

PATTON[®]

Surge Protection & Optical Isolation

Equipment is everything...*Protect it!*

WAN/Telco Protectors

V.35, RS-232, RS-422/485, T1, E1,
PRI, ISDN, Dial-up, Leased Line,
DDS & 10Base-T Interfaces



Video Protectors

CATV, SATV DirectTV F-Type
& CCTV BNC Interfaces



LAN Protectors

10/100Base-T RJ-45 (802.3af
compliant), 10Base-2 Coax BNC
& 10Base-5



Industrial & Process Control Protectors

RS-232, RS-422, & RS-485 Interfaces



Workstation, PC & Printer Protectors

RS-232, RS-422, PC Parallel, &
Centronics[®] Parallel Interfaces



Optical Isolators

RS-232 & RS-422/485 Interfaces

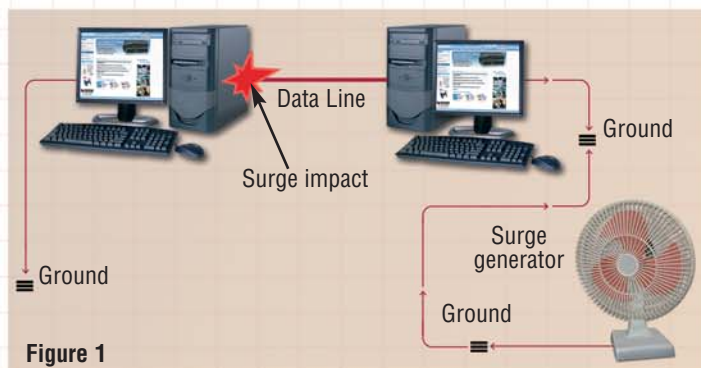


Surge Protection

The Danger: Data Line Transients

Within the buildings that house your network, electrical energy is continually in motion, attempting to reach equilibrium with respect to ground potential voltage. This process, called the ground surge phenomenon, produces data line transients: quick spikes of energy (microseconds in duration) that can be lethal to sensitive computing equipment. Sources of data line transients include:

- **Nearby lightning strikes:** Lightning strikes that occur nearby—or even miles away—send ripples of energy through the earth that are conducted into the cabling network of your building. Each event causes data line transients to occur throughout the system.
- **Induced AC voltages:** During the normal operation of elevator motors, air conditioners, fluorescent lights and other AC powered equipment, the surrounding structure is momentarily charged with energy (specifically, when AC power is applied or removed from the appliance). When this occurs, the ground surge phenomenon induces transients onto nearby data cables (see figure 1).



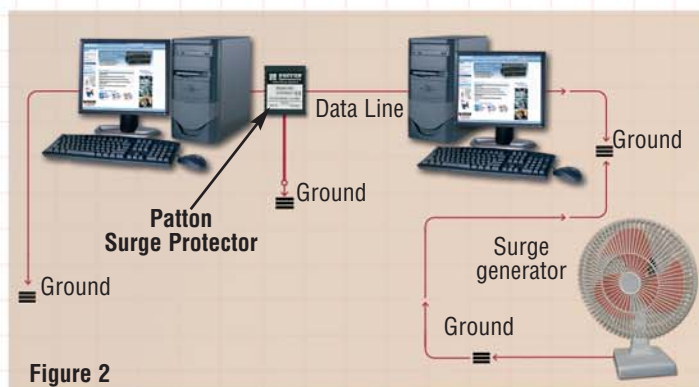
- **Operation of UPS's:** Uninterruptible power supplies and AC surge protectors work in the same manner as AC appliances described above. When they receive a surge, they dump it to ground. The charged ground may then induce a transient surge onto data lines that reference ground.

If you fail to safeguard the network against data line transients, the results can be glitches and lockups, internal component degradation (leading to eventual failure) or immediate hardware damage. These, in turn lead to costly downtime and expensive hardware replacement. The organization's well-being suffers.

The Safeguard: Proven Patton Surge Protection Technology

At Patton, decades of datacom experience enable us to produce data line surge protectors with superior technology and proven reliability.

Patton data line protectors intercept and regulate transient voltages bi-directionally, diverting harmful voltages away from sensitive equipment (see figure 2). Solid state, hybrid circuitry allows Patton protectors to operate transparently in the network, and to take repeated surge “hits” without degrading in performance.



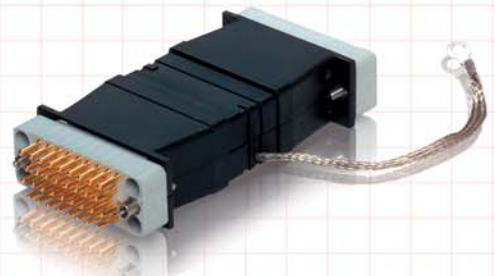
Most important, the performance of Patton's data line protectors has been independently certified. All Patton protectors have received the CE mark, showing that they have passed three rigorous electromagnetic immunity requirements of the International Electrotechnical Commission (IEC): the Electrostatic Discharge Test (IEC 801.2), the Electrical Fast Transient Test (IEC 801.4) and the Surge Immunity Test (IEC 801.5). Patton telco protectors are also UL listed.

*F.D. Martzloff, "Coupling, Propagation, and Side Effects of Surges in an Industrial Building Wiring System, Conf. Record of IEEE/IAS (Industry Applications Society) Annual Mtg., Oct 3-6, 1988, Pittsburgh, PA, pp. 1467-1476 (Oct 1988).

Surge Protectors for Every Application

WAN/Telco Protectors

Telco lines can bring some very undesirable transients into your network. Let Patton's WAN/telco protectors guard your expensive networking equipment against damage. Figure 3 shows how Patton protects a dial-up modem circuit. Figure 4 shows a Patton protection scheme for both a CSU or ISDN TA and the switch or router that connects to your telco hardware. Surges are diverted safely to chassis ground through a braided metal strap.



Model 546—V.35



Model 552 Series—Dial-up, Leased Line, DDS, T1, E1, PRI, ISDN/U, ISDN/ST

- ▶ Surge handling capacity of **1500 Watts**
- ▶ Telco protectors **UL497A** tested and listed
- ▶ Surge energy is diverted safely to ground through braided metal strap
- ▶ Repeated surges won't degrade protector performance
- ▶ **Fail-safe design** guards equipment in the event of a severe surge

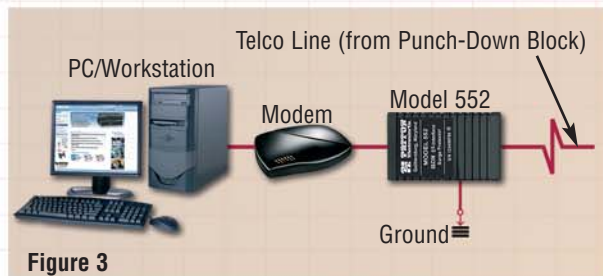


Figure 3

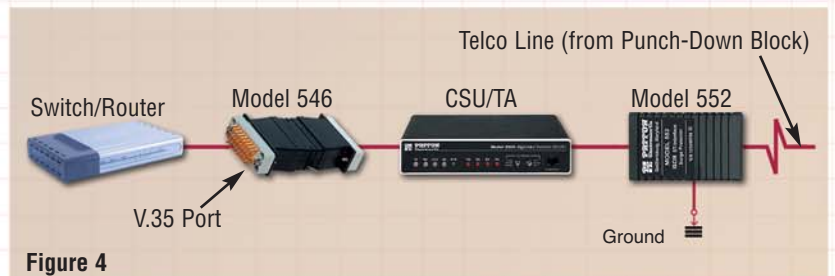


Figure 4

Video Protectors

Coax video cables can be effective conductors of surge energy from nearby lightning strikes. Protect your valuable video hardware against damage with Patton's video surge protectors. Figure 5 shows SATV and CATV applications. Figure 6 illustrates protection for a CCTV system.



Models 552 & 543—CCTV, CATV, SATV

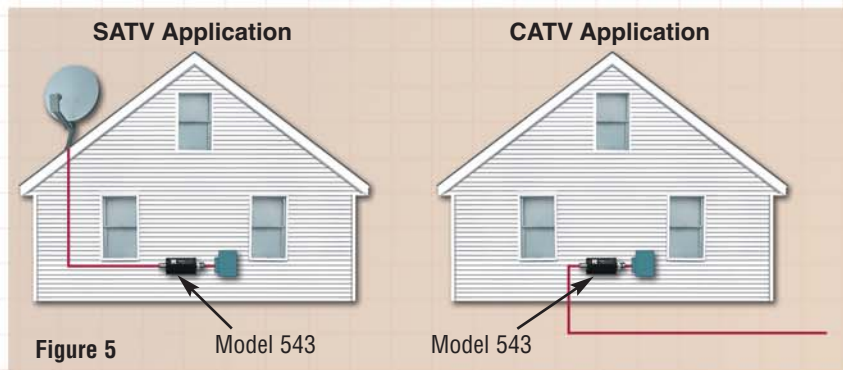


Figure 5

Model 543

Model 543

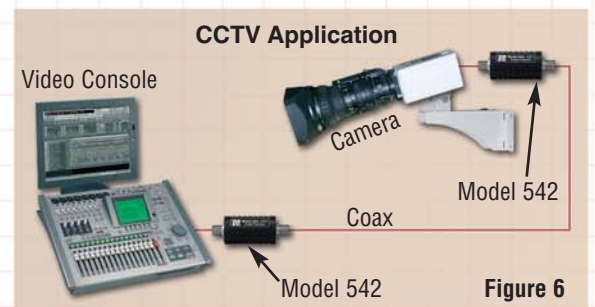


Figure 6

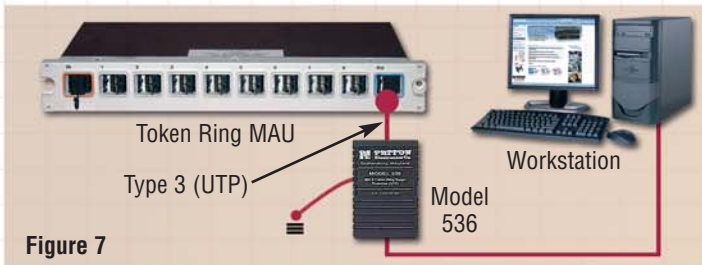
Model 542

Model 542

Surge Protection

LAN Protectors

Patton LAN protectors meet IEC surge handling requirements and are specifically designed to protect your LAN without hindering network performance. Figure 7 shows the Patton 802.5 Token Ring protector. Figure 8 depicts various applications for Patton 802.3 Ethernet protectors.



