Cincinnati Electrosystems 9650-D

"Mini" Protocol Converter

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9650/7650 "Mini" Protocol Converter

Instruction Guide

Cincinnati/DynaComp
502 TechneCenter Dr., Suite A
Milford, Ohio 45150

9650-701 REV - September 1993

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502 TechneCenter Dr., Suite A
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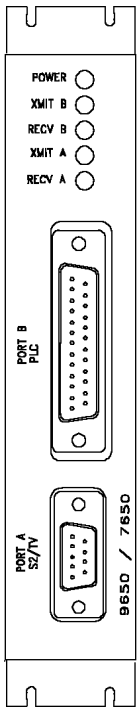
Chapter 1 - Welcome

Welcome!

1.1 What is the "Mini" Protocol Converter?



The **"Mini" Protocol Converter** is a device, which, in combination with Cincinnati/- DynaComp's software products, translates the communication protocols of one manufacturer's devices to those of another manufacturer. Serial communication devices produced by Cincinnati/- DynaComp may be directly connected to the programming port or serial port of most PLCs. This eliminates the need for ASCII/BASIC modules or input/output cards for communication with operator interface devices.

The "Mini" Protocol Converter supports 2 serial ports. One 25-pin serial port serves as a programming port/communication port. A 9-pin serial port acts as a communication port. Each of these ports is software configurable. Transmit/Receive LEDs are provided for both serial ports.

Offline configuration software is required for port definition and operation of the protocol converter. More than 18 different protocols are available. The software is used to create a "configuration file." Once created, this configuration file is downloaded into the protocol converter memory. Unplugging the programming cable places the hardware in RUN mode, which activates the configuration in the protocol converter.

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1.2 Overview: "Mini" Protocol Converter

1.2.1 What Manual Should I Use...?

Please take the time to read the manuals included with the "Mini" Protocol Converter to familiarize yourself with installation, specifications, configuration procedures, operating capabilities, and programming methods. The following documentation is included with this Protocol Converter:

9650/7650 "Mini" Protocol Converter Hardware Manual

1.2.1.1 ...to Install and Connect the "Mini" Protocol Converter

For information on installing and connecting the "Mini" Protocol Converter, refer to this manual, the *9650/7650 "Mini" Protocol Converter Hardware Manual*. Information provided in this manual includes dimensions, installation information, connections, and specifications. In addition, this manual identifies the hardware features of the "Mini" Protocol Converter.

1.2.1.2 ...to Program and Operate the "Mini" Protocol Converter

For information on programming and operating the "Mini" Protocol Converter, refer to your **Software Manual** in combination with the applicable **Protocol Reference Guide.**

1.2.2 Features: "Mini" Protocol Converter

The following are features of the "Mini" Protocol Converter:

- Allows the user to Quick Connect any Series Two or TouchView devices to a PLC.
- Supports downloadable protocols.
- PLC Port for communicating with various PLCs.
- Serial Port for communicating with Series Two or Touch View devices or other PLCs.
- LEDs for communication diagnostics.

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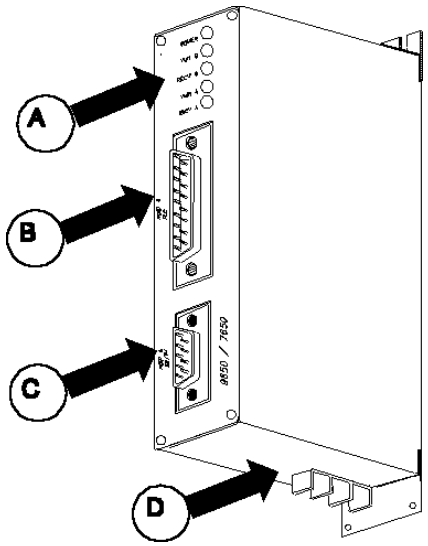
1.2.3 "Mini" Protocol Converter Hardware

Each hardware component of the "Mini" Protocol Converter is illustrated below.



