



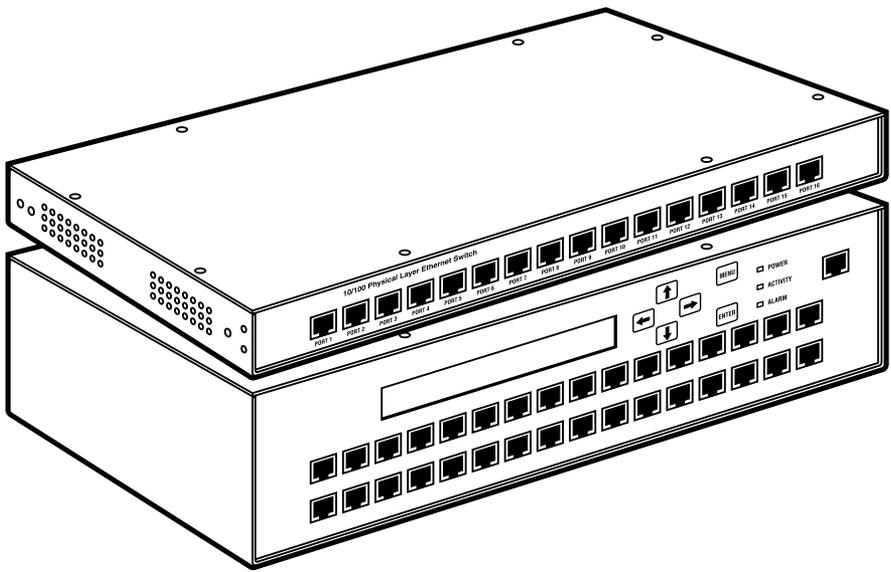
© Copyright 2004. Black Box Corporation. All rights reserved.

---

1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746



# 16- or 32-Port 10/100 Physical Layer Ethernet Switch



**CUSTOMER  
SUPPORT  
INFORMATION**

Order toll-free in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)  
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**  
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018  
Web site: [www.blackbox.com](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto:info@blackbox.com)



**FEDERAL COMMUNICATIONS COMMISSION  
AND  
INDUSTRY CANADA  
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.*

**EUROPEAN UNION DECLARATION OF CONFORMITY**

This equipment complies with the requirements of the European EMC Directive 89/336/EEC.



**NORMAS OFICIALES MEXICANAS (NOM)  
ELECTRICAL SAFETY STATEMENT**

**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.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
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.

### TRADEMARKS USED IN THIS MANUAL

IBM is a registered trademark of International Business Machines Corporation.

Windows and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

UL is a registered trademark of Underwriters Laboratories Incorporated.

*Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.*

# Contents

Chapter	Page
1. Specifications . . . . .	6
2. Introduction . . . . .	8
3. Installation . . . . .	9
3.1 What the Package Includes . . . . .	9
3.2 Switch Location. . . . .	9
3.3 AC Line Voltage . . . . .	9
3.4 Rackmount Installation . . . . .	10
3.5 Connecting the Ethernet Ports . . . . .	11
3.6 Serial Port Interface . . . . .	12
3.7 LAN Interface . . . . .	13
3.8 Connecting Multiple 32-Port Physical Layer Switches. . . . .	13
4. Operation . . . . .	15
4.1 AC Power Switch. . . . .	15
4.2 Keypad, Indicators, and LCD Display . . . . .	15
4.2.1 Keypad . . . . .	15
4.2.2 Indicators . . . . .	16
4.2.3 LCD Display (32-Port Switch Only) . . . . .	17
4.3 LCD Display Control Menus (32-Port Switch Only) . . . . .	17
4.4 Physical Layer Switch Port Configuration. . . . .	19
4.5 Default Configuration . . . . .	20
5. LAN Port Configuration . . . . .	21
6. Control Software . . . . .	25
7. Serial Port/LAN Port Commands . . . . .	30
7.1 Serial Port . . . . .	30
7.2 LAN Port . . . . .	30
7.3 Expanded List of Commands . . . . .	32
8. Command Line Utility. . . . .	39
Appendix. Troubleshooting . . . . .	41
A.1 Calling Black Box . . . . .	41
A.2 Shipping and Packaging . . . . .	41

# 1. Specifications

## **Ethernet Ports**

**Data Rate:** 10 Mbps or 100 Mbps

**Interface:** 10BASE-T, 100BASE-TX

**Protocol:** IEEE 802.3 10BASE-T

**Cable Length (Maximum):** To devices connected via copper interfaces: 328 ft. (100 m) over Category 5 or better UTP cable (8-conductor, 100-ohm)

**Latency:** Less than 20 nanoseconds

**Connectors:** SW595A: (16) RJ-45 female; SW596A: (32) RJ-45 female

**Indicators:** SW595A: (32) LEDs: (16) Signal Detect (green);  
(16) LEDs that are not active at this time (yellow);  
SW596A: (64) LEDs: (32) Signal Detect (green);  
(32) LEDs that are not active at this time (yellow)

## **Serial Interface**

**Data Rate:** 9600 bps (default) or 19.2 kbps, software-selectable

**Interface:** RS-232

**Protocol:** Asynchronous

**Cable Length (Maximum):** To serial management device: 50 ft. (15.2 m)

**Serial Management:** No parity, 8 data bits, 1 stop bit

**Connectors:** (1) DB9 female

**Indicators:** None

**LAN Control Port**

**Data Rate:** 10 Mbps

**Interface:** 10BASE-T Ethernet

**Protocol:** TCP/IP

**Cable Length (Maximum):** To devices connected via LAN management interface: 328 ft. (100 m) over Category 5 or better UTP cable

**Connectors:** (1) RJ-45 female

**Indicators:** (2) LEDs: (1) Link Active (green); (1) LAN interface or TCP/IP (socket) connection (yellow)

**General**

**Agency Approvals:** UL®, CUL, FCC Class A, CE

**Operation:** Half- or full-duplex switching

**Connector:** (1) IEC-320 for power

**Temperature Tolerance:** 32 to 131°F (0 to 55°C)

**Relative Humidity:** Up to 90%, noncondensing

**Power:** 90 to 260 VAC (auto-ranging), 47 to 63 Hz, 85 watts

**Size:** SW595A: 1.75"H (1U) x 16.8"W x 12"D (4.4 x 42.7 x 30.5 cm);  
SW596A: 3.5"H (2U) x 16.8"W x 12"D (8.9 x 42.7 x 30.5 cm)

**Weight:** SW595A: 5.5 lb. (2.5 kg);  
SW596A: 7 lb. (3.2 kg)

## 2. Introduction

The 16- or 32-Port 10/100 Physical Layer Ethernet Switch manages connections within Ethernet and Fast Ethernet networks, providing easy-to-use, point-to-point connectivity. The switch complies with 10BASE-T and 100BASE-TX standards. Using the switch for remote configuration of Ethernet connections eliminates direct manipulation of Ethernet patch cords and provides the ultimate in network connection flexibility. One RS-232 serial port and a 10BASE-T Ethernet TCP/IP LAN port provide remote control of the switch.

