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Installation Guide
for the model 2216
RS-232 Communications Module

(for use with Model 2600XM series Automation Controllers)

This document is current as of the following revision levels:	
Controller Firmware	R2.0
Controller Hardware	C
Board Hardware	A

This guide is intended to assist in the proper installation and use of the model 2216 Dual channel RS-232 communications model. This module provides two independent ports supporting all current CTC protocols.

The model 2216 when plugged into a 2600XM controller has a variety of uses including: program downloading and diagnostic functions, data acquisition from host computers, operator interfacing, print reporting and interface to other intelligent devices such as bar-code readers, temperature controllers, etc..

This guide provides installation and connection information.

PRELIMINARY

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Installation and Connection Information

The model 2216 communications module must be inserted into one of the slots of a model 2600XM(-10) Automation Controller. Any combination of modules may be inserted into the controller, and they may be inserted in any order; the controller's CPU will dynamically assign 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 (from slot #1 to slot #X).

To install a module into the model 2600XM:

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. It is best to also remove the A.C. line cord from the side of 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 in the new module.

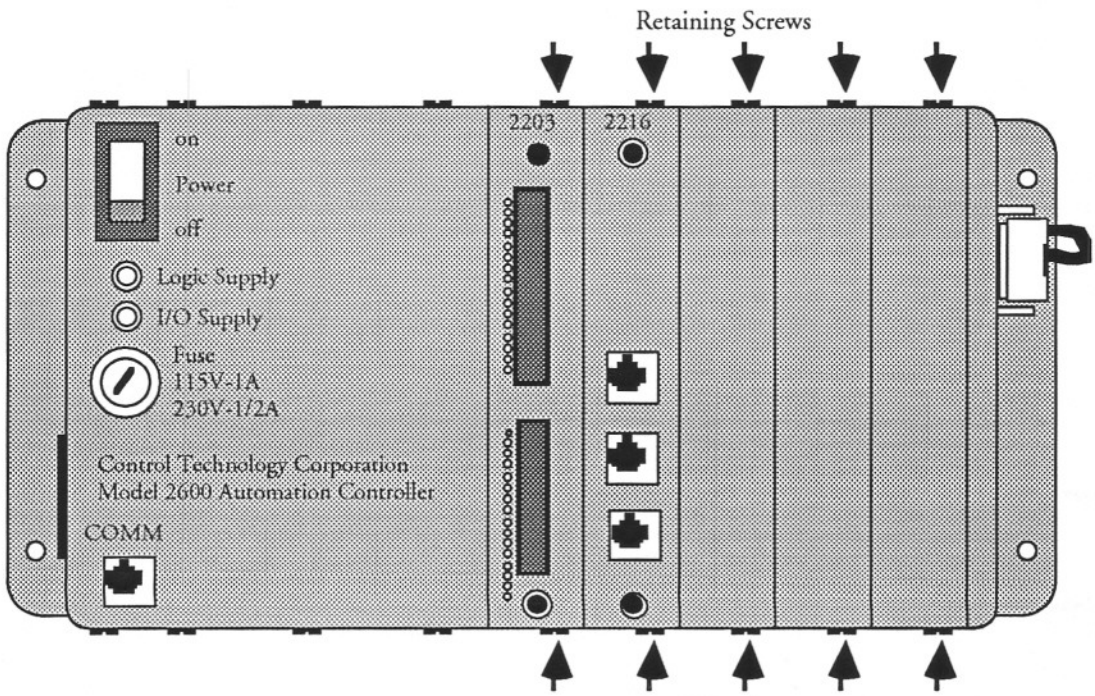
3. Slide the module into the slot, insuring that the circuit board slides into the nylon guides at top and bottom, and that the card is oriented properly (labelling should read right-side-up!).

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.

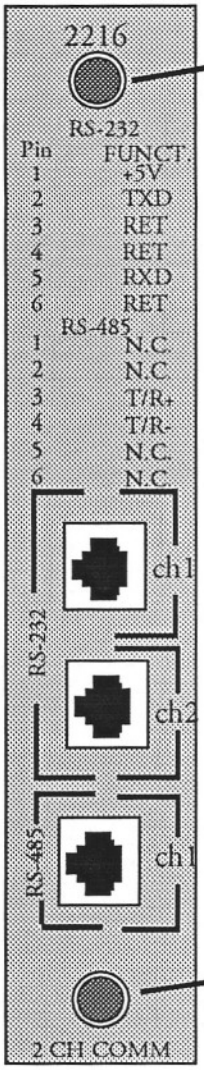
5. Reinstall the retaining screws in the top and bottom of the new module.

Model 2600XM Automation Controller

Shown with a model 2216 communications module in the second position.



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Module Extraction Handle - do not detach!

RS-232 Channels #1 and #2 using the same modular jack format as the controller's on-board port. These connections are compatible with CTC's 2881-2883 communications cables and of course the cable supplied with Quickstep™.

(At this time, RS-485 communications is not supported)

Another Module Extraction Handle - do not detach!

