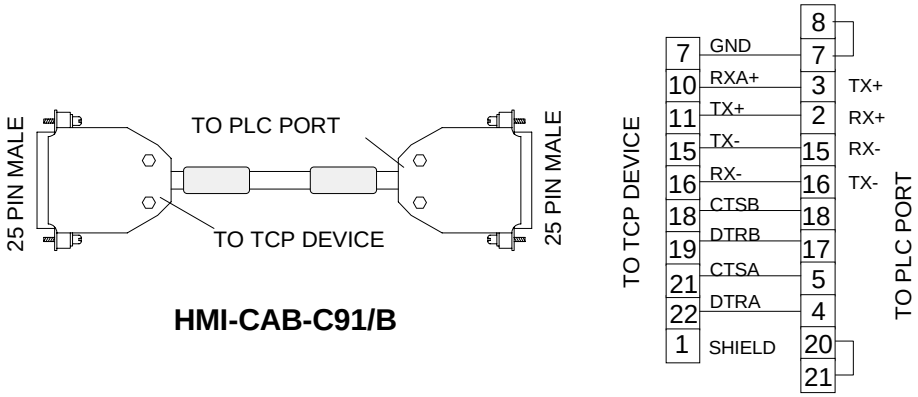
1. Do not write to special relays M9000 to M9255 and special registers D9000 to D9255.

Mitsubishi FX Series

Connecting to a Mitsubishi FX



HMI-CAB-C91/B Cable



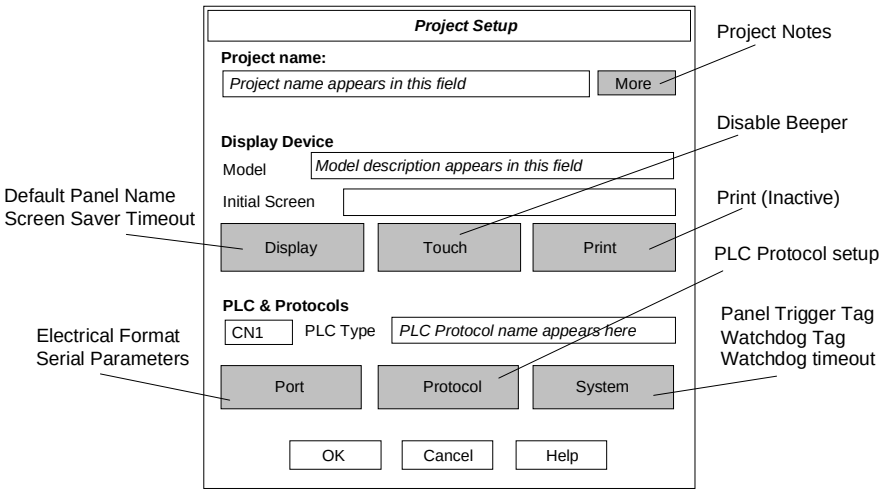
The Mitsubishi FX ON has a mini DIN connector for the program port. The Mitsubishi FX20PCADP converter is a mini DIN to 25-pin D adapter. Use this adapter with the HMI-CAB-C91 cable to connect to the program port.

Setup for using a Mitsubishi FX PLC

Use the following procedure to ensure your target device is setup properly for the Mitsubishi FX PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Mitsubishi FX).** See PLC Type on page 5.

Port Button

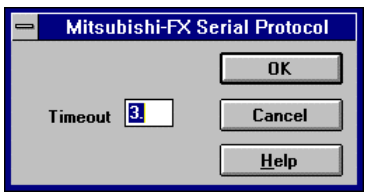
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Mitsubishi FX**

Elect. Format	RS422/485 Full Duplex
Baud Rate	9600
Data Bits	7
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

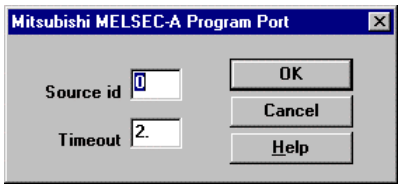
Mitsubishi FX Tag Variable Table

PLC Name	Word Range	Write	Value Range	Operator
D0	0-511	Y	0-65535	PB, SS, PL, IPB
T0	0-255	Y	0-32767	PB, SS, PL, IPB
C0	0-199	Y	0-32767	PB, SS, PL, IPB
C200	200-255	Y	32-bit unsigned Counter	PB, SS, PL, IPB
X0	0-177	N	1-bit Input, 0-1	
Y0	0-177	Y	1-bit Output, 0-1	
M0	0-1023	Y	1-bit Internal Relay	
S0	0-999	Y	1-bit State, 0-1	

Mitsubishi Program Port

Mitsubishi MELSEC-A Program Port

The drawing shows the setup dialog box for Mitsubishi MELSEC-A Program Port. The default setting for Timeout is correct for most applications.



Serial Port Parameters for the Display

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Mitsubishi MELSEC-A Program Port**.

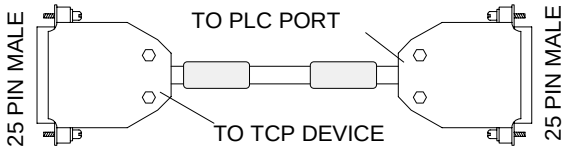
Elect. Format	RS422/485 Full Duplex
Baud Rate	9600
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

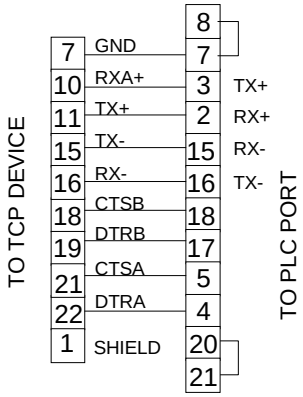
The Programmable Logic Controller's (PLC) switches should be set as follows:

03 OFF
04 ON
05 ON
06 OFF ---> 9600
07 ON
08 ON ---> 8 DATA BITS
09 OFF ---> NO PARITY
10 ON
11 OFF ---> 1 STOP
12 ON ---> SET CHKSUM
MODE = 1

HMI-CAB-C91/B Cable

Connect the HMI-CAB-C91 cable between the I/O port on the Quick Panel and the Program Port on the PLC.





HMI-CAB-C91/B

Tag Variable Table

Name	Address range	Value range	Writeable	Type
D	0-1023	0-65535	Y	integer
TN	0-255	0-65535	Y	integer
CN	0-255	0-65535	Y	integer
W	0-3FF	0-65535	Y	integer
R	0-8191	0-65535	Y	integer
X	0-7FF	0-1	Y	integer
Y	0-7FF	0-1	Y	integer
M	0-2047	0-1	Y	integer
M9	9000-9255	0-1	Y	integer
L	0-2047	0-1	Y	integer
B	0-3FF	0-1	Y	integer
F	0-255	0-1	Y	integer
TS	0-255	0-1	Y	integer
TC	0-255	0-1	Y	integer
CS	0-255	0-1	Y	integer
CC	0-255	0-1	Y	integer

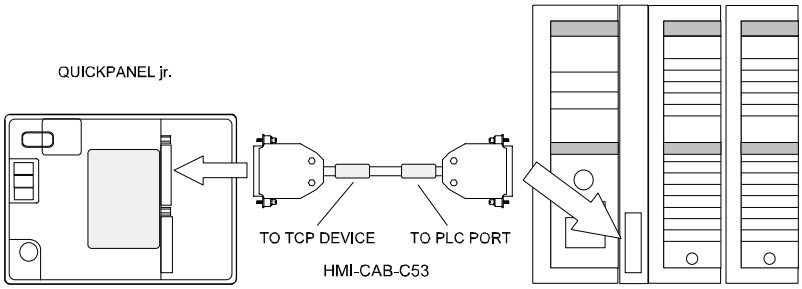
Modicon

Modicon Modbus

Modicon 884 or 984A, B, or X Processor

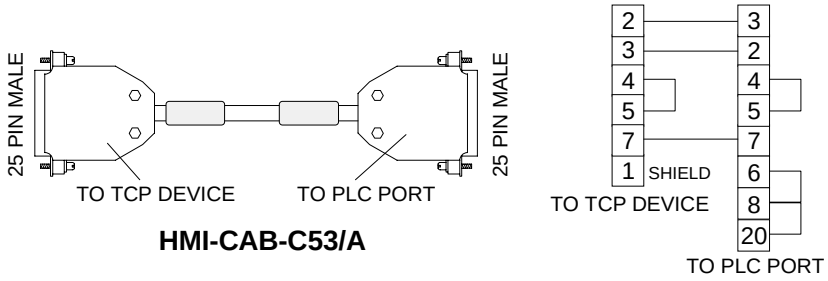
To connect a target display to a Modicon 884, 984 A, B, or X, or other 25 pin Modbus Port, use an HMI-CAB-C53 cable, connected as shown below.

Make sure you connect the target display to the end marked TO TCP DEVICE and connect the Modicon PLC to the end marked TO PLC PORT.



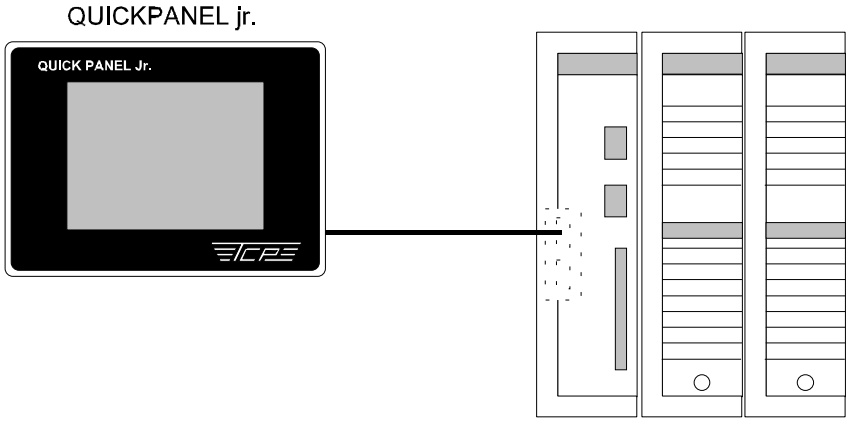
HMI-CAB-C53/A Cable

This cable is used to connect the target display to a Modicon Modbus on an 884, 984 A, B, or X Processor.



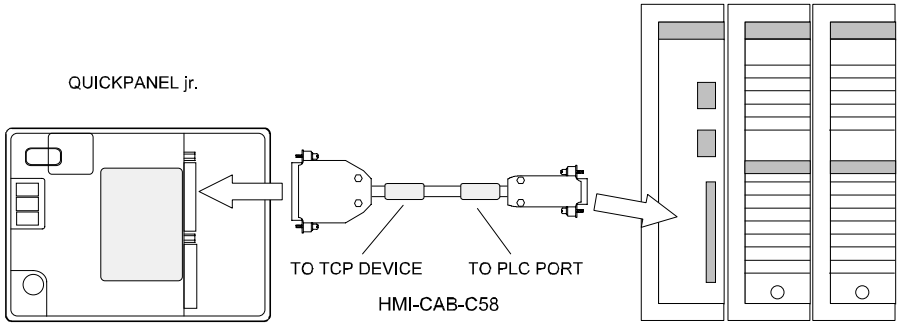
HMI-CAB-C53/A

Modicon Slot Mount 984 PLC (9-pin Modbus Port)



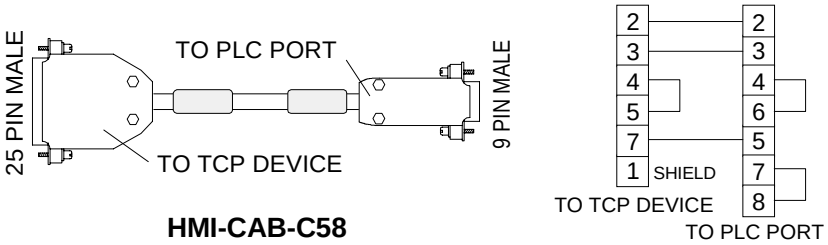
Connecting a Modicon Slot Mount 984 PLC

To connect a target display to a Modicon Slot Mount 984 PLC, use an HMI-CAB-C58 cable, connected as shown below.



HMI-CAB-C58/A Cable

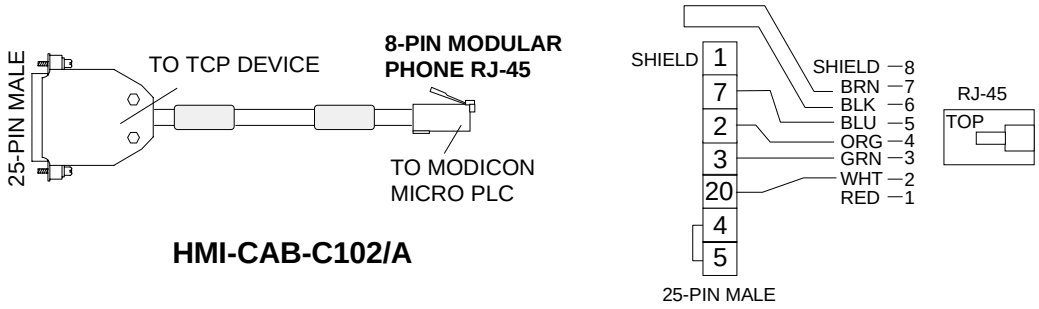
This cable is used to connect the target display to a Modicon Slot Mount 984 PLC.



HMI-CAB-C58

HMI-CAB-C102/A Cable

This cable is used to connect the target display to a Modicon 984 Micro PLC.

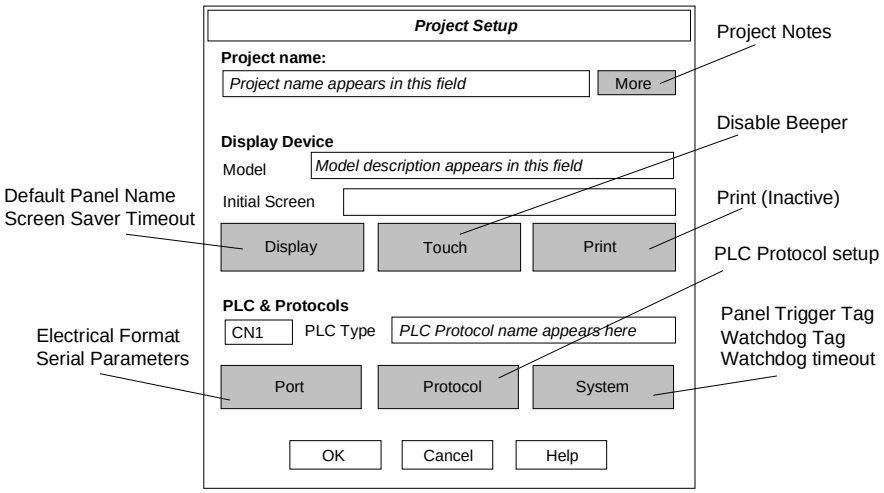


Setup for using an 884 or 984 PLC

Use the following procedure to ensure your target device is setup properly for the Modicon Modbus PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Modicon Modbus).** See PLC Type on page 5.

Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Modicon Modbus**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

The drawing shows the setup dialog box for Modicon Modbus (Serial). Enter the PLC ID (PLC address). The default setting for Timeout is correct for most applications.

The user can now select the storage format (word order) for float and dword data types.

When tags are created automatically, the address field will be padded with zeros if you entered the original tag with preceding zeros. A four digit field will be used if you entered a 4 digit number, else a five digit field will be used by default. Note that you must type the original tag in correctly.

The single write command check box allows the user to select between the multiple write commands currently supported by the Modbus protocol and single write commands supported by previous versions of Modbus.

When this box is not selected (default setting) it supports the multiple write commands of Modbus. When the box is selected, the protocol will support only single write commands.

Tag Variable Table

This protocol supports Multi-Drop and RS422/485 Half Duplex.

Some Modicon systems use multiple processors connected together. You can address a slave by adding an underscore and the slave address to the variable name. For example, OD0001 is read from the Source ID station address while OD0001_3 is read from slave address 3.

The latest version Modicon Modbus and Modbus Plus drivers support the new variable types DR (double), LU(long), LS(long signed) and FR(float). This protocol also supports the Sixnet extensions (Daniel) for those devices designed to utilize the extended variables. A copy of the Modicon tag variable table is shown below.

Node ID Delimiter: _
Node ID Max: 1-247
Node ID Format: D
Address Format: D
Bit Delimiter for IR and OR: .
Bit Range for IR and OR: 1 to 16
Bit Format for IR and OR: D

NOTE: All output types except DR support "Single write command option".

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Format	Data Width	Data Word Order	Bit write (y/n/ rmw)	Read / Write
Words								
IR	1-65535	0	65535	UI	16	n/a	n/a	R
OR	1-65535	0	65535	UI	16	n/a	rmw	R/W
OS	1-65535	-32768	32767	SI	16	n/a	n/a	R/W
ON	1-65535	-32767	32767	SI	16	n/a	n/a	R/W
MS	1-65535	0	65535	TX	16	n/a	n/a	R/W
DR	1-65534	0	99999999	?	32	n/a	n/a	R/W
LU	1-65534	0	99999999	LUI	32	ADJ	n/a	R/W
LS	1-65534	-99999999	99999999	LSI	32	ADJ	n/a	R/W
FR	1-65534	-99999999	99999999	FLT	32	ADJ	n/a	R/W
ILU	1-65534	0	99999999	LUI	32	ADJ	n/a	R
ILS	1-65534	-99999999	99999999	LSI	32	ADJ	n/a	R
IFR	1-65534	-99999999	99999999	FLT	32	ADJ	n/a	R
Bits								
OD	1-65535	0	1	Bit	1	n/a	Y	R/ W
ID	1-65535	0	1	Bit	1	n/a	Y	R
Sixnet Extensions (Daniel)								
DIL	1-65534	-100000000	100000000	LSI	32		n/a	R
DOL	1-65534	-100000000	100000000	LSI	32		n/a	R/W
DIF	1-65534	-100000000	100000000	FLT	32		n/a	R
DOF	1-65534	-100000000	100000000	FLT	32		n/a	R/W

IRaaaaa	Input register
ORaaaaa	Output register
OSaaaaa	Output register, Signed
ONaaaaa	Output register, Negitive
MSaaaaa	Output register, Text
DRaaaaa	Output register, Double
LUaaaaa	Output register, Long
LSaaaaa	Output register, Long, Signed
FRaaaaa	Output register, Float
ILUaaaaa	Input register, Long
ILSaaaaa	Input register, Long, Signed
IFRaaaaa	Input register, Float
ODaaaaa	Output Discrete
IDaaaaa	Input Discrete

Note: The Sixnet extensions are not supported on all Modbus devices. Use these extensions ONLY with those devices designed to utilize the extended variables.

Examples:

MODICON	QUICKPANEL
00001	OD0001
01236	OD1236
10001	ID0001
10256	ID0256
30001	IR0001
34096	IR4096
40001	OR0001
49999	OR9999

Modbus Plus

Modbus Plus is a local area network system designed for industrial control applications. A network is a group of nodes on a signal path that is accessed by the passing of a token. A token is a group of bits that is passed in sequence from one device to another on a single network, to grant access for sending messages. While holding the token, a node initiates message transactions with other nodes. Each message contains routing fields that define its source and destination. A node is any device that is physically connected to the Modbus Plus cable. Up to 32 devices can connect directly to the network cable over a length of 1500 feet. Each node is identified by a unique address assigned by the user.

The network bus consists of twisted-pair shielded cable run in a direct path between successive nodes. The minimum cable length between any pair of nodes must be at least 10 feet. The maximum cable length between two nodes is the same as the maximum section length of 1500 feet. The node at each end of a section uses a terminating connector, which provides resistive termination to prevent signal reflections on the network bus. Terminating connectors have a molded shell that is light gray in color. The other nodes use an inline connector which is dark gray.

Network cables are NOT supplied by Total Control Products, Inc. Order the following cables from your Modbus Plus distributor.

Inline Connector, AS-MBKT-085

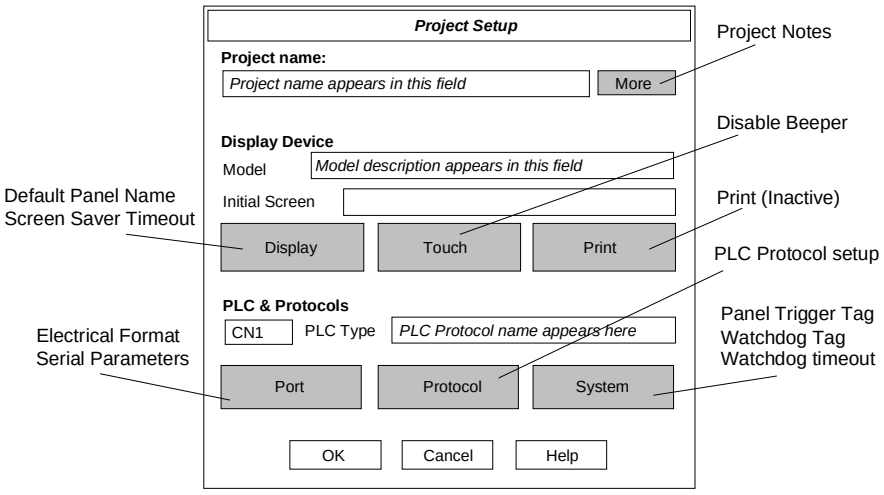
Terminating Connector, AS-MBKT-185.

Setup for using Modbus Plus

Use the following procedure to ensure your target device is setup properly for the Modicon Modbus Plus protocol. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Modbus Plus).** See PLC Type on page 5.

Port Button

The Port settings are not required since the Modbus Plus adapter is controlled directly by the internal processor.

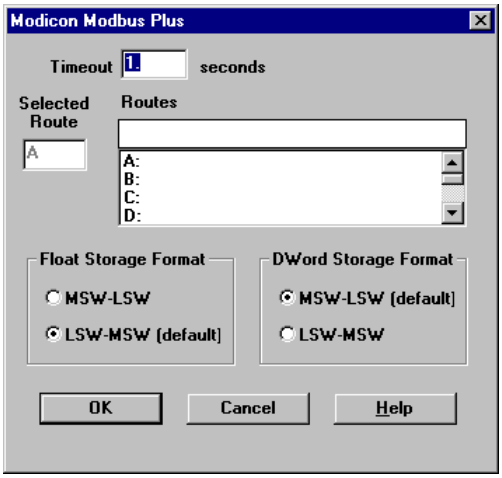
Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

The drawing shows the setup dialog box for Modicon Modbus Plus. The default route is A. Enter the route and the route string. See Route Strings for a description of how to assign routes. The default setting for Timeout is correct for most applications.

The user can now select the storage format (word order) for float and dword data types.

When tags are created automatically, the address field will be padded with zeros if you entered the original tag with preceding zeros. A four digit field will be used if you entered a 4 digit number, else a five digit field will be used by default. Note that you must type the original tag in correctly.



Modbus Plus Tag Variables

The latest version Modicon Modbus and Modbus Plus drivers support the new variable types DR (double), LU(long), LS(long signed) and FR(float). A copy of the Modicon tag variable table is shown below.

Node ID Delimiter: _
Node ID Max: 1-64
Node ID Format: D
Address Format: D
Bit Delimiter for IR and OR: .
Bit Range for IR and OR: 1 to 16
Bit Format for IR and OR: D

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Frmt	Data Width	Bit write (y/n/	Read Write rmw)
Words							
IR	1-65535	0	65535	UI	16	n/a	R
OR	1-65535	0	65535	UI	16	rmw	R/W
OS	1-65535	-32768	32767	SI	16	n/a	R/W
MS	1-65535	0	65535	TX	16	n/a	R/W
DR	1-65534	0	99999999	?	32	n/a	R/W
LU	1-65534	0	99999999	LUI	32	n/a	R/W
LS	1-65534	-99999999	99999999	LSI	32	n/a	R/W
FR	1-65534	-99999999	99999999	FLT	32	n/a	R/W
ILU	1-65534	0	99999999	LUI	32	n/a	R
ILS	1-65534	-99999999	99999999	LSI	32	n/a	R
IFR	1-65534	-99999999	99999999	FLT	32	n/a	R
Bits							
OD	1-65535	0	1	Bit	1	Y	R/ W
ID	1-65535	0	1	Bit	1	Y	R

IRaaaaa	Input register
ORaaaaa	Output register
OSaaaaa	Output register, Signed
MSaaaaa	Output register, Text
DRaaaaa	Output register, Double
LUaaaaa	Output register, Long
LSaaaaa	Output register, Long, Signed
FRaaaaa	Output register, Float
ILUaaaaa	Input register, Long
ILSaaaaa	Input register, Long, Signed
IFRaaaaa	Input register, Float
ODaaaaa	Output Discrete
IDaaaaa	Input Discrete

Examples:

MODICON	**QUICKPANEL**
00001	OD0001
01236	OD1236
10001	ID0001
10256	ID0256
30001	IR0001
34096	IR4096
40001	OR0001
49999	OR9999

Route Strings

Route strings are added to a variable name to locate the PLC address, which may be at the end of a chain. Each point on the link must be defined in order to arrive at the selected processor. For example, a route might be 60, 20, and 1, which woul appear at the end of the variable name as OR100_60.20.1. If you define Route A as 60.20.1, then the variable name can be OR100_A. There are 26 route menus, designated A through Z.

If you use just OR100 as the variable name, the default route is Route A.

Modbus Slave

CAUTION

Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

The drawing shows the setup dialog box for Modicon Modbus Slave. Enter the PLC ID (PLC address).

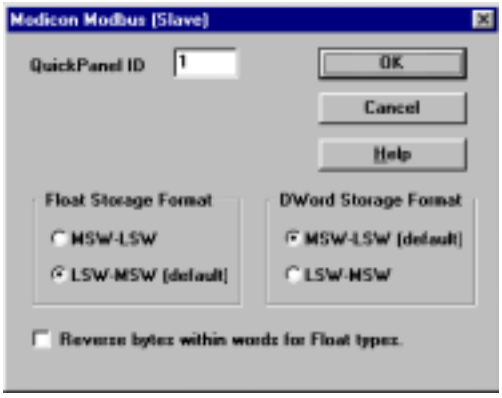
The slave protocol now supports the full set of modbus commands for reading/writing to ID, OD, OR and IR type memory.

Refer to the tag variable table for full details on variable types and ranges supported. (Note that Input types are read/write from the slave QuickPanel, but to the master they are read only.)

Read-modify-write is now supported on OR and IR data types.

The latest version provides for Float and Dword storage formating. You can now reverse the byte order within the words that makeup float types.

Leading zeros are added to tags that are created automatically - a 4 digit field is used if the original tag uses 4 digits, else it defaults to a 5 digit field so long as the original tag has a leading zero.



Serial Port Parameters for the Display

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Modicon Modbus Slave**

Elect. Format	RS232C
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Click OK to return to the Project Setup dialog box.

Panel Trigger Tag and Watchdog Register

The System button will display the System Configuration dialog box, which is used to select the panel trigger tag and setup the watchdog register.

The ***Panel trigger tag*** is a register in the PLC that can be used to select a panel for display. Each panel has a unique ID number which is displayed when you save or open a panel.

When the panel ID number is put in the PLC trigger register, the selected panel will be displayed. The panel change occurs ONLY when the value in the register changes and the change overrides anything else being displayed. If you leave *Panel trigger tag* blank, panel selection is done using the GOTO PANEL operator.

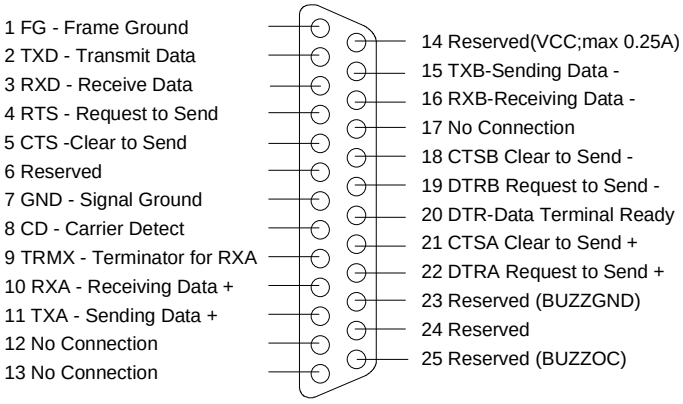
You can use a combination of Panel trigger tag and GOTO PANEL operators. The operator can select different panels by pressing a GOTO PANEL button, and the PLC can select a panel by changing the panel ID number in the Panel trigger register. In this situation, the GOTO PANEL operator will write the panel ID number to the Panel trigger register to initiate the panel change. The important point to remember is that a new panel is displayed when a change occurs in the PLC trigger register.

If you use Panel Trigger Tag, you should also select a Initial Panel. If the Panel Trigger Tag register in your PLC is equal to 0 or an unused panel ID number, and you don't use a Initial Panel, the display screen will be blank.

The ***Watchdog tag*** selection is a register in the target PLC that is written to in intervals determined by the Timeout setting. The target display will write this register in the selected time period. Your PLC requires additional logic to examine and test the data in order to determine if a communication fault has occurred.

Serial Port Pin Assignment

The following drawing illustrates the pin assignments for the QUICKPANEL serial communication port. Note that pins 4 and 5 should be jumpered.



Modbus Slave Tag Variables

The tag variable table for the current Modbus Slave driver is shown below.

Address Format: D
Bit Delimiter for IR and OR: .
Bit Range for IR and OR: 1 to 16
Bit Format for IR and OR: D

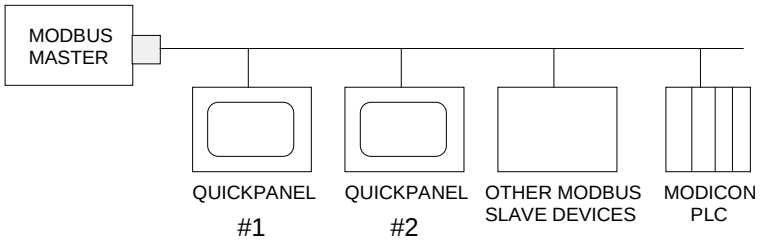
Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Frmt	Data Width	Byte Order	Word Order	Bit write (y/n/ rmw)	Read / Write
Words									
IR	1-999	0	65535	UI	16	M-L	n/a	rmw	R/W
OR	1-9999	0	65535	UI	16	M-L	n/a	rmw	R/W
OS	1-9999	-32768	32767	SI	16	M-L	n/a	n/a	R/W
DR	1-9998	0	99999999	?	32	M-L	n/a	n/a	R/W
LU	1-9998	0	99999999	LUI	32	M-L	adj	n/a	R/W
LS	1-9998	-99999999	99999999	LSI	32	M-L	adj	n/a	R/W
ILU	1-998	0	99999999	LUI	32	M-L	adj	n/a	R/W
ILS	1-998	-99999999	99999999	LSI	32	M-L	adj	n/a	R/W
FR	1-9998	-99999999	99999999	FLT	32	ADJ	adj	n/a	R/W
IFR	1-998	-99999999	99999999	FLT	32	ADJ	adj	n/a	R/W
Bits									
OD	1-999	0	1	Bit	1	n/a	n/a	Y	R/ W
ID	1-999	0	1	Bit	1	n/a	n/a	Y	R/W

IRaaaaa	Input register
ORaaaaa	Output register
OSaaaaa	Output register, Signed
DRaaaaa	Output register, Double
LUaaaaa	Output register, Long
LSaaaaa	Output register, Long, Signed
ILUaaaaa	Input register, Long
ILSaaaaa	Input register, Long, Signed
FRaaaaa	Output register, Float
IFRaaaaa	Input register, Float
ODaaaaa	Output Discrete
IDaaaaa	Input Discrete

MODICON	**QUICKPANEL**
40001	OR0001
49999	OR9999

Modbus Slave Diagram

The drawing shows how a QUICKPANEL might be connected as a slave device. This is a multiple slave configuration using RS422/485 Half Duplex. This configuration was tested at 19200 Baud, 8 Data Bits, Even Parity, 1 Stop Bit and No Handshake.



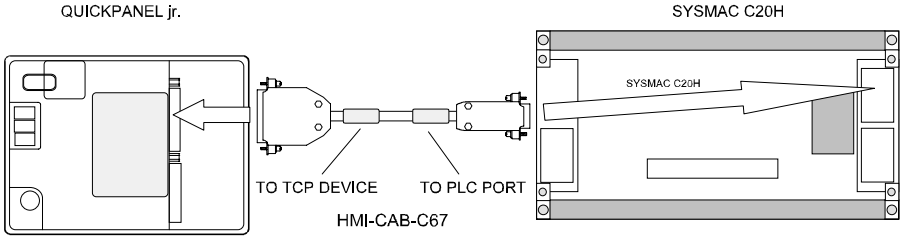
OMRON

OMRON C20H

Connecting to an OMRON C20H PLC

To connect a target display to an OMRON C20H PLC , use an HMI-CAB-C67 cable, connected as shown below.

