L180 and L700 Tape Library Uninterruptible Power Supply

Reference Manual



L180 and L700 Tape Library Uninterruptible Power Supply

Reference Manual

First Edition (June 2001)

This edition contains 56 pages. See "Summary of Changes" on page v for the revision history and summary of changes made to this document.

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Summary of Changes

EC Number	Date	Edition	Description
111657	June 2001	First	Initial release.

Summary of Changes

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Preface

StorageTek offers an uninterruptible power supply (UPS) as an optional feature for protecting the L180 and L700 Tape Libraries. This reference manual contains information about the UPS with an overview about how to install it and how to service it if there is a problem.

The information in this manual is for anyone interested in this optional feature.

Note: This document is a supplement to the StorageTek conversion bills and APC publications. Refer to those documents for specific information.

Organization

The organization of this manual is:

Chapter 1	"General Information" provides an overview about this feature.
Chapter 2	"Controls and Indicators" describes the indicators on the UPS.
Chapter 3	"Installation Overview" outlines the installation tasks.
Chapter 4	"Fault Isolation" assists in isolating problems with the UPS.
Chapter 5	"Service" describes how to contact StorageTek if problems exist.
Appendix A	"Specifications" lists the specifications for this feature.
Glossary	Defines new or special terms and abbreviations in this manual.
Index	Assists in locating information in this manual.

Comments and Suggestions

A Reader's Comment Form at the back of this publication lets you communicate suggestions or requests for change. StorageTek encourages and appreciates reader feedback.

StorageTek employees with Intranet access may complete an online Reader's Comment Form. The URL is:

http://gandalf/sts/nid/idrcf2.htm

Alert Messages

Alert messages call the reader's attention to information that is especially important or that has a unique relationship to the main text or graphic.

Note: A note provides additional information that is of special interest. A note might point out exceptions to rules or procedures. A note usually, but not always, follows the information to which it pertains.

CAUTION:

A caution informs the reader of conditions that might result in damage to hardware, corruption of data, corruption of application software, or longterm health problems in people. A caution always precedes the information to which it pertains.

WARNING:

A warning alerts the reader to conditions that might result in injury or death. A warning always precedes the information to which it pertains.

Related Publications

The following publications contain additional information:

Tape Library Publications	Part Number
L180 Tape Library Operator's Guide	95895
L700 Tape Library Hardware Operator's Guide	95845
L180/L700 Tape Libraries General Information Manual	MT 9111
L180/L700 Tape Library Ordering and Configuration Guide	MT 9112

APC Publications

APC Uninterruptible Power Supply manuals are shipped with the equipment or go online at www.apcc.com for more information.

Additional Information

StorageTek offers several methods for you to obtain additional information. Use one of the following when you want to obtain additional information or to get the latest edition of any StorageTek publication.

StorageTek's External Web Site

StorageTek's external web site provides marketing, product, corporate, and service information. In addition, the external web site serves as an entry point to the Customer Resource Center and to the Channel site. The external web site is accessible to anyone with a web browser and an Internet connection.

The URL for StorageTek's external web site is http://www.storagetek.com

Customer Resource Center

StorageTek's Customer Resource Center (CRC) web site enables members to resolve technical issues by searching code fixes and technical documentation. CRC membership entitles you to other proactive services, such as HIPER subscriptions, technical tips, answers to frequently asked questions, and online product support contact information. Customers who have a current warranty or a current maintenance service agreement may apply for membership by clicking on the **Request Password** button on the CRC home page. StorageTek employees may enter the CRC through PowerPort.

The URL for the CRC is http://www.support.storagetek.com.

Hardcopy Publications

You may order hard copies of publications listed on the Customer Resource Center or *Documents on CD*.

Service publications have *numeric* part numbers. To order hard copies of service publications, contact your local Customer Services Logistics Depot.

Marketing publications have *alphanumeric* part numbers. To order hard copies of marketing publications, do one of the following:

- Visit the StorageTek's PowerPort and select alphabetical listings under "L" or select Online Forms. Then search for Literature Distribution. Follow the instructions on the Literature Distribution web page.
- Send an e-mail to Literature Distribution at **DistrL@louisville.stortek.com**.
- **Note:** If you are a StorageTek customer, please contact a StorageTek representative to help you obtain copies of StorageTek publications.

Safety Precautions

Please read and observe the following safety topics for this product.

CAUTION:

Potential injury: On-the-job safety is important; therefore, observe the following safety precautions while you are engaging in any maintenance or installation activity. Failing to follow these precautions could result in serious injury.

- Remove all conductive jewelry, such as watches and rings, before you service powered-on equipment.
- Avoid electrical shock. Be careful when you work near power connectors and supplies.
- Power-off the equipment that is being serviced (unless otherwise stated). Remember that dangerous voltages could still be present in some areas even though power is off.
- Enforce good housekeeping practices in the equipment area to help prevent fire and accidents.
- Do not lift heavy loads without assistance.

Note: The batteries are heavy and require two people to lift and install them.

Battery Safety

- The UPS contains potentially hazardous voltages. Do not attempt to disassemble the unit. The only exception is when replacing the batteries—battery replacement is permissible.
- Except for the battery, the unit contains no user serviceable parts. Repairs are performed only by factory trained service personnel.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or damage the batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.
- Replace the batteries with the same part number and type as the original.

Door Interlock

A safety interlock for the tape library is located behind the front door. When the door is opened, the interlock immediately disables all tape library motors.

Electrostatic Discharge Damage Prevention

Before you touch any internal components in the library, including drives, you must take precautions against electrostatic discharge (ESD).

CAUTION:

Components are sensitive to static electricity: Even a small electrostatic discharge can damage an electrical component that is inside the library. A damaged component might not fail immediately, but over time, it will become worse and might eventually cause an "intermittent" problem. Be sure that you touch an *unpainted* metal surface of the library before you reach inside the library or touch the drives.

Before you touch any internal components:

- 1. With your finger, touch an *unpainted* metal surface of the library. In some libraries, you can touch the library's frame. In other libraries, you might have to touch a bolt on the wall or on the door frame.
- 2. Keep your body movement to a minimum as you touch library components.

Note: Antistatic wrist straps that have clip-on ends are commercially available.

Rack Safety and Precautions

WARNING:

Possible personal injury:

- More than one person might be required to install equipment into the library's rack or to remove equipment from the library's rack.
- Personnel should take adequate precautions when they are moving a library that contains rack-mounted equipment. The weight of some rack equipment might alter the height of the library's center of gravity. This condition might cause the library to tip during a move.