Front View - Model 2216 RS-232 Communications Module

Addressing

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 ASCII and binary protocols may be used on any port in the controller from a host computer or intelligent host terminal making connection and interface simple.

Any port may also be configured to act as a host using currently supported message transmitting and receiving conventions (see register list located in 2600XM controller installation guide). To select a port for host communications you must store the port number to register #12000 prior to accessing any of the communications registers where the controller's on-board port is port #0, the first and second ports in the controller's rack are #1 and #2, respectively. Up to sixteen ports are supported within the 2600XM controller series.

EXAMPLE:
store 2 to reg#12000 (select the second comm port in the controller)
store 10 to reg#12001 (send row 10 of the data table out selected comm port)
if reg#12000 = 0 goto next (testing for port to be unbusy)

Note: Register #12000 has different meanings from writing to reading.

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Computer-based Programming and Communications

The RS-232 ports on the model 2216 provide a means for both programming and data communications. CTC's personal-computer-based programming software "Quickstep™" allows programs to be quickly written, stored on disk, and ultimately downloaded into a model 2600XM Automation Controller. This software package also provides a comprehensive diagnostic capability, allowing you to monitor or modify the controller's internal registers, flags, I/O, etc., in real time while your program is executing.

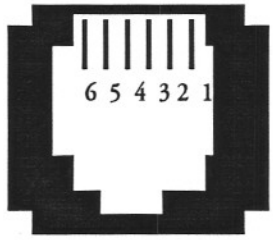
The model 2216 is equipped with built-in protocols allowing direct computer communications with the controller's RS-232 port. This protocol, described fully in CTC's "A Guide to CTC Serial Data Communications", allows an external computer to directly interact with many of the controller's resources (i.e.; counters, registers, I/O, flags, etc.), without modifying the controller's program. The 2216 can also be configured to support communications to other external peripherals such as operator interface terminals, bar-code readers, printers, other controllers, etc., acting as a host.

RS-232 Connections

Connection to the 2216's RS-232 ports are made via modular jack on the front of the module (labeled "ch1" and "ch2"). These jacks each carry the "receive" signal, two grounds and the "transmit" signal for communications. The "Pin Connection" diagram on this page illustrates the wiring of the jacks; note that the center four conductors of a six-conductor jack are used.

A series of standard CTC cables are available for making connection to these jacks, as shown in the diagram below. As an alternative, many commonly-available telephone cables may be substituted – do NOT, however, connect the controller to a telephone line.

Connecting to a "D" Connector



1 - +5 Volts DC
2 - TxD (outbound)
3 - Common
4 - Common
5 - RxD (inbound)
6 - Ground

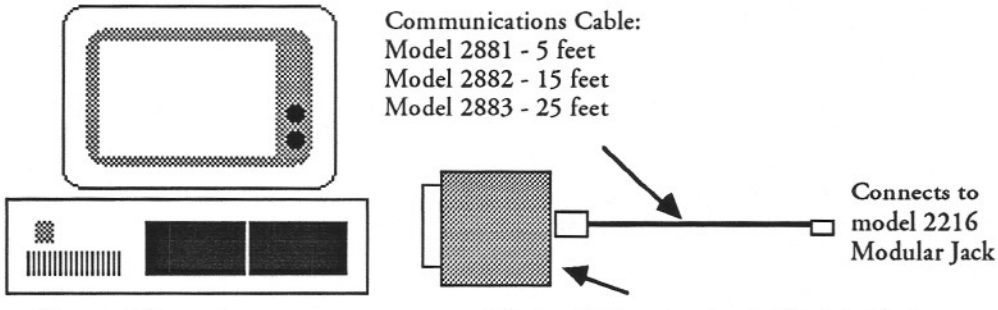
Modular Jack Pin Connections

End View

RS-232 ports on computers are frequently brought out through 25-pin or 9-pin "D" type connectors. There is a standard for wiring such connectors, followed by IBM® and many other PC manufacturers.

CTC has adapters available, the model 2880A or -B, which will connect directly to a male 25-pin (-A version) or 9-pin (-B version) "D" connector, and which provides a modular jack wired for compatibility with the model 2216 COMM ports. To be fully compatible when using this adapter, the computer's communications port should be wired as a "DTE" device (i.e.; pin 2 = TxD, pin 3 = RxD, pin 7 = Ground).

Wiring Aids for Connection of Personal Computer to RS-232 "COMM" Connector on model 2216



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2216 Specifications

Absolute Maximum Ratings	Min.	Max.	Units
Current draw from on-board +5V Supply		250	mA D.C.
Temperature:			°C
Operating		+50	°C
Storage	-20	+80	

Operating Characteristics	Min.	Typ.	Max.	Units
RS-232 Transmiters		±9	±12	VDC
RS-232 Receivers	±3		±12	VDC
Power Supply requirements from controller:				
+5 Volts D.C.		185	250	mA
+24 Volts D.C.		85	170	mA

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