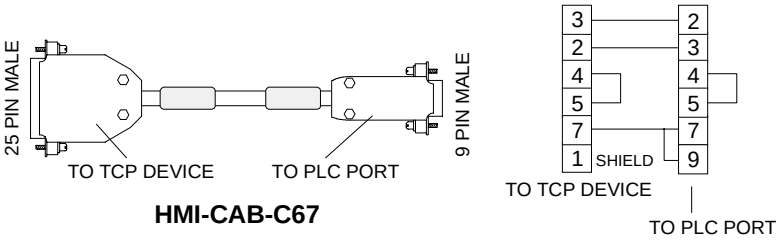
Make sure you connect the target display to the end marked TO TCP DEVICE and connect the PLC to the end marked TO PLC PORT.



HMI-CAB-C67/A Cable

This cable is used to connect the target display to an OMRON C20H PLC.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.

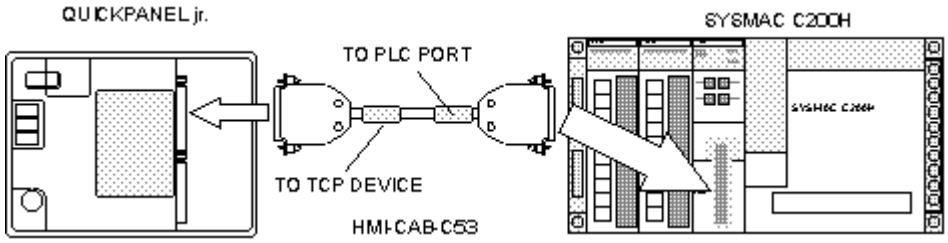


HMI-CAB-C67

Connecting to an Omron C200H PLC

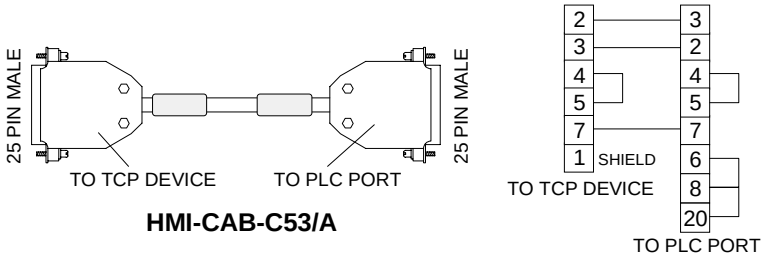
To connect a target display to an Omron C200H PLC , use an HMI-CAB-C53 (RS232) or HMI-CAB-C108 (RS422) cable, connected as shown below.

Make sure you connect the target display to the end marked TO TCP DEVICE and connect the PLC to the end marked TO PLC PORT.



HMI-CAB-C53/A Cable

This cable is used to connect the target display to an Omron C200H LK201 RS232 Communications module.



HMI-CAB-C53/A

OMRON C200H-LK201/202 Host Link Adapter

This interface adapter can be used to connect a C200H PLC to a target display.

Indicators

Run: Lights when the Host Link Unit is operating and blinks if SW1 to SW4 are improperly set.

RCV: Lights when the host computer is sending data to the Host Link Unit.

XMT: Lights when the Host Link Unit is sending data to the host computer.

ERROR: Lights if a communication error has been detected, and goes off when a new command has been received normally. Lights when an error has occurred between the Host Link Unit and CPU rack. In this case the Run indicator blinks.

Switch Settings

Before setting the switches, be sure to turn off the power to the PLC. Using a small blade screwdriver, set each switch so that the desired set value appears in the window below the switch. SW1-SW4 are factory set to 0.

NOTE: The digits on the swatches are very small and hard to read. Make sure they are set to the correct value before applying power to the PLC.

SW1 and SW2 = Unit number of the Host Link. SW1 is the upper digit and SW2 is the lower digit.

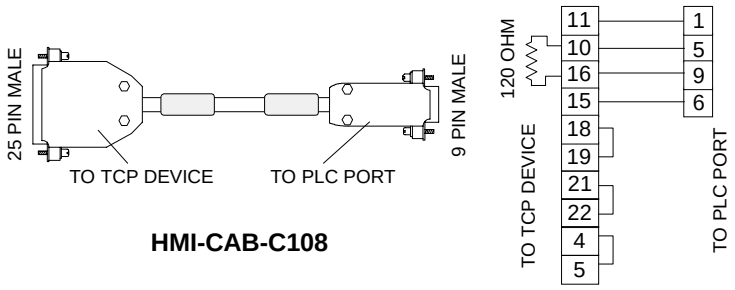
SW3 = Transmission speed. 4=4800 bps, 5=9600 bps, 6=19.2K bps.

SW4 = Transmission format Set to A, which is command level 1, 2, 3, Even parity, 8 data bits, 1 stop bit.

There are switches located on the back panel, which are viewable by removing the Host Link Module. Switch 3 is ON, Switch 4 is OFF (factory default). The CTS switch is set to the 0V position (set down is factory default).

HMI-CAB-C108/A Cable

This cable is used to connect the target display to an Omron C200H LK202 RS422/485 Communications module.



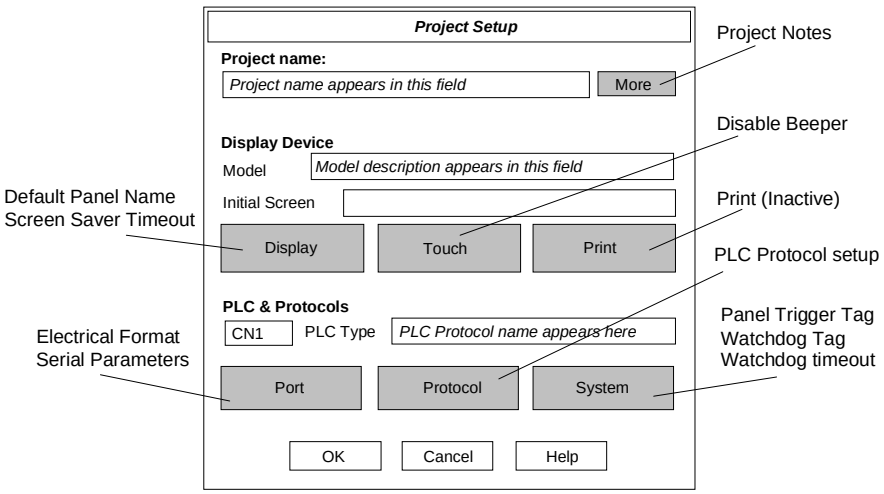
HMI-CAB-C108

Setup for using an OMRON PLC

Use the following procedure to ensure your target device is setup properly for the Omron PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Omron Serial).** See PLC Type on page 5.

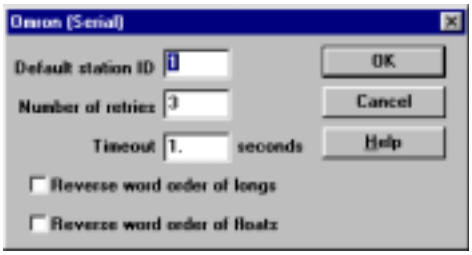
Port Button

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Omron (Serial)**. Note the setting differences for the C20H and C200H-LK201/202 Host Link Adapters.

	C20H	C200H-LK201 HLA	C200-LK202
Elect. Format	RS232C	RS232C	RS422/485 Full Duplex
Baud Rate	9600	19200	19200
Data Bits	7	8	8
Parity	Even	Even	Even
Stop Bits	2	1	1
Handshake	None	None	None

Protocol Button

The following drawing shows the Omron protocol setup dialog box. Enter the Default station ID (PLC address). The default setting for Timeout and Number of retries is correct for most applications. Long variables (L format qualifier) for 32-bit signed integer and Float (F format qualifier) for 32-bit IEEE float variables can be read in reverse word order.



Click OK to return to the Project Setup dialog box.

Omron Tag Variable Table

PLC Name	Word Range	Bit Range	Value Range	Write	Value Range
IR	000 to 235	00000 to 23515	0-65535	Y	16-bit Integer
LR	00 to 63	0000 to 6315	0-65535	Y	16-bit Integer
HR	00 to 99	0000 to 9915	0-65535	Y	16-bit Integer
AR	00 to 27	00 to 2715	0-65535	Y	16-bit Integer
DM	0000 to 0999	NA	0-65535	Y(1)	16-bit Integer
DM	1000 to 1999	NA	0-65535	N (Read Only)	16-bit Integer
TIMP	000 to 511		0-65535	Y	4-digit BCD
TIMHP	000 to 511		0-65535	Y	4-digit BCD
CNTP	000 to 511		0-65535	Y	4-digit BCD
CNTRP	000 to 511		0-65535	Y	4-digit BCD
TIMS	000 to 511		0-65535	Y	4-digit BCD
TIMHS	000 to 511		0-65535	Y	4-digit BCD
CNTS	000 to 511		0-65535	Y	4-digit BCD
CNTRS	000 to 511		0-65535	Y	4-digit BCD

(1) Word writes are valid. Bit writes are not valid.

NOTE According to Omron, writing to the Timer/Counter variable types using Host Link protocol is not valid in RUN mode. Writing may cause a PLC COMM error in RUN mode.

NOTE When using a Timer or Counter, only ONE operation for each timer can be performed on each screen. That is, if you are reading TIMP01 present, you cannot also try to read TIMS01.

TIMP = Timer present
TIMHP = Timer (high resolution) present
CNTP = Counter present
CNTRP = Counter (reverse) present
TIMS = Timer set
TIMHS = Timer (high resolution) set
CNTS = Counter set
CNTRS = Counter (reverse) set

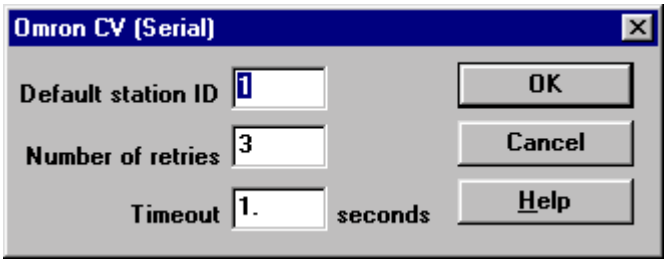
The word number is optionally followed by a colon ":" and a format qualifier. If the format is not specified, it is assumed to be BCD for timers and counters, and 16-bit signed integer for everything else. The format qualifiers are:

I 16-bit signed integer (-32768 to 32767)
L 32-bit signed integer (-2147483647 to 2147483647)
F 32-bit IEEE float (-9.9E-8 to 9.9E8)
C 16-bit BCD (0 to 9999)
D 32-bit double BCD (0 to 99999999)
B Bit

The "B" qualifier is always followed by a 1 or 2 digit decimal number in the range of 0 to 15, with 0 being the low order bit. Writes are not permitted in the DM memory type.

Omron CV

The following drawing shows the Omron CV protocol setup dialog box. Enter the Default station ID (PLC address). The default setting for Timeout and Number of retries is correct for most applications.



Serial Port Parameters for the Display

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Omron CV**.

	CV
Elect. Format	RS232C
Baud Rate	2400
Data Bits	7
Parity	Even
Stop Bits	2
Handshake	None

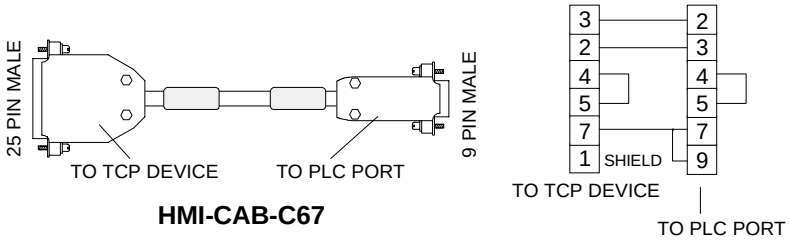
Click OK to return to the Project Setup dialog box.

Connecting to an Omron CV1000 PLC

To connect a target display to an Omron CV1000H PLC , use an HMI-CAB-C67 cable.

HMI-CAB-C67/A Cable

This cable is used to connect the target display to an Omron C20H PLC.



HMI-CAB-C67

Omron CV Tag Variable Table

PLC Name	Word Range	Write	Value Range
IR	0-9999	Y	16-bit Integer
LR	0-9999	Y	16-bit Integer
HR	0-9999	Y	16-bit Integer
AR	0-9999	Y	16-bit Integer
DM	0-65535	Y(1)	16-bit Integer
TIMP	0-9999	Y	4-digit BCD
TIMHP	0-9999	Y	4-digit BCD
CNTP	0-9999	Y	4-digit BCD
CNTRP	0-9999	Y	4-digit BCD
TIMS	0-9999	Y	4-digit BCD
TIMHS	0-9999	Y	4-digit BCD
CNTS	0-9999	Y	4-digit BCD
CNTRS	0-9999	Y	4-digit BCD

(1) Word writes are valid. Bit writes are not valid.

NOTE According to Omron, writing to the Timer/Counter variable types using Host Link protocol is not valid in RUN mode. Writing may cause a PLC COMM error in RUN mode.

NOTE When using a Timer or Counter, only ONE operation for each timer can be performed on each screen. That is, if you are reading TIMP01 present, you cannot also try to read TIMS01.

TIMP = Timer present
TIMHP = Timer (high resolution) present
CNTP = Counter present
CNTRP = Counter (reverse) present
TIMS = Timer set
TIMHS = Timer (high resolution) set
CNTS = Counter set
CNTRS = Counter (reverse) set

The word number is optionally followed by a colon ":" and a format qualifier. If the format is not specified, it is assumed to be BCD for timers and counters, and 16-bit signed integer for everything else. The format qualifiers are:

I 16-bit signed integer (-32768 to 32767)
L 32-bit signed integer (-2147483647 to 2147483647)
F 32-bit IEEE float (-9.9E-8 to 9.9E8)
C 16-bit BCD (0 to 9999)
D 32-bit double BCD (0 to 99999999)
B Bit

The "B" qualifier is always followed by a 1 or 2 digit decimal number in the range of 0 to 15, with 0 being the low order bit. Writes are not permitted in the DM memory type.

PLC Direct

DL305 DirectNET

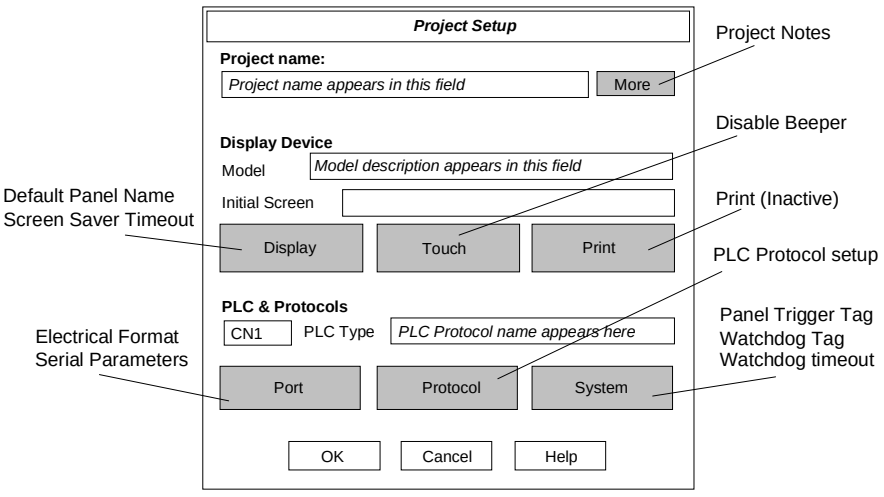
This protocol supports the DirectNET serial interface on many PLC Direct PLCs. This section describes the operation of the DL305 Series PLC. The series includes the DL330/330P with D3-232-DCU, DL340 and DL350. The QuickPanel must be connected to a port configured as a DirectNET Master.

Setup for using a DL305 DirectNET PLC

Use the following procedure to ensure your target device is setup properly for the DL330/330P with D3-232-DCU, DL340 and DL350 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project in the Communications User Manual.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select **Direct 305 DirectNET** from the list box.

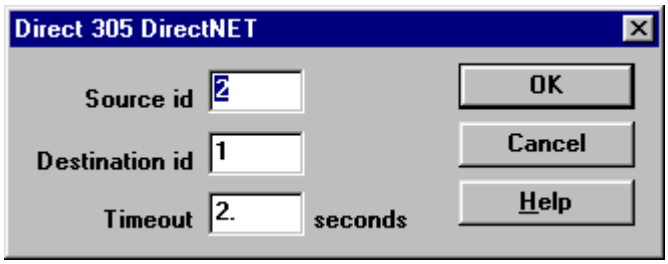
Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **Direct 305 DirectNET.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the **Direct 305 DirectNET** PLC.



Enter the Source ID (QuickPanel ID) and Destination ID (PLC ID). The Timeout setting is correct for most applications.

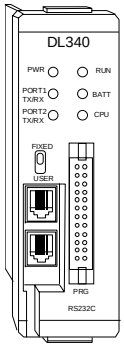
Click OK to return to the Project Setup dialog box.

DL330 and DL330P with D3-232-DCU

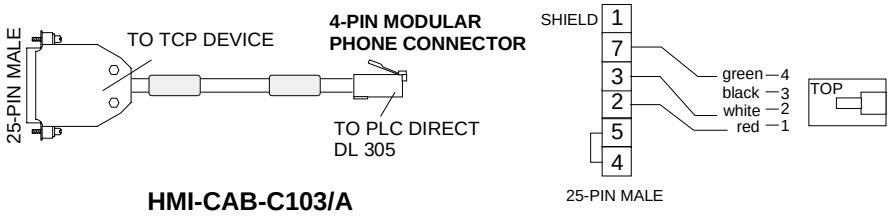
The DL330 and DL330P have no DirectNET ports and must use a D3-232-DCU Data Communication Module to connect to the DirectNET. Use the HMI-CAB-C53 Cable for connecting a QuickPanel to a Direct Logic DL330/DL330P with D3-232-DCU. These modules support baud rates to 19.2K. Make sure the baud rate on the module matches the baud rate on the QuickPanel.

DL340 Cable

The DL340 has two RJ11 ports, both supporting DirectNET protocol up to 38K Baud. The QuickPanel does not support 38K Baud so make sure the baud rate on the DL340 is set to the same setting as the QuickPanel. The top RJ11 port is designated Port 1 and is a slave only port. The bottom port, designated Port 2, can be set up as a DeviceNET Slave or Master. If you use Port 2, it must be configured as a Slave port. The hardware switches on the module determine the configuration for Port 2. The DL340 is shown below.



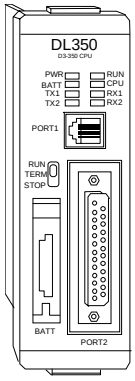
Use the HMI-CAB-C103 Cable for connecting a QuickPanel to a Direct Logic DL340.



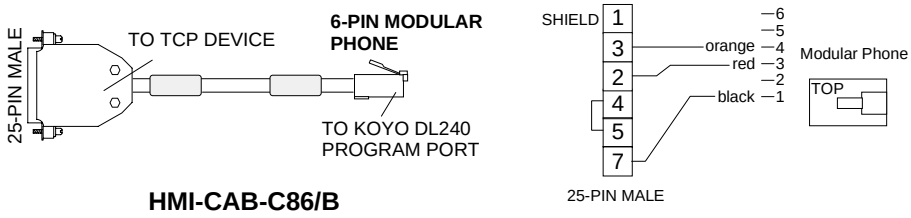
HMI-CAB-C103/A

DL350 Cable

The DL350 has a 6P6C Phone Jack supporting RS232C and is marked PORT1. A 25-pin D-shell Connector supporting RS232C/RS422 is marked PORT2. Both ports support DirectNET. If you decide to use Port 2, it must be configured as a DeviceNET Slave port. The hardware switches on the module determine the configuration for Port 2. The DL350 is shown below.

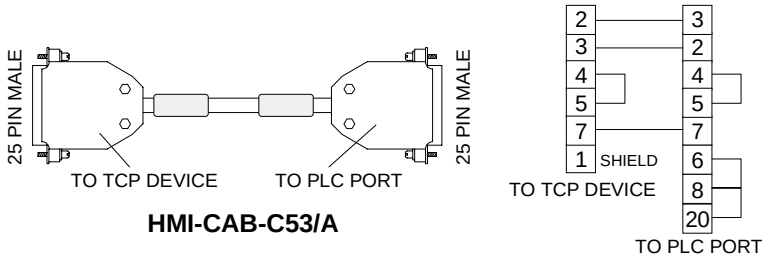


Use the HMI-CAB-C86 Cable for connecting a QuickPanel to a Direct Logic DL350 PORT1.



HMI-CAB-C86/B

Use the HMI-CAB-C53 Cable for connecting a QuickPanel to a Direct Logic DL350 PORT2.



HMI-CAB-C53/A

DL305 Tag Variable Table

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Format	Data Width	Data Word Order	Bit write (y/n/rmw)	Read / Write	Description & Notes
32 bit types									
RD(2)	400-576	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
RD(2)	700-776	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
RL(2)	400-576	-1E+08	1E+08	S (1)	32	rev.	n/a	R/W	Variable long
RL(2)	700-776	-1E+08	1E+08	S (1)	32	rev.	n/a	R/W	Variable long
RF	400-576	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
RF	700-776	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
RR	400-576	-1E+08	1E+08	D	32	rev.	n/a	R/W	Variable real
RR	700-776	-1E+08	1E+08	D	32	rev.	n/a	R/W	Variable real
Words									
R(2)	400-576	-32768	32767	S (1)	16	n/a	ww (3)	R/W	Variable (BYTE)
R(2)	600-677	0	9999	S (1)	16	n/a	ww (3)	R/W	Counter Acc,Timer Acc
R(2)	700-776	-32768	32767	S (1)	16	n/a	ww (3)	R/W	Variable Byte
Bits									
IO	0-157	0	1	n/a	1	n/a	ww (3)	R/W	Input/Output (Bit)
IO	700-767	0	1	n/a	1	n/a	ww (3)	R/W	Input/Output (Bit)
C	160-377	0	1	n/a	1	n/a	ww (3)	R/W	Variable (Bit)
C	770-1077	0	1	n/a	1	n/a	ww (3)	R/W	Variable (Bit)
SR	500-577	0	1	n/a	1	n/a	ww (3)	R/W	Shift Register Bit
CT	600-677	0	1	n/a	16	n/a	n	R	Counter Status
T	600-677	0	1	n/a	16	n/a	n	R	Timer Status

Note: To specify bits for R, use the form **Raaa.bb**, where **aaa** means the word address and **bb** means the bit specification from 00-15. Writing to bits cause a word write.

Note 1:R location can be interpreted as Signed Integer, Unsigned Integer or BCD. The normal interpretation of a R location is Signed Integer.

Note 2: The format qualifier changes the way this variable is read.
C Read or Write as BCD -9999 - 9999
I Read or Write as Signed Integer -32767 to 32768
U Read or Write as an Unsigned Integer 0 to 65535

Note 3: Writing to a bit cause a word write.

Address Format = Octal

The bit delimiter for R words is (.). The bit range is 0-15. The bit format is D (decimal). Other variable types do NOT use bit delimiter.

The bit format for IO, C, and SR types is D (decimal)

The node ID delimiter for all types is (_) . This is an underscore symbol. The Minimum Node ID is 1, the Max Node ID is 90. The Node ID format is D (decimal).

Direct 405/205 DirectNET

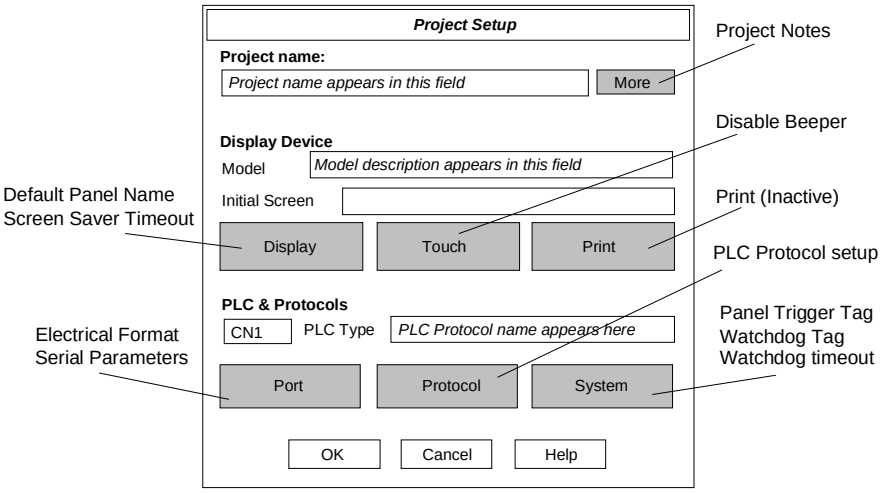
This protocol supports the DirectNET serial interface on many PLC Direct PLCs. This section describes the operation of the DL405/205 Series PLC. The series includes the DL240/250 and DL430/440/450.

Setup for using a DL405/205 DirectNET PLC

Use the following procedure to ensure your target device is setup properly for the DL405/205 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project in the Communications User Manual.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select **Direct 405/205 DirectNET** from the list box.

Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **Direct 405/205 DirectNET.**

Elect. Format	RS232
Baud Rate	19200
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

Protocol Button

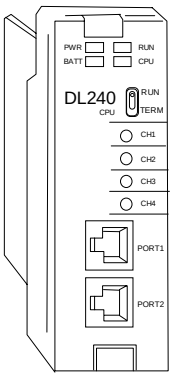
Click the Protocol button to display the dialog box associated with the **Direct 405/205 DirectNET** PLC.

Enter the Source ID (QuickPanel ID) and Destination ID (PLC ID). The Timeout setting is correct for most applications.

Click OK to return to the Project Setup dialog box.

DL240 Cable

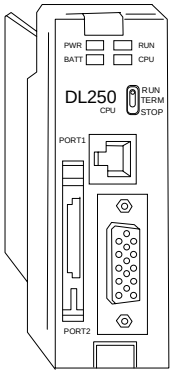
The DL240 has two 6P6C phone connectors labeled PORT 1 and PORT2. Note that only PORT2 is a DirectNET port. Use only PORT2 when connecting to a QuickPanel. The DL240 is shown below.



Use the HMI-CAB-C86 Cable for connecting a QuickPanel to a Direct Logic DL240 PORT2. (See the drawing in a previous section).

DL250 Cable

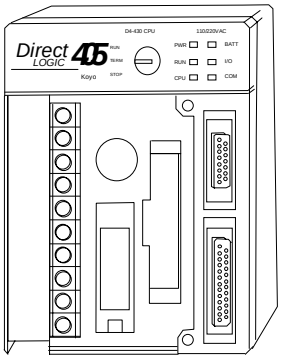
The DL250 has a 6P6C Phone Jack for DirectNET support. The port is marked PORT1 and supports RS232 at 9600 Baud, Odd parity only. Make sure the baud rate on the DL250 is set to the same setting as the QuickPanel.



Use the HMI-CAB-C86 Cable for connecting a QuickPanel to a Direct Logic DL250 PORT1. (See the drawing in a previous section).

DL430/440

The DL430 and DL440 have 25-pin DirectNET connections. The baud rate is dipswitch selectable and must match the settings on the QuickPanel.



Use the HMI-CAB-C53 Cable for connecting a QuickPanel to a Direct Logic DL430 and DL440. (See the cable drawing in a previous section).

DL430/440 with D4-DCM Data Communication Module

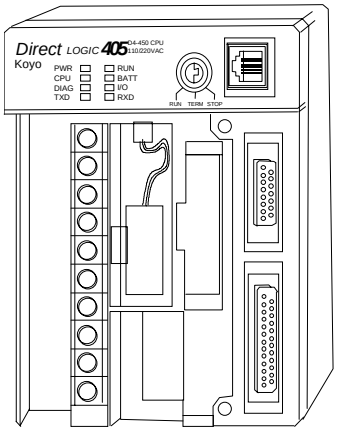
If the DirectNET port is being used, you can use a D4-DCM module to provide additional DirectNET protocol. Make sure the dip switches for the communication parameters on the DCM module are the same as the QuickPanel.

Use the HMI-CAB-C53 Cable for connecting a QuickPanel to a Direct Logic D4-DCM Data Communication Module. (See the drawing in a previous section).

DL450 Cable

The DL450 has a 6P6C Phone Jack supporting DirectNET. The DL450 also has a 25-pin DirectNET connection that can be set to Master or Slave protocol. Make sure the communication parameters for the DirectNET port are the same as the QuickPanel.

If you decide to use the 25-pin DirectNET connection, it must be configured as a DeviceNET Slave port. The DL450 is shown below.



Use the HMI-CAB-C53 Cable for connecting a QuickPanel to a Direct Logic DL450 bottom port (25-pin logical Port A). (See the drawing in a previous section).

DL405/205 Tag Variable Table

Format: nnaaaaa.bb[_dd][\p]

nn is the name or type of the variable
aaaaa is the address of the variable (addresses are in octal)
.bb is the bit number of the variable
_dd is the destination address
\p is an optional protocol or port number (range 1-2)

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Format	Data Width	Data Word Order	Bit Write	Read /Write	Description & Notes
32 bit									
VD	0-17777	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
VD	40000-41237	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
VL	0-17777	-1E+08	1E+08	S (1)	32	rev	n/a	R/W	Variable long
VL	40000-41237	-1E+08	1E+08	S (1)	32	rev	n/a	R/W	Variable long
VF	0-17777	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
VF	40000-41237	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
VR	0-17777	-1E+08	1E+08	D	32	rev	n/a	R/W	Variable real
VR	40000-41237	-1E+08	1E+08	D	32	rev	n/a	R/W	Variable real
Words									
V	0-377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Timer Accumulator
V	400-777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	(System Status)
V	1000-1377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Counter Accumulator
V	1400-7377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	User (Variable)
V	7400-7777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	(System Status)
V	10000-37777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Variable
V	40000-40177	-32768	32767	S (1)	16	n/a	ww (2)	R/W	GX (Global Input)
V	40200-40377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	GY (Global Output)
V	40400-40477	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"X" (Input)
V	40500-40577	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"Y" (Output)
V	40600-40777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"C" (Variable)
V	41000-41077	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"S" (Stage Status)
V	41100-41117	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"TMR Status"
V	41140-41157	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"CNT Status"
V	41200-41237	-32768	32767	S (1)	16	n/a	n	R	"Spec.Relay" (System Status)
Bits									
GX	0-3777	0	1	n/a	1	n/a	ww (2)	R/W	Global Input (Bit)
GY	0-3777	0	1	n/a	1	n/a	ww (2)	R/W	Global Output (Bit)
X	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Input (Bit)
Y	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Output (Bit)
C	0-3777	0	1	n/a	1	n/a	rmw(3)	R/W	Variable (Bit)
S	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Stage Status (Bit)
T	0-377	0	1	n/a	1	n/a	ww (2)	R/W	Timer Status (Bit)
CT	0-377	0	1	n/a	1	n/a	ww (2)	R/W	Counter Status (Bit)
SP	0-777	0	1	n/a	1	n/a	n	R	System Status (Bit)

Note 1:V locations can be interpreted as Signed Integer, Unsigned Integer, or BCD. The normal interpretation of a V location is Signed Integer. Reading V locations in a different format is done by adding a colon and a suffix to the V location address.
V100:C Read or Write the contents of V100 as BCD 0000-9999
V100:I Read or Write the contents of V100 as Signed Integer -32767 to 32767
V100:U Read or Write the contents of V100 as an Unsigned Integer 0 to 65535

Note 2: Writing to a bit cause a word write.

Note 3: Bit writes to C type variables are supported. The process of writing a single bit in a C variable is called Read-Modify-Write, where the variable is read, the desired bit is changed and the whole byte is written back to the PLC. If the contents of the C variable is changed by the PLC during the Read-Modify-Write operation, the byte value will be the new value of the *QUICKPANEL*™ write operation.

Address Format = Octal

The bit delimiter for V words is (.). The bit range is 0-15. The bit format is D (decimal). Other variable types do NOT use bit delimiter.

The bit format for V, GX, X, Y, C, S, T, CT, and SP types is D (decimal)

The node ID delimiter for all types is (_) . This is an underscore symbol. The Minimum Node ID is 1, the Max Node ID is 90. The Node ID format is D (decimal).

Profibus

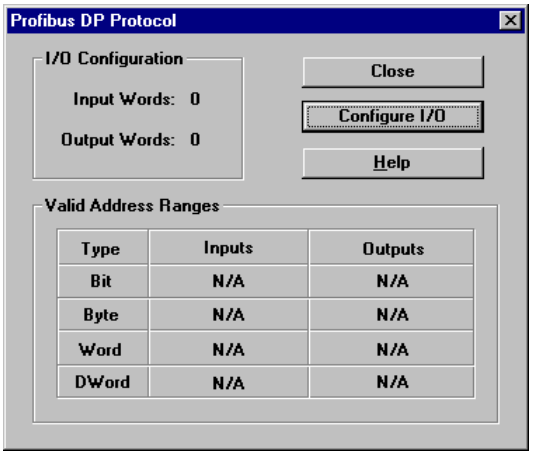
The most important advantages of PROFIBUS in comparison with other fieldbuses are the stable international standard EN 50 170 and the universal features covering a wide range of applications in manufacturing, process and building automation. Open and vendor independent communication with PROFIBUS is not just a vision. Its success has been demonstrated in over 100,000 applications. Independent market studies confirm that PROFIBUS with its market share of more than 40% leads the market for open industrial fieldbus systems in Germany and Europe.

