
Uninterruptible Power Systems (UPS) Power Conditioners Surge Suppressors Tranceiver

Technical Information and Reference

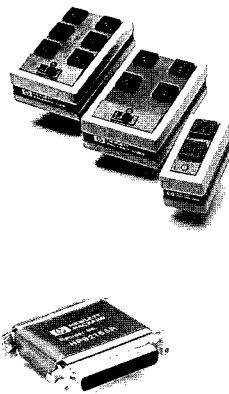
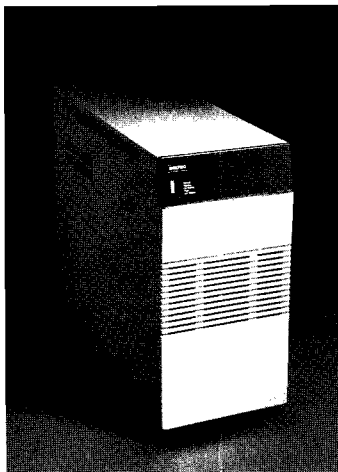
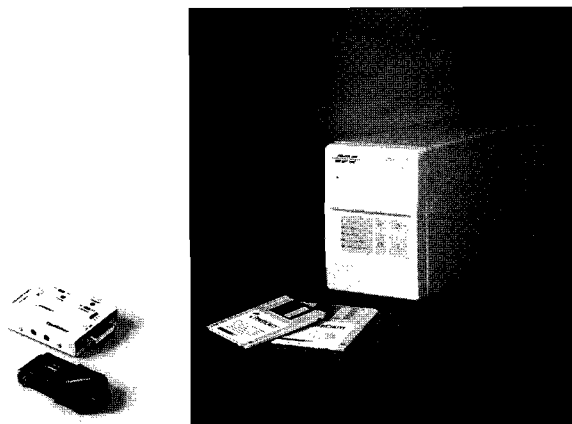


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Uninterruptible Power Systems (UPS)

Hewlett-Packard offers a line of high performance intelligent Uninterruptible Power Systems (UPS) and surge suppressors from third-party manufacturers for computer customers. These products have been tested by Hewlett-Packard to be compatible with HP computers. By offering high quality and high performance complementary products from reputable manufacturers, Hewlett-Packard can provide a more "complete" computer system solution to our customers.

The Problems with Power

The effects of power problems range from key board lockups to complete data loss or burnt circuit boards. Today, businesses rely more and more on a utility power supply that is pushed beyond its capacity. A momentary power outage is all it takes to lose data. More dangerous is the loss of previously written files, or all files stored on a hard disk, which can occur while the computer is saving a file. Network servers and Unix systems are particularly susceptible. Power problem types are described as follows, with a product solution reference guide for power problems and data line problems on the next page.

SAGS (also known as brown-outs): Short term decreases in voltage levels and the most common power problem.

Cause: Typically caused by the start-up power demands of many electrical devices (including motors, compressors, elevators, etc.), sags also are the electric utilities' means of coping with extraordinary power demands. In a procedure known as "rolling brownouts," the utility will systematically lower voltage levels in certain areas for hours or days at a time. Hot summer days, when air conditioning requirements are at their peak, often prompt rolling brownouts.

Effect: A sag can "starve" a computer of the power it needs to function, causing frozen key boards and unexpected system crashes resulting in the loss or corruption of data.

BLACKOUT: Total loss of utility power.

Cause: Excessive demand on the power grid, lightning storms, ice on power lines, earthquakes, etc.

Effect: Loss of current work and possible loss of hard drive File Allocation Table (FAT), resulting in total loss of data stored on drive.

SPIKE (also known as impulse): An instantaneous, dramatic increase in voltage. A spike can enter electronic equipment and

damage or completely destroy components.

Cause: Typically caused by a nearby lightning strike, spikes can also occur if utility power lines are downed in a storm.

Effect: Catastrophic damage to hardware; loss of data.

SURGE: A short term increase in voltage, typically lasting at least 1/120 of a second.

Cause: When high-powered electrical motors (such as air conditioners) are switched off, the extra voltage is dissipated through the power line.

