
PanelMate® Cutler-Hammer Communication Driver Manual

Preface

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Printed in the United States of America.

P/N 01-00448-02

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You should contact your local distributor for product pricing, availability, ordering, expediting and repairs.

Website Address

www.cutler-hammer.eaton.com

Use the Cutler-Hammer website to find product information. You can also find information on local distributors or Cutler-Hammer sales offices.

e-TRC

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- 414-449-7100, selection 5 (8:00AM-5:00PM EST)

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If you have questions regarding the repair or upgrade of an OI/IPC, contact your local distributor. Additional support is also available from our well-equipped Repair and Upgrade Service department.

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This center, located in Zurich, Switzerland, provides high-level quality support and product repair services for your PanelMate products. You will receive real-time technical and application support.

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Introduction

1

In this chapter, you will learn:

- *The important notes to consider before getting started*
- *About driver installation*
- *How to download drivers to a PanelMate unit*

Important Notes to Consider before Getting Started

Note 1: Up to eight PLCs can be connected to one Operator by using the current protocol.

Note 2: If you need to use a connectivity option not contained in this section, contact the Cutler-Hammer Customer Support Group for recommendations.

Note 3: Starting with the 1.00 release of PanelMate Power Pro/PC Configuration Software, connectivity to the Cutler-Hammer D200, and D500 was removed. Contact the Cutler-Hammer Customer Support Center for additional information.

Note 4: PanelMate PC is not compatible with NetSolver releases prior to 3.01.

Installing Drivers

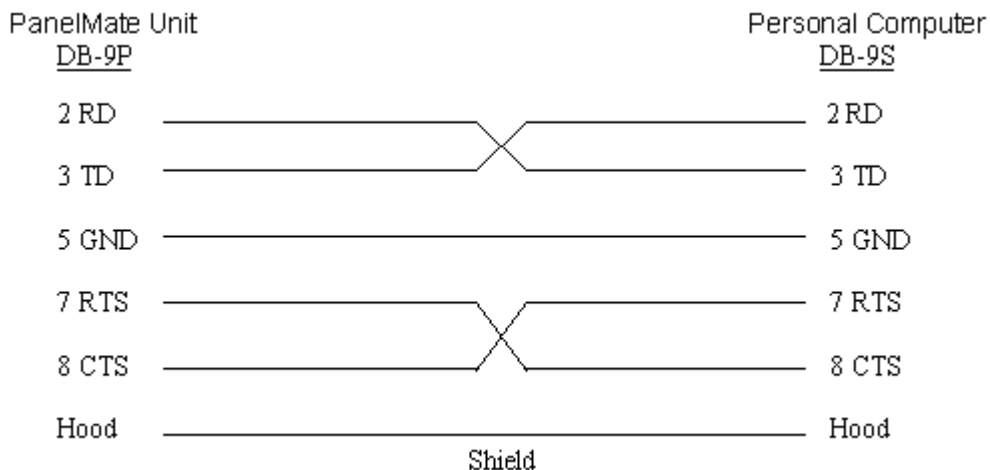
PanelMate Configuration Editor software is installed using a CD-ROM. To install the drivers from the CD-ROM, select the **Install Software** option and then **Install Drivers**. From the dialog box, select the driver you wish to install.

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*.

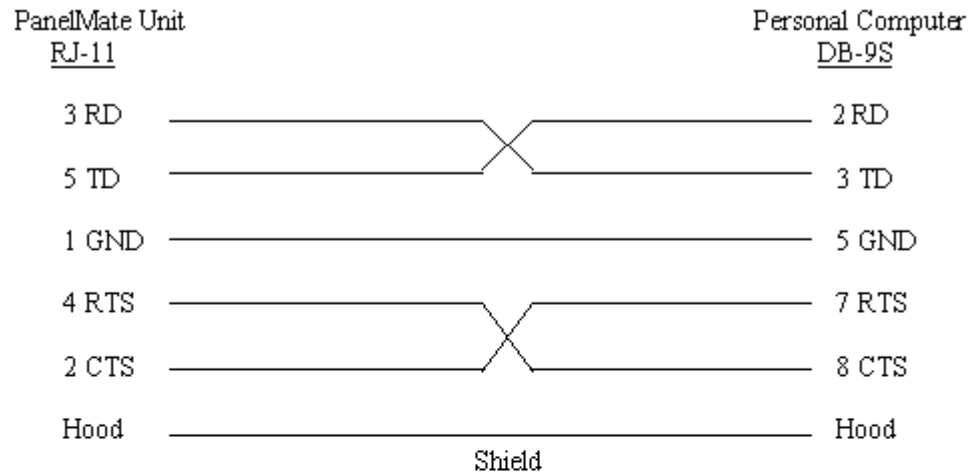
Serial Transfer Cables

Cable P/N 0518

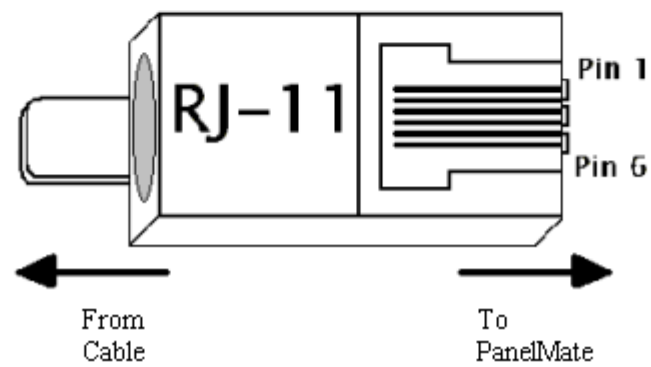


Cable P/N 0818

(PanelMate Power Series 1500 and PanelMate 500 only)



RJ-11 pin configuration



Connectivity Options



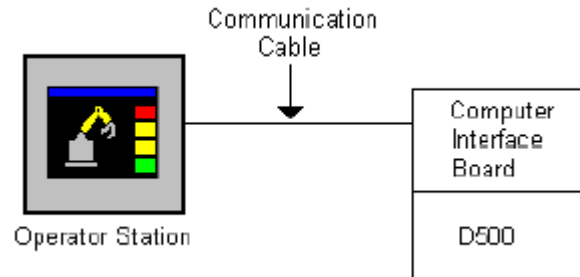
In this chapter, you will learn:

- *How to connect an operator station to a PLC*
- *How to connect an operator station to multiple PLC's*

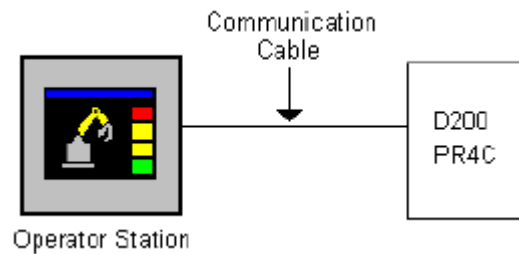
One Operator Station to One PLC

Connecting to D500

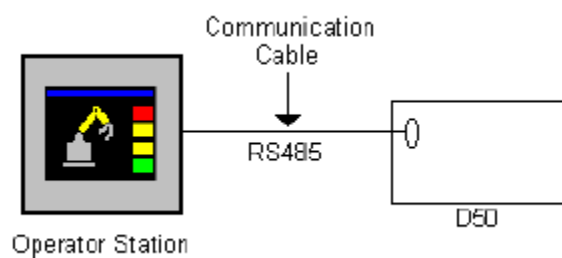
Direct connection to a CPU20 using the computer interface terminals, or to a CPU25 or CPU50 using the computer interface board (D500CIB99).



