

# Installing the Panel

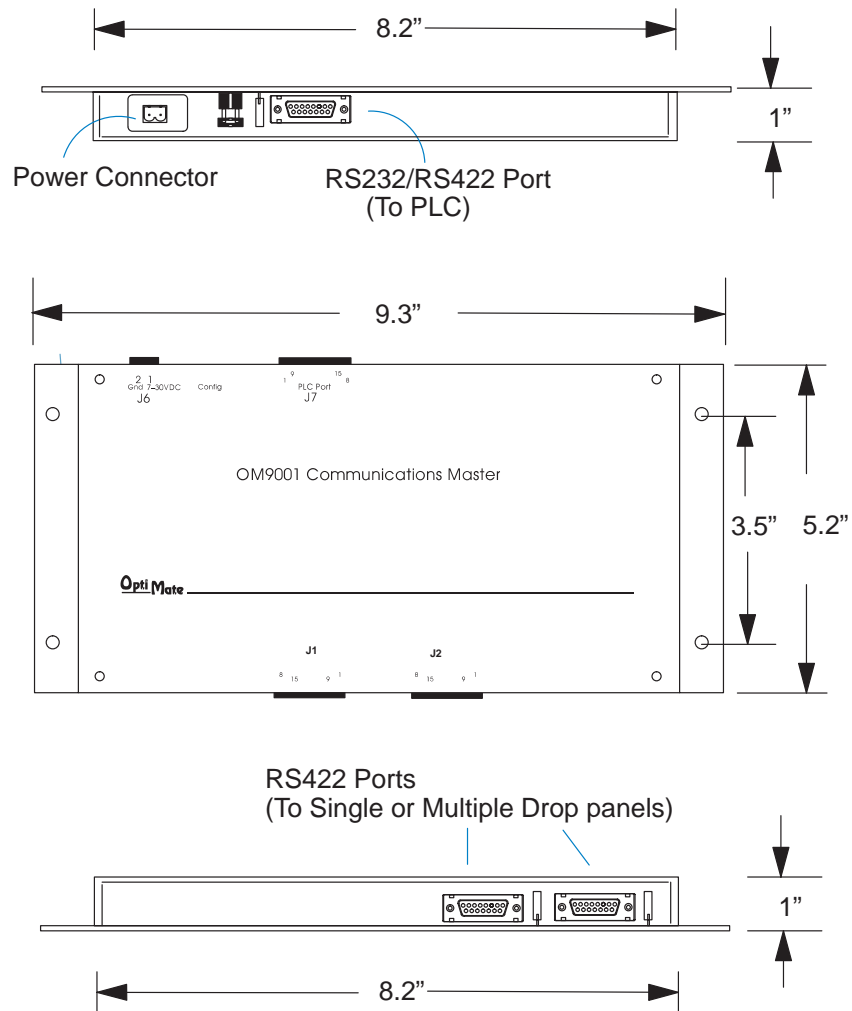
In this section, you will be given all of the information you need to install the panel. Before actually installing the OP-9001 panel, it may be helpful to examine the specifications and make sure that the requirements of your application are met.

## Panel Specifications:

<b>Physical Specifications</b>	Weight .....	22 ounces
	Panel Fasteners .....	Four holes to accept four 16x32 machine screws
	NEMA Rating .....	NEMA 1
<b>CPUs Supported</b>	CPUs .....	DL105, DL205, DL305, DL405, PLC <i>Direct</i> Compatibles SLC 5/03, SLC5/04
<b>Environmental Specifications</b>	Operating Temperature .....	0° to 50° C
	Storage Temperature .....	-20° to 80° C
	Operating Humidity .....	5 to 95% (non-condensing)
	Air Composition .....	No corrosive gases permitted
<b>Operating Specifications</b>	Power Budget Requirement .....	3.75 VA @ 8 – 30 VDC 310 mA @ 12 VDC 155 mA @ 24 VDC
	Power Connector .....	Removable Terminal Block 2 position
	Absolute Maximum Voltage .....	32 VDC
	Diagnostics .....	Power On, CPU
	Communication Link .....	RS232 or RS422 4800, 9600 and 19200 baud 15 pin female D type connector *Only 4800 and 9600 baud will work with Allen-Bradley PLCs.

