



## Port Manager Switches



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#### INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
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7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
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10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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# 1. Specifications

<b>Compliance</b> —	FCC Class A, IC Class/classe A
<b>Interfaces</b> —	Proprietary modular serial, compatible with EIA RS-232 (DTE)
<b>Protocol</b> —	Asynchronous
<b>Code Set</b> —	ASCII
<b>Data Format</b> —	Either 8 data bits, no parity, or 7 data bits, even or odd parity; either 1 or 2 stop bits (independently user-selectable for each port)
<b>Flow Control</b> —	DTR/CTS (hardware), X-ON/X-OFF (software), or both (independently user-selectable for each port)
<b>Operation</b> —	Full duplex (command echo) or half-duplex (no echo), user-selectable
<b>Data Rate</b> —	38,400, 19,200, 9600, 4800, 2400, 1200, or 300 bps (independently user-selectable for each port)
<b>Maximum Distance</b> —	Up to 150 ft. (45.7 m); might be less if you use flat-
<b>Internal Memory</b> —	256 KB battery-backed, autoconfiguring, dynamically allocated buffer SRAM on SIMMs (or DIPs in some units); units with 512 KB are available as special quotes

<b>User Controls —</b>	Keyboard commands; (2) Front-mounted CLEAR and SET pushbuttons; (3) Rear-mounted: (1) 8-position DIP switch for comm. parameters; (1) 115-/220-VAC slide switch; (1) OFF/ON rocker switch
<b>Indicators —</b>	All front-mounted: Both models: ON and RDY (ready) LEDs; SW545 models: (8) ACTIVITY LEDs; SW546 models: (16) ACTIVITY LEDs
<b>Connectors —</b>	All rear-mounted: All models: (1) IEC 320 male power inlet; SW545 models: (8) RJ-11 female; SW546 models: (16) RJ-11 female
<b>Leads/Signals Supported —</b>	Ports 1 and 2: Pins 1 through 6 (CTS in, SGND, RD in, RLSD [DCD] in, TD out, and DTR out respectively); Ports 3 and up: Pins 1 through 6 (CTS in, SGND, RD in, RTS [held high], TD out, and DTR out respectively)
<b>Power —</b>	From outlet through 6-ft. (1.8-m) power cord (included with SW545 units only) and internal power supply: Either 115 VAC, 60 Hz or 220 VAC, 50 Hz (user-selectable); Consumption: 5 watts
<b>Fuse —</b>	250 volts, 125 mA Slo-Blo
<b>Temperature Tolerance —</b>	32 to 122° F (0 to 50° C)



## PORT MANAGER SWITCHES

**Humidity**

**Tolerance —** 20 to 80% noncondensing

**Size —**

1.8" (1U) H x 17"W x 6.5"D (4.4 x 43.2 x 16.5 cm);  
when rackmount brackets are added, the unit is  
19" (48.3 cm) wide

**Weight —**

6 lb. (2.7 kg)

## 2. Introduction

### 2.1 General Overview

With our 8-port and 16-port Port Manager (PM) Switches, you can control and manage a network without having to worry about the in-band restrictions associated with SNMP. Both models of the Switch make it possible to establish on-site or remote communication with any piece of equipment that has an RS-232 command port. You can access such devices without having to travel to the installation site, even when your network is down.

#### *Versatile Connectivity*

The PM Switch provides a practical solution for applications that require communicating with devices using dissimilar data rates. You can individually tailor the Switch's 8 or 16 ports for specific data rates, data formats, types of flow control, and various other custom parameters and options.

#### *Easy Setup and Operation*

Configuring the PM Switch is simple. You can select communications parameters or enable or disable options through a convenient menu system. The Switch can be easily configured to fit the requirements of almost any data-communications application.

#### *Limited Command Access*

The PM Switch is ideal for situations that require two tiers of command/configuration security. You can individually configure the Switch's ports either as Administrator ports with access to all commands, or as User ports with access to basic commands only.

#### *Modular Design*

The PM Switch's RJ-11 jacks can be quickly and easily connected (through RS-232 modular adapters) to computers, modems, and other LAN/WAN hardware. The Switch is compact and occupies only one rack unit (1.75 inches) of vertical rack space.

#### *Buffered Ports*

The PM Switch has 256 KB of nonvolatile, dynamically allocated buffer memory that prevents data from overflowing during communication sessions. If your application requires more memory, call Black Box for technical support; they might be able to provide you with a quote on units with 512-KB buffers.

### *Modem Communication*

You can control the PM Switch either from a local PC directly cabled to it or from a remote PC across a modem link. Use ProComm® (or another communications program) to send commands to ports and to receive and display status information from them. All devices connected to the Switch's ports would have outbound access to the outside world through any connected modem, but the Switch's modem ports are password-protected to restrict unauthorized inbound access to other devices connected to the Switch.

### *Configuration Backup*

Once you have configured the PM Switch to fit the requirements of your application, you can save your chosen parameters and options in the form of an ASCII text file for future retrieval. If the Switch's configuration is accidentally altered or deleted, you can use your terminal-emulation software to reload this configuration file into the unit.

## 2.2 The Port Manager Switches Illustrated

### 2.2.1 THE FRONT PANELS

The front panels of the Port Manager Switches are very similar to each other. The front panel of the 16-port unit is shown in Figure 2-1 below; it includes several controls and indicators, whose functions are described beneath the illustration. The front panel of the 8-port unit does not have ACTIVITY LEDs 9 through 16.

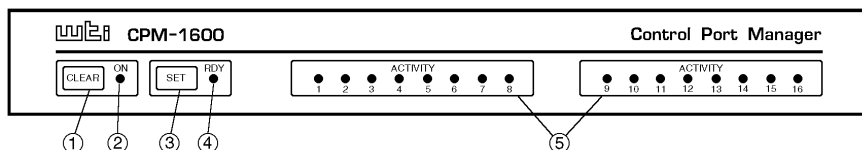


Figure 2-1. The front panel of the 16-port PM Switch.

- ① **CLEAR Button:** Press this to restart the PM Switch's operating program without changing the parameter settings you've chosen or breaking existing port connections.
- ② **ON LED:** Lights when the unit is receiving AC power.
- ③ **SET Button:** Press this button to initialize the PM Switch to the default values corresponding to the current settings of its SETUP Switch (see **Section 3.1**). To initialize the PM Switch, press and hold both the SET button and the CLEAR button, release only the CLEAR button, and then release the SET button.

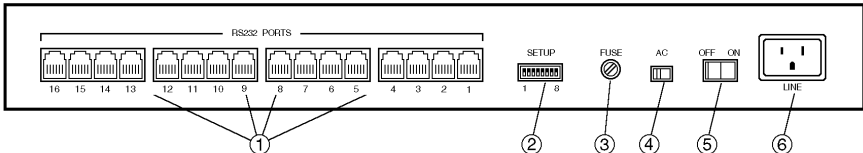
### NOTE

Be aware that when you initialize the PM Switch, all command-selected parameters will be cleared, and the PM Switch will revert to its default parameters. This might cause existing connections to fail and prevent new connections until you issue commands to change parameters on certain ports.

- ④ **RDY LED:** Flashes to show that the unit is operational.
- ⑤ **ACTIVITY LEDs:** Light to show that the corresponding port is receiving data.

## 2.2.2 THE REAR PANELS

The rear panels of the Port Manager Switches are also similar. The rear panel of the 16-port unit is shown in Figure 2-2 below; it includes several controls and connectors whose functions are described beneath the illustration. The rear panel of the 8-port unit does not have RS-232 ports 9 through 16.



**Figure 2-2. The rear panel of the 16-port PM Switch.**

- ① **RS-232 Ports:** Plug six-wire flat-satin or twisted-pair cable from the devices you want to control into these RJ-11 jacks.  
Use Port 1 to communicate with the PM Switch during setup and configuration. When the PM Switch is initialized to its default state, Port 1 is the only port with access to all PM Switch commands.  
You can connect Port 1 to either a PC or modem. (After initial setup, this is also true for Port 2.) When a modem is connected to the PM Switch, you can control the Switch from a remote PC.
- ② **SETUP Switch:** Use this 8-position DIP switch to set the PM Switch's default data rate, flow-control type, message type, port mode, and duplex type. See **Section 3.1.1**.
- ③ **Fuse:** If this should happen to blow for whatever reason, replace it with a 250-volt, 1/8-amp Slo-Blo fuse only.
- ④ **AC Switch:** Slide this switch to the left to select 115-VAC input power. Slide it to the right to select 220-VAC input power.
- ⑤ **ON/OFF Switch:** Move to the ON position to turn the PM Switch ON. Move it to OFF to turn the PM Switch OFF.
- ⑥ **LINE Connector:** Plug the included AC power cord into this universal IEC 320 male inlet.

## 3. Getting Started

This chapter provides a brief overview of the Port Manager Switch's basic capabilities, and describes tests that you can perform to determine whether the unit is operating properly.

### 3.1 Setting Default Communication Parameters

#### 3.1.1 USING FACTORY-DEFAULT PARAMETERS

Use the SETUP DIP switch on the rear panel of the PM Switch to select default settings for all of the PM Switch's RS-232 ports. (A label next to the SETUP switch summarizes its functions.)

When the PM Switch is shipped from the factory, all eight positions of the SETUP switch are set to down. This collective setting corresponds to these parameters: 9600 bps, 8 data bits, no parity, DTR/CTS flow control, verbose command response, and no echo (half-duplex). These parameters should suit most applications; if you need different settings for your application, see **Section 3.1.2**.