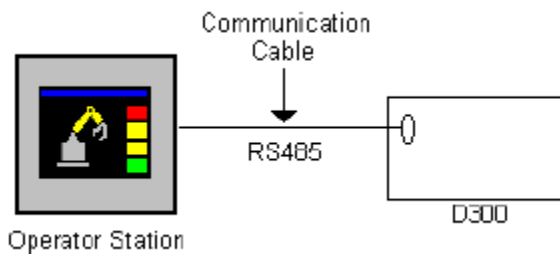
Connecting to D200



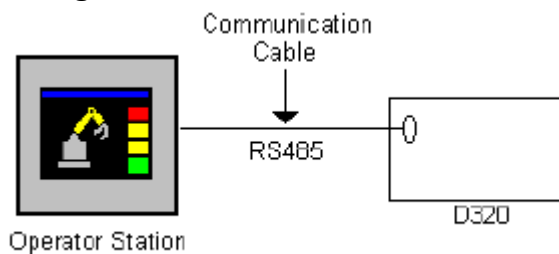
Connecting to D50



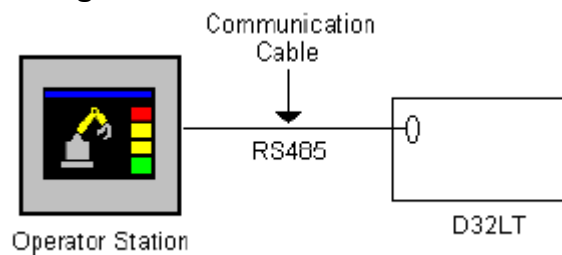
Connecting to D300



Connecting to D320



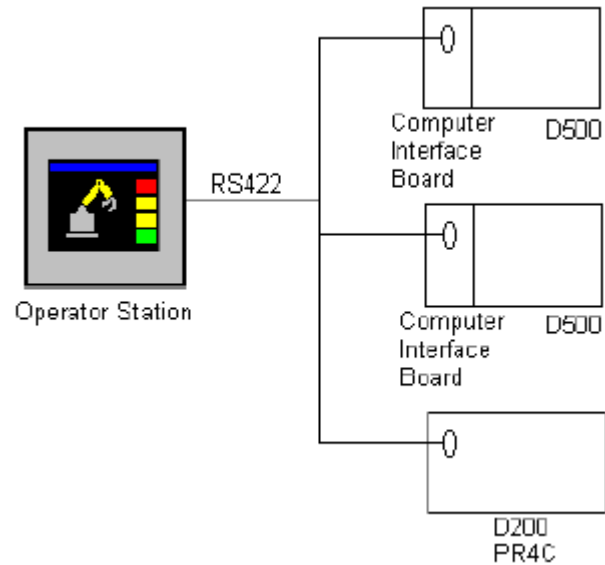
Connecting to D32LT



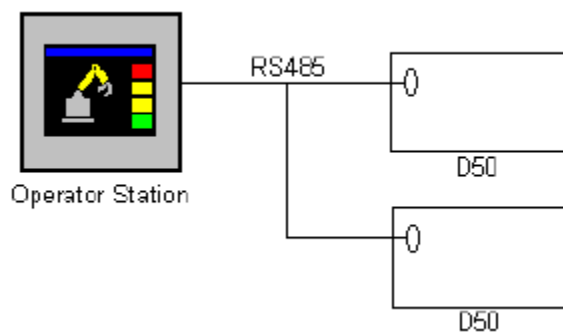
One Operator Station to Multiple PLCs

Connecting to D500

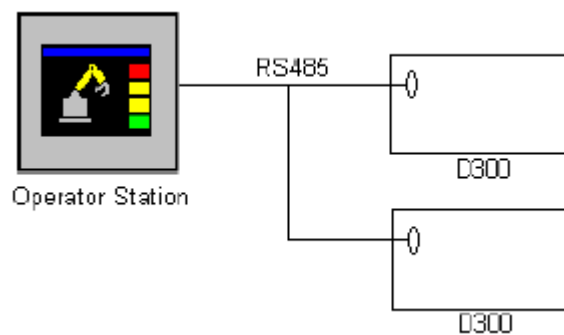
Multiple connections to CPU20s using the computer interface terminals, or to CPU25s or CPU50s using the computer interface board (D500CIB99).



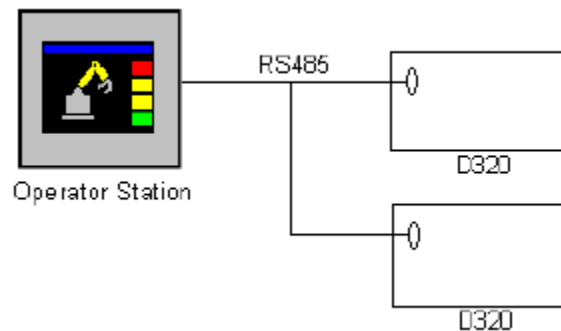
Connecting to D50



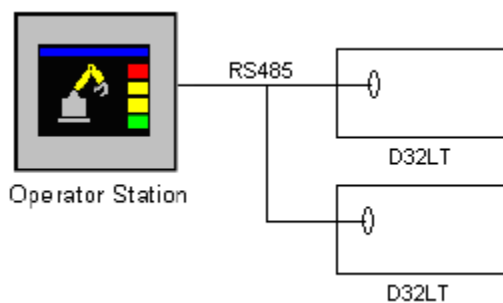
Connecting to D300



Connecting to D320



Connecting to D32LT



Operator Station Setup

3

In this chapter, you will learn:

- *How to setup for PLC communication*

Operator Station Configuration for D200 and D500

Configure the following setup in the **PLC Name and Port Table** dialog box, in the PanelMate Configuration Editor:

Field	Selection	Comments
Port	1 or 2 if available	Selecting Port 2 is recommended (if available), so that Port 1 can be used to upload and download configurations. However, Port 1 must be selected for PanelMate Power Series 1500 and 1100 LT PowerPro units.
Device Use	Cutler-Hammer D200/D500	
Local ID		Can be set to any number between 0 and 99. See Note 2.
Data Bits	8	
Stop Bits	1	
Parity	NONE	
Baud Rate		Set to match the PLC setup (between 1200 and 9600 K Baud).
Electrical	RS422	
Name		Use a six character name. See Note 1.
Port		Must match the Operator Station port selected.
Model		Set to match the processor model type. See Note 3.
Remote ID		Must match the PLC ID#. See Note 2.