## Dimensions

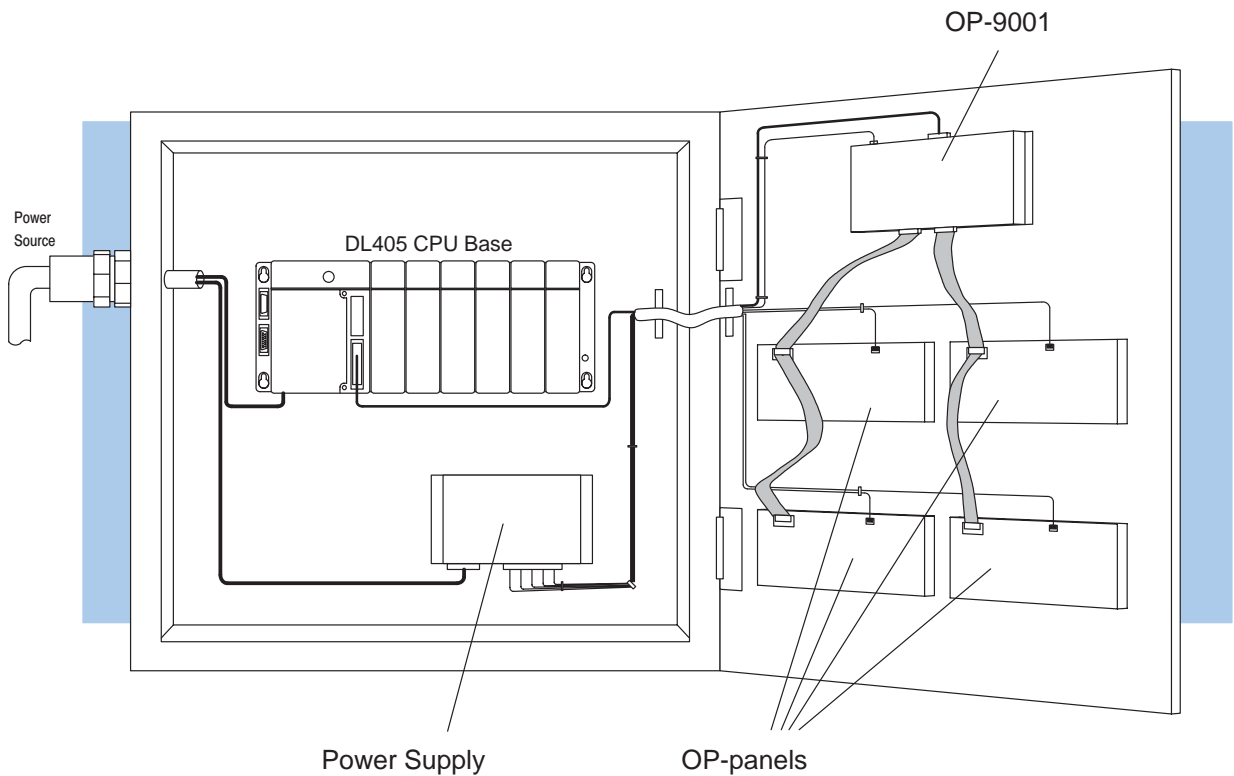
(All dimensions are given in inches)



## Power and Cabling Requirements

### What Are Your Application Needs?

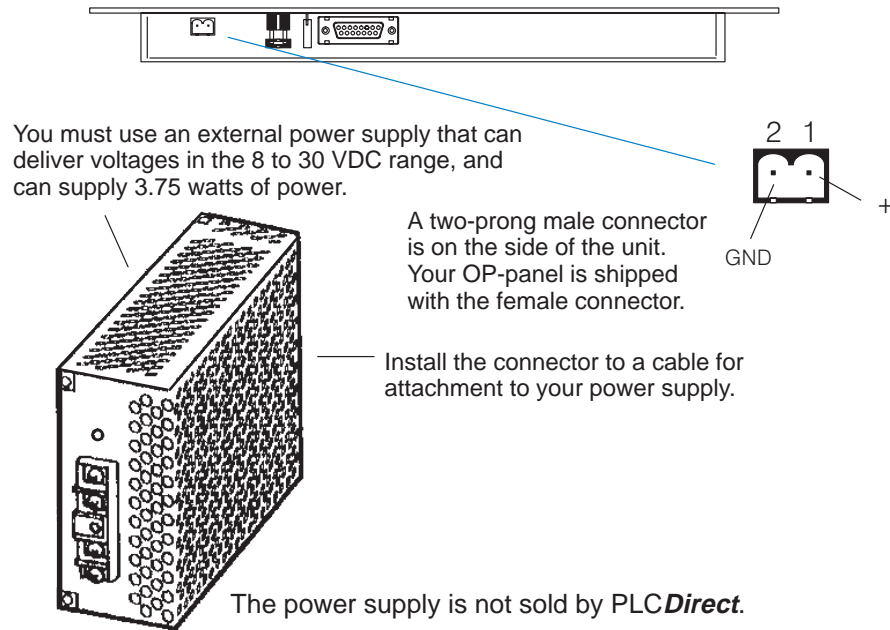
By using an OptiMate OP-9001 Communications Master, you can connect multiple Optimate units up to a single CPU. Up to 31 individual units can be connected in a daisy-chain fashion to the OP-9001. Communications are via RS422 between the OP-9001 and the operator interfaces. If you use a good quality shielded cable, you can have a total distance of up to 4000 feet between the OP-9001 and the last operator interface unit in the chain. If you only have a short distance (up to 30 feet), you can use ribbon cable and easy-to-install crimp-on ribbon connectors.