CAUTION:

Potential equipment damage: Do not exceed the maximum allowable weight and U-height for equipment in the rack area:

- L180 weight is 77 kg (170 lb) and U-height is 6 units.
- L700 weight is 130 kg (300 lb) and U-height is 17 units.

Observe the following when you are installing equipment into the library's rack:

• Ensure that the equipment has UL listing (listing by Underwriters' Laboratories), CSA certification (certification by the Canadian Standards Association), and CE compliance (compliance with the European Council's directives and standards).

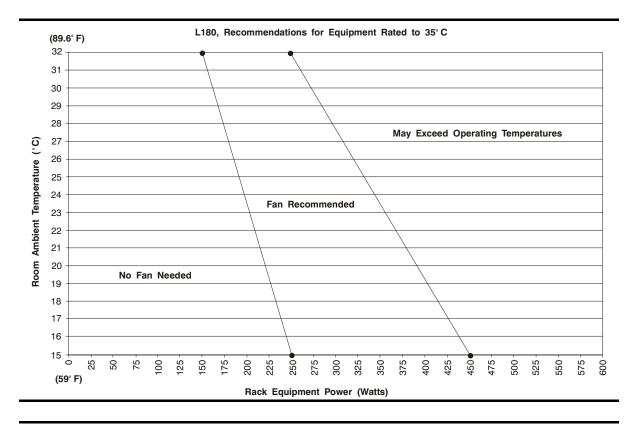
- Understand that the library does not supply power to the rack area. So ensure that the rack-mounted equipment has an adequate power source.
- Follow the manufacturer's guidelines to position, to support, and to fasten the equipment in the rack.
- Locate the equipment so that it does not block or hinder any ventilation openings in the library's rack area. For example, do not block library or drive exhaust areas, the electronic module exhaust area, perforated metal, or other similar ventilation.
- Locate the equipment so that the library's doors adequately clear the equipment when you close them.
- Install the equipment from the bottom of the rack to the top of the rack; StorageTek recommends that you place the heaviest items near the bottom of the rack.
- Ensure that the equipment in the rack does not create an overcurrent condition, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that the equipment in the rack has reliable earth ground, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that any equipment that you place within the rack is adequately cooled. The library's internal ambient temperature should not exceed the recommended operating temperature.

Base your cooling considerations upon the power dissipation within the rack space as well as upon the ambient room conditions that are external to the library.

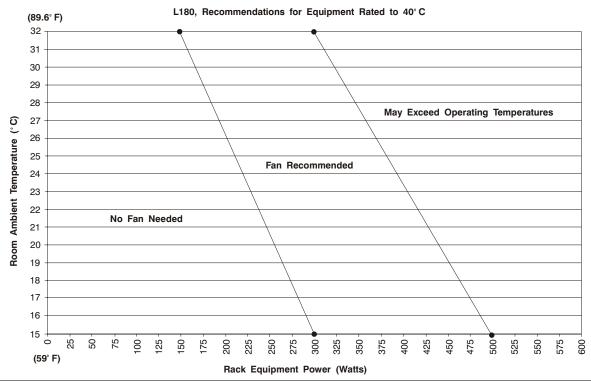
Note: StorageTek offers an optional feature that provides additional cooling for equipment installed in the rack space area.

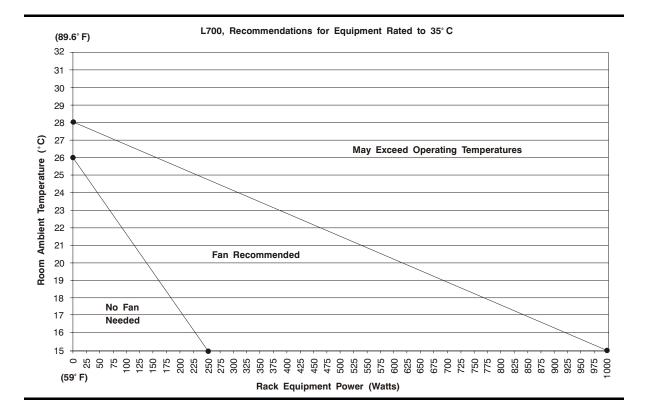
Library	Feature Code	Description	Conversion Bill
	DFAN	Domestic fan, rack area cooling	101331
L180	L180 EFAN International fan, rack area cooling		101332
	JFAN	Japanese fan, rack area cooling	101331
	DFAN	Domestic fan, rack area cooling 101323	
L700	EFAN	International fan, rack area cooling	101324
	JFAN	Japanese fan, rack area cooling	101323

See the following charts for temperature recommendations in the libraries.

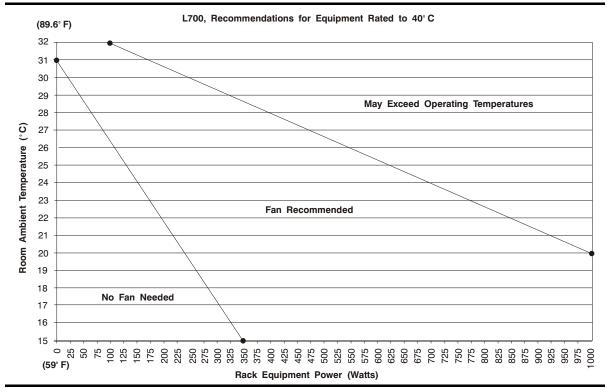


L180 Temperature Recommendations





L700 Temperature Recommendations



General Information

This chapter contains an introduction about the uninterruptible power supplies for StorageTek's L180 and L700 Tape Libraries.

Introduction

StorageTek and American Power Conversion (APC) offer an internal uninterruptible power supply (UPS) with full AC redundancy for protecting StorageTek's L180 and L700 Tape Libraries. The UPS is an *optional feature* that allows these tape libraries to maintain continuous operation in the event of a power disruption. The UPS also eases the effects of blackouts, brownouts, sags and surges in AC power.

The optional feature consists of two uninterruptible power supplies, an Ethernet interface, a redundant switch, and a power outlet strip.

- The two power supplies supplement customer utility power during a blackout and provide conditioning by filtering out small fluctuations and disturbances or disruptions in the AC line voltage.
- The Ethernet interface allows you to monitor the status of each UPS.
- The switch (also called the redundant switch) alternates between the two UPS units to provide continuous power to the library.
- The outlet strip allows you to connect up to eight additional components to the UPS.
- **Note:** This feature is capable of mounting internally in the rack space of each library.