Note 1: You must use an alphanumeric or underscore (_) character.

Note 2: Local ID and Remote ID must be different.

Note 3: Used for range checking in addressing.

Note 4: The PLC ID number in the PLC Name Table must correspond to the selected station number on the CPU20. There are eight distinct ID numbers (0 through 7). Stations 8 and 9 on the rotary switch correspond to station numbers 0 and 1, respectively. To avoid confusion, do not use numbers over 7.

Note 5: The PLC ID number in the PLC Name Table must correspond to the selected station number on the CPU25, CPU50, CPU50, or D200 PR4C. There are eight distinct ID numbers (0 through 7). Stations 8 through F on the rotary switch correspond to station numbers 0 through 7, respectively. To avoid confusion, do not use numbers over 7.

Operator Station Configuration for D50

Configure the following setup in the **PLC Name and Port Table** dialog box, in the PanelMate Configuration Editor:

Field	Selection	Comments
Port	1 or 2 if available	Selecting Port 2 is recommended (if available), so that Port 1 can be used to upload and download configurations. However, Port 1 must be selected for PanelMate Power Series 1500 and 1100 LT PowerPro units.
Device Use	Cutler-Hammer D50/D300	
Local ID		Can be set to any number between 0 and 99. See Note 2.
Data Bits	8	
Stop Bits	1	
Parity	NONE	
Baud Rate	9600	Must be set to 9600.
Electrical	RS485	
Name		Use a six character name. See Note 1.
Port		Must match the Operator Station port selected.
Model		Set to match the processor model type. See Note 3.
Remote ID		Must match the PLC ID#. See Note 2.

Note 1: You must use an alphanumeric or underscore (_) character.

Note 2: Local ID and Remote ID must be different.

Note 3: Used for range checking in addressing.

Operator Station Configuration for D300

Configure the following setup in the **PLC Name and Port Table** dialog box, in the PanelMate Configuration Editor:

Field	Selection	Comments
Port	1 or 2 if available	Selecting Port 2 is recommended (if available), so that Port 1 can be used to upload and download configurations. However, Port 1 must be selected for PanelMate Power Series 1500 and 1100 LT PowerPro units.
Device Use	Cutler-Hammer D50/D300	
Local ID		Can be set to any number between 0 and 99. See Note 1.
Data Bits	8	
Stop Bits	1	
Parity	NONE	
Baud Rate	1200 to 9600	
Electrical	RS485	
Name		Use a six character name. See Note 2.
Port		Must match the Operator Station port selected.
Model		Set to match the processor model type. See Note 3.
Remote ID		Must match the PLC ID#. See Note 1.

Note 1: Local ID and Remote ID must be different.

Note 2: You must use an alphanumeric or underscore (_) character.

Note 3: Used for range checking in addressing.

Operator Station Configuration for D320

Configure the following setup in the **PLC Name and Port Table** dialog box, in the PanelMate Configuration Editor:

Field	Selection	Comments
Port	1 or 2 if available	Selecting Port 2 is recommended (if available), so that Port 1 can be used to upload and download configurations. However, Port 1 must be selected for PanelMate Power Series 1500 and 1100 LT PowerPro units.
Device Use	Cutler-Hammer D50/D300	
Local ID		Can be set to any number between 0 and 99. See Note 1.
Data Bits	8	
Stop Bits	1	
Parity	NONE	
Baud Rate	1200 to 19200	Must match PLC setting.
Electrical	RS485	
Name		Use a six character name. See Note 2.
Port		Must match the Operator Station port selected.
Model		Set to match the processor model type. See Note 3.
Remote ID		Must match the PLC ID#. See Note 1.

Note 1: Local ID and Remote ID must be different.

Note 2: You must use an alphanumeric or underscore (_) character.

Note 3: Select model type D300. Used for range checking in addressing.

Operator Station Configuration for D32LT

Configure the following setup in the **PLC Name and Port Table** dialog box, in the PanelMate Configuration Editor:

Field	Selection	Comments
Port	1 or 2 if available	Selecting Port 2 is recommended (if available), so that Port 1 can be used to upload and download configurations. However, Port 1 must be selected for PanelMate Power Series 1500 and 1100 LT PowerPro units.
Device Use	Cutler-Hammer D50/D300	
Local ID		Can be set to any number between 0 and 99. See Note 1.
Data Bits	8	
Stop Bits	1	
Parity	NONE	
Baud Rate	1200 to 19200	Must match PLC setting.
Electrical	RS485	
Name		Use a six character name. See Note 2.
Port		Must match the Operator Station port selected.
Model		Set to match the processor model type. See Note 3.
Remote ID		Must match the PLC ID#. See Note 1.

Note 1: Local ID and Remote ID must be different.

Note 2: You must use an alphanumeric or underscore (_) character.

Note 3: Select model type D300. Used for range checking in addressing.

PLC and Communication Module Setup

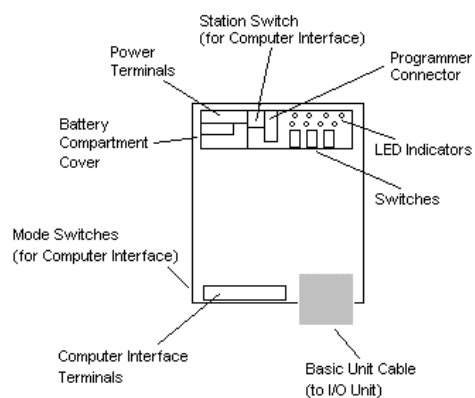
4

In this chapter, you will learn:

- *About DIP switch settings*

CPU20

The following DIP switches are set to define communication parameters.



