



V Series Controller Installation Instructions

Use these installation instructions to install a V Series Controller. The controller allows the V Series electronics to be separate from a door's locking mechanism and to be located up to 500 feet away from the locking mechanism. The controller provides V Series electronic features for use with electrically-controlled locking devices.

The controller is well-suited to provide access control for:

- exit devices
- glass doors
- non-standard doors
- turnstiles
- doors controlled by electric strikes or magnetic locks
- electrically-operated mortise or cylindrical locks.

The controller is suitable for use with interior or exterior doors. The controller has an adaptable power supply input that accepts 12 to 24 volts AC or DC. A backup battery supports the controller's programming in the event of a power failure. All controller functions are shut down while under backup power.

The main role of the controller is to control the operation of the locking device connected to the controller. A reader can be connected to the controller to provide a means for users to access the door controlled by the controller.

Figure 2 shows the relationship between the controller and the other possible components in the access control system for the door.

The controller can accept a request-to-exit signal from a lock or a separate request-to-exit device, such as a button, can be connected to the controller. When someone turns a door knob with a request-to-exit feature, or presses a request-to-exit button, the controller does not trigger an alarm when the door is opened. If the controller is programmed for the RQE unlock feature, the controller also unlocks the door.

A remote unlock device, such as a button, can be connected to a controller. This device can be located away from the door. When someone, such as a receptionist, presses the remote unlock button, the controller unlocks the door if programmed for the remote unlock feature.

The controller can monitor the door's status. If the door is opened without use of a valid access method, the controller can trigger a door forced alarm. The controller can monitor whether the door has been open too long. The controller also can supervise a tamper switch, which can be used to protect the controller enclosure or another device. The controller's alarm output can trigger an external alerting device, such as a siren or strobe light, or a security system.

Installation overview

Caution: To prevent damage, always wear a properly grounded electrostatic discharge (ESD) wrist strap when installing the controller.

1 Prepare to mount the enclosure

- a Unpackage the controller.
- b Check that you have the following components, in addition to these instructions:
 - ▲ enclosure with circuit boards and battery pack installed
 - ▲ magnetic stripe reader (optional)
 - ▲ keypad reader with *V Series Keypad Security Device Programming Guide* (optional)
 - ▲ proximity reader (optional)

- ▲ remote RS-232 connector (optional)
 - ▲ temporary access cards (for magnetic stripe and proximity readers only)
 - ▲ *V Series Controller Enclosure Drilling Template (V05)*.
- c Read these instructions carefully before you begin installation.

Note: *Wire gauge and length requirements for each device to be connected to the controller are included in Figure 1.*
 - d Reference the V05 template to select a location for the controller enclosure. Get four mounting screws suitable for the selected mounting surface.
 - e If you are running cables to the enclosure through the wall or ceiling, drill any necessary cable entry holes for the cables.
 - f Run all necessary cables to the selected mounting location.

2 Mount the enclosure

- a Referencing the V05 template, install the four mounting screws for the enclosure. Do not tighten the screws completely.
- b If you ran cables through the wall or ceiling to the enclosure, hold the enclosure near the selected mounting location and feed the cables through the appropriate cable entry holes into the enclosure.

Note: *In addition to the cable entry hole in the back of the enclosure above the controller board, there are cable entry holes in the sides, top, and bottom of the enclosure.*
- c With the enclosure door removed, hang the enclosure on the four mounting screws and slide it into position so that the screws are in the narrow part of the keyhole-shaped mounting holes. Then, tighten the mounting screws.

3 Connect devices to the controller board

You can connect the devices listed below to the controller board. Refer to Table 1 and to Figure 1.

- **Locking device.** Use the locking device output. Set the locking device jumper (J1).
- **Magnetic stripe or proximity card reader or keypad reader (optional).** Use the reader output, reader communications input, and reader power output. Set DIP switches 1, 2, 3, 4, and 5. Also, set the power jumper (J3).

