
PanelMate® Square D Communication Driver Manual

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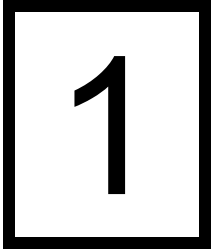
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Introduction



In this chapter, you will learn:

- *About driver installation*
- *How to download drivers to a PanelMate unit*
- *The supported memory types*

Introduction

The Operator Station can be used with any of the Square D Sy/Max family of PLCs, using the Square D driver. The driver takes responsibility for communications to this programmable controller, generating the protocol necessary to request information from and send information to the PLC.

Note: Check the Cutler-Hammer web site for current information on PanelMate PC connectivity to the Square D driver.

This manual describes the basic configuration of Square D PLCs and the Operator Station. More information on the Square D modules can be found in the appropriate Square D Instruction Bulletin.

The Square D PLC driver supports models 100, 300, 400, 500, 600, and 700. The SY/MAX protocol must be used for each of the above mentioned models. No special ladder logic is required in the PLC to support the interface. Direct connection to the processor and network communications, using the Network Interface Module (NIM), are supported. Write broadcasting is also supported by this driver.

The following Square D route assignments can be used:

00-199	Used for normal network routing.
200	Used to read the NIM status.
233-254	Used for network broadcasting capabilities.

Installing Drivers

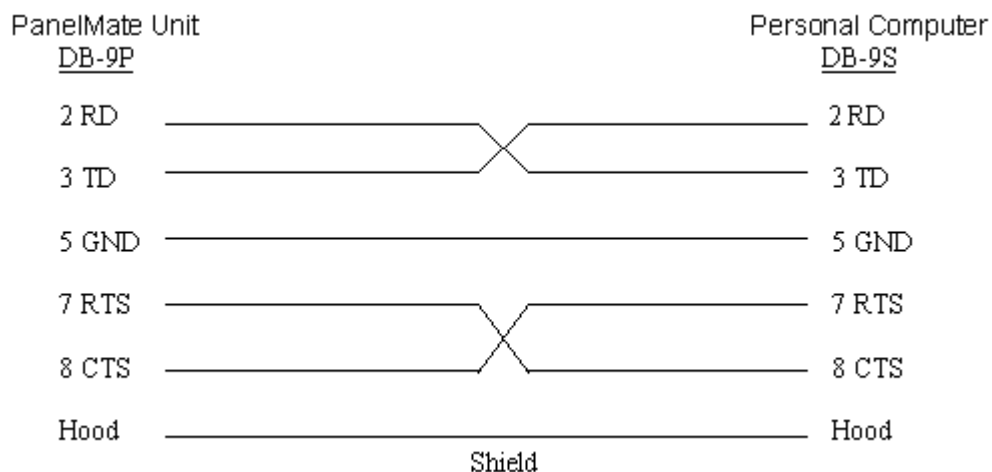
PanelMate Configuration Editor software is installed using a CD-ROM. To install the drivers from the CD-ROM, select the **Install Software** option and then **Install Drivers**. From the dialog box, select the driver you wish to install.

Downloading Drivers to a PanelMate Unit

- In the VCP Transfer Utility, choose the “Executive” tab and select the proper Executive Firmware to download to the PanelMate unit.
- Click the button labeled “Add to Operation List.”
Note: In order to download to a PanelMate for the first time or to clear the existence of another driver, the PanelMate must first be loaded with Executive Firmware.
- Choose the “Driver” tab.
- Select the appropriate driver to be downloaded to the PanelMate.
- Click the button labeled “Add to Operation List.”
- Place the PanelMate unit in Serial Transfer Mode.
- Connect a serial transfer cable from the correct port on the PC to port 1 on the PanelMate. (See cabling below.)
- Click “Start” at the bottom of the VCP Transfer Utility window.
- **Note:** For a more detailed description of downloading procedures and troubleshooting see *PanelMate Power Series, PowerPro, Pro LT Transfer Utility User’s Guide*.