A - Diagnosticd LEDs
B - Port B (PLC/Prog. Port)
C - Port A (S2/TV Port)
D - Power Connector

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Chapter 2 - Receiving Inspection

2.1 Packing List

After receiving your "Mini" Protocol Converter, you should immediately check to confirm that you have received the following items:

- 9650/7650 "Mini" Protocol Converter
- *9650/7650 "Mini" Protocol Converter Hardware Manual*
- TVC Kit (7650 only), including: TouchView to 7650 Cable (CBL-6115); Protocol Reference Guides; Diskette; TVC Instruction Manual; 3-Ring Binder

The following are optional items:

- 128K Memory
- 9650 and 7650 Options:
  Level Two Software
  TSP 4 Software
  Series Two to 9650 Cable (CBL-6116)
  9 pin Programming Cable (CBL-6114)
  25 pin Programming Cable (CBL-6113)

2.2 What to Do if Something is Missing or in Error

If you find that there has been a packing error, contact Customer Service at:

(513) 831-6800 Customer Service
(513) 831-4866 FAX

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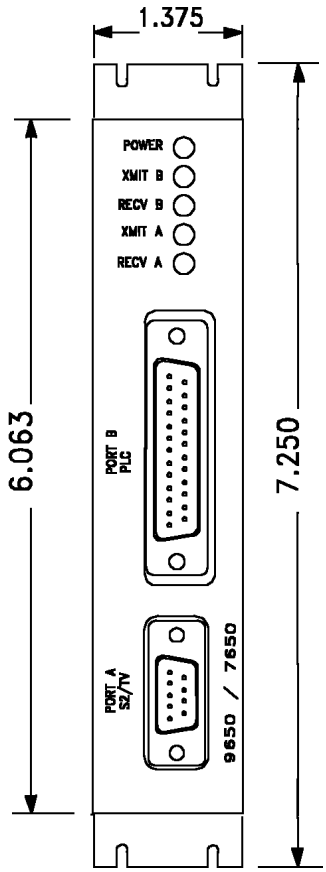
Chapter 3 - Mechanical

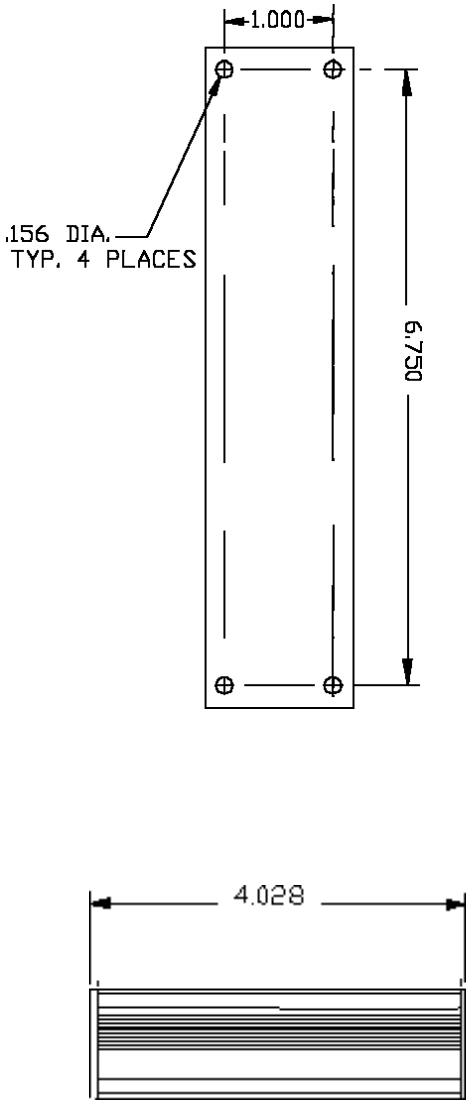
3.1 Dimensions

The following illustrations show the dimensions for the **front panel**, **mounting**, and **top view** for the "Mini" Protocol Converter.