Note: *Standard readers are the Mercury Security, MR-5 (magnetic stripe card reader), the Essex KTP-71212XX (keypad reader), the Motorola ASR603, and the HID MB-5398 (proximity readers). To determine whether another reader is compatible with the controller, refer to the specifications provided in Table 1 for the reader output, reader communications input, and reader power output.*
- **Door status switch and/or door latch monitor (optional).** Use the door status/latch monitor input.
- **Request-to-exit device (optional).** Use the request-to-exit input.
- **Remote unlock device (optional).** Use the remote unlock input.
- **Tamper switch (optional).** Use the tamper switch input.
- **Security system or alerting device (optional).** Use the alarm output.
- **Remote RS-232 connector (optional).** Use the controller board's RS-232 connector.
- **Shielding & grounding.** Connect all cable shielding to the grounding screw located to the right of the circuit board. Then connect the grounding screw connection to earth ground.

Table 1—Controller inputs and outputs

Input/output	Description	Related DIP switches, jumpers, and programming tasks																				
Backup battery input	Input for the 4.8 volt nicad battery pack. In the event of a power failure, the battery pack temporarily powers the micro-processor until it can properly shut down.	Before you install the controller, we recommend you charge the backup battery pack in the controller for at least 48 hours.																				
	<p>Note: When changing batteries, dispose of old batteries in accordance with all federal, state, and local regulations.</p> <p>Caution: After a power interruption, the backup battery pack may require 48 hours to recharge. If another power interruption occurs within 48 hours, the controller might lose its programming.</p>																					
Power input two (2) terminals (Polarity does not matter.)	Input for a 12 to 24 volts AC or DC at 0.75 amp power supply. Caution: To prevent damage and injury, connect the power supply after all other connections have been made.	None																				
Alarm output NC terminal NO terminal COM terminal	Relay output that can be used to signal a security system or activate an alarm input for an alerting device such as a siren, bell, or strobe light. This output can switch up to 1 amp at 24 volts AC or DC. This output is triggered by door open too long (DOTL), tamper, or door forced conditions.	Program the alarm output duration. For instructions, see the <i>V Series Intelligent Programmer Software User Manual</i> .																				
Locking device output NC terminal NO terminal COM terminal	Relay output used to unlock or lock an external locking device. This output can switch up to 5 amps at 24 volts AC or DC. To determine which terminals to use, consider how the locking device should operate when power fails at the controller. Refer to the appropriate table below based on whether the controller and locking device share one power supply or have two separate power supplies.	Set the locking device jumper (J1). To determine which jumper setting to use, consider how the locking device should operate when power fails at the controller. Refer to the appropriate table below based on whether the controller and locking device share one power supply or have two separate power supplies.																				
	<i>Table A—Controller and locking device share one power supply</i>																					
		<table border="1"> <thead> <tr> <th rowspan="3">Terminals to use Jumper setting to use</th> <th colspan="2">During power failure at the central controller</th> </tr> <tr> <th>Locking device is fail-safe</th> <th>Locking device is fail-secure</th> </tr> </thead> <tbody> <tr> <td>NC & COM de-energized</td> <td>NO & COM de-energized</td> </tr> </tbody> </table>		Terminals to use Jumper setting to use	During power failure at the central controller		Locking device is fail-safe	Locking device is fail-secure	NC & COM de-energized	NO & COM de-energized												
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	<p>Note: A fail-safe locking device locks when power is applied, and unlocks when power is removed. A fail-secure device unlocks when power is applied, and locks when power is removed.</p>																					
Reader output RLED terminal GLED terminal SOUND terminal	Output that supplies 10 mA at 5 volts, and provides signals corresponding to the V Series Electronic Lock's green LED, red LED, and sounder. This output can be connected to the reader and used to provide visual and/or audio user feedback similar to the feedback provided by the electronic lock. For a description, see the <i>V Series Service Manual</i> . The table below shows the recommended color wiring connections for the standard readers—the Mercury Security, MR-5 (magnetic stripe card reader), the Essex KTP-71212XX (keypad reader), and the Motorola ASR603, and the HID MB-5398 (proximity readers).	Set controller DIP switch 1. Note: For readers with a single two-color LED, set DIP switch 1 ON. For readers with two separate LEDs, set DIP switch 1 OFF. The table below shows the recommended controller DIP switch settings for the standard readers—the Mercury Security, MR-5, the Essex KTP-71212XX, the Motorola ASR603, and the HID MB-5398. Reader S1 Mercury Security ON Essex OFF Motorola ON HID ON For the Mercury Security, MR-5 (magnetic stripe card reader), set DIP switch 2 on the reader itself to OFF.																				
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Table 1—Controller inputs and outputs