Now turn ON the PC you will be using to control the PM Switch. Run its communications program (ProComm, for example), and set the program to use parameters matching those of the PM Switch (9600 bps, 8 data bits, no parity, DTR/CTS flow control, and full duplex in the factory-default configuration).

If you'll be connecting the PC and the PM Switch across a modem link, make sure the modem is set for the data rate and other communication parameters you are using.

#### 3.1.2 SETTING NEW DEFAULT PARAMETERS

If you want to, you can set the PM Switch to use default parameters that match those of your communications program or device instead of vice versa. To do this, refer to the label on the bottom of the PM Switch that shows the possible settings of the SETUP switch, and set the SETUP switch for your desired parameters (see **Section 4.1**). After moving the SETUP switch, initialize (reset) the PM Switch: Press and hold the SET and CLEAR keys, release CLEAR, then release SET. (Your changes will not take effect until you initialize the Switch.) All of the PM Switch's Activity LEDs will flash briefly, then the unit will return to normal operation.

## 3.2 Connecting Your PC to the PM Switch

In order to initially configure the PM Switch, you must connect a PC to Port 1. Port 1 is always used for communication during initial setup, because Port 1 is the only PM Switch port through which you can access all commands (including Administrator commands) when the unit has been initialized to the default state.

(Note that after the unit has been installed and configured, you can give other PM Switch ports access to all PM Switch commands. This allows any PM Switch port to function as a “Control Port” after initial configuration is complete.)

You can control the PM Switch either by using a local PC that communicates with the unit across a single cable, as described in **Section 3.2.1**, or by using a remote PC that communicates with the unit across a modem link, as described in **Section 3.2.2**.

### NOTE

**You can use one of the three modular adapters included with the PM Switch for this purpose if you want to. Two are PC-type adapters: One has a DB9 female connector, pinned to interface with an IBM® AT® or compatible computer; the other has a DB25 female connector, pinned to interface with an IBM® PC/XT™ or compatible computer. The third adapter has a DB25 male connector and is pinned to interface with a standard modem. See Appendix A for a description of the adapter pinouts, end-to-end pinning, and the product codes of the relevant adapter kits if you want to build your own adapters. If you want to order assembled adapters instead of building more, call Black Box for a special quote.**

### 3.2.1 DIRECT CONNECTION

Making a direct connection is the easiest way to configure the PM Switch for the first time. Take these steps:

1. Attach an appropriate modular adapter to your PC's COM port. (Make sure you connect the adapter to the COM port used by your communications program.)
2. Plug one end of one of the modular flat-satin cables included with the PM Switch into the unit's Port 1. Plug the other end of the cable into the adapter you just attached to your PC's COM port. (If you want to use a different cable to make this connection, it must be a six-wire, straight-through-pinned twisted-pair [our product code EYN725MS] or flat-satin [our product code EL06MS] cable with RJ-11 male connectors.)

3. Turn ON the PC and run ProComm (or a similar communications program). Go on to **Section 3.3**.

### 3.2.2 CONNECTION ACROSS A MODEM LINK

If you want to, you can perform first-time configuration across a modem link instead of through a direct connection. Take these steps:

1. If you haven't already done so, run a normal modem cable from the remote PC's COM port to the remote modem's serial port. Make sure you connect this cable to the COM port used by your communications program.
2. Attach an appropriate modular adapter to your local modem's serial port.
3. Plug one end of one of the modular flat-satin cables included with the PM Switch into the unit's Port 1. Plug the other end of the cable into the adapter you just attached to your modem's serial port. (If you want to use a different cable to make this connection, it must be a six-wire, straight-through-pinned twisted-pair [our product code EYN725MS] or flat-satin [our product code EL06MS] cable with RJ-11 male connectors.)
4. Turn ON the remote PC and run ProComm (or a similar communications program). Go on to **Section 3.3**.

## 3.3 Applying Power to the PM Switch

Connect a power cord to the IEC 320 male inlet on the rear panel of the PM Switch. (A power cord is included with the 115-VAC versions of the PM Switches.) Plug the other end of the cord into a working AC outlet. Move the PM Switch's ON/OFF switch to ON. The PM Switch's ON LED should light, and its RDY LED should begin to flash.

### NOTE

**If all of the PM Switch's Port Activity LEDs flash when you power up the box, this may indicate a problem with the PM Switch unit. Please contact Black Box for technical support as described in Section 9.1.**



### 3.4 Communicating with the PM Switch Unit

Take these steps to enter the PM Switch's command mode, explore the unit's basic features, and check for proper operation:

1. If you have not already done so, start your communications program (ProComm, for example).
2. Issue the "Wake Port" command to access the PM Switch Command Mode and make certain the port is ready to receive commands. Type `"/^E [Enter]"` (that is, press the `[/]` key, then simultaneously press the `[Ctrl]` key and the `[E]` key, then press `[Enter]`). The `"PM_>>"` prompt should appear.
  - a) If the `"PM_>>"` prompt is displayed, you have successfully accessed the Command Mode. This shows the PC has contacted the PM Switch, and the unit is operating properly.
  - b) If the `"PM_>>"` prompt is not displayed, this might indicate a problem in communicating with the PM Switch unit. Check the following:
    - Cable connection: Check the cable connection between the PM Switch unit and the PC. Make certain the modular adapter and the RJ-11 cable connectors are firmly seated.
    - Communication parameters: Make certain the PM Switch and ProComm (and the modems, if a modem link is involved) are using the same communication parameters.
3. Type `"/H"` and press `[Enter]`. The PM Switch's Help Screen will appear as shown in Figure 3-1 on the next page. The Help Screen lists all available PM Switch commands, along with a brief description of each command.
4. Type `"/S"` and press `[Enter]`. The PM Switch's Status Screen will appear as shown in Figure 3-2 on the next page. The Status Screen summarizes current conditions at all PM Switch ports. The various fields of the Status Screen are described in more detail in the entry for the `/S` command in **Section 8.4**.

```

/^E           Wake-Up Port
/X           Sleep - Only Accepts Wake-Up Command
/H           Help - Displays COMmand List
/S           Status - Displays Status Screen           n   Port # or name
/W [n]       Who - Displays Port Parameters           N   Port #
/C <n> [n]    Connect - Local [Remote]                |   "or"
/D <n> |...| * Disconnect                             *   "all"
/E <n> | *    Erase Buffer                             <>  Required Entry
/I           Initialize / Test Unit                   []  Optional Entry
/F           Enter Site ID
/J           Read Site ID
/P <n>       Set Port Parameters
/U           Read Port Parameters
/L-[n]      Load Port Parameters
/G-00       Reset All Ports
/D, /E, /I  Commands: Add /Y to bypass "SURE? (Y/N) "

```

**Figure 3-1. The PM Switch's Help Screen.**

# PORT MANAGER SWITCHES

SYSTEM		STATUS		VERSION 1.4				MEMORY 256KB	
PORT	NAME	STATUS	BAUD	E/P	HS	MODE	TIMEOUT	BUFF	CTS
01		*FREE	9600	8N	DTR	ANY	OFF	----	H
02		FREE	9600	8N	DTR	ANY	OFF	----	L
03		FREE	9600	8N	DTR	ANY	OFF	----	L
04		FREE	9600	8N	DTR	ANY	OFF	----	L
05		FREE	9600	8N	DTR	ANY	OFF	----	L
06		FREE	9600	8N	DTR	ANY	OFF	----	L
07		FREE	9600	8N	DTR	ANY	OFF	----	L
08		FREE	9600	8N	DTR	ANY	OFF	----	L
09		FREE	9600	8N	DTR	ANY	OFF	----	L
10		FREE	9600	8N	DTR	ANY	OFF	----	L
11		FREE	9600	8N	DTR	ANY	OFF	----	L
12		FREE	9600	8N	DTR	ANY	OFF	----	L
13		FREE	9600	8N	DTR	ANY	OFF	----	L
14		FREE	9600	8N	DTR	ANY	OFF	----	L
15		FREE	9600	8N	DTR	ANY	OFF	----	L
16		FREE	9600	8N	DTR	ANY	OFF	----	L

Figure 3-2. The PM Switch's Status Screen.

5. The PM Switch can perform two different types of port connections: Resident Connections and Third-Party Connections.
  - a) Resident Connection: This type of connection occurs when your resident port (the port that the device you're using is attached to) issues a /C command to connect to a second port:
    - i. To connect Port 1 to Port 3, type "/C 3" and press [Enter]. Note that while Port 1 is connected to Port 3, the PM Switch will not recognize commands received through Port 1. However, the PM Switch will recognize a Resident Disconnect Sequence (see below) issued at a connected port.
    - ii. Issue a Resident Disconnect Sequence to disconnect Port 1 from Port 3: Type "[Enter]+++[Enter]".
  - b) Third-Party Connection: This type of connection occurs when your resident port issues a command to create a connection between two other ports.
    - i. To connect Port 3 to Port 4, type "/C 3 4" and press [Enter].
    - ii. Note that while Ports 3 and 4 are connected, Port 1 will still recognize PM Switch commands. For example, if you type "/S" and press [Enter], the Status Screen will appear. Note that the "STATUS" column now lists Ports 3 and 4 as connected, while Port 1 is listed as "FREE".
    - iii. Issue a Third-Party Disconnect command to disconnect Ports 3 and 4. Type "/D 3" and press [Enter].
    - iv. Type "/S" and press [Enter] to re-display the Status Screen. Note that the "STATUS" column now lists Ports 3 and 4 as "FREE".