Leading manufacturers of automation technology stand behind PROFIBUS with all their know how and offer a wide range of innovative products and services which are listed and continuously updated in the PROFIBUS product guide. The PROFIBUS product guide is available free of charge from the offices of the PROFIBUS User Organization. A complete technical description of PROFIBUS can be found at the Internet site listed below.

The PROFIBUS User Organization can be viewed on the Internet under: **http://www.profibus.com.**

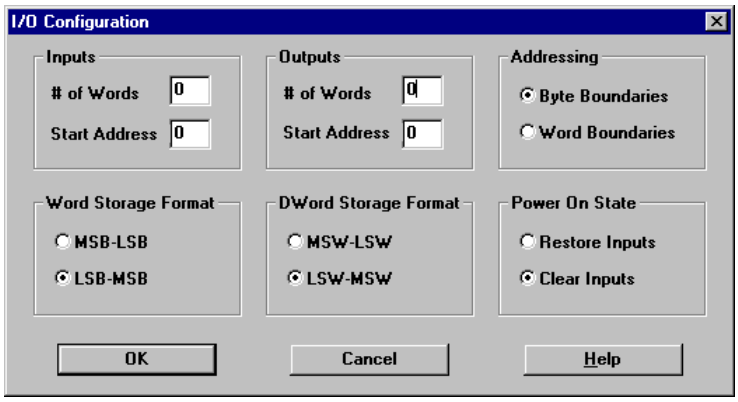
Setup

The drawing shows the setup dialog box for Profibus Protocol. Click the Configure I/O button to select the number of Input and Output words.



Configure I/O

Click the Configure I/O button to display the following dialog box.



Inputs

Enter the number of Input words up to a maximum of 100 words (200 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same Profibus address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the Profibus DP Protocol dialog box. The Start Address is provided so that the user can align the tag address entered in Quick Designer with the mapped address in the PLC or host device.

Outputs

Enter the number of Output words up to a maximum of 100 words (200 bytes). The Start Address is normally set to 0. You can change the Start Address to create an offset address. Different devices can reference the same Profibus address but may require an offset for one of the devices. Changing the Start Address will change the address ranges shown in the Profibus DP Protocol dialog box.

Addressing

Some PLCs use Byte addressing while others use Word addressing. Select Addressing on Byte Boundaries or Word Boundaries, based on your PLC type. The range of valid addresses will be displayed in the Profibus DP Protocol dialog box, which appears when you close the configuration dialog box.

Word Storage Format

This option allows selecting the way bytes are arranged into words. Selecting MSB-LSB will arrange bytes from the MSB (Most Significant Byte) to the LSB (Least Significant Byte). Selecting LSB-MSB will arrange bytes from the LSB (Least Significant Byte) to the MSB (Most Significant Byte. MSB-LSB will store the MSB in the current address byte and the LSB will be stored in the next byte. LSB-MSB is stored in the opposite order.

Double Word Storage Format

This option allows selecting the way words are arranged into double words. Selecting MSW-LSW will arrange words from the MSW (Most Significant Word) to the LSW (Least Significant Word). Selecting LSW-MSW will arrange words from the LSW (Least Significant Word) to the MSW (Most Significant Word). MSW-LSW will store the MSW in the current address word and the LSW will be stored in the next word. LSW-MSW is stored in the opposite order.

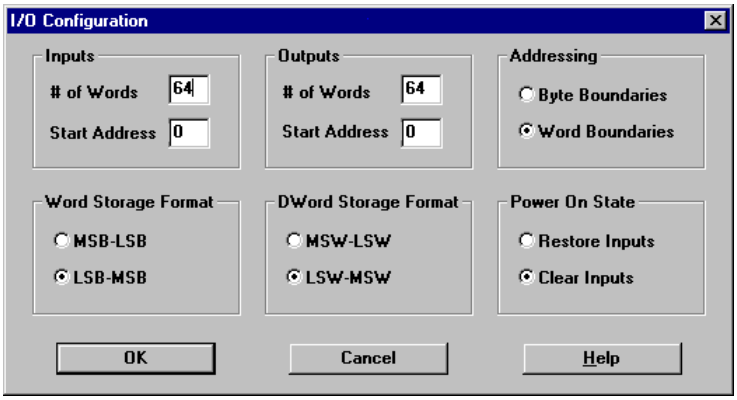
Power On State

A Series B module contains a Battery Backup RAM circuit that maintains a copy of the inputs. The input states can be restored (Restore Inputs) or cleared (Clear Inputs) when power is applied.

Note: ***ONLY*** Series B modules contain the Battery Backup RAM circuit. Series B modules can be identified by the model number on the product label. Example: MODEL: QPI-PBS-202 SERIES B

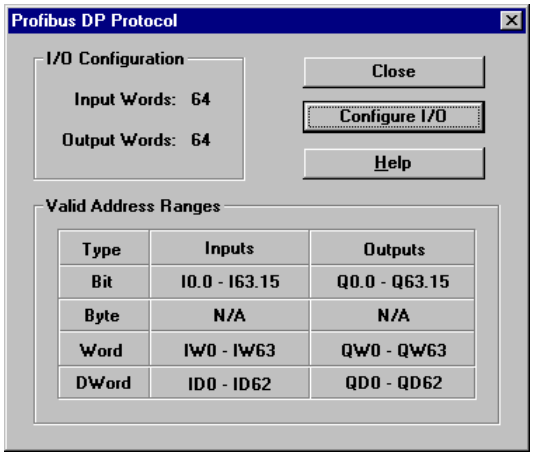
Example 1:

In this configuration example, Input Words are set to 64, Output Words are set to 64 and Addressing is set to Word Boundaries.



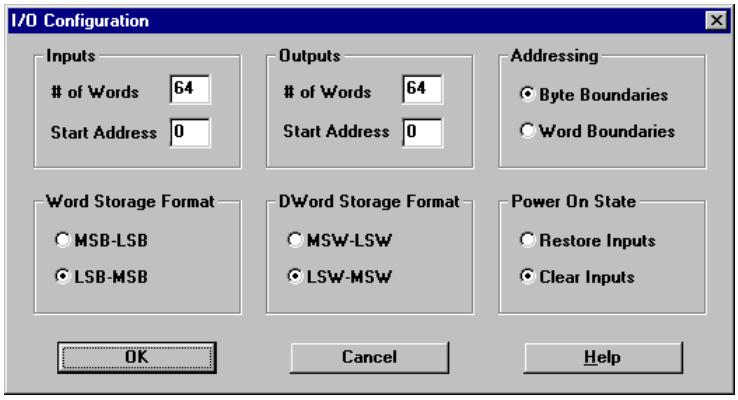
When the OK button is clicked, the following Profibus DP Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

The number of Input and Output words selected will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 64. The variable name for Input Words is IW and the range for 64 words is IW0 to IW63. Output Words are also set to 64, so the variable name is QW and the range is QW0 to QW63.



Example 2:

In this configuration example, Input Words are set to 64, Output Words are set to 64 and Addressing is set to Byte Boundaries.

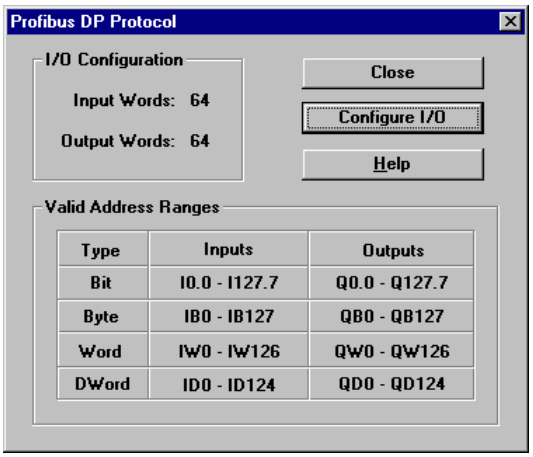


When the OK button is clicked, the following Profibus DP Protocol dialog box will appear. The valid address ranges are shown for all types of variables.

When byte addressing is selected, the valid address ranges appear in a different format in the Profibus DP Protocol dialog box.

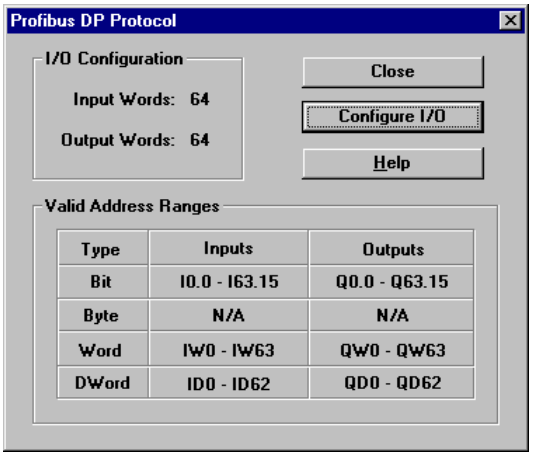
The number of words selected will determine the range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. For example, in the following dialog box, the number of Input Words is set to 64. The variable name for Input Bits is I and the range for 64 words is I0.0 to I127.7. Output Words are also set to 64, so the variable name for bit Outputs is Q, with the range of Q0.0 to Q127.7.

A byte is 8 bits, therefore the addressing method is to use a period as the bit delimiter in the addressing format. For example, I0.0 is bit 0 of Word 0, and I0.7 is bit 7 of Word 0.



Profibus DP Protocol Dialog Box

The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type. A word addressing example is shown below.



GSD Files

PROFIBUS devices have different performance characteristics. Features differ in regard to available functionality (i.e., number of I/O signals and diagnostic messages) or possible bus parameters such as baud rate and time monitoring. These parameters vary individually for each device type and vendor. To achieve simple Plug and Play configuration of PROFIBUS, the characteristic features are specified in an electronic data sheet sometimes called a device data base file or GSD file. Standardized GSD data expand open communication up to the operator control level. Using configuration tools based on GSD files makes integration of devices from different vendors in a bus system simple and user-friendly.

The Device Data Base Files provide a clear and comprehensive description of the characteristics of a device type in a precisely defined format. The GSD files are prepared individually by the vendor for each type of device and made available to the user in the form of a device data base sheet and a device data base file. The precisely defined file format permits the configuration system to simply read in the device data base file of any PROFIBUS-DP device and automatically use this information when configuring the bus system. Project engineers are spared the time-consuming job of determining this information from the technical manuals. During the configuration phase, the configuration system automatically performs checks for input errors and consistency of the data entered in relation to the total system.

GSD File Format

The device data base file is divided into three parts:

General specifications

This section contains vendor and device names, hardware and software release states, baud rates supported, possible time intervals for monitoring times and the signal assignment on the bus plug connector.

DP master-related specifications

This section contains all parameters which only apply to DP master devices (i.e., the maximum number of slaves which can be connected or upload and download capabilities). This section does not exist for slave devices.

DP slave-related specifications

This section contains all specifications related to slaves (i.e., the number and type of I/O channels, specification of diagnostic tests and information on the consistency of the I/O data).

GSD File Installation

Total Control Products has created a GSD file for use with the QuickPanel and vendor specific Profibus protocol. You must install the GSD file as described in the README.TXT file, which is found on the protocol release disk. The file name is Hms-1002.gsd.

GSD files of all PROFIBUS-DP devices that are tested for their conformity to the PROFIBUS standard are available in the GSD library on the World Wide Web Server of the PROFIBUS User Organization for free downloading. When the Profibus protocol for Total Control has been tested for conformity, it will appear in the GSD library. The address is:

http://www.profibus.com.

Ident Number

Every type of a DP slave must have an ident number. Masters require this number to enable them to identify the types of devices connected without creating significant protocol overhead. The master compares the ident number of the connected DP devices with the ident number specified by the configuring tool in the configuration data. Transfer of user data is not started until the correct device types with the correct station addresses have been connected on the bus. This provides a high degree of security against configuration errors.

Cables

The PROFIBUS standard defines two variations of the bus cable for PROFIBUS - FMS and PROFIBUS - DP. Type A is especially recommended for high transmission speeds (> 500 kBaud) and permits doubling of the network distance in comparison to Type B. Type B should only be used at low baud rates and low requirements on the network distances.

Type A

Cable specification Type A for PROFIBUS - FMS and PROFIBUS - DP

Impedance : 135 up to 165 Ohm at a frequency of f from 3 up to 20 MHz.
Cable capacity : < 30 pF per meter
Core diameter : > 0,34 mm², corresponds to AWG 22
Cable type : twisted pair cable. 1 x 2 or 2 x 2 or 1 x 4 lines
Resistance : < 110 Ohm per km
Signal attenuation : max. 9 dB over total length of line section
Shielding : CU shielding braid or shielding braid and shielding foil

Type B

Cable specification Type B for PROFIBUS - FMS and PROFIBUS - DP

Impedance : 100 up to 130 Ohm at a frequency of f > 100 kHz
Cable capacity : typ. < 60 pF per meter
Core diameter : > 0,22 mm², corresponds to AWG 24
Cable type : twisted pair cable. 1 x 2 or 2 x 2 or 1 x 4 lines
Signal attenuation : max. 9 dB over total length of line section
Shielding : CU shielding braid or shielding braid and shielding foil

Shielding

EN 50170 leaves it to the user if a shielded or unshielded cable shall be used. In areas with no disturbances unshielded cable is permitted. The following reasons however make it advisable to use a shielded cable:

a) An area free of disturbances will only exist inside of a shielded cabinet. As soon as a relay is mounted into the cabinet non interference is no longer ensured.

b) The use of unshielded cables requires additional protection mechanisms at the bussignal inputs against overvoltage.

Therefore it is recommended to always use shielded cable.

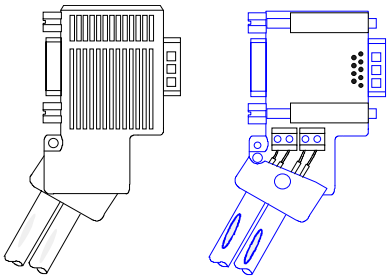
This recommendation is also applicable for eventually needed supply cables from external power supplies to the PROFIBUS devices. (e.g. repeaters).

Double shielded lines are especially suitable for surroundings with heavy electromagnetic interference. In order to guarantee optimal protection the outer shield (shielding braid) and the inner shield (shielding foil) should be connected to ground on both cable ends flatly with a ground termination clip.

When using a shielded bus cable it is recommended to connect the shield on both sides low inductively with the protective ground in order to achieve optimal electromagnetic compatibility. In case of separate potentials (e.g. refinery) the shield should be connected only at one side of the bus cable to the protective ground.

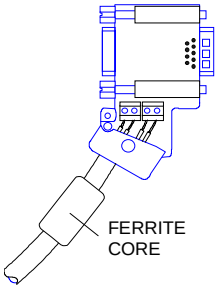
Connectors

Cable assemblies, cable and connectors can be obtained from several manufacturers. Make sure that you always connect the same wires to the same terminal A or B (for example, always connect green wire to terminal A and the red wire to terminal B). A typical connector/cable assembly is shown below.



Ferrite Cores

Attach the ferrite cores to the data cables leading to the Profibus module. This will help to suppress the effect of any noise created by surrounding equipment. TDK ferrite cores (ZCAT2035-0930A) or their equivalent, are recommended.



PLC Comm Errors

In the event of a communication problem, error messages are displayed on a status line at the bottom of the display.

02:FF:A0	Error initializing Anybus module
02:FF:01	Incorrect Anybus module ID
02:FF:02	Anybus module watchdog time-out (module lockup)
02:FF:03	Network Error - Network not connected
02:FF:10	The timestamp in BBRAM does not match timestamp downloaded. Since the BBRAM is invalid, the inputs will be cleared. This is a non-critical error and it will only be displayed for 2 seconds after power up or reboot. Note that it is normal for this error to be displayed after downloading a new project since a new time stamp is included in the download. If this error is displayed after a reboot or power-cycle, the BBRAM in the unit may be defective.

02:FF:11	The BBRAM has a checksum error. Since the BBRAM is invalid, the inputs will be cleared. This is a non-critical error and it will only be displayed for 2 seconds after power up or reboot. It is possible that the power was lost or the QP was rebooted at the exact instance we were updating the BBRAM and therefore the data in the BBRAM is invalid. However, if this error occurs often, the BBRAM in the unit may be defective.

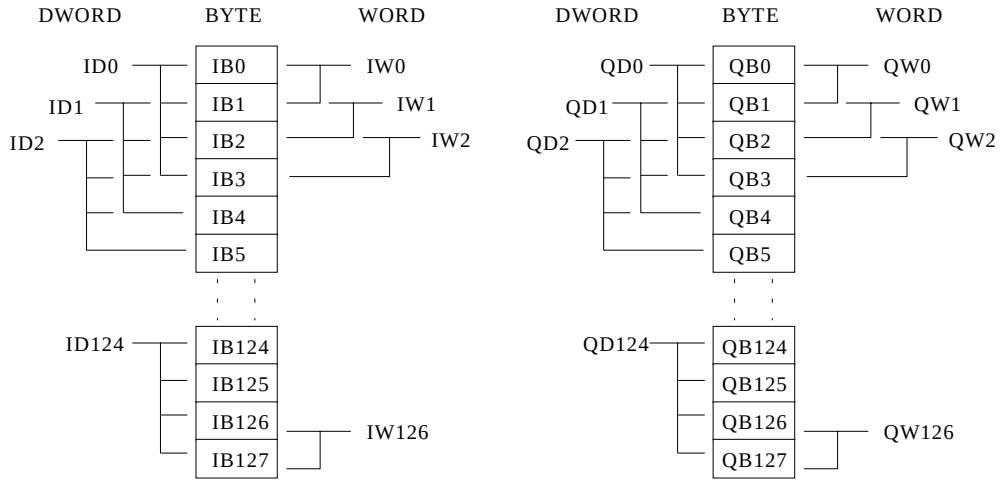
Tag Variables

Valid tag variable names and address ranges are shown in the Profibus DP Protocol dialog box when you configure the protocol.

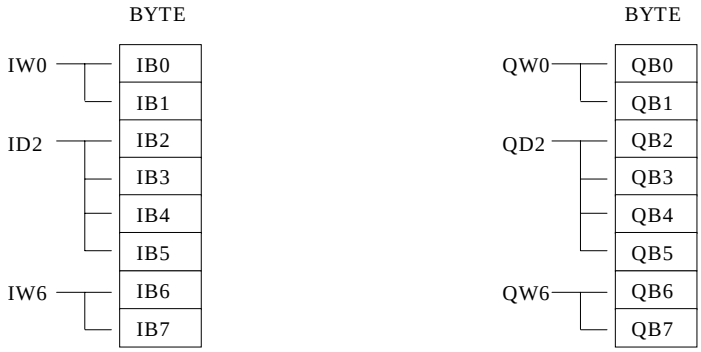
The number of Input and Output words and the addressing will determine the valid address range limits for each variable type. The variable type names are fixed and are displayed in a cell corresponding to the addressing type.

Example 3, Byte Addressing: Input Words = 64, Output Words = 64, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I127.7	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q127.7	0 to 1	N	Bit
IB (Input Byte)	IB0 to IB127	0 to 255	Y	Byte
QB (Output Byte)	QB0 to QB127	0 to 255	N	Byte
IW (Input Word)	IW0 to IW126	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW126	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID124	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD124	-999999999 to 999999999	N	Dword

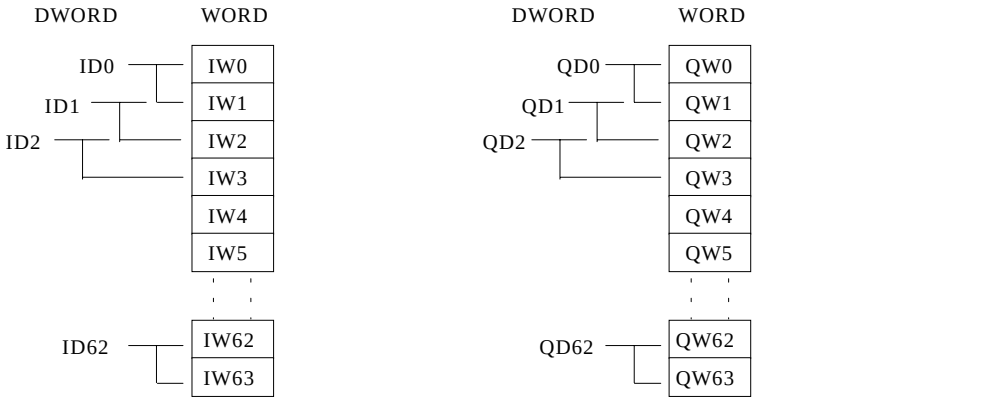


For the combination of a W, DW, W, the following example shows the layout.



Example 4, Word Addressing: Input Words = 64, Output Words = 64, Input start address = 0, Output start address = 0.

Name	Address range	Value range	Write	Type
I (Input Bit)	I0.0 to I63.15	0 to 1	Y	Bit
Q (Output Bit)	Q0.0 to Q63.15	0 to 1	N	Bit
IW (Input Word)	IW0 to IW63	-32768 to 32767	Y	Word
QW (Output Word)	QW0 to QW63	-32768 to 32767	N	Word
ID (2 Word Input)	ID0 to ID62	-999999999 to 999999999	Y	DWord
QD (2 Word Output)	QD0 to QD62	-999999999 to 999999999	N	Dword



For the combination of a W, DW, W, the following example shows the layout.

Reliance AutoMate

AutoMate 15, 20, 30/30E, 40/40E

AutoMate Processors

This section describes the operation of a target display with Reliance AutoMate series Programmable Logic Controllers. The following processors are supported:

AutoMate 15, 20, 30/30E, 40/40E.

The target display can communicate with AutoMate processors using three different methods:

1: Direct to programming port on the AutoMate processor.

Direct communications can be established through the EIA connector port on the front of the AutoMate processor. The target display connects the same way as an IBM PC running APX. Communication is limited to RS-232-C at 9600 Baud, 8 bits with one stop bit. In this mode the host can only talk to the processor it is connected to even if there is a second processor in the same rack. The programming port is always set for host communication. The AutoMate processor is always a slave for host communication.

2> Direct to a Serial Communications Card (45C203) to any AutoMate Processor in the rack.

Through the Serial Communications Card a host may talk to any AutoMate processor in the rack. Parameters can be set to allow any port on the serial communication card to communicate with any AutoMate processor in the same rack.

3> Through an R-Net network via a R-Net AutoMate Gateway.

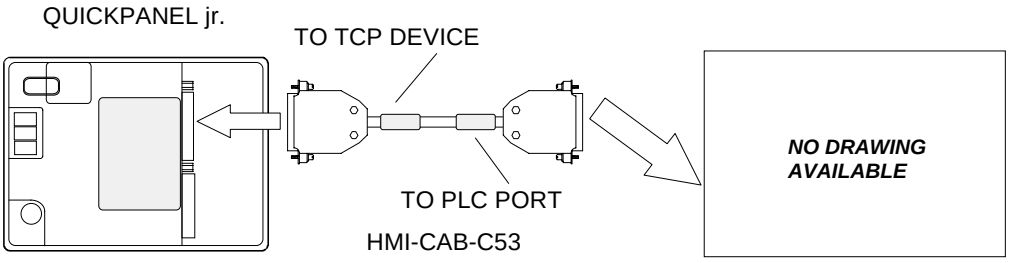
R-Net is the AutoMate local area network. It is an asynchronous, baseband system and communicates at 880 K baud. The host system can gain access to this network through an AutoMate R-Net Gateway (45C27 or 45C28). Through a Gateway, the host system can direct messages to any AutoMate processor on the network by addressing the destination byte as the AutoMate address. In this mode, R-Net is transparent to the host. Communications with the Gateway can be established through the EIA connector on the front of the head. Communications can be RS232 or RS422. The communication parameters (node number, maximum nodes, and config line turnaround) are set up with a command sent from the host computer. The gateway's port parameters are stored in volatile memory so they are lost if power is interrupted. If power is interrupted, the target display will automatically reconfigure the Gateway when power is restored.

AutoMate Processor Port Connection

A single point connection between the target display and a Reliance AutoMate RS232 serial port is shown below. The port is full duplex, 8 data bits, 1 stop bit, and the baud rate is fixed at 9600.

To connect a target display to a Reliance AutoMate processor port, use an HMI-CAB-C53 cable, connected as shown below. The wiring diagram for a HMI-CAB-C53 cable is shown in a later section.

Make sure you connect the target display to the end marked TO TCP DEVICE and connect the PLC to the end marked TO PLC PORT.



AutoMate Serial Communications Processor

The communication parameters of the Serial Communications Processor are more flexible than those of the AutoMate processor programming port. The setup for this card is stored in volatile R/W memory and is lost when power is removed. Each of the three ports is set to a default condition on power up. These defaults are: RS232C, full duplex, 8 data bits, 1 stop bit.

Port 0 Address = Slot number 9600 Baud
Port 1 Address = Slot number 4800 Baud
Port 2 Address = Slot number 1200 Baud

Baud rates on the serial communications processor can be configured for baud rates from 300 to 19.2K for each port. These are set from the AutoMate application program. This card does not support RS422.

To connect a target display to a Reliance AutoMate serial communication processor port, use an HMI-CAB-C53 cable. The wiring diagram for a HMI-CAB-C53 cable is shown in a later section.

AutoMate R-Net Gateway

The target display interface to the R-Net AutoMate Gateway is an asynchronous RS-232/422 serial port with switch-selectible communication rates from 110 to 19.2 K Baud. The R-Net AutoMate Gateway buffers messages in both directions allowing the transmission of messages on R-Net without waiting for each response from each processor. The R-Net Gateway node number is assigned by the target display from information found in the setup menus. The target display is responsible for originating and receiving commands, for configuring the Gateway, for processing of response (ACK/NAK) frames, for computing and verifying check sums, and for matching response to commands.

The R-Net Gateway does not retain its parameters when power is lost. The target display will set the Gateway parameters if the power is lost and restored.

If you connect the target display to the Gateway using RS232-C, then the TCP cable HMI-CAB-C53 will work.

AutoMate R-Net Gateway Switch Settings

The following switch settings are required for connecting the Gateway to the target display.

Switch Position	ON	OFF
S1-1	Illegal	**Asynchronous**
S1-2	Illegal	**Binary**
S1-3	**8 Data Bits**	7 Data Bits
S1-4	Parity On	**Parity Off**
S1-5	Parity Even	**Parity Odd**

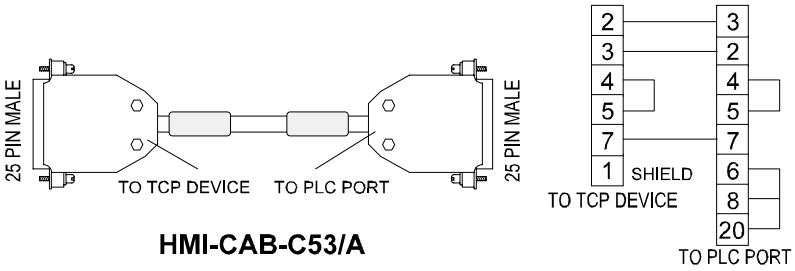
Baud Rate	S1-6	S1-7	S1-8
2400	OFF	OFF	ON
4800	ON	OFF	ON
9600	**OFF**	**ON**	**ON**
19200	ON	ON	ON

Switch Position	Function	ON	OFF
S2-4	Receive Clock	External	**Internal**
S2-5	I/O Port	RS422	**RS232**
S2-6	19.2K Baud	19737 Hz	**18750 Hz**
S2-7	NA		**OFF**
S2-8	NA		**OFF**

HMI-CAB-C53/A Cable

This cable is used to connect the target display to a Reliance AutoMate.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



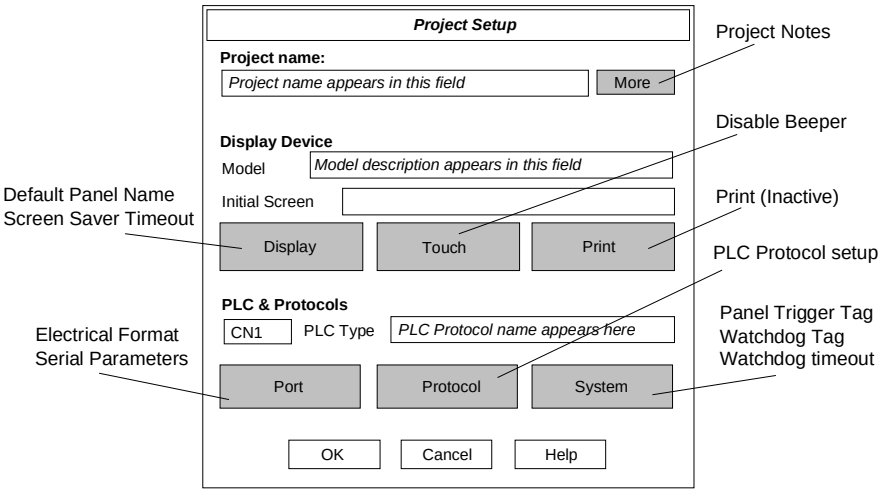
HMI-CAB-C53/A

Setup for using a Reliance AutoMate PLC

Use the following procedure to ensure your target device is setup properly for the Reliance AutoMate PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Reliance Automate)**. See PLC Type on page 5.

Port Button

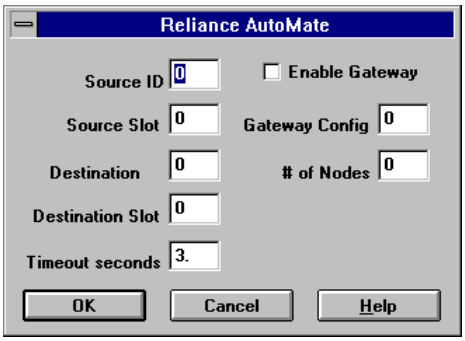
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Reliance AutoMate.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter the Source ID and Source Slot. Enter the Destination ID and Destination Slot. Enter the Gateway Config ID and # of Nodes. Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

RELIANCE Tag Variable Table

Target display tag variables are named using the Reliance Automate nomenclature for Registers, Points, Destination Nodes and Destination Slots. The following table shows the format for variable names. If the Point name is omitted then the entire register will be addressed. If the Destination Node or Destination Slot are omitted, then the default Destination parameters will be used. Here are some samples of variable names.

R3645	Register 3645 (at the default Destination address)
R2000.14	Register 2000, Point 14 (default Destination address)
R17600.02	Register 17600, Point 2 (default Destination address)
R157100.12_2:5	Register 157100, Point 12 at Node 2, Slot 5.

Input Range and Scale Range values are automatically set for the variable type. In this case, register names are O to 65535. Registers with points are O to 1.

Registers and Points

Registers are user accessible 16 bit memory locations within an AutoMate. A Point is a single bit of a register. Register addresses can range from 0 to 157775 octal, depending on the model of the AutoMate. Points are the combination of the register address and the bit address within the register. The bit address can range from 00 to 17 octal.

When looking at a Point number, the User can automatically determine the Register containing that Point and the individual bit within that Register. For example, the Point 14.15 would be read as register 14 and bit address 15.

Register and Point Ranges

The table below shows the valid register ranges for each of the AutoMate processors. Some of these registers are reserved for specific functions or data.

	Low Point	High Point	Low Register	High Register
AutoMate 15	0.00	15.17	0	15
			1000	1067
AutoMate 20	0.00	76.17	0	76
			2000	2777
AutoMate 30/30E	0.00 2000.00 20000.00	76.17 3777.17 27777.17	0 2000 20000	76 3777 27777
AutoMate 40	0.00 1600.00 20000.00	177.17 17677.17 157775.17	0 1600 20000	177 17677 157775
AutoMate 40E	0.00 20000.00	17677.17 157775.17	0 20000	17677 157775

Timeout Delay

To complete a transaction, the target display sends a message to read or write data. Messages must be acknowledged in a specific amount of time. If there is no response to a message, a timeout occurs and the message is lost. The current timeout delay is shown in seconds. One second is the shortest time allowed, and any value less than 1 second is treated as 1 second.

Source ID

The Source ID is the target display "RACK" location or the target display ID number. When connected to the R-Net AutoMate Gateway, this number is also the node number. The target display must act as an AutoMate Processor in order to communicate, so choose an unused node.

Source Slot

The Source Slot is the target display "SLOT" location. The target display must act as an AutoMate Processor in order to communicate, so choose an unused slot.

Destination ID

The Destination ID is the default destination rack. This ID is the node that variables are assigned to if their name lacks the " _ "delimiter.

Destination Slot

The Destination Slot is the default slot number.

Gateway ON

This option informs the target display that the AutoMate Gateway will be in use. When the Gateway is ON, there are two more menu options that require entries. They are "Gateway Max Nodes" and "Gateway Config", which are discussed in the next two sections.