## Connecting a Power Supply to the OP-9001

### Power Supply Connections

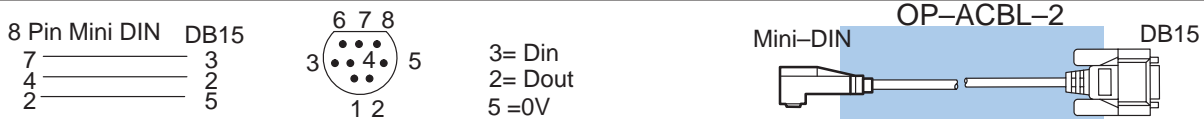
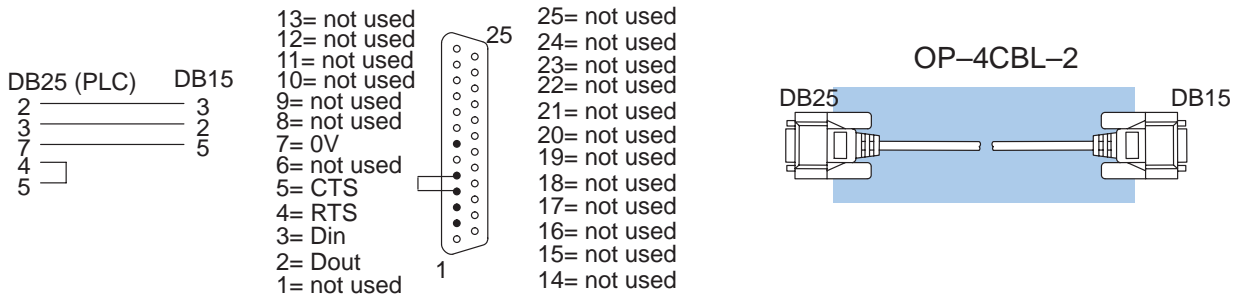
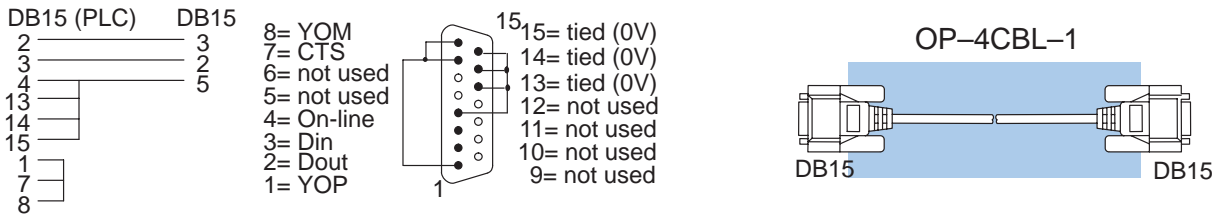
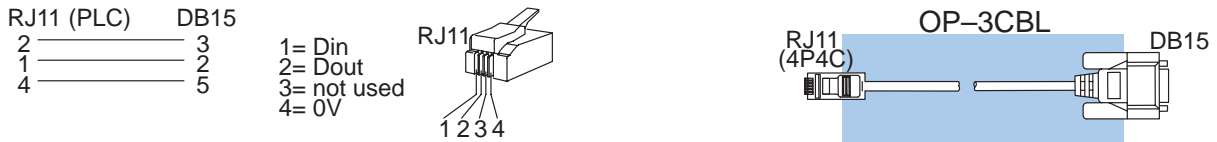
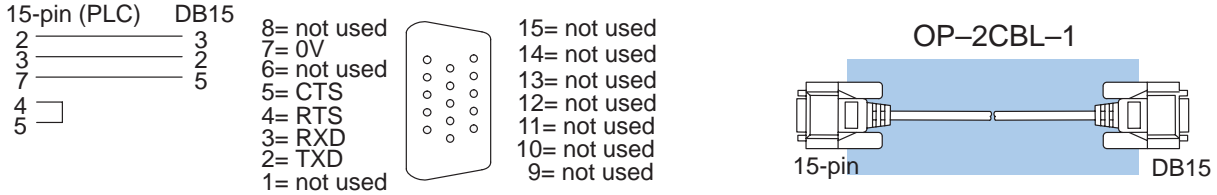
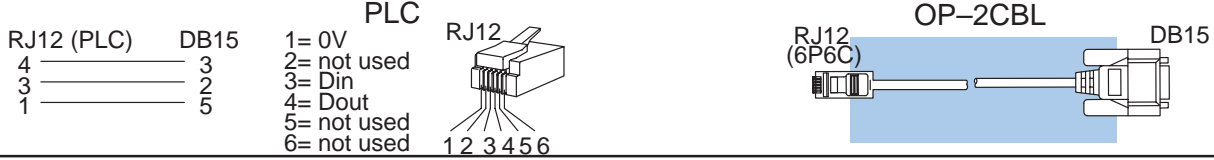
The OP-9001 panel can operate on DC voltages between 8 and 30 VDC rated at 3.75 watts. Connect the panel to a power supply (within the required voltage range and wattage) using the terminal block connector supplied. The connector is polarized to prevent reversing the connections. The male receptacle on the rear of the panel will only connect in one way with the female connector that is supplied with your OP-9001 panel. Pin 1 is the positive connection, while Pin 2 is the negative, or ground, connection.