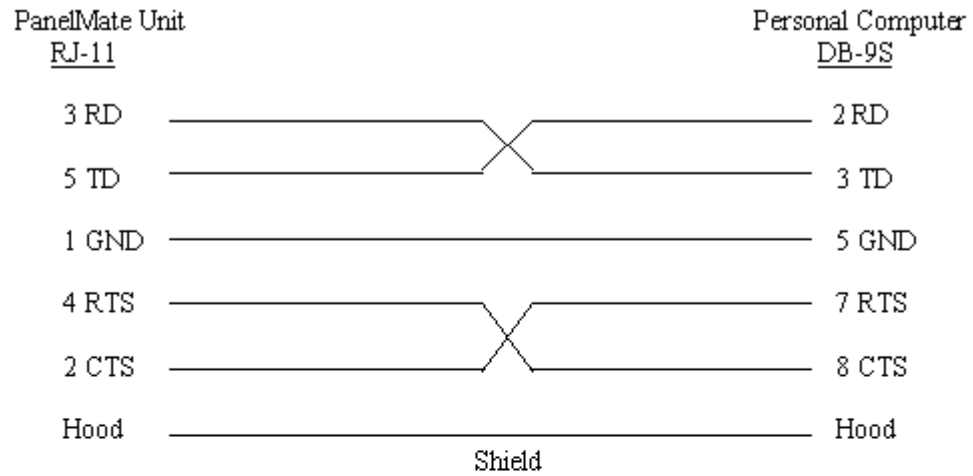
Serial Transfer Cables

Cable P/N 0518

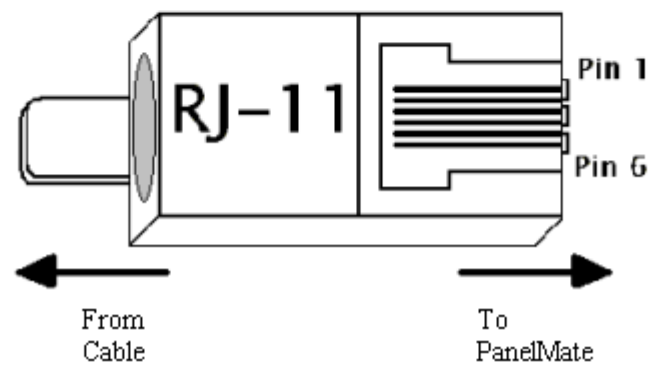


Cable P/N 0818

(PanelMate Power Series 1500 and PanelMate 500 only)



RJ-11 pin configuration



Memory

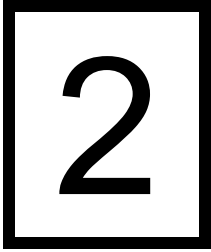
The following list contains the memory types supported by the Square D driver.

S	Storage register
R	Internal relay logic
N	External I/O
O	External output
I	External input

The maximum address range for each of the supported PLC models is given in the following table.

Model	Address Range
100	1-44 words
300	1-112 words
400	1-8000 words
500	1-2008 words
600	1-8000 words
700	1-8000 words

Possible Configurations

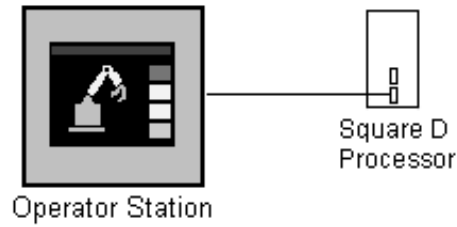


In this chapter, you will learn:

- *How to connect an operator station to Square D PLCs*

Direct Connection

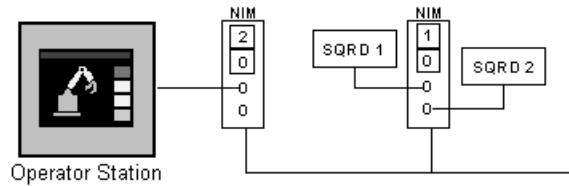
Direct connection between an Operator Station and the processor.



Note: When using a direct connection between the Operator Station and the Square D processor, the minimum baud rate for proper operation is 1200.