What it Does

If an AC power failure occurs, it causes the switch to automatically transfer the load from the customers power source to the UPS without interruption to the tape library. If the UPS battery fails or is discharged, the switch automatically transfers the load to the redundant UPS without interruption. This dual UPS configuration will supply power to the equipment until the customers power is restored or the batteries are discharged.

While running on battery power, periodic beeps will sound; this is normal. Press the **TEST** button to turn off this alarm. If you hear a continuous beep, you have *two* minutes before the UPS will shutdown.

Feature Codes

The UPS is an optional feature available from StorageTek. Table 1-1 lists the library, feature code, and conversion bill number for the UPS:

Library	Feature Code	Description	Conversion Bill
L180	L180RPWRDomestic power switch and UPS		101406
	EPWR	International power switch and UPS	101407
L700 RPWR		Domestic power switch and UPS	101410
	EPWR	International power switch and UPS	101411

Table 1-1. Feature Codes

Note: The UPS feature requires the optional rack cooling feature. See Chapter 3 for information about the prerequisites.

Installation

StorageTek service representatives can install the UPS feature in the libraries. The UPS bundle is drop-shipped by APC (the manufacturer) within 24 hours of the receipt of the order.

Use the information in the *L180/L700 Tape Library Ordering and Configuration Guide* (part number MT9112) to order the library and the desired features including the UPS.

See Chapter 3 for an overview of the installation instructions.

Service

If there is a problem, place a service call to StorageTek's Call Center. If it is determined that the UPS has failed; the call will be escalated by the Call Center and StorageTek's Technical Support to APC, who has 7 by 24 coverage. The replacement parts will be sent to the customer site.

Notes:

- See Chapter 4 for information about how to isolate problems with the UPS.
- See Chapter 5 for the procedure to place a service call.

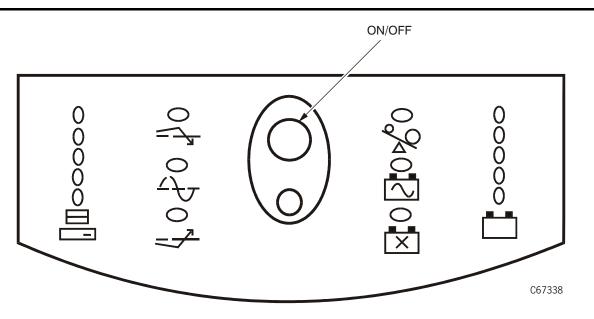
Controls and Indicators

This chapter describes the indicators for the uninterruptible power supply (UPS) and the redundant switch.

UPS Indicators

Figure 2-1 shows and describes the indicators for the UPS:

Figure 2-1. UPS Indicators



ON/OFF TEST	Press the larger (upper) button to supply power or silence the alarm. Press the smaller (lower) button to turn off power.
4	Online This LED is on when the UPS is supplying customer (utility) power to the equipment (load).
	On Battery This LED is on during battery operation. During battery operation, the UPS beeps four times every 30 seconds until the UPS goes back online or the battery is discharged.
	Note: Press the TEST button to turn off this alarm.

	SmartTrim This LED comes on when the UPS is compensating for high voltages.
-	SmartBoost This LED comes on when the UPS is compensating for low voltages.
×	Replace Battery This LED is on if the self-test fails or when the battery needs to be replaced. If the self-test fails, the UPS emits short beeps for one minute for up to five hours. The alarm stops when the self-test passes (or when you replace the battery). See "Battery Replacement" on page 4-9 for the procedure.
<u>\$</u> Q	Overload This LED comes on when the load of the UPS exceeds its capacity. An audible alarm sounds until the overload is removed.
	Note: The circuit breaker to the UPS may trip. Disconnect any nonessential equipment from the UPS to eliminate the overload condition.
0 85% 0 67% 50% 33% 17% 17% 17%	 Load Bar Graph This indicator is on the <i>left</i> side of the front panel. It displays the percentage of the UPS's rated capacity. The five LEDs show the power drawn from the UPS by the equipment connected to it. For example: If three LEDs are on, the load is drawing between 50% and 67%. If all the LEDs are on, test the configuration and make sure an overload condition does not exist.
0 100% 0 80% 0 60% 0 40% 0 20%	 Battery Charge Graph This indicator is on the <i>right</i> side of the front panel. It displays the charge percentage of the battery. For example: When all five LEDs are on, the battery is fully charged. When the indicators start to go out, the battery is not at 100% capacity. When the indicators are flashing, this indicates a low battery warning. The low battery warning occurs approximately two minutes before the battery is discharged.
0 132 0 123 0 115 0 107 0 98	 Utility Voltage Bar Graph This indicator is on the <i>right</i> side of the front panel. It displays the value of the input (utility) voltage. The value is between the lit indicator and the next highest value. For example: If three LEDs are on, the input voltage is between 115 and 123 VAC. If all of the LEDs are on, the input voltage is too high for the configuration and should be checked.

Redundant Switch Indicators

Figure 2-2 shows and describes the indicators for the redundant switch:

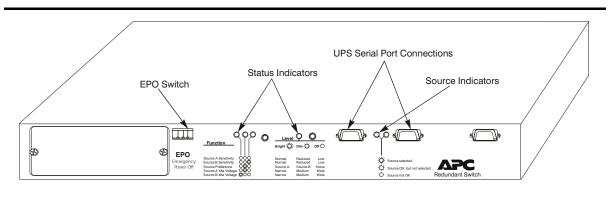
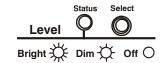


Figure 2-2. Redundant Switch Front Panel

C67350



		User Se	electable O		
Function	Default	Bright	Dim	Off	Description
Source A Sensitivity	Reduced	Normal	Reduced	Low	Sets transfer sensitivity to line conditions
Source B Sensitivity	Reduced	Normal	Reduced	Low	Sets transfer sensitivity to line conditions
Source Preference	Source A	Source A	Source B	None	Selects the preferred AC source
Source A Xfer Voltage	Medium	Narrow	Medium	Wide	Sets the transfer voltage window
Source B Xfer Voltage	Medium	Narrow	Medium	Wide	Sets the transfer voltage window

The redundant switch front panel has the controls and indicators that allow you to program settings for the UPS.

Note: The default settings are suggested for normal use.