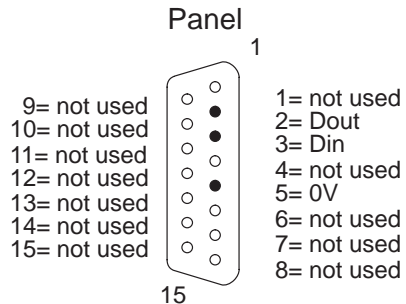
Model	Current Consumed at 12VDC	Current Consumed at 24VDC
OP-9001	0.31A	0.16A

### Pinout Diagrams for Cabling

**Connecting Cable** The connecting cable may vary depending on the CPU used. Refer to the following page to confirm the proper cable is chosen for connecting your PLC.



RS-422 Pinout	
PLC	Panel
Din +	11 = Dout+
Din -	12 = Dout -
Dout +	9 = Din +
Dout -	10 = Din-
0V	5 = 0V
RTS+	
CTS+	
RTS-	
CTS-	



## Choosing Your Connecting Cables

Depending on which PLC you are using, you may require as many as two cables. Here are the requirements:

- **OP-ACBL-1:** *all* units require this cable for configuration. This is a 9-pin female to 15-pin male cable that connects your personal computer to the OP-panel. This cable is also used to connect an OP-panel to the Allen-Bradley SLC 500 CPUs listed.
- **CPU Cables:** You will also need the appropriate cable to connect your CPU to the OP-panel. Use the chart shown to the right to choose the correct communications cable.

