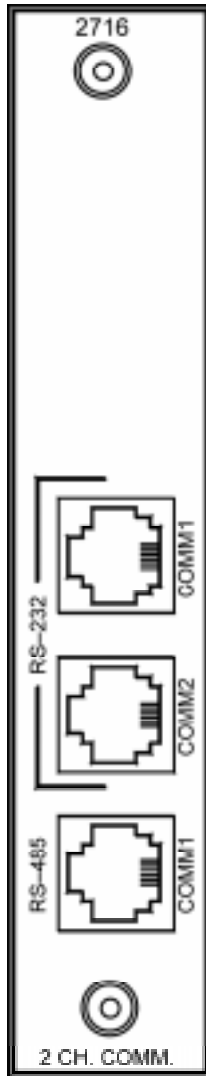


# Installation Guide



## 2716 Communications Module

For Use with 2600XM and 2700 series Automation Controllers

This document is current as of the following revision levels:

- 2716 Hardware - Rev. A
- 2716 Firmware - R1.1

This guide contains installation and applications information for the 2716RS-232 Communications Module.

The 2716 provides two RS-232 serial ports and one RS-485 port. These ports are optoisolated from the controller's logic circuitry, as well as the I/O power system for the controller. The two serial ports may be software-configured to one of six baud rates from 1200 baud to 38.4k baud. The default is 9600 baud.

This guide is divided into the following sections:

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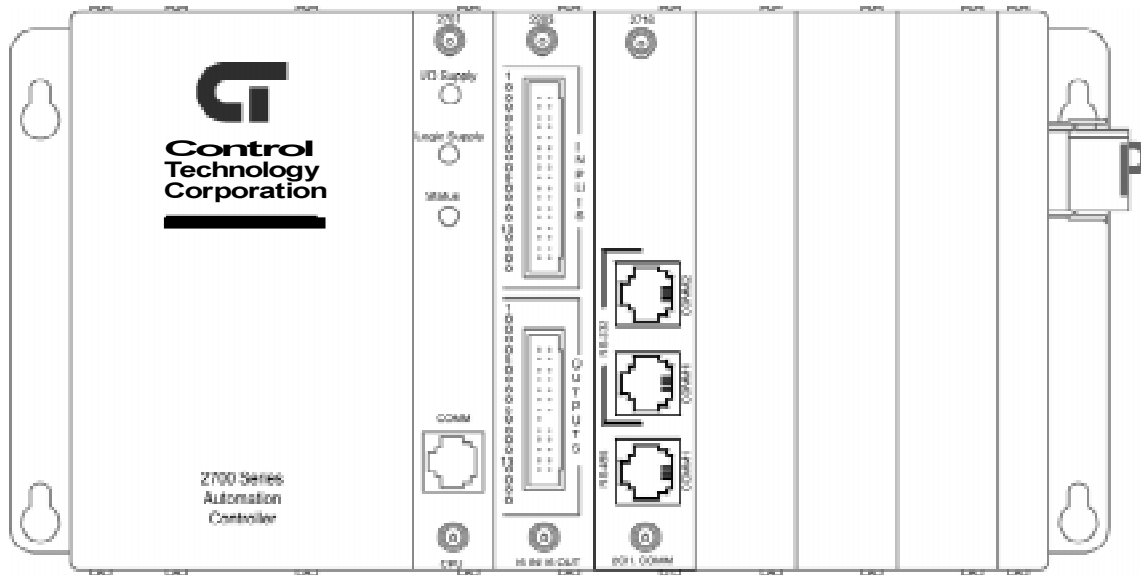
# Inserting the 2716 Module into Your Controller

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The model 2716 Communications module must be inserted into one of the slots of your automation controller. Any combination of modules may be inserted into the controller, subject to system limits. You may insert them in any order; the controller's CPU dynamically assigns motor numbers, input numbers, output numbers, etc., each time power is reapplied to the controller. These numbers are assigned from left to right across the controller. For example, from slot No. 1 to slot No. 5 in the controller shown below.