Patton twisted-pair surge protectors are EIA/TIA TSB-40A Category-5 certified and operate at data rates up to 100 Mhz. Model 580 Series barrier protectors install at major cabling junctions between floors or rooms, while Model 570 Series point-of-use protectors install at individual workstations and workgroup wiring closets.

- ▶ Reliable protection for 802.3, 802.5, 802.3af, and Cat-5/100-MHz LANs
- ▶ Hybrid circuit won't hinder network performance
- ▶ **Fail-safe design** guards equipment in the event of a severe surge



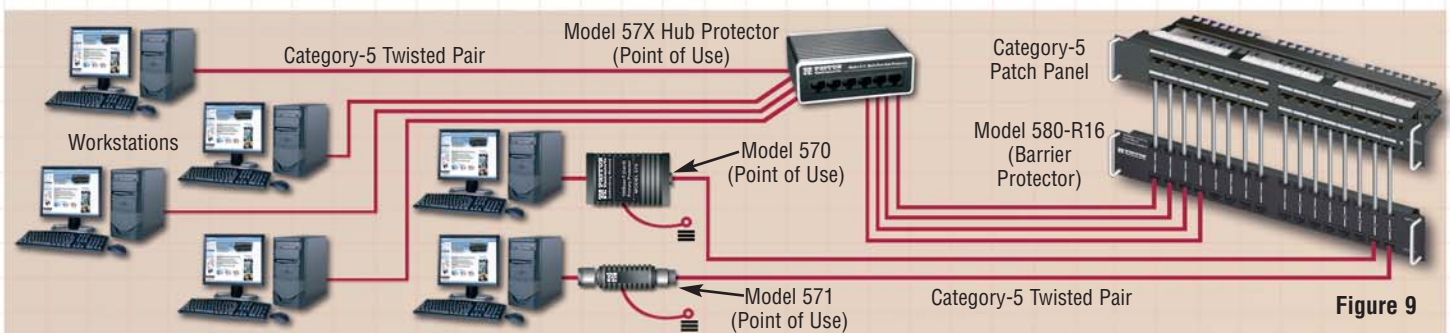
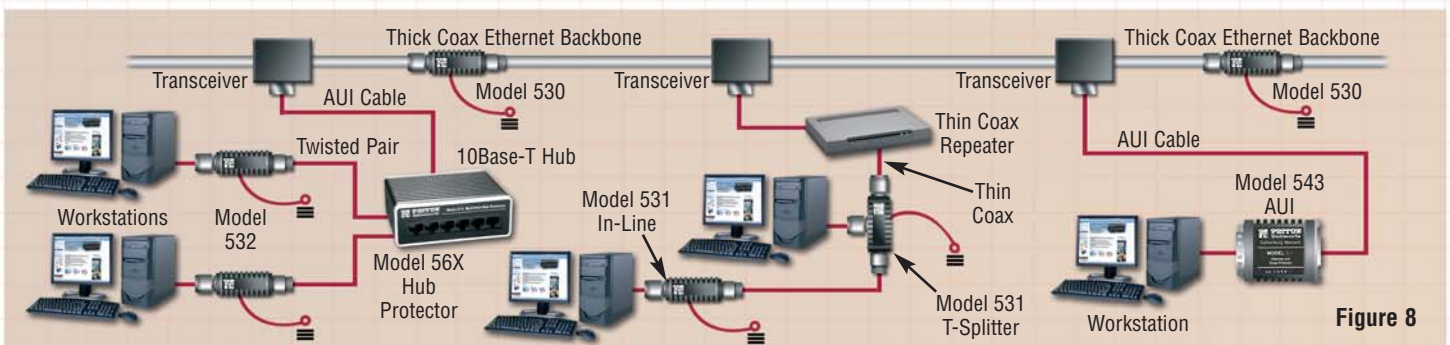
Ethernet—10/100Base-TX and 802.3af secondary protectors for barrier and point-of-use applications



Ethernet—Thick coax, thin coax, AUI and twisted pair secondary protectors for single and multiple ports



Token Ring—Type 1 (data connector and DB-9) protectors for 4/16 Mbps

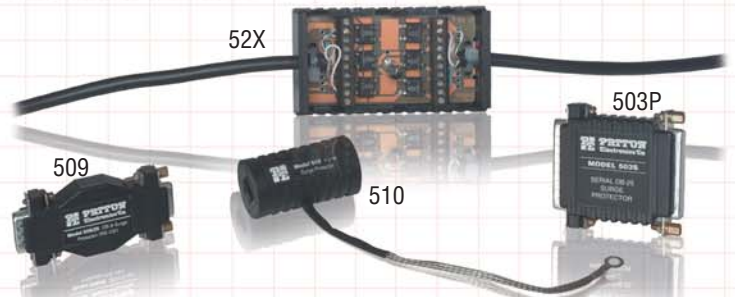


Surge Protectors for Every Application

Industrial & Process Control Protectors

When it comes to transient surges, industrial environments can be brutal on computer control systems: heavy duty AC motors turn on and off constantly, raising and lowering ground potential throughout the shop. On top of that, metal surfaces of many shapes and sizes are present to conduct transient energy in unpredictable ways. It all adds up to hazardous conditions for the delicate ICs on computer cards! Fortunately, as figure 10 shows, you can guard your computer control systems with Patton's RS-422/485 industrial surge protectors! Choose from D-sub, modular, or terminal strip protectors (customized versions are available).

- ▶ Reliable protection for **RS-232, RS-422** and **RS-485** process and control equipment
- ▶ Surge energy diverted safely to chassis ground through D-shell or braided metal strap
- ▶ **Fail-safe design** guards equipment in the event of a severe surge



RS-232/RS-422—Secondary protectors with a variety of interfaces (including terminal blocks)

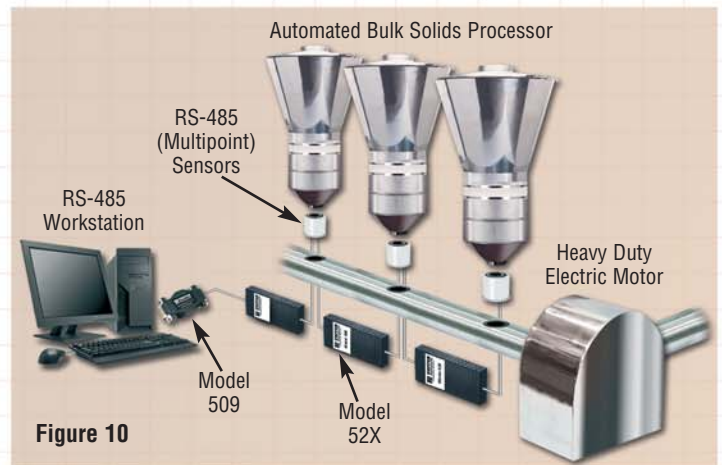
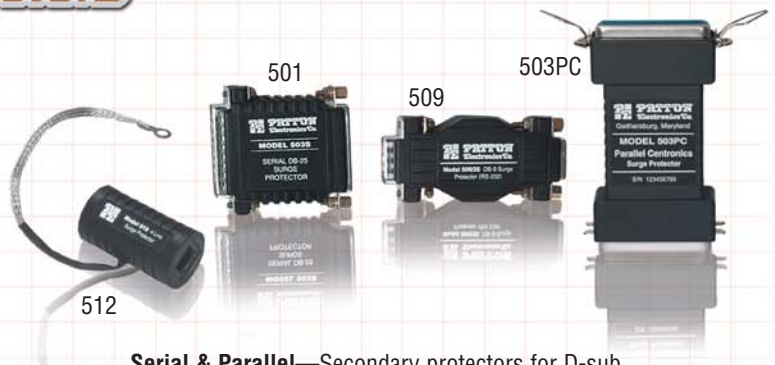


Figure 10

Workstation/PC/Printer Protectors

The small ICs on your PC's communication boards are no match for transient surges. And transients can come from many sources: electric fans, space heaters, coffee machines, fluorescent lights—you name it! Protect your serial and parallel ports with Patton surge protectors. So your PC is connected to an uninterruptable power supply (UPS)? Great! But don't stop there—just because your AC line is protected against surges, doesn't mean they can't enter your computer by the "back door" through your data ports. Implement a complete solution by adding Patton data line protectors!