3.1.1 Front Panel



3.1.2 Mounting and Top View



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3.2 Specifications

The specifications for the "Mini" Protocol Converter are listed below.

Power Requirements	**10-30 VDC** 2.5 W
Operating Temperature	0 to 50° C
Humidity	10% to 90%, non-condensing
Weight	Approx. 1 lb.
Program & Message Storage	Flash EPROM, 32K standard, 128K optional
S2/TV Port (Port A)	**Communication** Serial RS-232 or RS-422
	Baud Rate 300, 600, 1200, 2400, 4800, 9600, 19.2K, Software Selectable
PLC Port (Port B)	**Communication** Serial RS-232, RS-422, RS-485, or current loop
	Baud Rate 300, 600, 1200, 2400, 4800, 9600, 19.2K, Software Selectable

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Chapter 4 - Electrical Connections

4.1 Power Connections

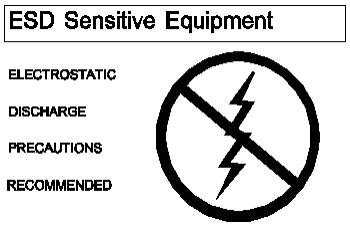
The **power connector** for the "Mini" Protocol Converter is located on the bottom of the unit.

4.1.1 10-30 VDC

Standard units are powered by 10-30 VDC.

4.2 Grounding Communication Cables

Communication cables should be shielded twisted-pair type. It is important that communication cables connected to Cincinnati/-DynaComp devices be properly grounded. This is true of all types of communication (RS-232 and RS-422).



Caution!! Electrostatic Discharge (ESD) precautions should be observed when connecting communication cables to equipment.

4.3 Logic Ground

When connecting communication cables the logic ground line from each device must be connected to the logic ground of the next device in the serial link.

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4.4 Earth Ground (Shielding)

Important The communication circuits of some Cincinnati/DynaComp devices may be damaged if communication cables are not properly grounded. This will require that the device be returned to Cincinnati/DynaComp for repairs. Read the following material for grounding information.

In addition to the logic ground, it is important to properly connect the cable shield. The shield should be connected to earth ground, **not** logic ground.

Whether the shield should be connected to earth ground at one end of the cable or at both ends varies with each application and environment.

Earth ground may not be at the same potential at all locations in an installation. The relative potential depends on how power lines are run and the number and location of true earth ground points.
In most cases earth ground of two pieces of equipment is not at the same potential. Therefore, it is usually best to connect the shield of the twisted-pair cable to earth ground at only **one** end of the cable. This should be the end of the cable connected to the Cincinnati/DynaComp device. *(If the shield is connected at both ends when there is a potential difference a current will flow in the shield, which may introduce noise.)*

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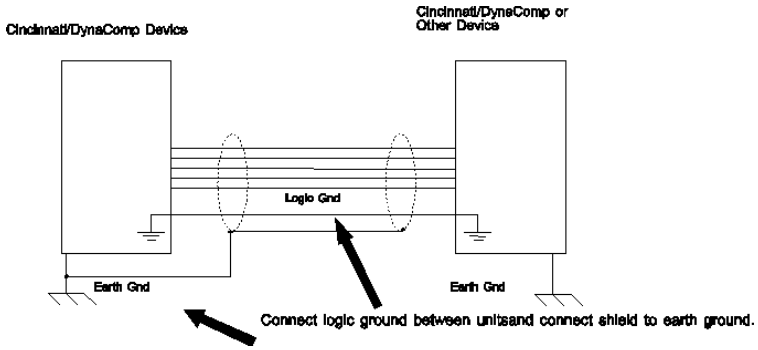
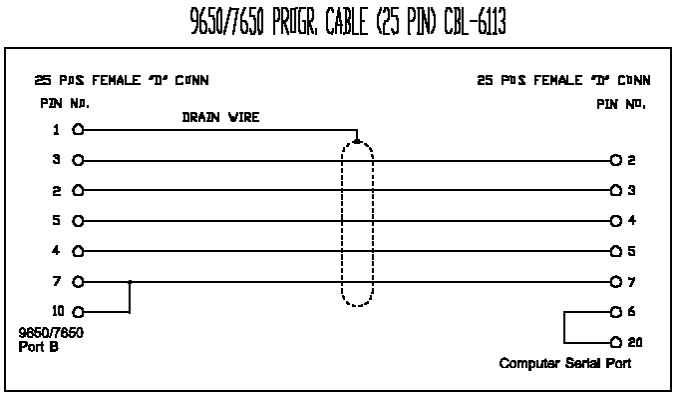