Input/output	Description	Related DIP switches, jumpers, and programming tasks																														
<p>Reader communications input DATA terminal STRB terminal CARDPR terminal</p>	<p>Input for an ABA signal consisting of a data signal and a strobe signal (and sometimes a card present signal).</p> <p>Note: <i>The strobe signal sometimes is called “clock.”</i></p> <p>The table below shows the wiring connections for the standard readers—the Mercury Security, MR–5, the Essex KTP–71212XX, the Motorola ASR603, and the HID MB–5398.</p> <table border="1" data-bbox="423 411 967 583"> <thead> <tr> <th>Term</th> <th>Mercury</th> <th>Essex</th> <th>Motorola</th> <th>HID</th> </tr> </thead> <tbody> <tr> <td>DATA</td> <td>Green</td> <td>Green</td> <td>Green</td> <td>Green</td> </tr> <tr> <td>STRB</td> <td>White</td> <td>Red</td> <td>White</td> <td>White</td> </tr> <tr> <td>CARDPR</td> <td>None</td> <td>None</td> <td>None</td> <td>None</td> </tr> <tr> <td>PWR</td> <td>Red</td> <td>Orange</td> <td>Red</td> <td>Red</td> </tr> <tr> <td>GND</td> <td>Black</td> <td>Yellow</td> <td>Black</td> <td>Black</td> </tr> </tbody> </table>	Term	Mercury	Essex	Motorola	HID	DATA	Green	Green	Green	Green	STRB	White	Red	White	White	CARDPR	None	None	None	None	PWR	Red	Orange	Red	Red	GND	Black	Yellow	Black	Black	<p>Set controller DIP switches 2, 3, 4, and 5.</p> <p>See Table C for the switch settings for various reader types.</p>
Term	Mercury	Essex	Motorola	HID																												
DATA	Green	Green	Green	Green																												
STRB	White	Red	White	White																												
CARDPR	None	None	None	None																												
PWR	Red	Orange	Red	Red																												
GND	Black	Yellow	Black	Black																												
<p>Reader power output PWR terminal GND terminal</p>	<p>Output that provides 5 volts DC at up to 100 mA, or 12 or 24 volts DC at up to 200 mA, to the reader. The table above shows the wiring connections for the standard readers.</p> <p>Note: <i>The standard readers — the Mercury Security, MR–5, the Essex KTP–71212XX, the Motorola ASR603, and the HID MB–5398 — operate at the optimal voltage — 12 volts.</i></p>	<p>Set the power jumper (J3).</p> <p>Caution: To prevent damage to the reader, set the power jumper (J3) before supplying power to the controller.</p> <p>For the standard readers, set the jumper to the 12 V position.</p>																														
<p>RS-232 connector</p>	<p>Connector for use when programming the controller using a PC. To program the controller, connect a remote RS-232 connector to this connector. Then, connect the PC to the remote connector using either the laptop cable or the palmtop cable. Alternately, connect a PC directly to this connector using either the laptop cable or the palmtop cable. See Figure 3.</p>	<p>When programming using the RS-232 connector, DIP switch 6 must be set to the OFF position.</p>																														
<p>Door status/latch monitor input DOOR terminal GND terminal</p>	<p>Input that signals the status (open or closed) of the door. To monitor door status, you can use a door contact and/or a latch switch. Use the door contact to monitor whether the door is closed. Use the latch switch to monitor whether the lock’s latch is out (secure) or in (not secure). Thus one or both of these sensors can be used to determine whether the door has been secured.</p> <p>When used in combination, the door contact and latch switch must be either both normally closed contacts or both normally open contacts. If both contacts are normally closed, wire the devices in series. If both contacts are normally open, wire the devices in parallel.</p>	<p>Program the controller to generate door forced alarms and/or door open too long alarms. For instructions, see the <i>V Series Intelligent Programmer Software User Manual</i>.</p>																														
<p>Request-to-exit input ROE terminal GND terminal</p>	<p>Input for a switch contact that signals the controller to unlock the door and/or to not trigger an alarm while the door is unlocked or exited. If the lock has a built-in request-to-exit output, connect that output here. Or you can connect a separate request-to-exit device, such as a button.</p>	<p>Program the controller for request-to-exit operation. For instructions, see the <i>V Series Intelligent Programmer Software User Manual</i>.</p>																														
<p>Remote unlock input REMOTE terminal GND terminal</p>	<p>Input for a switch contact that signals the controller to unlock the door. A remote unlock device, such as a button, can be connected to this input. This device can be located away from the door. When someone, such as a receptionist, presses the button, the input signals the controller to unlock the door.</p>	<p>Program the controller for remote unlock operation. For instructions, see the <i>V Series Intelligent Programmer Software User Manual</i>.</p>																														
<p>Tamper switch input TMPR terminal GND terminal</p>	<p>Input for a switch contact that signals the controller when a tamper switch has been triggered. You can use a tamper switch to protect the controller enclosure or another device.</p>	<p>None</p>																														
<p>Handheld connector</p>	<p>Connector for programming the controller using a handheld terminal. Connect the handheld cable to this connector.</p> <p>Note: <i>This connector also can be used when programming using a PC. Connect the PC-to-lockset adapter cable to this connector.</i></p>	<p>When programming using the handheld connector, DIP switch 6 must be set to the ON position. After programming, set switch 6 back to the OFF position.</p>																														