- ▶ Protection for **RS-232, RS-422, PC parallel** or **Centronics® parallel** interfaces
- ▶ Combined surge handling capacity up to **36,000 watts**
- ▶ Surge energy is diverted safely to ground through braided metal strap or connector D-shell
- ▶ **Fail-safe design** guards equipment in case of a severe surge



Serial & Parallel—Secondary protectors for D-sub, modular, and Centronics® interfaces

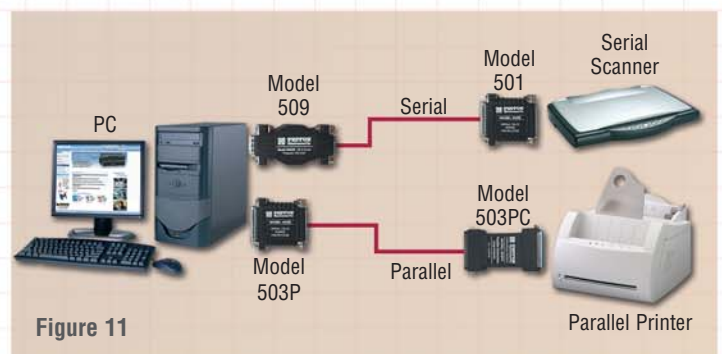












Figure 11




Surge Protection

Selection Guide by Connector Type

| Connector Type | Interface | Protector Description | Pins Protected | Model | Page |
|---|---------------|--|-------------------------|----------|-----------|
| Centronics®  | Parallel | Parallel Centronics® Protector, Male/Female (M/F) | All 36 Pins | 503PC | 11 |
| Coax BNC  | 10Base-2 | Ethernet In-Line Protector | Center/Shield | 531 XX† | 13 |
| | 10Base-2 | Ethernet Protected T-Splitter | Center/Shield | 531 XXX | 13 |
| | CCTV | Video CCTV In-Line Protector | Center/Shield | 542 XX | 14 |
| | CCTV | Video CCTV In-Line Protected T-Splitter | Center/Shield | 542 XXX | 14 |
| Coax F-Type  | CATV/SATV | Video CATV/SATV In-Line Protector | Center/Shield | 543 FF | 14 |
| Coax N-Type  | 10Base-5 | Ethernet In-Line Protector | Center/Shield | 530 XX | 13 |
| DB-15  | RS-232 | RS-232, All-Wire, In-Line Protector, M/F | All 15 Wires | 515/25 | 10 |
| | RS-422/485 | RS-422, All-Wire, In-Line Protector, M/F | All 15 Wires | 515/6 | 10 |
| | T1 | T1 In-Line Protector, M/F | 1, 3, 9 & 11 | 515-T1 | 10 |
| DB-25  | Parallel | Parallel Port, In-Line Protector, M/F | All 24 Wires | 503 P | 11 |
| | RS-232 | RS-232, All-Wire, In-Line Protector, M/F | All 24 Wires | 503 S | 10 |
| | RS-232 | RS-232, 4-Wire In-Line Protector, M/F | 2, 3, 7, 20 | 500 | 10 |
| | RS-232 | RS-232, 8-Wire In-Line Protector, M/F | 2-8, 20 | 501 | 10 |
| | RS-232 | RS-232, Low-Cap. 12-Wire In-Line Protector, M/F | 2-8, 11, 20, 22, 24, 25 | 501 LC | 10 |
| | RS-232 | RS-232, 11-Wire In-Line Protector, M/F | 2-8, 15, 17, 22, 24 | 502 | 10 |
| | RS-232 | RS-232 Opto Isolator, M/F | 2-8, 15, 17, 22, 24 | 590 | 19 |
| | RS-422/485 | RS-422, DB-25 All-Wire, In-Line Protector, M/F | 2, 3, 4, 5 | 503P | 11 |
| DB-9  | RS-232 | RS-232, DB-9 All Wire, In-Line Protector, M/F | All 24 Wires | 509/25 | 10 |
| | RS-422/485 | RS-422, DB-9 All-Wire, In-Line Protector, M/F | All 9 Wires | 509/6 | 10 |
| M/34  | V.35 | V.35 In-Line Protector, M/F | All 9 Wires | 546/34MF | 15 |
| | | Note: Also available with 19 wires protected | All 34 Wires | | |
| RJ-11  | Dial-Up | Single 2-Wire Modem/Fax Protector, Female/Female (F/F) | 4 & 5 | 552-D2 | 15 |
| | Dial-Up | Dual 2-Wire Modem/Fax Protector, F/F | 3, 4, 5 & 6 | 552-D4 | 15 |
| | RS-232 | RS-232, RJ-11 4-Wire In-Line Protector, F/F | 2, 3, 4 & 5 | 510/25 | 11 |
| | RS-232 | RS-232, RJ-12, 6-Wire In-Line Protector, F/F | All 6 Wires | 511/25 | 11 |
| | RS-422/485 | RS-422, RJ-11 4-Wire In-Line Protector, F/F | 2, 3, 4 & 5 | 510/6 | 11 |
| RJ-45  | RS-422/485 | RS-422, RJ-12, 6-Wire In-Line Protector, F/F | All 6 Wires | 511/6 | 11 |
| | 10/100Base-TX | Cat-5, In-Line, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 571* | 12 |
| | 10/100Base-TX | Cat-5, In-Line, Barrier, F/F / PoE 802.3af* | All 8 Wires | 581* | 12 |
| | 10/100Base-TX | Cat-5, In-Line, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 570* | 12 |
| | 10/100Base-TX | Cat-5, In-Line, Barrier, F/F / PoE 802.3af* | All 8 Wires | 580* | 12 |
| | 10/100Base-TX | Cat-5, 4-Port Hub, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 574* | 12 |
| | 10/100Base-TX | Cat-5, 6-Port Hub, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 576* | 12 |
| | 10/100Base-TX | Cat-5, 8-Port Hub, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 578* | 12 |
| | 10/100Base-TX | Cat-5, 4-Port Hub, Barrier, F/F / PoE 802.3af* | All 8 Wires | 584* | 12 |
| | 10/100Base-TX | Cat-5, 6-Port Hub, Barrier, F/F / PoE 802.3af* | All 8 Wires | 586* | 12 |
| | 10/100Base-TX | Cat-5, 8-Port Hub, Barrier, F/F / PoE 802.3af* | All 8 Wires | 588* | 12 |
| | 10/100Base-TX | Cat-5, 8-Port Panel, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 570-R8* | 12 |
| | 10/100Base-TX | Cat-5, 16-Port Panel, Point of Use, F/F / PoE 802.3af* | All 8 Wires | 570-R16* | 12 |

Surge Protectors for Every Application

Selection Guide by Connector Type

| Connector Type | Interface | Protector Description | Pins Protected | Model | Page |
|---|---|---|--|------------|-----------|
| RJ-45  | 10/100Base-TX | Cat-5, 8-Port Panel, Barrier, F/F / PoE 802.3af* | All 8 Wires | 580-R8* | 12 |
| | 10/100Base-TX | Cat-5, 16-Port Panel, Barrier, F/F / PoE 802.3af* | All 8 Wires | 580-R16* | 12 |
| | Dial-Up | Triple 2-Wire Modem/Fax Protector, F/F | 2, 3, 4, 5, 6 & 7 | 552-D6 | 15 |
| | Dial-Up | Quad 2-Wire Modem/Fax Protector, F/F | All 8 Wires | 552-D8 | 15 |
| | All Telco | All Telco Interfaces Except Dial-Up, F/F | All 8 Wires | 552-L8 | 15 |
| | DDS | 4-Wire DDS Protector, F/F | 1, 2, 7 & 8 | 552-DDS | 15 |
| | ISDN | ISDN "U" Interface Protector, F/F | 3, 4, 5 & 6 | 552-U | 15 |
| | ISDN | ISDN "ST" Interface Protector, F/F | All 8 Wires | 552-ST | 15 |
| | Leased Line | 4-Wire Leased Line Protector, F/F | 3, 4, 5 & 6 | 552-L4 | 15 |
| | RS-232 | RS-232, RJ-45 8-Wire In-Line Protector, F/F | All 8 Wires | 512/25 | 11 |
| | RS-232 | RS-232, 4-Port Hub Protector, F/F | All 8 Wires | 514/25 | 13 |
| | RS-232 | RS-232, 6-Port Hub Protector, F/F | All 8 Wires | 516/25 | 13 |
| | RS-232 | RS-232, 8-Port Hub Protector, F/F | All 8 Wires | 518/25 | 13 |
| | RS-232 | RS-232, 12-Port Hub Protector, F/F | All 8 Wires | 513/25 | 13 |
| | RS-422/485 | RS-422, RJ-45, 8-Wire In-Line Protector, F/F | All 8 Wires | 512/6 | 11 |
| | RS-422/485 | RS-422, 4-Port Hub Protector, F/F | All 8 Wires | 514/6 | 13 |
| | RS-422/485 | RS-422, 6-Port Hub Protector, F/F | All 8 Wires | 516/6 | 13 |
| | RS-422/485 | RS-422, 8-Port Hub Protector, F/F | All 8 Wires | 518/6 | 13 |
| | RS-422/485 | RS-422, 12-Port Hub Protector, F/F | All 8 Wires | 513/6 | 13 |
| | T1/E1/PRI | T1, E1, ISDN PRI Protector, F/F | 1, 2, 5 & 6 | 552-T1 | 16 |
| | Token Ring | Type 3, UTP In-Line Protector, F/F | 3, 4, 5 & 6 | 536 FF | 14 |
| | Token Ring | Type 3, UTP In-Line Protector, Shielded Con., F/F | 3, 4, 5 & 6 | 536SRJ45FF | 14 |
| | Terminal Strip  | RS-232 | RS-232, 2-Wire, Terminal Strip In-Line Protector | 2-Wire | 522/25 |
| RS-232 | | RS-232, 4-Wire, Terminal Strip In-Line Protector | 4-Wire | 524/25 | 16 |
| RS-232 | | RS-232, 6-Wire, Terminal Strip In-Line Protector | 6-Wire | 526/25 | 16 |
| RS-232 | | RS-232, 8-Wire, Terminal Strip In-Line Protector | 8-Wire | 528/25 | 16 |
| RS-232 | | RS-232, 10-Wire, Terminal Strip In-Line Protector | 10-Wire | 521/25 | 16 |
| RS-422/485 | | RS-422, 2-Wire, Terminal Strip In-Line Protector | 2-Wire | 522/6 | 16 |
| RS-422/485 | | RS-422, 4-Wire, Terminal Strip In-Line Protector | 4-Wire | 524/6 | 16 |
| RS-422/485 | | RS-422, 6-Wire, Terminal Strip In-Line Protector | 6-Wire | 526/6 | 16 |
| RS-422/485 | | RS-422, 8-Wire, Terminal Strip In-Line Protector | 8-Wire | 528/6 | 16 |
| RS-422/485 | | RS-422, 10-Wire, Terminal Strip In-Line Protector | 10-Wire | 521/6 | 18 |
| Twinax  | AS/400, Sys 3X | Twinax, In-Line Surge Protector | Center/Shield | 545 MF | 14 |
| | AS/400, Sys 3X | Twinax, Protected T-Splitter | Center/Shield | 545 MFF | 14 |