Effect: Computers and sensitive electronic devices are designed to receive power within a certain voltage range. Anything outside of the expected peak and "average" voltage (RMS) levels will stress delicate components and cause premature failure.

NOISE: Electrical noise disrupts the smooth sine wave one expects from utility power.

Cause: Electrical noise is caused by many factors, including lightning, load switching, generators, industrial equipment, etc. It may be intermittent or chronic.

Effect: Noise introduces glitches and errors into executable programs and data files.

Power Problem Solution Guide

	AC Surge Suppressor	APCC UPS	Deltec UPS	RS-232 Surge Suppressor	Current's OptiSiftor	Power Conditioner
AC Noise	•	•	•			•
AC Surge	•	•	•			•
AC Spike	•	•	•			•
Blackout		•	•			
Brownouts		•	•			•
RS-232 surges				•	•	
RS-232 signal amplifier				•	•	

UPS Cross-reference Selection Chart

This is a general guideline for selecting the right UPS model. This UPS reference table covers the power requirement of the computer only, not other devices and peripherals that are connected to it. Please refer to the kVA Calculation Guide on the next page and example shown below to determine the exact size of UPS for your systems.



Product Number	600VA UPS APCC-600	1.25kVA APCC-1250	2.4kVA DELT-2026	3.6kVA DELT-2036
HP Vectra PCs	•	•		
HP9000				
Series 300s		•	•	
Series 400s		•	•	
Series 700s		•	•	
Series 800s			•	•
DN10000			•	•
DN3000, 3500, 4000,4500,5500		•	•	•
HP3000 (single phase only)		•	•	•

How To Calculate What kVA Size UPS the Computer System Needs

1. Read the MAXIMUM CURRENT RATING on the back label of each component in the system.
2. Multiply the MAXIMUM CURRENT by the VOLTAGE being used (i.e. 120 volts (typical) or 240 volts). Then divide by 1000 to get kVA size of each component in the system.
3. Add the kVA calculations of each component to get a total system kVA.
4. Select the UPS with the size greater than the system kVA requirement (typically 20 percent higher).

Example:

System's Component	Maximum Current (Step 1)	Component's kVA required (Step 2)
Computer	4A (Amp)	$(4A \times 120V)/1000 = 0.48kVA$
Disc Drive	3A	$(3A \times 120V)/1000 = 0.36kVA$
Monitor	1A	$(1A \times 120V)/1000 = 0.12kVA$
Total System's kVA (Step 3)		0.96kVA
Selecting UPS (Step 4):		$0.96kVA \times 1.2 = 1.15kVA$ UPS (P/N: APCC-1250 1.25VA UPS)

If Watts or BTU data is needed, use the following steps:

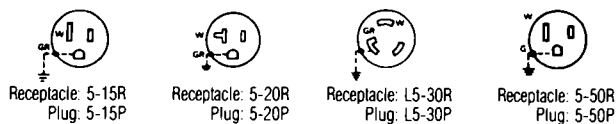
1. VA = Voltage x Total System Current (Amps)
2. Watts = Voltage x Total System Current (Amps) x Power Factor (PF)
3. BTU = Voltage x Total System Current (Amps) x Power Factor (PF) x 3.414

Using the previous example,

1. VA = 120V x 8Amps = 960VA
2. Watts = 120V x 8Amps x 0.8 = 768 Watts
3. BTU/Hr = 120 x 8Amps x 0.8 x 3.414 = 2,622 BTU/Hr

Note: Assume a Power Factor (PF) of 0.8 if not known. Some UPS device or equipment may specify the Watt rating. Use this rating if available.