0	0	0	Function Select Indicator Indicates which user programmable parameter is selected for status display or modification. Use the left Select button to cycle through the five user selectable options above.
	0		Function Status Indicator Indicates the state of the selected user programmable function. Use the right Select button to cycle among the choices.
AC B	Sou	rce A	AC Source Indicator Indicates the line quality and select status of each source.
	柋		Indicators: Bright = source selected
	Ċ.		Dim = source okay, but not selected
	0		Off = source is not okay

Installation Overview

This chapter contains an overview about how to install the uninterruptible power supply (UPS) optional feature for the L180 and L700 Tape Libraries.

Note: Always refer to the instructions sent with the feature for specific information about how to install the UPS.

Prerequisites

The following are the prerequisites for installing the UPS:

UPS Feature Codes

Library	Feature Code	Description	Conversion Bill
L180	RPWR	Domestic power switch and UPS	101406
	EPWR	International power switch and UPS	101407
L700	RPWR	Domestic power switch and UPS	101410
	EPWR	International power switch and UPS	101411

Rack Cooling Feature

StorageTek offers an optional feature that provides additional cooling for equipment installed the rack space area. This feature is *required* for the UPS.

Library	Feature Code	Description	Conversion Bill
	DFAN	Domestic fan, rack area cooling	101331
L180	EFAN	International fan, rack area cooling	101332
	JFAN	Japanese fan, rack area cooling	101331
	DFAN	Domestic fan, rack area cooling	101323
L700	EFAN	International fan, rack area cooling	101324
	JFAN	Japanese fan, rack area cooling	101323

Rear Door Replacement

Some early model library rear doors are not compatible with the optional rack cooling feature. Check the serial number of your library, if it falls within the ranges listed, you need to replace the rear door.

The following table lists the serial number range, description, and field bill number for the rear door.

Library	Serial Numbers	Description	Field Bill
L180	1 - 6015	StorageTek rear door HP rear door Sun rear door NCR rear door	101334 101336 101337 101338
L700	1 - 6798	StorageTek rear door HP rear door NCR rear door	101326 101339 101340

Power Connections

Make sure you have the correct power connections for this feature:

- The L180 library, UPS Model SU1400RM2U, uses an L5-15, locking 120 VAC, 15 Amp plug. The customers power source requires an L5-15R receptacle.
- The L700 library, UPS Model SU3000RM3U, uses an L5-30, locking 120 VAC, 30 Amp plug. The customers power source requires an L5-30R receptacle.
- The International feature (EPWR) uses a Hubbell 316P6W (plug) and Hubbell 316R6W (receptacle).

Before Beginning

Before beginning these installations, make sure:

- You observe the information in "Safety Precautions" on page x.
- All equipment has been received.
- There are two separate power sources; one for each UPS.
- The library and all tape drives are offline.
- **Note:** For simplicity, this installation procedure uses figures of the L180 UPS; the procedure is similar for the L700. Refer to the instructions sent with the feature for specific information about how to install the UPS.

Instructions

The following is an overview of the installation procedure to install the UPS in the L180 and L700 Tape Libraries:

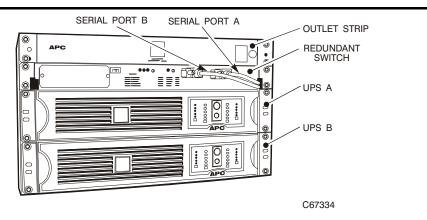
- 1. Open the front door.
- 2. Open the rear door.

Note: You can remove the doors for ease of installation.

- 3. Power-off the library and all the tape drives.
- 4. Unpack the UPS, redundant switch, mounting hardware, and documentation.
- 5. Install the rail kits for the UPS in the rack area.
- **Note:** The rail kits and mounting hardware are included in the packaging for each component.

Figure 3-1 shows the location of the equipment.





WARNING:

Personal injury. The power supplies are heavy and require more than one person to lift and install them. Make sure you use proper lifting techniques when installing the UPS. The L180 UPS weighs 28.6 kg (63 lb) and the L700 UPS weighs 51.8 kg (114 lb).

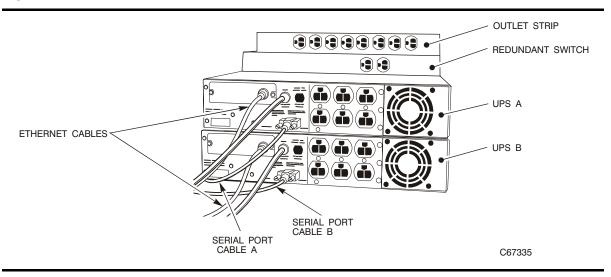
- 6. Install the first (lower) UPS in the rack area. This is UPS B.
- 7. Install the second (upper) UPS in the rack area. This is UPS A.

Important:

Reconnect the battery cables. The batteries are shipped disconnected from the UPS. Remove the front cover of the UPS and connect the batteries to the power supply.

- 8. Connect the Ethernet cables to each UPS.
- 9. Connect the serial port cables to the connectors on the rear of the UPS.
- 10. Using the rack-mount hardware, install the switch above UPS A.

Figure 3-2. Rear Connections



- **Note:** See Figure 3-3 on page 3-5 for a block diagram of the cable routing and connections.
- 11. Connect the UPS serial port cables to the switch.
- 12. Connect the power cables to the switch.
- 13. Route the power cable from the cooling fan through the rack area of the library and connect it to the outlet strip.
- 14. Using the rack-mount hardware, install the outlet strip above the switch.
- 15. Connect any additional power cables to the outlet strip.

CAUTION:

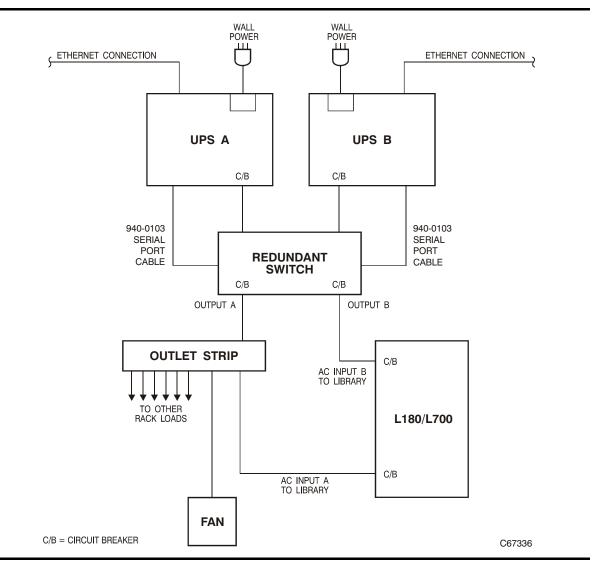
Power cable requirement. Make sure you use the IEC 60309 power cables for connection of the UPS to the customer power source.

