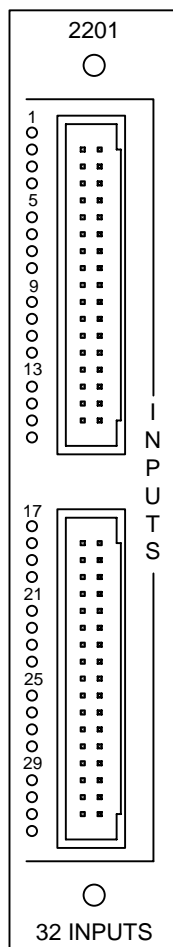


Model 2201 32-Channel Input Module Installation Guide



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Notes to Readers

The *Model 2201 Installation Guide* provides the following information:

- System Overview -- describes the 2201's basic features.
- Description and Connection Diagrams -- an overview of the 2201's basic functions; pinout diagrams for its input connectors.
- Specifications -- general specifications; hardware and firmware revision levels.
- Board Handling Precautions-- contains general guidelines on handling printed circuit boards with ESD devices.
- Installation -- describes how to install the 2201 module in a CTC controller.
- Applications Guide -- contains technical information on the 2201's input features.


Related Documents

The following documents contain additional information:

- For information on Quickstep, refer to the *Quickstep™ Language and Programming Guide* or the *Quickstep™ User Guide*.
- For information on the registers in your controller, refer to the *Register Reference Guide* (available at www.ctc-control.com).
- For information on Microsoft Windows or your PC, refer to the manuals provided by the vendor.

Formatting Conventions

The following conventions are used in this book:

ALL CAPS BOLDFACE	Identifies DOS, Windows, and installation program names.
Boldface	Indicates information you must enter, an action you must perform, or a selection you can make on a dialog box or menu.
<i>Italics</i>	Indicates a word requiring an appropriate substitution. For example, replace <i>filename</i> with an actual file name.
Text_Connected_With_Underlines	Indicates symbolic names used in Quickstep programs. Step Names are ALL_CAPITALS. Other symbolic names can be Initial_Capitals or lower_case.
SMALL CAPS	Identifies the name of Quickstep instructions in text.
Courier font	Identifies step names, comments, output changes, and Quickstep instructions appearing in the Quickstep editor.
Art Code 	Identifies the file name of a particular graphic image.

Contacting Control Technology Corporation

Control Technology Corporation is located in Massachusetts. Our business hours are 8:30 AM to 5:00 PM. EST (Eastern Standard Time).

Contact Method	Address or Number
E-Mail:	
Technical Support:	help@ctc-control.com
Technical Publications:	techpubs@ctc-control.com
Website:	www.ctc-control.com
Telephone:	508.435.9595 and 800.282.5008
FAX:	508.435.2373
Mail:	Control Technology Corporation 25 South Street Hopkinton, MA 01748

Your Comments

Suggestions and comments about this or any other Control Tech document can be e-mailed to the Technical Publications Group at techpubs@ctc-control.com.

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System Overview

The Model 2201 input module has 32 digital input channels. Self-powered inputs make it easy to interface with many types of sensors. The controller's +24 V supply is available on each channel for output devices and electronic sensors used on the 2201's inputs. Each channel also has an independent LED status indicator that simplifies troubleshooting and setup.