Plug and Receptacle Configurations:



American Power Conversion's Smart-UPS 600VA, 1.25kVA Uninterruptible Power Systems

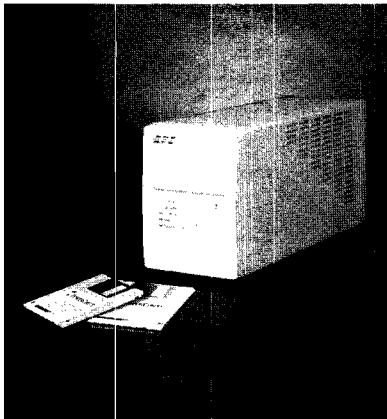
For HP Computers and Workstations

Order Number:

APCC-600 (600VA UPS)

APCC-1250 (1.25kVA UPS)

Hewlett-Packard offers the Smart-UPS from American Power Conversion Company (APCC) for HP computer users. American Power Conversion's Smart-UPS Uninterruptible Power Systems offer a most cost-effective and reliable solution to power problems that damage computers equipment and can cause data corruption. The Smart-UPS is ideally suited for use as stand-alone UPS for HP Vectras, workstations and



the HP3000. The Smart-UPS not only protects the hardware and data from blackouts, but also from brownouts, surges and spikes. In addition, for PC LANs, the Smart-UPS's Power Monitoring software performs orderly shutdown, and automatic restart when utility power resumes.

- UPS Monitoring software for LANs provides orderly shutdown of a network file-server in the event of an extended AC power loss.
- SmartBoost feature allows the UPS to supply correct output voltage in chronic brownout situations without running from battery.
- Sine wave output provides complete compatibility with all applications.
- Noise isolation EMI/RFI filter prevents electrical noise from affecting computer operation or introducing "glitches" into data files.
- Site and unit diagnostic automatically spots poor ground and reversed polarity, determines when battery needs replacement, and notifies users of overload situations
- Lightning and surge protection offers an extra degree of safety against file loss.

Indicators:

- Replace battery indicator
- Low battery indicator

- Load power and voltage meters
- Overload indicator
- Site-wiring fault indicator
- On-utility line indicator
- On-battery indicator
- Utility SmartBoost indicator

HP Hardware Supported

- HP Vectras
- HP3000
- HP9000 Series 400s, 700s
- DN3000, DN3500, DN4000, DN4500, DN5500

HP Software Supported

- HP LAN Manager 1.x
- HP LMX (running on SCO Unix)

TECHNICAL SPECIFICATIONS

For 600VA and 1.25kVA UPS

Voltage:

Nominal input voltage:

117 VAC, single-phase

Input voltage window:

103-132 VAC

Frequency: 50 or 60 Hz (unit will output the frequency it initially senses)

On battery output voltage: Pure Sine wave at 115 VAC +/- 5%

Connection:

Input Plugs: 5-15P (6 feet)

Output receptacles: 4-receptacle 5-15R (6 for 1.25kVA UPS)

Operation:

Transfer time: 2 milliseconds typical, 4 millisecond maximum

Maximum capacity (Volt-Amps, Watts): 600, 400 (1250, 900 for 1.25kVA UPS)

Distortion: < 5% (linear load)

Load power factor range, crest factor range: 0.5 to 1.0, <5

Battery Backup Time: 6 minutes at half load, 20 minutes at full load

Battery: Sealed, maintenance-free lead acid

Recharge Time: 10 hours

Physical Dimensions:

Height: 14.2" (17.8" for 1.25 kVA UPS)

Width: 6.6" (9.1" for 1.25 kVA UPS)

Depth: 4.7" (6.9" for 1.25 kVA UPS)

Weight: 30 lbs (56 lbs for 1.25kVA UPS)

Operating Temperature:

0 to 45 degree C

Operating Humidity:

0 to 95% non condensing

Audible Noise: Less than 45 dBA

Regulatory approval:

UL Listed

CSA Certified

FCC Class A Compliance

APCC-600SX

UPS Monitoring Kit to be used with 600 or 1250VA UPS for

LMX (LAN Manager Unix) running on SCO UNIX..