- 16. Route and connect the main AC power cables from the UPS to the customer's outlets.
- 17. Power on the library and tape drives.
- 18. Power on each UPS and the switch:
 - a. Turn-on (up) the two circuit breakers on the rear of the UPS (one is the input power, the other is the overcurrent protection breaker).
 - b. Press the ON/TEST button on the front of the UPS.

- c. Turn-on (to the right) the two circuit breakers on the rear of the switch (Load 1 and Load 2).
- d. Press the power button on the front of the outlet strip.
- 19. Make sure all components (library, tape drives, fans, and UPS) are on.
- 20. Follow the directions on the APC publication, *WEB/SNMP Management Card, Installation and Quick Start Manual* to configure the TCP/IP settings. This document and a CD-ROM are provided in the UPS packaging.

Figure 3-3 shows the cables and connections for the UPS:





APC Web/SNMP Management Card

The APC AP9606 Web/SNMP management card is a web-based management tool that allows you to monitor and configure the UPS. The card conforms to open communication standards such as Telnet, HTTP, and SNMP.

The client software requirements include standard Web browsers such as Microsoft Internet Explorer and Netscape Navigator Versions 4.0 and above.

Refer to the APC documentation and CD-ROM for information about how to configure and use this management tool.

Operation

After you install the UPS and power it on, you can expect the following:

- The UPS performs a self-test.
- The batteries begin to charge.

Once the UPS has completed the self-test, you can configure the following options:

- Voltage sensitivity
- Low battery warning

Self-Test

The UPS automatically performs a self-test when you power it on and every two weeks afterwards (by default). These automatic self-tests alleviate any maintenance requirements by eliminating the need for periodic manual selftests.

During the self-test, the UPS briefly operates the loads using the battery.

- If the self-test passes, the UPS returns to online operation.
- If the self-test fails, the UPS immediately returns to online operation and lights the replace battery LED. Recharge the battery overnight and perform the self-test again. If the replace battery LED is still on, replace the battery.

Note: The loads are not affected if the self-test fails.

Charge the Battery

When you connect the UPS to the customer's (utility) power, it charges the battery. The battery will charge fully during the first four (4) hours of normal operation. Do not expect full runtime during this initial charge period.

Voltage Sensitivity

When the UPS detects distortions with the input power (by default), it reacts by transferring the UPS to battery operation to protect the loads. Also, when the quality of the power is poor, the UPS may frequently transfer to on-battery operation. If the loads can operate normally under such conditions, the capacity of the battery and service life may be conserved by reducing the sensitivity of the UPS.

Note: The following procedure may require *two* people to perform.

To set the voltage sensitivity:

- 1. Using a pointed object (such as a pen), press the configuration button on the rear panel of the UPS.
 - a. Press it once to set the sensitivity to reduced.
 - b. Press it again to set the sensitivity to low.
 - c. Press the button a third time to reset the sensitivity to normal.
- 2. When the UPS is set to normal sensitivity, the configuration LED is brightly lit. When set to reduced sensitivity, the LED is dimly lit. When set to low sensitivity, the LED is off.

Low Battery Warning

The low battery warning occurs when there are approximately two minutes of on-battery run time remaining (by default). Two minutes may not be enough time to gracefully shut down the library and tape drives.

To change the warning interval:

- 1. Using a pointed object (such as a pen), press the configuration button on the rear panel of the UPS while pressing and holding the front panel **TEST** button.
 - a. Press the configuration button once to set the low battery warning interval to approximately five minutes.
 - b. Press it again to set the interval to approximately seven minutes.
 - c. Press the button a third time to reset the interval to two minutes.

Installation Overview

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Fault Isolation

This chapter contains screen examples and a troubleshooting table to help you diagnose power-related problems with the uninterruptible power supply (UPS). This chapter also contains a procedure for StorageTek's service representatives to replace the battery in the UPS.

Note: Refer to the library service manual for information about how to isolate problems with the library.

As a quick overview, this chapter contains the following:

- The screen examples demonstrate how to determine if the UPS is functioning properly, if the AC input voltage is acceptable, if the output load is connected, or if the battery needs replacement. The screen information is available from the APC AP9606 Web/SNMP Management Card inside the UPS through the Ethernet connection.
- Table 4-1 on page 4-7 contains a list of possible problems and solutions that may occur with the UPS.
- "Battery Replacement" on page 4-9 lists the safety precautions for the battery and outlines a procedure for StorageTek's service representatives to replace a battery.
- **Note:** If you are a customer, see Chapter 5 for information about how to contact StorageTek's Customer Support Services if the UPS requires service or maintenance.

UPS is On

The following screen shows when the UPS is on and communicating properly.

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Web/SNMP		
Management	www.apcc.com	Smart-UPS 700
IP: 159.215.6.98	Status of Smart-UPS 700 named	APC ?
Smart-UPS 700	Describes UPS status	
Status	On	
Diagnostics	Serial communication has been	established.
Control	UPS is on.	
	Reason For Last Transfer To	Due to software command or UPS's
Configuration	Battery:	test control.
PowerChute	Internal Temperature:	043.2 Degrees Celsius
Events	Describes utility power status	
Network	Input Voltage:	114.4 VAC
System	Input Frequency:	60.00 Hz
Logout	Maximum Line Voltage:	115.0 VAC
	Minimum Line Voltage:	113.7 VAC
Help	Describes output power status	
Assistant	Output Voltage:	114.4 VAC
	Output Frequency:	60.00 Hz
Links	Load Power:	010.9 % Watts
User Link 1		
User Link 1	Describes battery status	
	Battery Capacity:	097.0 %
User Link 3	Runtime Remaining:	0105 Minutes
	Battery Voltage:	27.60 VDC

This screen displays information about the output power status.

If the load is not connected (such as the circuit breaker tripped or the equipment is disconnected) the Load Power status will show a lower level during normal operation.

This screen also displays input voltage and frequency information on the Utility Power Status section. Reported voltages that differ greatly from the expected nominal voltage indicate a quality problem with the input power.