* PoE 802.3af compliant models are available, call for details.

† X = Specify Gender: Male (M) or Female (F)

Note: Special order options include custom cables, custom connectors and customer-specified Nominal Breakdown Voltages

Surge Protection

Workstation Port Protection

RS-232

DB-25

DB-9



These asynchronous surge protectors guard RS-232 data and control signals against harmful transients. Ideal for situations where you have equipment such as multiplexers, repeaters, concentrators, and short-range modems connected to long lengths of cable, they protect against signal noise and surges.

- ▶ Protect your expensive communications equipment from line-to-line and line-to-ground transients.
- ▶ Highly sensitive avalanche-diode circuitry
- ▶ Install quickly and easily
- ▶ Available with DB-9 and DB-25 connections

Model 501
Page 10

Model 509
Page 10

RS-232 & RS-422

RJ-11, RJ-12, & RJ-45



These ultra-miniature protectors fit almost anywhere and handle transient surges up to 600 watts per wire.

- ▶ Surge handling capacity of up to 4,800 watts
- ▶ Install quickly and easily
- ▶ 6-in. (15.2 cm) extension cable included

Model 510
Page 11

TERMINAL BLOCKS

Universal



Design your own "custom" surge protectors to fit just about any 2, 4, 6, 8, or 10-wire application.

- ▶ Surge handling capacity of 1,500 watts
- ▶ Highly sensitive avalanche-diode circuitry
- ▶ 7.5 V and 18 V clamping voltage options

Model 52X
Page 16

PARALLEL

Centronics or DB-25



When you're protecting your computer's data lines from transient surges, don't forget the parallel ports. The relatively low voltages of parallel signals make them surge-sensitive!

- ▶ Protects all parallel interface pins
- ▶ Surge handling capacity of 1,500 watts
- ▶ Centronics or DB-25 options

Model 503P
Page 11

X.21

DB-15



Protects any X.21, RS-232, RS-422/485, or T1 interface port that uses a DB-15 connector.

- ▶ Data rates up to 20 Mbps
- ▶ Clamping voltage options for RS-232/485, X.21, and T1
- ▶ Highly sensitive avalanche-diode circuitry

Model 515
Page 10

10/100 BASE-TX

CAT-5 Certified



These 10/100Base-TX surge protectors are EIA/TIA TSB-40A Category-5 certified, and can protect your RS-422/423, Token Ring, and ATM equipment too!

- ▶ Install at equipment locations (570) or wiring closets (580)
- ▶ Complies with transient immunity standards IEC 801-2, 801-4, & 801-5
- ▶ PoE 802.3af

Model 570/580
Page 12

WAN Port Protection

DIAL-UP

Protects Phones, Faxes, Modems



2- or 4-Wire dial-up protectors
Model 552-D
Page 15

LEASED LINE

Protects Analog Devices



4-Wire leased-line protector
Model 552-L4
Page 15

ISDN

Protects TAs & NTUs 'U' & 'ST'



8-Wire ISDN protector ST Type
Model 552-ST
Page 15

DDS

Protects 56/64k CSUs



4-Wire DDS protector
Model 552-DDS
Page 15

T1/E1

Protects 1.544 & 2.048 Mbps CSUs



4-Wire T1, E1, & ISDN PRI protector
Model 552-T1
Page 15

V.35

Protects Modems, CSU/DSUs, etc.



Plugs directly into V.35 ports, so you won't need cables
Model 546
Page 15

Surge Protectors for Every Application

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| Ethernet AUI Surge Protector (DB-15) | 14 |
| 802.5 Token Ring Surge Protectors | 14 |
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10BASE-2

BNC, ThinNet



Guard legacy Ethernet data lines—especially the long cable runs used for routers and bridges—from transient surges that can be caused by nearby lightning, AC motors, appliances or even the normal operation of UPS devices. Let our coax Ethernet protectors shield your LAN from costly downtime due to surges.

- ▶ Available for ThinNet ("thin" coax) and ThickNet ("thick" coax) Ethernet
- ▶ Highly sensitive avalanche-diode circuitry
- ▶ Low signal loss
- ▶ Install quickly and easily
- ▶ Miniature size

Model 531
Page 13

10BASE-5

N-Type, ThickNet



Model 530
Page 13

AUI

IEEE 802.3 Compliant



Let our AUI Ethernet protectors shield your LAN from costly downtime due to surges.

- ▶ Complies with the IEEE 802.3 Specification
- ▶ Highly sensitive avalanche-diode circuitry
- ▶ Install quickly and easily

Model 534
Page 14

TOKEN RING

IEEE 802.5 Compliant



These surge protectors guard 802.5 networks against data loss & hardware damage caused by data line transients. Protects repeaters, MAUs, & other Token Ring devices

- ▶ Protection for 4 Mbps or 16 Mbps Token Ring Networks
- ▶ Surge handling capacity of 1,500 watts
- ▶ Available with RJ-45, DB-9, & IBM data connectors

Models 535/6/7
Page 14

Multiport Protection

10/100BASE-TX

Up to 100 Mbps
(PoE 802.3af available)



Contains up to 8 10/100Base-TX protectors per enclosure

Models 57X & 58X
Page 12

10/100BASE-TX (CATEGORY-5)

Up to 100 Mbps
(PoE 802.3af available)



Protects 8 or 16-port Category-5 interfaces (including RS-422, RS-423, 10/100Base-TX, Token Ring, Fast Ethernet, and ATM) twisted-pair hubs against transients

Models 570R & 580R
Page 12

Async DB-25 Surge Protectors

Models 500 & 501



FEATURES & BENEFITS

- ▶ **Model 500** protects pins 2, 3, 7 and 20 (pin 1 and shell connected to ground)
- ▶ **Model 501** protects pins 2, 3, 4, 5, 6, 7, 8 and 20 (pin 1 and shell connected to ground)

ORDERING INFORMATION

500: Async DB-25 Surge Protector
501: Async DB-25 Surge Protector

Async DB-25 Low Capacitance Surge Protector

Model 501LC



FEATURES & BENEFITS

- ▶ Get maximum distance from long runs
- ▶ Protects pins 2–8, 11, 20, 22, 24 & 25
- ▶ Adds an insignificant 45 pF of capacitance to each signal

ORDERING INFORMATION

501LC: Async DB-25 Surge Protector, Low Capacitance

Sync DB-25 Surge Protector

Model 502



FEATURES & BENEFITS

- ▶ Protects pins 2–8, 15, 17, 22 & 24
- ▶ Diverts surge energy to pin 1 and D-shell at both ends

ORDERING INFORMATION

502: Sync DB-25 Surge Protector

Sync DB-9 Surge Protector

Model 509



FEATURES & BENEFITS

- ▶ Two clamping voltages: 7.5 V (RS-422) or 18V (EIA-574/RS-232)
- ▶ Combined surge-handling of 5,400 watts
- ▶ Protects all 9 pins

ORDERING INFORMATION

509/6: DB-9 Surge Protector (for RS-422/485)
509/25: DB-9 Surge Protector (for RS-232)

Sync DB-15 Surge Protector

Model 515



FEATURES & BENEFITS

- ▶ Support for data rates up to 20 Mbps
- ▶ Clamping voltages for RS-232 (18V), RS-422, 485, X.21, T1 (7.5V)
- ▶ 515/6 & 515/25 protect all 15 wires
- ▶ 515/T1 protects pins 1, 3, 9, and 11

ORDERING INFORMATION

515/6: DB-15 Surge Protector (for RS-422/485)
515/25: DB-15 Surge Protector (for RS-232)
515/T1: DB-15 Surge Protector

Serial DB-25 Surge Protector (All 25 Leads)

Model 503S



This universal surge protector guards any RS-232 system (synchronous or asynchronous) against data loss and hardware damage caused by data line tran-

sients. There are many sources of such transients—lighting strikes, fluorescent lights, elevator motors, even UPSs. AC protection alone is not enough! The Model 503S diverts harmful data line surges to chassis ground (through either D-shell) before they reach your hardware.