Self-Powered Inputs

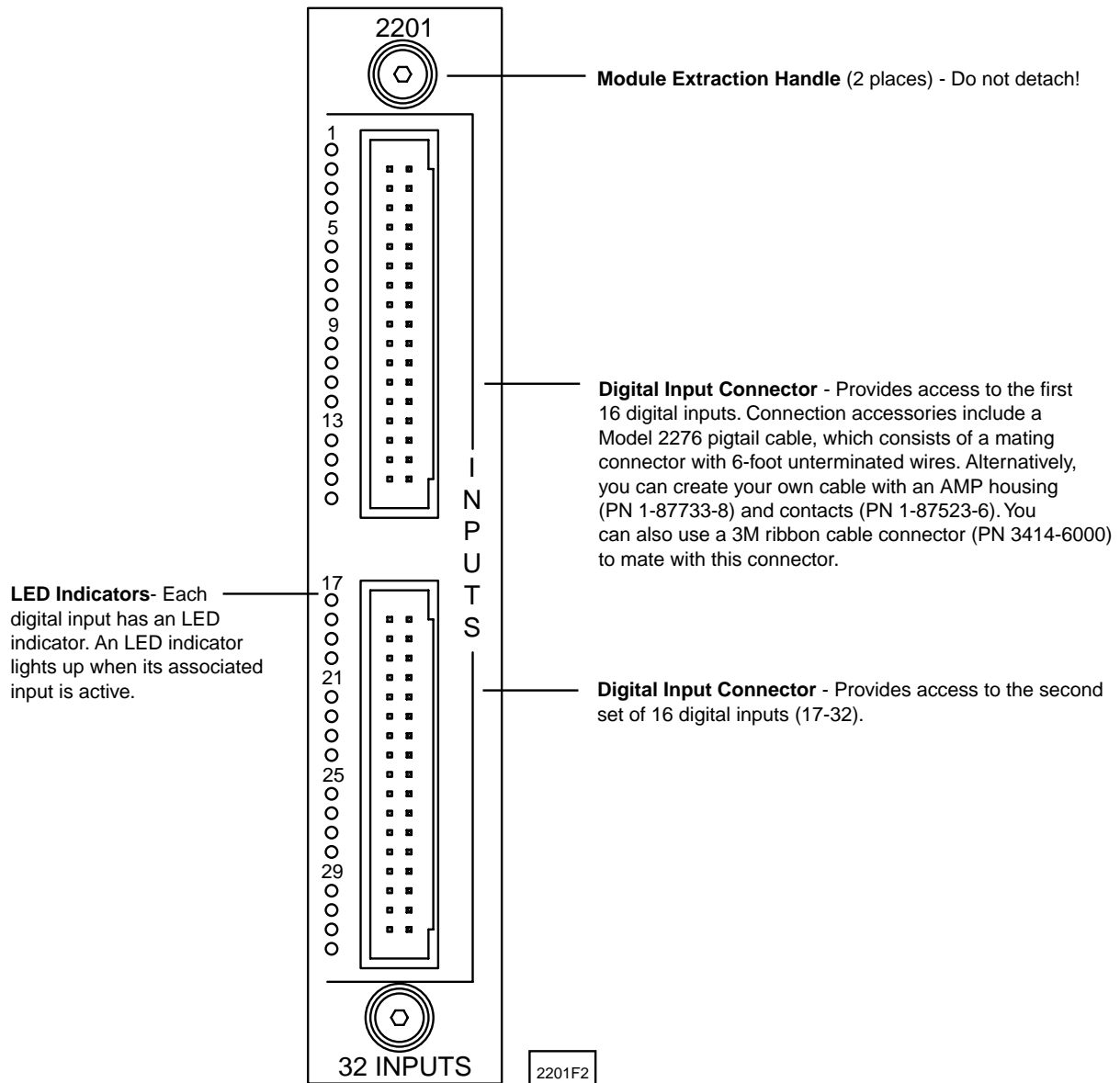
The module's 32 input channels are self-powered. Each input is resistively pulled-up to the controller's 24V supply and is activated by an external switch closure to the common for this supply. This feature allows easy connection to such components as Hall-effect sensors, proximity sensors, limit switches, manual switches, photo-optics, and similar input devices.

The module's design ensures reliable operation in severe applications. Each input's 24 V signal level avoids problems with contact contamination in industrial environments. Complete opto-isolation is used between the inputs and the controller's logic circuitry, which results in a high degree of immunity to electrical noise.

2201 Description

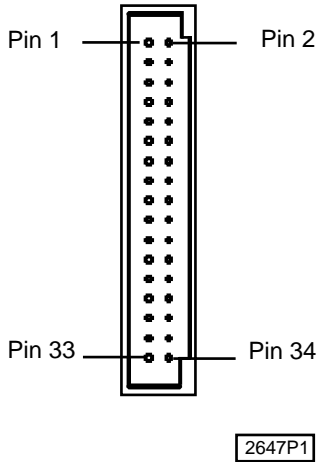
Figure 1 shows the 2201's faceplate and describes its different features.