UPS is Off

The following screen s	shows that the	UPS is off.
------------------------	----------------	-------------

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Web/SNMP		
Management	www.apcc.com	Smart-UPS 700
IP: 159.215.6.98	Status of Smart-UPS 700 named	APC ?
Smart-UPS 700	Describes UPS status	
Status	Off	
Diagnostics	Serial communication has been	n established.
	UPS is off.	
Control		
Configuration	Reason For Last Transfer To Battery:	Due to software command or UPS's test control.
PowerChute	Internal Temperature:	042.7 Degrees Celsius
Events		
Network	Describes utility power status Input Voltage:	114.4 VAC
System	Input Frequency:	60.00 Hz
Logout	Maximum Line Voltage:	115.0 VAC
	Minimum Line Voltage:	113.7 VAC
Help		
Interactive	Describes output power status	
<u>Assistant</u>	Output Voltage:	000.0 VAC
	Output Frequency:	60.00 Hz
Links	Load Power:	010.9 % Watts
User Link 1	Describes battery status	
User Link 2	Battery Capacity:	095.0 %
User Link 3	Runtime Remaining:	0103 Minutes
	Battery Voltage:	27.60 VDC

UPS is Not Communicating

The following screen shows what happens if the UPS is not communicating.

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ldress 🛃 http://159.215.6.98/				▼ ć
Web/SNMP				
Management				Status Summary
IP: 159.215.6.98	UPS Status			
	Describes th	e UPS status		
Events		or a Smart-UPS or a Matrix	x-UPS	
Liones				
Network		adement Card		
	Web/SNMP Man			
Network	Describes th	e Management Card status		10/00/0000
Network System	Describes th Name:	e Management Card status Unknown	Date:	12/20/2000
Network System	Describes th	e Management Card status		12/20/2000 14:10:17 0 Days 0 Hours 0 Minutes

The above status might be caused by:

- Disconnected cables
- The AP9606 card is not configured properly. Check the status lights on the card.

Link RX/TX LEDs		
Off	The device which connects the Management Card to the network is turned off or it is not operating correctly.	
Flashing	The card is receiving data packets from the network.	

Status LED	Indicates the status of the Management Card	
Off	The Management Card has no power.	
Solid Green	The Management Card has valid network settings.	
Flashing Green	The Management Card does not have valid TCP/IP settings.	
Solid Red	A hardware failure has been detected in the Management Card.	
	Contact StorageTek's Customer Support Services.	
Flashing Red	The Management Card is making BOOTP requests. If you do not use a BOOTP server, you need to configure the Management Card's TCP/IP settings.	

Battery Needs Replacement

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Web/SNMP		
Management		
Card	www.apcc.com	Smart-UPS 1400
IP: 159.215.6.98	Status of Smart-UPS 1400 name	ed UPS IDEN ?
Smart-UPS 1400	Describes UPS status	_
Status	Discharged, Bad Battery	
	UPS: Batteries need immediate	
Diagnostics	Serial communication has been	n established.
Control	UPS: Batteries discharged. UPS is on.	
Configuration		
PowerChute	Reason For Last Transfer To	Due to software command or UPS's
	Battery:	test control.
Events	Internal Temperature:	025.0 Degrees Celsius
Network		
System	Describes utility power status	
Logout	Input Voltage:	120.0 VAC
	Input Frequency:	60.00 Hz
Help	Maximum Line Voltage: Minimum Line Voltage:	125.0 VAC 115.0 VAC
2 Interactive	Minimum Line Voltage:	115.0 VAC
<u>Assistant</u>	Describes output power status	
	Output Voltage:	120.0 VAC
Links	Output Frequency:	60.00 Hz
User Link 1	Load Power:	050.0 % Watts
User Link 2		
User Link 3	Describes battery status	
	Battery Capacity:	100.0 %
	Runtime Remaining:	0020 Minutes
	Battery Voltage:	27.60 VDC

The following screen shows when the battery needs to be replaced.

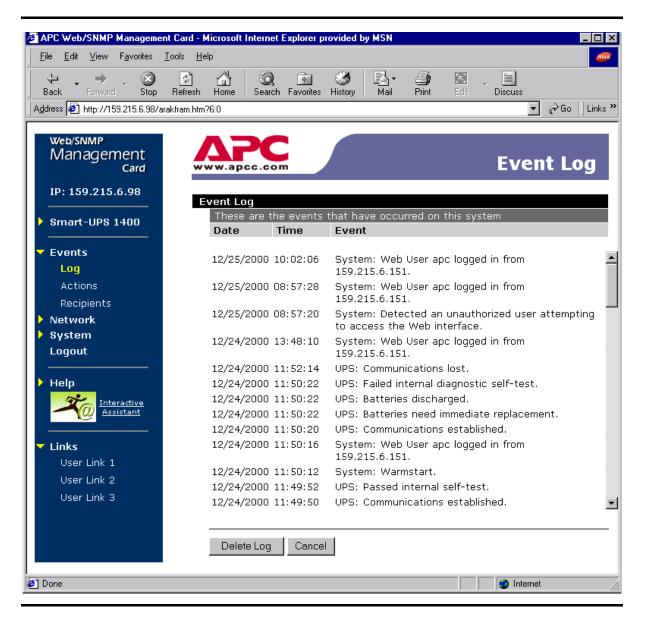
When you receive this message check the UPS. The UPS alarm sounds every five hours. If AC power does not return, then the UPS will shutdown when the battery is discharged.

Contact StorageTek Customer Support Services if the unit is under warranty or to replace the battery if the UPS is out of warranty.

See Chapter 5, "Service" for information about how to contact StorageTek.

View Event Log

The following screen shows an example of the event log.



The Event Log stores past events including information that will help troubleshoot intermittent or site specific power problems.

■ Troubleshooting the UPS

Table 4-1 describes some possible problems and solutions when troubleshooting the UPS:

Pı	oblem and Possible Cause	Solution
U	PS will not turn on.	
•	ON button not pushed.	Press the ON button once to power on the UPS and other equipment.
•	UPS not connected to AC power supply.	Make sure the power cable from the UPS to the customer's input power is securely connected at both ends.
•	UPS input circuit breaker tripped.	Reduce the load on the UPS by unplugging equipment and reset the circuit breaker (on back of the UPS) until you isolate the device causing th problem (or the UPS).
•	Very low or no utility voltage.	Check the AC power supply to the UPS with a table lamp. If the light is very dim, check the inpuvoltage.
•	Battery not connected properly.	Check the battery connections.
U	PS will not turn off.	
•	Internal UPS fault.	Do not attempt to use the UPS. Unplug the UPS and contact StorageTek's Customer Support Services* immediately to obtain a new UPS.
U	PS operates on battery although no	rmal line voltage exists.
•	UPS's input circuit breaker tripped.	Reduce the load on the UPS by unplugging equipment and reset the circuit breaker (on back of the UPS) until you isolate the device causing the problem (or the UPS).
•	Very high, low, or distorted line voltage.	 Move the UPS to a different outlet on a different circuit. Test the input voltage with the Utility Voltage display. If acceptable to the load, reduce the UPS's sensitivity (refer to the APC User's Manual for more information).