4 Connect the power supply to the controller board

Caution: To prevent damage and injury, connect the power supply after all other connections have been made.

Connect the 12 to 24 volts AC or DC at 0.75 amp power supply to the controller board's power input. Refer to Table 1 and to Figure 1.

5 Finish the Installation

- a When you've finished making connections to the controller board, dress all cables so they do not interfere with installation of the enclosure door.
- b Install the enclosure door.

Programming the controller

You can use either a V Series Handheld Terminal or an IBM-compatible PC running the V Series Intelligent Programmer Software (IPS) to program the controller.

To program the controller using a handheld terminal:

- a Connect the handheld cable to the controller's handheld connector, shown in Figure 1.
- b Place controller DIP switch 6 in the ON position.
- c Follow the instructions in the *V Series Handheld Terminal User Manual*.
- d When you've finished programming the controller, place DIP switch 6 back in the OFF position.

To program the controller using a PC running the IPS:

- a Connect the palmtop cable or laptop cable to the controller's remote RS-232 connector or to the RS-232 connector on the controller board, shown in Figure 1.
- b Follow the instructions in the *V Series Intelligent Programmer Software User Manual*.

Specifications

Enclosure size: 12" x 12" x 3"

Normal operating temperature: -40°F to +158°F (-40°C to +70°C)

Storage temperature: -58°F to +176°F (-50°C to +80°C)