Network Connection

The following figure shows a network consisting of two devices and an Operator Station.



Note: Network reads are not currently supported.

Cabling

3

In this chapter, you will learn:

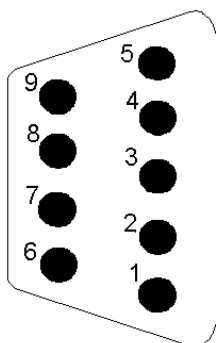
- *The cabling requirements for Square D PLCs*

Cable Configurations

The Square D driver supports RS422 communications only. The following tables show the pinouts for the processor module ports and NIM ports. These pinouts should be used for creating the communications cables.

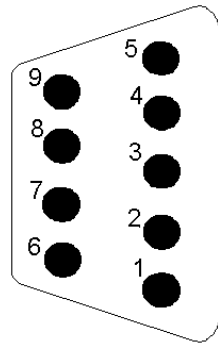
A 15-foot PLC cable can be purchased from Cutler-Hammer. Contact the Customer Support Group (see the Customer Support section in the Preface,) or your local distributor for more information. Refer to the PLC Cabling Cross-Reference List section for cabling catalog numbers.

Processor Port Pinouts



Pin	Signal
1	RS422 TxD (-)
2	RS422 TxD (+)
3	RS422 RxD (-)
4	RS422 RxD (+)
5	+5 V
6	+5 V
7	Signal GND
8	Signal GND
9	Chassis GND (shield)

NIM Port Pinouts



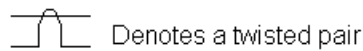
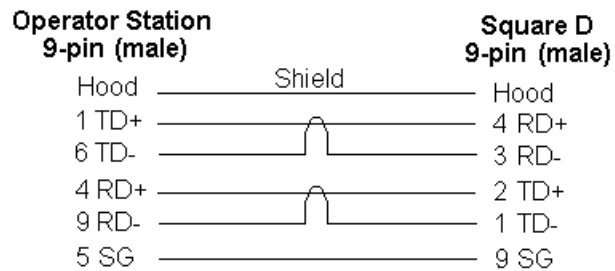
Pin	Signal
1	RS422 TxD (-)
2	RS422 TxD (+)
3	RS422 RxD (-)
4	RS422 RxD (+)
5	CTS (+)
6	RTS (+)
7	CTS (-)
8	RTS (-)
9	Chassis GND (shield)

The following figures show the cable configuration between the Operator Station and Square D modules. The maximum cable length when using RS422 is 4000 feet. RS422 cable must be twisted double-wire-shielded cable.

The Operator Stations that have 9-pin female connectors (DB-9S) must have cables configured male connectors (DB-9P).

Operator Station to Processor Cabling

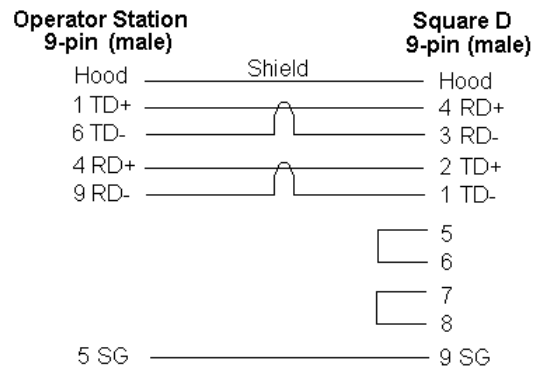
Cable Catalog Number: **SD21A**




Note: If ground loop problems occur, remove hood connection of shield wire on the PLC end.

Operator Station to NIM Cabling

Cable Catalog Number: **SD22A**



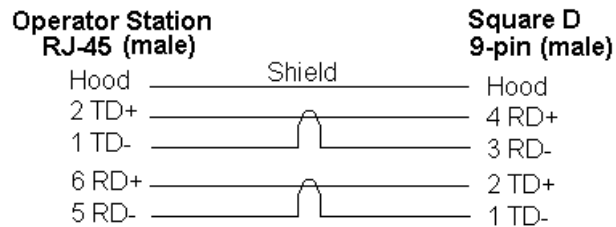
 Denotes a twisted pair


Note: If ground loop problems occur, remove hood connection of shield wire on the PLC end.