To install a module into the automation controller:

1. Insure that all A.C. and D.C. power to the controller has been removed. This includes any external supplies which may be connected to the controller.
  2. Remove the retaining screws from the top and bottom of the cover plate in the position to be used for the new module. Save these screws to re-install the new module.
  3. Slide the module into the slot, insuring that the circuit board slides into the nylon guides at top and bottom, and that the card is oriented properly (labelling should read right-side-up).
  4. Press the module firmly into the controller; when properly seated, the faceplate of the module should be flush with the adjacent sheet metal surface.
  5. Reinstall the retaining screws in the top and bottom of the new module.
- 



# Board Handling Precautions

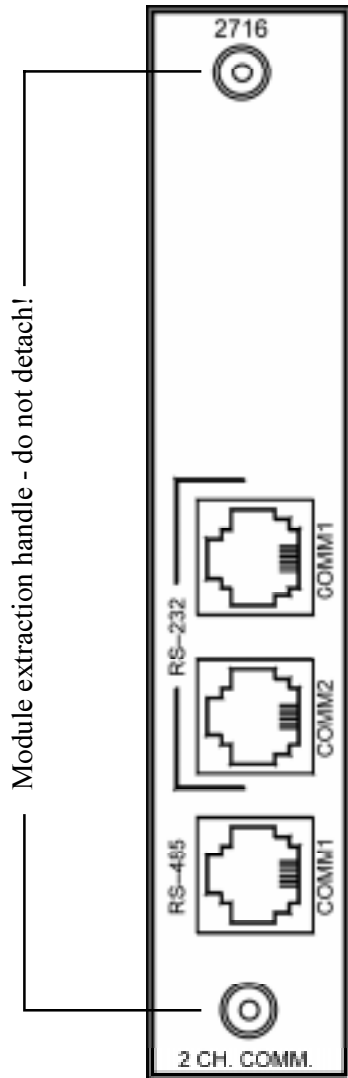
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The module's printed circuit board contains electrostatic discharge sensitive (ESD) devices. Improper handling could result in damage to the board. The following precautions are recommended when handling the board or before inserting it into the controller:

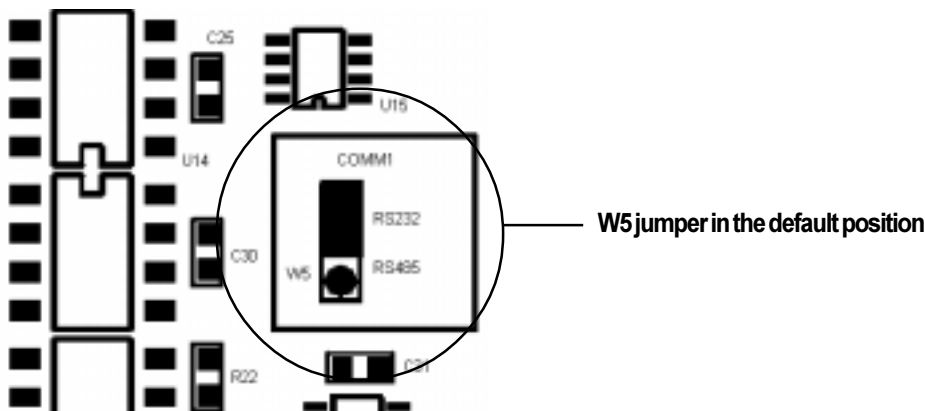
- Make sure you are grounded electrically by either using a wrist strap connected to an electrically grounded workstation or by physically touching the controller case or something electrically connected to the controller case.
- Avoid touching the leads or contacts of the circuit board and handle the board by its edges only.
- Transport circuit boards in protective, anti-static bags, bins or totes. Do not insert boards into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap, or plastic trays.

# 2716 Communications Ports



**RS-232 channels 1 and 2:** These channels use the same modular jack format as the controller's on-board port. These connections are compatible with CTC's 2881 - 2883 communications cables as well as the cable supplied with your Quickstep™ software.

**RS-485 channel:** This port is configured for half-duplex operation. It becomes active when the W5 jumper is in the RS-485 position. The RS-485 port then becomes the COMM 1 port on the module.