The switch's protocol-independent electronic switching matrix allows any of the 16 or 32 independent Ethernet ports to be "patched" to any other port, providing full-speed, bi-directional Ethernet connectivity with virtually zero latency. 16 or 32 user-defined preset patching configurations may be instantly recalled either via the serial or LAN port. The Physical Layer Ethernet Switch fully supports all Ethernet and Fast Ethernet operational modes, including half-duplex, full duplex, and auto-negotiation.

The switch is completely transparent to the Ethernet devices which are connected to it. Control software is included to configure port-to-port connections. No additional software or drivers are required for the switch's installation or operation.

An auto-ranging, universal power supply allows operation with AC input voltages between 90 and 260 VAC.

# 3. Installation

## 3.1 What the Package Includes

- (1) 16- or 32-Port 10/100 Physical Layer Ethernet Switch
- (1) IEC-320 power cord
- (1) 10-ft. (3-m) DB9 male to DB9 female RS-232 cable
- (1) DB9 male to DB25 female RS-232 adapter
- (2) Rackmounting brackets with (4) 12-24 screws
- (4) bottom feet
- (1) CD-ROM containing control software and this users' manual

If anything is missing or damaged, please contact Black Box Technical Support at 724-746-5500.

## 3.2 Switch Location

When deciding where to place the switch, make sure that the dual fans and ventilation slots on the sides of the unit obtain adequate airflow. Do not place the switch on any devices that generate excessive heat.

## 3.3 AC Line Voltage

The switch can be externally connected to any AC input voltage between 90 and 260 volts with a frequency range of 47 to 63 Hz. The switch consumes approximately 85 watts of power. Unless otherwise specified, the switch will be shipped with a North American-style IEC power cord. For other power cords, call Black Box at 724-746-5500.

### 3.4 Rackmount Installation

You can install the switch in a standard 19-inch (EIA unit) rack. The 16-port switch occupies 1 rack unit of vertical space (1.75 inches [4.4 cm]), while the 32-port switch occupies 2 rack units of vertical space (3.5 inches [8.9 cm]).

*To install the switch:*

Attach one of the two mounting brackets to each side of the switch using the screws provided. Position the switch on the rack, aligning the mounting bracket holes with the rack holes. Use  $\frac{5}{8}$ -inch 12-24 screws (included) to install it in the rack.

*Rackmount considerations:*

1. For proper operation, make sure that the maximum recommended operating ambient temperature of 131°F (55°C) is not exceeded.
2. If the switch is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Install the rack in an environment compatible with the switch's maximum rated operating temperature.
3. For safe operation, do not compromise the amount of airflow required.
4. Mounting the switch in a rack should not cause a hazardous condition because of uneven mechanical loading.
5. Do not overload the electrical circuit to which the switch will be installed.
6. Maintain reliable earthing of rackmount equipment. Pay close attention to power strips.

After you install the switch in the rack, connect the Ethernet ports as described in **Section 3.5**, then the serial or LAN port interface as described in **Sections 3.6** and **3.7**. If desired, cascade multiple 32-port switches as described in **Section 3.8**.

### 3.5 Connecting the Ethernet Ports

The switch has 16 or 32 8-conductor RJ-45 connectors for connection to 10BASE-T Ethernet or 100BASE-TX Fast Ethernet devices. These RJ-45 connectors are wired the same as an Ethernet hub, transmitting on pins 3 and 6 and receiving on pins 1 and 2. This allows standard Ethernet devices such as PCs (which transmit on pins 1 and 2 and receive on pins 3 and 6) to be connected to the switch with standard “straight” network cables.

When connecting one of the switch’s ports directly to an Ethernet hub or network switch, you’ll need to use a crossover cable, which swaps the transmit and receive wire pairs as shown in Table 3-1.

**Table 3-1. Network cable pin assignments.**

<b>Standard Cable</b>	<b>Crossover Cable</b>
Pin 1 to Pin 1	Pin 1 to Pin 3
Pin 2 to Pin 2	Pin 2 to Pin 6
Pin 3 to Pin 3	Pin 3 to Pin 1
Pin 4 to Pin 4	Pin 4 to Pin 4
Pin 5 to Pin 5	Pin 5 to Pin 5
Pin 6 to Pin 6	Pin 6 to Pin 2
Pin 7 to Pin 7	Pin 7 to Pin 7
Pin 8 to Pin 8	Pin 8 to Pin 8

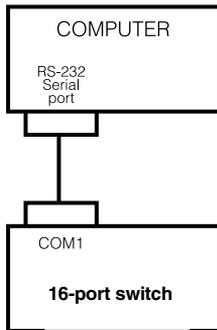
All connections should be made with Category 5 (or better) unshielded twisted-pair (UTP) cable with a characteristic impedance of 100 ohms.

### 3.6 Serial Port Interface

Serial port COM1 is an RS-232 DB9 female connector that's wired so it can be connected directly to a PC-compatible serial port with a standard "straight" serial cable (DB9 serial cable with a male connector on one end and a female connector on the other end, wired pin 1 to pin 1, pin 2 to pin 2, etc.), which is included. The serial port can also be configured to operate as a separate communications port.