Relative humidity: 10% to 90% non-condensing for indoor installations

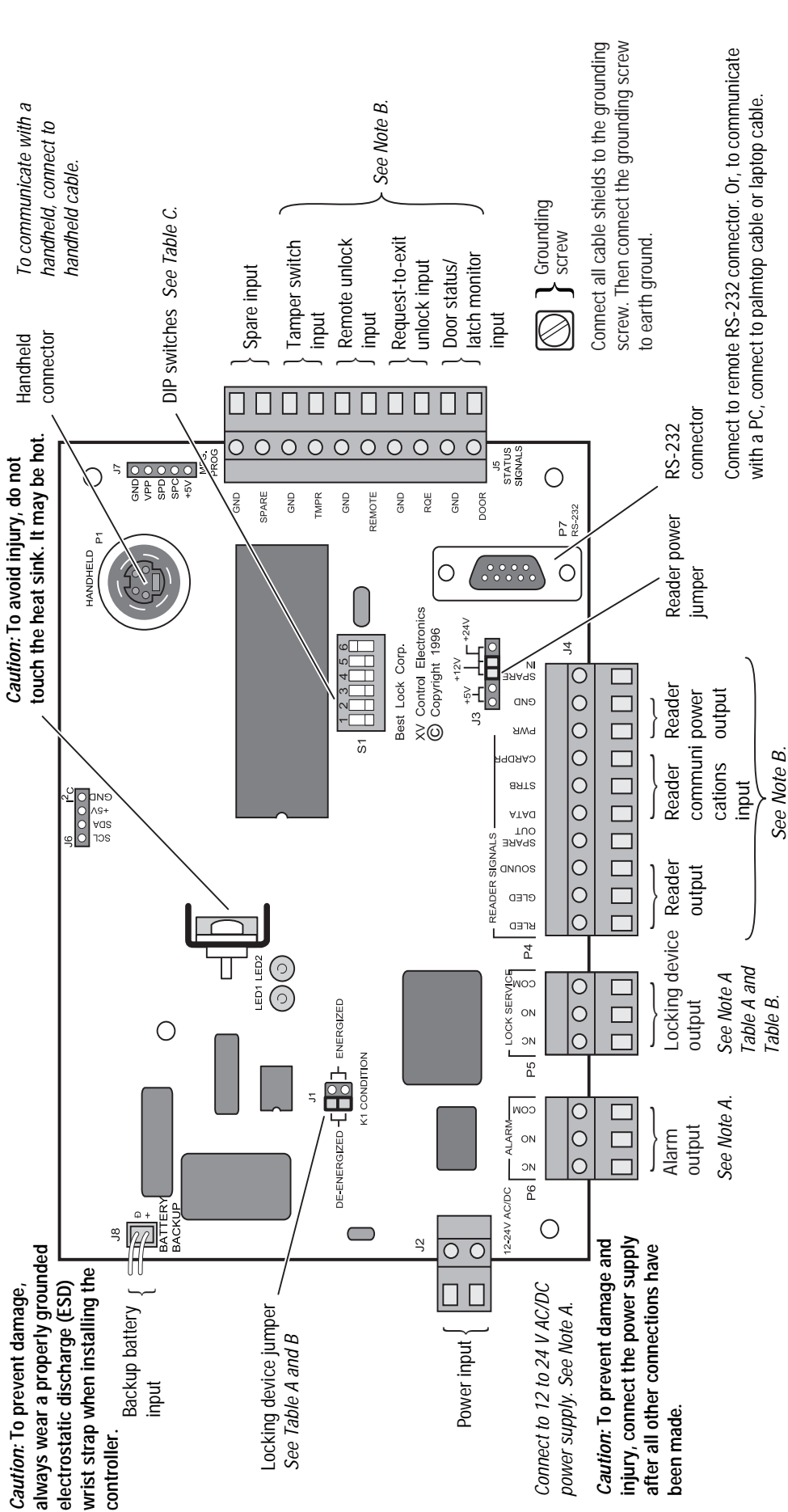


Figure 1—Controller board wiring diagram

Table A—Controller and locking device share one power supply

During power failure at the central controller	
Locking device is fail-safe	Locking device is fail-secure
Terminals to use	NO & COM
Jumper setting to use	de-energized

Table B—Controller and locking device have two separate power supplies

During power failure at the central controller	
Fail-safe locking device should be locked	Fail-secure locking device should be unlocked
Terminals to use	NC & COM
Jumper setting to use	de-energized
	energized
	de-energized
	energized
	NC & COM
	energized

Note A: To determine the appropriate wire gauge and length, refer to Minimum Gauge Wire Chart for Lock Circuits.

Note B: We recommend you use 22 AWG shielded cable no more than 500' long.