Gateway Max Nodes

Each unit connected to a R-Net network must have a unique node number. The node number is the address used in the communications protocol. Node numbers range from 0 to 31 decimal for a maximum of 32 nodes on a network. For maximum throughput, node numbers should be assigned beginning with node zero and be assigned consecutive numbers. Gaps in the node number assignment causes a 10 millisecond increase in the amount of time required for information to be passed around the network. The Max number causes the Gateway to restart with the first assigned node when the maximum node number is reached. This number should be one higher than the highest node number on the network.

Gateway Configure

If the Gateway loses power, the target display will reset the Gateway parameters after receiving a error message. The Gateway response delay parameters as follows:

00 = 0.2 sec.	10 = 2.6 sec.
01 = 0.5 sec.	11 = 2.9 sec.
02 = 0.8 sec.	12 = 3.2 sec.
03= 1.1 sec.	13 = 3.5 sec.
04 = 1.4 sec.	14 = 3.8 sec.
05 = 1.7 sec.	15 = 4.1 sec.
06 = 2.0 sec.	16 = 4.4 sec.
07 = 2.3 sec.	17 = 4.7 sec.

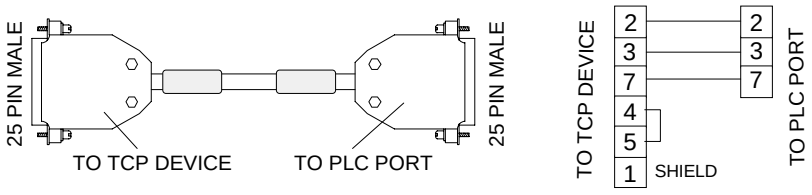
The target display will configure the Gateway with the node number, the maximum number of nodes, and the config value of the response delay.

Sattcon 05-35

Sattcon 05-35

Cable

Use the HMI-CAB-C89 Cable for connecting a QuickPanel to a Sattcon 05-35 PLC.



HMI-CAB-C89

Setup the QuickPanel to RS232C, 9600 baud, 8 data bits, none parity, 1 stop bit, and no handshake. Connect the HMI-CAB-C89 cable between the I/O port on the QuickPanel and the port on the PLC.

Tag Variable Table

Name	Address range	Value range	Writeable	Type
R	0-3071	0-65535	Y	integer
IOW	0-37760	0-65535	Y	integer
Raaaa.bb	0-15	0-1	Y	integer
	0-37777	0-1	Y	integer

Note: Raaaa.bb, **aaaa** is a valid R address, and **bb** is a bit number from 1 to 15.

Siemens

TI CCM2 305/405

NOTE: Koyo manufactures an identical unit for several models of the TI 305/405 family. See PLC Direct section for more information.

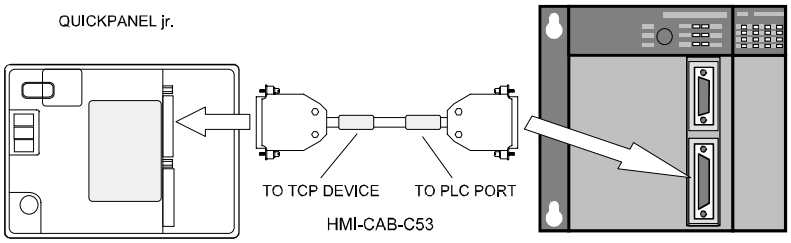
DL330	TI330
DL330P	TI330S
DL340	TI335
DL430	TI425/430
DL440	TI435

The Koyo DL205 can be connected to the display using the HMI-CAB-C86 cable.

Connecting to Simatic TI 405 CCM2

To connect a target display to a Simatic TI 405 CCM2 port, use an HMI-CAB-C53 cable, connected as shown below.

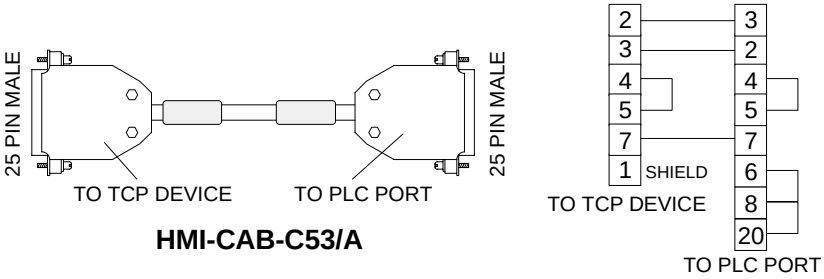
Make sure you connect the target display to the end marked TO TCP DEVICE and connect the Simatic TI 305/405 PLC to the end marked TO PLC PORT.



HMI-CAB-C53/A Cable

This cable is used to connect a target display to a Simatic TI 405 CCM2 port.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



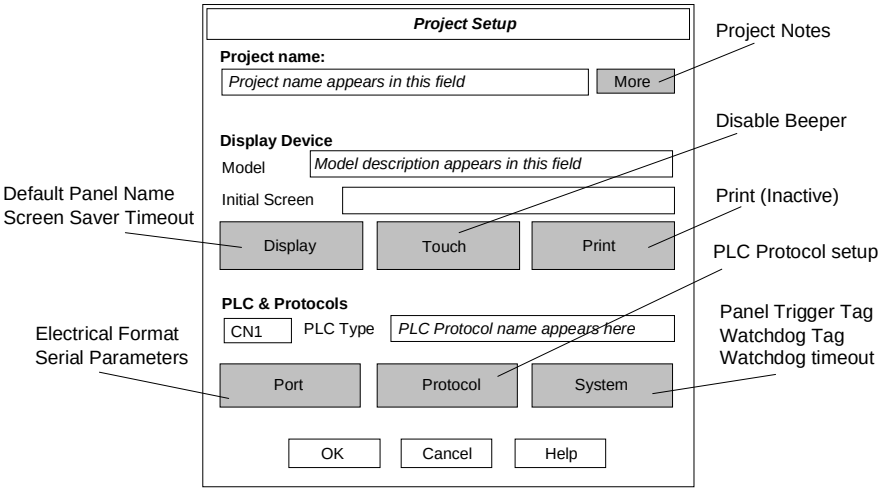
HMI-CAB-C53/A

Setup for using a Simatic TI 405 PLC

Use the following procedure to ensure your target device is setup properly for the Simatic TI 405 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(TI CCM2 305/405).** See PLC Type on page 5.

Port Button

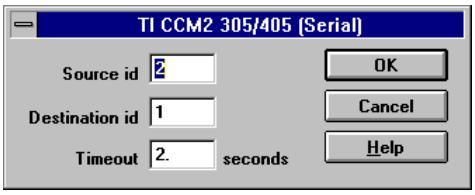
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **TI CCM2 305/405**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter the Source ID. Enter the Destination ID. (PLC address). Enter Timeout in seconds.



NOTE: The PLC secondary address should be set to 1, protocol to HEX and parity to ODD.

Click OK to return to the Project Setup dialog box.

Simatic TI 405 Tag Variable Table

Format: nnaaaaa.bb[_dd][\p]

nn is the name or type of the variable
aaaaa is the address of the variable (addresses are in octal)
.bb is the bit number of the variable
_dd is the destination address
\p is an optional protocol or port number (range 1-2)

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Format	Data Width	Data Word Order	Bit write (y/n/rmw)	Read / Write	Description & Notes
32 bit									
VD	0-17777	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
VD	40000-41237	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
VL	0-17777	-1E+08	1E+08	S (1)	32	rev	n/a	R/W	Variable long
VL	40000-41237	-1E+08	1E+08	S (1)	32	rev	n/a	R/W	Variable long
VF	0-17777	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
VF	40000-41237	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
VR	0-17777	-1E+08	1E+08	D	32	rev	n/a	R/W	Variable real
VR	40000-41237	-1E+08	1E+08	D	32	rev	n/a	R/W	Variable real
Words									
V	0-377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Timer Accumulator
V	400-777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	(System Status)
V	1000-1377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Counter Accumulator
V	1400-7377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	User (Variable)
V	7400-7777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	(System Status)
V	10000-37777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	Variable
V	40000-40177	-32768	32767	S (1)	16	n/a	ww (2)	R/W	GX (Global Input)
V	40200-40377	-32768	32767	S (1)	16	n/a	ww (2)	R/W	GY (Global Output)
V	40400-40477	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"X" (Input)
V	40500-40577	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"Y" (Output)
V	40600-40777	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"C" (Variable)
V	41000-41077	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"S" (Stage Status)
V	41100-41117	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"TMR Status"
V	41140-41157	-32768	32767	S (1)	16	n/a	ww (2)	R/W	"CNT Status"
V	41200-41237	-32768	32767	S (1)	16	n/a	n	R	"Spec.Relay" (System Status)
Bits									
GX	0-3777	0	1	n/a	1	n/a	ww (2)	R/W	Global Input (Bit)
GY	0-3777	0	1	n/a	1	n/a	ww (2)	R/W	Global Output (Bit)
X	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Input (Bit)
Y	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Output (Bit)
C	0-3777	0	1	n/a	1	n/a	rmw(3)	R/W	Variable (Bit)
S	0-1777	0	1	n/a	1	n/a	ww (2)	R/W	Stage Status (Bit)
T	0-377	0	1	n/a	1	n/a	ww (2)	R/W	Timer Status (Bit)
CT	0-377	0	1	n/a	1	n/a	ww (2)	R/W	Counter Status (Bit)
SP	0-777	0	1	n/a	1	n/a	n	R	System Status (Bit)

Note 1:V locations can be interpreted as Signed Integer, Unsigned Integer, or BCD. The normal interpretation of a V location is Signed Integer. Reading V locations in a different format is done by adding a colon and a suffix to the V location address.
V100:C Read or Write the contents of V100 as BCD 0000-9999
V100:I Read or Write the contents of V100 as Signed Integer -32767 to 32767
V100:U Read or Write the contents of V100 as an Unsigned Integer 0 to 65535

Note 2: Writing to a bit cause a word write.

Note 3: Bit writes to C type variables are supported. The process of writing a single bit in a C variable is called Read-Modify-Write, where the variable is read, the desired bit is changed and the whole byte is written back to the PLC. If the contents of the C variable is changed by the PLC during the Read-Modify-Write operation, the byte value will be the new value of the *QUICKPANEL*™ write operation.

Address Format = Octal

The bit delimiter for V words is (.). The bit range is 0-15. The bit format is D (decimal). Other variable types do NOT use bit delimiter.

The bit format for V, GX, X, Y, C, S, T, CT, and SP types is D (decimal)

The node ID delimiter for all types is (_) . This is an underscore symbol. The Minimum Node ID is 1, the Max Node ID is 90. The Node ID format is D (decimal).

Simatic TI 305

Simatic TI 305 Tag Variable Table

Device Prefix	Address Range	Data Range Min.	Data Range Max.	Data Format	Data Width	Data Word Order	Bit write (y/n/rmw)	Read / Write	Description & Notes
32 bit types									
RD(2)	400-576	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
RD(2)	700-776	-1E+08	1E+08	S (1)	32	norm	n/a	R/W	Variable double
RL(2)	400-576	-1E+08	1E+08	S (1)	32	rev.	n/a	R/W	Variable long
RL(2)	700-776	-1E+08	1E+08	S (1)	32	rev.	n/a	R/W	Variable long
RF	400-576	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
RF	700-776	-1E+08	1E+08	D	32	norm	n/a	R/W	Variable float
RR	400-576	-1E+08	1E+08	D	32	rev.	n/a	R/W	Variable real
RR	700-776	-1E+08	1E+08	D	32	rev.	n/a	R/W	Variable real
Words									
R(2)	400-576	-32768	32767	S (1)	16	n/a	ww (3)	R/W	Variable (BYTE)
R(2)	600-677	0	9999	S (1)	16	n/a	ww (3)	R/W	Counter Acc,Timer Acc
R(2)	700-776	-32768	32767	S (1)	16	n/a	ww (3)	R/W	Variable Byte
Bits									
IO	0-157	0	1	n/a	1	n/a	ww (3)	R/W	Input/Output (Bit)
IO	700-767	0	1	n/a	1	n/a	ww (3)	R/W	Input/Output (Bit)
C	160-377	0	1	n/a	1	n/a	ww (3)	R/W	Variable (Bit)
C	770-1077	0	1	n/a	1	n/a	ww (3)	R/W	Variable (Bit)
SR	500-577	0	1	n/a	1	n/a	ww (3)	R/W	Shift Register Bit
CT	600-677	0	1	n/a	16	n/a	n	R	Counter Status
T	600-677	0	1	n/a	16	n/a	n	R	Timer Status

Note: To specify bits for R, use the form **Raaa.bb**, where **aaa** means the word address and **bb** means the bit specification from 00-15. Writing to bits cause a word write.

Note 1:R location can be interpreted as Signed Integer, Unsigned Integer or BCD. The normal interpretation of a R location is Signed Integer.

Note 2: The format qualifier changes the way this variable is read.
C Read or Write as BCD -9999 - 9999
I Read or Write as Signed Integer -32767 to 32768
U Read or Write as an Unsigned Integer 0 to 65535

Note 3: Writing to a bit cause a word write.

Address Format = Octal

The bit delimiter for R words is (.). The bit range is 0-15. The bit format is D (decimal). Other variable types do NOT use bit delimiter.

The bit format for IO, C, and SR types is D (decimal)

The node ID delimiter for all types is (_) . This is an underscore symbol. The Minimum Node ID is 1, the Max Node ID is 90. The Node ID format is D (decimal).

Simatic TI500 Program Port

QUICKDESIGNER software can be used with the following Simatic TI PLC 500 types. A target display can be connected to a Simatic TI 500 PLC through the program port, optional dual communication card, or a remote base controller with the optional RS232 communications interface.

PLC Type	Program Port on Controller	Dual COM Port Card	Remote Base
520	RS232	RS232 (2)	
520C	RS232 & RS422	RS232 (2)	
525	RS232 & RS422	RS232 (2) note 1	
530	RS232	RS232 (2)	
535	RS232 & RS422	RS232 (2) note 1	
530C	RS232 & RS422	RS232 (2)	
545	Port 1 note 2	Port 2 note 2	
560/565	RS232 & RS422	RS232 (2)	RS232

note 1: via 500 series I/O

note 2: 545-1101 and 545-1102 have different pin configurations for Port 2.

The 545 controller (545-1101) had 1 RS-232 port and 1 RS-422/485 port. When the 555 was introduced, Siemens changed the RS422/485 port (Port 2) to accommodate RS232. To do this, the pins for the RS422/485 connection out of port 2 had to be moved around to make the RS232 connection on ports 1 and 2 identical. This means that any cable that connected to the old 545 port 2 (RS422/485) would need to be changed to be usable on the 555. The new 545 (545-1102) also has this new configuration. Note the wiring changes in the following table.

545-1101 CONFIGURATION

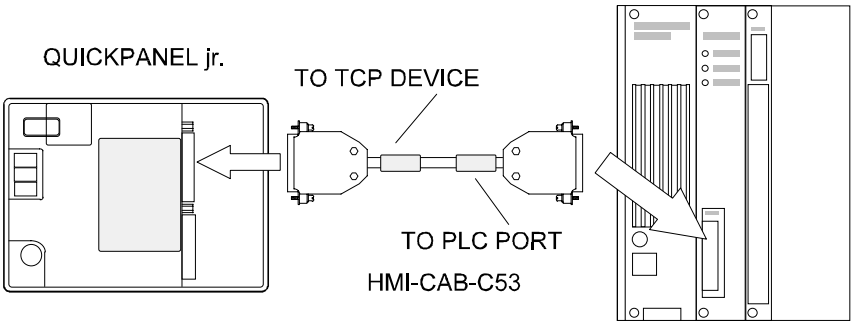
Port 1 RS-232 Port Pinouts Male 9-Pin D Type		Port 2 RS-422 Port Pinouts Female 9-Pin D Type		Port 2 RS-485 Port Pinouts Female 9-Pin D Type	
Pin	Signal	Pin	Signal	Pin	Signal
1	RSD	1	DO+	1	TX/RX+
2	FCV	5	DI+	7	TX/RX-
3	XMT	3	GND	3	GND
4	DTR	7	DO-		
5	GND	8	DI-		
6	DSR				
7	RTS	Dipswitch 1 is ON		Dipswitch 1 is OFF	
8	CTS				

545-1102, 555-110X CONFIGURATION

Port 2 RS-232 Port Pinouts Male 9-Pin D Type		Port 2 RS-422 Port Pinouts Female 9-Pin D Type		Port 2 RS-485 Port Pinouts Female 9-Pin D Type	
Pin	Signal	Pin	Signal	Pin	Signal
2	RCV	3	DO+	3	TX/RX+
3	XMT	9	DI+	8	TX/RX-
5	GND	5	GND	5	GND
		8	DO-		
		2	DI-		
Dipswitch 1 is ON		Dipswitch 1 is ON		Dipswitch 1 is OFF	

Connecting to Simatic TI 535 Program Port

To connect a target display to a Simatic TI 535 Program Port, use an HMI-CAB-C53 cable as shown in the following drawing. Make sure you connect the target display to the end marked TO TCP DEVICE and connect the Simatic TI 535 Program Port to the end marked TO PLC PORT.

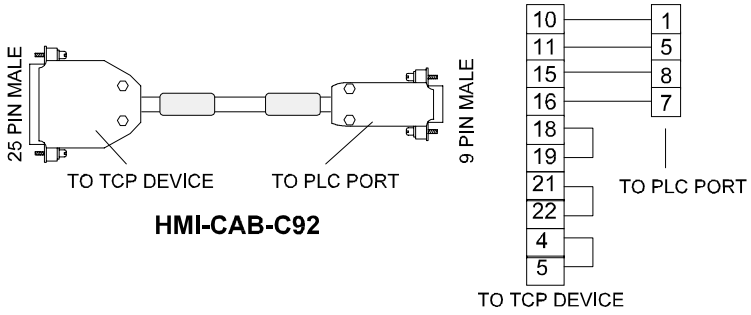


The cable drawing and wiring diagram for the HMI-CAB-C53 cable can be found in the Simatic TI 305/405 CCM2 section at the beginning of this chapter.

The target display can also connect to the program port using the cables shown below.

HMI-CAB-C92

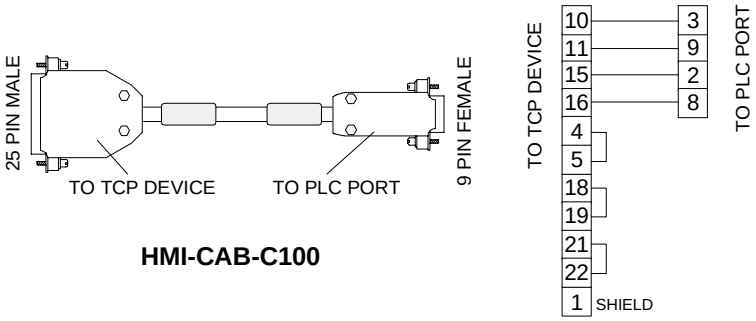
The HMI-CAB-C92 is a 9-pin male RS-422 cable.



HMI-CAB-C92

HMI-CAB-C100

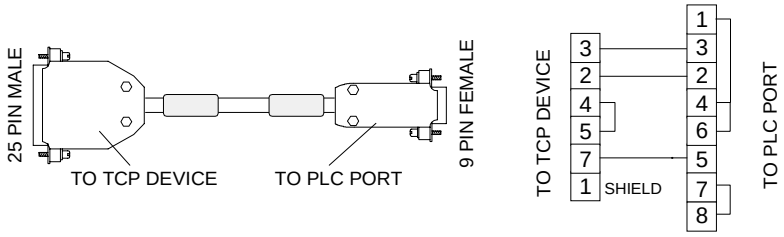
The HMI-CAB-C100 is a 9-pin female RS-422 cable for the TI545-1102 Series.



HMI-CAB-C100

HMI-CAB-C101

The HMI-CAB-C100 is a 9-pin male RS-232 cable.



HMI-CAB-C101

TI 545 RS232 Port 2

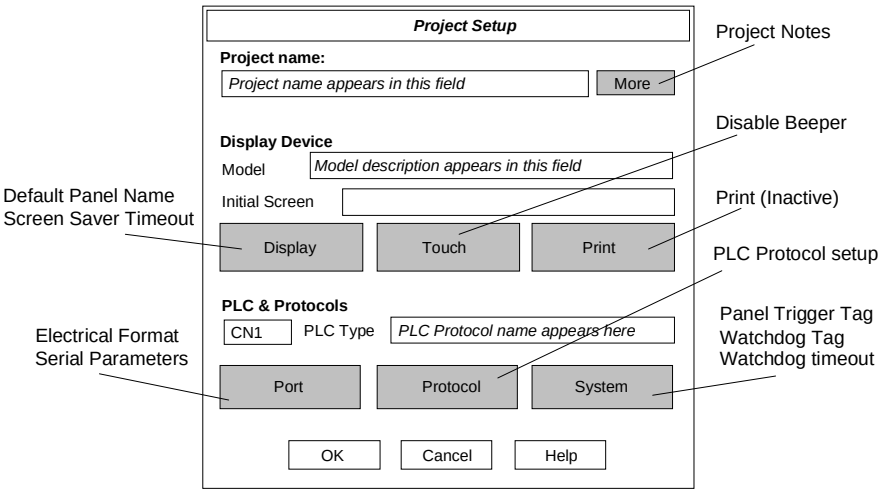
For those interested in using RS232 to Port 2 of a TI545, use an HMI-CAB-C101 cable shown above with a minor change. Move the jumper from pins 4 and 6 and move it to pins 5 and 6.

Setup for using a Simatic TI 500 PLC

Use the following procedure to ensure your target device is setup properly for the Simatic TI 500 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(TI 500 Series).** See PLC Type on page 5.

Port Button

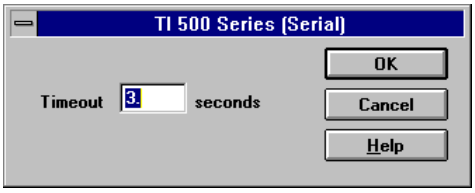
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **TI 500 Series.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	7
Parity	Odd
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

Simatic TI Tag Variable Names

The legal variable names used with Simatic TI PLC's are shown in the following table. All series 520, 525, 530, 535, 560, and 565 are integers.

Format	Variable Type	Max in Group
DB00000	Drum Time Base	10
DC00000	Current Drum Status Word (read only)	10
DP00000	Drum preset for steps 1 thru 16 of drum n. N can range from 1 to 30	7
TP00000	Timer/Counter preset value	7
TC00000	Timer/Counter current value	7
V00000	Variable Storage	7
WX00000	Word Input Image Register	7
WY00000	Word Output Image Register	7
X00000	Discrete Input Bit	10
Y00000	Discrete Output Bit	10
CR00000	Discrete "Control Relay" Bit	10

The variables listed in the above table can have one to five digit BCD address values. Variable names must be upper case. For example, TC1 is a valid variable name for Timer 1 but tc1 is not.

Model 560/565 "S" Register Names

The following "S" register variables are available for reading and writing, except where noted. Registers shown in the 'Real Only' column are from -99999999 to 99999999. Registers shown in the 'Integer Only' column are from -32767 to 32767.

Real Only	Integer Only
AADB	AADBI
	ACFH, ACFL
AERR	AERRI (1)
AHA, AHHA	AHAI, AHHAI
ALA, ALLA	ALAI, ALLAI
AODA	AODAI
APV	APVI
APVH, APVL	
ARCA	
ASP	ASPI
ASPH, ASPL	ASPHI, ASPLI
ATS	AVF
AYDA	AYDAI
	DCP/DCC
KF	K (1)
LADB	LADBI
	LCFH, LCFL
LERR	LERRI (1)
LHA, LHHA	LHAI, LHHAI
LKC	
LLA, LLLA	LLAI, LLLAI
LMN, LMX	LMNI, LMXI
LODA	LODAI
LPV	LPVI
LPVH, LPVL	
LRCA	LRSF
LSP	LSPI
LSPH, LSPL	LSPHI, LSPLI
LTD, LTI, LTS	LVF
LYDA	LYDAI
	STW (1)
T	TI
	TCP/TCC
VF	WXI (1)
	WYI
	V
	WX, WY
DSP/DSC (2)	

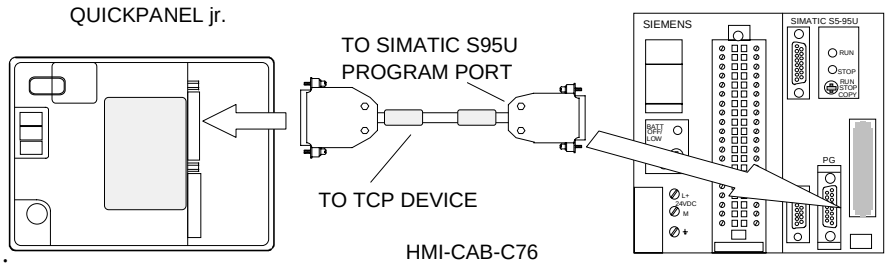
(1) READ ONLY

(2) Range value = 0 to 15

Simatic S Series

Connecting a Simatic S5-95U PLC

To connect a target display to a Simatic S5-95U, use an HMI-CAB-C76 cable, connected as shown below.



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HMI-CAB-C76 Cable

This cable is used to connect a target display to a Siemens Simatic S5 Series PLC.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application.

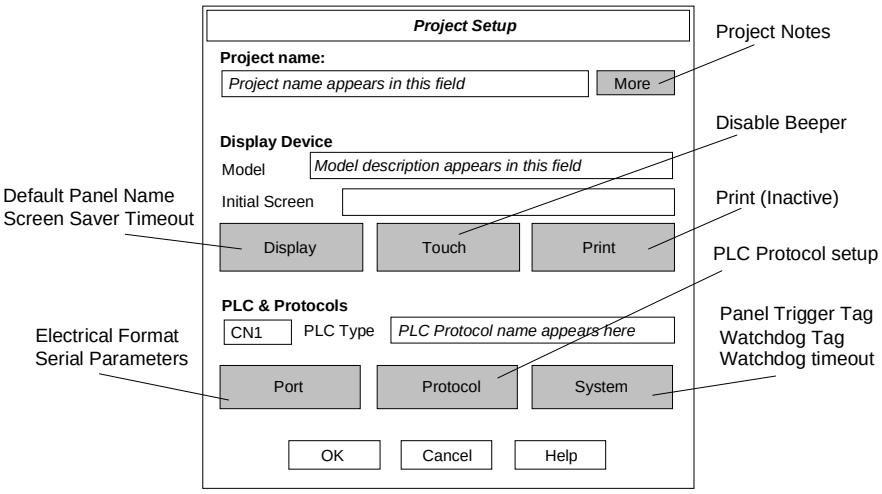
This cable contains a circuit board which converts RS232 into current loop. Since this cable cannot be made in the field, no cable diagrams are provided.

Setup for using a Simatic S5 Series PLC

Use the following procedure to ensure your target device is setup properly for the Simatic S5 PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Simatic S5).** See PLC Type on page 5.

Port Button

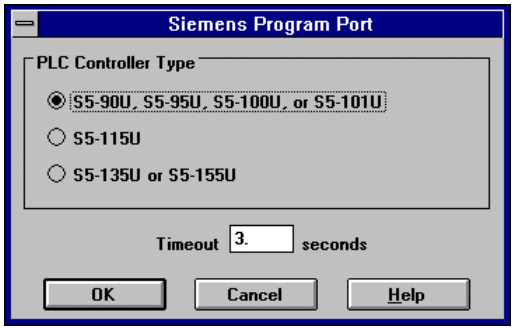
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Simatic S5**.

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Select the PLC Controller type. Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

Siemens S5 Series Tag Variables

Tag variables are registers or bits in your PLC that make the operators on the target display active.

Format 1:a[b][ccc]ddd[.ee]

a is the memory type
b is the size or position with bit as default for inputs, outputs, and flags, and words for the other types
ccc is the data block number
ddd address
.ee bit designation for data registers

Format 2:DBaaa:Dxbbb[.cc]

DB is the static designation for Data Block
x is a letter either w, l or r
aaa is data block number
bbb is the address
.cc bit designation for data registers

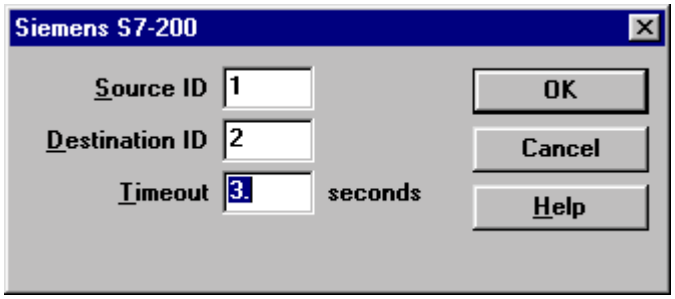
Tag Name	Address Range	Bit Range	Write	Value Range	Example	PLC Name	Notes
I	000-127 (1)	0 - 7(req)	NO	0 - 1	I00.5		PL, IPB
IB	000-127 (1)	N/S	NO	0 - 255	IB12	IB012	
IW	000-126 (1)	N/S	NO	0-65535	IW0	IW000	Input word (3)
Q	000-127 (1)	0 - 7(req)	NO	0 - 1	Q00.6	None	
QB	000-127 (1)	N/S	NO	0 - 255	QB26	QB026	
QW	000-126 (1)	N/S	NO	0-65535	QW0	QW000	Output word (3)
F	000-255 (1)	0 - 7(req)	YES	0 - 1	F00.2	None	
FY	000-255 (1)	N/S	YES	0 - 255	FY45	FY045	
FW	000-255 (1)	N/S	YES	0-65535	FW0	FW0	Flag word (3)
T	000-255 (1)	N/S	YES	0-999	T0	T0	Timer (4)
C	000-255 (1)	N/S	YES	0-999	C0	C0	Counter (4)
ASC	1-999		YES	ASCII			Double
D	003-255 (1,2)	00-15(opt)	YES	-32768 to 32767	D010000 D01000.7	DB010:DW000 NONE	Default memory (5)
DB#:DL#	003-255 (1)	N/S	NO	0 - 255	DB04:L8	DB004:DL008	Byte format (8 bits).
DB#:DR#	003-255 (1)	N/S	NO	0 - 255	DB05:L7	DB005:DL007	Byte format (8 bits).
DB#:DW#	003-255 (1,6)	00-15(opt)	YES	-32768 to 32767	DB012:10 DB011:13.7	DB012:DW010 NONE	Word format (16 bits). Bit writes are RMW
DB#:DD#	003 - 255		YES	-100000000 to 100000000			Double
DB#:DF#	003 - 255		YES	-99999999 to 99999999			Float

I	Input
IW	Input Word
Q	Output
QW	Output Word
F	Flags
FW	Flag Word
T	Timer Word
C	Counter Word
D	Data Word

Note 1: The maximum address is determined by the processor type and memory configuration.
Note 2: Both the address and data block range.
Note 3: Double byte memory (8 + 8 bits, B1 & B0), only even addresses are supported.
Note 4: Word memory, typically BCD format.
Note 5: Default memory type, word Bit writes are RMW
Note 6: Lowest block is DB06
(req) = required, (opt) = optional

SIEMENS S7-200

The following dialog box is displayed when you select SIEMENS S7-200 protocol.



Serial Port Parameters

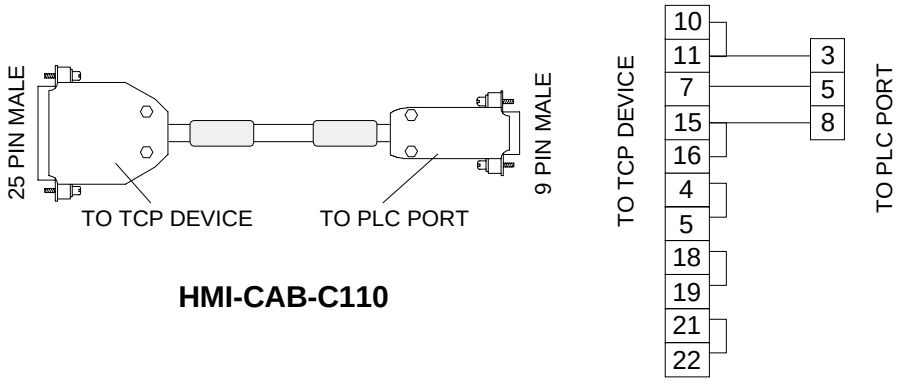
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. The following settings are recommended for **Siemens S7-200.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

HMI-CAB-C110 Cable

Use the HMI-CAB-C110 Cable to connect the target display to the S7-200 PLC.

A label is placed on each end of the cable to indicate which device should be connected to that end. One of the labels will also indicate the cable part number so you can quickly verify you are using the right cable for your application. You can make your own cable using the following wiring diagram.