**Table 3-2. RS-232 connector pinouts.**

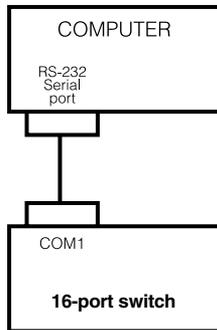
Pin	IBM® PC	Switch COM1
1	DCD Input	DCD Output
2	Receive Data Input	Transmit Data Output
3	Transmit Data Output	Receive Data Input
4	DTR Output	Connected to pin 8
5	Ground	Ground
6	DSR Input	DSR Output
7	RTS Output	No connection
8	CTS Input	Connected to pin 4
9	RI Input	No connection



**Figure 3-1. 16-port switch controlled by the RS-232 serial interface.**

### 3.7 LAN Interface

You can remotely control the switch via the TCP/IP LAN control port (RJ-45 connector). Simply connect the LAN ports of your computer and switch to an Ethernet hub on your network, as shown in Figure 3-2.



**Figure 3-2. 16-port 10/100 Physical Layer Switch controlled via its TCP/IP LAN port.**

### 3.8 Connecting Multiple 32-Port Physical Layer Switches

Up to 32 switches can be controlled by a single RS-232 serial interface or LAN control port. To operate in this configuration, set the serial ports to operate in daisychain mode and assign a unique device number to each switch. (To select the daisychain mode, go to the **Configuration** menu, **Communications** tab, and click on the **Serial/LAN Port, Daisychain Mode** button.) The 32-port switches have in/out ports for cascading. However, the 16-port switches have only an in port. You can cascade one 16-port switch at the end of a daisychain of three 32-port switches as shown in Figure 3-3. Or, control four 32-port switches via one LAN port (Figure 3-4).

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

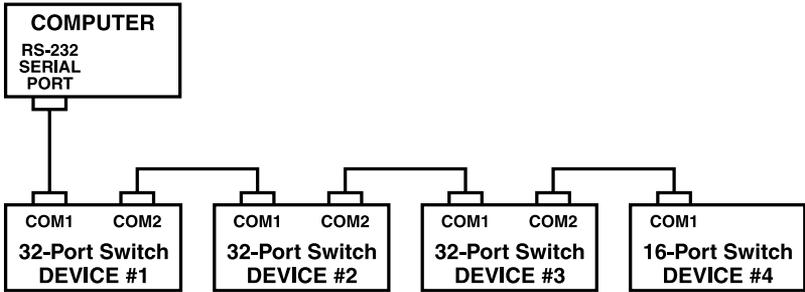


Figure 3-3. Three 32-Port 10/100 Physical Layer Ethernet Switches and one 16-Port 10/100 Physical Layer Ethernet Switch controlled via one serial port.

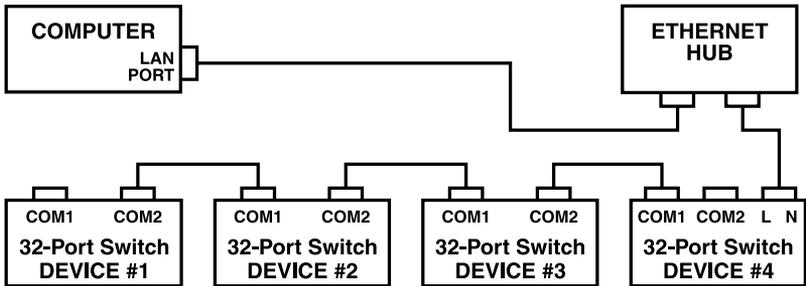


Figure 3-4. Four 32-Port 10/100 Physical Layer Ethernet Switches controlled via one TCP/IP LAN port.

## 4. Operation

Once you have installed the 10/100 Physical Layer Ethernet Switch, you are ready to operate it. First, notice where the AC power switch, keypad, and indicators are located on the switch. If you have the 32-port model, also notice its LCD display. Next, follow the instructions in **Sections 4.1** through **4.3** to operate the switch. Finally, read **Sections 4.4** and **4.5** for instructions on how to configure the switch.

### 4.1 AC Power Switch

The first thing you must do is power on the switch. The power switch is located on the rear panel. Setting the switch to the “1” position applies power to the unit.

### 4.2 Keypad, Indicators, and LCD Display

Next, make yourself familiar with the keypad and indicators on the switch. The front panel indicates switch operation and status. If you have the 32-port model, also review **Section 4.3** for how to use its LCD display.

#### 4.2.1 KEYPAD

The keypad enables menu selection and parameter setup for the switch.

**Table 4-1. Keypad functions.**

Key	Function
Menu	Returns to the switch’s setup and configuration main menu.
Enter	Selects the highlighted setup parameter.
Up, Down, Right, and Left Arrows	Scrolls the cursor to enable menu selection.

**4.2.2 INDICATORS**

LED indicators tell you switch status at a glance.

**Table 4-2. Indicator functions.**

<b>Indicator</b>	<b>Function</b>
Power	Lights when power is on.
Activity	Lights when a command has been received by the serial or LAN port.
Alarm	A visual and audible alarm indicates either that the power supply failed or that the internal temperature exceeds the specified temperature limit. To silence the audible alarm, press the front-panel Menu key. The Alarm LED will remain lit until the alarm condition is corrected.
Signal Detect	A green LED on each Ethernet port indicates the presence of a signal.
LAN Status	The green LED to the left of the LAN control port lights when the link is active (the LAN port is plugged into and communicating with an Ethernet hub).
	The yellow LED lights when the LAN interface is waiting for a software TCP/IP connection to be established. When the connection is made, the yellow LED blinks, and continues to blink until the connection is terminated.

### 4.2.3 LCD DISPLAY (32-PORT SWITCH ONLY)

The LCD display indicates the available switch selection parameters. Scroll through the main menu (only two lines are visible at any time) as shown in Figure 4-3.

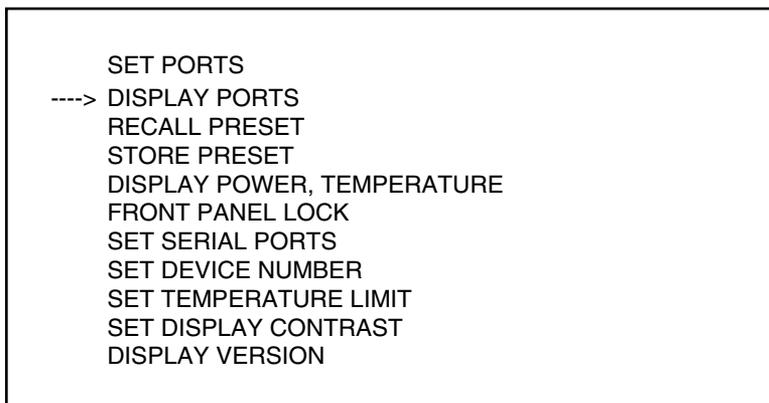


Figure 4-3. LCD display main menu.