Table C—Standard reader DIP switch settings

Reader	S1	S2	S3	S4	S5	S6
Mercury Security, MR-5	Note C	ON	ON	ON	OFF	Note D
Essex, KTP-71212XX	Note C	ON	ON	ON	OFF	Note D
Motorola ABA	Note C	OFF	OFF	OFF	OFF	Note D
Motorola Weigand	Note C	ON	OFF	OFF	OFF	Note D
HID ABA reader with HID ABA card	Note C	OFF	ON	OFF	OFF	Note D
HID ABA reader with HID 26 bit Weigand card	Note C	ON	ON	OFF	OFF	Note D
HID ABA reader with HID 37 bit Weigand card	Note C	OFF	OFF	ON	OFF	Note D
Handheld Terminal communications	Do not move switches 1–5					
						ON

Note C: Use switch 1 to set the LED and sounder output for various readers. See Reader Output on page 2.

Note D: Use switch 6 for handheld terminal communications only. Leave the switch in the off position normally.

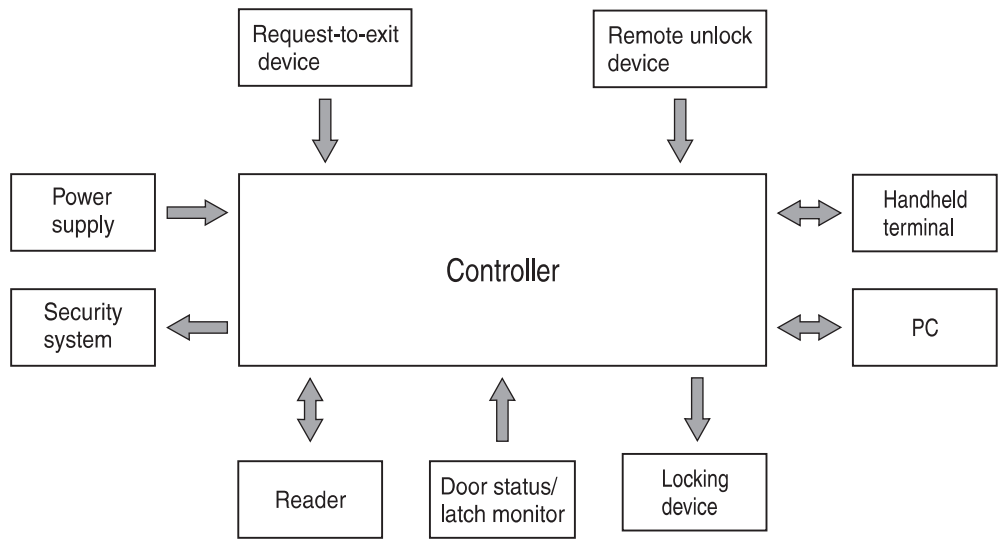


Figure 2—Block diagram

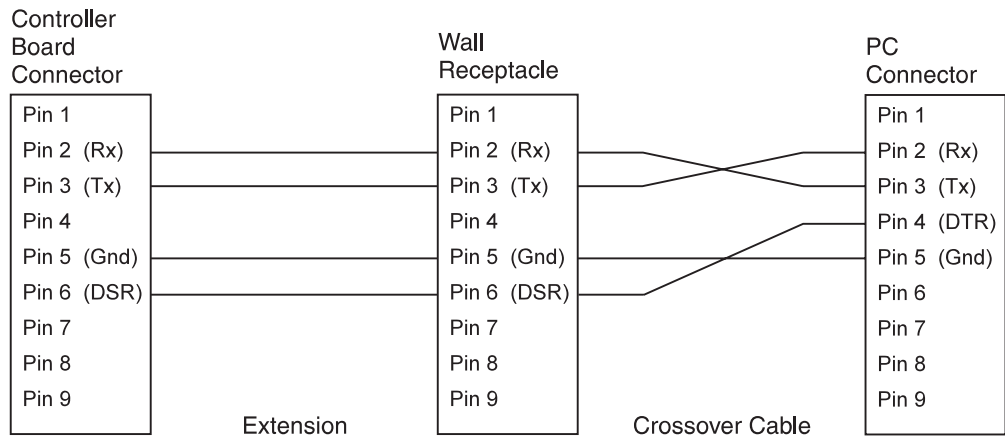


Figure 3—RS-232 wiring diagram