FEATURES & BENEFITS

- ▶ Protects all 25 serial pins on the DB-25 connector
- ▶ Combined surge handling capacity of 36,000 watts
- ▶ Diverts surges safely to chassis ground through D-shell connectors

ORDERING INFORMATION

503S: RS-232 Serial DB-25 Surge Protector
503S/6: RS-422/485 Serial DB-25 Surge Protector

RJ-11, RJ-12, & RJ-45 Surge Protectors

Models 510, 511 & 512

The Models 510, 511 and 512 surge protectors let you choose 4, 6 or 8 wire protection for either an RS-232 or RS-422 modular interface. These ultraminiature protectors fit almost anywhere and handle transient surge up to 600 watts per wire. Harmful surge energy is diverted safely to chassis ground using a built-in braided metal strap. Should these protectors encounter a severe surge above their rated capacity, they will divert all voltages to ground.



FEATURES & BENEFITS

- ▶ **Models 510** protects four wires on the RJ-11 connector (combined surge handling of 2400 W)
- ▶ **Models 511** protects six wires on the RJ-12 connector (combined surge handling of 3600 W)
- ▶ **Models 512** protects eight wires on the RJ-45 connector (combined surge handling of 4800 W)
- ▶ Heavy braided ground strap diverts surge energy to frame ground
- ▶ Clamping at 18 volts for RS-232 and 7.5 volts for RS-422
- ▶ "Fail-safe" design guards hardware in case of severe surge

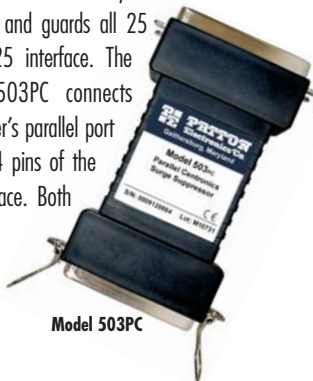
Model 512 application diagram



Parallel Surge Protectors

Models 503P & 503PC

When protecting your computer's data lines from transient surge, don't forget the parallel ports: The relatively low voltages of parallel signals make them surge-sensitive! The Patton Model 503P connects directly to a PC's parallel port and guards all 25 pins of the DB-25 interface. The Patton Model 503PC connects directly to a printer's parallel port and guards all 34 pins of the Centronics® interface. Both models handle repeated surges up to 1500 kW.



Model 503PC

FEATURES & BENEFITS

- ▶ **Model 503P** protects all 25 pins on the DB-25 parallel interface
- ▶ **Model 503PC** protects 34 pins on the Centronics® parallel interface
- ▶ Surge energy diverted to chassis ground through connector shells
- ▶ 1.5 kw (503PC) surge handling capacity
- ▶ 503PC clamps at +8V -3V; 503P clamps at 6.8 V
- ▶ Quick response time of 500 nsec



Model 503P

Model 503P & 503PC application diagram



ORDERING INFORMATION

Model 510

510/6: 4 line modular surge protector (RS-422, 6V clamping)

510/25: 4 line modular surge protector (RS-232, 25V clamping)

Model 511

511/6: 6 line modular surge protector (RS-422, 6V clamping)

511/25: 6 line modular surge protector (RS-232, 25V clamping)

Model 512

512/6: 8 line modular surge protector (RS-422, 6V clamping)

512/25: 8 line modular surge protector (RS-232, 25V clamping)

IMPORTANT

When ordering a Model 510, 511 or 512, please provide us with the following information:

- Whether your application is 4-wire (RJ-11), 6-wire (RJ-12) or 8-wire (RJ-45)
- Whether your application is RS-232 (clamps at 18V) or RS-422 (clamps at 7.5V)

Model 503 & 503PC

503PC: Centronics® 36-Pin Parallel Surge Protector

503P: DB-25 Parallel Surge Protector

I'm Bob, one of Patton's Support Engineers. If you do not find what you need at www.patton.com or in this catalog, or if you have technical questions or comments, please call me at +1 301.975.1007. You can also send e-mail to puckett@patton.com.



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10/100Base-TX (Cat-5) Secondary Surge Protector

Models 570, 580, & 570-POE, 580-POE

Our Cat-5 protector works at speeds up to 100 Mbps

These 10/100Base-TX surge protectors are EIA/TIA TSB-40A Category-5 certified, and can protect your RS-422/423, Token Ring, and ATM equipment too! With a NEXT spec of -43dB (worst pair), you can rest assured that these units will protect your 10/100Base-TX, RS-422 or 100VG-AnyLan data lines without hindering critical network performance. The Model

570 is designed for use at the sensitive equipment port, while the Model 580 protects barriers (such as wiring closets).



SPECIFICATIONS

Environment: Category-5 Interfaces that use the RJ-45 connector, including RS-422/423, 10Base-T, Token Ring, 100Base-TX & ATM

Connectors: RJ-45 Female

Response Time: Clamped to 13 V after 0.1 μ s

Surge Clamp Voltage: Model 570—13 V max with 1 kV Input; Model 580—15 V max with 2 kV Input

NEXT Loss: Model 570—worst pair Better than -46 dB at 100 MHz; Model

580—worst pair Better than -43 dB at 100 MHz

Characteristic Impedance: 100 ohm

Surge Rating: IEC 801.5 Standard Level

DC Clamp Voltage: Common Mode to Gnd, each line 7.5 V @ 50 mA; Differential mode, per pair 8.1 V @ 50 mA

Insertion Loss: Less than 0.4 dB at 100 MHz (including connector)

Return Loss: Better than 14 dB

Group Delay: None, 1–100 MHz
Series Resistance: Less than 400 milli-ohms

Grounding: External ground strap provides separate unit-ground to chassis-ground

Dimensions: 2.25 x 1.69 x 0.75 in (5.72 x 4.29 x 1.91 cm)

570 & 580

Common mode (to ground) (each line): 7.7 V @ 10mA (pulse)

Differential mode (per pair): 8.6 V @ 10 mA (pulse)

570-POE & 580-POE

Pairs (1, 2) & (3, 6)

Common mode (to ground) (each line): 7.7 V @ 10mA (pulse)

Differential mode (per pair): 8.6 V @ 10 mA (pulse)

Pairs (4, 5) & (7, 8)

Common mode clamping voltage is 69 V @ 1 mA (pulse transient) and Differential mode clamping voltage is 70 V @ 1mA (pulse transient).

FEATURES & BENEFITS

- ▶ EIA/TIA TSB-40A Category-5 certified
- ▶ Models for use at the equipment (570) or barriers/wiring closets (580)
- ▶ Near-end cross-talk (NEXT) better than -43 db for transparent protection
- ▶ Complies with transient immunity standards IEC 801-2, 801-4, & 801-5
- ▶ Response time of 0.1 μ s
- ▶ 802.3af compliant models available

ORDERING INFORMATION

570: 10/100Base-T (CAT-5) Protector Point of Use (8-Wire)

570-POE: 10/100Base-T PoE Protector Point of Use

580: 10/100Base-T (CAT-5) Protector Barrier (8-Wire)

580-POE: 10/100Base-T PoE Protector Barrier

10/100Base-TX (Cat-5) Secondary Multipoint Protectors, Hub and Panel (Rack Mount) Formats

Models 57X & 58X

Our Cat-5 protector works at speeds up to 100 Mbps.



The Model 57X and 58X Series Category-5 hub protectors are available in 4, 6 or 8-port standalone versions, as well as 8 or 16-port rack mount panels. All Model 57X and 58X units are EIA/TIA TSB-40A Category-5 certified, and divert harmful data line transients to chassis ground through a single braided metal strap. This approach reduces the number of ground connections required. Specifications like near-end cross-talk



(NEXT) of better than -43 dB at 100MHz, as well as insertion loss of less than 0.4 dB, insure transparent operation.

FEATURES & BENEFITS

- ▶ Provides 4, 6, 8 or 16 ports of protection against transients
- ▶ Guards twisted-pair interfaces at speeds up to 100 Mbps
- ▶ EIA/TIA TSB-40A Category-5 Certified
- ▶ Models for Point-of-Use (57X) or Barriers/Wiring Closets (58X)

SPECIFICATIONS

Connectors: RJ-45 Female

Response Time: Less than 5 ns

Characteristic Impedance: 100 ohm

NEXT Loss: Better than -43 dB at 100 MHz

Surge Clamp Voltage: Model 57X—13 V max with 1 kV Input; Model 58X—15 V max with 2 kV Input

Surge Rating: IEC 801.5 Standard Level

DC Clamp Voltage: Common Mode to Gnd, each line 7.5 V @ 50 mA;

Differential mode, per pair 8.1 V @ 50 mA

Return Loss: Better than 14 dB

Insertion Loss: Less than 0.4 dB (including connector) at all frequencies

Series Resistance: Less than 400 milli-ohms

Grounding: External ground strap through mounting screws

ORDERING INFORMATION

574: 4-Port, 10/100Base-TX (CAT-5) Hub Protector Point for Use

576: 6-Port, 10/100Base-TX (CAT-5) Hub Protector Point for Use

578: 8-Port, 10/100Base-TX (CAT-5) Hub Protector Point for Use

570R8: 8-Port 10/100Base-TX (CAT-5) Panel Protector Point for Use

Call for 802.3af PoE versions.