## NOTE

Throughout this manual (and in the control software you received), the vendor code ACI-2050 refers to the SW595A or SW596A. The vendor code ACI-2050-C16 refers to the SW595A. The vendor code ACI-2050-C32 refers to the SW596A.

## 4.3 LCD Display Control Menus (32-Port Switch Only)

The 32-port switch features an LCD display on its front panel. Following is a list of the available commands. Use these commands to control your switch via the LCD.

SET PORTS:

```
PRESS ENTER TO CONNECT PORT 01 TO 32
(THIS WILL DISCONNECT PORT 01 FROM 02)
```

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

DISPLAY PORTS:

01< >02	03< >04	05< >06	07< >08
09< >10	11< >12	13< >14	15< >16

RECALL PRESET:

RECALL PRESET PRESS ENTER TO RECALL PRESET 01
--

STORE PRESET:

STORE PRESET ENTER TO STORE SETTINGS AS PRESET 01
--

DISPLAY POWER, TEMPERATURE:

DISPLAY POWER, TEMPERATURE		
SUPPLY 1 GOOD	SUPPLY 2 GOOD	+29.5°C

FRONT PANEL LOCK:

FRONT PANEL UNLOCKED ENTER PASSWORD TO LOCK: 0000
--

SET SERIAL PORTS:

COM 1 9600*	19200	DAISY CHAIN	Y	N*
COM 2 9600	19200	ENABLE LAN	Y*	N

SET DEVICE NUMBER:

SET DEVICE NUMBER	01
USE UP/DOWN KEYS	

SET TEMPERATURE LIMIT:

SET TEMPERATURE LIMIT	
CURRENT TEMPERATURE +29.5°C	MAX +55°C

SET DISPLAY CONTRAST:

SET DISPLAY CONTRAST
USE UP/DOWN KEYS

DISPLAY VERSION:

APCON ACI-2050-C32	*
S/N 5001084 ver 2050114	LAN

## 4.4 Physical Layer Switch Port Configuration

The switch has an internal memory device that retains the last configuration and setup information. Patch settings, as well as all other configuration parameters, are saved in non-volatile memory as they are entered on the front panel or via the LAN or serial ports.

## 4.5 Default Configuration

The switch's default configuration as shipped from the factory is defined below.

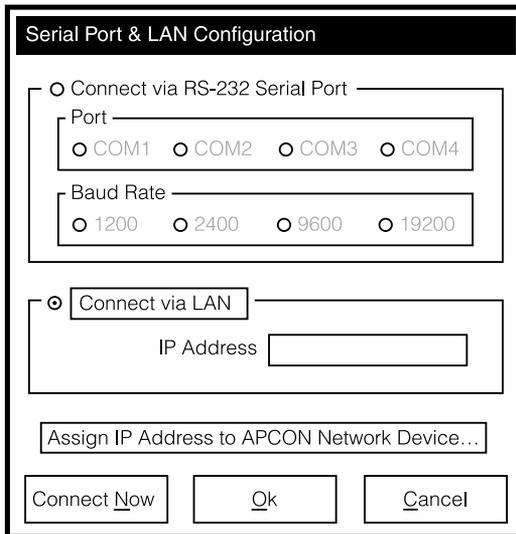
PORTS:	All off
SERIAL PORTS:	9600 baud, not daisy chained
DEVICE NUMBER:	01
TEMPERATURE ALARM:	50° Celsius
FRONT PANEL:	Unlocked
LAN PORT:	Enabled
IP ADDRESS:	Not assigned

## 5. LAN Port Configuration

The switch is equipped with a LAN port that allows remote control of the switch via a standard 10-Mbps Ethernet connection running TCP/IP.

The LAN port and serial port COM1 are mutually exclusive: when the LAN port is enabled, COM1 is disabled. The LAN port is enabled by default as shipped from the factory. The LAN port can be disabled from the front panel to the second RS-232 serial port (COM2) if daisy chaining of serial ports is required.

Although the LAN port is enabled by default, an IP address must be assigned to the switch before the LAN port may be used. The IP address may be assigned by using the control software (included). Select **Communications** on the **Settings** menu. The **Serial Port & LAN Configuration** screen appears (see Figure 5-1). Press the **Assign IP Address to APCON Network Device...** button to invoke the IP configuration utility program. (This utility may also be directly executed by double-clicking on the **ApconCfg.exe** file found in the subdirectory where the control software was installed.)



**Figure 5-1. Serial port and LAN configuration menu in the control software.**

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

To initialize an IP address, enter the MAC address of the switch's LAN interface (this can be found on a label on the switch's back panel) and the desired IP address and subnet mask. See Figure 5-2. (Make sure you enter an IP address and subnet mask that are compatible with your network; contact your network administrator if you need assistance. If you want to access the switch from a separate network segment, you will also need to enter the IP address for your default gateway.) Click on the **Configure** button.

Configure APCON Network Device [X]

Initialize IP Address

Device MAC Address [ - - - - - ]

Change IP Address

Current IP Address: [ 10 .1 .1 .142 ] [ Search ]

New IP Address [ 10 .1 .1 .155 ]

Change Subnet Mask?

Subnet Mask [ 255.255.255.0 ]

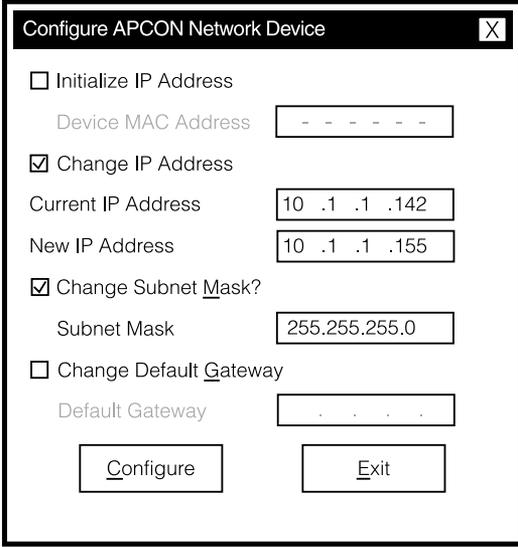
Change Default Gateway

Default Gateway [ . . . . ]

[ Configure ] [ Exit ]

**Figure 5-2. Initializing an IP address.**

If the LAN port has already had an IP address assigned to it and you want to change it to a different IP address, click on the **Change IP Address** checkbox. Enter the current IP address and the desired new IP address, as shown in Figure 5-3. Then click on the **Configure** button.