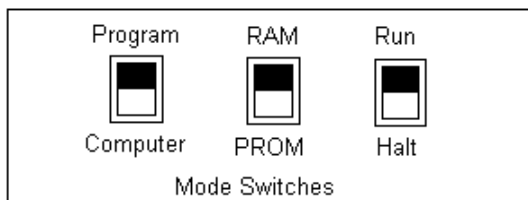
Baud Rate	BR2	BR1
9600	OFF	OFF
4800	OFF	ON
2400	ON	OFF
1200	ON	ON

Parity Type	PR
Odd	OFF
Even	ON

Transmission Mode	MOD
Special	OFF
Standard	ON

Parity Mode	PEN
Disable	OFF
Enable	ON

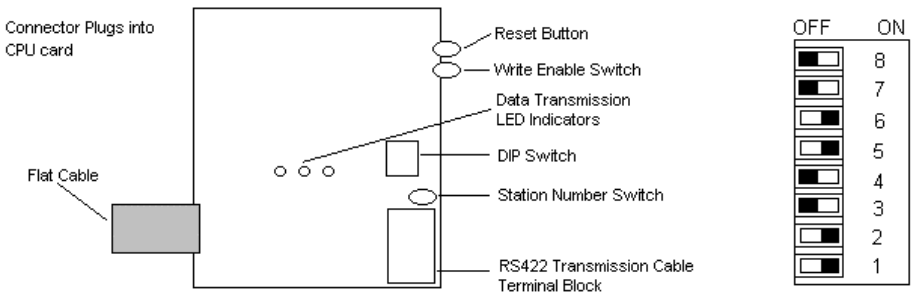
At the upper right of the processor, there are three two-position switches used to set its mode of operation.



The Computer/Program slide switch must be in the Computer position and the Run/Halt slide switch must be in the Run position to enable communications with the Operator Station.

CPU25 and CPU50

The following diagram shows the layout of the interface board for CPU25 and CPU50.



DIP Switches

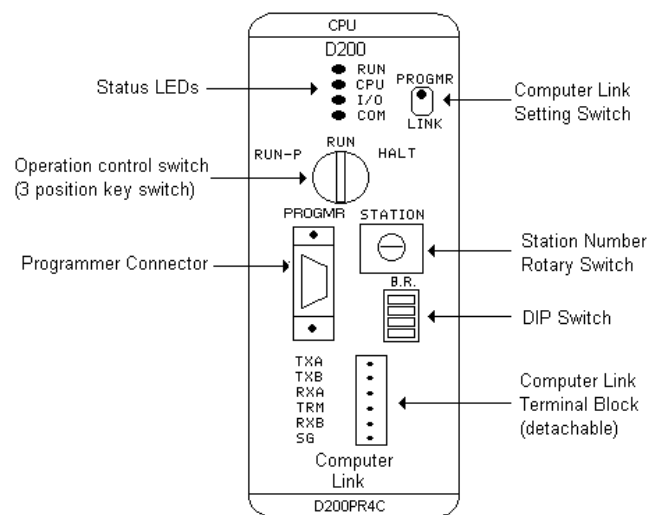
8	SP0	Control command enabled (off)
7	SP1	Program block write enabled (off)
6	SP2	Binary mode disabled (on)
5	BR0	
4	BR1	BAUD rate = 9600 (off)
3	BR2	(off)
2	PEN	Parity Disabled (on)
1	EVN	Parity odd/even don't care (off or on)

The Write Enable switch must be in the ON position.

Baud Rate Switch	Disabled	9600	4800	2400	1200	600	300	200
(5) BR0	OFF	ON	OFF	ON	OFF	ON	OFF	ON
(4) BR1	OFF	OFF	ON	ON	OFF	OFF	ON	ON
(3) BR2	OFF	OFF	OFF	OFF	ON	ON	ON	ON

D200 PR4C

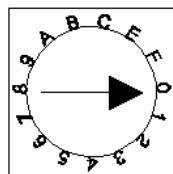
The following DIP switches are set to define communication parameters.



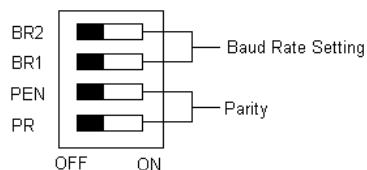
To communicate with the Operator Station, the computer link setting switch should be set to link as shown in the following figure.



Use the station number rotary switch to set the station number for the computer interface mode. (0 to F)



Configure the DIP switch to define the communication parameters.



BR2	BR1	Baud Rate
OFF	OFF	9600
OFF	ON	4800
ON	OFF	2400
ON	ON	1200

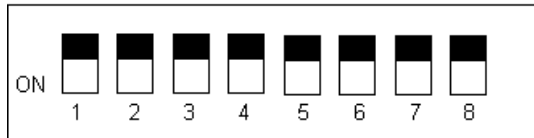
PEN	PR	Parity
OFF	NA	None
ON	OFF ON	ODD EVEN

D50

No adjustments are necessary for the Cutler-Hammer D50 PLC to communicate to an Operator Station.

D300 CPU300

The following DIP Switches (SW1), located on the CPU board, are set to define communication parameters.



Termination	Switch 1
No Terminating Resistor	OFF
For RS485 communications, the last PLC must be terminated using a built-in 120 ohm resistor. To terminate the last PLC, set this switch to ON. Set this switch to OFF in all other PLCs.	ON

RS232/RS485 Communication	Switch 3	Switch 4
RS232	OFF	ON
RS485	ON	OFF

Baud Rate	Switch 5	Switch 6
9600	ON	ON
4800	OFF	ON
2400	ON	OFF
1200	OFF	OFF

Note: Switches 7 and 8 must be set to ON.

D300 CPU310

In RS-485 communication mode, an end resistor must be used to terminate the connection to the first and last CPUs in a network. To set termination, use the following DIP switches (SW3) located on the CPU board. Switches 1 and 2 are used for COM1, switches 3 and 4 are used for COM2.



Termination	Switch 1	Switch 2	Switch 3	Switch 4
No Terminating Resistor. For all devices in the middle of a series, set these switches to OFF.	OFF	OFF	OFF	OFF
Terminating Resistor. To terminate the connection to the first and last PLC in a series, set these switches to ON.	ON	ON	ON	ON

D320

Early versions of the D320 had the following DIP switches, located on the front of the CPU board, that were set to define communication parameters.

For later versions of the D320, see the next graphic.