The Operator Stations that have RJ-45 modular jacks must have cables configured with male modular connectors.

Operator Station to Processor Cabling

Cable Catalog Number: **SD31**

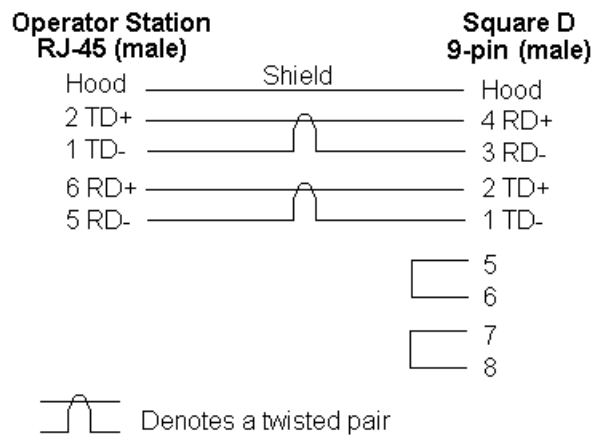


 Denotes a twisted pair

Note: If ground loop problems occur, remove hood connection of shield wire on the PLC end.

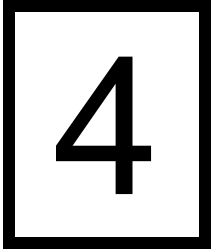
Operator Station to NIM Cabling

Cable Catalog Number: **SD32**



Note: If ground loop problems occur, remove hood connection of shield wire on the PLC end.

Communication Parameters



In this chapter, you will learn:

- *The different switch settings*

Default Communication Parameters

The default communication parameters are shown below. If you intend to use any baud rate other than the default with a direct connection, you must use the Square D programmer to change it. The data bits, parity, and stop bits must be set as shown below and cannot be changed on the Square D PLC:

Baud rate	9600
Data bits	8
Parity	Even
Stop bits	1

The NIM is the only part of the network described earlier that has switches that need to be set for proper communications. Two types of switches reside on the NIM; thumbwheel and DIP.

Note: The settings for parameters, such as baud rate, must match the parameters set for the Operator Station.

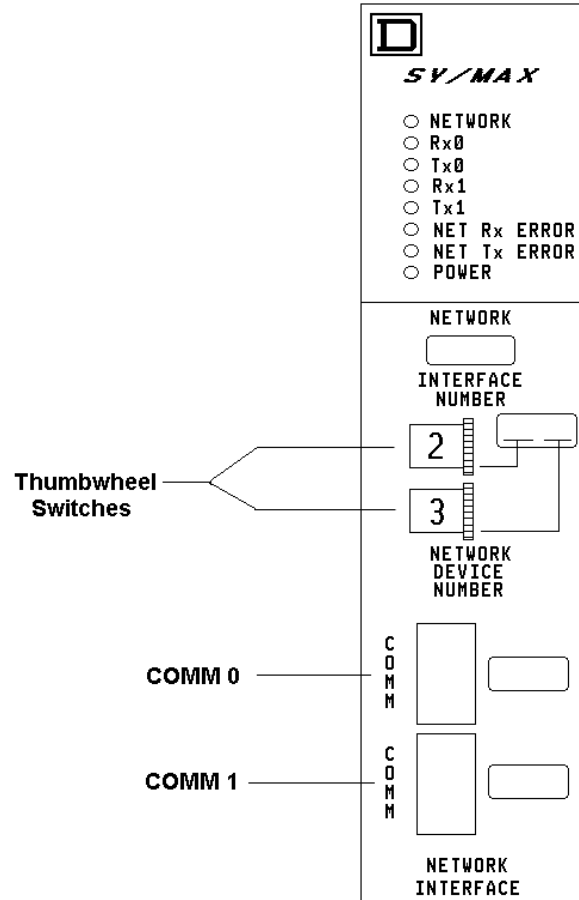
Thumbwheel Switches

The two thumbwheel switches, shown in the following figure, are used to select the module address on the network. The number set on the thumbwheel switches and the port number are used as the Network ID# in the PLC Name and Port Editor. The port number is used as a prefix on the front of the number on the thumbwheels.