Table 4-1. Troubleshooting the APC Uninterruptible Power Supply

٠	Normal UPS operation.	None. The UPS is protecting the load.
---	-----------------------	---------------------------------------

Problem and Possible Cause Solution

UPS does not provide expected backup time.

of a	UPS's battery is weak because recent power outage or is near end of its service life.	Charge the battery. Batteries require recharging after extended outages. The batteries wear faster when in service more often and when operated at higher temperatures. If the battery is near the end of its service life, consider replacing the battery.
		Contact StorageTek's Customer Support Services. *
• The	UPS is overloaded.	Check the UPS load display and unplug any less needed equipment (such as printers).

Front panel indicators flash sequentially.

•	The UPS has been shutdown by	None. The UPS will restart automatically when
	remote control.	power is restored.

All indicators are lit and the UPS emits a constant beeping sound.

•	Internal UPS fault.	Do not use the UPS. Turn off the UPS.
		Contact StorageTek' Customer Support Services* immediately to obtain a new UPS.

All indicators are off and the UPS is plugged into the power source.

•	The UPS has shutdown and the battery is discharged from an extended outage.	None. The UPS will return to normal operation when power is restored and the battery has a sufficient charge.			
Tl	The Replace Battery light is on.				
•	Weak batteries.	Allow the batteries to recharge for at least four hours.			
		If the problem persists after recharging, contact StorageTek's Customer Support Services* to replace the batteries.			
•	Replacement batteries not connected properly.	Check or reconnect the battery connections.			

Customer Support Services.

Battery Replacement

The following procedure explains how to replace a worn or weak battery in the UPS. Observe the following safety precautions before replacing the battery.

Battery Safety

Observe the following safety precautions when replacing the batteries:

WARNING:

Personal injury. Do not lift heavy loads without assistance. The batteries are heavy and require two people to lift and install them.

- The UPS contains potentially hazardous voltages. Do not attempt to disassemble the unit. The only exception is when replacing the batteries—battery replacement is permissible.
- Except for the battery, the unit contains no user serviceable parts. Repairs are performed only by factory trained service personnel.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or damage the batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.
- Replace the batteries with the same part number and type as the original.

Instructions

The UPS battery is easy to replace using a hot-swappable battery tray. Battery replacement is a safe procedure and is isolated from electrical hazards.

Notes: Read the following before beginning this procedure:

- You may leave the UPS and the protected equipment on for this procedure.
- The battery tray is accessible from the front of the UPS.
- Be careful removing the battery tray—it is heavy.
- This procedure requires a Phillips head screwdriver.
- Small sparks at the battery connectors are normal during re-connection.

To replace the battery:

- 1. Remove the front cover.
 - a. Using both hands, insert an index finger behind the lip of the curved section of the front cover.
 - b. Pull the cover towards you. The cover will unsnap.
 - c. Unhook and remove the cover from the UPS to expose the battery door.

- 2. Remove the two (2) screws from the battery door with a Phillips screwdriver and remove the battery door.
- 3. Disconnect the leads from the battery. Pull the connectors towards you to disconnect the battery.
- 4. Use a Phillips head screwdriver to remove the screws that secure the battery tray. Set the screws aside.

WARNING:

Personal injury. The batteries are heavy. Use two people to remove the battery from the UPS.

- 5. Use the battery tray handle to slide the tray out about *halfway*.
- 6. Hold the tray from the sides and slide it out to the fully extended position.

- 7. Carefully lift the tray up so that the stop tab clears the edge of the UPS.
- 8. Return the battery tray using the package the replacement battery was shipped in.
- 9. Hold the new tray on the sides and align it with the opening.
- 10. Raise the back of the tray up slightly to position the stop tab on the inside of the opening.
- 11. Push the battery tray in completely.
- 12. Remove the tape on the new battery to expose the connectors.
- 13. Reconnect the battery leads.
- 14. Replace the screws.
- 15. Tuck the battery cables into place.
- 16. Replace the battery door.
- 17. Replace the front cover.
- 18. Write down the model number, serial number, and date of purchase of the UPS. APC will issue a Returned Material Authorization Number (RMA#).
 - **Note:** Contact Customer Support Services for this number if you did not receive one.
- 19. Mark the RMA# on the outside of the package.
- 20. Return the UPS by insured, prepaid carrier to the address given to you by Customer Support Services.

Note: The stop tab on the bottom of the tray prevents the battery from coming out completely.

Service

This chapter describes what to do if problems occur with the uninterruptible power supply (UPS). In some cases, you might be able to correct the problem. In other cases, you must contact your service provider to correct the problem.

Customer Support Services

The Call Center for Customer Support Services (CSS) is available 24 hours a day, seven days a week, to customers with StorageTek maintenance contracts and to StorageTek employees.

To contact StorageTek's CSS about a problem:

1. Use the telephone to call StorageTek at:

1–800–525-0369 (from within the United States)

303-673-4056 (from outside the United States)

- One of StorageTek's worldwide offices (see page 5-2)
- 2. Describe the problem to the call taker. They will ask you several questions and either route your call to a support technician or dispatch a service representative.

Please have the following information available when placing a service call:

Account name	
Site location number	
Contact name	
Telephone number	
Equipment model number	
Serial number (if known)	
Urgency of problem	
Problem description	

Service Procedures

When you need to replace a battery or the UPS:

- 1. Verify that no circuit breakers are tripped—this is the most common problem with the UPS.
- 2. Did the customer account lose power?
- 3. Review the information in Chapter 4, "Fault Isolation" to help isolate the problem, such as a weak or discharged battery.
- 4. Once it is determined that the UPS has failed, the call will be escalated. StorageTek will work with APC to get a replacement part (such as a battery or UPS) to the customer's site.
- 5. Write down the model number, serial number, and date of purchase of the UPS. APC will issue a Returned Material Authorization Number (RMA#).
- 6. Pack the UPS properly using the same packing material the replacement arrived in to avoid damage in transit.
- **Note:** Never use Styrofoam beads for packaging, damage during transit is not covered under warranty.
- 7. Mark the RMA# on the outside of the package.
- 8. Return the UPS by insured, prepaid carrier to the address given to you by Customer Support Services.