In some cases better performance is achieved when the shield of twisted-pair cable is connected to earth ground at **both** ends. However, this is advisable only if the equipment at each end of the cable is connected to earth ground which is at the same potential (most often this is not the case). *Damage to equipment may result if the potential difference is too great.*

4.5 Cables

4.5.1 CBL-6113

This programming cable can be purchased as an option. CBL-6113 is used to connect the "Mini" Protocol Converter's 25 pin programming port to a computer's 25 pin serial port.



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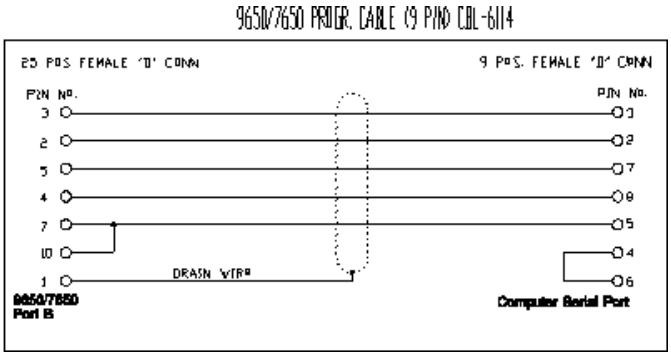
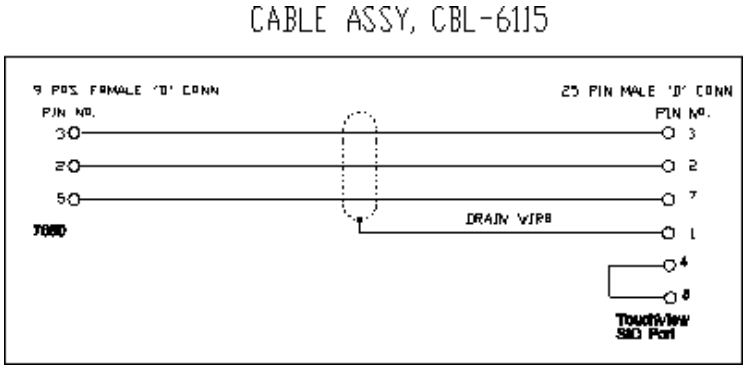
4.5.2 CBL-6114

This programming cable can be purchased as an option. CBL-6114 is used to connect the Protocol Converter's 25 pin programming port to a computer's 9 pin port.



4.5.3 CBL-6115

This cable, the "TouchView to 7650 cable," is included with the 7650 "Mini" Protocol Converter.



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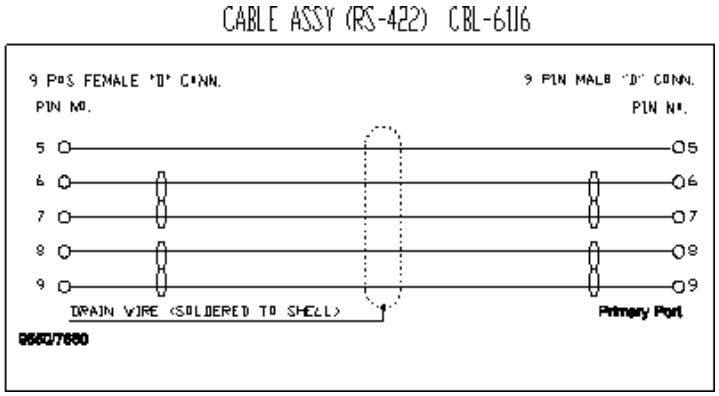
4.5.4 CBL-6116

This cable can be purchased as an option. CBL-6116 is used to connect the Protocol Converter's Series Two Port (Port A) to the primary port of a Series Two device.