## 4. Installation

6. Define the Site I.D. message. The Site I.D. allows the user to denote the location or name of the PM Switch unit. The Site I.D. cannot include nonprintable ASCII codes such as [NUL] (the null character) and [LF] (the line-feed character).
  - a) Type “/F” and press [Enter]. The PM Switch will prompt the user to enter the Site I.D. Key in the desired Site I.D. and press [Enter]. The Site I.D. can be up to 32 characters long.
  - b) To display the Site I.D., type “/J” and press [Enter].
  - c) Note that the Site I.D. will be cleared when the PM Switch is initialized.

This completes the introductory overview of the PM Switch unit. After you have determined that the unit is operating properly, configure the PM Switch as described in **Chapter 4**.

This chapter describes the procedures for installing the Port Manager Switch and connecting devices to the unit.

### 4.1 Setting the SETUP Switch

When the PM Switch is shipped from the factory, all of the positions of its SETUP DIP switch are set to *down*, which means the PM Switch is configured to default to 9600 bps, 8 data bits, no parity, DTR flow control, verbose command response, and no command echo (half-duplex operation). These factory-default switch settings are compatible with most applications. If the default settings are not compatible with your application, change the switch settings as described in the following subsections.

The SETUP Switch should be set to match the communication parameters used by the device attached to Port 1. This assures that you can access the PM Switch if the unit is initialized to default parameters.

**NOTE**

Communication parameters (data rate, parity, etc.) can also be individually selected for each PM Switch port by accessing the Command Mode and invoking the /P command as described in Section 5.3.4. However, when the PM Switch is initialized, these parameters will return to the settings specified by the current SETUP switch configuration.

If you change the configuration of the SETUP switch while the unit is powered ON, the new configuration will not take effect until you initialize the PM Switch. You can do this by sending the unit the /I command, or you can press and hold the unit's CLEAR and SET buttons, release the CLEAR button, then release the SET button.

Positions 6 and 8 of the SETUP switch are reserved for future use.

**4.1.1 DEFAULT DATA RATE (POSITIONS 1 THROUGH 3)**

Use positions 1 through 3 of the SETUP switch to select the default data rate for all PM Switch ports. The default data rate must match the data rate your control device will use when communicating with the PM Switch. If the control device will communicate across a modem link, select a default data rate that is compatible with the modem.

After the PM Switch has been installed, you can also use the port-configuration command /P to select individual data rates for each port.

Switch Position	Data Rate (bps)
1 2 3	
D D D	9600*
U D D	300
D U D	1200
U U D	2400
D D U	4800
U D U	9600
D U U	19.2K
U U U	38.4K
* = Factory Default	

### 4.1.2 DEFAULT FLOW CONTROL (POSITION 4)

The default flow-control format should be set to match the flow control used by the device attached to Port 1 of the PM Switch. You can use Position 4 of the SETUP switch to select either DTR (hardware) or X-ON/ X-OFF (software) flow control: Set Position 4 *down* for DTR or *up* for X-ON/X-OFF. (DTR is the factory-default setting.)

After the PM Switch has been installed, the port-configuration command `/P` can also be used to select both DTR and XON/XOFF flow control, or no flow control. The `/P` command can select a different flow-control format for each port.

### 4.1.3 DEFAULT RESPONSE MESSAGE FORMAT (POSITION 5)

The PM Switch can respond with either verbose (English text) or terse (numeric /abbreviated) messages. Both terse and verbose response messages are summarized in **Section 8.2**. You can set Position 5 of the SETUP switch to *down* for verbose messages (the factory-default setting) or *up* for terse messages.

After the unit has been installed, the `/P` command can also set the response-message format to “none” (Quiet Mode). When the Quiet Mode is selected, the PM Switch will not send messages in response to commands. The `/P` command can select a different Response-Message Format for each port.

### 4.1.4 DEFAULT COMMAND ECHO (POSITION 7)

You can use Position 7 of the SETUP switch to enable or disable the Command Echo. When you enable Command Echo, characters sent to the PM Switch will be echoed back to the control device. Set position 7 *down* to disable the echo (the factory-default setting) or *up* to enable it.

After the PM Switch is installed, the `/P` command can enable or disable Command Echo individually for each port.

## 4.2 Connecting a Modem to the PM Switch

The PM Switch can be controlled either by a local PC that communicates with the unit across a single cable, or by a remote PC that communicates across a modem link.

The PM Switch's "Modem Mode" provides several useful options that can be employed when the unit is controlled by modem. The Modem Mode, which is only available on PM Switch Ports 1 and 2, provides password-protected access to the Command Mode, and allows the user to redefine the Modem Reset Message and Hang-Up Message.

### NOTE

**An external modem can also be connected to any other PM Switch port, providing that the modem does not require password protection, an externally generated reset message, or a hang-up message.**

**The Modem Mode can also provide password-protected access to the Command Mode when the PM Switch is controlled by a local device that communicates with the unit across a single cable.**

Regardless of whether the unit will be controlled locally or remotely, the Control Device should communicate with the PM Switch through Port 1. This allows access to the unit if the PM Switch is initialized to default parameters. In the default state, Port 1 is the only port with access to all PM Switch commands. (After the PM Switch has been installed and configured, Port 2 can also be connected to a modem to allow remote access to the Command Mode.)

To connect a modem to the PM Switch, first attach an appropriate modular adapter to the modem's serial port. You can use the modem-style adapter included with the PM Switch for this purpose if you want to. This adapter has a DB25 male connector and is pinned to interface with standard asynchronous modems. See **Appendix A** for a description of the adapter pinouts, end-to-end pinning, and the product codes of the relevant adapter kits if you want to build your own adapters. If you want to order assembled adapters instead of building more, call Black Box for a quote.

After you attach the adapter, run a six-wire, straight-through-pinned twisted-pair or flat-satin cable with RJ-11 connectors—either one of the cables included with the PM Switch, or a cable just like them—from the adapter to PM Switch Port 1. Our product codes for these cables are EYN725MS for twisted-pair or EL06MS for flat-satin.



### 4.3 Initializing the Unit to Default Settings

If the SETUP Switch configuration has been changed while the PM Switch is powered ON, the unit must be initialized in order for the new switch configuration to take effect. To do this, simultaneously press the SET button and CLEAR button, located on the front-panel of the PM Switch unit. Then release the CLEAR button, wait one second, and then release the SET button.

### CAUTION!

**When the PM Switch is initialized, the unit will revert to the parameters specified by the current SETUP Switch configuration. Any command-selected parameters will be lost.**

### 4.4 Connecting Devices to the PM Switch

From modems to printers, many different types of devices can be connected to the PM Switch. To physically connect a device to the PM Switch, take these steps:

1. Access the Command Mode.
2. Determine which PM Switch port will be used for connection to the new device (Port 3, for example).
3. Type “/S” and press [Enter]. The PM Switch will display the Status Screen. Find the “BUFF” column in the Status Screen. The BUFF column lists the amount of memory currently being used to store buffered data for each port.
  - a) If the Status Screen indicates the port has data stored in buffered memory, issue the “/E” command to clear the buffer. The “/E” command uses the format:  

```
/E ## [Enter]
```

where ## is the number of the PM Switch port buffer to be cleared. For example, to clear the buffer for port three, type “/E 3” and press [Enter].
  - b) Note that buffered data which has been cleared using the /E command cannot be recovered.
4. Attach an appropriate modular adapter to an RS-232 serial port on the device you intend to connect.

**NOTE**

You can use one of the three modular adapters included with the PM Switch for this purpose if you are connecting a PC, terminal, or modem. Two are PC-type adapters: One has a DB9 female connector, pinned to interface with an IBM® AT® or compatible computer; the other has a DB25 female connector, pinned to interface with an IBM® PC/XT™, compatible computer, or terminal. The third adapter has a DB25 male connector and is pinned to interface with a standard modem. See Appendix A for a description of the adapter pinouts, end-to-end pinning, and the product codes of the relevant adapter kits if you want to build your own adapters. If you want to order assembled adapters instead of building more, call Black Box for a special quote.

- a) Modem: Ports 1 and 2 can be configured for the Modem Mode, which provides password-restricted access to the Command Mode, and allows the user to redefine the Modem Reset and Hang-Up Messages. An external modem can also be connected to any other PM Switch port, providing that the modem does not require password protection, an externally generated reset message, or a hang-up message. Connect an appropriate modular adapter to the modem's serial port.
  - b) PC: You can connect a PC or terminal to any of the PM Switch's RS-232 ports by attaching the appropriate modular adapter to the serial (COM) port of the PC or terminal.
  - c) Serial Printer: You can connect a serial printer to any of the PM Switch's RS-232 ports. Use an adapter assembled from our FA024 kit.
  - d) Other Devices: For a description of the PM Switch Port interface, please refer to Figures A-1 through A-3 in **Appendix A**.
5. Run a six-wire, straight-through-pinned twisted-pair (EYN725MS) or flat-satin (EL06MS) cable with RJ-11 connectors (like the cable included with the PM Switch) from the adapter to a vacant PM Switch RS-232 port.
  6. Select communication parameters for the port as described in **Section 5.3.4**.

## 5. Configuration

This chapter describes how to configure the Port Manager Switch to fit your application.