# Specifications

<b>Absolute Maximum Ratings</b>		<b>Min</b>	<b>Max</b>	
Ambient temperature				
Operating		0	+50	°C
Storage		-20	+80	°C
<b>RS-232 Operating Characteristics</b>		<b>Min</b>	<b>Typ</b>	<b>Max</b>
RS-232 transmitters			+9	+12 VDC
RS-232 receivers		+3		+12 VDC
Common mode voltage range		-10.0		+10.0 VDC
<b>RS-485 Operating Characteristics</b>		<b>Min</b>	<b>Typ</b>	<b>Max</b>
RS-485 common mode rejection		-7		+12 VDC
RS-485 hysteresis			70	mVDC
Combined impedance is less than 1 RS-485 load, up to 32 devices on a Bus				
<b>Power Supply Requirements ( from controller)</b>		<b>Typ</b>	<b>Max</b>	
Logic supply (5 volt from controller)		320	360	mA
Auxiliary supply (24 volt from 24 volt bus)		0	0	mA

**Note:** Specifications shown above are at 25° C, unless otherwise noted.

# Port Addressing

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## RS-232 Communications

Each communications port is designed to function independently and is automatically serviced on an interrupt basis. Quickstep program activity will in no way cause adverse effects to data integrity. CTC's communications protocols or DLLs may be used on any port in the controller from a host computer or intelligent host terminal making connection and interface simple.

## Configuring RS-232 and RS-485 ports

Both the RS-232 and RS-485 ports may be configured to act as a host using currently supported message transmitting and receiving conventions. See the register reference list available on CTC's Web site. To select a port for host communications you must store the port number to register 12000 prior to accessing any of the communications registers. The controller's on-board port is port No. 0. The first and second ports in the controller's rack are ports 1 and 2. Up to eleven ports are supported by the 2600XM and 2700 controller series.

Example:

```
store 2 to Reg_12000 (select the second communications port in the controller)
store 10 to Reg_12001 (send row 10 of the data table out the communications port)
if Reg_12000 = 0 got next (testing to see if port is busy or not)
```

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**NOTE:** Register 12000 has different meanings when reading and writing to it.

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# Computer Based Programming and Communications

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## RS-232 Protocols

The RS-232 ports on the model 2716 provide a means for downloading Quickstep programs and data communications support. The model 2716 is equipped with built-in protocols that allow direct computer communications with RS-232 ports. These protocols allow an external computer to directly interact with many of the controller's resources, such as registers, inputs and outputs, flags. The *CTC 32-bit Data Communications Functions Reference Guide* available in the customer area of our website describes these protocols. The 2716 can also be configured to act as a host to support communications with other external peripherals such as operation interface terminals, bar-code readers, printers, and other controllers.

## RS-232 Connections

Connections to the module's RS-232 port is made via a modular jack on the module either, COMM 1 or COMM 2. This jack carries the receive signal, two commons (ground), and the transmit signal for the communications channel. The pin connection diagram illustrates the wiring of the jack. Only the center four connectors of a six- or eight-conductor jack are used.

A series of standard CTC cables are available for making connections to this jack. See the illustrations below and on the following page. As an alternative, many commonly-available telephone cables may be substituted.

**NOTE:** Do not connect the controller to a telephone line.

Modular jack  
pin connections

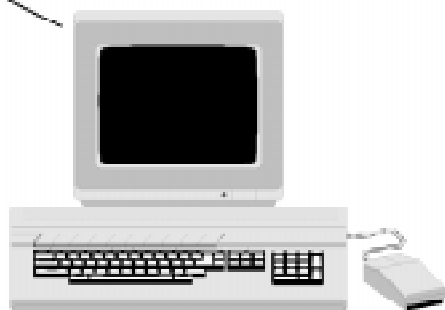


- 2 - TxD outbound
- 3 - Ground
- 4 - Ground
- 5 - RxD inbound

## Connecting to a D Connector

RS-232 ports on computers are frequently brought out through 25- or 9-pin D type connectors. There is a standard for wiring such connectors followed by most PC manufacturers.

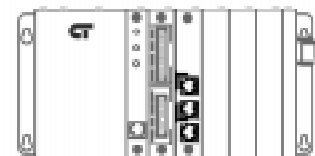
Personal computer with RS-232  
asynchronous communications board



Communications cable:  
Model 2881 - 5 feet  
Model 2882 - 15 feet  
Model 2883 - 25 feet



D-connector to modular Jack adapter:  
Model 2880A for 25-pin D-connectors  
Model 2880B for 9-pin D-connectors



2716 COMM ports

**RS-485 Connections**

Connections to the module's RS-485 port is made via a modular jack on the module labeled COMM 1. This jack carries the receive signal and the transmit signal for the communications channel (half duplex communications). The pin connection diagram illustrates the wiring of the jack. Only the center two connectors of a six- or eight-conductor jack are used.

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**Modular jack  
pin connections**



- 1 - NC
  - 2 - NC
  - 3 - T/R +
  - 4 - T/R -
  - 5 - NC
  - 6 - NC
-