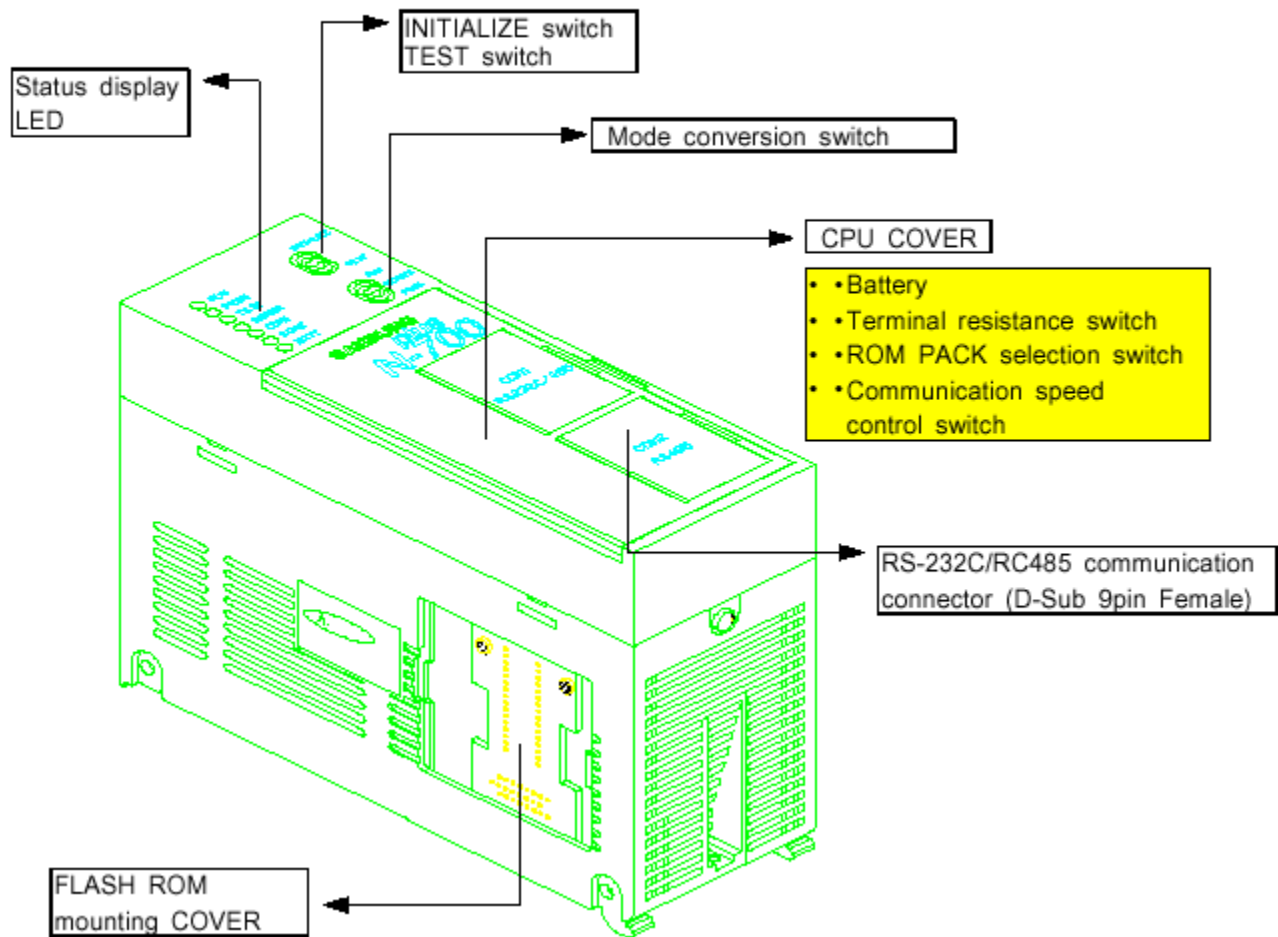


Function	Switch Number					
	1	2	3	4	5	6
COM1, 9,600 bps	OFF	-	-	-	-	-
COM1, 19,200 bps	ON	-	-	-	-	-
COM2, 9,600 bps	-	OFF	OFF	-	-	-
COM2, 19,200 bps	-	ON	OFF	-	-	-
COM2, 38,400 bps	-	OFF	ON	-	-	-
COM2, 4,800 bps	-	-	ON	-	-	-
Terminating resistors for RS485 communications not connected	-	-	-	-	OFF	OFF
Terminating resistors for RS485 communications connected	-	-	-	-	ON	ON

Note: The communication port can be used for an RS232 or RS485 connection. It will automatically select between the two.

Note: The terminating resistors are connected to the end of the communication line to help remove communication interference and signal distortion when it occurs between the PLC and other PLCs or peripherals. The terminating resistors are typically used with long communication distances and the RS485 communication protocol.

Name and function of each part of CPU unit



• INITIALIZE switch

Clears CPU Error. Operates when mode exchange switch is Stopped.

• Status display LED

LED	Color	Function
RUN	Green	On when CPU is RUN
PROG.	Green	On when Program is in changeable state
TEST	Green	On when CPU is TEST mode
ERROR	Red	On when CPU has error
COM 1	Green	Flicker when CPU is communicating (COM1, COM2)
COM 2	Green	
BATT.	Red	On when battery voltage is low or isn't installed

• Mode conversion switch

State	Function
RUN	CPU set in RUN Mode.
REMOTE	CPU set in RUN or PROG Mode.
PROG.	CPU set in Stop, or Program change mode

Operate "DIP switch1 (6 pin)" located in front of CPU unit as follows.

PIN Number	Switch		Function	Shape
1	OFF		COM1, 9600bps	
	ON		COM1, 19200bps	
2	3	OFF	OFF	
		ON	OFF	
		OFF	ON	
		ON	ON	
4	OFF		When running program in built-in RAM.	
	ON		When running program stored in FLASH ROM	
5	6	OFF	OFF	
		ON	ON	

• • Selecting switch for Communication method (DIP switch2)

• • Start from 2001.01

Operate "DIP switch2 (2 pin)" located in front of CPU unit as follows.

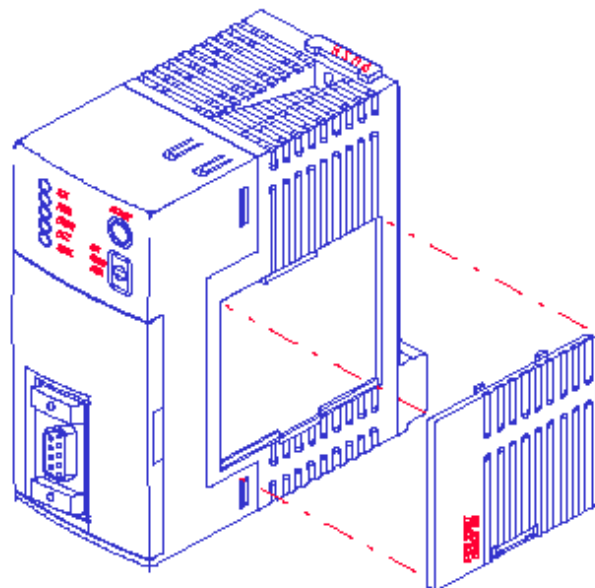
or later

PIN Number	Switch		Function	Shape
1	OFF		RS-232C selection for COM 1	
	ON		RS-485 selection for COM 1	
2	OFF		RS-232C selection for COM 2	
	ON		RS-485 selection for COM 2	

• • Caution

- • Communication port can be used for RS232/485, and automatically selected between them. (Do not support from 2001.1, refer to the DIP Switch 2)
- • Terminal resistance is a resistance connected to the end of communication line to help this problems when mutual communication inference and communication signal distortion made between PLC and other peripherals, or when communication distance is far (in case of RS485 communication method)
- • Set to "ON" in case of RS232 communication method to reduce mutual communication inference.

• • D32LTCPU321



INITIALIZE switch

Clears CPU Error. Operates when mode exchange switch is Stopped.