The screenshot shows a dialog box titled "Configure APCON Network Device" with a close button (X) in the top right corner. The dialog contains several configuration options:

- Initialize IP Address
  - Device MAC Address: [ - - - - - ]
- Change IP Address
  - Current IP Address: [ 10 .1 .1 .142 ]
  - New IP Address: [ 10 .1 .1 .155 ]
- Change Subnet Mask?
  - Subnet Mask: [ 255.255.255.0 ]
- Change Default Gateway
  - Default Gateway: [ . . . . ]

At the bottom of the dialog, there are two buttons: "Configure" and "Exit".

**Figure 5-3. Changing an IP address.**

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

If you can't quite remember an IP address, go to the **Configure APCON Network Device** menu (see Figure 5-2) and press the **Search** button. The screen shown in Figure 5-4 appears. Enter a starting and ending IP address. This will give you a range of IP addresses to search through. The IP address and MAC address for each device found will be listed, as shown below.

Starting IP Address	Ending IP Address
10 .1 .1 .220	10 .1 .1 .250

Search

10.1.1.220	00-20-4a-54-17-26
10.1.1.221	00-20-4a-54-17-2b
10.1.1.222	00-20-4a-54-01-21
10.1.1.223	00-20-4a-54-02-54
10.1.1.224	00-20-4a-54-01-42
10.1.1.225	00-20-4a-54-0a-3d
10.1.1.226	00-20-4a-54-0a-44
10.1.1.227	00-20-a3-2b-9e-5a

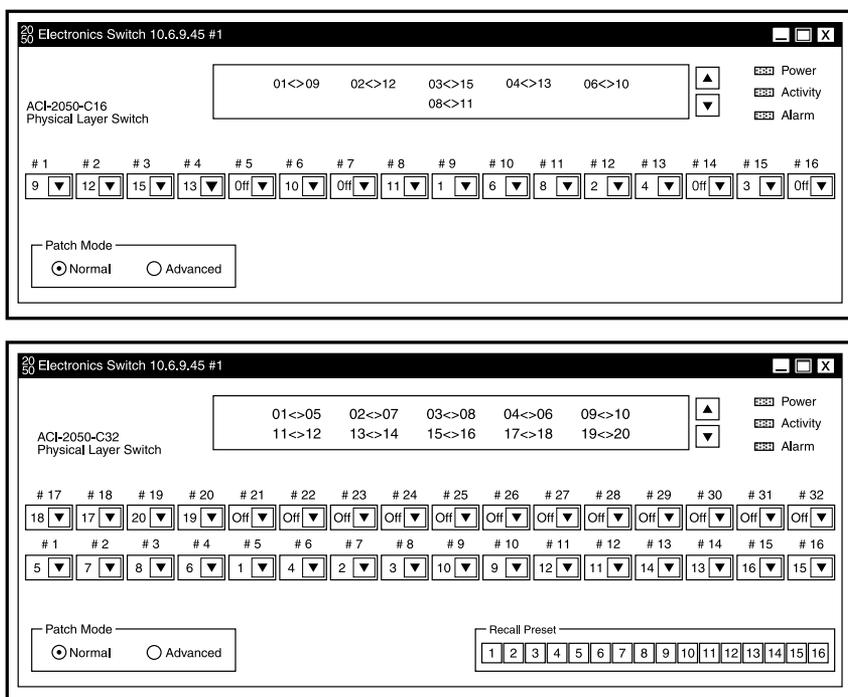
OK Cancel

**Figure 5-4. Searching for a network device's IP address.**

## 6. Control Software

Your switch is supplied with control software, which allows remote control of the switch, for Windows® 95, 98, 2000, Me, XP, and Windows NT®. Follow instructions on the CD-ROM to install the software. Command line software for Windows and for HyperTerminal is also available on the included CD-ROM. The Windows based control software provides complete control of all switch settings and configuration parameters in real time. It also supports operation via an RS-232 serial port and via TCP/IP over an Ethernet LAN connection.

To select the patch mode, select **Normal** or **Advanced** from the main screen.



**Figure 6-1. Control software screen, Normal patch mode selected.**  
The top screen shows the 16-port switch's menu, and the bottom screen shows the 32-port version.

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

Next, enter the port names and definitions in the **Port Name Definitions** screen.

Port 1	Marketing	9	Switch #1 Port 5
Port 2	Materials	10	Switch #1 Port 6
Port 3	Publication	11	Hub #1 Port 3
Port 4	Accounting	12	Hub #1 Port 4
Port 5		13	Link to Bldg A
Port 6	Tech Support	14	
Port 7		15	Lazer Printer
Port 8	Test Repair Lab	16	I

Clear All      Close

**Figure 6-2. Defining the port names.**

Choose a preset port number and name as shown in Figure 6-3.

ACI-2050 Preset Definition

Preset Number: 1      Preset Name: Normal

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13	n/c	15	n/c	10	n/c	n/c	9	8	5	n/c	n/c	1	n/c	3	n/c

Clear      Store      Cancel      Close

ACI-2050 Preset Definition

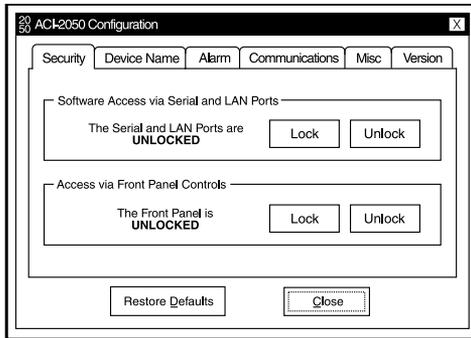
Preset Number: 1      Preset Name: Normal

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
18	17	20	19	Off											
1	2	3	4	5	6	1	4	2	3	10	9	12	11	14	13
5	7	8	6	1	4	2	3	10	9	12	11	14	13	16	15

Clear      Store      Cancel      Close

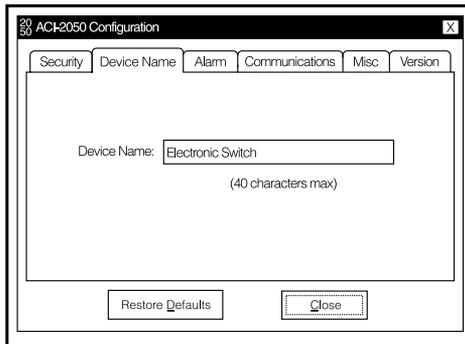
**Figure 6-3. Preset definition (number and name).**  
The top screen shows the 16-port switch's menu, and the bottom screen shows the 32-port version.