### 5.1 Accessing the PM Switch's Command Mode

When the Command Mode is active, you can invoke commands to configure the unit, display its status, and connect or disconnect ports. The Command Mode can be accessed from either a local PC that communicates with the PM Switch across a single cable, or from a remote PC that communicates across a modem link.

1. Start the communications program (ProComm, for example) on your local or remote PC. Make certain the PM Switch and ProComm are set for the same communication parameters (data rate, parity, etc.).
2. Access the PM Switch's Command Mode.
  - a) Local Access: To access the command mode from a local PC, type “/^E” and press [Enter]. The PM Switch's Command Mode should now be active.
  - b) Remote Access: To access the command mode from a remote PC, take these steps:
    - i. Dial the number for the modem connected to PM Switch Port 1. The PM Switch should respond with the “ENTER PASSWORD” prompt.

#### NOTE

**The password prompt will not be displayed when the PM Switch is first configured, or immediately after the unit has been initialized. In the default state, the port will be set for the “Any-to-Any” port mode, and the Password feature will be disabled.**

- ii. If you have defined a password for modem access, key in your password and press [Enter]. If the password has not been defined, just press [Enter]. The “PM\_>>” prompt should appear.
- iii. Type “/^E” and press [Enter] to make certain that the Command Mode is active, and that the unit is ready to receive commands.

## **5.2 Defining and Reading the Site I.D.**

When your application involves communicating with several PM Switch units, the Site I.D. can indicate the location or name of each unit. (If you defined the Site I.D. during the initial configuration described in

**Chapter 3**, and have not reinitialized the PM Switch since, skip this section.)

### **NOTE**

**The Site I.D. cannot include nonprintable ASCII Codes, such as nulls and line feeds.**

**The Site I.D. will be cleared when the PM Switch is initialized to default settings.**

To assign the PM Switch a Site I.D., take these steps:

1. Access the Command Mode.
2. Type “/F” and press [Enter]. The PM Switch will prompt you to enter the Site I.D. When it does, key in the desired Site I.D. (this can be up to 32 characters long) and press [Enter].
3. To display and verify the Site I.D., type “/J” and press [Enter].

### 5.3 Port Configuration

#### 5.3.1 CONFIGURATION CONVENTIONS

When responding to prompts, invoking commands, and selecting items from the port-configuration menu, note the following:

- To select an item from the Port Configuration menu, key in the number for the item and press [Enter].
- When defining the Port Name or Password, do not use ASCII control codes (nonprintable characters), the slash character [/], the quotation mark ["], the asterisk character [\*], or blank spaces.
- The Port Name cannot begin with a number.
- Refer to the instructions in each screen for additional functions available under that screen.
- To exit a menu or prompt without changing its current configuration, press [Esc].
- The Password and Port Names are case-sensitive. When defining Passwords or Port Names, take care to note the exact text, including the case of each character.

#### 5.3.2 PORT MODES

The PM Switch offers two port-operation modes: Any-to-Any Mode and Modem Mode.

##### **The Any-To-Any Mode**

When the Any-to-Any Mode is selected, the PM Switch will respond to ASCII commands to connect that port to any other port. All PM Switch ports can be configured for the Any-to-Any Mode.

When a port is configured for the Any-to-Any Mode, a password will not be required in order to access the Command Mode. In addition, the port will not send the defined Modem Reset Message or Hang-Up Message.

### The Modem Mode

The Modem Mode allows the port to be connected to an external modem. A port configured for Modem Mode can also perform all of the functions normally available in the Any-to-Any Mode. Only Ports 1 and 2 can be configured for the Modem Mode.

In addition to allowing data transfer, the Modem Mode also provides several functions specifically related to modem communication. When the Modem Mode is selected, you can also define a password to restrict remote access to the Command Mode. When someone calls the PM Switch across a modem link, the unit will prompt the caller to enter the password. The PM Switch allows three attempts to enter the password. If the correct password is not entered in three attempts, or if the caller does not respond to the password prompt within 30 seconds, the PM Switch will disconnect and reset the modem.

The Modem Mode also allows redefinition of the Modem-Reset Message and Hang-Up Message. Although the default reset and hang-up messages are compatible with most modems, these messages can be redefined when necessary.

Note that a modem can also be connected to a PM Switch port configured for the Any-to-Any Mode, providing that the modem does not require an externally supplied reset message or hang-up message.

When using the Modem Mode, note the following:

- The PM Switch supports DCD input and the input and output of flow-control signals on Modem Mode ports, as long as the modular adapter attached to the modem's serial port is pinned correctly. (The included adapter is; when you assemble an adapter from the FA024 adapter kit according to the pinout in **Appendix A**, the DSR signal from the modem must be high in order to pull up the DTR signal.)
- When a modem is connected to the PM Switch, other connected devices can use the modem for calling out. To call out from the modem, invoke the /C command to connect to the port, and access the modem as you normally would.

### 5.3.3 COMMAND AVAILABILITY

The “Commands” field in the Port Configuration menu allows you to specify which PM Switch commands will be available to each port. You can select either “All” commands or only “Basic” commands. The “All” option is normally selected for administrator ports, and allows access to all PM Switch commands. The “Basic” option is normally selected for user ports, and allows limited access to PM Switch commands. **Section 8.3** summarizes the commands and shows which are available under either option.

In the default state, Port 1 is the only port with access to “All” PM Switch commands. When ports are configured, at least one PM Switch port should be granted access to “All” PM Switch commands.

### 5.3.4 PORT-CONFIGURATION COMMANDS

This section describes the procedure for using the Port Configuration Menu to select options for each port.

Note that parameters and options selected at the Port Configuration Menu will stay in effect until the PM Switch is initialized using the /I command or the CLEAR and SET buttons. When the unit is initialized, parameters will revert to the defaults specified by the SETUP switch configuration.

After parameters have been selected, the configuration can be saved to an ASCII file on your PC. Later, if the PM Switch configuration is altered or deleted, you can send the file with the saved parameters to the PM Switch to automatically reconfigure the unit without your having to manually redefine each parameter. **Chapter 7** describes the procedure for saving configuration parameters to an ASCII file.

To select port parameters, take these steps:

1. Access the PM Switch Command Mode.
2. Type “/P”, followed by the number of the port to be configured, then press [Enter]. For example, to configure Port 2, type “/P 02 [Enter]”. The Port Configuration menu, shown in Figure 5-1 on the next page, should appear.
3. (Optional) After all ports have been configured, save your configuration parameters to an ASCII file as described in **Chapter 7**.

```

PORT PARAMETERS #02

1. PORT NAME:
2. BAUD RATE:          9600
3. BITS/PARITY:       8-None
4. STOP BITS:         1
5. HANDSHAKE:         DTR
6. MODE:              Any-to-Any
7. COMMANDS:          All
8. LOGOFF CHAR:       +
9. DISCONNECT
   SEQ:                On
   TIMEOUT:            Off
10. TIMEOUT:          5 Sec
11. MESSAGE TYPE:     Verbose
12. ECHO:              On

Enter: "<" previous port,
       ">" next port,
       "##" change parameter
       <ESC> exit ...

```

**Figure 5-1. The Port Configuration Menu for Port 2.**

The Port Configuration menu offers the following options:

1. **Port Name:** Assign a name to this port (“MODEM,” for example). This name can be up to eight characters long, and it is case-sensitive (for example, the unit considers “MODEM” and “Modem” to be different names).
2. **Data Rate:** Set the data rate for this port. You can choose any standard rate from 300 to 38.4K bps.
3. **Bits/Parity:** Set the number of data bits and type of parity for this port. You can choose 8/none, 7/even, or 7/odd.
4. **Stop Bits:** Set the number of stop bits—1 or 2—for this port.
5. **Handshake:** Define the handshaking format (type of flow control) for this port. You can choose None, X-ON/X-OFF (software), DTR (hardware), or Both.



**6. Mode:** Define the operation mode for this port. For Ports 1 and 2, you can select either Any-to-Any Mode or Modem Mode. For Ports 3 and above, you can only select the Any-to-Any Mode.

When you select the Modem Mode for Ports 1 or 2, the PM Switch will display an additional menu that is used to select the following parameters:

1. *Password:* Define a Password to restrict modem access to the Command Mode. To disable the password requirement, press [Enter] without keying in a password. The Password is case-sensitive, and can be up to 32 characters long.
2. *Reset Message:* When necessary, this option can be used to redefine the modem-reset message. The default Reset Message is "ATQ0&C1&D0S0=1". This reset message is compatible with most modems.
3. *Hang-Up Message:* When necessary, this option can be used to redefine the modem hang-up message. The default Hang-Up Message is "~~~+++~~~ATH0". This Hang-Up Message is compatible with most modems.

**7. Commands:** Determine which commands will be available to this port. The port can be configured to recognize only "Basic" commands (user), or "All" commands (administrator). When the PM Switch is configured, at least one port (typically Port 1) should be granted access to all PM Switch commands.

**8. Logoff Char.:** Select the Logoff Character for this port. The Logoff Character determines the Logoff Sequence that must be issued at this port in order to disconnect it from a second port (that is, to perform a Resident Disconnection). When you choose the Logoff Character, be aware of the following:

- The default Logoff Character is "+". As a result, the default Logoff Sequence is "[Enter]+++[Enter]".
- If you choose a different Logoff character, it must be entered three times in place of the "+++" in the default Logoff Sequence. For example, if you choose "#" as the Logoff Character, the Logoff Sequence becomes "[Enter]###[Enter]".