Includes interface cable for 9-pin serial ports, adaptor for computers with 25-pin serial ports, software (on both 5 1/4 and 3 1/2" disks), and manual

WARRANTY:

2-year unit repair/replacement

TECHNICAL SUPPORT:

provided by American Power Conversion at (800) 541-8896 in USA, and (800) 443-4519 in Canada

ORDERING INFORMATION

APCC-600

American Power Conversion's 600VA Smart UPS

APCC-1250

American Power Conversion's 1250VA Smart UPS

APCC-600SA

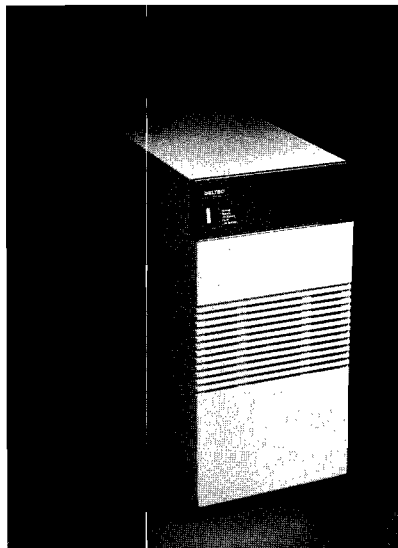
UPS Monitoring Kit to be used with 600 or 1250VA UPS for LAN Manager 1.x. Includes interface cable for 9-pin serial ports, adaptor for computers with 25-pin serial ports, software (on both 5 1/4 and 3 1/2" disks), and manual

Deltec's 2000 Series Uninterruptible Power Systems (UPS) 2.4kVA, 3.6kVA, On-Line, Single-Phase

For HP Computers and Workstations
Order Number:
DELT-2026 (2.4kVA UPS)
DELT-2036 (3.6kVA UPS)

Deltec's 2000 Series Uninterruptible Power Systems offer a most cost effective and reliable solution to power problems that damage computers and other critical equipment. As a true on-line UPS, 2000 Series systems provide the highest level of protection – a constant flow of refined, regulated, computer-grade power – through virtually any utility line disturbance. Therefore, the 2000 Series UPS not only protect the hardware and data from blackouts, brown-outs, surges and spikes, it offers the added benefit of reduced service costs that result from running the computers on “clean” power.

- RS-232 interface allows remote monitoring and shutdown.
- Power monitoring software for HP-UX and Domain O/S workstations included.
- Automatic Transfer Switch (ATS) ensures unattended transfer to bypass power in the event of UPS failure so that the load will remain powered.



- Eight receptacle output panel included.
- Remote Emergency Power Off (REPO).
- Ball casters and leveling feet included to ease placement.
- Low Input current distortion.
- Isolated output voltages for noise protection.
- High overload capability – no need to pay for an oversized UPS to allow for heavy startup load current.

HP Hardware Supported

- HP3000
- HP9000 Series, 400s, 800s, 700s
- DN3000, DN3500, DN4000, DN4500, DN5500, DN10000

Controls

- AC Input Circuit Breaker
- Battery Circuit Breaker
- Audible Alarm Silence Button
- Remote Shutdown via RS-232 or EOP button

Indicators

Front Panel LEDs for:

- Normal mode
- Battery mode (AC Input Failure)
- Bypass mode
- Low Battery
- Summary Alarm (includes overtemp and overload)

Technical Specifications

For 2.4 and 3.6kVA UPS

INPUT

Voltage:

Input: 120 VAC

Frequency: 60 Hz

Maximum Input Current:

23.9 Amps (34.6 Amps for 3.6kVA UPS)

Current Distortion: Less than 10% with full, non-linear load

Input Plugs: L5-30P (5-50P for 3.6kVA UPS). Wall receptacle not provided

OUTPUT

Voltage:

Output: 120 VAC

Frequency: 60 Hz

Regulation: 2%, steady state

Efficiency: 87%, no load to full load

Voltage Distortion: Less than 3%, THD

Crest Factor: Greater than 3:1

Battery Backup Time:

10 minutes at full load with 0.8PF, standard internal battery pack

Recharge Time: 3 hours, max; standard internal battery

Connection:

Output Connections: 8 receptacles (5-15R) and 1 L14-30 receptacle



Operation:*Physical Dimensions:*

Width: 11.5"

Height: 24"

Depth: 28"

Weight: 240 lbs (290 lbs for 3.6kVA UPS)

Operating Temperature:

0 to 40 degree C

Operating Humidity: up to 95%

non condensing

Audible Noise: Less than 55dB*Regulatory approval:*

UL Listed

FCC

Class A

CSA Certified

SYSTEM REQUIREMENTS*For Power Monitoring Software***Systems Supported:**

- HP-UX: HP9000 series 400s, 800s, 700s
- DOMAIN: HP9000 series 400's, DN3000, DN3500, DN4000, DN4500, DN5500, DN10000

Operating Systems:

- HP-UX version 7.03 or better
- DOMAIN SR 10.3 or better

System Memory**Requirements:**

- 200 Kbytes recommended
- 1/4" Cartridge Tape
- Drive: Required to install Power Monitoring Software for HP9000 workstations

ORDERING INFORMATION**DELT-2026**

Deltec's 2.4kVA UPS. Includes Power Monitoring software for

HP-UX O/S (1/4" tape, 25-pin/25-pin cable), casters, 8-receptacle output panel, Automatic Transfer Switch

DELT-2036

Deltec's 3.6kVA UPS. Includes Power Monitoring software for HP-UX O/S (1/4" tape, 25-pin/25-pin cable), casters, 8-receptacle output panel, Automatic Transfer Switch

DELT-4500S

Power monitoring software for DOMAIN O/S. Includes 1/4" tape, 25-pin/25-pin cable, user's manual

WARRANTY:

1 year unit repair/replacement

TECHNICAL SUPPORT:

provided by Deltec at (800) 854-2658 for West U.S., (800) 848-4734 for East U.S. or Fax (619) 299-6124.

Power Conditioners from AAA Power System Company

For HP Computer**Systems****Order Number:****46296G/H**

Hewlett-Packard offers 1kVA and 2kVA power conditioners from AAA Power System Company to computer customers. Power conditioners clean and regulate the power

that drives computer systems. In addition, they protect the computer systems from power surges and sags on the utility line which can affect normal operations.

TECHNICAL SPECIFICATIONS*Input Voltage:* 120 VAC*Input Voltage Regulation Range:*

+7 to -23% Nominal

Output Voltage: 120 VAC*Output Voltage Regulation:* +- 5%*Frequency:* 60Hz*Transformer Impedance:* 3 to 5%*Efficiency:* >= 96%*Load Power Factor:* Unity to 0.3*Leading or Lagging**Harmonic Distortion:* < 1%*Audible Noise:* < 30 dB*Operating Temperature:*

0 to 40 degree C

Operating Humidity:

10 to 90% non-condensing

Physical Dimensions:

Width: 11"

Height: 10.5"

Depth: 15.5"

Weight: 50 lbs (60 lbs for 2kVA)

ORDERING INFORMATION**46296G**

1kVA power conditioner

46296H

2kVA power conditioner

WARRANTY:

6-month unit repair/replacement

TECHNICAL SUPPORT:

provided by AAA Power System

Co. at (213) 721-5017

AC Power Surge Suppressors

For HP personal computers and peripherals
Order Number:
92165A/B/C

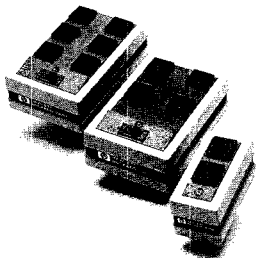
Hewlett-Packard's AC power Surge Suppressors are designed to protect the users' personal computers and peripherals against power electrical surges and transients. These AC surge suppressors feature three-stage circuitry to detect and dissipate dangerous electrical surges on power line.

- EMI/RFI noise filtering.
- Resettable circuit breaker.
- Three-stage circuitry to detect and dissipate dangerous electrical surges.
- Protection status indicator.
- Tested and qualified by HP.