From the Configuration screen, select the **Security** tab. Then choose whether to **Lock** or **Unlock** the ports.



**Figure 6-4. Security/password configuration.**

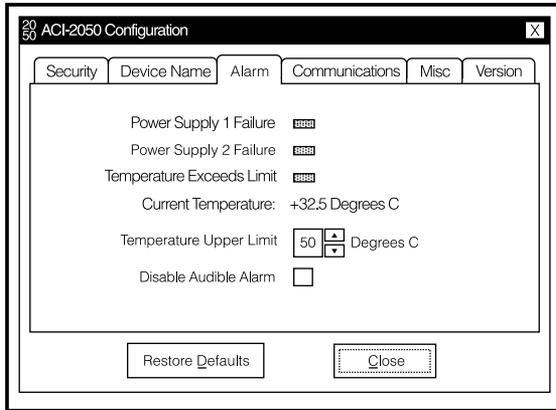
Next, select the **Device Name** tab. Enter the device name.



**Figure 6-5. Device names configuration.**

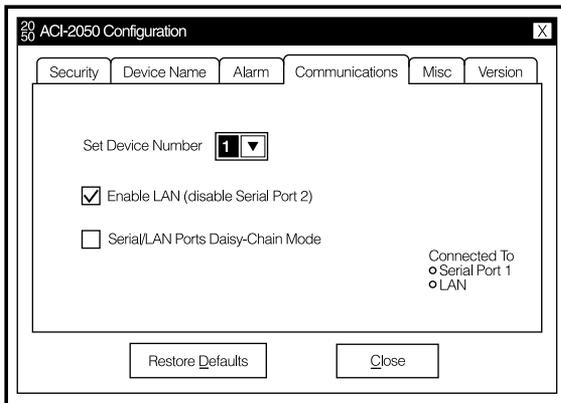
## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

From the **Alarm** tab, select the temperature upper limit and whether nor not to disable the audible alarm.



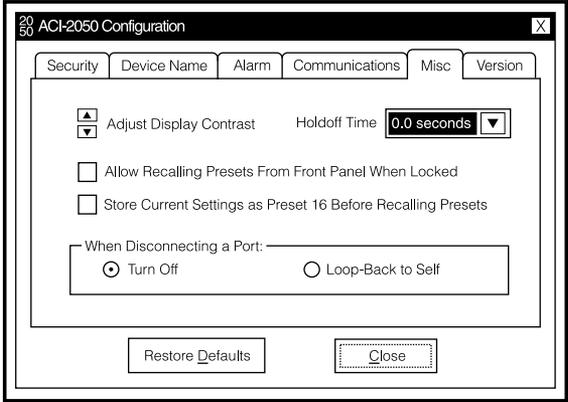
**Figure 6-6. Set the alarms for power supply and temperature.**

Select the **Communications** tab. Check the appropriate box to enable the LAN port or the serial port.



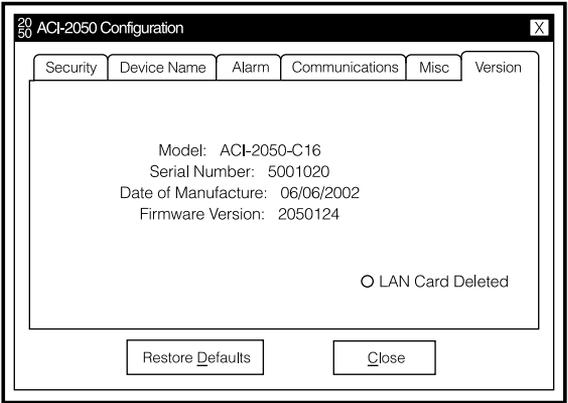
**Figure 6-7. Select the configuration for the serial and LAN port.**

Select the **Miscellaneous** tab and its associated options.



**Figure 6-8. Configuring miscellaneous options.**

Access the version information for your switch, as shown in Figure 6-9.



**Figure 6-9. Available version information.**

# 7. Serial Port/LAN Port Commands

The switch may be controlled using simple ASCII character strings via the RS-232 interface or via the Ethernet TCP/IP LAN port.

## 7.1 Serial Port

The following information provides the parameters necessary to control the switch using any standard serial interface:

- a) Baud rate internally selected for 9600 (factory default) or 19,200 baud.
- b) Transmit and receive set for 8 data bits, 1 stop bit, no parity.

Set parameters would look like this: `MODE COMx 9600,N,8,1`

## 7.2 LAN Port

When communicating with the switch using TCP/IP via the LAN port, you must specify port number 3001 (as well as the IP address) when establishing the TCP/IP connection. Some versions of HyperTerminal allow connections to IP addresses. You may also use Telnet to send command strings to the switch (but remember to specify 3001 as the port number). The command strings are the same regardless of whether you are communicating via a serial port or via the LAN port.