HMI-CAB-C110

Tag Variable Table

PLC Name	Function	Tag Name	Addr Range	Bit Range	Write	Range	Sample
Bit Access							
V	Variable Bit	V	0 - 65535	0 - 7	Yes	0 - 1	V89.4
I	Input Bit	I	0 - 1023	0 - 7	Yes	0 - 1	I0.7
Q	Output Bit	Q	0 - 1023	0 - 7	Yes	0 - 1	Q3.5
M	Memory Bit	M	0 - 1023	0 - 7	Yes	0 - 1	M11.2
SM	Special Bit	SM	0 - 1023	0 - 7	(1)	0 - 1	SM23.0
T	Timer Bit	T	0 - 1023	NA	Yes	0 - 1	T8
C	Counter Bit	C	0 - 1023	NA	Yes	0 - 1	C9
Byte Access							
VB	Variable Byte	VB	0 - 65535	NA	Yes	-128 to 127 (0 to 255)	VB60, VB60:U
IB	Input Byte	IB	0 - 1023	NA	Yes	-128 to 127 (0 to 255)	IB3, IB3:U
QB	Output Byte	QB	0 - 1023	NA	Yes	-128 to 127 (0 to 255)	QB1, QB1:U
MB	Memory Byte	MB	0 - 1023	NA	Yes	-128 to 127 (0 to 255)	MB4, MB4:U
SMB	Special Byte	SMB	0 - 1023	NA	(1)	-128 to 127 (0 to 255)	SMB36, SMB36:U
Word Access							
VW	Variable	VW	0 - 65534	NA	Yes	-32768 to 32767 (0 to 65535)	VW700, VW700:U
TW	Timer	T	0 - 1022	NA	Yes	0 to 32767 (0 to 32767)	T50, T50:U
CW	Counter	C	0 - 1022	NA	Yes	-32768 to 32767 (0 to 32767)	C30, C30:U
IW	Input	IW	0 - 1022	NA	Yes	-32768 to 32767 (0 to 65535)	IW4, IW4:U
QW	Output	QW	0 - 1022	NA	Yes	-32768 to 32767 (0 to 65535)	QW5, QW5:U
MW	Memory	MW	0 - 1022	NA	Yes	-32768 to 32767 (0 to 65535)	MW13, MW13:U
SMW	Special Mem	SMW	0 - 1022	NA	(1)	-32768 to 32767 (0 to 65535)	SMW41, SMW41:U
AIW	Analog Input	AIW	0 - 1022	NA	No	-32768 to 32767 (0 to 65535)	AIW28, AIW28:U
AQW	Analog Output	AQW	0 - 1022	NA	No	-32768 to 32767 (0 to 65535)	AQW10, AQW10:U
Double Word Access							
VD	Variable	VD	0 - 65532	NA	Yes	-2147483648 to 2147483647 0 to 4294967295	VD1000 VD1000:U
VF	Variable Float	VF	0 - 65532	NA	Yes	-2147483648 to 2147483647 0 to 4294967295	VF1000 VF1000:U
ID	Input	ID	0 - 1020	NA	Yes	-2147483648 to 2147483647 0 to 4294967295	ID3 ID3:U
QD	Output	QD	0 - 1020	NA	Yes	-2147483648 to 2147483647 0 to 4294967295	QD4 QD4:U
MD	Memory	MD	0 - 1020	NA	Yes	-2147483648 to 2147483647 0 to 4294967295	MD12 MD12:U
SMD	Special Memory	SMD	0 - 1020	NA	(1)	-2147483648 to 2147483647 0 to 4294967295	SMD6 SMD6:U
HCD	High-Speed Cnt	HCD	0 - 1020	NA	No	-2147483648 to 2147483647 0 to 4294967295	HCD0 HCD0:U

Adding :U to the tag name will change the variable to unsigned. Unsigned integers are shown as (nnnnn).
(1) Above address 29 only

This protocol driver now supports multidrop addressing. This will allow multiple PLCs and multiple QuickPanels to communicate over a single PPI network. Each PLC should have a unique node address and each QuickPanel should have a unique node address (Source ID).

Each QuickPanel is also assigned a default PLC (Destination ID). Tag names can be specified with or without a node identifier. For example:

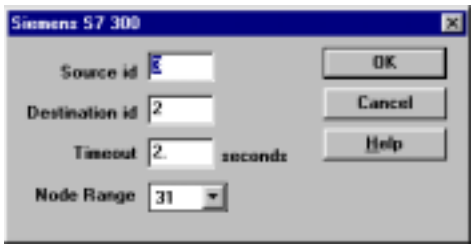
Tag name 'VW01_2' will access variable word 1 in the PLC node 2

Tag name 'VW01_10' will access variable word 1 in the PLC node 10

Tag name 'VW01' will access variable word 1 in the default PLC node (Destination ID).

Siemens S7300 MPI

The drawing shows the setup dialog box for Siemens S7300 MPI Protocol. The default setting for Timeout is correct for most applications. See PLC user manual for more information about the Node Range settings.



Source ID: Address of the QuickPanel

Destination ID: Address of the S7

Make sure the switch on the PC adapter is set to 19.2 kbps. See the PC adapter user manual for instructions on setting the RS232 baud rate. Connect the PC adapter to the S7 and make sure the power LED on the PC adapter is ON. The Activity LED on the PC adapter will flash when there is communication between the adapter and the display.

Serial Port Parameters for the Display

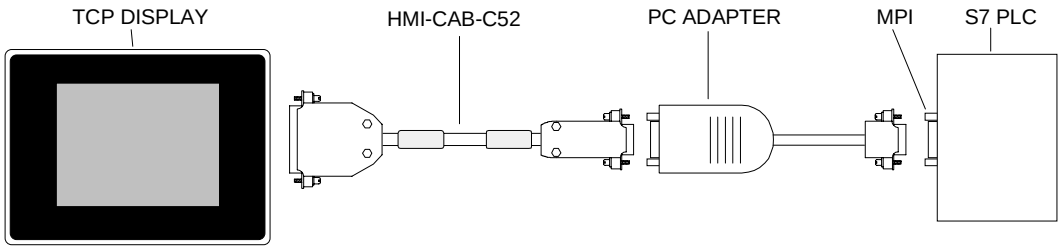
Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Siemens S7MPI Protocol.**

Elect. Format	RS232
Baud Rate	19200
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

Click OK to return to the Project Setup dialog box.

HMI-CAB-C52 Cable

The target display connects to a Siemens S7300 MPI port using an HMI-CAB-C52 cable. Connect the cable to the PC adapter 6ES7 972-0CA21-0XA0. The PC adapter connects a PC or QuickPanel display to the MPI interface (Multipoint Interface) via the serial COMM port of an S7 PLC.



Communication Setup

SIEMENS SIMATIC S7-300 – Connect the PLC to the QuickPanel using an HMI-CAB-C52 cable and the Siemens S7 PC adapter configured for 19200 baud rate. Setup the QuickPanel port communication to RS232C, 19200 baud, 8 data bits, odd parity, 1 stop bit, and none handshake. Click on Protocol, and set the source I.D. to 3, destination I.D. to 2, the timeout to 2 seconds and node range to 31.

Tag Variable Table

Device Prefix	DB Range	File Format	Address Range Min./Max.	Bit Range Min./Max.	Data Range Min./Max.	Description & Notes
BITS (the last digit is the bit (0-7))						
E or I	n/a	n/a	0-127b	0-7	0-1	Input
A or Q	n/a	n/a	0-127b	0-7	0-1	Output
M or F	n/a	n/a	0-255b	0-7	0-1	Internal Bit
DB##:DB	01-60	Dec	0-65535b	0-7	0-1	Data Block
WORDS (addressing is in byte increments, use every second address for word addressing)						
EW or IW	n/a	n/a	0-126	n/a	0-65535	Input
AW or QW	n/a	n/a	0-126	n/a	0-65535	Output
MW or FW	n/a	n/a	0-254	n/a	0-65535	Internal Bit
DB##:DW	01-60	Dec	0-65534	n/a	0-65535	Data Block
T	n/a	n/a	0-127	n/a	0-65535	Timer(Read Only)
C or Z	n/a	n/a	0-63	n/a	0-65535	Counter(Read Only)
DOUBLE WORD (32 BIT)						
DB##:DD	01-60	Dec	0-65532	n/a	-99999999 99999999	Data Block

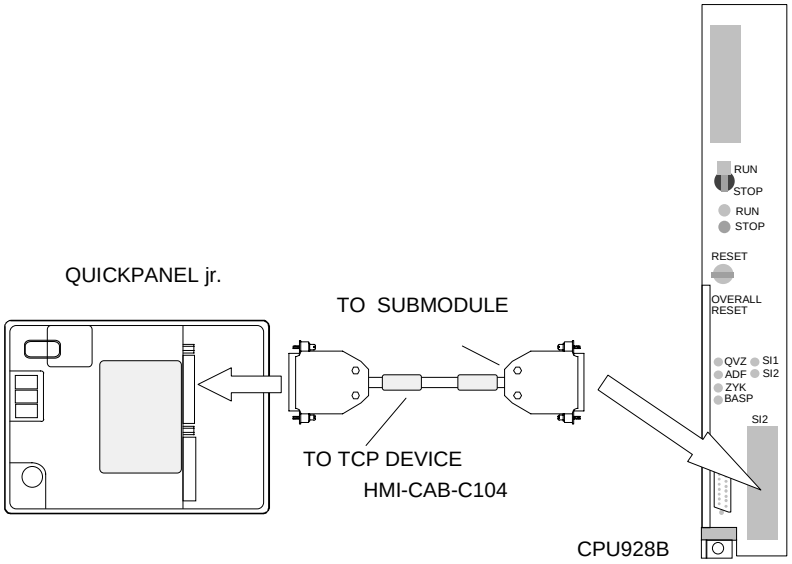
Word and double words work on even addresses. If an odd address is entered the protocol will use the preceding address. _ID option for alternate PLC address is NOT available. The data block bit will clear the rest of the word (excluding toggle pushbutton). Input, Output, and Int Bits are true bit writes.

EX: MW3 will work as MW2.
EX: DB01:DD7 will work as DB01:DD6.

SIMATIC 3964R

This section describes the operation of the target display with a SIMATIC S5 RK 512 Computer Link Module which uses the 3964R transmission procedure.

The following drawing shows a QuickPanel jr. connected to the interface submodule.



HMI-CAB-C104 Cable

This cable is used to connect a target display to a SIMATIC S5 RK 512 Computer Link Module.

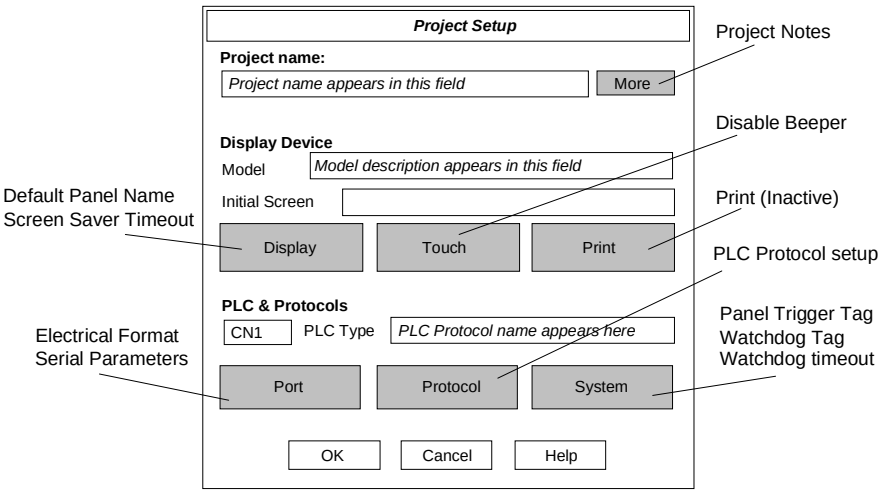
This cable contains a circuit board which converts RS232 into current loop. Since this cable cannot be made in the field, no cable diagrams are provided.

Setup for using Simatic S5 RK 512 Computer Link

Use the following procedure to ensure your target device is setup properly for the Simatic S5 RK 512 Computer Link. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Siemens 3964R).** See PLC Type on page 5.

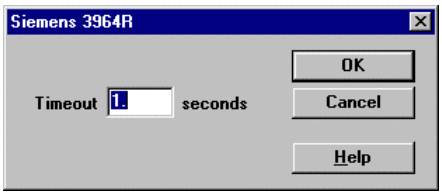
Port Button

Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Siemens 3964R.**

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC. Select the PLC type. Click OK to return to the Project Setup dialog box.



RK 512 Computer Link with 3964R Procedure

Using the RK 512 computer link, data can be exchanged between the CPU 928B in an S5 135U or S5 155U and a QuickPanel. The SIMATIC S5 RK 512 computer link transmits data bytes using the 3964R transmission procedure, which adds start and end characters to the data bytes and initiates repetitions if errors occur. The RK 512 replies to every correctly received command message with a reply message.

Various submodules are available for the RK 512 computer link. This section describes the operation with a TTY submodule. The TTY submodule is installed in the submodule receptacle of the second interface of the CPU 928B. You must assign parameters to the second interface for the RK 512 computer link. You will need the DX 2, a static parameter set, and a send coordination byte (SCB).

You must enter the following information in **DX 2**:

- link type: RK 512 computer link
- location of the static parameter set
- location of the send coordination byte (SCB)

In the DB/DX containing the **static parameter set** you must enter the parameters for the physical layer and for the data link layer.

- The parameters for the physical layer are as follows:
- transmission speed (bps)
- parity
- bit per character
- stop bits

The parameters of the data link layer, that determine the characteristics of the 3964R transmission procedure, are as follows:

- mode: 3964R procedure with defaults or assigned values
- priority
- character delay time
- acknowledgment delay time
- connection attempts
- number of repetitions

With the **send coordination byte (SCB)** you can perform the following:

- reset the RK 512 computer link

You can generate the parameter set in DX2 and the static parameter set either via the DB editor or via the menus in the COM PP Parameter Assignment Software.

Assigning Parameters to DX 2

DX 2 contains the link type and the pointers to the required parameters and parameter sets. The following table shows the recommended values when assigning parameters to DX 2. The assignment in DX 2 begins at DW 0. All the numerical values are in hex.

DW	Parameter	Significance
0	4D41	MA
1	534B	SK
2	5832	X2
3	0020	RK 512 computer link
4	440A	Static Parameter in DB10
5	0004	from DW4
6	0000	Dynamic Parameter Sets (not used)
7	0000	
8	0000	Job Mailbox (not used)
9	0000	
10	0000	reserved
11	0000	reserved
12	0000	reserved
13	0000	reserved
14	4D00	SCB IN FLAG
15	0006	FLAG WORD 6

Static Parameter Set

In the static parameter set, you must enter the parameters for the physical and data link layers. The following table shows the recommended values to enter in the data block for the static parameter set. The parameter assignment begins at the DW specified in DX 2. (In this example the DW is DB10) All numerical values are shown in hex.

DB10	Parameter	Significance
4	0008	Transmission speed: 9600
5	0002	Parity: Even
6	0008	Bits: 8 bits per character
7	0001	Stop bits: 1
8	0000	reserved
9	0002	Mode: RK 512 3964R procedure with default values
10	0001	Priority: High
11	00FF	Character delay time: 2.55 sec.
12	010A	Ack. delay time: 2.66 sec.
13	0003	Connect attempts: 3
14	0005	Repetitions: 5

SIMATIC 3964R Tag Variables

Tag variables are registers or bits in your PLC that make the operators on the target display active. Below are the formats for memory and data block type variables.

DBaaa:DWbbb[.cc]

DB is the static designation for Data Block
aaa is data block number
DW is the static designation for Data Word
bbb is the data word address
.cc bit designation for data registers

DXaaa:DWbbb[.cc]

DX is the static designation for Extended Data Block
aaa is data block number
DW is the static designation for Data Word
bbb is the data word address
.cc bit designation for data registers

Examples:

DB3:DW0 Data Block 3: Data Word 0
DB255:DW255 Data Block 255: Data Word 255
DX3:DW0 Extended Data Block 3: Data Word 0
DX255:DW255 Extended Data Block 255: Data Word 255
DB10:DW100.15 Data Block 10: Data Word 100, Bit 15

SIMATIC 3964R Tag Variable Table

Tag Name	Block Address Range	Word Address Range	Bit Range	Suprt Write	Value Range	Example	Notes
DB#:DW#	003 - 255 (1)	000 - 255 (1)	00 - 15 optional	YES	-32768 to 32767	DB012:DW010 DB10:DW100.15	Word format (16 bits). Bit writes are RMW
DX#:DW#	003 - 255 (1)	000 - 255 (1)	00 - 15 optional	YES	-32768 to 32767	DX012:DW100 DX10:DW100.15	Word format (16 bits). Bit writes are RMW
DB#:DD#		000 - 255 (1)		YES	-99999999-99999999		double
DB#:DF#		000 - 255 (1)		YES	-99999999-99999999		float
DX#:DD#		000 - 255 (1)		YES	-99999999-99999999		double
DX#:DF#		000 - 255 (1)		YES	-99999999-99999999		float
DB#:DW#		000 - 255 (1)		YES	ASCII		string

(1) The maximum address is determined by the processor type and memory configuration.
(2) Both the address and data block range.

Square-D

Communication Setup

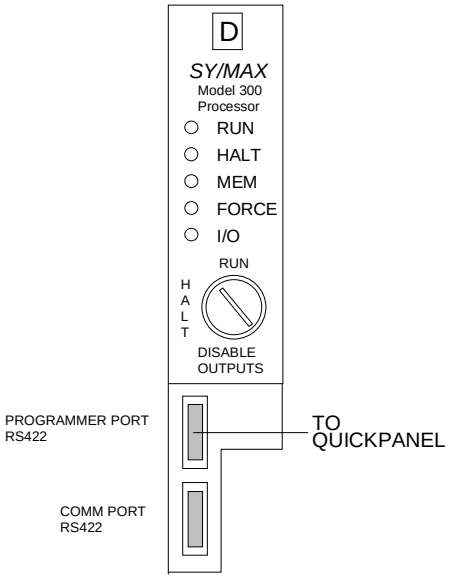
This section describes the operation of the target display with Square-D series Programmable Logic Controllers.

Communications

The target display can communicate with Square-D processors using RS422 Communications Protocol. The Square-D PLC has two ports on the processor module which appear the same to the target display. The target display can also communicate to a Square-D processor using one of the Network Interface Modules.

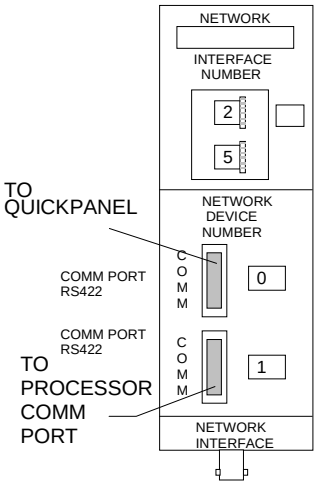
Connecting the *QUICKPANEL*™ to a Model 300 Processor

The settings for the PLC port must match those of the target display. The Square-D Module has several switch settings that must be set up for proper communications. The Square-D documentation for the PLC Module contains details on how to configure it to match the parameters of the target display.



Connecting a display to a Network Interface Module

The target display can also communicate over a network using a Network Interface Module. The target display connects to one of the comm ports using the same cable as a direct processor connection. The Network Module is shown below.

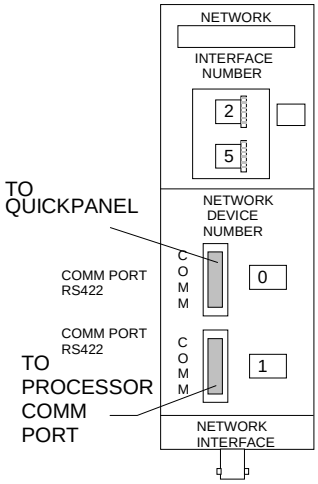


Selecting the Square-D Device Number

The target display will access a network device according to the device address set on the Network Interface Module. The Network Device number is determined by reading the thumbwheel value on the front of the module and adding a 0 or 1 in front of the module number for Comm Port 0 or 1 respectively. As shown above, the device address for Comm Port 0 is 025 and the device address for Comm Port 1 is 125.

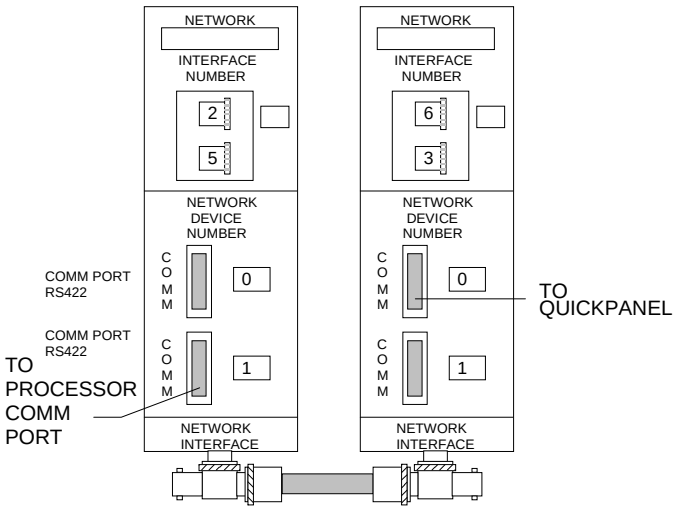
Determining the Route Numbers.

The Square-D Processor must connect to a Network Interface module by connecting one of it's comm ports to one of the comm ports on the Network Interface module. From the first Network Interface Module, other Network Modules can be connected using a coaxial cable. The target display must know the Network Device address numbers in order to get to the processor module. In the following drawing, only one Network Interface Module is connected to the Processor. The target display is connected to device address 025 and the Processor is connected to device address 125. Therefore, the route to take to get from the target display to the Processor is from comm port 0 (device address 025) to comm port 1 (device address 125). You will need to know this information when you name target display variables.



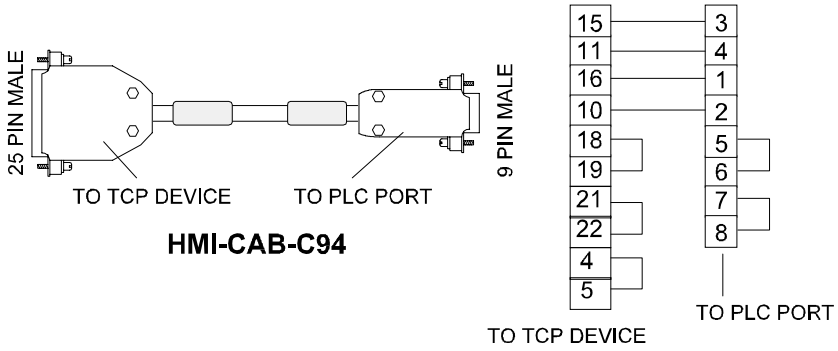
Remote Network Interface Connections

If the Network Interface Module is located in a remote location, the route to the Processor must be made known to the target display. In the drawing below, the Network Module connected to the target display is numbered 63, which makes the address at Port 0 equal to 063. The Processor is connected to Port 1 of the Network module set to 25, which makes the address 125. The route address is 063 to 125.



HMI-CAB-C94 Cable

To connect the target display to any Square-D comm port, use the HMI-CAB-C94 cable. The cable connections are shown below. Remember to set up the target display configuration for RS422.



Timeout Delay

To complete a transaction, the target display sends a message to read or write data. Messages must be acknowledged in a specific amount of time. If there is no response to a message, a timeout occurs and the message is lost. The current timeout delay is shown in seconds.

Route Setup

The target display will access a station according to its device address number. The default station address setting of the target display is 0, which means that any variable without a Device Address number will come directly from the programmer port. For example, if the variable name was S40, then the target display assumes it is connected to the programmer port.

Target displays can be connected to Network devices but the "ROUTE" from the target display to the Processor must be known. The "ROUTE" is the path from the target display port to the Processor port, using device address numbers. For example, if the variable name was S40_100.000, the route would be from port 100 to 000.

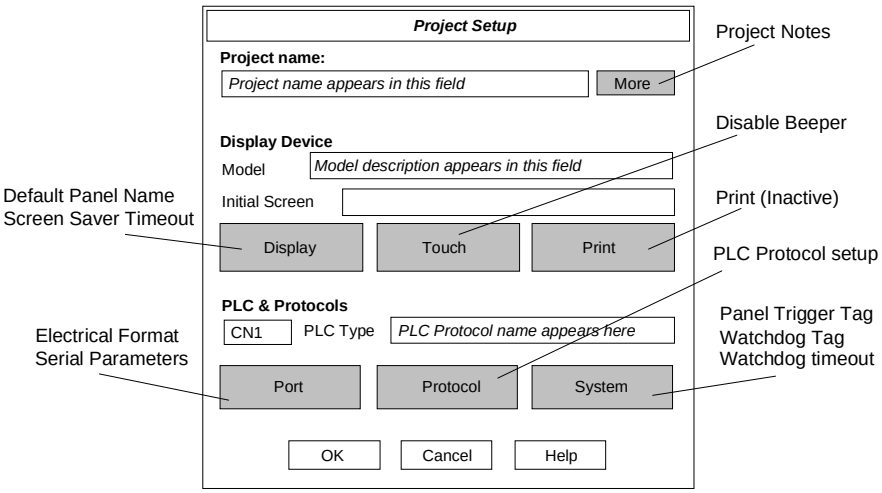
The "ROUTE SETUP" menu option allows you to set multiple routes, and tag the variable name with the selected route. For example, S40_A would find the route specified by ROUTE SETUP A. Setting a route eliminates tedious typing of route numbers.

Setup for using Square-D PLC

Use the following procedure to ensure your target device is setup properly for the Square-D PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Square-D SY/MAX).** See PLC Type on page 5.

Port Button

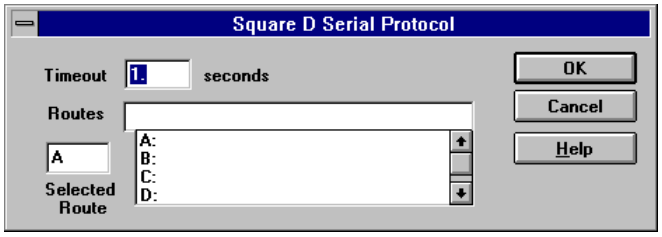
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Square-D SY/MAX.**

Elect. Format	RS422/485 Full Duplex
Baud Rate	9600
Data Bits	8
Parity	Even
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

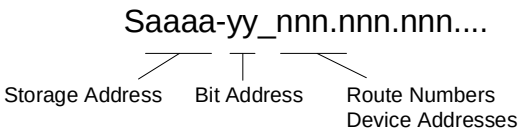
Enter Timeout in seconds. Enter the Route address



Click OK to return to the Project Setup dialog box.

Square-D Variable Names

Square-D PLC variables are referenced using storage address numbers, an optional bit address, and an optional route number. The following drawing shows the general format for variable names.



aaaaa Address range from 1 to aaaaa. 0 is not a valid address. aaaaa is the upper limit of the installed memory.

-yy Bit address from 1 to 16 Decimal, with bit 1 the Least Significant Bit (LSB)

_nnn. Route number. Each device number is separated by a period.

Example 1:

First assume that the *QUICKPANEL*™ is connected to the "programmer" port and you want to read storage register 40. Here is the variable name.

S40

Example 2:

Now suppose you want to read storage register 35, bit 2. Here is what the variable name will look like.

S40-02

Input Range and Scaled Range values are automatically set for the variable type. In this case, S type variables are set from -32768 to 32767. Bit addresses are set from O to 1.

Example 3:

In many applications, the programmer port must be left open. The target display can connect to the other comm port, and can also connect to one of the Comm ports on a Network Interface Module. When connected to a port on a network device, the target display must know the Network Device number. Refer back to the general format of the variable name and you will see that the route numbers are part of the variable name. Look at Figure 3 and you will see that the target display is connected to device address 025. Also in Figure 3 you will see that the Processor is connected to device address 125.

The variable name must include the route numbers from the target display to the Processor. For the configuration in Figure 3, the route would be 025 to 125. Here is what the variable name would look like if you tried to read storage register 27, bit 1.

S27-01_025.125

Note that the "Route:" number is started with the underscore symbol.

Every time you create a new variable in the target display, you must include the route numbers. There is an easy way to reduce the amount of typing required and still have the route set correctly. When you select Square-D from the Protocol menu, one of the options in the Square-D menu is "Route:". In this menu selection you can enter the route numbers and each time a new variable is created, it will assume the route numbers from this setting. If the "Route:" number had been set to 025.125, the variable from the last paragraph would have this format:

S27-01

The Network Device number can be included as part of the variable name, or it can be automatically assigned by the "Route:" default number from the Communications Protocol menu.

Warning: If you do not include the route number as part of the variable name, or do not have the "Route:" parameter set, then you cannot be connected to a network device.

Example 4:

In this example, the target display is connected to a remote network device. There may be several network devices on the coaxial cable. Figure 4 shows a typical remote connection. The target display is connected the network device 63, and since it is connected to Port 0, the device address is 063. The processor is connected to network device 25, and since it is connected to Port 1, the device address is 125. The route from the target display to the Processor is 063 to 125. If you read storage register 33, bit 11, the variable will look like this:

S33-11_ 063.125

If you use the "Route:" menu option and set the route number to 063.125, then the same variable would have this format:

S33-11

Example 5:

In Example 4, the route was set to 063.125. If you want a variable from a device address other than the one set in "Route:", then you can still use the underscore and route address numbers when the variable is created. If a Processor were connected to network device 12, Port 0, the variable from example 4 would look like this:

S33-11_063.012

Notice that the 063 portion of the route address remained the same, since the target display was still connected to Port 0 of network device 63.

Bit Configuration

The Square-D bit configuration is 01 to 16. The *QUICKPANEL*™ maps the bits correctly.

SQUARE-D BIT MAP

16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01

Toshiba

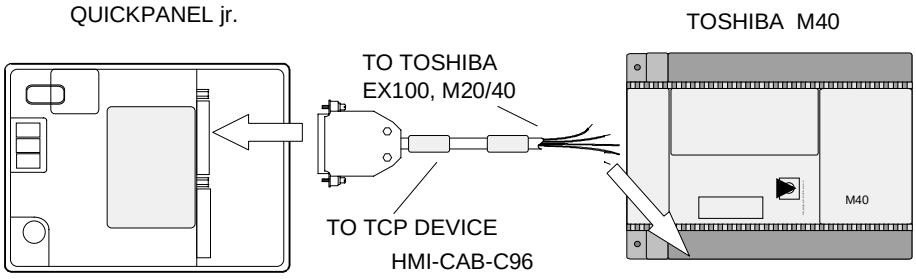
Toshiba T1, T2, T3, EX100, EX200B, EX250, EX500, M20/40

This section describes the operation of the target display with the Toshiba series Programmable Logic Controllers. The T2 and M40 series are presented in detail. The other series are similar in design and the interface connection is the same.

Connecting a target display to a Toshiba M20/40

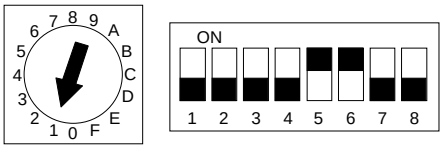
The connection between a target display and the EX100 and M20/40 series PLC is RS-485, half duplex. The protocol can support 16 stations up to a maximum distance of 1km.

The terminal connections are located under the lower terminal cover. RXA and RXB should be jumpered with a 120 ohm, 1/2 watt resistor.



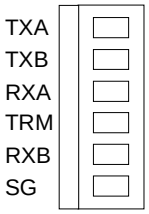
M20/40 Computer Link Switch Settings

The station selector switch and the dipswitches are located under the operation control switch cover. Set the station number on the rotary switch. The dipswitch settings shown in the following drawing are 9600, no parity, computer link enabled and 4K-step mode.



Connecting a target display to a Toshiba EX100

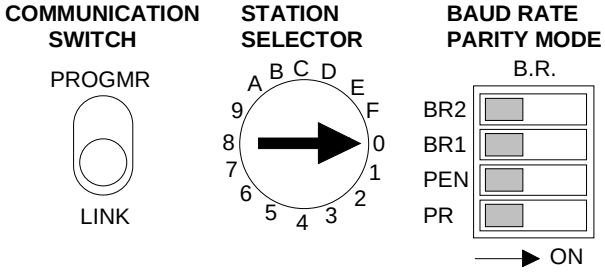
The EX100 has an RS-485 Terminal Block which makes it easy to connect the HMI-CAB-C96 cable. The terminal block connections are shown below.