OptiMate Cables			
Family	CPU (or other device)	Port	Cable
DirectLOGIC-DL105	DL130	Only port	OP-2CBL
DirectLOGIC-DL205	DL230	Only port	OP-2CBL
		DL240	Top port
	DL250	Bottom port	OP-2CBL
		Top port	OP-2CBL
D2-DCM (module)	Only port	OP-2CBL-1	
DirectLOGIC-DL305	DL330	Requires DCU*	OP-4CBL-2
	DL330P	Requires DCU*	OP-4CBL-2
	DL340	Top port	OP-3CBL
		Bottom port	OP-3CBL
	DL350	Top port	OP-2CBL
Bottom port	OP-4CBL-2		
DirectLOGIC-DL405	DL430	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	DL440**	Top port	OP-4CBL-1
		Bottom port	OP-4CBL-2
	DL450	Phone Jack	OP-2CBL
		Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	D4-DCM (module)	Only port	OP-4CBL-2
Slice I/O panels	Only port	OP-4CBL-1	
GE® Series 1	IC610CPU105/106	Requires DCU*	OP-4CBL-2
GE® Series- 90/30	All Models (311-351)	RS232, RS422 Serial Port	OP-GCBL-1
GE® Fanuc-Series 90 Micro	All Models	RS232, RS422 Serial Port	OP-GCBL-1
MODICON	ModBus	RJ45 port	OP-MCBL-1
TI305™ / SIMATIC® TI305-	325-07, PPX:325-07	Requires DCU*	OP-4CBL-2
	330-37, PPX:330-37	Requires DCU*	OP-4CBL-2
	325S-07 (or 325 w/ Stage Kt)	Requires DCU*	OP-4CBL-2
	330S-37, PPX:330S-37	Requires DCU*	OP-4CBL-2
	335-37, PPX:335-37	Phone Jacks	OP-3CBL
If DCU is used*	OP-4CBL-2		
TI405- / SIMATIC® TI405-	425-CPU, PPX:425-CPU **	Only port	OP-4CBL-1
	PPX:430-CPU	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
	435-CPU, PPX:435-CPU **	Top port (15-pin)	OP-4CBL-1
		Bottom port (25-pin)	OP-4CBL-2
Smart Slice- I/O panels	Only port	OP-4CBL-1	
A-B SLC 500	5/03, 5/04	Bottom port	OP-ACBL-1
A-B	MicroLogix	Only port	OP-ACBL-2

\* — requires RS232 Data Communications Unit (D3-232-DCU)

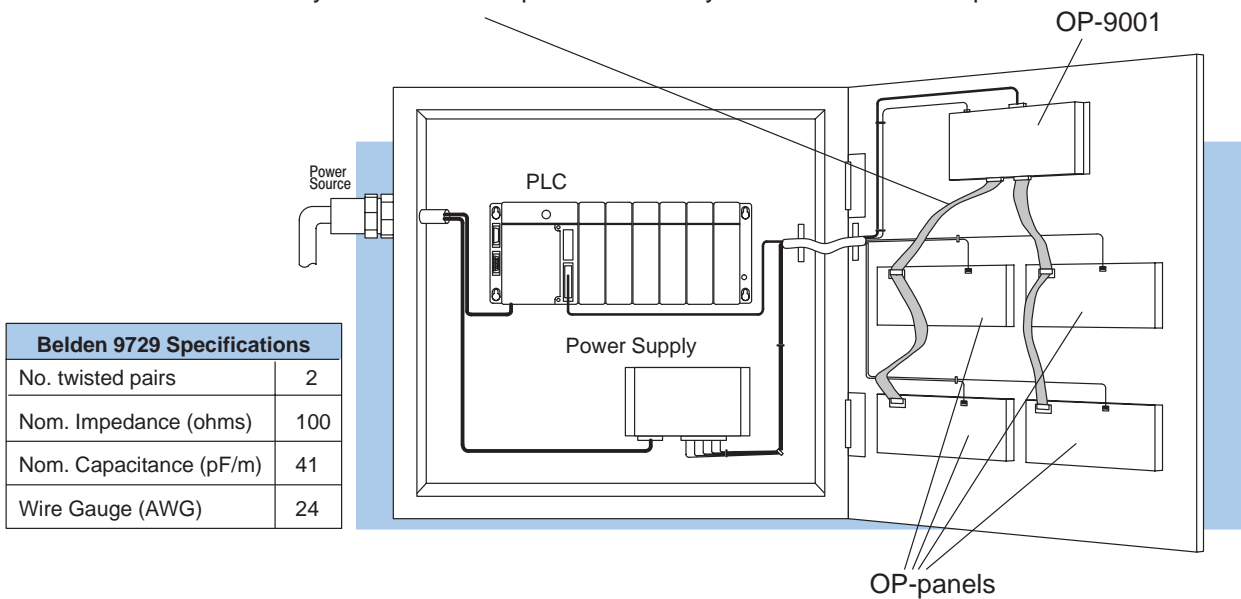
\*\* — also DC versions

# Custom Cables for Connecting Panels to the OP-9001

You must build your own cables for connecting the multiple panels to your OP-9001. Since the proper cable choice really depends on your application, we offer the following connectors. For electrically noisy environments, we recommend a good shielded cable, such as Belden 9729 or equivalent. This type of cable will require the solder-type connectors. If you're going 30 feet or less, you can use ribbon cable. For ribbon cable, we recommend Belden 9L28015 or 3M 3365/15. See the chart below for more details concerning the Belden cable.