TECHNICAL SPECIFICATIONS

Applicable line voltage: 120 VRMS nominal, 15 Amp capacity

Standby current: less than 1 milliamp



Protecting mode: Transverse and Common (3-stage models)

Noise attenuation range:
-5 dB to -40 dB

Frequency: 100kHz to 30 Mhz

Input: 5-15R

Output receptacles (5-15R):
2, 4, and 6

Clamping level (volts peak):
200+/- 5% at 1 mA

Operating temperature:
-225 to 75 degree C

Operating humidity: less than 95% non-condensing

Physical Dimensions:
Width: 2" (5" for 92165B/C)
Height: 2"
Depth: 4.5" (7" for 92165B/C)

Regulatory:
UL Listed
CSA Approved

ORDERING INFORMATION

92165A
2 receptacle (5-15R) AC power surge suppressor

92165B
4 receptacle (5-15R) AC power surge suppressor

92165C
6 receptacle (5-15R) AC power surge suppressor

WARRANTY:
90-day unit replacement

AC Multiple-outlet Power Strips

For HP computers and peripherals
Order Number:
92199A/B

Hewlett-Packard offers two multiple outlet AC power strips. Both have cases made of seamless steel with baked-on finish for durability. Mounting hardware is provided and each strip features a 1.8m (6 ft.) power chord with molded U.S. connector.

TECHNICAL SPECIFICATIONS

Electrical rating: 15A, 125 VAC, 60 Hz, 1875 W continuous duty

Physical Dimensions:
Width: 2.5" (2" for 92199B)
Height: 1" (1.5" for 92199B)
Depth: 12" (8.75" for 92199B)

Regulatory:
UL Listed

ORDERING INFORMATION

92199A
6 outlet (5-15R) AC power strip

92199B
4 receptacle (5-15R) AC power strip

WARRANTY:
90-day unit replacement



Current Technology's OptiSiftor

The First True Optically Isolated RS-232 Transceiver

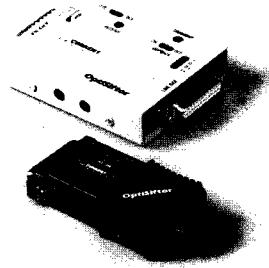
For HP Computers and Terminals

Order Number:
CURR-FS02

Hewlett-Packard offers the OptiSiftor from Current Technology. The OptiSiftor protects computers and related equipment using RS-232 from damage due to transients caused by lightning or other sources of energy, and from ground loops which cause errors or erratic operations. By acting as a high-powered repeater, the OptiSiftor solves the problems associated with "weak", error-prone data communication signals which result from using RS-232 beyond 50 foot design limit.

In addition, the OptiSiftor's optical barrier also eliminates ground loop error conditions which can cause CPU and/or disk errors. As the first totally isolated RS-232 protection and transmission device, the OptiSiftor establishes a physical break between the device and the wire, eliminating line noise and surges, thereby protecting sensitive electronics.

- 100 percent Optical Isolation:
 - provides total metallic break
 - maximum protection from impulses and heavy duty surges

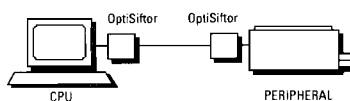


- breaks potentially damaging ground loops
- error-free operation

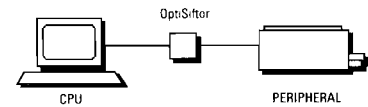
- Unique Transceiver Line Driver:
 - amplifies the signal
 - drives RS-232 far beyond 50 ft
 - transmit data at higher speeds
 - increases system performance
- Easy to install:
 - standard connection
 - no costly terminators required
 - compatible with RS-232 XON/XOFF

APPLICATIONS

- Primary application: installing an OptiSiftor at each end of the transmission line as shown below. This not only isolates the line and protects data and equipment from impulses, but also gives the system capability to extend the range of normal RS-232, in both directions, and with high speed and far greater accuracy.



- Secondary application: OptiSiftor acts as a high-powered repeater. By installing the OptiSiftor in the path shown below, the user gains the capability of driving the signal to effectively double the length of cable currently in use.