TXA-Sending line A (output)
TXB-Sending line B (output)
RXA-Receiving line A (input)
TRM-Terminal for termination resistor
RXB-Receiving line B (input)
SG-Signal ground

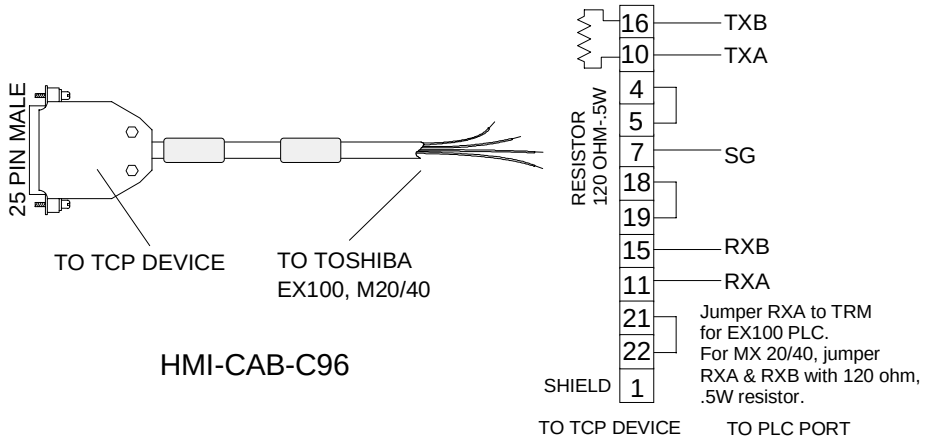
EX100 Computer Link Switch Settings

Set the communication switch to the LINK position. Set the station number on the rotary switch. The baud rate settings shown in the following diagram are 9600, no parity.



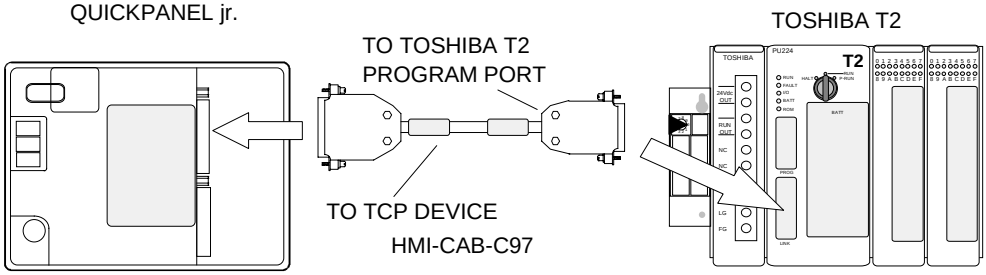
HMI-CAB-C96 Cable

This cable is used to connect a target display to a Toshiba EX100 or M20/40 series PLC.



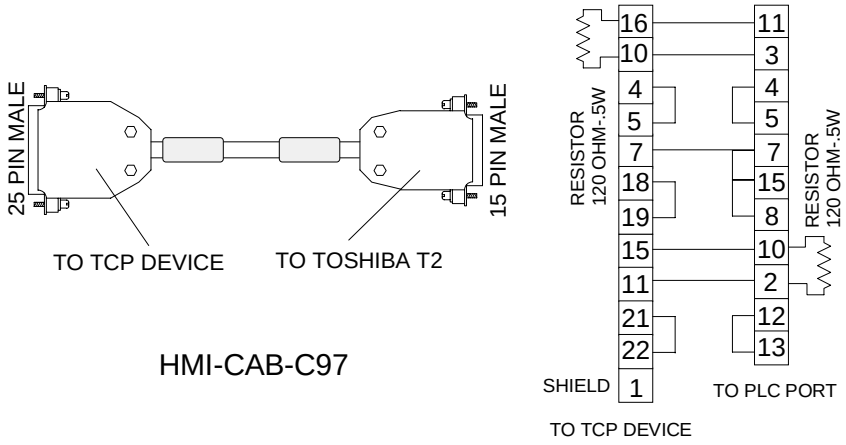
Connecting a target display to a Toshiba T2 PLC

The connection is RS-485. Connect the HMI-CAB-C97 cable to the LINK port.



HMI-CAB-C97 Cable

Use the following diagram to construct your own cable.

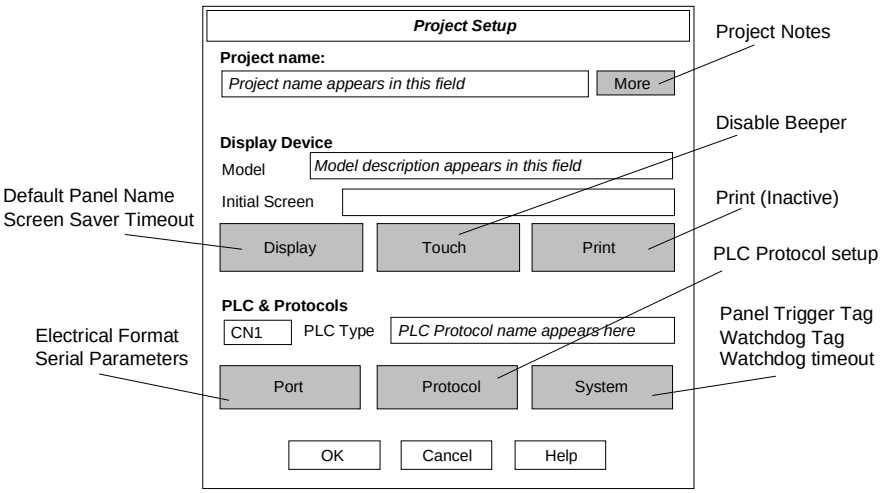


Setup for using Toshiba PLCs

Use the following procedure to ensure your target device is setup properly for the Toshiba PLC. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **(Toshiba).** See PLC Type on page 5.

Port Button

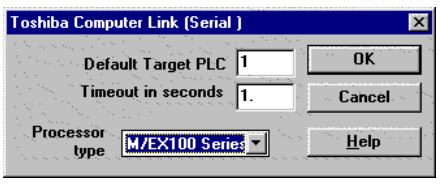
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. The following settings are recommended for **Toshiba**.

Elect. Format	RS422/485 Full Duplex
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

The drawing shows the setup dialog box for Toshiba Computer Link (Serial). Enter the Default Target PLC (CPU ID) number. Select the Processor type from the list box. (M/EX100, T1, T2, T3, EX250/500). The default setting for Timeout is correct for most applications.



Click OK to return to the Project Setup dialog box.

Toshiba Tag Variables

Format: MA:F{ L }_d

M - memory type

X - input bit, all plcs
XW - input register, all plcs
Y - output bit, all plcs
YW - output register, all plcs
R - auxiliary bit, all plcs
RW - auxiliary register, all plcs
L - link relay, only t2s and t3s
LW - link relay register, only t2s and t3s
Z - link device, all plcs
ZW - link device register, all plcs
S - special, only t2s and t3s
SW - special register, only t2s and t3s
T - timer, all plcs
T. - timer bit (single bit indicating completion), T1 - T3
C - counter, all plcs
C. - bit (single bit indicating completion), T1 - T3
D - data register, all plcs
F - files, t2s and t3s

NOTE: The X and Y memory types map to the SAME registers

NOTE: The X and Y memory types do not keep their values in run mode. For example, if you write a 1 to X00 you would see a value of one for an instant but it would go back to zero.

A - address NOTE: in the case of input devices x, y, r ... the last digit indicates the bit desired

F - format

I - signed integer
U - unsigned integer (DEFAULT FOR ALL REGISTER DATA)
C - BCD
F - float (NOT CURRENTLY SUPPORTED)
A - ascii
B - bit followed by number to specify which bit
L or l - long data (32 bits) (NOT SUPPORTED)

d – destination

Destination address other than default target address.

Toshiba Tag Variable Table

Name	Address Range	Bit suffix Range	Writes supported	Value Range **	Sample(s)	Notes:
X	EX/M: 0 - 31 T1: T.B.A. T2: 0 - 63 T3: 0 - 255	0 - F	yes	0 or 1	X12	The last digit of the address indicates the desired bit
XWA or XWA:U	EX/M: 0 - 63 T1: T.B.A. T2: 0 - 63 T3: 0 - 255	N.A.	yes	0 - 65535	XW27	Unsigned integer default format
Y	EX/M: 0 - 31 T1: T.B.A. T2: 0 - 63 T3: 0 - 255	0 - F	yes	0 or 1	Y34F_14	The last digit of the address indicates the desired bit
YWA or YWA:U	EX/M: 0 - 63 T1: T.B.A. T2: 0 - 63 T3: 0 - 255	N.A.	yes	0 - 65535	YW56	Unsigned integer default format
R	EX/M: 0 - 63 T1:T.B.A. T2: 0 - 127 T3: 0 - 511	0 - F	yes	0 or 1	R457	The last digit of the address indicates the desired bit
RWA or RWA:U	EX/M: 0 - 63 T1:T.B.A. T2: 0 - 127 T3: 0 - 511	N.A.	yes	0 - 65535	R63	Unsigned integer default format
L	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 255	0 - F	yes	0 or 1	L346	The last digit of the address indicates the desired bit
LWA or LWA:U	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 255	N.A.	yes	0 - 65535	LW56	Unsigned integer default format
Z	EX/M: 0 -31 T1:T.B.A. T2: 0 - 511 T3: 0 - 511	0 - F	yes	0 or 1	Z238	The last digit of the address indicates the desired bit
ZWA or ZWA:U	EX/M: 0 -31 T1:T.B.A. T2: 0 - 1023 T3: 0 - 1023	N.A.	yes	0 - 65535	ZW245	Unsigned integer default format
S	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 255	0 - F	yes	0 or 1	S254F	The last digit of the address indicates the desired bit
SWA or SWA:U	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 255	N.A.	yes	0 - 65535	SW5	Unsigned integer default format
TA or TA:U	EX/M: 0 -127 T1:T.B.A. T2: 0 - 255 T3: 0 - 511	N.A.	yes	0 - 32767	T6	Unsigned integer default format

T.A	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 511	N.A.	yes	0 - 1	T.19	This bit indicates that the timer has finished
CA or CA:U	EX/M: 0 -95 T1:T.B.A. T2: 0 - 255 T3: 0 - 511	N.A.	yes	0 - 65535	C12	Unsigned integer default format
C.A	EX/M: N.A. T1:T.B.A. T2: 0 - 255 T3: 0 - 511	N.A.	yes	0 - 1	C.99	This bit indicates that the counter has finished
DA:I	EX/M: 0 - 1535 T1:T.B.A. T2: 0 - 4095 T3: 0 - 8191	N.A.	yes	-32768 - 32767	D134:I	
DA:U or DA	EX/M: 0 - 1535 T1:T.B.A. T2: 0 - 4095 T3: 0 - 8191	N.A.	yes	0 - 65535	D7:U_1	Unsigned integer default format
DA:C	EX/M: 0 - 1535 T1:T.B.A. T2: 0 - 4095 T3: 0 - 8191	N.A.	yes	0 - 9999	D55:C	
DA:B#	EX/M: 0 - 1535 T1:T.B.A. T2: 0 - 4095 T3: 0 - 8191	0 - F	NO	0 - 1	D99:B5	
DA:A	EX/M: 0 - 255 T1:T.B.A. T2: 0 - 4095 T3: 0 - 8191	N.A.	yes	two packed ascii values	D34:A	
FA:I	EX/M: N.A. T1:T.B.A. T2: 0 - 1023 T3: 0 - 8191	N.A.	yes	-32768 - 32767	F134:I	
FA:U or FA	EX/M: N.A. T1:T.B.A. T2: 0 - 1023 T3: 0 - 8191	N.A.	yes	0 - 65535	F10:U	Unsigned integer default format
FA:C	EX/M: N.A. T1:T.B.A. T2: 0 - 1023 T3: 0 - 8191	N.A.	yes	0 - 9999	F8191:C	

Toyopuc PC1

Toyopuc PC1

CAUTION

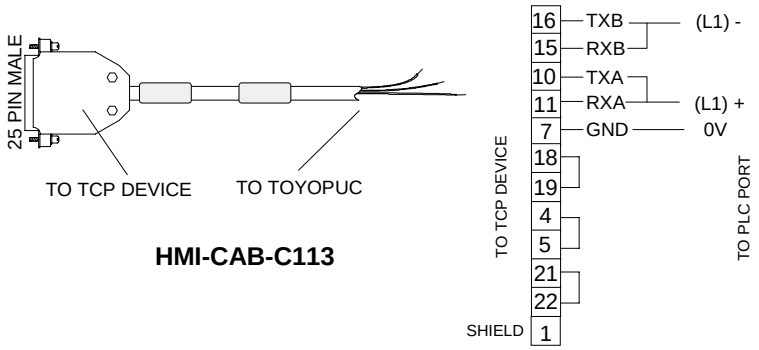
Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

A computer link card needs to be installed into the bottom slot (Link 1).

Set the communication parameters as follows:

9600 baud
8 Data Bits
Even Parity
1 Stop Bit
RS422 half duplex

Cable



HMI-CAB-C113

Toyopuc Tag Variables

Bits range from 0 to 3777 octal
Words range from 4000 to 7776 octal
Words can have even addresses only

Valid tag strings consist of the address only

355 = bit 355
4002 = word 4002 (-32768 to 32767)

Toyopuc-2

TOYOPUC PC2F

CAUTION Do NOT use this protocol with QP1 devices. It is designed to be used with *ONLY* QP2 devices. For example, QPJ-**2**D100-L2P is a QP2 device.

Tag Variable Table

Name	Address range	Value range	Writeable	Type
XaaW	0-7F	0-65535	Y	integer
YaaW	0-7F	0-65535	Y	integer
MaaW	0-7F	0-65535	Y	integer
KaaW	0-2F	0-65535	Y	integer
LaaW	0-7F	0-65535	Y	integer
VaW	0-F	0-65535	Y	integer
N	0-1FF	0-65535	Y	integer
D	0-2FFF	0-65535	Y	integer
R	0-7FF	0-65535	Y	integer
B	0-1FFF	0-65535	Y	integer
S	0-3FF	0-65535	Y	integer
Xaab	0-7FF	0-1	Y	integer
Yaab	0-7FF	0-1	Y	integer
Maab	0-7FF	0-1	Y	integer
Kaab	0-2FF	0-1	Y	integer
Laab	0-7FF	0-1	Y	integer
Vab	0-FF	0-1	Y	integer
Paab	0-1FF	0-1	Y	integer
T	0-1FF	0-1	Y	integer
C	0-1FF	0-1	Y	integer

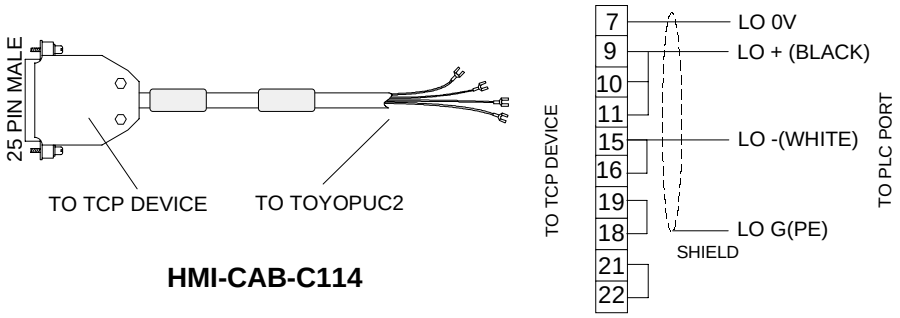
CONFIGURATION

Toyopuc PC2 - Setup the Quick Panel to RS422/485 Half Duplex, 19200 baud, 8 data bits, even parity, 1 stop bit, and none handshake. Click on Protocol and set the PLC Station No. to 0.

Verify the following Switch Settings in the PLC: L0 Switches, for ST. NO. HI. set 0, ST. NO. HI. set to 0, BAUD RATE set to 1; L2 Switches, for ST. NO. HI. set 0, ST. NO. LO. set to 1, BAUD RATE set to 2.

Connect the cable shown in the CABLE section between the I/O port on the QuickPanel and the port on the PLC.

Cable



HMI-CAB-C114

Uni-Telway Network

The drawing shows the setup dialog box for Uni-Telway Protocol. Enter the QuickPanel ID number. The default setting for **Timeout** and **Polls to Pass By** is correct for most applications. See PLC user manual for more information about the settings.

1.The QuickPanel is a slave on the Uni-Telway network. The slave addresses on the Uni-Telway network should all be consecutive starting with address 1. Also, the master PLC should be set to poll no more than the maximum slave address that exists on the network. This will ensure that the master only polls existing slaves and that the network is operating at the maximum speed.

2. Polls To Pass By setting: 0 (default) to 10. Since the QuickPanel is a slave on the Uni-Telway network, it must first be polled before it can make a request of the PLC. This setting allows the user to reduce the amount of network traffic associated with the QuickPanel, however, this will also slow down the update time of the QuickPanel. This value should be set to zero for most applications.

3. The QuickPanel may display a communication error if it is reading a system bit while the programming terminal is connected.

Serial Port Parameters for the Display

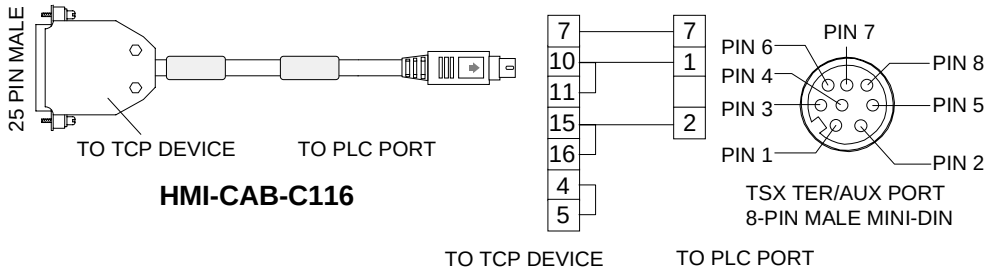
Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **Uni-Telway Protocol.**

Elect. Format	RS422/485 Half duplex
Baud Rate	9600
Data Bits	8
Parity	Odd
Stop Bits	1
Handshake	None

Click OK to return to the Project Setup dialog box.

HMI-CAB-C116 Cable

The target display connects to a Uni-Telway PLC using an HMI-CAB-C116 cable. Connect the cable to the AUX port (when available) on the PLC.



Communication Setup

This protocol was developed using the TSX 37 Series PLC. The TSX 37-10 PLC has a single terminal port marked TER. TSX37-21 and TSX 37-22 PLCs have two terminal ports, marked TER and AUX, which are functionally identical. Connect a Quick Panel to the AUX port when available.

Configured as the UNI-TELWAY master (default function), the terminal port is used to connect a programming terminal to the PLC. The terminal port also allows a man-machine interface to be connected. The default communication mode of the terminal port is UNI-TELWAY master. The terminal port, marked TER, can be used to connect any device supporting the UNI-TELWAY protocol. The terminal port marked AUX, available on TSX 37-20 PLCs, can only be used to connect devices which have their own power supply.

The terminal port is used to select the operating mode during configuration.

Tag Variable Table

Device Prefix	Address Range	Bit delimiter	Bit Range	Node ID delimiter	Node ID Range	Data Range Min.	Data Range Max.	Width	Data Write	Bit Rd Write
Master Words										
%MW	0-65535	:X	0-15	n/a	n/a	-32768	32767	16	y (2)	R/W
%KW	0-65535	:X	0-15	n/a	n/a	-32768	32767	16	n	R
%SW	0-65535	:X	0-15	n/a	n/a	-32768	32767	16	n	R/W
Master Dwords										
%MD	0-65534	:X	0-31	n/a	n/a	-99999999	99999999	32	y (2)	R/W
%KD	0-65534	:X	0-31	n/a	n/a	-99999999	99999999	32	n	R
%SD	0-65534	:X	0-31	n/a	n/a	-99999999	99999999	32	n	R/W
Master Bits										
%M	0-65535	n/a	n/a	n/a	n/a	0	1	1	y	R/W
%S	0-255	n/a	n/a	n/a	n/a	0	1	1	n	R
%IX	1-99	.	0-31	n/a	n/a	0	1	1	n	R
%QX	1-99	.	0-31	n/a	n/a	0	1	1	n	R
Slave Words										
%MW	0-2047	:X	0-15	_	1-31	-32768	32767	16	y (2)	R/W
%KW	0-2047	:X	0-15	_	1-31	-32768	32767	16	n	R
%SW	0-2047	:X	0-15	_	1-31	-32768	32767	16	n	R
Slave Dwords										
%MD	0-2046	:X	0-31	_	1-31	-99999999	99999999	32	y (2)	R/W
%KD	0-2046	:X	0-31	_	1-31	-99999999	99999999	32	n	R
%SD	0-2046	:X	0-31	_	1-31	-99999999	99999999	32	n	R
Slave Bits										
%M	0-2047	n/a	n/a	_	1-31	0	1	1	y	R/W
%S	0-255	n/a	n/a	_	1-31	0	1	1	n	R
%IX	1-99	.	0-31	_	1-31	0	1	1	n	R
%QX	1-99	.	0-31	_	1-31	0	1	1	n	R

Tag Name Format

Name Format	PLC Name	**Example**
Master Words		
%MWaaaaa:Xbb	Master Word	%MW37:X10
%KWaaaaa:Xbb	Master Constant Word	%KW37:X10
%SWaaaaa:Xbb	Master System Word	%SW37:X10
Master Dwords		
%MDaaaaa:Xbb	Master Double Word	%MD37:X10
%KDaaaaa:Xbb	Master Constant Double Word	%KD37:X10
%SDaaaaa:Xbb	Master System Double Word	%SD37:X10
Master Bits		
%Maaaaa	Master Internal Bit	%M37
%Saaaaa	Master System Bit	%S37
%IXaa.bb	Master Discrete Input Bit	%IX1.31
%QXaa.bb	Master Discrete Output Bit	%QX2.0
Slave Words		
%MWaaaaa:Xbb_dd	Slave Word	%MW37:X10_1
%KWaaaaa:Xbb_dd	Slave Constant Word	%KW37:X10_1
%SWaaaaa:Xbb_dd	Slave System Word	%SW37:X10_1
Slave Dwords		
%MDaaaaa:Xbb_dd	Slave Double Word	%MD37:X10_1
%KDaaaaa:Xbb_dd	Slave Constant Double Word	%KD37:X10_1
%SDaaaaa:Xbb_dd	Slave System Double Word	%SD37:X10_1
Slave Bits		
%Maaaaa_dd	Slave Internal Bit	%M37_1
%Saaaaa_dd	Slave System Bit	%S37_1
%IXaa.bb_dd	Slave Discrete Input Bit	%IX1.31_1
%QXaa.bb_dd	Slave Discrete Output Bit	%QX2.0_1

ASCII Protocol

Single Drop

Single Drop protocol extends the functionality of the *QUICKPANEL*™ family by allowing a host device access to the target display memory. Single Drop is an ASCII communication protocol that allows panel triggering, reading and writing variables, and setting the time and date.

A host device can be a computer, embedded controller, ASCII Module, BASIC Module, or any device capable of sending and receiving ASCII character strings. XON/XOFF protocol is supported.

Panels are made up of operators such as push buttons, pilot lights and data displays. The tag variable assigned to each operator is an internal variable. The names of the internal variables for ASCII communication are DMxxxx, where xxxx is a value from 1 to 9999. Each variable name has a corresponding ID number. The ID number is used in the ASCII protocol to identify the associated variable.

For example, the variable name DM0020 has the ID of 0020. If a numeric display were assigned the variable DM0020, the host device must send data to the variable DM0020. The ASCII protocol can identify the variable by the ID number of 0020. The format of the ASCII protocol is described in the following sections.

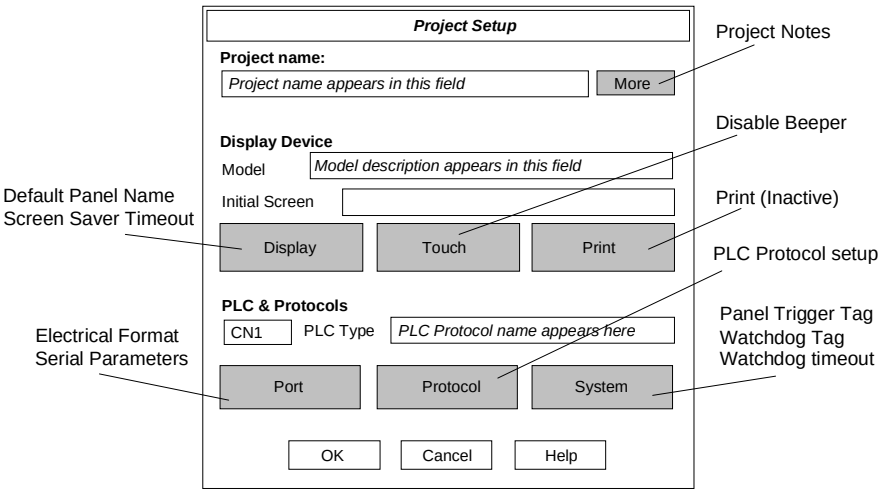
An example section is included to help guide you through setup and panel design.

Setup for using ASCII Protocol

Use the following procedure to ensure your target device is setup properly for ASCII Protocol. The procedure is in condensed format. Only the required settings are outlined. For additional details, see Creating a New Project beginning on page 3.

Project Setup

The drawing is a diagram of the Project Setup dialog box. Each button will display an additional dialog box. Many settings are options and are not required to establish communications. Verify the *Project name* and *Display Device Model* are correct. Leave the Initial Screen name blank.



PLC Type

Select the PLC type from the list box. **ASCII Single Drop**. See PLC Type on page 5.

Port Button

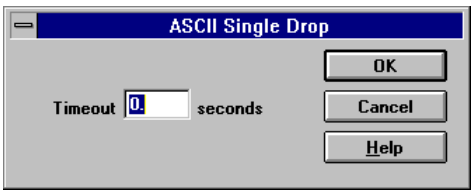
Click the Port button to display the Serial Parameters dialog. The port values are automatically set to standard default values. See Serial Parameters on page 6. XON/XOFF communications is supported using RS232 or 422/485 in full duplex mode. The following settings are recommended for **ASCII Single Drop**.

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the dialog box associated with the selected PLC.

Enter Timeout in seconds.



Click OK to return to the Project Setup dialog box.

Internal Tags

The ASCII protocol requires using internal tag variables. You must create a contiguous block of internal tag variables using the name DMxxxx, where xxxx is a four digit count from 0001 to 9999. These tag variables are assigned to the various operators used on the panels. For example, a pilot light tag variable name might be DM0002. You cannot use dm0002 or DM002.

Tag Name	ID Number
DM0001	0001
DM0050	0050
DM0200	0200
DM0555	0555

Single Drop Limits

You must use DM0001 to DM9999 internal addresses.

The combined total of the internal addresses can not take up more than 10,000 words. To find the approximate internal address space used, use the following procedure.

Add all the interger and float tags and multiply by 2. This value is Sum A.
Add the lengths of all string tags and divide by 2. This is Sum B.
Add Sum A and Sum B. Total cannot be greater than 10,000 words.

Strings are 0 to 127 characters in length.

QP1 Interger Range: -9,999,992 to 9,999,992
QP1 Floating Point Range: -9999999.999999 to 9999999.999999
QP2 Interger Range: -999,999,999 to 999,999,999
QP2 Floating Point Range: -9999999.999999 to 9999999.999999

No command can be longer than 1000 characters.

The Read command can read only one string at a time. The Write command can only write one string at a time.

Triggering a Panel

A panel is made up of multiple operators, such as pilot lights and push buttons. Each panel is identified by an ID number when it is saved. The panel ID number is used to trigger and untrigger selected panels. When a panel is triggered it becomes the active screen.

The format for the command to trigger a panel is:

(^T) (Panel ID number) (^M)

(^T) is the combination of the CTRL key and the T key pressed together. This key combination produces a code equivalent to 14 hex or 20 decimal. (Panel ID number) is the ID number of the panel to be triggered. ^M is a CARRIAGE RETURN which indicates the end of the ASCII string. A CARRIAGE RETURN code is equivalent to 0D hex or 13 decimal.

Example: ^T1^M (trigger panel with the ID of 1)

The following example is a BASIC statement that will send an ASCII string to trigger panel 8.

```
PRINT#1,CHR$(20);8;CHR$(13)
```

The first part of the BASIC statement is CHR$(20). The ASCII character 20 is equivalent to a CONTROL-T. The next section of code is the character 8, which is the panel ID number. The last section of the code string is CHR$(13). The ASCII character 13 is equivalent to a CARRIAGE RETURN.

Untriggering a Panel

The format for the command to untrigger a panel is:

(^U) (Panel ID number) (^M)

(^U) is the combination of the CTRL key and the U key pressed together. This key combination produces a code equivalent to 15 hex or 21 decimal. (Panel ID number) is the ID number of the panel to be untriggered. (^M) is a CARRIAGE RETURN which indicates the end of the ASCII string. A CARRIAGE RETURN code is equivalent to 0D hex or 13 decimal.

Example: ^U1^M (UNtrigger panel with the ID of 1)

(Untriggering a panel will cause the display to remain blank)

The following example is a BASIC statement that will send an ASCII string to untrigger panel 8.

```
PRINT#1,CHR$(21);8;CHR$(13)
```

The first part of the BASIC statement is CHR$(21). The ASCII character 21 is equivalent to a CONTROL-U. The next section of code is the character 8, which is the panel ID number. The last section of the code string is CHR$(13). The ASCII character 13 is equivalent to a CARRIAGE RETURN.

Reading Variables

Operators such as pilot lights and numeric data displays must be tied to a tag variable (the Dmxxxx internal tags). When using the ASCII protocol, you must write the data to the variable in the target display or read the data from the variable in the target display.

The format for the command to read an internal variable is:

(^R) (Variable ID number) (,) (Count) (^M)

(^R) is the combination of the CTRL key and the R key pressed together. This key combination produces a code equivalent to 12 hex or 18 decimal. (Variable ID number) is the ID number of the first variable to be read. (,) is a required delimiter. (Count) is the number of consecutive variables you want to read. (^M) is a CARRIAGE RETURN which indicates the end of the ASCII string. A CARRIAGE RETURN code is equivalent to 0D hex or 13 decimal.

The format for reading 4 variables, beginning with variable ID 1 is:

^R1,4 ^M

The target display will return a string of characters in the following format:

(^R) (value 1) (,) (value 2) (,) ... (value N) (^M)

If you try to read a variable ID that does not exist, a zero length string will be returned. In the above example, the command string requested 4 variables, starting with variable ID number 1. The target display will return a string of characters similar to the one below. In the example below, variable ID 3 does not exist, so the value appears as a zero length string.

(^R) (12) (,) (43) (,) ( ) (,) (24) (^M)

If you typed the command string from an ASCII terminal, this is the response from the target display. Note the zero value between the value 43 and 24.

⇑12,43,,24.

The following example is a BASIC statement that will read 4 variables, beginning with variable ID 1.

```
PRINT#1,CHR$(18);1;",";4;CHR$(13)
```

The first part of the BASIC statement is CHR$(18). The ASCII character 18 is equivalent to a CONTROL-R. The next section of code is the character 1, which is the starting variable ID number. (,) is a required delimiter. (4) is the number of variables to read. The last section of the code string is CHR$(13). The ASCII character 13 is equivalent to a CARRIAGE RETURN.

Writing to Variables

The format for the command to write to a variable is:

(^V) (Variable ID number) (,) (value 1) (,) (value 2) (,)... (value N) (^M)

(^V) is the combination of the CTRL key and the V key pressed together. This key combination produces a code equivalent to 16 hex or 22 decimal. (Variable ID number) is the ID number of the first variable to be written. (,) is a required delimiter. (value 1) is the value to be written to the starting ID. (value 2) is the next data value to be written to the next variable. (^M) is a CARRIAGE RETURN which indicates the end of the ASCII string. A CARRIAGE RETURN code is equivalent to 0D hex or 13 decimal.

The format for writing two data values, starting with ID 2 is:

^V2, 767, 325 ^M

The following example is a BASIC statement that will send an ASCII string to write 2 data values, starting with variable ID 2.

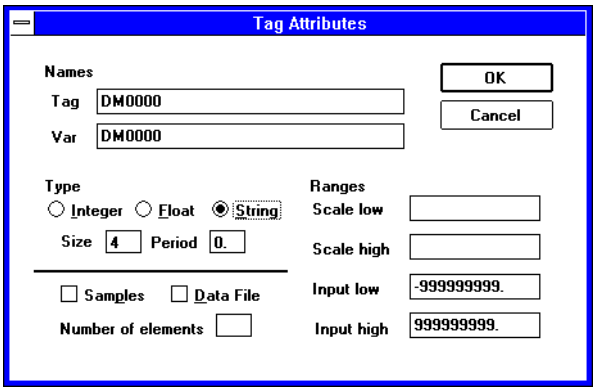
```
PRINT#1,CHR$(22);2;",";767;",";325;CHR$(13)
```

The first part of the BASIC statement is CHR$(22). The ASCII character 22 is equivalent to a CONTROL-V. The next section of code is the character 2, which is the starting variable ID number. (,) is a required delimiter. (767) is the value to be written to the starting ID. (325) is the next data value to be written to the next variable. The last section of the code string is CHR$(13). The ASCII character 13 is equivalent to a CARRIAGE RETURN.

Writing Text Characters

The Text Display operator is used to display text characters or messages.

The tag variable selected for the Text Display operator MUST be changed to a STRING type.