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Chapter 5 - Operation

5.1 Introduction: "Mini" Protocol Converter

The "Mini" Protocol Converter is a device which acts as a translator between different PLCs and operator interface devices. This chapter describes the hardware and operational features of the "Mini" Protocol Converter.

5.1.1 Protocol Converter

The **"Mini" Protocol Converter** is capable of linking devices (networking) that communicate using different protocols. The Protocol Converter operates in Program mode, Run mode, and Bypass mode. The operating mode of the Protocol Converter is determined by the usage of the programming cables and software commands.

The Protocol Converter defaults to RUN mode. Connecting the programming cable to Port B puts the unit in Program mode. The unit cannot enter Run mode if the programming cable is connected. While there is no hardware-Bypass mode, there is a soft-Bypass mode. This mode connects the two serial ports, allowing the device attached to Port A to be programmed by the device (computer) attached to Port B. Refer to your TSP manual (Remote Programming Appendix) for further information.

- **Program Mode** In *Program* mode, configuration files may be downloaded into Protocol Converter memory.
- **Run Mode** In *Run* mode, the currently-loaded configuration is running.

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5.1.2 Programming the "Mini" Protocol Converter

The "Mini" Protocol Converter may be programmed using one of Cincinnati/DynaComp's configuration software packages. Information regarding the transfer of data between the target PLC and the Cincinnati/DynaComp device is entered and downloaded into the Protocol Converter. The 9650 is configured with Level Two or TSP 4. The 7650 is configured with TVC 2.0 or TSP 4.

5.1.3 Using the "Mini" Protocol Converter

After being programmed, the "Mini" Protocol Converter acts as a translator between a Cincinnati/DynaComp device and the PLC. A wide variety of PLCs are supported as well as Cincinnati/- DynaComp serial devices.

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5.2 Hardware Features: "Mini" Protocol Converter

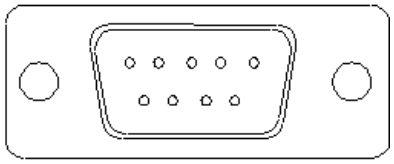
The following are hardware components of the "Mini" Protocol Converter:

5.2.1 Port A (S2/TV Port)

Port A, an RS-232 or RS-422 serial port, can be connected to Series Two devices, TouchView devices, or PLCs. The illustration below shows Port A.

If connected to a Series Two device, refer to the device manual for wiring information. If connected to the TouchView, refer to the TouchView Configuration Software manual for wiring information.

PORT A



1. + 5V
2. RS-232 RECV
3. RS-232 XMIT
4. RESERVED
5. SIGNAL GROUND
6. RS-422 XMIT +
7. RS-422 XMIT -
8. RS-422 RECV +
9. RS-422 RECV -

5.2.1.1 Series Two Network

Cincinnati/DynaComp has developed a serial communications protocol called the Series Two Protocol. The Series Two Network allows the user the flexibility of connecting up to 127 serial communication devices.