570R16: 16-Port 10/100Base-TX (CAT-5) Panel Protector Point for Use

584: 4-Port 10/100Base-TX (CAT-5) Hub Protector for Wiring Closets

586: 6-Port 10/100Base-TX (CAT-5) Hub Protector for Wiring Closets

588: 8-Port 10/100Base-TX (CAT-5) Hub Protector for Wiring Closets

580R8: 8-Port 10/100Base-TX (CAT-5) Panel Protector for Wiring Closets

580R16: 16-Port 10/100Base-TX (CAT-5) Panel Protector for Wiring Closets

Multiport RS-232 & RS-422 Surge Protectors

Model 51X Series

The Model 51X Series is a convenient way to provide data line surge protection for hosts, terminal servers, or other multiport devices. Guarding either RS-232 or RS-422/485 equipment, the Model 51X Series houses 4, 6, 8 or 12 surge protectors in a high density array. A choice of two different clamping voltages—11 volts for RS-422/485 devices or 27 volts for RS-232 devices—assures you of an unimpeded data flow. Matching RJ-45 input/output ports on the front and rear panels allow the Model 51X Series to connect conveniently in-line with each port on your device. All versions of the Model 51X Series support data rates up to 230 kbps. Harmful data line transients are intercepted before



they reach equipment ports and are diverted safely to chassis ground. Employing a solid state hybrid circuit, the Model 51X Series is able to handle repeated surges up to 1.5 kWatts. One 6-inch (15.2 cm) patch cable is included for each port on the unit.

Typical application



FEATURES & BENEFITS

- ▶ Four Port Densities Available: 4, 6, 8 or 12 Modular Ports per Enclosure
- ▶ Two Clamping Voltages: 11 Volts (RS-422/485) or 27 Volts (RS-232)
- ▶ Data Rates up to 230 kbps
- ▶ 1.5 kW of Surge Handling Capability
- ▶ Surge Energy Diverted to Ground through Braided Metal Strap

ORDERING INFORMATION

RS-232 Surge Protector

- 514/25: 4-Port Modular
- 516/25: 6-Port Modular
- 518/25: 8-Port Modular
- 513/25: 12-Port Modular

RS-422/485 Surge Protector

- 514/6: 4-Port Modular
- 516/6: 6-Port Modular
- 518/6: 8-Port Modular
- 513/6: 12-Port Modular

Coax Ethernet Surge Protectors

Models 530 & 531

Transient surges can be caused by nearby lightning, AC motors, appliances or even the normal operation of UPS devices. Let our coax Ethernet protectors guard your LAN from costly downtime due to surges.



Thick Ethernet
530 MF



Thin Ethernet
531 MF-F

FEATURES & BENEFITS

- ▶ Novell approved for NetWare versions 2.2 and 3.11 (Model 530)
- ▶ Meets the IEEE 802.3 specification
- ▶ Combined surge handling of 3 kW
- ▶ Direct connection to network interface cards and other LAN hardware
- ▶ "T" model replaces existing T-splitter
- ▶ Diverts surges safely to chassis ground via braided metal strap

SPECIFICATIONS

Connectors: N-type coaxial
Response Time: Less than 5 ns
Input Capacitance: 18 pF
Clamp Voltage: 25 V at 100 A (8/20 μ s waveform)
Surge Current: 400 A (8/20 μ s waveform)
Energy Handling: 1,500 watts per wire

Transfer Loss: -0.65 dB at 100 MHz
Group Relay: None, 1 MHz to 100 MHz
Dimensions: 2 in. L x 1 in. dia.
Op. Temp.: -67 to 212°F (-55 to 100°C)

ORDERING INFORMATION

Model 530

530 MF: Thick Ethernet Surge Protector, (N-Type, Male to Female)

Model 531

531 MF: Thin Ethernet Surge Protector, (BNC, Male to Female)

531 MFF: Thin Ethernet Surge Protector, (BNC, T-Splitter, Male, Female, Female)

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Ethernet AUI Surge Protector (DB-15)

Model 534

Gives workstations and hubs the upper hand against transients

The Model 534 connects directly to DB-15 AUI ports on interface cards, hubs and repeaters. Protecting DB-15 pins 1 thru 6, 8, 9, 11, 12, 13 and 14 (pins 1, 4, 8, 11 and 14 are electrically connected on both ends), the Model 534 intercepts transient voltages and sends them safely to ground through both DB-15 connector shells.



FEATURES & BENEFITS

- ▶ Meets the IEEE 802.3 specification
- ▶ Combined surge handling capacity of 7,200 watts

ORDERING INFORMATION

Ethernet AUI Surge Protector
534 MF: DB-15 (Male to Female)

802.5 Token Ring Surge Protectors

Models 535, 536, & 537

Whatever your Token Ring topology, we have the right data line protector for you!

Token Ring surge protectors guard 802.5 networks against data loss and hardware damage caused by data line transients. Sophisticated solid data circuits allow our Token Ring protectors to protect transparently—while shielding your devices from surge hit after surge hit.



FEATURES & BENEFITS

- ▶ IEEE 802.5 compliant
- ▶ Protection for 4 Mbps or 16 Mbps Token Ring networks

ORDERING INFORMATION

Type 1 Token Ring Surge Protector
535 MF: DB-9 (Male to Female)

Type 3 Token Ring Surge Protector
536 FF: UTP, RJ-45 (Female to Female)

536S FF: STP, RJ-45 (Female to Female)

Type B Token Ring Surge Protector
537: IBM Data Connector

Twinax Surge Protector for IBM AS/400

Model 545

Reliable data line protection for midrange systems

The Model 545 greatly reduces the threat that transient surges pose to twinax networks. Installing directly between incoming twinax data cables and twinax data ports, the Model 545 safely diverts surge energy to chassis ground before hardware damage occurs. Our T-splitter version replaces the twinax T-splitter on your existing connection.



FEATURES & BENEFITS

- ▶ 3,000 watts energy handling
- ▶ In-line (MF, FF) or T-splitter (MFF) configurations available

ORDERING INFORMATION

AS/400 Surge Protector
545MF: Twinax, male to female

545FF: Twinax, female to female

545MFF: Twinax "T" male, female, female

Video Surge Protectors

Models 542 & 543

The Model 542 and 543 video surge protectors connect in-line between the coax video cable and the connection port on your camera, console, or other video equipment. Transient surges are intercepted and diverted to ground through a braided metal strap. The video protectors can handle repeated surges up to 1,500 watts per wire. Their "fail safe" design protects your video equipment even in the event of a severe surge.



FEATURES & BENEFITS

- ▶ 3,000 watts energy handling
- ▶ In-line (MF, FF) or T-splitter (MFF) configurations available

ORDERING INFORMATION

542: CCTV (BNC)

543: SATV, VSAT, DirectTV (F-Type)

V.35 (M/34) Surge Protector

Model 546

Compact unit that plugs directly into your M/34 interface—no expensive adapter cables!

The Model 546 surge protector guards V.35 data ports against damage and data loss due to transient surges. It intercepts harmful surges and diverts them to chassis ground through a braided metal strap. All standard data, clocking and control signals on the CCITT V.35 interface are protected (although the Model 546 is also available with all 34 pins protected).



FEATURES & BENEFITS

- ▶ Surge handling capacity of 1,500 watts
- ▶ Supports data rates up to 20 Mbps
- ▶ Able to handle repeated surges without degrading in performance

ORDERING INFORMATION

546MF: V.35 Surge Protector (Standard Lines) M/34 (Male to Female)

546/34MF: V.35 Surge Protector (All 34 Lines) M/34 (Male to Female)

Telco Line Surge Protectors

Model 552 Series

Guard All Your Telco Lines: T1, ISDN, DDS, Leased & Dial-up!

Your telco lines are a vital data link with the outside world. But they can also carry some very undesirable transient spikes into your data ports! The Patton Model 552 installs between an incoming telco line and a dial-up/leased line modem, ISDN modem (a.k.a. TA, NTU), T1/E1/PRI or DDS CSU/DSU or other termination hardware to intercept and divert telco line transients.



FEATURES & BENEFITS

- ▶ Seven versions custom tailored to specific Telco interfaces!
- ▶ Safety tested and listed under UL 497A specification for secondary surge protectors
- ▶ Surge handling capacity of 1500 W
- ▶ Surge energy diverted to ground through braided metal strap
- ▶ "Fail-safe" design protects equipment in case of overload
- ▶ 6-in. (15.24 cm) modular cable included

THE PART NUMBER TELLS YOU THE APPLICATION:

Model 552-D2: For protection of 2-wire dial-line modems, faxes, phones

Pins Protected: Pins 4 and 5 on the RJ-45 interface (RJ-11 pins 3 and 4 via 6 in./15 cm patch cable)

Protection Mode: Common mode pins 4, 5 to shielding braid; Differential mode pins 4, 5

Model 552-D4: For protection of 4-wire dial-line modems, faxes, phones

Pins Protected: Pins 3, 4, 5, 6 on the RJ-45 interface (RJ-11 pins 3, 4, 5, 6 via 6 in./15 cm patch cable)

Protection Mode: Common mode pins 3, 4, 5, 6 to shielding braid; Differential mode pins 3, 4, 5, 6

Model 552-L4: Protects 4-wire leased line modems.

Pins Protected: Pins 3, 4, 5, 6 on the RJ-45 interface; (RJ-11 Pins 2, 3, 4, 5 via 6 in./15 cm patch cable)

Protection Mode: All pins common mode to shielding braid; Differential 3 and 6, 4 and 5

Model 552-DDS: Protects 56/64K CSU/DSU products

Pins Protected: Pins 1, 2, 7, 8

Protection Mode: Common mode pins 1, 2, 7, 8 to shielding braid; Differential mode pins 1, 2, 7, 8

Model 552-T1 & E1: For protection of T1 & E1 CSU/DSUs and multiplexers

Pins Protected: Pins 1, 2, 4, 5

Protection Mode: Common mode pins 1, 2, 4, 5 to shielding braid; Differential mode pins 1, 2, 4, 5

Model 552-E1CX: Protects all shields and center pins

Pins Protected: All shields and center pins

Protection Mode: Common mode center pins and shield to shielding braids; Differential mode center pins to shields

Model 552-U: For protection of ISDN TAs and NTUs.