Set the SIZE to the number of characters for the Text Display buffer. If you want to display 20 characters, set SIZE to 20. (The LENGTH field in the Text Format setting dialog is not used)

The format for the command to write to a text variable is:

(^V) (Variable ID number) (,) (text message) (^M)

Example: ^V0,TEXT^M

Setting the Time and Date

The format for the command to set the time and date is:

(^L) (mo,dd,yy,hh,mm,ss) (^M)

(^L) is the combination of the CTRL key and the L key pressed together. This key combination produces a code equivalent to 0C hex or 12 decimal. The format of the date is the standard month, day, and year string, with "mo" the month, "dd" the day, and "yy" the year. The format for the time is the 24 hour clock, with "hh" the hours, "mm" the minutes and "ss" the seconds. (^M) is a CARRIAGE RETURN which indicates the end of the ASCII string. A CARRIAGE RETURN code is equivalent to 0D hex or 13 decimal.

The format for writing the time and date is:

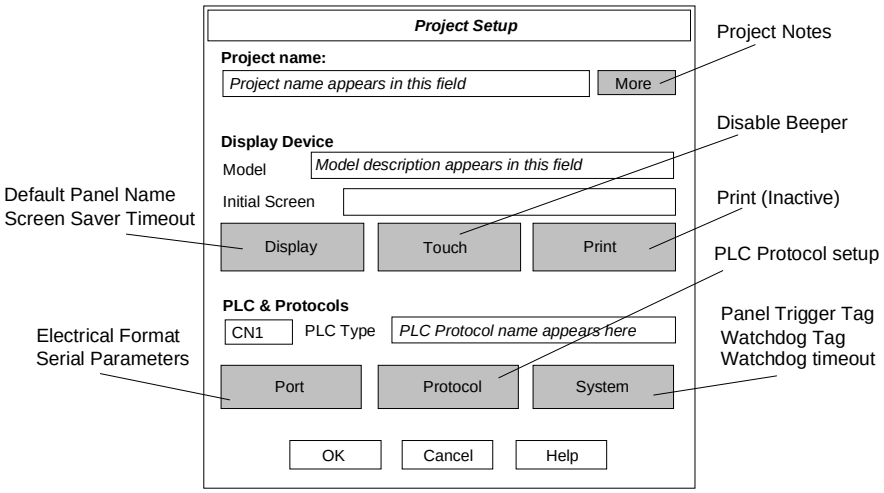
^L07,14,94,02,55,00^M (Date = 7/14/94, Time = 2:55:00

Example

The following example uses common panel tools and a terminal emulation program to demonstrate ASCII protocol. Start by creating a new project and selecting a display type.

Project Setup Dialog Box

Many settings are options and are not required to establish communications. Make sure you have selected the correct Display Device model.



Display, Touch, Print Buttons

You can leave these settings alone for now.

PLC Type

Select **ASCII Single Drop** from the PLC type list box.

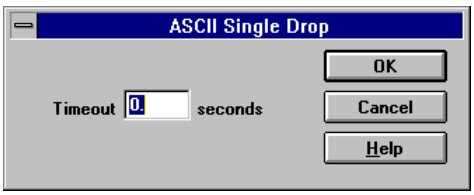
Port Button

Click the Port button to display the Serial Parameters dialog. The following settings are recommended for **ASCII Single Drop**. Make sure these settings are the same as the port settings on your computer port.

Elect. Format	RS232
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Handshake	None

Protocol Button

Click the Protocol button to display the ASCII Single Drop dialog box. The timeout shown works for most applications.

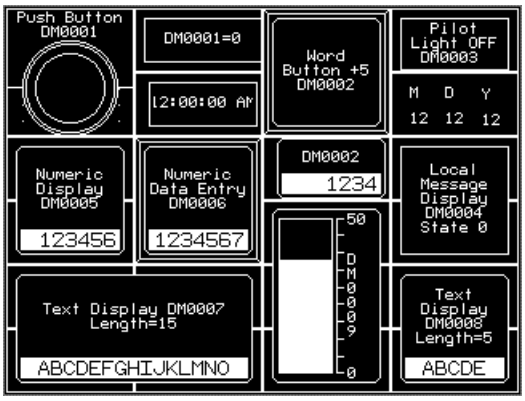


System Button

Make sure you select QPJ-1 or QPJ-2 for compilation. For more information about creating a new project and configuring the display, see page 3. Please note that some features are available only on the QP2.

Panel Design

For this example, a panel has been created that contains many of the common panel tools. The following picture shows what the panel looks like on a QuickPanel jr.



As you create each panel component, a dialog box will ask the name of the TAG. The tag names have a specific naming format for the ASCII protocol.

The following table is a list panel components and internal tags which are used in the examples of the ASCII protocol.

Panel Type	Tag Name	ID Number	Tag Type	Bytes	Data
Push Button Circular, Toggle	DM0001	0001	Integer	2	0
Pilot Light (to display the state of the above Push Button)	DM0001	0001	Integer	2	0
Word Button Standard, Action=Add, Mode=Dec, Value=5	DM0002	0002	Integer	2	0
Numeric Display (to display the value of the above Word Button)	DM0002	0002	Integer	2	0
Pilot Light	DM0003	0003	Integer	2	0
Local Msg Disp. Value=Word	DM0004	0004	Integer	2	0
Numeric Display	DM0005	0005	Integer	2	0
Numeric Display	~System_Month				
Numeric Display	~System_Day				
Numeric Display	~System_Year				
Numeric Entry	DM0006	0006	Integer	2	0
Text Display	DM0007	0007	String	15	TOTAL CONTROL
Text Display	DM0008	0008	String	5	QUICK
Bar Graph Scale Range=0 to 50	DM0009	0009	Integer	2	0

NOTES:

There are two text displays. One is set to 15 characters and the other is set to 5. The internal tags must be edited to change the type from integer to string.

Three additional Numeric Displays were added to display the Month, Day, and Year. The tags are permanent internal tags. The internal tag names must be entered exactly as shown.

Download the project

When you have completed the setup and panel design, download the project to the target display. For more information on how to download a project, see page 10.

Setup the Host

The host controller must be configured to operate with the target display. The host serial port settings must match those of the target display.

In this example, the Terminal program from Windows 3.11 is used to communicate with the target display. The terminal program is configured to match the serial port parameters on the display. The terminal program has function keys that are used to send the required character strings to the display. The terminal program can display the strings sent by the display.

The terminal program has several Settings that are used to establish communications. Here is a list of the settings used for this example.

Settings:

Terminal Emulation: VT100

Function Keys:

LEVEL1	F1	RD DM0001	^R1,1^M
	F2	RD DM0002	^R2,1^M
	F3	WT 03=1	^V3,1^M
	F4	WT 03=0	^V3,0^M
	F5	WT 04=2	^V4,2^M
	F6	WT 04=0	^V4,0^M
	F7	WT 05=9999	^V5,9999^M
	F8	WT 05=0	^V5,0^M
LEVEL2	F1	RD 06	^R6,1^M
	F2	WT 06=3456	^V6,3456^M
	F3	WT 07	^V7,TOTAL^M
	F4	WT 07	^V7,CONTROL^M
	F5	WT 08	^V8,QUICK^M
	F6	WT 08	^V8,^M
	F7	WT 09=48	^V9,48^M
	F8	WT 09=20	^V9,20^M
LEVEL3	F1	TIME	^L08,05,96,02,20,00^M

Communications: 9600, 8 Data Bits, 1 Stop Bit, No Parity, No Flow Control, COM2.

When you have completed configuring the terminal program, save the file for future use. Make sure the display is connected to the host device. The function keys allow reading and writing to all the panel elements and are intended to show the basic operation of the ASCII protocol.

Testing the ASCII Protocol

The target display has been downloaded with setup information and a panel. The host is configured to communicate with the display using the Terminal program. Now you must send an ASCII string to the display and receive a reply. Use the function keys described above to send the strings to the display.

Read Command:

The read command is used to read 1 or more integers and only 1 string at a time from the QP2.

Format: (^R)(Variable ID number)(,) (Count) (^M)

Example: ^R1,1^M (Level 1, F1)

Explanation: Read 1 Tag starting with tag 1. Tag 1 is DM0001, which is assigned to the Push Button. The initial reading of the Push Button should be 0.

Data returned from the display: ^R0^M

Note: Push the button on the display and the pilot light assigned to the Push Button should change to 1. Send the read command again and the value returned should be 1.

Example: ^R2,1^M (Level 1, F2)

Explanation: Read 1 Tag starting with tag 2. Tag 2 is DM0002, which is assigned to the Word Button. The initial reading of the Word Button should be 0.

Data returned from the display: ^R0^M

Note: Press the Word button on the display and watch the Data Display assigned to the Word Button increment by 5. Send the read command again and the value returned should be 5.

Example: ^R6,1^M (Level 2, F1)

Explanation: Read 1 Tag starting with tag 6. Tag 6 is DM0006, which is assigned to the Numeric Data Entry button. The initial reading of the should be 0.

Data returned from the display: ^R0^M

Note: Push the Numeric Data Entry button on the display and a keypad screen will appear. Enter a new number and press DONE. The Numeric Data Entry will display the new value. Send the read command again and the new value will be returned. You can also write a value to the tag for the Numeric Data Entry. (Use Level 2, F2 Function key)

Write Command:

The write command is used to write 1 or more integers and only 1 string at a time to the QP2. The write command can also be used to NULL out strings and Zero out integers.

Format: (^V)(Variable ID number)(,)(Value 1)(,)(Value 2)(,) ... (Value N)(^M)

Example: ^V3,1^M (Level 1, F3)

Explanation: Write to Tag 3 a value of 1. Tag 3 is DM0003, which is assigned to a Pilot Light.

Results: Setting Tag 3 to 1 will turn the Pilot Light ON.

Example: ^V3,0^M (Level 1, F4)

Results: Setting Tag 3 to 0 will turn the Pilot Light OFF.

Example: ^V4,2^M (Level 1, F5)

Explanation: Write to Tag 4 a value of 2. Tag 4 is DM0004, which is assigned to a Local Message Display. The initial state of the display will be state 0.

Results: Setting Tag 4 to a value of 2 will display state 2.

Example: ^V4,0^M (Level 1, F6)

Results: Setting Tag 4 to a value of 0 will display state 0.

Example: ^V5,9999^M (Level 1, F7)

Explanation: Write to Tag 5 a value of 9999. Tag 4 is DM0005, which is assigned to a Numeric Display. The initial state of the display will be state 0.

Results: Setting Tag 5 to a value of 999 will cause the Numeric Display to show 9999.

Example: ^V5,0^M (Level 1, F8)

Results: Setting Tag 5 to a value of 0 will cause the Numeric Display to show 0.

Example: ^V7,TOTAL^M (Level 2, F3)

Explanation: Write to Tag 7 the text characters "TOTAL." Tag 7 is DM0007, which is assigned to a Text Display. The text display is set to show 15 characters. The DM0007 tag is defined as a STRING and set to a size of 15.

Results: Writing the text characters to Tag 7 will cause the text display to show the word "TOTAL." Note: Use Level 2, F4 to write "CONTROL." Use Level 2, F5 key to write "QUICK" to the text display assigned to DM0008. Use Level 2, F6 key to write null characters to DM0008.

Example: ^V9,48^M (Level 2, F7)

Explanation: Write to Tag 9 a value of 48. Tag 9 is DM0009, which is assigned to a Bar Graph. The initial state of the bar graph will be shown as 0.

Results: Setting Tag 9 to a value of 48 will cause the Bar Graph to display a bar equal to 48.

Note: Use Level 2, F8 key to write the value 20 to the Bar Graph.

Setting the Date and Time:

The command is used set the date and the time. The date consist of Month (mo) , Day (dd) and Year (yy). Time consist of Hour (hh), Minutes (mm), and Seconds (ss). The system does not support setting the seconds for QP2.

Format: (^L) (mo,dd,yy,hh,mm,ss) (^M)

Example: ^L08,07,96,02,55^M (Level 3, F1)

Results: The date is set to 8/07/96. and the time was set to 2:55.

Reading and Writing Multiple Tags

You can save communication time by sending a command to read/write more than one tag. The format for a read command looks like this:

Format: (^R)(Variable ID number)(,) (Count) (^M)

The 'Count' portion of the protocol can be set to allow reading multiple tags.

There are some restrictions for writing. You can write multiple integer tags and ONE string tag. The string tag MUST be the last tag written. You cannot write more than one string tag. If the string tag is the first tag written, then all the items listed will be assumed to be part of the string.

Example: ^V5,25,8888,NEW TEXT, STOP,40

This looks like you should write 5 tags beginning with tag 5. Sorry, it won't work. Remember only one string tag at a time and it must be the last tag. Here is what would happen if the above command string is sent.

DM0005	25
DM0006	8888
DM0007	NEW TEXT, STOP,40
DM0008	(no change)
DM0009	(no change)

Error Messages

Error messages appear on the bottom of the QP2 display. Errors encountered with QP1 are ignored and the message is discarded.

Error Messages	Meaning
PLC COM. ERROR(02: D0)	Month out of Range
PLC COM. ERROR(02: D1)	The month was not sent when sending the date
PLC COM. ERROR(02: D2)	Day Out Of Range
PLC COM. ERROR(02: D3)	The day was not sent when sending the date
PLC COM. ERROR(02: D4)	Year out of Range
PLC COM. ERROR(02: D5)	The year was not sent when send the date
PLC COM. ERROR(02: D6)	Hour out of Range
PLC COM. ERROR(02: D7)	The hour was not sent when sending the date
PLC COM. ERROR(02: D8)	Minutes out of range
PLC COM. ERROR(02: D9)	The minutes were not sent when sending the date
PLC COM. ERROR(02: DA)	A long invalid packet was sent
PLC COM. ERROR(02: DB)	The trigger command was trying to access screen 0
PLC COM. ERROR(02: DC)	The screen number was not sent with the trigger command
PLC COM. ERROR(02: DD)	An incomplete write command was sent
PLC COM. ERROR(02: DE)	The first field in the read command was not numeric or was 0
PLC COM. ERROR(02: DF)	A read was issued for data that does not exist and the count was less then 1 or not numeric
PLC COM. ERROR(02: F0)	A read Was issued for data that does not exist and the count was not specified
PLC COM. ERROR(02: F1)	Internal Error - Getting semaphore to set the date
PLC COM. ERROR(02: F2)	Internal Error - Getting the second semaphore to set the date
PLC COM. ERROR(02: F3)	Internal Error - Binary Search Failed
PLC COM. ERROR(02: F4)	Internal Error - Allocating Memory for the DM table
PLC COM. ERROR(02: F5)	Internal Error - There was more then 10k words to allocate for the DM table
PLC COM. ERROR(02: F6)	The packet received was to large.
PLC COM. ERROR(02: F7)	The communication time-out

ASCII Flex Protocol

The ASCII Flex Protocol is designed to allow intelligent controllers to communicate with Quick Panels. In the world of Programmable Logic Controllers (PLC), the protocol is nearly invisible to the user. For example, when a pilot light is placed on a panel, a variable is assigned to it. The variable is the name of a register in the PLC. A corresponding register in the QuickPanel is also assigned to hold the variable data.

All of the variables for a panel are assembled into a polling list. Each variable in turn is read from the PLC by a sequence of commands which are built into the protocol.

In the world of Intelligent Controllers, the protocol is highly visible to the user. For example, when a NUMERIC DATA DISPLAY is placed on a panel, a variable is assigned to it. The variable is a QuickPanel register that holds information read from the controller.

The variable for the Numeric Data Display can be associated with a polling list. Each time the variable is polled, the sequence associated with the variable is executed. The variable could also be unsolicited, whereby nothing happens to it until the controller sends a designated sequence.

A sequence will consist of a sequence name, a command type and one or more commands. For example, a sequence name might be MOTOR SPEED , the first command is a SEND, and the first command string might be SET SPEED {RF22}. The second command could be a RECEIVE, and the command GET SPEED {RF23}.

The sequence named MOTOR SPEED must be associated with a variable. In the command string SET SPEED {RF22}, RF22 is the variable. In the command string GET SPEED {RF23}, RF23 is the variable. The GET SPEED variable RF23 could be assigned as the tag variable for a Numeric Data Display.

The number of sequences and associations is limited only by the amount of memory available. See the Appendix for a formula which will help you calculate the amount of memory used. The procedure for creating sequences will be discussed in detail in later sections.

WARNING

When using one of the PLC protocols, you can't set the Panel Trigger tag or Watchdog tag until you've closed down the main setup dialog at least once. Tags can't be set in the setup dialog the first time into the dialog.

There is a similar situation with ASCII Flex protocol.

You must close down the setup dialog after you select Flex as your protocol. From then on, you are free to do what you want in the Flex dialogs.

If on the other hand, you select Flex as your protocol and then immediately go into the Flex dialogs and create Sequences and tags, you will really be sad when nothing works. It looks like Edit/New sequence dialogs stop you from creating tags at this point. However, you will have no idea why the tags you are entering aren't being accepted. Furthermore, the Error Msg and Invalid Msg tags will get created but remain invalid.

Don't use Internal tags as embedded variables within a Command String. You can use them as internal tags within the QuickPanel but not in any operation that sends or receives info from a motion controller.

Sample Project

This project consists of a single panel containing a Push Button, two Numeric Data Displays and two text displays. To view the commands sent by the QuickPanel, a PC running a Terminal Mode program was used. This demo shows the basic operation of the Flex protocol.

Demo Panel

The panel for the project was designed first. The panel is shown below. The Flex protocol requires using a specific set of registers for tag assignments. These register names will later be used as embedded characters in string commands.

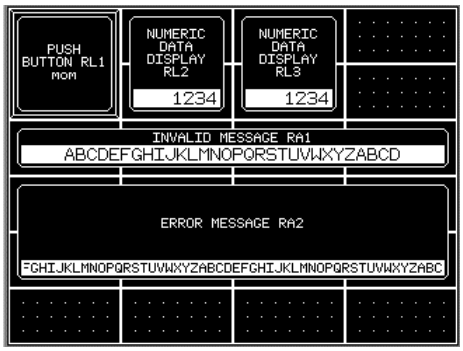
RAxxxx	Register Ascii
RLxxxx	Register Long
RFxxxx	Register Float

Examples:

RA1000
RF1001 * Prec 2
RL9999
RA0
RL44

In the examples above, the 'xxxx' stands for the element number. Valid element numbers go from 0 to 9999.

Also, you do not have to enter 4 digits for the element number. In the Flex protocol you can just type RL1.



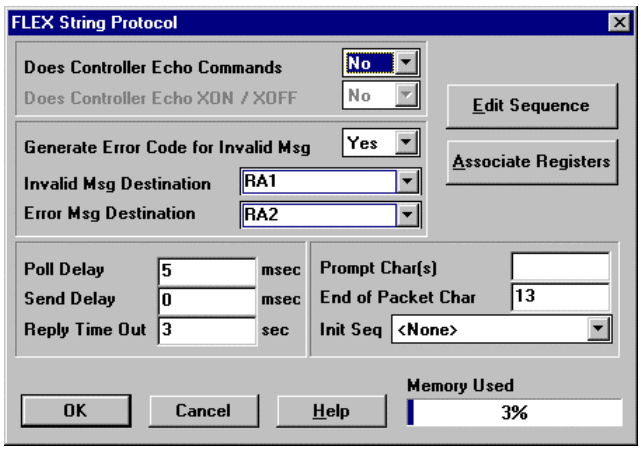
The Push Button is a Momentary button with the tag variable assigned to RL1. One Numeric Data Display is assigned to RL2 and the other to RL3. A Text display was assigned to RA1 for Invalid Messages and another Text display was assigned to RA2 for Error Messages. The registers for Invalid Messages and Error Messages are entered in Setup.

The Push Button is intended to send an ASCII string when it is pressed. The Data Display assigned to RL2 is intended to poll the terminal for data. The Data Display assigned to RL3 is intended to display data from an unsolicited command string sent from the controller. The terminal is able to send incorrect command strings to check if the error messages and invalid messages appear in the text displays.

Protocol Setup

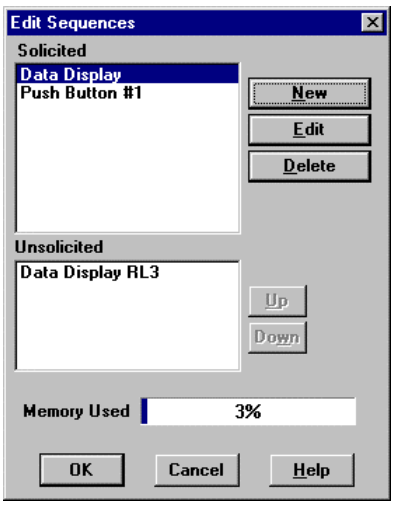
The Flex String Protocol dialog box used for the demo is shown below. The Invalid Msg Destination register is assigned to RA1, which is the same tag used for the Invalid Message Text field. The Error Msg Destination register is assigned to RA2, which is the same tag used for Error Message Text display. The Reply Time Out was set to 3 seconds, which gives you plenty of time to click one of the Function Keys in Terminal mode to send a character string. (The codes in the Function Keys are shown later.)

The End of Packet Character is 13, which is a Carriage Return. This packet must be included in the strings sent from the terminal.

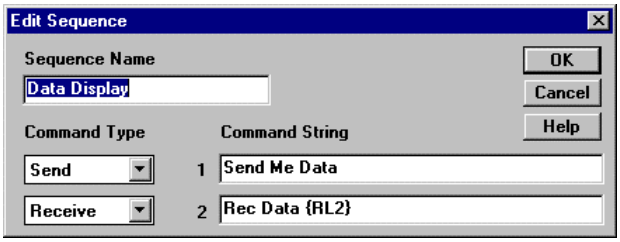


Edit Sequence

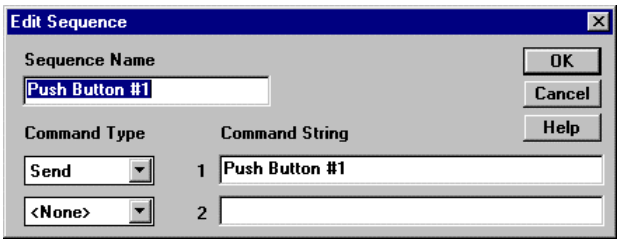
The Edit Sequences dialog box shows a list of all Solicited and Unsolicited sequences. Click on any sequence to Edit or Delete it.



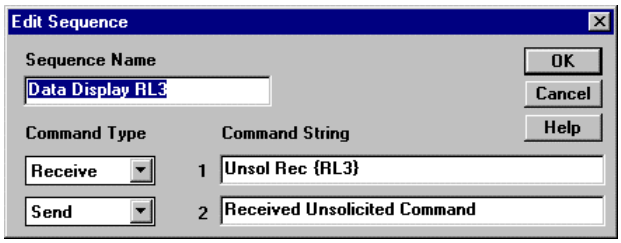
Click the New button to create the sequences for the demo. The first sequence is Data Display. Note that this sequence has a Send and Receive command. The Command String is sent out and a reply is expected in the format shown for the Receive Command String. The format must match or an error message is generated. Note also that the Receive Command String uses RL2 to store the incoming data.



The next sequence is the Push Button. In this sequence, only the Send command is used. The Command String will be sent to the terminal when the Push Button is pressed. This association will be setup in a different dialog box.

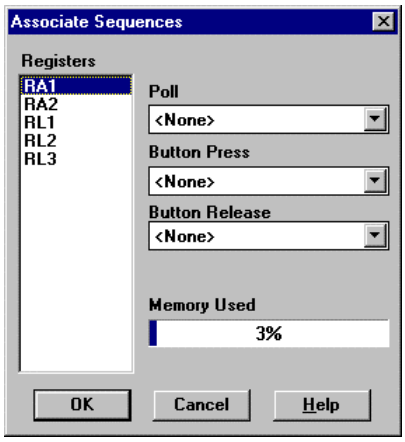


The last sequence is another Data Display. Note that the Command Type starts with a Receive and ends with a Send command. The register RL3 will not be updated automatically but will change when the terminal sends a Command String in the format specified by the Receive Command String. If the received command string is valid, the Send command sends out a Command String.



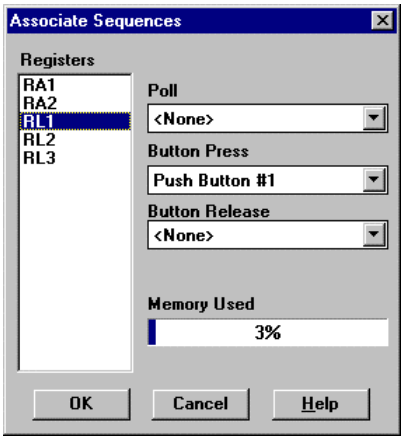
Click OK to close the dialog box and click OK to close the Edit Sequences dialog box.

Once all the sequences are created, any associations of registers and sequences are made in the Associate Sequences dialog box. Click the Associate Sequences button. The dialog box will show all of the assigned registers. Note that RA1 is currently selected and all assignments are set to <None>. That means that this register is not in the Poll list and no Button actions are associated. RA1 is the ASCII register used for displaying Invalid Messages. RA2 will appear the same way since it is used to display Error Messages.

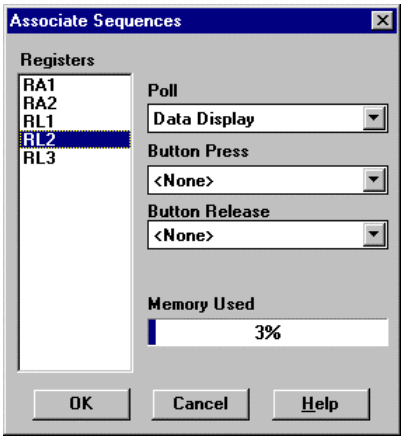


The next association is for RL1, which is assigned to the Push Button. RL1 is associated with the sequence Push Button #1 for a Button Press. When the push button is pressed, the sequence defined by Push Button #1 is executed. The sequence sends out a command string.

Note: It is recommended that you use the Register Long (RLxxxx) register with a Momentary Push Button. The RL register supports bit types. If the RL is used with Momentary Push Button a sequence can be executed on the Press and another sequence can be executed on the Release. If you must use an RF or RA with a Push Button, then the ON button can be used if you want the Sequence to go out on Push.



The next association is for RL2, which is assigned to a Numeric Data Display. Note that RL2 is associated with Data Display in the Poll list. That means RL2 will be automatically updated. Each time RL2 comes up in the poll list, the sequence defined by Data Display will be executed. The sequence sends out a command string and waits for a formatted reply.

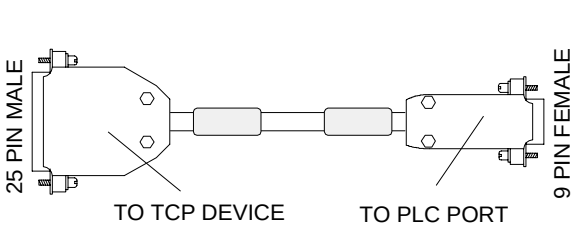


Click OK to close the Associate Sequences dialog box. Click OK to close the Flex String Protocol dialog box. Close the Setup dialog box. Click the download button to load the project into your QPx-2 display.

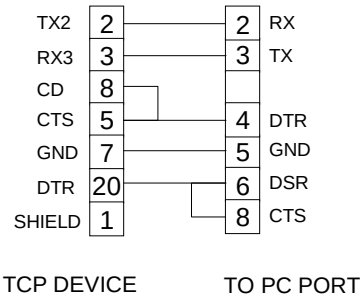
Hardware Connection

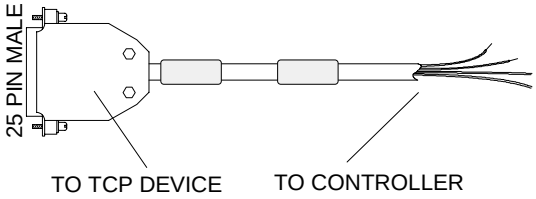
There are two methods used to connect a QuickPanel display to an intelligent controller or terminal.

Go to Project Setup and click the Port button. The choices for Handshake are None and Xon/off. Use the Hardware Handshake cable with the None option when the Controller or PLC uses the hardware handshaking lines to control the communications. Use the No Handshake cable with the None option when the Controller or PLC does not do any hardware handshaking. Use the No Handshake cable if your Controller or PLC uses software handshake. Both cables are shown below.

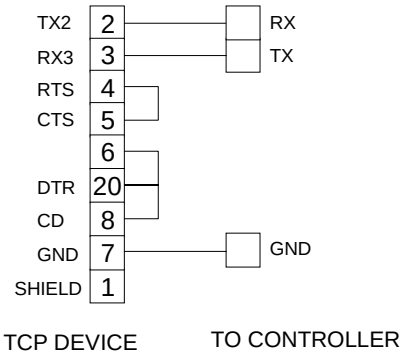


HARDWARE HANDSHAKE



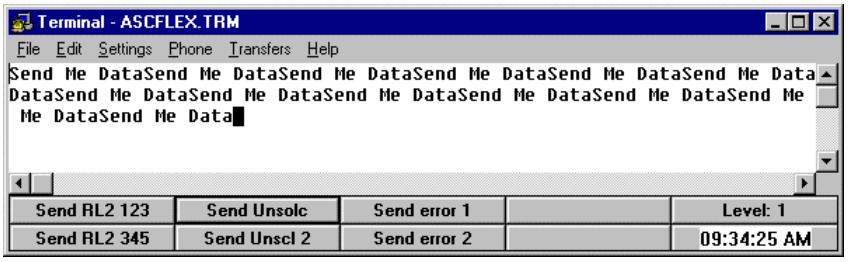


NO HANDSHAKING



For this demo, the NO handshake cable was used to connect the display to a PC. A terminal emulation program was used to display the command sequences received from the display. Function keys in the terminal program were used to send sequences to the display. The communication setup for the terminal program was setup to match the display settings. The terminal mode screen is shown below. Note the Function keys are shown at the bottom of the screen.

Once the communication parameters are set correctly, the screen should show the command string being sent by the display. This string is sent by the display because a Numeric Data Display is tied to the variable RL2, which is assigned to a Poll. Each time RL2 appears in the Poll list, the sequence associated with RL2 is executed. Remember that the sequence sends out a string and waits for a reply.



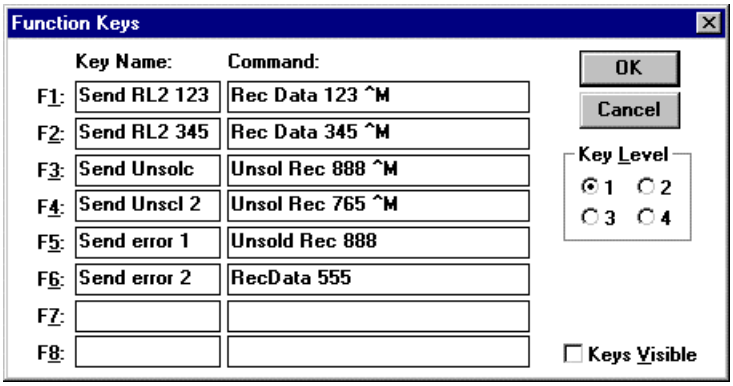
The Function keys were setup to send specific command strings. The setup is shown below.

Pressing the F1 key will send the string "Rec Data 123 ^M." The format must be "Rec Data " because this was specified for the Data Display sequence. The number following the "Rec Data " string will become the data stored in RL2. The "^M" is the End of Packet Character specified in the Flex Protocol setup.

Pressing F2 sends a different value to RL2 using the same command sequence described above.

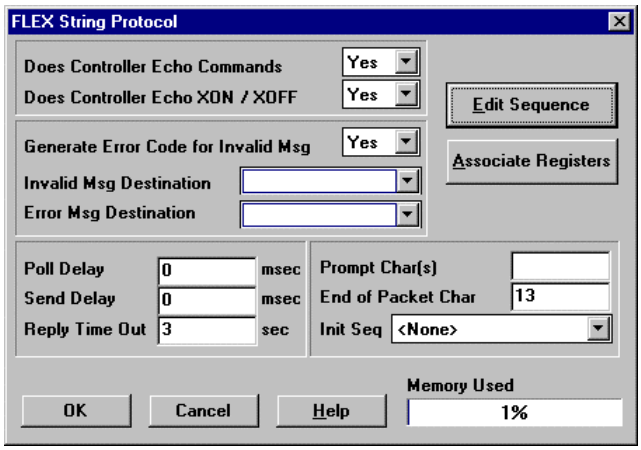
Pressing F3 or F4 will send out a string "Unsol Rec ", which is the format for the unsolicited sequence Data Display RL3. When this string is received by the display, the format will be checked and if it is correct, the sequence for Data Display RL3 will be executed. The sequence consists of reading the string, which updates RL3 register, and sending out a reply string.

Function keys F5 and F6 send out incorrect strings and should generate error messages on the display.



Global Parameters

The following parameter are global which can be set in the Setup.



Does Controller Echo Commands

Does Controller Echo Commands is a character data entry field which will except a Y or N character. Some terminal protocols echo the characters being sent to the controller back to the Quick Panel. Set the option to Y if the controller sends an echo and N if it does not send an echo. The default setting is Yes.

Does Controller Echo XON/XOFF

Does Controller Echo XON/XOFF is a character data entry field which will except a Y or N character. Some terminal protocols echo the XON/XOFF characters being sent to the controller back to the Quick Panel. Set the option to Y if the controller echoes the XON/XOFF characters and N if it does not echo those characters. The default setting is Yes.