TECHNICAL SPECIFICATIONS

Connection:

DB25-pin RS-232M (device side)
DB25-pin RS-232F (line side)

DTE/DCE Switch: yes

Physical Dimensions:

Width: 3"

Height: 1"

Depth: 4"

Weight: 3 oz

Operating Temperature:

30 to 130 degree F

Circuit isolation: 7,000 volts

ORDERING INFORMATION

CURR-FS02

Current Technology's RS-232 Transceiver

WARRANTY:

3-year unit replacement

TECHNICAL SUPPORT:

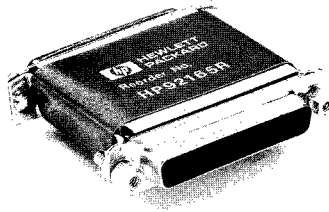
provided by Current Technology at (800) 238-5000 or (214) 238-5300

RS-232 Transient Surge Protector

**For HP Computers and
peripherals**
Order Number:
92165R

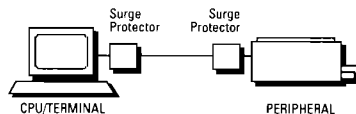
Hewlett-Packard's Transient Surge Protector is specially designed to protect the users' computer and peripheral data lines from electrical noises, without transmission-distortion increases in capacitance. Other low-cost surge protectors rely on increased capacitance to protect data lines. This leads to signal distortion, which can result in scrambled data transmission or transmission failure.

- All-metal exterior provides extra RFI protection.
- Protection of pins 2-8 and 20 ensures compatibility with all HP devices (pin 1 equals chassis ground).
- Low capacitance steering diodes with high-speed TransZorbs minimize added line impedance.



APPLICATIONS

- Installing a RS-232 Transient Surge Protector at each end of the transmission line as shown below.



TECHNICAL SPECIFICATIONS

Interface: RS-232 DB 25-pin
Enclosure: all metal for extra RFI protection
Clamp voltage: +/- 26 volts typical; +/- 40 volts maximum
Clamp response: 60ns
Power Dissipation:
4K watts (100us)
9K watts (20us)
Line capacitance: 30-60 pF
Physical Dimensions:
Width: 2.1"
Height: 0.5"
Depth: 1.9"
Weight: 2 oz

ORDERING INFORMATION

92165R
RS-232 Transient Surge
Protector

WARRANTY: 90-day unit
replacement

ORDERING INFORMATION

The products are manufactured by third-party manufacturers and are sold by Hewlett-Packard (under the manufacturer's label) in the U.S. only. The products are sold at manufacturer's list price, and additional discounts are offered through quantity breaks and Purchase Agreement Discountable (PAD). These products can be ordered from HP through HP sales offices.

UNINTERRUPTABLE POWER SYSTEMS

APCC-600	600VA UPS from American Power Conversion (APCC)
APCC-1250	1.25kVA UPS from APCC
APCC-600S	A UPS monitoring software kit for LAN Manager 1.x kit from APCC. Includes interface cable (9-pin), adaptor for 25-pin connector, and software (5 1/4 and 3 1/2" disk)
APCC-600SX	UPS monitoring software kit for LMX (running on SCO Unix) from APCC. Includes interface cable (9-pin), adaptor for 25-pin connector, and software (5 1/4 and 3 1/2" disk)
DELT-2026	2.4kVA UPS (On-Line) from Deltec Corp. Includes Power Monitoring software for HP-UX O/S (1/4" tape, 25-pin/25-pin cable), casters, 8-receptacle output panel, Automatic Bypass Transfer Switch
DELT-2036	3.6kVA UPS (On-Line) from Deltec. Includes Power Monitoring software for HP-UX O/S (1/4" tape, 25-pin/25-pin cable), casters, 8-receptacle output panel, Automatic Bypass Transfer Switch
DELT-4500S	Power Monitoring Software for Domain O/S (1/4" tape, 25-pin/25-pin cable)

TRANCEIVER/SURGE SUPPRESSORS/POWER STRIPS/POWER CONDITIONERS

CURR-FS02	RS-232 Tranceiver (optically isolated)
92165R	RS-232 Transient Surge Protector
92165A	AC Surge Suppressor (2 5-15R receptacles)
92165B	AC Surge Suppressor (4 5-15R receptacles)
92165C	AC Surge Suppressor (6 5-15R receptacles)
92199A	Power Strip (6 5-15R receptacles)
92199B	Power Strip (5 5-15R receptacles)
46296G	1kVA power conditioner
46296H	2kVA power conditioner