Mode selector switch

State	Function
RUN	CPU set in RUN Mode.
REMOTE	CPU set in RUN or PROG Mode.
PROG.	CPU set in Stop, or Program change mode

Status display LED

LED	Color	Function
RUN	Green	On when CPU is RUN
PROG.	Green	On when Program is in changeable state
ERROR	Red	On when CPU has error
BATT.	Red	On when battery voltage is low or isn't installed
COMM.	Green	Flicker when CPU is communicating.

• Selecting switch for Comm./program booting ("DIP switch1 ")

Operate "DIP switch1 (4pin)" located in front of CPU unit as follows:

PIN Number	Switch		Function	DIP switch1
1	OFF		When running program in built-in RAM.	
	ON		When running program stored in FLASH ROM	
2	OFF		Set RS-232C comm. method(IBM-PC etc.)	
	ON		Set RS-485 comm. method (Handy-Loader etc.)	
3 4	OFF	OFF	Set 9600 bps comm. speed	
	ON	OFF	Set 38400 bps comm. speed	
	OFF	ON	Set 19200 bps comm. speed	
	ON	ON	Set 4800 bps comm. speed	

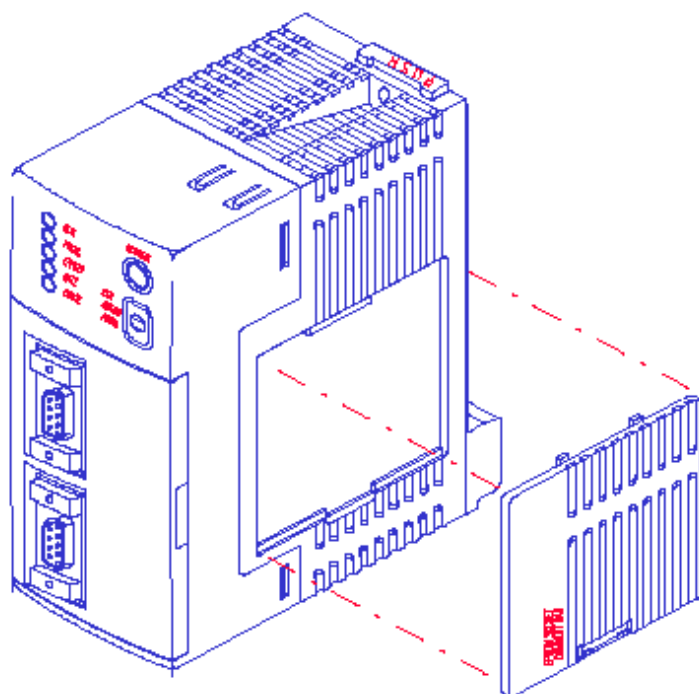
• Selecting switch for terminal resistance ("DIP Switch2")

Operate DIP switch2 (2pin) located in inner of CPU unit as follows:

PIN Number	Switch		Function	DIP switch2
1, 2	ON	ON	Set terminal resistance Install in terminal station when using RS-485 method comm.	
1, 2	OFF	OFF	No set terminal resistance Install not terminal station when using RS-485 method comm.	

Distortion of communication signal and communication disturbance occurs when PLC and other peripheral devices or communication distance is far. Terminal resistance is connected to the end of communication line to help this problem.

• D32LTCPU322 (Old Version)



INITIALIZE switch

Clears CPU Error. Operates when mode exchange switch is Stopped.

Mode selector switch

State	Function
RUN	CPU set in RUN Mode.
REMOTE	CPU set in RUN or PROG Mode.
PROG.	CPU set in Stop, or Program change mode

Status display LED

LED	Color	Function
RUN	Green	On when CPU is RUN
PROG.	Green	On when Program is in changeable state
ERROR	Red	On when CPU has error
BATT.	Red	On when battery voltage is low or not installed
COMM.	Green	Flicker when CPU is communicating.

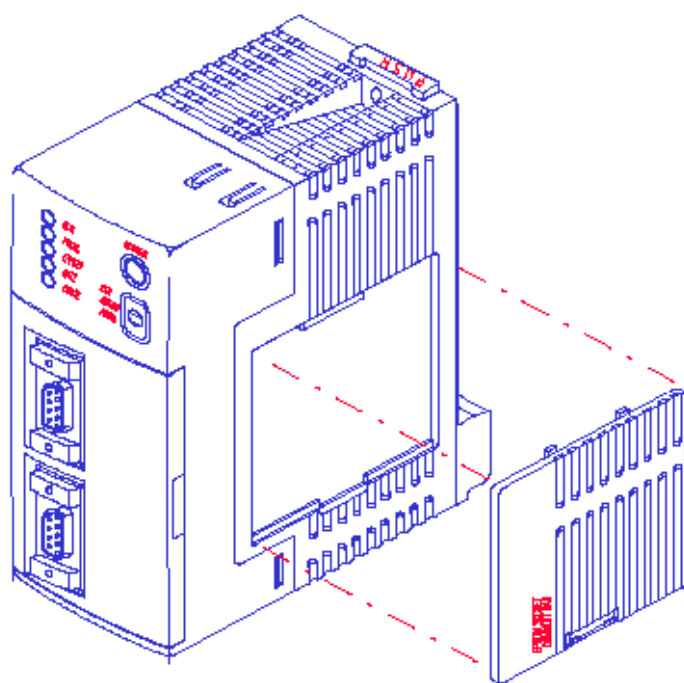
- Selecting switch for Comm./program booting(DIP switch1), located in side of CPU

PIN No	Switch		Function	Dip Switch1
1,2	OFF	OFF	Communication speed, 9,600 bps set. (COM1)	
	ON	OFF	Communication speed, 19,200 bps set. (COM1)	
	OFF	ON	Communication speed, 38,400 bps set. (COM1)	
	ON	ON	Communication speed, 4,800 bps set. (COM1)	
3,4	OFF	OFF	Communication speed, 9,600 bps set. (COM2)	
	ON	OFF	Communication speed, 19,200 bps set. (COM2)	
	OFF	ON	Communication speed, 38,400 bps set. (COM2)	
	ON	ON	Communication speed, 4,800 bps set. (COM2)	
5	ON		
	OFF		
6	ON		
	OFF		
7	OFF		
8	ON		
	OFF		

- Selecting switch for terminal resistance ("DIP Switch2") , located in side of CPU

PIN No	Switch		Function	Dip Switch2
1, 2	ON	ON	Set terminal resistance in COM1 Install in terminal station when using RS-485 method comm	
	OFF	OFF	No set terminal resistance in COM1 Using RS232C or RS485 : when no terminal station	
3, 4	ON	ON	Set terminal resistance in COM2 Install in terminal station when using RS-485 method comm	
	OFF	OFF	No set terminal resistance in COM2 Using RS232C or RS485 : when no terminal station	

• **D32LTCPU322 (New Version 2001.1)**



INITIALIZE switch

Clears CPU Error. Operates when mode exchange switch is Stopped.