Generate Error Code for Invalid Message

An error occurs when a command received from the controller is not recognized. The entry in this field has no effect on the other error codes that can be displayed. Generate Error Code for Invalid Message is a data entry field which can take a "Y" or a "N". If "N" is in the field then commands from the controller which are not recognized will not trigger an error code to be displayed. If "Y" is in the field then commands from the controller which are not recognized will trigger an error code to be displayed. The default setting is Yes.

Invalid Message Destination

Invalid Message Destination is a data entry field which will only take a DM register as valid data. The DM register will be used to display a command received from the controller which was not recognized. The DM register will have to be a string type. The user will have to create the Text Display Message for the DM.

Error Message Destination

Error Message Destination from figure 1 is a data entry field which will only take a DM register as valid data. This DM register will be setup up as a text field. Internal Error Messages will be placed in the DM register.

Poll Delay

The Poll Delay is a numeric data entry field. The data should be entered in milliseconds. It is the time the operating system waits between executing the sequences for the DM registers of the current screen. The range is 0-10000.

Send Delay

Send Delay is a numeric data entry field. The data should be entered in milliseconds. All Send Commands in Sequences will wait this amount of time before the command is sent. The range is 0-10000 with the default set to 0.

Reply Time Out

Reply Time Out is a numeric data entry field. The data should be entered in seconds. It is the time that Quick Panel will wait for a response from the controller. If the time allotted has expired, then an error could be displayed. The range is 0-60, with a default of 3.

Prompt Characters

Prompt Characters is a character data entry field which will except 1 or more characters. The character(s) entered should be the characters used for the prompt. If the protocol has no prompt character nothing should be entered. The limit for this field is 5 printable characters.

End of Packet Char

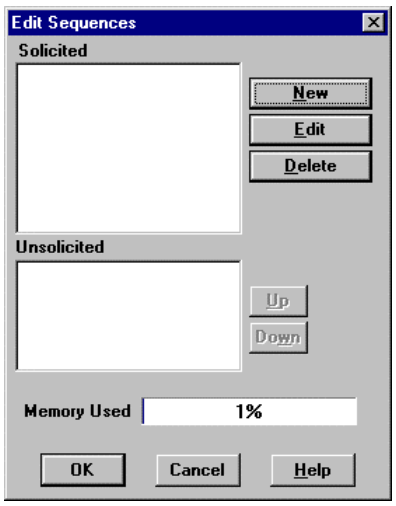
End of Packet Char is a data entry field which will take 1 character. The character will be used to determine where the end of a Receive or Unsolicited Receive Command is located. It will be used for all Receive and Unsolicited Receive Commands. Any character can be used and the default is 13 (carriage return). This field must have an entry.

Initialization Sequence

Initialization Sequence from figure 1 is a data entry field which will only except Sequence Label has valid data. The Sequence will be executed during the initialization stage of the Quick Panel. It can be used to send a Carriage Return to the controller, to let the Controller know that the Quick Panel is ready to communicate. Any valid sequence can be used.

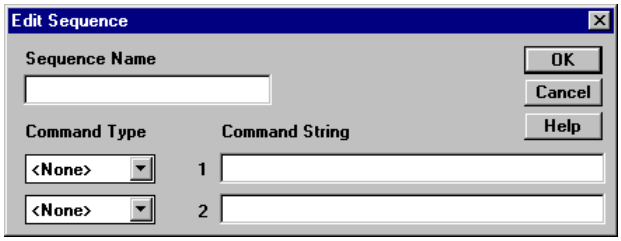
Edit Sequences

The Edit Sequences dialog box will list all the Solicited and Unsolicited sequences. You can create a new sequence, edit existing sequences or delete a sequence.



New Sequence

This dialog box allows creating new sequences. (This is the same dialog box for editing sequences).



Sequence Name

This is a unique name used to identify the sequence. For example, the name might be Start Motor, Get Speed, or Increase Torque. Sequence names are limited to 16 characters.

Sequence

A Sequence contains a Sequence Name and up to 2 commands but no less then 1 command. The command types are: Send , Prompted Send and Receive. A Command String can be broken down into 1 or more Byte Literals, DM's , and Format Specifiers.

An Unsolicited Sequence has a Receive Command as the first command in the Sequence, and cannot use a Prompted Send Command.

Send Command

The main purpose of a Send Command is transmit commands to a controller. A Send Command can contain the following components: String Literals, Embedded Register Fields, and Byte Literals. For example: {RF22 *Prec 5}\13\10 is a command string.

String Literal: Elements of a string command that is not an embedded register or a Byte Literal. In the above example, 'Set Speed' is a string literal.

Embedded Register Field: This is the tag name used to read or write data in a string command. The tag name is set apart from the rest of the command string by brackets. In the above example, {RF22} is an embedded register field.

Byte Literal: The Byte Literal can be any printable or non-printable characters such as the carriage return, comma, new line and form feed. The ASCII value of the character is used. The characters can form strings. In the above example, \13\10 is a byte literal string for a carriage return and a line feed.

Command strings are limited to 80 characters. See the Appendix for more information about the syntax used in the String Commands.

Receive Command

The Receive Command has two main purposes. It used to verify that the string sent from controller matches the format of the command and to extract data from the string so it can be stored in a register. For example: Get Speed {RF23}.

String Literal: Elements of a string command that is not an embedded register or a Byte Literal. In the above example, 'Get Speed' is a string literal.

Embedded Register Field: This is the tag name used to read or write data in a string command. The tag name is set apart from the rest of the command string by brackets. In the above example, {RF23} is an embedded register field.

Byte Literal: The Byte Literals are printable or non-printable characters such as the carriage return, comma, new line and form feed. The character in the Receive Command should match the character in the string received from the controller. The Byte Literals can be grouped to form a string.

Prompted Send Command

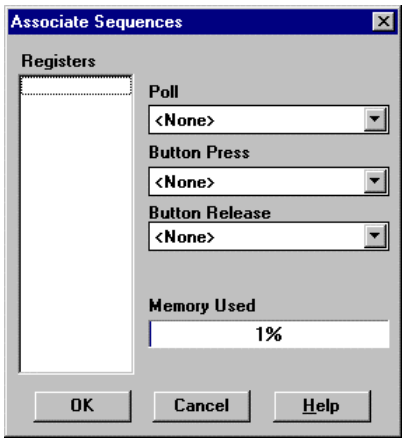
This command is just like the Send Command except that it waits for a Prompt from the controller, before doing the Send.

Unsolicited Receive Command

It is a special type of Receive Command. The command can be received from the controller in two ways: 1) The Quick Panel could be waiting for a particular Receive Command inside a Sequence and receive a command other then the intended command , 2) or the Quick Panel was not processing a Sequence and received a command anyway. The Unsolicited Receive Command will be processed by the Quick Panel in the following way. When an Unsolicited Receive Command is received, the Sequences which begin with Receive Commands will be searched. The command received from the controller will be compared to the first Receive Command of each Unsolicited Sequence. If there is a match, that Sequence will be processed .

Associate Registers

The Associate Sequences dialog box is used to associate sequences with registers.



Poll

The Poll table will enable the user to associate the Sequence Names with Rx registers. The result of this association will enable the operating system to execute a Sequence when a read of a particular register is done. This association between the registers and the labels sets up a Poll. A Poll exists when 1 or more Sequences are executed in a sequential interval. Not all the Rx registers have to have Sequences associated with them.

Button Press

A button press operates by writing to a register only when the button is pressed. The button is assigned to a Rx register. The register is Associated with a Sequence Name. Writing to a register will cause the operating system to execute a sequence.

If a Push Button is used, then a Button Press could cause a Sequence to execute and a release could cause another Sequence to execute. Not all the registers have to have Sequences associated with them.

Button Release

A button release operates by writing to a register only when the button is released. The button is assigned to a Rx register. The register is Associated with a Sequence Name. Writing to a register will cause the operating system to execute a sequence.

Limits

Character Limits

Sequence Names	16 Characters
Command Strings	80 Characters
Prompt String	5 Characters
End Of Packet Char	1 Character

Number of Sequences, Number of Associations

These are limited only by the amount of memory available. Later in this document I will provide a Formula for calculating the amount of memory used.

Memory Used Status Bar

This indicator is shown on 3 of the Flex dialogs. It represents the percentage of memory used by the project. Whenever you take an action which pushes the memory used over 100%, an error message is displayed indicating this problem and giving you suggestions on how to gain more project memory.

The worst case scenario is you will have to Cancel out of the New Sequence dialog or remove Associations. The current memory limit is 16384 bytes.

Setup Options

Parameter	***Scale***	***Range***	***Default***	***Have to Fill in***
Poll Delay	Milliseconds	0 - 10000	0	No
Reply Time Out	Seconds	0 - 60	3	No
Send Delay	Milliseconds	0 - 10000	0	No
Prompt Char(s)	Characters	Up to 5 Printable characters	None	No
End of Packet Char (Rcv only)	Characters	Any character	13 (CR)	Yes
Initialization Sequence	Label	Any Valid Sequence	None	No
Does Controller Echo Commands -	Y/N	Y/N	Y	No
Does Controller Echo XON/XOFF	Y/N	Y/N	Y	No
Generate Error Code for Invalid Message	Y/N	Y/N	Y	No
Invalid Message Destination	DM type	Valid DM for a string type	None	No
Error Message Destination	DM Type	Valid DM for a string type	None	No

Tag Table

This is the syntax for normal tag creation via the Tag Editor or assignment to a Panel Object. There are three tags.

RAxxxx	Register Ascii
RLxxxx	Register Long
RFxxxx	Register Float

Examples:

RA1000
RF1001 * Prec 2
RL9999
RA0
RL44

In the examples above, the 'xxxx' stands for the element number. Valid element numbers go from 0 to 9999.

Also, unlike the Ascii string protocol, you do not have to enter 4 digits for the element number. In Ascii, you would have to type DM0001. In the Flex protocol you can just type RL1.

Syntax Used in the String Commands

The string commands you enter in the Edit Sequence or New Sequence dialogs are composed of the following elements.

- Embedded register fields
- Byte Literals
- String Literals

Embedded Register Fields

This is how you specify a tag name to read from or write to in a string command. All you do is wrap a normal tag name in brackets.

{RA1}
{RL283}
{RF43}

There is just one extension to the float syntax that is available. You can specify the precision of a float tag within the embedded field. To set the precision of a Float to 2, you would do this

{RF43 * Prec 2}

This syntax will only work and within a string command. You can't specify a precision in the tag editor this way. Also, you should only specify a Float precision on SEND string commands.

Byte Literals

Use Byte literals to embed ascii characters in a string command. The syntax is as follows:

\xxx where 'xxx' is a decimal value from 0 to 255.

To embed a carriage return/line feed you would add the following to your string command.

\13\10.

Remember that the ‘xxx’ is in decimal, not hexadecimal.

String Literals

String literals is everything else in the string command that is not an embedded register and not a Byte Literal.

Examples:	*Breakdown:*
Set Speed {RF22 * Prec 5}\13\10	
	‘Set Speed ‘= string literal
	‘{RF22 * Prec 5}’= embedded float register, prec 5
	‘\13’= byte literal, carriage return
	‘\10’= byte literal, line feed
Get Speed {RF23}	
	‘Get Speed ‘= string literal
	‘{RF23}’= embedded float register

Handling Unsolicited Sequences

Some controllers may send out commands that the QuickPanel does not understand. One suggestion for handling this is to define an Unsolicited Sequence which uses a RAx register in the Receive command. The RAx will match on any string. This Unsolicited Sequence could be strategically placed in the list of unsolicited sequences so they could drastically rduce the number of unsolicited sequences that have to be defined.

Memory Used Calculation

To calculate the exact amount of memory used you would have to know the length of each sequence name, string command, tag name etc. This calculation uses average lengths and is thus just an estimate.

a = total number of sequences (solicited and unsolicited)
b = number of unsolicited sequences
c = average length of sequence name used (maximum = 16)
d = average length of step string used (maximum = 80)
e = average length of Association (maximum = 54)

(Tag Name, Press Sequence Name, Release Sequence Name, Poll Sequence Name)
f = number of tags with at least one association
g = total number of steps in project

Step 1: Calculate Basic overhead.
T1 = 146 + (a * (3 + c)) + (b * (1 + c))

Step 2: Calculate String Command Bytes
T2 = g * (3 + d)

Step 3: Calculate Poll Table Bytes
T3 = f * (5 + e)

Total Bytes Used = T1 + T2 + T3

Error Messages

Below is a list of the Error numbers and Error messages which can be displayed in the ASCII Flex Protocol. Following each Error Message is a more descriptive explanation of the error.

Error #: 02:87
Error Msg ERROR 02:87 Prompted Send Failed because no Prompt was defined
Explanation: A Prompted Send was executed but, no prompt was defined so it failed.

Error #: 02:88
Error Msg ERROR 02:88 Prompted Send Failed waiting for the prompt, RCV Packet too large
Explanation: A Prompted Send was executed but, while waiting for the prompt a packet was received which was larger then the Receive Buffer. The Prompt was not received. The End of Packet character may be incorrect.

Error #: 02:89
Error Msg ERROR 02:89 Prompted Send Failed waiting for the prompt (RCV time-out)
Explanation: A Prompted Send was executed but, while waiting for the prompt a time-out occurred.

Error #: 02: 8A
Error Msg ERROR 02:8A Prompted Send Failed Transmitter could not send the EOP char
Explanation: A Prompted Send was executed, a prompt was not available, the Quick Panel tried to send the End of Packet character, it could not because the transmitter was not available. The transmitter was not available because it was waiting for a XON character from the controller or the DSR line to the controller was not active.

Error #: 02:8B
Error Msg ERROR 02:8B Invalid Command read while processing a Sequence
Explanation: (Compiler Error) A Command read while processing a Sequence was invalid.

Error #: 02:8C
Error Msg ERROR 02:8C Invalid Type read while processing a Send Command
Explanation: (Compiler Error) A Send Command in Sequence was being executed and an Invalid type was read, that the Quick Panel did not recognize.

Error #: 02:8D
Error Msg ERROR 02:8D Length of a literal string in a Send Cmd is > 120 Bytes
Explanation: A Send Command was trying to send to the controller a Literal String which was greater than a 120 characters.

Error #: 02:8E
Error Msg ERROR 02:8E Length of the byte literal in a Send Cmd is > 120 Bytes
Explanation: A Send Command was trying to send to the controller a byte Literal which was greater than a 120 characters.

Error #: 02:8F
Error Msg ERROR 02:8F The length for the Rx String in a Send Command was invalid

Explanation: (Compiler Error) The length was less than 5 when it should have been at least 5.

Error #: 02:90
Error Msg ERROR 02:90 The length for the Rx Long in a Send Command was invalid
Explanation (Compiler Error) The length was not equal to 4.

Error #: 02:91
Error Msg ERROR 02:91 The length for the Rx Float in a Send Command was invalid
Explanation: (Compiler Error) The length was less then 4.

Error #: 02:92
Error Msg ERROR 02:92 The Received Literal String did not match
Explanation: A string was received by the Quick Panel, but it did not match the literal string defined by the user.

Error #: 02:93
Error Msg ERROR 02:93 Length of Literal String in the Rcv Cmd is > 120 Bytes
Explanation: A receive command was being executed but the literal string received was greater than 120 characters.

Error #: 02:94
Error Msg ERROR 02:94 Invalid Type while processing a Receive Command
Explanation: (Compiler Error) A Receive Command in a Sequence was being executed and an Invalid type was read, that the Quick Panel did not recognize.

Error #: 02:95
Error Msg ERROR 02:95 The Received Byte Literal did not match
Explanation: A Byte literal(s) was received by the Quick Panel, but it did not match the Byte Literal(s) defined by the user.

Error #: 02:96
Error Msg ERROR 02:96 Length of Byte Literal in the Rcv Cmd is longer than 120 Bytes
Explanation: A receive command was being executed but the Byte literal(s) received was greater than 120 characters.

Error #: 02:97
Error Msg ERROR 02:97 Length for the Rx string in a Rcv Cmd was invalid
Explanation: (Compiler Error) The length should have been 5.

Error #: 02:98
Error Msg ERROR 02:98 The length for the Rx Long in a Receive Command was invalid
Explanation: (Compiler Error) The length was not equal to 4.

Error #: 02:99
Error Msg ERROR 02:99 No digits were found for the Rx Long in a Receive Command
Explanation: A Receive Command was being executed, it was expecting numeric data from the controller but data was not numeric.

Error #: 02:9A
Error Msg ERROR 02:9A The length for the Rx Float in a Receive Command was invalid

Explanation: (Compiler Error) The length was not equal to 4.

Error #: 02:9B
Error Msg ERROR 02:9B No digit or . found for the Rx Float in a Receive command
Explanation: A Receive Command was being executed, it was expecting numeric data or a '.' from the controller but data was not numeric.

Error #: 02:9C
Error Msg ERROR 02:9C Invalid Command Read while processing an Unsolicited Sequence
Explanation: (Compiler Error) A Command read while processing an Unsolicited Sequence was invalid.

Error #: 02:9D
Error Msg ERROR 02:9D While processing an Unsolicited Command a match was not found
Explanation: An Unsolicited Command was received by the Quick Panel which did not have a match in the table of Unsolicited Sequences.

Error #: 02:9E
Error Msg ERROR 02:9E Invalid Start of the Unsolicited Commands
Explanation: (Compiler Error)The first step of an Unsolicited Command was not a receive command.

Error #: 02:9F
Error Msg ERROR 02:9F Rcv Command failed on the 2nd Rcv of an Unsolicited Cmd
Explanation: A Unsolicited Sequence was being executed and the second Receive Command of the Unsolicited Sequence failed.

Error #: 02:A0
Error Msg ERROR 02:A0 Rcv Buffer over flowed on the 2nd Rcv of an Unsolicited Cmd
Explanation: A Unsolicited Sequence was being executed and the second Receive Command of the Unsolicited Sequence failed because the Receive Buffer over flowed. The End of Packet character may be incorrect.

Error #: 02:A1
Error Msg ERROR 02:A1 Comm time-out on the 2nd Receive of an Unsolicited Cmd
Explanation: A Unsolicited Sequence was being executed and the second Receive Command of the Unsolicited Sequence failed because the Communications Timed out wait for a packet.

Error #: 02:A2
Error Msg ERROR 02:A2 Could not release the RAM for the Poll Table
Explanation: Memory was dynamically allocated, and an attempt was made to free the RAM (probably by going into a off-line mode) and it was unsuccessful.

Error #: 02:A3
Error Msg ERROR 02:A3 Ran out of RAM trying to allocate RAM for the Poll Table
Explanation: A problem occurred trying to dynamically allocate RAM for the Poll table.

Error #: 02:
Error Msg ERROR 02:A4 Error Allocating Memory for the Rx table
Explanation: A problem occurred trying to dynamically allocate RAM for the Rx table .

Error #: 02:A5
Error Msg ERROR 02:A5 There was more then 10k words to allocate for the Rx table
Explanation: The Quick Panel can only dynamically allocate 10 thousand WORDs or 20 thousands bytes for the Rx table. To many local registers have been created.

Error #: 02:A6
Error Msg ERROR 02:A6 The packet received was to large
Explanation: A packet was received which was larger then the Receive Buffer. The End of Packet character may be incorrect.

Error #: 02:A7
Error Msg ERROR 02:A7 The communication timed-out
Explanation: The Communications timed-out wait for a packet.

Error #: 02:A8
Error Msg ERROR 02:A8 Packet to large on the Receive of a Solicited Cmd\0" },
Explanation: While executing a Receive Command in a Solicited Sequence a packet was received which was larger then the Receive Buffer. The End of Packet character may be incorrect.

Error #: 02:A9
Error Msg ERROR 02:A9 Comm time-out on the Receive of a Solicited Cmd\0" },
Explanation: While executing a Receive Command in a Solicited Sequence the communications timed-out.

Error #: 02:AA
Error Msg ERROR 02:AA Transmitter time-out waiting for an XON char or the DSR line
Explanation: The transmitter in the Quick Panel could not send out any characters because it was waiting for a XON character from the controller or the DSR line to the controller was not active.
Error #: 02:AB
Error Msg ERROR 02:AB Recv failed, then proc as Unsol Seq, then Recv timeout getting CMD
Explanation: A Sequence was executing a Receive Command, the data received did not match what was intended. The data received from the controller was then processed as an Unsolicited Sequences. Then the receiver timed-out waiting for the intended data from the controller. The data received from the controller may not be an Unsolicited Command. The Receive Command in the Sequence may not be correct, thus the Quick Panel would not receive another command from the controller.

Error #: 02:AC
Error Msg ERROR 02:AC Recv failed, then proc as Unsol Seq, then Recv Err buffer overflow
Explanation: A Sequence was executing a Receive Command, the data received did not match what was intended. The data received from the controller was then processed as an Unsolicited Sequences. Then the receive buffer over flowed getting the intended data from the controller. The End of Packet character may be incorrect.

Error #: 02:AD
Error Msg ERROR 02:AD Compiler version does not match the Driver Version\0"}
Explanation: The Compiler and the Driver have been given a version numbers which should match. The version numbers are used to make sure that the Compiler and Driver work together. If the Version numbers are different it could cause unexpected results. This error indicates that Version numbers do not match.

Error #: 02:AE
Error Msg ERROR 02:AE Could not transmit because all of the echoes were not received
Explanation: The driver when in echo mode is suppose to echo all the characters it receives. If the driver wants to transmit a string and it did not receives all the characters echoed from an earlier sent command it will wait the time-out period for the echo of all the characters. If the driver does not receive the echo of all the characters within the time-out period this error occurs. To fix the problem increase the time-out period. If this does not fix the problem, make sure the controller is echoing all the characters sent to it.

Appendix A

Using Windows

Note: If you are an experienced Windows user, skip this section.

Selecting and Canceling Menus

To select a menu item, use the mouse to point to the name of the menu on the menu bar and click the name to open the menu. To cancel a menu, click the menu name or anywhere outside the menu.

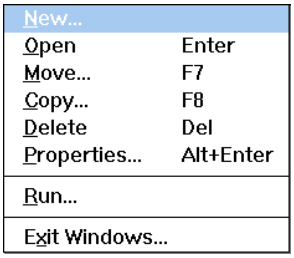
Please refer to your Windows user guide for information on using menus and dialog boxes.

Choosing Menu Commands

The items listed on menus are commands that represent actions the application can carry out. Menu items can also be attribute assignments, a list of files, or names of cascading menus.

To choose an item from a selected menu, click the item name. Windows applications follow certain conventions when listing items on a menu. These conventions signal that extra information about the menu commands follows.

MENU CONVENTION	MEANING
Dimmed command name.	The command is not available at this time.
An ellipsis after the name.	A dialog box will appear.
A check mark next to the name.	The command is active.
A key combination after the name.	A shortcut combination for this command.
A triangle at the right side.	Command leads to cascading menu.



Dialog Boxes

Windows uses dialog boxes to request information from you and provide information to you. When Windows needs additional information to carry out a command you have chosen, a dialog box requests that information. You complete the dialog by providing the missing information. Windows also uses dialog boxes to display additional information and warnings, or to explain why a requested task could not be completed.

Command Buttons

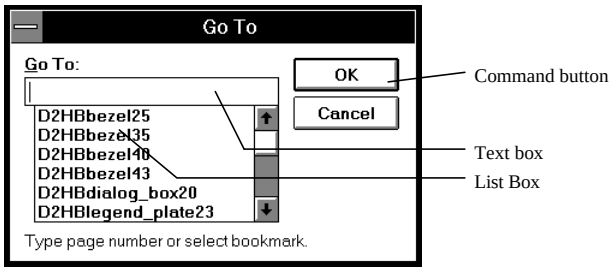
Command buttons initiate an immediate action. One command button in each dialog box carries out the command you choose, using the information supplied in the dialog box. Other command buttons let you cancel the command or choose from additional options. To choose a command button, click the button.

Text Boxes

A text box is a space into which you type information. When you move to an empty text box, a flashing vertical bar appears at the far left side of the box. If the box already contains text, it is automatically highlighted and any text you type replaces it. You can erase the text by pressing DELETE or BACKSPACE.

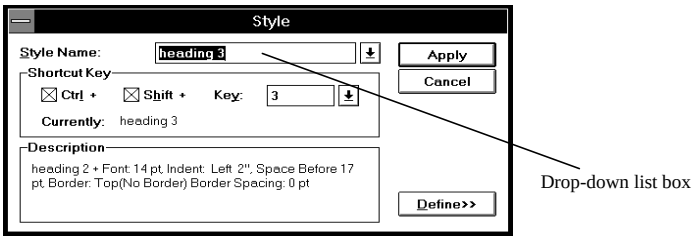
List Boxes

A list box shows a column of available choices. Scroll bars are used to move up and down through the list. To select an item from a list, click the item you want then choose a command button.



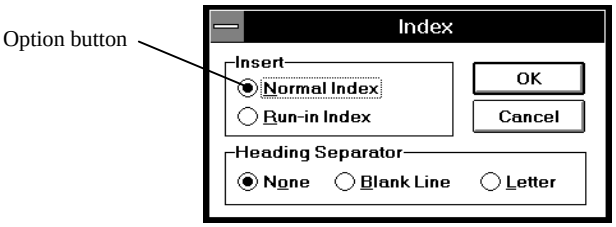
Drop-Down List Boxes

A drop-down list box appears with the current choice highlighted in the box. The arrow in a square box at the right opens into a list of available choices when you select it. Drop-down boxes are used in dialog boxes that are too small or too crowded to contain open list boxes.



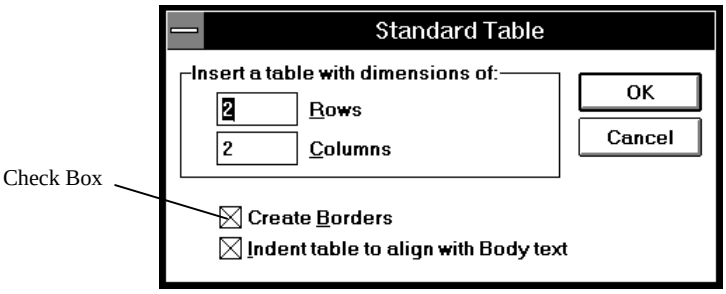
Option Buttons

Option buttons appear in dialog boxes as a list of mutually exclusive items. You can select only one option from the list at a time. The selected option button contains a black dot. To select an option button, click the button.



Check Boxes

Check boxes offer a list of options you can switch on and off. You can select as many or as few check box options as are appropriate. When an option in a check box is selected, it contains an X. To select a check box, click the empty box.



Appendix B

Error Messages

This section explains the messages that appear when an error has occurred in the Quick Panel unit during RUN mode. The origin of the problem behind each error message is explained with appropriate ways of disposing of the error. After a problem has been solved, turn the power Off, then On, and restart the Quick Panel.

Error Message List

The error messages listed below may appear on the Quick Panel unit. Instructions on how to find and solve error messages are explained on the following pages.

- SYSTEM ERROR
- ILLEGAL ADDRESS IN SCREEN DATA
- UNSUPPORTED TAG IN SCREEN DATA
- PLC NOT CONNECTED
- PLC NOT RESPONDING
- RECEIVE DATA ERROR
- PLC COM. ERROR
- SCREEN MEMORY DATA IS CORRUPT
- OBJ. PLC HAS NOT BEEN SETUP
- CLOCK SETUP ERROR
- SCREEN TRANSFER ERROR

There is a priority system in displaying error messages. When a system error occurs, the message SYSTEM ERROR displays before any other messages. For errors other than System Error, the message for the most recent error displays.

After resolving the error, the error message remains on the screen until the screen has been switched, or until the unit has been reset.

Error Messages--Details

SYSTEM ERROR

Indicates a fault in the basic operations of the Quick Panel. Following the error message, an error code, as shown, will appear.

SYSTEM ERROR (03: x x)

Displays when a PC transferred file cannot be rebuilt. The x x portion of the message indicates the error number.

SYSTEM ERROR (x x x : x x x : x x x)

Displays in RUN mode when a file cannot be rebuilt. The message shows the error numbers in sequence.

ILLEGAL ADDRESS IN SCREEN DATA

Caused by an overlap of addresses. Following the error message, error codes, as listed below, appear. If the error cannot be fixed, please report the error code and details on how the error developed to the Quick Panel technical support team.

ILLEGAL ADDRESS IN SCREEN DATA (0 0 B: x x x : x x x)

Overlapping Addresses

Error 1	Error 2	Contents
	191	All or part of the T-File or S-tag address range overlap
OC1	192	the addresses of System Data Area.
	193	
	194	All or part of the System Data Area address, A-File, or
0C2	195	S-tag address range overlap the addresses setup in a
	196	
	197	All or part of the T-File, or the S-tag or K-tag address
0C3	198	range overlap the address range set in an A-file.
	199	

UNSUPPORTED TAG IN SCREEN DATA

A list of tag(s) in use that are unsupported by the current Quick Panel version appear with this error message. Setup the tags to correspond with the Quick Panel.

PLC NOT CONNECTED

Displays when there is a transmission timeout error. Check the cable wiring and connect correctly.

PLC NOT RESPONDING

Displays when there is a Reply Timeout Error. The origin of the problem and the matching solutions are listed below.

1. The power for the PLC host is not activated. Turn On the host's power switch.

2. Quick Panel unit INITIALIZE setup (Setup l/O, PLC Setting) is incorrect. Setup the unit correctly and match up with the current host and Communication Cable.

3. The host and Quick Panel powering up process was incorrect. Turn the host's power On first, wait 2-3 seconds, then power up the Quick Panel unit.

4. The Communication Cable was not connected properly. Check the Communication Cable wiring and connect it up properly.

RECEIVE DATA ERROR

Displays when there is a problem in trying to receive the data.This error appears when the Communication Cable is pulled out when the Quick Panel unit is On; or, when normal communication operations are being run, but the Quick Panel has been powered Off, then back On. Begin running transmissions again.

PLC COM. ERROR

Appears when the address setup for tags exceed the address range on the host side. Check the Error Number that appears and use the following table to eradicate the problem.

PLC COM. ERROR (02: X X)

The XX portion of the message is the error code.

Error FC: The communication settings for this unit and the host do not match. Fix the SI0 communication settings to match the host.

Error FB: The address set on a tag, or the address set by an alarm message is out of a set range. (address range error).

Error FA: Address range error. Set the addresses within the allowable range.

Error 51: The tag address, Alarm message Registry address, and the like, do not exist in the PLC's internal memory. Setup the addresses in a device range that exists.

In Toshiba's PROSEC T Series, the Error Code is 4 places long; on the Quick Panel, Error Numbers are displayed and changed into Hexadecimal. For example, the error code 0134 would be changed into 86 hex.

With the Allen-Bradley PLC-5 Series, the EXT STS error codes have been re-mapped to start at DOH, so it will not conflict with other error codes. For example, error code 01 is mapped to D1, and error code 1A is mapped to EA.

SCREEN MEMORY DATA IS CORRUPT

Displays when the checksum of the screen memory data does not match because of a corruption in the screen files. Error codes, as shown below, follow the error message, SCREEN MEMORY CHECKSUM ERROR. By referring to the error code, check the screens that have errors. When a screen file has been corrupted, delete that file, and make a new one (or recall a backup copy if available).

SCREEN MEMORY DATA IS CORRUPT (x x x x : x x x x)

The first error code is the Screen Number that has an error (displays only one Screen Number). The second code is the number of screens that have errors (Decimal).

OBJ. PLC HAS NOT BEEN SETUP

The host PLC setup in Quick Panel's INITIALIZE Screen does not match the PLC in use. Use the Error Code that follows the error message to select the proper PLC type in the Quick Panel.

OBJ. PLC HAS NOT BEEN SETUP (xx)

The XX is the PLC number (Hexadecimal) written onto the System File. See the Table below.

PLC #	PLC TYPE	PLC :	PLC TYPE
0	SYSMAC - C	13	Code Reserved
1	MELSEC - AnN	16	Code Reserved
4	MICREX - F	1F	SIMATIC - S5 90-115
B	MELSEC - AnA	20	SIMATIC - S5 135-155
C	KOSTAC SR	21	SIMATIC 3964R
D	SYSMAC - CV	22	PLC-5
9	MEMCON - Scl	4D	Memory to Memory
A	MEMCON - SC2	67	HIZAC - EC
10	HIZAC H	84	MICREX - F T-LINK

CLOCK SET UP ERROR

This message displays when the backup battery for the internal clock is dead. The battery obviously needs to be replaced. Please contact the Quick Panel technical support team for service. After exchanging the backup battery, set up the internal clock.

The life span of the backup battery depends on the ambient temperature and the amount of current being charged and used. The table below gives a general indication of how long the battery will last.

Battery Temperature	under 40 C	40~ 50 C	50~ 60 C
Expected Life Span	over 10 yrs.	over 4.1 yrs.	over 1.5 yrs.

SCREEN TRANSFER ERROR

Displays when an error occurs in the data transmission from the screen editor to the Quick Panel. Try re-transmitting the screen data.