- The Logoff Character should only be redefined when the default Logoff Sequence is not compatible with your application.
  - The disconnect sequence is not used when performing a Third-Party Disconnection. The /D command is used to initiate a Third-Party Disconnection.
- 9. Disconnect:** Enable or disable the Logoff Sequence (“SEQ:”) and/or Timeout Disconnection (“TIMEOUT:”) for this port. Be aware that if you disable both the Logoff Sequence and the Timeout Disconnection for a port, the only way to terminate any connection made to the port will be to either:
- a) Send a Logoff Sequence or wait for a Timeout Disconnection at the port at the other end of the connection, or
  - b) Initiate a Third-Party Disconnection from a third port with “All” command capability.
- 10. Timeout:** Select the Timeout Period for this port. When Timeout Disconnection is enabled for this port, and the port does not receive or transmit data for the specified Timeout Period, the port will disconnect from the associated port. You can choose 1, 5, 15, or 30 seconds or 1, 5, 15, or 30 minutes as the Timeout Period.
- 11. Message Type:** Define the type of response messages that will be sent when the PM Switch responds to commands. You can select Verbose Messages (English-text response), Terse Messages (numeric/ abbreviated response), or Quiet Mode (no response).
- 12. Echo:** Enable or disable command echo (that is, choose the duplex setting). If command echo is enabled (full duplex), commands sent to the PM Switch will be echoed back to the sending device. If command echo is disabled (half-duplex, the default setting), commands will not be echoed.

## 6. Operation

### 6.1 Connecting and Disconnecting Ports

This section describes how to use ASCII commands to make and break connections between Port Manager Switch ports.

Because the PM Switch converts data rates and other communications parameters, you can connect devices to the unit that use dissimilar data rates, parity, flow control, etc.

#### 6.1.1 CONNECTING PORTS

Two different types of connections can be made between PM Switch ports: Resident Connections and Third-Party Connections.

For a Resident Connection, your resident port (the port to which the device you're using is attached) issues a /C command to connect to a second port. For example, if Port 4 issues the /C command to connect to Port 5, this is a Resident Connection.

For a Third-Party Connection, your resident port issues a /C command to create a connection between two other ports. For example, if Port 1 is your resident port, and Port 1 issues a command to connect Port 2 to Port 3, this is a Third-Party Connection.

### NOTES

**Port Names are case-sensitive. When invoking the /C command, make certain to use the right case for each letter of the Port Name.**

**Ports that have been assigned Basic (User) command capability can use the /C command to perform a Resident Connection only. Ports with Basic command capability cannot initiate a Third-Party Connection.**

To connect PM Switch ports, take these steps:

1. Access the PM Switch Command Mode.
2. Invoke the /C command to connect the desired ports.
  - a) **Resident Connection:** To connect your resident port to another port, type “/C *nn*” (where *nn* is the number or name of the port you want to connect to), then press [Enter].
 

Examples:

To connect your resident port to Port 8, type “/C 08 [Enter]”.

To connect your resident port to a port named “MODEM,” type “/C MODEM [Enter]”.
  - b) **Third-Party Connection:** To connect any two ports (other than your resident port), type “/C *nn NN*” (where *nn* and *NN* are the numbers or names of the two other PM Switch ports, then press [Enter]..
 

Examples:

To connect Port 5 and Port 6, from a third port with “All” command capability, type “/C 05 06 [Enter]”.

To connect a port named “SALES” to a port named “MODEM” from a third port with “All” command capability, type “/C SALES MODEM [Enter]”.

When you send a /C command with a port name, it is only necessary to enter enough letters to differentiate the desired port from other ports. For example, if you want to connect your resident port to a port named “SALES”, and no other port names begin with the letter “S,” you can send just “/C S”.

### 6.1.2 DISCONNECTING PORTS

There are three different methods for disconnecting ports: the Resident Disconnection, the Third-Party Disconnection, and the No-Activity Timeout. Providing the timeout feature has been enabled, a No-Activity Timeout can be used to disconnect resident ports or Third-Party ports.

#### NOTE

**When you use DTR flow control for a given port, the DTR signal will drop for approximately 250 ms after that port is disconnected from another.**

1. **Resident Disconnection:** Disconnecting your resident port from another port. For example, if you are communicating through Port 3, and Port 3 is connected to Port 4, a Resident Disconnection would be used to disassociate the two ports. A Resident Disconnection is initiated by sending a Logoff Sequence.
  - a) The default Logoff Sequence is “[Enter]+++[Enter]”.
  - b) If the default Logoff Sequence is not compatible with your application, you can redefine the Logoff Character with the /P (Port Configuration) command. For example, if the Logoff Character is redefined as “@”, the new Logoff Sequence will be “[Enter]@@@[Enter]”.
2. **Third-Party Disconnection:** Disconnecting two ports by sending the /D command from a third port. For example, if you are communicating through Port 1, and you wish to disconnect Port 3 from Port 4, a Third-Party Disconnection would be used.
  - a) The /D (Disconnect) command can be invoked by any Administrator port (that is, any port that has been granted access to “All” commands.
  - b) The /D command line can specify both connected ports, or either of the two connected ports. For example, if Port 1 has access to “All” commands, you can disconnect Port 3 from Port 4 by sending any one of these commands through Port 1:

```
/D 03 04 [Enter] or
/D 03 [Enter] or
/D 04 [Enter]
```

- c) The /D command line can specify port names instead of port numbers. However, port names are case-sensitive, so make sure you use the right case for each letter of the port name.
3. **No-Activity Timeout:** Providing that the Timeout Disconnection feature has been enabled for either connected port, the No-Activity Timeout can be used to automatically disconnect any two connected ports.
- a) The Timeout Feature is enabled and defined by invoking the /P command to access the Port Configuration Menu for the desired port. Option 9 is used to enable or disable the Timeout Feature, and Option 10 is used to define the Timeout Period.
  - b) When the Timeout Feature has been enabled, the port will automatically disconnect when no additional data is received for the defined Timeout Period. The default Timeout Period is 5 seconds.

## 6.2 Defining Hunt Groups

A “hunt group” is a user-specified set of ports that you can direct the PM Switch to scan and connect to the first available member. Hunt groups are created by assigning identical or similar port names to two or more ports. Any port can belong to a hunt group. To create a hunt group, take these steps (remembering that port names are case-sensitive):

1. Access the PM Switch Command Mode.
2. Invoke the /P command to access the Port Configuration Menu for one of the ports you want to include. For example, to configure Port 4, type “/P 4 [Enter]”.
3. From the Port Configuration Menu, select item 1 to define the port name.

4. Repeat steps 2 and 3 above to assign similar or identical names to the other ports you wish to include in the hunt group. For example, a series of ports in a hunt group could be named “sequentially”—“PRINTER1”, “PRINTER2”, “PRINTER3”, etc.—or all ports in the group could be assigned the same name, such as “PRINTER”.
5. To connect to the next available port in the hunt group, invoke the /C (Connect) command using the “group name” to specify the desired group of ports. For either example group in step 4, you would simply send “/C PRINTER [Enter]”.
6. The PM Switch will connect to the first available port in the hunt group. If all ports in the specified hunt group are presently connected, the PM Switch will respond with a “BUSY” message.

Note that it is only necessary to enter enough letters of the port name to differentiate the ports in the hunt group from other ports. For example, to connect your resident port to the first available port in a group of ports named “SALES-US”, “SALES-CA”, “SALES-EU”, etc., the connect command can be invoked as “/C SALES”, or even as “/C S” (providing no other port names begin with the letter “S”).

The names of ports in hunt groups must be unique to that group. Otherwise ports with names that are similar or identical to those of the hunt group will also be included in the hunt group.

- Hunt Group Example 1: PM Switch Ports 1 and 2 have been configured for the Modem Mode, and modems have been installed at both ports. Port 1 has been named “MODEM1” and Port 2 has been named “MODEM2”. If your resident port is Port 4, and you want to connect to the first available modem, access the PM Switch Command Mode, type “/C MODEM”, and press [Enter].
- Hunt Group Example 2: Ports 3, 4, and 5 have been configured for the Any-to-Any Mode and printers are attached to each port. All three ports have been named “PRINTER”. If your resident port is Port 1, and you want to connect Port 2 to the first available printer, access the PM Switch Command Mode, type “/C 02 PRINTER” and press [Enter].

## 6.3 Port Buffers

When two ports are communicating at dissimilar data rates, the PM Switch's port buffers prevent data overflow at the slower of the two ports.

The port buffers are a collective 256 KB of nonvolatile memory that is shared for buffering purposes by all PM Switch ports. Buffer memory is dynamically allocated in 2-KB blocks. The Status Screen lists the amount of buffer memory currently being used by each port.

Note that if data is allowed to accumulate in a port buffer, this will decrease the amount of buffer memory available to other ports. If the Status Screen indicates an accumulation of data at an unused port, the /E (Erase Buffer) command can be invoked to clear the buffer. To clear a buffer, type "/E *n* [Enter]", where *n* is the one- or two-digit number of the port whose buffer is to be cleared.