Mode selector switch

State	Function
RUN	CPU set in RUN Mode.
REMOTE	CPU set in RUN or PROG Mode.
PROG.	CPU set in Stop, or Program change mode

Status display LED

LED	Color	Function
RUN	Green	On when CPU is RUN
PROG.	Green	On when Program is in changeable state
ERROR	Red	On when CPU has error
BATT.	Red	On when battery voltage is low or not installed
COMM.	Green	Flicker when CPU is communicating.

- Selecting switch for Comm./program booting(DIP switch1), located in side of CPU

PIN No	Switch		Function	Dip Switch1
1,2	OFF	OFF	Communication speed, 9,600 bps set. (COM1)	<div style="text-align: center;"> *** ***** *** ***** </div>
	ON	OFF	Communication speed, 19,200 bps set. (COM1)	
	OFF	ON	Communication speed, 38,400 bps set. (COM1)	
	ON	ON	Communication speed, 4,800 bps set. (COM1)	
3,4	OFF	OFF	Communication speed, 9,600 bps set. (COM2)	
	ON	OFF	Communication speed, 19,200 bps set. (COM2)	
	OFF	ON	Communication speed, 38,400 bps set. (COM2)	
	ON	ON	Communication speed, 4,800 bps set. (COM2)	
5	ON		RS-485 selection for COM 1	
	OFF		RS-232C selection for COM 1	
6	ON		RS-485 selection for COM 2	
	OFF		RS-232C selection for COM 2	
7	OFF		for system set (No use absolutely)	
8	ON		When power on, program load from EEPROM(Flash ROM)	
	OFF		When power on, program run by RAM	

Note 1. MODBUS protocol supported by inter flag register state in CPU.

2. Battery connection method change DIP Switch function to direct connection to the battery connector.

Cable Diagrams



In this chapter, you will learn:

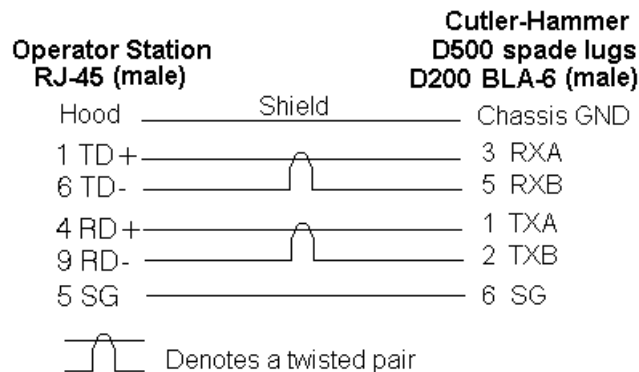
- *The different cable diagrams*

Note: *A 15-foot PLC cable can be purchased from Cutler-Hammer. Contact the Cutler-Hammer Customer Support Group at (614) 882-3282 or your local distributor for more information.*

Operator Stations with DB-9 Connectors to D500 and D200 PLCs

Cable Part Number: **CH21A**

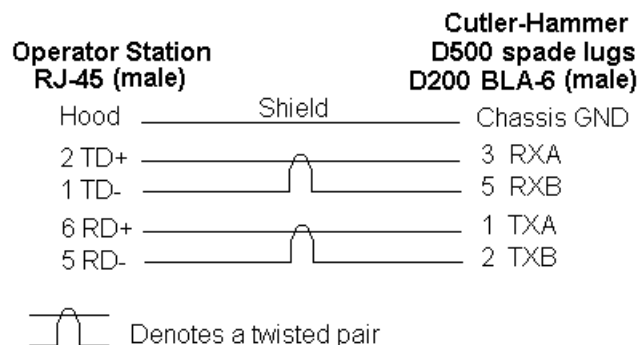
The Operator Stations that have 9-pin female connectors (DB-9S) must have cables configured with male connectors (DB-9P).



Note: For PanelMate PC applications, a female 9-pin connector is required for connecting to a male 9-pin port. To quickly convert a Cutler-Hammer cable for PC use, simply attach the 9-pin Gender Changer found in the PanelMate PC Runtime Kit.

Operator Station with RJ-45 Connectors to D500 and D200 PLCs

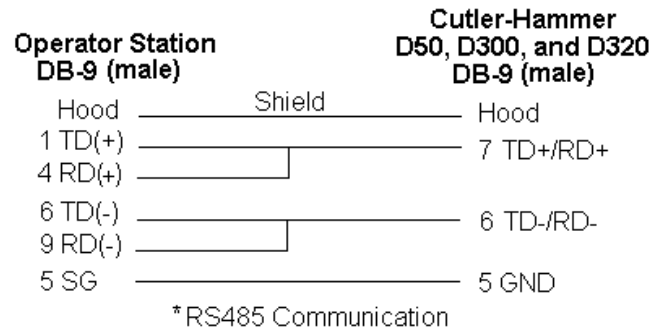
The Operator Stations that have RJ-45 modular jacks must have cables configured male modular connections.



Operator Stations with DB-9 Connectors to D50, D300, D320 and D32LT PLCs

Cable Part Number: **CH22A**

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

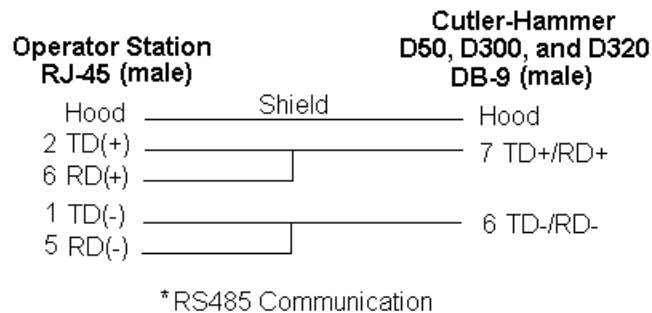


Note: For PanelMate PC applications, a female 9-pin connector is required for connecting to a male 9-pin port. To quickly convert a Cutler-Hammer cable for PC use, simply attach the 9-pin Gender Changer found in the PanelMate PC Runtime Kit.

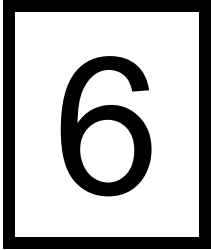
Note: For PanelMate PC applications that require data exchanges between RS232 and RS422/485 ports, a RS232 to RS422/485 converter is required to enable communication.