StorageTek's Worldwide Offices

You may contact any of StorageTek's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on StorageTek's external web site at:

http://www.storagetek.com/StorageTek/about/about_wo.html

Contact number: _____

Specifications

This appendix lists the specifications for the uninterruptible power supply (UPS), redundant switch, and outlet strip.

Uninterruptible Power Supply

The following tables list the specifications for the UPS.

Table A-1.	Technical Spe	cifications

Specification	L180	L700
APC Model Numbers	Smart-UPS 1400 RM	Smart-UPS 3000 RM
Nominal input voltage	120 VAC	120 VAC
Frequency	47 to 63 Hz	47 to 63 Hz
Power cable (6 ft) Domestic International	NEMA L5-15P Hubbell 316P6W	NEMA L5-30P Hubbell 316P6W
Rated power (Volt Amps)	1,400 VA	3,000 VA
Output power (Watts)	950 W	2,250 W
Surge energy rating	480 Joules	320 Joules
Thermal dissipation	171 Btu/hr	375 Btu/hr
Input protection	Circuit breaker	
Protection	Overcurrent and short circuit Shutdown on overload	

Table A-2. Battery Specifications

Specification	L180	L700
Battery type	Leakproof, maintenance-free, sealed Lead-Acid battery with suspended electrolyte	
Replacement battery	RBC 24 cartridge (tray)	RBC 12 cartridge (tray)
Backup time (half load)	26.5 minutes	12.4 minutes
Recharge time	ge time 3 hours (typically)	
Battery life	3 to 6 years	

Specification	L180	L700
Height	8.9 cm (3.5 in.)	13.3 cm (5.25 in.)
Width	48.3 cm (19 in.)	48.3 cm (19 in.)
Depth	45.7 cm (18 in.)	63.5 cm (25 in.)
Weight	28.6 kg (63 lb)	51.8 kg (114 lb)
Rack space (units)	2 U	3 U

Table A-3. Physical Specifications

Table A-4. Environmental Specifications

Temperature:	
Operating	0° to 40°C (32° to 104°F)
Storage	-15° to 45°C (50° to 113°F)
Altitude:	
Operating	0 to 3.05 km (0 to 10,000 ft)
Storage	0 to 15.24 km (0 to 50,000 ft)
Relative humidity (operating and storage)	0 to 95% (non-condensing)

Table A-5. UPS Typical Runtime

Load (Watts)	Volt Ampere	L180	L700
65	100	4 hr 10 min.	5 hr 52 min.
130	200	2 hr 16 min.	3 hr 31 min.
195	300	1 hr 28 min.	2 hr 27 min.
260	400	1 hr 3 min.	1 hr 50 min.
325	500	47 min.	1 hr 26 min.
390	600	36 min.	1 hr 10 min.
455	700	28 min.	58 min.
520	800	23 min.	44 min.
585	900	18 min.	41 min.
650	1000	15 min.	36 min.
780	1200	11 min.	26 min.
910	1400	8 min.	21 min.
1040	1600		16 min.
1300	2000		10 min.
1430	2200		9 min.
1625	2500		5 min.

Redundant Switch

Table A-6. Redundant Switch Specifications

Specification	L180	L700
Nominal voltage	120 VAC	120 VAC
Frequency	47 to 63 Hz	47 to 63 Hz
Maximum load	1,400 VA; 12 A	3,000 VA; 14 A
Height	4.4 cm	(1.75 in.)
Width	22.9 cm	n (17 in.)
Depth	22.9 cr	n (9 in.)
Weight	4.5 kg	(10 lb)
Rack space (units)	1	U

Outlet Strip

Table A-7. Outlet Strip Specifications

Specification	Value
Nominal voltage	120 VAC; 50/60 Hz
Maximum line current	15 A
Height	4.4 cm (1.75 in.)
Width	48.2 cm (19 in.)
Depth	14.6 cm (5.75 in.)
Weight	1.45 kg (3.2 lb)
Number of outlets	9

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Glossary

This glossary defines new or special terms and abbreviations found in this manual.

A

A Ampere.

AC Alternating current.

APC American Power Conversion Corporation.

B

Btu British thermal unit. A standard measure of a device's heat output. The amount of heat required to raise one pound of water one degree Fahrenheit.

С

C Celsius or Centigrade. A unit of measure for temperature.

cm Centimeter. A unit of measure for length or distance.

CRC Customer Resource Center.

CSS Customer Support Services.

D

dBA Adjusted decibels (dB).

decibel (dB) One tenth of a bel. A unit of measure for relative power.

E

electrostatic discharge (ESD) An

undesirable discharge of an accumulated electrical charge (static) that can severely damage delicate equipment and degrade electrical circuitry. **ESD** See electrostatic discharge.

Ethernet A 10 Mb/s baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection.

F

F Fahrenheit. A unit of measure for temperature.

H

Hertz A unit of frequency equal to one cycle per second. For example, in the United States, power line frequency is 60 Hz, or a change in voltage polarity 120 times per second.

HTTP Hypertext transfer protocol.

Hz See Hertz.

I

in. Inch. A unit of measure for length or distance.

J

Joule A unit of energy or work, equal to the work done when the application point of a one newton force moves one meter in the direction of application.

K

kg Kilogram.

L

lb Pound. A unit of measure for weight.

S

SNMP Simple Network Management Protocol.

Т

tape library A housing that contains cartridge tapes and a robot that moves the tapes between storage cells and the attached tape drives.

TCP/IP Transmission Control Protocol/ Internet Protocol. A set of communication protocols that support peer-to-peer connection functions for local and wide area networks.

Telnet An application protocol in TCP/IP that allows a user at one site to access a remote system at another site.

U

uninterruptible power supply (UPS) A

buffer between utility power and the load that requires, uninterrupted or sustained, power during outages.

unit (U) A unit of measure for rack space.

UPS See uninterruptible power supply.

V

V Volts.

VAC Volts alternating current.

VDC Volts direct current.

W

W Watt.

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Publication Part Number:

Questions and Comments:

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