The sequence for communicating with the switch is defined as:

- a. Start sequence:

ASCII "cr", "/", "/" (hex 0d, 2f, 2f)

- b. Physical Layer Ethernet Switch device number character:

Device	1	2	3	4	5	6	7	8
ascii		}	~	(del)	`	a	b	c
Device	9	10	11	12	13	14	15	16
ascii	d	e	f	g	h	i	j	k
Device	17	18	19	20	21	22	23	24
ascii	l	m	n	o	p	q	r	s
Device	25	26	27	28	29	30	31	32
ascii	t	u	v	w	x	y	z	{

c. Command character(s) and optional parameters: See Table 7-1.

d. End sequence:

ASCII “cr” (hex 0d)

**Table 7-1. Command summary.**

<b>Command</b>	<b>Command Character</b>	<b>Example</b>
Set Port Assignment	P	<cr>//   P0115<cr>
Store Current Settings As Preset	G	<cr>//   G04FFFFFFFF<cr>
Set Holdoff Time	H	<cr>//   H14<cr>
Recall Preset	J	<cr>//   J07<cr>
Lock Front Panel	L	<cr>//   L1234<cr>
Enable/Disable Audible Alarm	OA	<cr>//   OA1<cr>
Set Serial Port Baud Rate	OB	<cr>//   OB10<cr>
Set Comm Port Mode	OC	<cr>//   OC1<cr>
Set Switch Device Number	OD	<cr>//   OD05<cr>
Enable/Disable LAN Port	OE	<cr>//   OE10<cr>
Set Factory Defaults	OF	<cr>//   OF<cr>
Lock Serial/LAN Ports	OL	<cr>//   OL1234<cr>
Get Serial Port Lock Status	OS	<cr>//   OS<cr>
Set Temperature Limit	OT	<cr>//   OT45<cr>
Unlock Serial/LAN Ports	OU	<cr>//   OU1234<cr>
Report Firmware Revision	R	<cr>//   R<cr>
Report Current Port Assignments	S	<cr>//   S<cr>
Re-Trigger Holdoff Timer	T	<cr>//   T<cr>
Unlock Front Panel	U	<cr>//   U1234<cr>
Switch With Holdoff	W	<cr>//   W<cr>
Switch Without Holdoff	X	<cr>//   X<cr>
Report Alarm/Power Status	a	<cr>//   a<cr>
Report Holdoff Time	h	<cr>//   h<cr>
Report Temperature	t	<cr>//   t<cr>
Report Model, S/N, & Date of Manufacture	?	<cr>//   ?<cr>

All examples in this manual assume that the device number is set to 1—the device address character in the example command strings is the “vertical bar” or pipe character “|” (7C hex).

Some advanced commands are not shown in this manual. For details, call Technical Support.

### 7.3 Expanded List of Commands

#### G—Store Current Settings As Preset

command string: `<cr> // | Gxxyyyyyyyyy<cr>`

`xx` = 2 decimal digits (01–16) specifying the preset number

`yyyyyyyy` = 32-bit hexadecimal bitmask indicating which ports should be included in this preset

bit 0 for port 1, bit 1 for port 2, etc.

example: `<cr> // | G04FFFFFFFF<cr>` store ports as preset 4

example: `<cr> // | G050000003F<cr>` store status of ports 1 through 7 as preset 5

example: `<cr> // | G1555555555<cr>` store status of all odd-numbered ports as preset 15

#### H—Set Holdoff Time

command string: `<cr> // | Hxx<cr>`

`xx` = 00 through FF holdoff time in Hex, 0.10-second increments

example: `<cr> // | H14<cr>` set holdoff to 2.0 seconds

### NOTE

**This command does not enable or disable switching with holdoff. The holdoff time interval is set when holdoff is in effect (see the “T”, “W”, and “X” commands).**

**J—Recall Preset**

command string: <cr> // | Jxx<cr>

xx = 2-digit decimal number (01–16) specifying preset to recall

example: <cr> // | J07<cr> recall preset number 7

**L—Lock Front Panel**

command string: <cr> // | Lxxxx<cr>

xxxx = 4-digit password

response: //|L0<cr> command failed (syntax error or front panel already locked)

response: //|L1<cr> command accepted (front panel now locked)

**OA—Enable/Disable Audible Alarm**

command string: <cr> // | OAx<cr>

x = 0, enable audible alarm

x = 1, disable audible alarm

x = 2, reset alarm, but stay enabled for next alarm event

example: <cr> // | OA1<cr> disable audible alarm

example: <cr> // | OA0<cr> enable audible alarm

**OB—Set Serial Port Baud Rate**

command string: <cr> // | OBxy<cr>

x = 1, serial port 1      x = 2, serial port 2

y = 0, 9600 baud      y = 1, 19,200 baud

example: <cr> // | OB10<cr> set serial port 1 to 9600 baud

example: <cr> // | OB21<cr> set serial port 2 to 19,200 baud

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

### OC—Set Comm Port Mode

command string: `<cr>// | OCx<cr>`

`x = 0`, daisychain mode

`x = 1`, dual-comm-ports mode

example: `<cr>// OC0<cr>` set daisychain mode

example: `<cr>// OC1<cr>` set dual-comm-ports mode

### OD—Set Physical Layer Ethernet Switch Device Number

command string: `<cr>// | ODxx<cr>`

`xx = 2-digit decimal number, 01–32`

example: `<cr>// | OD05<cr>` change device number to 5

### OE—Enable/Disable Ethernet LAN Port

command string: `<cr>// | OEx0<cr>`

`x = 0`, disable LAN (enable serial port 2)

`x = 1`, enable LAN (disable serial port 2)

example: `<cr>// | OE00<cr>` disable LAN port

example: `<cr>// | OE10<cr>` enable LAN port

### OF—Set Unit to Factory Defaults

command string: `<cr>// | OF<cr>`

## NOTE

**This command does not change baud rate, comm port mode, device number, and IP address.**

**OL—Lock Serial/LAN Ports**

command string: <cr> // | OLxxxx<cr>

xxx = 4-digit password

response: // | OL0<cr> command failed (syntax error or ports already locked)

// | OL1<cr> command succeeded, serial ports now locked

**NOTE**

**0000 is not a valid password.**

**OS—Get Serial/LAN Port Lock Status**

command string: <cr> // | OSx<cr>

response: // | OS0<cr> serial/LAN ports are unlocked

// | OS1<cr> serial/LAN ports are locked

**OT—Set Temperature Limit**

command string: <cr> // | OTxx<cr>

xx = 2-digit decimal number, 15 through 80 (°C)

example: <cr> // | OT45<cr> sets temperature limit to 45°C

**OU—Unlock Serial/LAN Ports**

command string: <cr> // | OUxxxx<cr>

xxxx = 4-digit password

response: // | OU0<cr> command failed (syntax error or invalid password)

// | OU1<cr> command succeeded, serial/LAN ports now unlocked

**P—Set Port Assignment**

command string: <cr> // | Pxyy<cr>

**NOTE**

*xx* and *yy* are 2-digit decimal numbers indicating which two ports are to be assigned to each other. If either port is assigned to another port, the other port will be turned off or be looped back to itself.

example: `<cr>// | P0115<cr>` assigns port 1 to port 15

**NOTE**

**Up to 16 port pairs may be specified with this command.**

example: `<cr>// | P01020405<cr>` patches ports 1 to 2, and 4 to 5.