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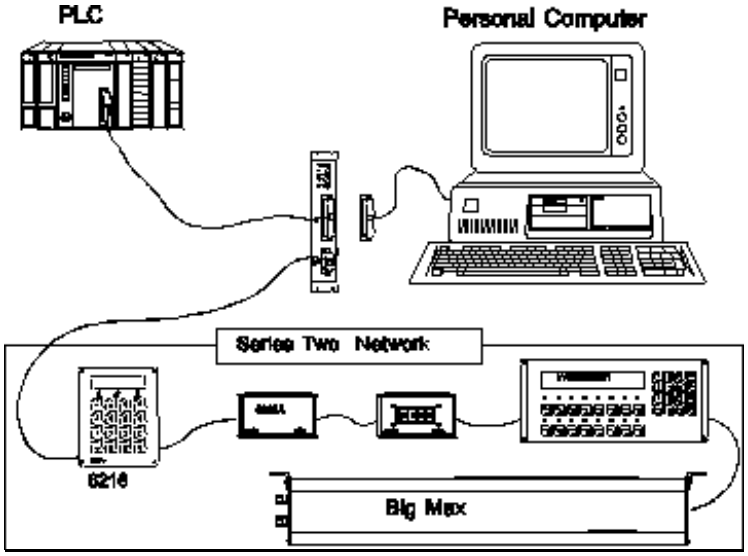
The network below demonstrates the products as they might appear in a Series Two network. This protocol allows up to 127 Series Two devices to communicate on the same RS-232 or RS-422 link. Each device has dipswitches, which are used to assign a unique address to that device. For further information concerning these dipswitches and their functions, refer to your device manual and/or the software manual.

The host of this network can be a personal computer, PLC ASCII/ BASIC module, or the Protocol Converter. If the Protocol Converter is used, the network can be connected directly to the programming port or serial port of a PLC. If you are using a Series Two product, refer to that device's instruction manual for additional wiring information. If you are using a TouchView Graphic Flat-Panel, refer to the TouchView Configuration Software manual for additional information.



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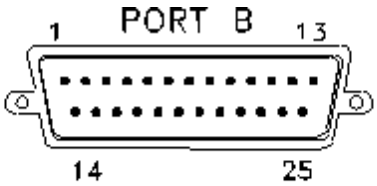
5.2.2 Port B (PLC Port)

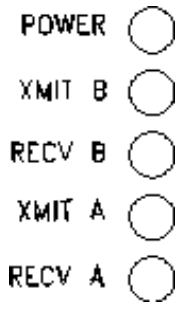
Port B may be connected to the serial port or programming port of your PLC. Cables are available from Cincinnati/DynaComp. The wiring diagram for each cable appears in the Protocol Reference Guide for that PLC. This port supports RS-232, RS-422, RS-485, or 4-20 mA current loop.



1. CHASSIS GROUND (SHIELD)	14. RS-422 RTS -
2. RS-232 TXD	15. RS-422 RTS +
3. RS-232 RXD	16. RS-422 RXD -
4. RS-232 RTS	17. RS-422 RXD +
5. RS-232 CTS	18. CURRENT LOOP RXD -
6. RS-232 DSR*	19. CURRENT LOOP RXD +
7. SIGNAL GROUND	20. RS-232 DTR*
8. UNUSED	21. RS-422 CTS -
9. +5 V	22. RS-422 CTS +
10. PROG	23. RS-422 TXD -
11. CURRENT LOOP CTS -	24. RS-422 TXD +
12. CURRENT LOOP CTS +	25. UNUSED
13. UNUSED	

* INTERNALLY TIED TOGETHER

5.2.3 LEDs



There are 5 **LEDs** located on the "Mini" Protocol Converter, two LEDs each for Port A and Port B, and 1 Power LED. The port LEDs are indicative of the ongoing activity on the communications line that is being performed by the "Mini" Protocol Converter. For each of the "Mini" Protocol Converter ports (Port A and Port B), there is a XMIT LED and a RECV LED. When lit, the XMIT LED indicates that the "Mini" Protocol Converter is transmitting data. When lit, the RECV LED indicates that the "Mini" Protocol Converter is receiving data. The Power LED indicates if the unit is turned on or off.