Pins Protected: Pins 3, 4, 5, 6;

Protection Mode: All pins common mode to shielding braid; Differential 3 and 6, 4 and 5

Model 552-ST: For protection of ISDN TAs and NTUs

Pins Protected: All 8 pins on the RJ-45 interface

Protection Mode: All pins common mode to shielding braid; Differential mode pins 1 and 2, 7 and 8; Differential mode pins 3 and 6, 4 and 5

SPECIFICATIONS

Series resistance: 0.340 ohms

In-line fuse rating: 250V, 0.75 amp, 2.95 (A² sec) nominal melting point

Approvals: UL497A Telco Specification (except E1 versions)

Connectors: Two female RJ-45 or 4 BNC jacks (552-E1CX)

Dimensions: 3L x 0.75H x 2.1W in.

(7.62L x 1.9H x 5.3W cm)

Weight: 0.1 lbs (0.045 kg)

ORDERING INFORMATION

552-D2: 2-Wire Dial Up Protector (RJ-11 pins 3 & 4)

552-D4: Dual 2-Wire Dial-Up Protector (RJ-11 pins 2, 3, 4 & 5)

552-L4: 4-Wire Leased Line Protector (RJ-45 pins 3, 4, 5 & 6)

552-DDS: 4-Wire DDS Protector (RJ-45 pins 1, 2, 7 & 8)

552-T1: 4-Wire T1 & ISDN PRI Protector (RJ-45 pins 1, 2, 4 & 5)

552-E1: 4-Wire E1 & ISDN PRI Protector (RJ-45 pins 3, 4, 5 & 6)

552-E1CX: Dual Coax E1 Protector

552-U: 4-Wire ISDN Protector—U Type (RJ-45 pins 3, 4, 5 & 6)

552-ST: 8-Wire ISDN Protector—ST Type (All 8 pins on the RJ-45)

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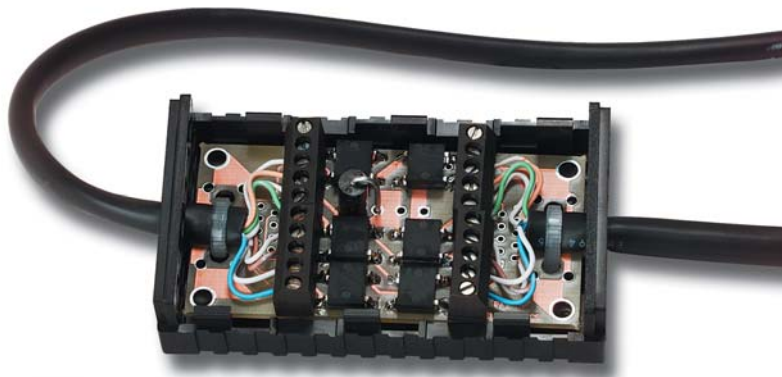
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PATTON
Electronics Co.

Terminal Strip Surge Protectors

Model 52X Series

Create the surge protector you need for just about any interface.

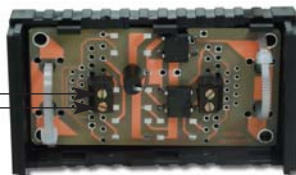


Design Your Own Protector

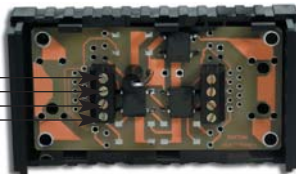
The Patton 52X Series lets you design your own “custom” surge protector to fit just about any 2, 4, 6, 8 or 10 wire application. You specify the number of lines you need protected. You specify the clamping voltage that is optimum for your application. Each surge protector comes with input/output terminal strips and strain relief straps to hold the wires.



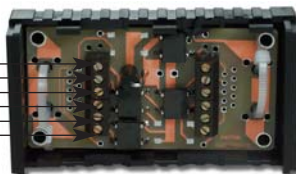
2 Wire



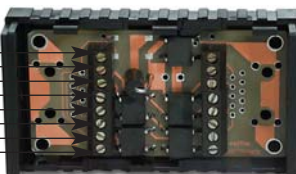
4 Wire



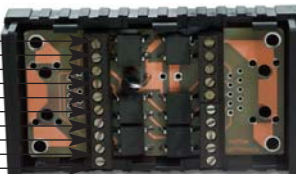
6 Wire



8 Wire



10 Wire



FEATURES & BENEFITS

- ▶ Clamping voltages for RS-232, RS-422, RS-485, Token Ring or Ethernet (call for custom options)
- ▶ Strain relief straps hold wires firmly in place
- ▶ Surge handling capacity of 1,500 watts
- ▶ Surge energy diverted to ground through braided metal strap
- ▶ You choose the number of lines to protect for your application

SPECIFICATIONS

Interface: RS-232, RS-422/485, Ethernet, Token Ring
Connectors: Terminal Strip
Wires Protected: 2, 4, 6, 8 or 10
Surge Capacity: 400A (8/20 μs)
Clamp Voltage: Residual surge[†] at 2 kV (1.2/50μs), 1 kA (8/20μs wave form [105 volts])
Maximum Speed: 20 Mbps
Construction: UL94-5V rated flame-retardant plastic

Dimensions: 3.0 x 1.67 x 0.8 in. (7.62 x 4.24 x 2.03 cm)
Humidity: 5–95%, non-condensing
Op. Temp.: -40 to +185°F (-40 to +85°C)
Dimensions: 3L x 0.75H x 2.1W in. (7.62L x 1.9H x 5.3W cm)
Weight: 0.1 lbs (0.045 kg)

[†]Residual surge is a special term defined by the IEEE and NEMA to replace the term *clamp voltage*.

I'm Danny, one of Patton's Support Engineers. If you're having a problem with a Patton product, I'll find the solution quickly. To buy one of these surge protectors, call +1 301.975.1000 or send e-mail to sales@patton.com.

ORDERING INFORMATION

| | |
|----------------------------|-------|
| Terminal Strip | |
| 522/25-TS: 2-Wire, 19.2 V | _____ |
| 524/25-TS: 4-Wire, 19.2 V | _____ |
| 526/25-TS: 6-Wire, 19.2 V | _____ |
| 528/25-TS: 8-Wire, 19.2 V | _____ |
| 521/25-TS: 10-Wire, 19.2 V | _____ |
| 522/6-TS: 2-Wire, 8.7 V | _____ |
| 524/6-TS: 4-Wire, 8.7 V | _____ |
| 526/6-TS: 6-Wire, 8.7 V | _____ |
| 528/6-TS: 8-Wire, 8.7 V | _____ |
| 521/6-TS: 10-Wire, 8.7 V | _____ |

Q&A on transient surges

Tutorial FAQ on data line surge protection

What are transients and what causes them?

Transient voltage surges (TVSSs) are high energy voltage spikes usually associated with lightning strikes or poor power quality. With a nearby lightning strike, the current on a data line can reach 300,000 amperes, but even a strike three miles away can still cause interruptions on data lines.

Surges can also be caused by energy from fluorescent lighting, motors and poor power circuits. Other culprits are AC wiring errors, differences in reference potential, and electrostatic discharge (ESD). The result: degraded system performance, increased down-time, or even damaged equipment.

I already have AC surge protectors, so why do I need data line surge protection?

AC surge protectors are effective but only solve half the problem. Along with AC lines, transients also attack incoming telephone lines and data communication lines. Therefore, a comprehensive method of protection should be followed.

If I've correctly routed the cable, or used shielded cable do I still need protectors?

Even routing cable correctly does not prevent electromagnetic energy from getting onto data lines. You should always place the cables away from motors and lights or run shielded cable. However, transient voltage surge suppressors (TVSS) still should be used, along with battery-backed power to avoid disaster.

Which TVSS should I buy?

There are several different types of TVSSs (air gaps, gas tubes, MOVs, zener diodes, and silicon avalanche diodes). Each protects a certain type of electronic circuit. For example fused protection circuits should be used for primary building entrance applications. Patton uses silicon avalanche diodes (SADs) to protect equipment ports. SADs are characterized by the high surge shunting capability, extremely fast response times, and low insertion losses. They don't degrade with repeated surges so they are ideal for port protection applications. In the case of an extreme overvoltage, SADs fail short, sacrificing themselves to save the equipment circuitry.

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All Patton surge protectors are CE marked

Certified suppressors can help other products gain CE compliance

What IEC certification means

To carry the CE mark, all Patton surge suppressors have had to withstand three types of electrical hazards: the IEC 801.2 test for ESD (electro static discharge), the 801.4 test for EFTs (electrical fast transients), and the 801.5 test for surge immunity.

ESD occurs when an electrical charge builds up from two non-conductive materials connecting and then separating from one another. ESD has the fastest rise time of 0.7 to 1.0 nanoseconds.

EFTs appear as disturbances in a building's electrical system and are common occurrences where electromechanical switches connect and disconnect inductive loads. EFTs have the second fastest rise time of the three hazards (5 nanoseconds).

Surges have a relatively slow 1.2 μ s rise time and carry the most power. The 801.5 test—the most crucial for surge suppressors—emulates hazards such as direct or nearby lightning strikes, load switching, and short-circuit failures.