### NOTES

**You cannot use port names or hunt-group names as arguments for /E commands.**

**To clear all port buffers, use an asterisk as the argument for an /E command (that is, type "/E \* [Enter]").**

**If your application requires more than 256 KB of buffer memory, call Black Box for technical support; they might be able to provide you with a special quote on PM Switches with 512-KB buffers.**



## 7. Saving Configuration Parameters

After you have configured the Port Manager Switch to fit the requirements of your application, configuration parameters can be downloaded to your PC and saved as an ASCII text file. Later, if the configuration is accidentally altered or deleted, the file with the saved parameters can be uploaded to automatically reconfigure the PM Switch without the need to manually redefine each parameter.

The saved parameters can also be uploaded to other PM Switch units. This allows rapid setup when several PM Switch units will be configured with the same parameters.

This chapter describes the procedures for using ProComm to save and load PM Switch parameters. Note that this procedure can also be adapted for use with other communications programs.

### 7.1 Sending Parameters to a File

1. Start ProComm and access the PM Switch Command Mode.
2. Use the /P command to disable the PM Switch's echo feature as described in **Section 5.3.4**. When the Port Configuration menu is displayed, option 12 is used to enable or disable the echo feature.
3. Press the [Page Down] key.
4. The ProComm Download Menu will appear. Select "(A) ASCII". ProComm will display a prompt which reads "ASCII DOWNLOAD - Please enter file name".
5. Type in a name for the file that will contain the saved PM Switch parameters, using the full path and drive designation ("C:\PMSWITCH.PAR", for example), then press [Enter].

6. At the ProComm screen, type “/U” and press [Enter]. The PM Switch will send a series of command lines to the file specified in Step 5 above. Each line describes parameters for an individual port.
  - a) The /U command must be invoked before ProComm’s download timeout is reached. The download timeout can be redefined using ProComm’s setup menu.
  - b) ProComm will emit a beep when the download-timeout period has elapsed.
7. When the PM Switch has finished sending parameters, press [Esc] to terminate ProComm’s Download mode.

### 7.2 Restoring Saved Parameters

1. Start ProComm and access the PM Switch Command Mode. Press the [Page Up] key to activate ProComm’s Upload menu.
2. Select “(A) ASCII”. The system will display a prompt which reads “ASCII UPLOAD - Please enter the file name”.
3. Key in the name of the ASCII text file with the stored parameters, using the full path and drive designation (“C:\PMSWITCH.PAR”, for example), then press [Enter].
4. ProComm will send the ASCII text file to the PM Switch and the saved parameters in the file will be restored. When ProComm has finished sending parameters to the PM Switch, press [Esc] to terminate ProComm’s Upload mode.
5. Type “/S” and press [Enter]; the PM Switch’s Status Screen will be displayed. Check the Status Screen to make certain the PM Switch has been configured with the saved parameters.

## 8. Command Reference Guide

This chapter describes the Port Manager Switch's command set and explains options available to each command.

### 8.1 Command Conventions

The commands described in this chapter use the following conventions:

**Slash Character:** Almost all commands begin with the slash character [/]. The only exception is the Logoff Sequence (default = “[Enter]+++[Enter]”).

**Asterisk Character:** When the asterisk character is entered as the argument of the /D (Disconnect Port) or /E (Erase Buffer) command, the command will be applied to all ports. For example, to disconnect all ports, type “/D \* [Enter]”.

**Suppress “SURE (Y/N)?” Prompt:** When the /D (Disconnect Port), /E (Erase Buffer), or /I (Initialize Unit) commands are invoked, the /Y option can be included in the command line to override the “SURE (Y/N)?” prompt. For example, to disconnect Port 8 without displaying the “SURE? (Y/N)” prompt, type “/D/Y 8 [Enter]”.

**Enter Key:** All commands are invoked by pressing the [Enter] key.

**Command Mode:** PM Switch Ports will only recognize commands when the Command Mode has been accessed. To access the Command Mode, type “/^E [Enter]” (^E = [Ctrl] + [E]).

**Connected Ports:** When the /C command has been issued to connect two ports, most PM Switch commands will not be recognized by either of the two connected ports. The only exception is the Logoff Sequence (default = “[Enter]+++[Enter]”), which will cause the two ports to disconnect.

## 8.2 Command Response

When commands are sent to the PM Switch, the unit can respond with either verbose (English-text) or terse (numeric/abbreviated) messages. The default message type for all PM Switch ports can be set to either terse or verbose by moving Position 5 of the PM Switch's SETUP switch.

After you select the default response-message type, you can use the Port Configuration (/P) command to specify an individual response-message format for each port. In addition to the Terse and Verbose response modes, the /P command can also select the Quiet Mode. When the Quiet Mode is selected for a PM Switch port, that port will not send messages in response to commands.

The table below summarizes the various response messages for both the Terse and Verbose modes.

Terse	Verbose
0	OK
1	PORT CONNECT
2	BUSY
3	PORT DISCONNECT
4	INVALID COMMAND
5	SURE ? (Y/N)
6	INVALID PARAMETER
7	INVALID SYNTAX
8	INVALID ACCESS
9	INVALID PORT TYPE
A	COMMAND ABORTED

## 8.3 Command Summary

Table 8-1 below summarizes all available PM Switch Commands.

**Table 8-1. The PM Switch's Commands**

Function	Command Syntax	Command Availability	
		All (Admin.)	Basic (User)
Wake Up	/^E [Enter]	X	X
Sleep	/X [Enter]	X	X
Help	/H [Enter]	X	X
Status	/S [Enter]	X	X
Who (View Port Parameters) <sup>1</sup>	/W [n] [Enter]	X	X <sup>1</sup>
Connect <sup>2</sup>	/C <<n>> [n] [Enter]	X	X <sup>2</sup>
Resident Disconnection <sup>3</sup>	[Enter]+++[Enter]	X	X
Third-Party Disconnection <sup>4</sup>	/D[/Y] <<n>> [n] [Enter] /D[/Y] * [Enter]	X	
Erase Buffer	/E[/Y] <<n>> [Enter] /E[/Y] * [Enter]	X	
Initialize	/I[/Y] [Enter]	X	
Enter Site ID	/F [Enter]	X	
Read Site ID	/J [Enter]	X	X
Set Port Parameters	/P <<n>> [Enter]	X	
Read Port Parameters	/U [Enter]	X	

<sup>1</sup>A port with "Basic" command capability cannot view parameters for a port configured for the Modem Mode. This prevents passwords from being displayed.

<sup>2</sup>A port with "Basic" command capability can establish a Resident Connection, but cannot perform a Third-Party Connection.

<sup>3</sup>Resident Disconnection: Used to disconnect your resident port from another port. Note that the Logoff Sequence can be redefined through the Port Configuration Menu (/P).

<sup>4</sup>Third-Party Disconnection: Used to disconnect two or more non-resident ports. Must be issued from a third port with "All" command capability.

## 8.4 Command Set

### Wake Up (Access Command Mode) (/^E)

Waking a port will provide access to the PM Switch's Command Mode, allowing you to enter commands to connect ports, display status, etc. When the Command Mode is inactive, the PM Switch will not respond to any commands except the /^E command.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /^E [Enter]

*PM Switch Response:* The Switch will respond as follows:

- Any-to-Any Mode: The “PM\_>>” prompt will appear.
- Modem Mode: The Switch will display the “ENTER PASSWORD” prompt. When the correct password is entered, the “PM\_>>” prompt will appear. After three unsuccessful attempts to enter the password, the port will be put back to sleep.

### Sleep (Exit Command Mode) (/X)

Puts the port to sleep and exits the PM Switch's Command Mode. While a port is sleeping, the unit will not recognize any PM Switch commands except the /^E (Wake Up) command. Note that exiting from the Command Mode will not terminate user-specified port connections. The /X command functions as follows:

- Any-to-Any Mode: Exits the PM Switch Command Mode. When the Command Mode is inactive, the port will not respond to any command except the Wake Up command (/^E).
- Modem mode: Disconnects and resets the modem. The “hang up” message is sent, the hardware (DTR) line to the modem drops for 250 ms, and the reset message is sent.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /X [Enter]

*PM Switch Response:* (Terse and Verbose) “PORT ASLEEP”

### **Help (/H)**

Displays a Help Screen, which lists all PM Switch commands along with a brief description of each command.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /H [Enter]

*PM Switch Response:* Displays Help Screen.