R—Report Firmware Revision Level

command string: `<cr>// | Rxxxxxxx<cr>`

response: `// | R2050114<cr>`

S—Report Current Port Assignments

command string: `<cr>// | S<cr>`

response: `// | S | } } ~ ~ (del) { z <cr>`

|} = 2-digit character indicating that port 2 is assigned to port 1

|~ = 2-digit character indicating that port 3 is assigned to port 2

~(del) = 2-digit character indicating that port 4 is assigned to port 3

{z = 2-digit character/letter indicating that port 31 is assigned to port 32

**NOTE**

Refer to the table in Section 7.2 for port letters or characters that correspond to ports 1 through 32.

*(del)* represents the delete key.

T—ReTrigger (restart) the Holdoff Timer

command string: `<cr>// | T<cr>`

**NOTE**

This command is functionally equivalent to the “W” command.

U—Unlock Front Panel

command string: <cr> // | Uxxxx<cr>

xxx = 4-digit password

response: //|U0<cr> command failed (Syntax error or invalid password)

response: //|U1<cr> command succeeded (Front panel now unlocked)

W—Switch With Holdoff (ReTrigger the Holdoff Timer)

command string: <cr> // | W<cr>

### **NOTE**

**This command is functionally equivalent to the “T” command.**

X—Switch Without Holdoff (Clear the Holdoff Timer)

command string: <cr> // | X<cr>

### **NOTE**

**This command forces Holdoff Timer to go to zero, allowing any pending port assignment changes to immediately take effect.**

a—Report Alarm (plus other) Status

command string: <cr> // | a<cr>

response: //|axx<cr>

xx = 2 hex digits (00 through FF) 0000 0000 bits 7, 6, 5, 4, 3, 2, 1, 0

00 = power supply 1 failure; hex value 00

01 = power supply 2 failure; hex value 02

02 = temperature exceeds limit; hex value 04

03 = LAN is enabled (serial port 2 is disabled); hex value 08

04 = front panel is locked; hex value 10

05 = serial ports are locked; hex value 20

06 = allow preset recall when front panel locked; hex value 40

07 = disconnected ports are looped back; hex value 80

h—Report Holdoff Time

command string: <cr> // | h<cr>

response: <cr> // | hxx<cr>

xx = 2 hex digits (00 through FF) holdoff time, in 0.10-second increments

t—Report Temperature

command string: <cr> // | t<cr>

response: // | t+x<cr>

t is degrees Celsius

x is 28.5

?—Get Model, Serial Number, Date of Manufacture

command string: <cr> // | ?xxxxxxxx<cr>

response: // | ?ACI-2050-C32 5001001 04/01/2001<cr>

Example: Model ACI-2050-C32, Serial Number 5001001, Date of manufacture 04/01/2001

### NOTE

Each field is separated by one or more ASCII space characters (20 hex).

## 8. Command Line Utility

The ApconCmd.exe Windows command line utility enables you to set switch parameters by typing commands at the Windows DOS prompt. These commands may also be included in batch files or may be assigned to icons on the Windows desktop. The ApconCmd.exe utility is automatically copied to your disk drive when you install the control software and may be found in the same subdirectory as the control software.

Use:

```
apconcmd [/?] [/i <IP Address>] [/c <Com Port>]
[/b <Baud Rate>][/n <Device Number>] [/v][/d][/p][/o]
[[/s]<Port Settings>[/t <Termination>][/h <holdoff>] [/x]
[[/g ##][/j ##][/l #####][/u #####][/w <command>][/r <command>]
```

or:

```
apconcmd /f <IP Address, IP Address>[/n <Device Number,<Device Number>>]
```

Where:

/? <this message>.

/i <IP Address> = The IP address of the network-enabled 10/100 Physical Layer Ethernet Switch (IP Address uses #.#.#.# decimal form).

/c <Com Port> = The number of the Com port to use (1–8; the default is 1).

/b <Baud Rate> = The baud rate for the Com port (2400, 9600, 19200; the default is 9600).

/n <Device Number> = The device number of the 10/100 Physical Layer Ethernet Switch to change (1–32; the default is 1).

/v = Show 10/100 Physical Layer Ethernet Switch version information.

/d = Display current port settings. Returns formatted string.

/p = Display switch settings in row/column format (A01B02...).

/o = Clear all port and termination settings.

[/s]<Port Settings> = Port settings string to send to a switch. Use -s ? to view settings options.

## 16- OR 32-PORT 10/100 PHYSICAL LAYER ETHERNET SWITCH

`/t <Termination>` = For SCSI switches, turn termination on or off. Use `-t ?` to view termination options.

`/h <holdoff>` = SCSI bus holdoff, in seconds. The SCSI switch will not change the switch settings on a bus until there has been inactivity for the specified number of seconds. Valid range is 0–25 in seconds.

`/x` = Ignore bus activity. Device settings will be changed immediately.

`/g <##>` = Store current switch settings as preset. `##` specifies 1–16.

`/j <##>` = Recall preset. `##` specifies 1–16.

`/l <####>` = Lock switch.

`/u <####>` = Unlock switch.

`/w <command>` = `<command>` is sent to the switch with no parsing. Any response from the device is ignored.

`/r <command>` = `<command>` is sent to the switch with no parsing. Any response from the device is displayed on the console's output.

Switch commands (`v`, `d`, `s`, `t`, `o`, `g`, `h`, `j`, `x`, `w`, `r`, `l`, `u`) may be combined to create complex sequences: `apconcmd "-d -j1 -d -j2 -o -d"` will recall and display switch preset settings 1 and 2, then clear all settings.

`-f <IP Address,IP Address>` searches a range of IP addresses for switches. Both the starting and ending IP address must be specified.

`-n <Device Number,<Device Number>>` specifies a device number or range of device numbers to search for.

# Appendix. Troubleshooting

## A.1 Calling Black Box

If you determine that your 16- or 32-Port 10/100 Physical Layer Ethernet Switch is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We 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.

## A.2 Shipping and Packaging

If you need to transport or ship your 16- or 32-Port 10/100 Physical Layer Ethernet Switch:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the switch for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.