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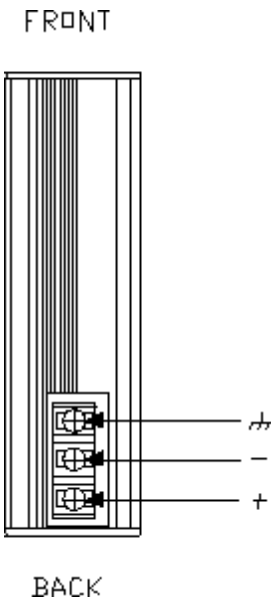
5.2.4 Power Connector

The **power connector**, shown in the illustration at the right, is located on the bottom of the "Mini" Protocol Converter. Standard units are powered by 10-30 VDC. The specifications are as follows:

0-30 VDC, 2.5 W (typical)



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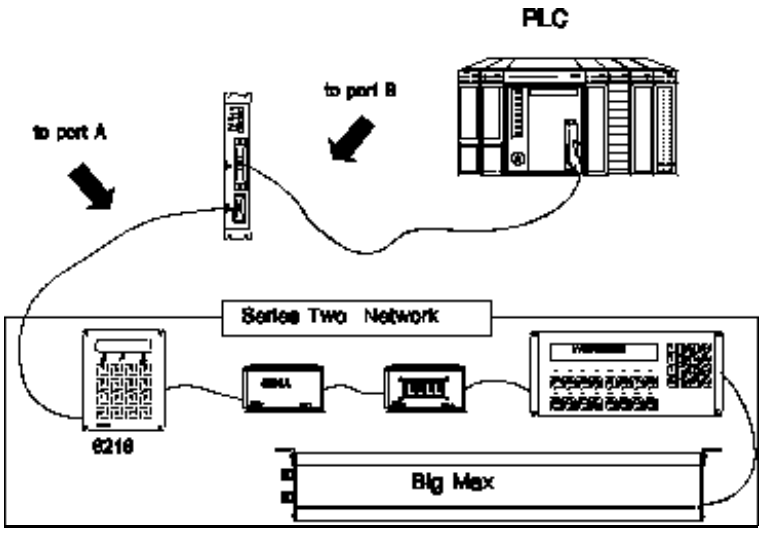
Chapter 6 - Series Two Networks



The **Protocol Converter** is a single board computer, which understands the communication protocol of the SERIES TWO network, and also understands the communication protocol of the PLC. It then acts as a translator between the PLC and the network. The **Protocol Converter** is configured to transfer data between registers in the PLC and the SERIES TWO network using Cincinnati/DynaComp software.

The **Protocol Converter** acts as the **Master** of a SERIES TWO network. It is placed between the network and your PLC.

SERIES TWO devices act as slaves. This means that a SERIES TWO device will not initiate communication with the **Master** or another slave. The SERIES TWO device will only respond to a request from the **Master**.

Communication on the network is either RS-232 or RS-422. A network can consist of 1 to 127 slaves. Each slave has an address, which is set using dip switches on the unit. Messages are then sent to the desired unit.

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6.1 SERIES TWO Ports and Repeaters

Messages that are sent to Series Two devices contain the address of the device, which the message is intended for. Each message is passed from one device to the next device on the network. In this way, every device on the network receives every message, but each responds only to messages addressed to them.

A message that is transmitted from the Protocol Converter is received at the **RECV IN** pin and is retransmitted to the next device through the **RECV OUT** pin. The device that the message is intended for then transmits its response back to the **Protocol Converter**. The response is transmitted from the **XMIT OUT** pin. If there are other SERIES TWO devices between the message recipient and the **Master**, each receives the response on their **XMIT IN** pin and retransmits it at the **XMIT OUT** pin.