### **Status (/S)**

Displays the Status Screen, shown below, which lists current conditions and parameters for all PM Switch ports.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /S [Enter]

*PM Switch Response:* The Status Screen:

## CHAPTER 8: Command Reference Guide

SYSTEM STATUS		VERSION 1.4						MEMORY 256KB	
PORT	NAME	STATUS	BAUD	B/P	HS	MODE	TIMEOUT	BUFF	CTS
01	SYSOP	*FREE	9600	8N	DTR	ANY	OFF	----	H
02	MODEM	C-05	19.2	8N	DTR	MODEM	5 MIN	----	H
03	SALES1	FREE	9600	8N	DTR	ANY	OFF	----	L
04	SALES2	*FREE	9600	8N	DTR	ANY	OFF	----	L
05	SALES3	C-02	19.2	8N	DTR	ANY	OFF	----	H
06	SALES4	FREE	9600	8N	XON	ANY	15 MIN	----	L
07	ENGR1	*FREE	9600	8N	DTR	ANY	5 SEC	----	L
08	ENGR2	C-09	9600	8N	DTR	ANY	OFF	----	H
09	ENGR3	C-08	9600	8N	DTR	ANY	5 MIN	----	H
10	SUPPORT1	FREE	9600	8N	DTR	ANY	5 SEC	----	L
11	SUPPORT2	FREE	9600	8N	DTR	ANY	OFF	----	L
12	SUPPORT3	FREE	9600	8N	DTR	ANY	OFF	----	L
13	PRB	FREE	9600	8N	DTR	ANY	1 MIN	----	L
14	NETALARM	FREE	9600	8N	DTR	ANY	BOTH	----	H
15		FREE	9600	8N	DTR	ANY	OFF	----	L
16		FREE	9600	8N	DTR	ANY	OFF	----	L



The Status Screen lists the following parameters:

- **PORT:** The Port Number.
- **NAME:** The user-defined Port Name.
- **STATUS:** The current status of each port:
  - \* The port has accessed the PM Switch Command Mode.
  - FREE** The port is not in use.
  - C-*nn*** The port is connected to port number *nn*.
- **BAUD:** The Port's data rate in bps or (for "19.2" or "38.4") Kbps.
- **B/P:** The port's data-bits and parity settings.
- **HS:** The port's flow-control (handshaking) setting:
  - XON** X-ON/X-OFF
  - DTR** DTR/CTS
  - BOTH** Both X-ON/X-OFF and DTR/CTS
  - NONE** No flow control
- **MODE:** The user-selected port mode, either "ANY" (Any-to-Any Mode) or "MODEM" (Modem Mode). Note that the Modem Mode is only available to Ports 1 and 2.
- **TIMEOUT:** The status of the Resident Disconnection and No-Data Timeout features for the port:
  - OFF** Timeout disabled, but Resident Disconnection still possible with Logoff Sequence.
  - [Time value]** Resident Disconnection disabled, but No-Data Timeout will cause automatic disconnection after indicated time.
  - BOTH** Both features enabled. (To see No-Data-Timeout periods, you must use the /W command for each specific port.)
  - NONE** Both features disabled—port can only be disconnected by actions taken at other ports.
- **BUFF:** The amount of data currently stored in the buffer for this port. The PM Switch will allocate buffer memory in 2-KB blocks. If necessary, the /E command can be issued from a port with "All" command capability to clear data from port buffers.

- **CTS:** The status of the port's DTR (Data Terminal Ready) output hardware signal: H is high (active) and L is low (inactive). The port's DTR signal is wired through the modular adapters to PCs' CTS (Clear to Send), DSR (Data Set Ready), and RLSD (Received Line Signal Detector)—also known as DCD (Data Carrier Detect)—input hardware leads. At least one of these leads needs to be high in order for the port to communicate properly with most PC communication programs.

### Who (View Port Parameters) (/W)

Displays the current configuration of an individual port, but does not allow the user to change port parameters.

### NOTE

**When this command is issued from a port with Basic (User) command capabilities, the PM Switch will not display parameters for any port configured for the Modem Mode. This prevents the port password from being displayed.**

**If you specify a port name with this command, it must be unique. If you specify a name or part of a name that is shared by more than port, the PM Switch will reject the command.**

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /W *nn* [Enter]

where *nn* is the two-digit number, or the name, of the desired port.

*PM Switch Response:* Displays port parameters.

*Examples:*

- To display parameters for your resident port, access the PM Switch Command Mode and type "/W [Enter]".
- To display parameters for Port 7, access the PM Switch Command Mode and type "/W 07 [Enter]".
- To display parameters for a port named "SALES", access the PM Switch Command Mode and type "/W SALES [Enter]"

### **Connect (/C)**

Establishes a bidirectional connection between two ports. There are two different types of PM Switch port connections:

- **Resident Connection:** If the /C command specifies one port name or number, the PM Switch will connect your resident port with the specified port. If the command specifies a name associated with a hunt group (see **Section 6.2**), the PM Switch will connect your resident port to the first available port in that group.
- **Third-Party Connection:** If the /C command specifies two port numbers or names, the PM Switch will connect the two ports indicated by the command. Note that a Third-Party Connection command must be issued from a third port which has been granted access to “All” PM Switch commands. Ports which have been configured for “Basic” command capability cannot perform a Third-Party Connection.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /C *m n* [Enter]

where *m* and *n* are the numbers or names of the ports to be connected.

*PM Switch Response:*

Verbose: “PORT CONNECT”

Terse: “1”

*Examples:*

- **Resident Connection:** To connect your resident port to Port 16, access the PM Switch Command Mode and type “/C 16 [Enter]”.
- **Third-Party Connection:** To connect Port 12 to Port 14, access the PM Switch Command Mode from a third port with “All” command capability and type “/C 12 14 [Enter]”.

**Third-Party Disconnection (/D)**

When two ports are connected, the /D command can be invoked at a third port with “All” command capability in order to disconnect them. Note that the /D command cannot be used to disconnect your resident port. To disconnect your resident port, issue the Logoff Sequence (default = “[Enter]+++[Enter]”) or wait for the Timeout Period to elapse (if Timeout Disconnection is enabled). Also be aware that you only need to specify one of the two connected ports to break the connection and free up both ports.

*Command Availability:* All (Administrator)

*Command Format:* /D[/Y] n [m ...] [Enter]

where:

- /Y [optionally] suppresses the “SURE? (Y/N)” prompt;
- n is the number or name of the [first] port to be disconnected, or is an asterisk if you want to disconnect all currently connected ports; and
- m, etc. are the numbers or names of additional ports you want to disconnect.

*PM Switch Response:*

Verbose: “SURE? (Y/N)” ; if you then enter “Y,” the Switch will respond with “PORT DISCONNECT.”

Terse: ]enter “Y,” the Switch will respond with “3.”

*Examples:*

- To disconnect Port 2 from Port 3, send either “/D 2 [Enter]” or “/D 3 [Enter]” from a device on a third port with “All” command capability.
- To disconnect Port 2 from Port 3 without having to deal with the “SURE? (Y/N)” prompt, send either “/D/Y 2 [Enter]” or “/D/Y 3 [Enter]” from a device on a third port with “All” command capability.
- To disconnect a group of ports with similar names, send “/D [shared characters] [Enter]” from a device on a third port with “All” command capability. If the three ports you wanted to disconnect were “PC1,” “PC2,” and “PC3,” you would send “/D PC [Enter]”.
- To disconnect all ports, send “/D \* [Enter]” from a device on a port with “All” command capability.

### Erase Buffer (/E)

Erases data from the buffer for a specified port. Note that you cannot specify a port name; you must specify a port number or (to clear all port buffers) an asterisk.

### CAUTION!

**Buffered data which has been cleared by the /E command cannot be recovered.**

*Command Availability:* All (Administrator)

*Command Format:* /E[/Y] n

where:

/Y [optionally] suppresses the “SURE? (Y/N)” prompt; and  
n is the one- or two-digit number of the port whose buffer is to be disconnected.

*PM Switch Response:*

Verbose: “SURE? (Y/N)” ; if you then enter “Y,” the Switch will respond with “OK”.

Terse: “5” ; if you then enter “Y,” the Switch will respond with “0.”

*Examples:*

- To clear the buffer for Port 3, access the PM Switch Command Mode from a port with “All” command capability and type “/E 3 [Enter]”.
- To clear all port buffers without having to deal with the “SURE? (Y/N)” prompt, access the PM Switch Command Mode from a port with “All” command capability and type “/E/Y \* [Enter]”.

**Initialize (/I)**

Tests the PM Switch's internal memory and initializes the system with the default parameters specified by the SETUP switch configuration.

**CAUTION!**

**When the /I command is invoked, the PM Switch will revert to the parameters specified by the SETUP switch configuration. Any command-selected parameters will be lost.**

*Command Availability:* All (Administrator)

*Command Format:* /I[/Y] [Enter]

where /Y [optionally] suppresses the "SURE? (Y/N)" prompt.

*PM Switch Response:*

Verbose: "SURE? (Y/N)"; if you then enter "Y," the Switch will begin the memory test and initialization sequence.

Terse: "5"; if you then enter "Y," the Switch will begin the memory test and initialization sequence.

**Enter Site ID (/F)**

When your application involves communication with several PM Switch units, the Site I.D. can be used to indicate the location or name of each unit. The Site I.D. message can be up to 32 characters long, and cannot include nonprintable ASCII codes such as nulls and line feeds.

*Command Availability:* All (Administrator)

*Command Format:* /F [Enter]

*PM Switch Response:* (Verbose and Terse) "ENTER SITE ID."

**Read Site ID (/J)**

Displays the user-defined Site I.D. message.

*Command Availability:* All (Administrator) / Basic (User)

*Command Format:* /J [Enter]

*PM Switch Response:* Displays Site I.D. Message

## 9. Troubleshooting

### Set Port Parameters (/P)

Displays a menu which allows the user to select options and parameters for an individual port. Please refer to **Section 5.3** for a detailed description of the procedure for defining port parameters.

### CAUTION!

When the unit is initialized (using the */I* command or the **SET** and **CLEAR** buttons), parameters selected with the */P* command will revert to the defaults specified by the **SETUP** switch configuration.

### NOTE

If you specify a port name with this command, it must be unique. If you specify a name or part of a name that is shared by more than port, the **PM Switch** will reject the command.

*Command Availability:* All (Administrator)

*Command Format:* */P n* [Enter]

where *n* is the number or name of the port to be configured.

*PM Switch Response:* The Port Parameters Menu will be displayed.

### Read Port Parameters (/U)

Sends configuration parameters to an ASCII text file as described in **Chapter 7**. When the */U* command is invoked, the system will send a series of command lines describing current port configuration.