Figure 1. 2201 Faceplate and Features



2201 Connection Diagrams

Table 1. Connection Diagram - Digital Input Connector

Digital Input Connector	Pin #	Signal	Pin #	Signal
	1	Input 1 (17)	2	Return
	3	Input 2 (18)	4	Return
	5	Input 3 (19)	6	Return
	7	Input 4 (20)	8	Return
	9	Input 5 (21)	10	Return
	11	Input 6 (22)	12	Return
	13	Input 7 (23)	14	Return
	15	Input 8 (24)	16	Return
	17	Input 9 (25)	18	Return
	19	Input 10 (26)	20	Return
	21	Input 11 (27)	22	Return
	23	Input 12 (28)	24	Return
	25	Input 13 (29)	26	Return
	27	Input 14 (30)	28	Return
	29	Input 15 (31)	30	Return
	31	Input 16 (32)	32	Return
33	+24 VDC	34	Return	

Specifications

Table 2. General Specifications

Description	Min.	Typical	Max.	Units
Absolute Maximum Ratings				
Ambient Temperature				
Operating	0		+50	°C
Storage	-20		+80	°C
Applied input voltage ¹	0		27.0	VDC
Operating Characteristics				
Input off voltage ($I_i = 0$ mA)		24.0	26.0	VDC
Input on current ($V_i = 0$ V)		-2.10	-2.85	mA
Input on current threshold ($V_i = 11$ V typical)		-1.0	-1.85	mA
Input off current (typical leakage current allowable)			-250	µA DC
Power Requirements (from controller) ²				
Logic supply (5 VDC)	125		150	mA
Auxiliary supply (24 VDC)	90		120	mA
<ol style="list-style-type: none"> Under normal operation, no external input voltage is applied. Inputs should be externally switched to the input common. Power requirements are worst-case; all inputs are activated. Specifications are at 25°C unless otherwise specified. 				

Table 3. Hardware / Firmware Revision Levels

Model Numbers	Hardware Revision Level	Firmware Revision Level ^{1 2}
2201	0	N/A
2200 Series	0	1.0
2600 Series	C	1.0
2700 Series	C	2.10
<ol style="list-style-type: none"> You can confirm firmware revision levels by doing a register read in Quickstep's monitor program. Use register 13003 to confirm the firmware revision in a 2600/2700 series controller. Firmware revision levels are not equivalent to standard decimal numbers. For example, firmware revision level 2.10 translates to: Major Revision Level 2 Major Revision Level 10 If this value changes to 2.20, it translates to : Major Revision Level 2 Major Revision Level 20 (not revision level 2) 		

Board Handling Precautions

The module's printed circuit board contains electrostatic discharge sensitive (ESD) devices. Improper board 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 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.

Installing the 2201 Module

The module fits into one of the slots of your automation controller (Figure 1). You can insert any combination of modules into the controller (subject to system limits) and can install them in any order. This is possible because the controller's CPU dynamically assigns such items as motor numbers, input numbers, and output numbers each time power is re-applied to the controller. These numbers are assigned from left-to-right across the controller. To install a module into the automation controller:

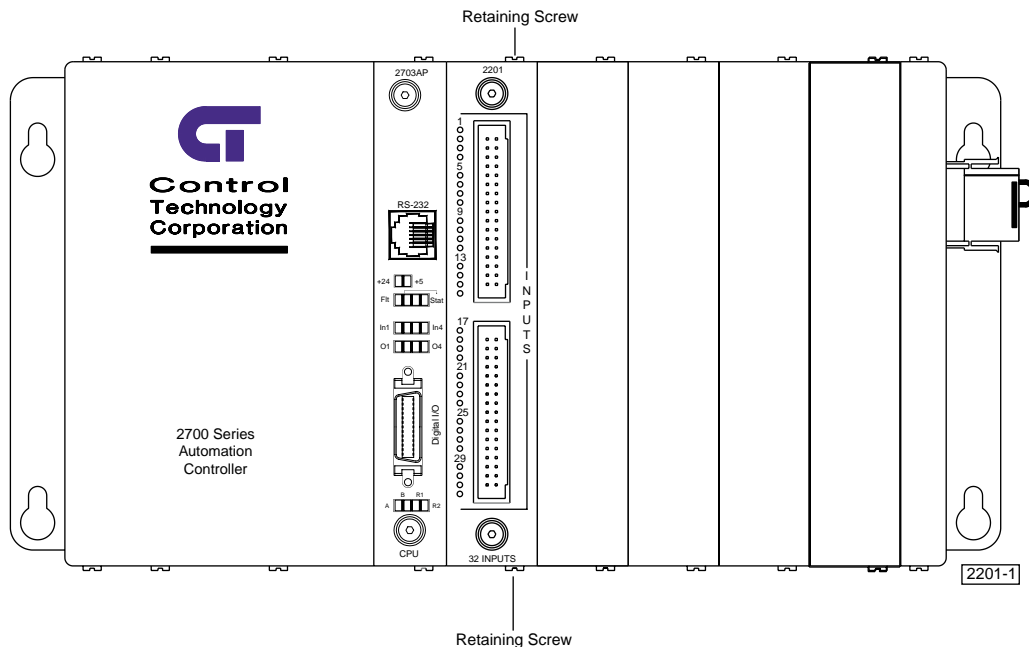


Note

Retain all hardware removed during this procedure.

1. Remove all AC and DC power, including any external supplies connected to the controller.
2. Locate an unused slot and remove two retaining screws from the top and bottom of its cover plate.
3. Slide the module into the slot and make sure that the circuit board slides into the nylon guides at the top and bottom of the controller case. Make sure that the card is oriented properly so that its labels are right-side-up.
4. Press the module firmly into the controller. Make sure that the module's faceplate is flush with the adjacent sheet metal surface.
5. Re-install two retaining screws in the top and bottom of the new module.

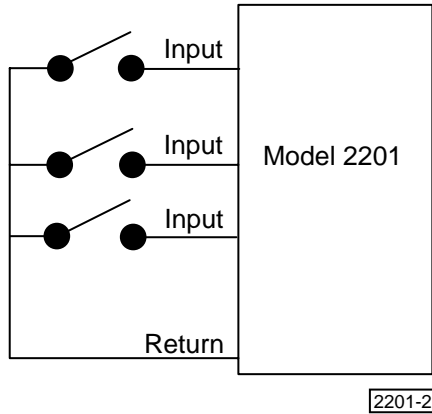
Figure 1. 2700 Series Controller with the 2201 module installed in the right-hand slot



Connecting a Digital Input

The Model 2201 has 32 digital inputs that you can activate with a switch closure (Figure 2) to **Return** (the common for the controller's 24 V supply). Each input is opto-isolated from the controller's logic circuitry and is internally self-powered by the 24 V supply through a current-limiting resistor.

Figure 2. Digital Input Activation



The controller senses when an input is pulled down to **Return** by a switch closure. A **MONITOR** instruction or any other programmed instruction referring to a general purpose input can use this information.

Using Solid-State Sensors

You can connect many types of electronic sensors such as three-wire Hall-effect sensors, proximity sensors, and phototransistors to the inputs without any additional circuitry. These devices must have sinking type open-collector outputs (NPN) and must be able to withstand at least +24 V on their output terminals when they are in the OFF state. The sensor must also be able to sink the required input current (i.e.- 2.1 mA) when ON.



Note

Do not use two-wire, solid-state sensors.

Electronic sensors have internal circuitry that generally requires an external power source. However, if the desired sensor has voltage requirements that equal the controller's built-in auxiliary supply (24 V), you can use the controller directly and do not need an external supply. Figure 3 shows how to connect a solid-state sensor to a digital input.

Figure 3. Connecting a Solid-State Sensor to a Digital Input