For example, if the thumbwheels are set to 23 and the Square D processor is connected to COMM port 0 and the Operator Station is connected to COMM port 1, the PLC ID# should be 23 and the Network ID# should be 123.

NIM Dipswitches

The NIM has three dipswitches that are mounted at the rear of the module near the card edge connector. The three dipswitches are labeled S3, S4, and S5. These switches are used to set the network baud rate, COM port baud rate, and mode of operation for COM ports 0 and 1.



Dipswitch S3

A special network port, on the bottom of the NIM, is used for high-speed network communications. Dipswitch S3 selects the network baud rate for network port. The cable length to be used determines the maximum baud rate. The following table shows the maximum cable length for each switch selectable baud rate.

Switch Position			
1	2	3	4
Open	Closed	Closed	Closed
Closed	Open	Closed	Closed
Closed	Closed	Open	Closed
Closed	Closed	Closed	Open

Baud Rate	Max Cable Length (feet)
500,000	2,400
250,000	4,250
125,000	9,250
62,500	15,000

Dipswitches S4 and S5

Dipswitches S4 and S5 will allow you to select the mode of operation, baud rate, self-test, and network size for COM ports 1 and 0, respectively. The following description covers both Dipswitches.

Switch position one selects whether broadcast messages on the network should be received by the COM port.

Switch Position 1
Open
Closed

Function
Disable receive broadcast
Enable receive broadcast

Note: The function of this switch changes depending on the mode selected (described later). The function given above for this switch position is for the SY/MAX mode of operation. When using a SY/MAX family CRT in the peripheral mode, this switch should be closed.

Switch positions two and three select the mode of operation. The Operator Station supports the SY/MAX mode only. Therefore, both of these switch positions should be in the closed state. The following table shows the possible mode selections.

Switch Position		Mode
2	3	
Closed	Closed	SY/MAX
Open	Closed	Net to Net
Closed	Open	8881
Open	Open	Peripheral

Switch positions four, five, and six select the COM port baud rate. The following table shows the possible baud rates.

Switch Position			Baud Rate
4	5	6	
Closed	Closed	Closed	19,200
Open	Closed	Closed	9,600
Open	Closed	Open	2,400
Open	Open	Closed	1,200
Open	Open	Open	300

Dipswitch S4

Switch position seven on Dipswitch S4 selects either normal operation or self-test. The self-test mode is used only for testing ports, RAM, and ROM on the NIM. The following table shows the possible switch selections.

Switch Position 7	Function
Open	Normal operation
Closed	Self test

The procedure for running the self-test is described in the Square D Instruction Bulletin for your NIM.

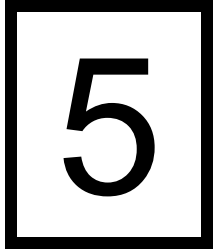
Dipswitch S5

Switch position seven on Dipswitch S5 sets the network sizes. The following table shows the possible network size selections.

Switch Position 7	Function
Open	Network size = 100 (00-99)
Closed	Network size = 31 (00-30)

Note: Reducing the network size to 31 modules will improve network access by a factor of three. Also, all modules on a network should have the same setting for this switch position. If this switch position on any of the modules is set to the closed state, the entire network size will be set to a maximum of 31.

Word and Bit References



In this chapter, you will learn:

- *How to configure word and bit references*

Word Referencing Method

The general word referencing method is:

[plcname,word#format]

The "plcname" is the name of the designated PLC as listed in the PLC Name and Port Table. The "word" is the reference number (address) of the word or register to be read or written. The "#format" is a code which specifies the format of the data being read or written. The "plcname" and "#format" are optional if you are using the default PLC and do not wish to change the data format, respectively.

The general bit referencing method is:

[plcname,bit]

The "plcname" is the designated PLC as listed in the PLC Name and Port Table. The "bit" is the reference number (address) of the bit, coil, or input to be written or read.