*Command Availability:* All (Administrator)

*Command Format:* */U* [Enter]

*PM Switch Response:* The **PM Switch** will send a series of command lines.

# Appendix A: Pinouts

## 9.1 Calling Black Box

If you determine that your Port Manager Switch is malfunctioning, *do not attempt to alter or repair it*. Contact Black Box. The problem might be solvable over the phone.

Before you do, make a record of the history of the problem. Black Box will be able to provide more efficient and accurate assistance if you have a complete description, including:

- The nature and duration of the problem.
- When the problem occurs.
- The components involved in the problem.
- Any particular application that, when used, appears to create the problem or make it worse.

## 9.2 Shipping and Packaging

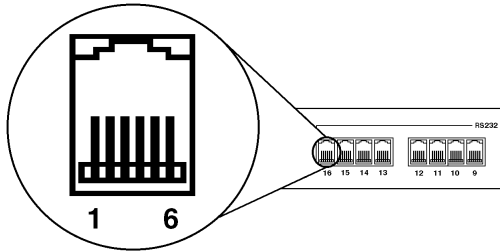
If you need to transport or ship your Port Manager Switch:

- Package it carefully. We recommend that you use the original container.
- Before you ship a unit for repair or return, contact Black Box to get a Return Materials Authorization (RMA) number, and make sure you include everything you received with the unit when you ship it.

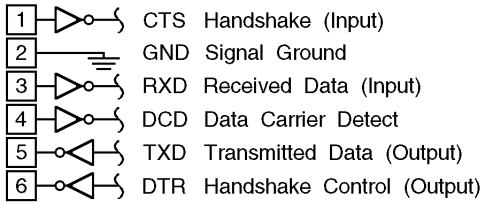


## PORT MANAGER SWITCHES

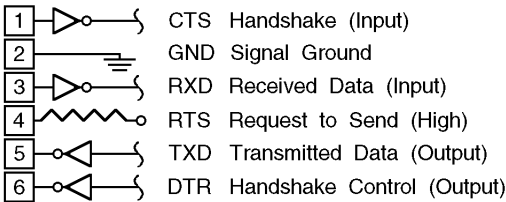
Figure A-1 below shows the pin numbering for the Port Manager Switch's RS-232 ports (RJ-11 connectors). Figure A-2 below shows the pinout (interface schematic) for ports 1 and 2; Figure A-3 below shows the pinout for ports numbered 3 and higher. Figure A-4 on the next page shows possible connections using modular adapters built from kits (our product codes are shown). Figures A-5 and A-6 on pages 58 and 59 show the pinouts of the adapters included with the PM Switch Tables A-1 through A-4 on the following pages show the end-to-end pinning you will need to keep in mind when assembling modular adapters for your application.



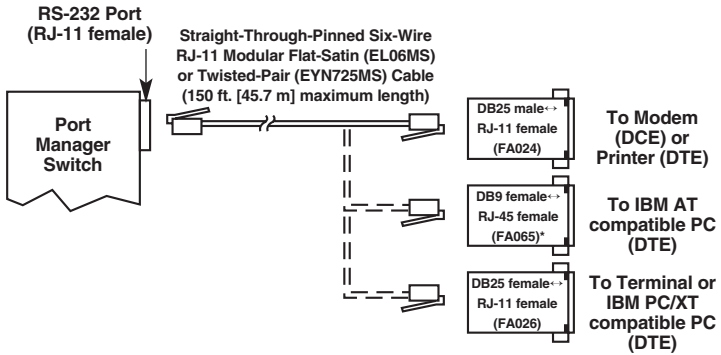
**Figure A-1. The PM Switch's RS-232 ports (RJ-11 connectors).**



**Figure A-2. Circuitry of ports 1 and 2 (Modem Ports).**



**Figure A-3. Circuitry of ports numbered 3 and higher.**



\*We do not currently carry DB9 to RJ-11 adapter kits as a stock item. The RJ-45 connectors on the kits shown are 100% backward-compatible with RJ-11.

Figure A-4. Possible connections using modular adapter kits.

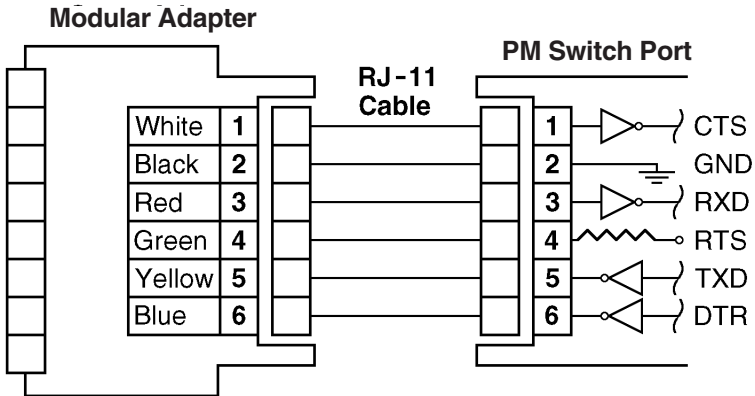
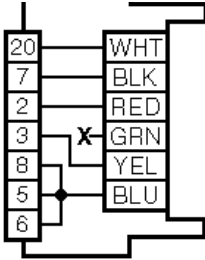
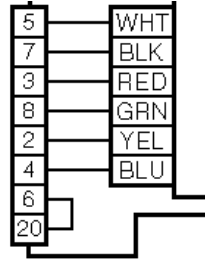


Figure A-5. The common interface of the PM Switch side of the modular adapters included with the Switch.

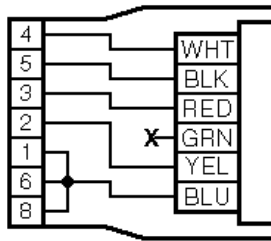
**Modular Adapter with DB25 Female Connector for PC/XT or Terminal (DTE)**



**Modular Adapter with DB25 Male Connector for Modem (DCE)**



**Modular Adapter with DB9 Female Connector for AT (DTE)**



**Figure A-6. The pinouts of the device sides of the modular adapters included with the Switch.**

**Table A-1. End-to-End Pinning, PM Switch RS-232 Port to Modem**

PM Switch (RJ-11 female)		Modem (DB25 female)	
Signal Abbrev.	Pin No.	Pin No.	Signal Abbrev.
CTS*	1	← 5	CTS
SGND	2	— 7	SGND
RD	3	← 3	RD
RLSD (DCD)	4	← 8	RLSD (DCD)
TD	5	→ 2	TD
DTR	6	→ 4	RTS
		← 6	DSR
		→ 20	DTR

**Table A-2. End-to-End Pinning, PM Switch RS-232 Port to Serial Port of AT Compatible Computer**

PM Switch (RJ-11 female)		Computer (DB9 male)	
Signal Abbrev.	Pin No.	Pin No.	Signal Abbrev.
CTS*	1	← 4	DTR
SGND	2	— 5	SGND
RD	3	← 3	TD
RTS	4	— X	
TD	5	→ 2	RD
DTR	6	→ 1	RLSD (DCD)
		→ 6	DSR
		→ 8	CTS

\*The PM Switch expects to see the signal on Pin 1 high.

## PORT MANAGER SWITCHES

**Table A-3. End-to-End Pinning, PM Switch RS-232 Port to Serial Port of Terminal or PC/XT Compatible Computer**

PM Switch (RJ-11 female)		Terminal or Computer (DB25 male)	
Signal Abbrev.	Pin No.	Pin No.	Signal Abbrev.
CTS*	1	← 20	DTR
SGND	2	7	SGND
RD	3	← 2	TD
RTS	4	— X	
TD	5	→ 3	RD
DTR	6	→ 5	CTS
		→ 6	DSR
		→ 8	RLSD (DCD)

**Table A-4. End-to-End Pinning, PM Switch RS-232 Port to Input Port of Serial Printer**

PM Switch (RJ-11 female)		Printer (DB25 female)	
Signal Abbrev.	Pin No.	Pin No.	Signal Abbrev.
CTS*	1	← 20	DTR
SGND	2	7	SGND
RD	3	← 2	TD
RTS	4	— X	
TD	5	→ 3	RD
DTR	6	→ 5	CTS
		→ 6	DSR
		→ 8	RLSD (DCD)

\*The PM Switch expects to see the signal on Pin 1 high.

# Appendix B: SW546A-D48

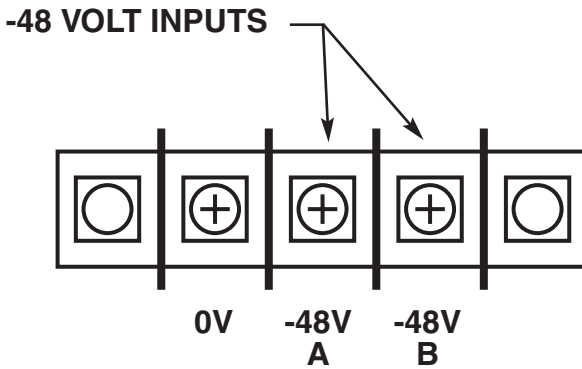
If you ordered product-code number SW546A-D48, this appendix is relevant to your Port Manager Switches's power option.

The 48 Volt DC Power Option (shown below) replaces the standard 117 VAC components on the lower left side of the back panel.

## NOTE

Connect -48 Volts DC between the "0" Volt terminal and either of the -48 Volt terminals.

Input Range: 40-60 VDC, 200 milliamps.







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