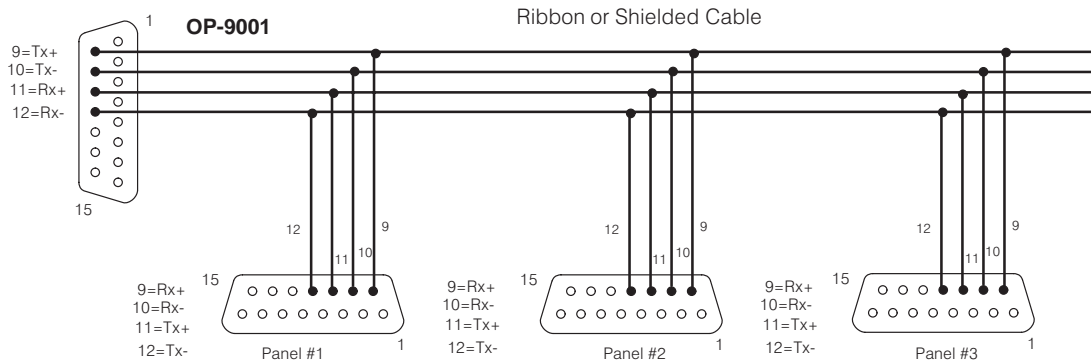
- **OP-CMCON-1** — pack of 4 ribbon cable connectors.
- **OP-CMCON-2** — pack of 4 solder-type connectors.

Ribbon cable with DB15 male connectors attached. Panels can be connected directly to the OP-9001 ports or be daisy-chained to other OP-panels.



Belden 9729 Specifications	
No. twisted pairs	2
Nom. Impedance (ohms)	100
Nom. Capacitance (pF/m)	41
Wire Gauge (AWG)	24

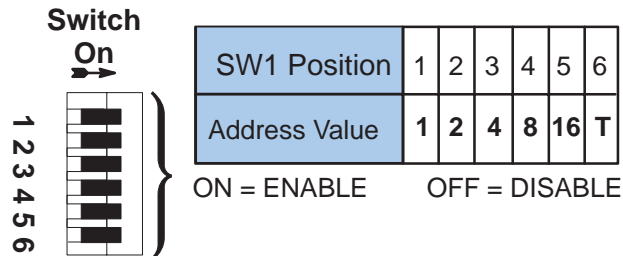
**Note:** Panels can be located as far away as 4000 feet from the OP-9001 when using shielded cable (Belden 9729 or equivalent). Flat ribbon connections can be used for a distance of 30 feet maximum. For ribbon cable, we recommend Belden 9L28015 or 3M 3365/15. **Notice in the diagram below that the receive and transmit lines are wired straight through for each of the panels connected to the OP-9001. For example, pin 9 of the OP-9001 is the Tx+ line and pin 9 of the panel is the Rx+ line. This keeps you from having to twist cable wires. The matchup between Tx and Rx is handled internally by the OP-9001.**



## Setting the Panel DIP Switches and OP-9001 Jumper

**Assigning Addresses to the Panels Connected to the OP-9001** A 6-position DIP switch on the rear of each individual panel allows you to assign a hardware address to your panel. Each panel must have a unique address. You can use any address between 0 and 30 when communicating between a panel and the OP-9001 Master Communications panel. Address 31, however, is reserved. See the note that follows.

**NOTE: You must use Address No. 31 when you are using the OPEditor software to download or upload your panel configurations to each individual panel.**



### How to Set the Operator Panel Addresses

To set the address on any of the individual panels so that they can communicate with the OP-9001, simply set the appropriate switches on the dip switch to the desired address. The figure below shows the binary weighting of each switch position. Notice that it is in decimal format. To select address 14 for example, you would press switches 2, 3 and 4 down to the right, and switches 1, 3 and 5 to the left ( $2 + 4 + 8 = 14$ ). **Remember that you must use address 31 only when communicating with a computer for uploading or downloading.** The letter T in position 6 stands for "terminal resistor". **The final panel in a multi-drop panel configuration should have this position turned ON.**

**NOTE: Each time you change the DIP switch setting, you must power cycle the panel.**

### Setting the Jumper of the OP-9001

There is a jumper terminal on the edge of the OP-9001 (located between the cable connector and the power supply connector). This jumper must be in place in order for the OP-9001 to communicate with your computer for downloading or uploading configurations. You must remove this jumper when you want the OP-9001 to communicate with your PLC.