Operator Stations with RJ-45 Connectors to D50, D300, D320 and D32LT PLCs

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



Memory Addressing



In this chapter, you will learn:

- *The different memory types*
- *About memory ranges*
- *About network and I/O addressing*
- *The different memory addresses*

D500 and D200 Memory Types

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

Memory Type Symbol	Description
X (Read only)	Input device (bit)
XW (Read only)	Input register
Y	Output device (bit)
YW	Output register
R	Control relay device (bit)
RW	Control relay register
Z	Remote link storage device (bit)
ZW	Remote link storage register
C	Counter register
T	Timer register (max. value 32767)
D	Data register

D500 and D200 Memory Ranges

Devices or Registers				
		CPU20	CPU25	CPU50 / D200 PR4C
X or Y	Device	X or Y 000-15F (256 devices)	X or Y 000-15F (256 devices)	X or Y 000-31F (512 devices)
	Register	XW or YW 00-31 (32 registers)	XW or YW 00-31 (32 registers)	XW or YW 00-63 (64 registers)
Z	Device	Z000-Z31F (512 devices)	Z000-Z31F (512 devices)	Z000-Z31F (512 devices)
	Register	ZW00-ZW31 (32 registers)	ZW00-ZW31 (32 registers)	ZW00-ZW31 (32 registers)
R*	Device	R000-R63F (1024 devices)	R000-R63F (1024 devices)	R000-R63F (1024 devices)
	Register	RW00-RW63 (64 registers)	RW00-RW63 (64 registers)	RW00-RW63 (64 registers)

*Devices R600-R63F (registers RW60-RW63) are reserved for special functions. Data should not be altered in these locations

Registers Only				
		CPU20	CPU25	CPU50 / D200 PR4C
XW or YW	Register	XW or YW 00-31 (16 registers)	XW or YW 00-31 (16 registers)	XW or YW 00-63 (32 registers)
T	Register	T000-T127 (128 timers)	T000-T127 (128 timers)	T00-T127 (128 timers)
C	Register	C00-C95 (96 counters)	C00-C95 (96 counters)	C00-C95 (96 counters)
D	Register	(D0-D1535 (1536 registers)	D0-D1535 (1536 registers)	D0-D1535 (1536 registers)

D50, D300, D320, and D32LT Memory Types

The following list contains descriptions of the memory types for the D50, D300, D320, and D32LT PLCs:

Memory Type Symbol	Description
R	External Input/Output
M	Auxiliary Internal Relay
K	KEEP Relay
F (Read only)	Internal Flag (Special Relay)
TC (Read only)	Timer Counter Output Point
W	Arithmetic Word register
SV	Timers and Counters (Set Value)
PV	Timers and Counters (Present Value)
SR (Read only)	Status Register
L (D300 and D320 only)	Link Area

D50, D300, D320 and D32LT Memory Ranges

The following list contains descriptions of the memory ranges for the D50, D300, D320, and D32LT PLCs:

Devices or Registers			
		D50	D300 / D320 / D32LT
R	Device Register	R000/00-R018/15 (56 devices) R0000-R0031 (32 registers)	R000/00-R033/15 (544 devices) R0000-R0127 (128 registers)
M	Device Register	M000/00-M031/15 (512 devices) M0000-M0031 (32 registers)	M000/00-M127/15 (2048 devices) M0000-M0127 (128 registers)
K	Device Register	K000/00-K015/15 (256 devices) K0000-K0015 (16 registers)	K000/00-K127/15 (2048 devices) K0000-K0127 (128 registers)
F (Read Only)	Device Register	F000/00-F001/15 (32 devices) F0000-F0001 (2 registers)	F000/00-F015/15 (256 devices) F0000-F0015 (16 registers)
TC (Read Only)	Device Register	--- TC000-TC255 (256 registers)	--- TC000-TC255 (256 registers)
W	Device Register	--- W0000-W0255 (256 registers)	--- W0000-W2047 (2048 registers)
SV	Device Register	--- SV000-SC255 (256 registers)	--- SV000-SV255 (256 registers)
PV	Device Register	--- PV000-PV255 (256 registers)	--- PV000-PV255 (256 registers)
SR (Read Only)	Device Register	--- SR000-SR255 (256 registers)	--- SR000-SR511 (512 registers)
L (D300 / D320 Only)	Device Register	--- ---	L000/00-L015/15 (256 devices) L000-L063 (64 registers)

Network and I/O Addressing

Each controller in a network must be assigned a network address so the Operator Station can communicate with it. The Operator Station network address is specified using the PLC Name and Port Table.

Note: Valid D50, D300, D320 and D32LT network addresses are between 0 and 223, or 255. It is recommended that address 255 not be used on a network with multiple PLCs since all D50, D300, D320, and D32LT PLCs will respond to address 255.

Register Memory Addressing

The format used for expressions is the memory type symbol (upper or lower case) and a reference number.

The following is the format for a register reference:

[mmrrr]

m = memory type symbol

(XW, YW, RW, ZW, C, T, or D for D500 and D200 models)

(R, M, K, F, W, SV, PV, SR, TC or L for D50, D300, D320 and D32LT models)

r = register value (leading 0s are not required)

Note: The memory type L is for D300, D320, and D32LT models only.

Note: In order to reference D registers greater than three digits, the D symbol must be omitted. The D symbol on register values less than four digits is optional.

The supported Cutler-Hammer PLCs will allow a maximum of 32 contiguous words per read. The maximum number of unused words before another read is generated is 10.

Device Memory Addressing

The following is the format for a device reference:

[mrrb]

m = memory type symbol

(X, Y, R, or Z for D500 and D200 models)

(R, M, K, F, or L for D50, D300, D320, and D32LT models)

r = two digit register value (leading 0s are not required)

b = bit number in hex (0-F)

Note: The memory type L is for D300, D320, and D32LT models only.

Memory Addressing Examples

D500, D200 and D32LT Memory Addressing Examples

Word References	
Reference	Description
[YW3]	Output register 3
[XW04]	Input register 4
[D1]	Data register 1
[1500]	Data register 1500
[2]	Data register 2
[RW10]	Control relay register 10
[C29]	Counter register 29
[T17]	Timer register 17

Bit References	
Reference	Description
[Y03F]	Output device, bit 15 of output register 3
[X110]	Input device, bit 0 of input register 11
[R147]	Control relay device, bit 7 of register 14
[Z224]	Remote link storage device, bit 4 of register 22

D50, D300, D320 and D32LT Memory Addressing Examples

Word References	
Reference	Description
[R0000]	External I/O - word 0
[r4]	External I/O - word 4
[M00007]	Internal Relay - word 7
[K0010]	KEEP Relay - word 10
[f0001]	Special Relay - word 1
[W009]	Arithmetic Register - word 9
[SV0010]	Set Value - word 10
[sR00255]	Status Register - word 255

Bit References	
Reference	Description
[R0/00]	External I/O - word 0, bit 0
[M00001/15]	Internal Relay - word 1, bit 15
[K015/15]	KEEP Relay - word 15, bit 15
[F1/7]	Special Relay - word 1, bit 7

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