Our CE mark is your opportunity

Why should it matter to you that all Patton data line surge suppressors carry the CE mark?

First, our CE mark means that you can compare other manufacturers to Patton. Have their data line products withstood the IEC 801.2, 801.4 and 801.5 tests successfully? Have their products been certified by a recognized, independent body?

Second, the CE mark means that our surge suppression products are certified for sale throughout the European Union.

Third, our CE mark can assist you in gaining CE certification. How? IEC standard EN50082-1 is the immunity standard with which *all* computing and communications equipment must comply to obtain CE certification. Most unprotected devices have difficulty meeting this standard, but can achieve compliance if they are protected by a Patton surge suppressor. For example, a major manufacturer's BER tester was unable to meet the IEC immunity requirements until the connection of a Patton surge suppressor boosted its marginal immunity to a level where it could handle the test voltages successfully. This example suggests many other applications where a Patton CE marked surge protector could be "bundled" with a product with marginal immunity, and the two could be CE certified as a system.

Please contact us if you wish to create declarations of conformity, or to discuss these opportunities.

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Electronics Co.

About optical isolation

What is optical isolation and when do you need it?

You have probably noticed that optical isolation is a popular feature on datacom products. But what is optical isolation? And why is this feature in demand? This section presents a brief overview of optical isolation.

Some background

In 1887, Gustav Hertz discovered that certain surfaces liberated electrons when influenced by light. Subsequent work by Max Planck and Albert Einstein in the early 1900s established that bundles of light energy, called *photons*, could transfer their energy to free electrons and liberate them from metal surfaces in a mathematically predictable way. The application of this *photoelectric phenomenon* to the field of semiconductors is the basis for optical isolation.

The basic theory

Optical isolation has two basic elements: a light source (usually a light emitting diode) and a photo-sensitive detector. These two elements are positioned facing one another and inserted in an electrical circuit to form an optocoupler. The key property of an optocoupler is that there is an insulating gap between the light source and the detector. No current passes through this gap, only the desired light waves representing data. Thus the two sides of the circuit are effectively isolated from one another.

Primary application

In data communications, the primary application for optical isolation is in a point-to-point data circuit that covers a distance of several hundred feet or more. Because the connected devices are presumably on different power circuits, a ground potential difference likely exists between them. When such a condition exists, the voltage of “ground” can be different, sometimes by several hundred volts.

Where a ground potential difference exists, a phenomenon called ground looping can occur. In this phenomenon, current will flow along the data line in an effort to equalize the ground potential between the connected devices. Ground looping can, at the very least, severely garble communications—if not damage hardware!

Optical isolation solves the problem of ground looping by effectively lifting the connection between the data line and “ground” at either end of the line. If an optically coupled connection exists at each end, the data traffic “floats” above the volatility of ground potential differences.

Optical isolation vs. transformer isolation

A common belief is that optical isolation is superior to transformer isolation in every case. Theoretically this is true, because optical isolation provides a “true” physical barrier, whereas transformer isolation is a coupling designed to merely “absorb” unwanted frequencies. However, in practice optical isolation is a less efficient transmitter of energy than transformer isolation—an important consideration when signal strength is an issue. Therefore transformer isolation is sometimes the best choice for very long-distance applications. And optical isolation also becomes a prohibitively expensive solution at higher data rates. So in the real world, transformer isolation still has its place.

Optical isolation vs. surge protection

Another common belief is that optical isolation takes the place of surge protection. After all, if optical isolation provides a barrier against ground loops, won't it provide a barrier against transients as well? This belief fails to account for the fundamental difference between ground loops and transients.

Ground loops tend to be of long duration and relatively low voltage. Transients, on the other hand, tend to be of short duration and very high voltage. Consequently, the amount of current instantly presented by a transient must be directed safely to ground. An optocoupler will be destroyed by a high voltage transient exceeding its rating. True, the transient will not get past the barrier, and components on the other side of the optocoupler will be spared. But components on the side receiving the “hit” (usually the analog line side) can be damaged. In any case, the unit will no longer pass data.

What's needed, therefore, is surge protection (such as the silicon avalanche diodes used by Patton) placed ahead of the optocoupler—right where the line enters from the outside world. Surge protectors respond instantly and shunt relatively large amounts of current quickly to chassis ground. This dangerous current is not permitted to roam around and damage components (including the optocoupler). Then the optocoupler can do its job of providing a constant barrier to low voltage ground loops.

Asynchronous RS-232 Optical Isolators

Model 590 Series

Don't let ground loops disrupt your RS-232 communications!

The Model 590 Series of RS-232 optical isolators guard your asynchronous equipment from the hazards of ground looping. Plugging directly into your DTE hardware, the Model 590 Series provides 2500V RMS peak DCE/DTE isolation. Both the Model 590A (19.2 kbps max) and Model 591A (115.2 kbps max) isolate 4 lines on the RS-232 interface—two of

which are selectable by internal jumpers. The Model 592 (19.2 kbps max) and Model 594 (115.2 kbps max) isolate 7 pre-wired lines on the RS-232 interface.



SPECIFICATIONS

Transmission Format: Asynchronous, full or half duplex

Interface Standard: EIA RS-232E

Connectors: DB-25 female on DCE side (direct connection to DTE equipment); DB-25 male on DTE side (connects by cable to DCE equipment)

Data Rates: Model 590A/592—0 to 19.2 kbps; Model 591A/594—0 to 115.2 kbps

Lines Isolated: Model 590A/591A—TD (2), RD (3), DTR (20) or RTS (4); CD (8), DSR (6) or CTS (5). Model 592/594—TD (2), RD (3), RTS (4), CTS (5), DSR (6), CD (8) and DTR (20).

Power Supply: Model 590A/591A—RS-232 Interface powered, or user-supplied 12V DC input on pin 9 of the DCE interface (45mA); Model 592/594—External AC transformer
Isolation: 2500V RMS peak isolation
Dimensions: 3.8 x 2.1 x 0.79 in. (9.7 x 5.3 x 2.0 cm)
Op. Temp.: 32–122°F (0–50°C)

Altitude: 0–10,000 feet (0–3,078 m)
Humidity: Up to 95% non-condensing

FEATURES & BENEFITS

- ▶ 2500V RMS peak isolation
- ▶ Models 590A and 592 support async data rates to 19.2 kbps
- ▶ Models 591A and 594 support async data rates to 115.2 kbps

ORDERING INFORMATION

RS-232 Optical Isolator (DB-25M to DB-25F)

590AF: 19.2 kbps, 4 Lines Isolated

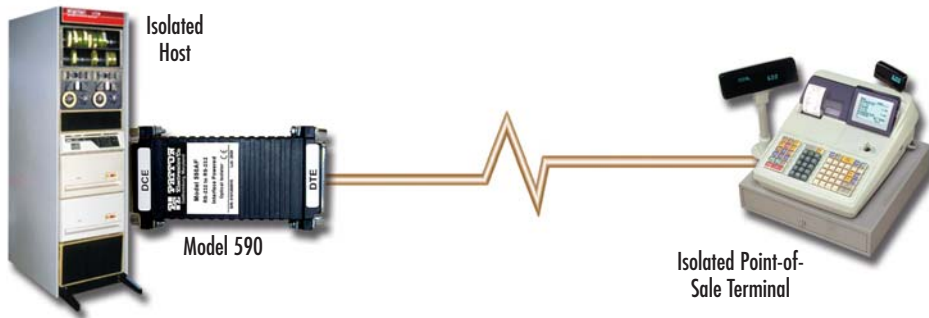
591AF: 115.2 kbps, 4 Lines Isolated

592/25F: 19.2 kbps, 7 Lines Isolated 120 V

594/25F: 115.2 kbps, 7 Lines Isolated, 120 V

230 VAC version also available, call for details.

Model 590 Series application diagram



I'm Jen, one of Patton's Sales Associates. Call me at +1 301.975.1000 when you want to purchase Patton products or if you have questions about our products. You can also send e-mail to sales@patton.com.

RS-422/485 Optical Isolators

Model 593 Series

Prevent the early failure of your RS-422/485 devices!

The Model 593 series of RS-422/485 optical isolators protects your RS-422/485 equipment from the hazards of ground looping. Connect the Model 593 directly to your equipment via a DB-25 or RJ-45 connector, or a terminal block. The Model 593 supports data rates up to 115.2 kbps.



SPECIFICATIONS

Transmission Format: Asynchronous, full- or half-duplex

Interface standard: RS-422/485, or terminal block

Data rates: Up to 115.2 kbps

Power Supply: AC external power supply

Isolation: 2500 Vrms peak isolation

Op. Temp.: 32–140°F (0–60°C)

Altitude: 0–10,000 ft (3,048 m)

Dimensions: 593/45 & 593/TB: 3.8L x 2.1W x 0.79H in. (9.7L x 5.3W x 2.0H cm)

593/25: 4.1L x 2.1W x 0.79H in. (10.4L x 5.3W x 2.0H cm)

Humidity: 5–95% non-condensing

FEATURES & BENEFITS

- ▶ 2500 Vrms peak isolation
- ▶ Supports asynchronous data rates up to 115.2 kbps

ORDERING INFORMATION

RS-422/485 Optical Isolator

593/45: RJ-45F to RJ-45F, 115.2 kbps 4 lines isolated

593/25F: DB-25F to DB-25F, 115.2 kbps 4 lines isolated

593/TB: Terminal block to terminal block, 115.2 kbps, 4 lines isolated

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