See the "Word and Bit References" topic in the Configuration Software Online Help for a more detailed explanation of word and bit references, including format descriptions.

The Square D Sy/Max protocol is supported on the Operator Station for models 100, 300, 400, 500, 600, and 700. These models use decimal register addresses and bit offsets. Addresses and offsets all range from 1 to 16 (not from 0 to 15). The Operator Station format default is S16.

Note that this consists of a one-character prefix that identifies the type of variable being referenced followed by the specific number of the variable. The following list contains the memory types supported by the Square D driver.

S	storage register
R	internal relay logic
N	external I/O
O	external output
I	external input

The prefixes are used to identify the usage of the variable to Square D. Its number uniquely identifies each variable. Therefore, the prefix may be omitted from the reference (e.g., [11] may be used instead of [S11]).

The following is the format of a register reference.

[rr]

rr PLC reference number of the register.

The following is the format of a register bit reference.

[rr-bb]

rr PLC reference number of the register.

bb PLC reference number of the bit position. The bit positions are numbered from 1 to 16, least significant to most significant, respectively

The Operator Station does not support writing to protected registers. If a template attempts to modify the contents of a protected register, a communications error will result. Therefore, if an unexplainable communications error occurs, the user is suggested to check the BEGIN FENCED REGISTERS and END FENCED REGISTERS parameters with a Square D Programmer. All data referenced by the Operator Station must lie between these parameters.

The supported Square D PLC models will allow a maximum of 60 contiguous words per read. The maximum number of unused words before another read is generated is 15.

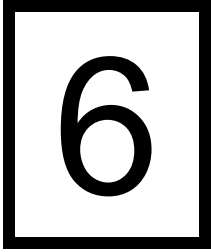
Examples

The following are examples of valid PLC references that may be assigned in the Operator Station expression fields.

Word References	
Reference	Description
[S13]	Word 13 is placed in a storage register
[R12]	Word 12 is internal relay logic
[N3]	Word 3 is external I/O
[O5]	Word 5 is external output
[I9]	Word 9 is external input

Bit References	
Reference	Description
[S32-14]	Word 32 bit 14 is placed in a storage register
[R96-3]	Word 96 bit 3 is internal relay logic
[N54-15]	Word 54 bit 15 is external I/O
[O23-2]	Word 23 bit 2 is external output
[I16-4]	Word 16 bit 4 is external input

Maintenance Access



In this chapter, you will learn:

- *How to use the Maintenance Template*

Maintenance Access

The Maintenance Template will access all memory locations supported by the PLC driver as defined in this manual. When running online, you may change the PLC reference. The Maintenance Template is designed to assist you in specifying the PLC reference by scrolling through a list of mnemonics that are used to enter the PLC word reference. When online in the PLC reference change mode, the following list is available.

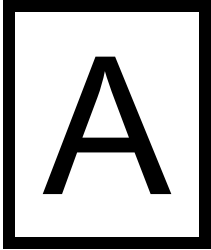
“S”, “R”, “N”, “O”, and “I”

You must enter the correct mnemonics and numeric values and create a legal reference to change a PLC reference.

Note: When a new reference is entered on an Operator Station, the Maintenance Template will remain in a paused state until the **Start Monitor** control button or the **Chng** soft function key is pressed. When the **Start Monitor** control button or the **Chng** soft function key is pressed, the Operator Station will parse the reference. (Parsing means checking the syntax and range of the reference to ensure that it is supported by the driver.)

Note: A Maintenance Template cannot be used to monitor unsolicited references.

PLC Cabling Cross-Reference List



In this chapter, you will learn:

- *The catalog numbers for PLC cables*

PLC Cabling Cross-Reference List

If you have a PanelMate Power Series 1500 and you wish to order PLC cables from Cutler-Hammer, use the following catalog numbers:

SD31	Square D PLC processor cable
SD32	Square D NIM Network Interface Module cable

For all other PanelMate Power Series models, use the following catalog numbers:

SD21	Square D PLC processor cable
SD22	Square D NIM Network Interface Module cable

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