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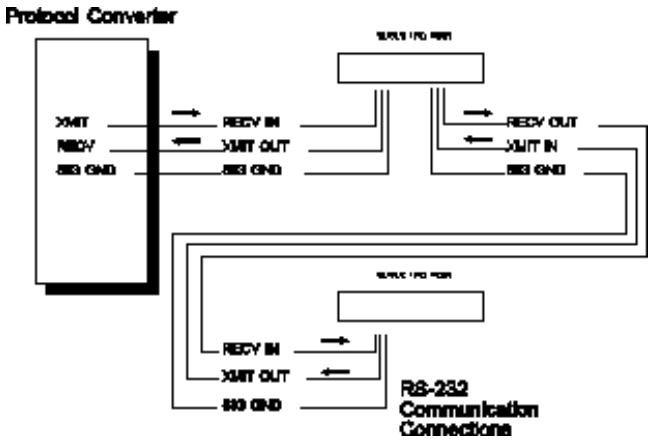
6.2 RS-232 Communication

RS-232 communications can be used on the SERIES TWO network as shown here.



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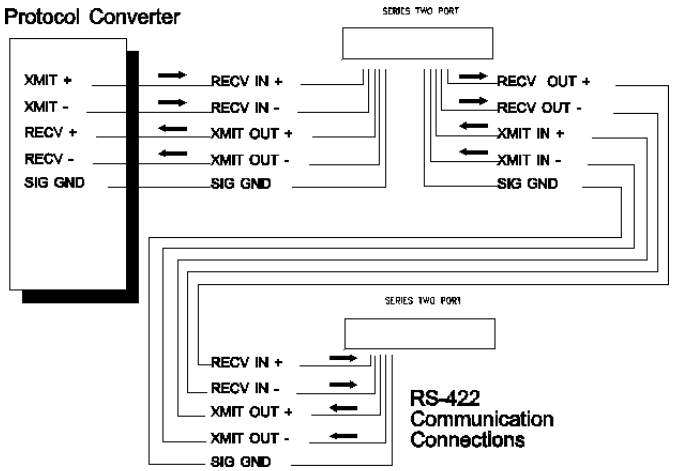
6.3 RS-422 Communication

RS-422 communications can be used on the SERIES TWO network as shown here.



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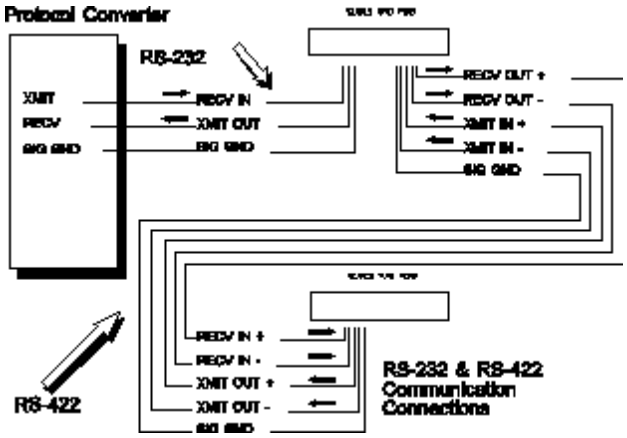
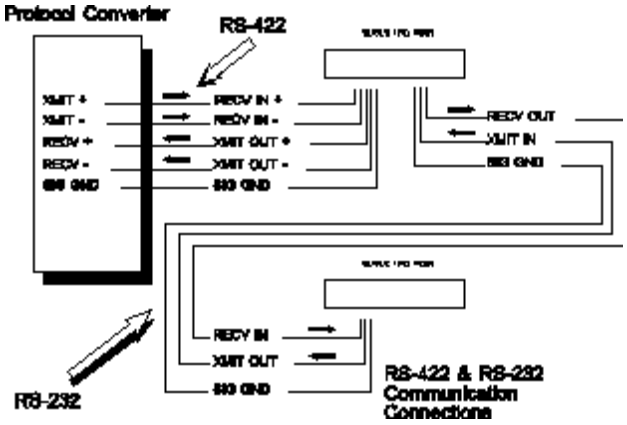
6.4 RS-232 and RS-422 Communication Combinations

Any combination of RS-232 and RS-422 communications can be used on a SERIES TWO network. The following two examples illustrate this.





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