BLACK BOX ®

The Source for Connectivity®

In-Line Surge Protectors
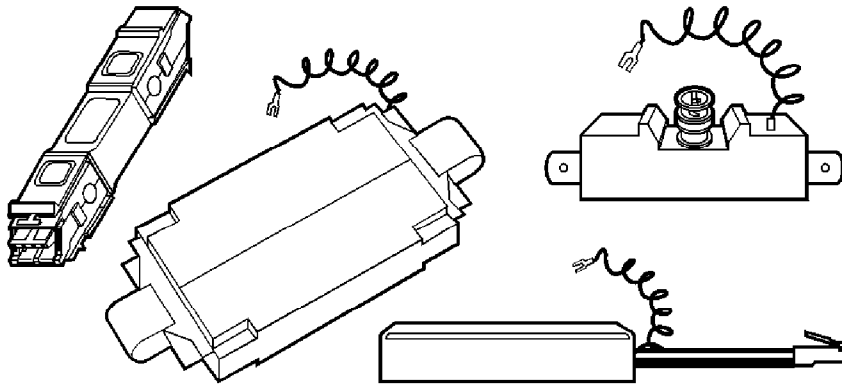
In-Line Surge Protectors, when used with AC Surge Protectors, give your network complete protection against surges and spikes.

Creating new data takes hours, even days. Guard your sensitive data against surges, spikes, ground-loop currents, and electrostatic discharge with In-Line Surge Protectors—all for a fraction of the cost of the equipment you wish to protect.

Key Features

▶ *Protect every data connection in your network—there's a protector for all your needs.*

▶ *The protectors are bipolar, so you get protection from both positive and negative surges.*

▶ *Easy to install   just plug and play.*

▶ *Compact size.*

▶ *Responds in less than 10 nanoseconds.*

▶ *Little or no series resistance (depends on model).*

Overview

Zap! and your data's gone. You've spent hours creating the data stored on your network, but in a split second you could lose it all. Don't let your worst nightmare come true—protect your sensitive data from surges and spikes. Power surges can enter through your AC circuits, but they can also enter through your data lines. You might already have AC surge protectors, but you still need data line protectors.

Our complete line of data protectors provide protection for virtually any type of interface. Choose from protectors for twinax or coax cable, RS-232 and RS-422 lines, telco, T1, CSU/DSU, or Ethernet, ARCNET®, and Token Ring interfaces.

All the protectors guard your data against ground-loop currents, electrostatic discharge, surges, and spikes.

All the protectors are compact and unobtrusive, so they won't add bulk to your installation.

• Twinax and coax protectors guard your IBM® 5250 and 3270 systems.

• RS-232 and RS-422 guard your outdoor and long-distance cable runs.

• Telco protectors guard your dialup modems and fax machines.

• T1 protectors guard your high-speed T1 equipment such as non-span or inhouse Channel Service Unit/Data Service Unit (CSU/DSU) lines.

• Local Area Network (LAN) protectors guard your multistation access units (MAUs), repeaters, concentrators, hubs, and nodes.

Refer to the "Hot Topics" section on page 4 to find the protector best suited to your application.

Typical Applications

You've just installed a new IBM 5250 that serves users in your region. Protect your server with a twinax surge protector.

Protect your small networks too—the LAN protectors are ideal for protecting every device in your office LAN.

Your data lines need protection, too. We have what you need to guard any connection.

Here's *why you need a surge protector.*

In an ideal world, the flow of electrical current in your computer systems would be equal at all times. No outside power disturbances would disrupt the balance of power in your electronic devices.

In the real world, however, several forms of power disturbances can wreak havoc on your electrical devices. These power disturbances come in the form of *induced transients,* (which include lightning, electrostatic discharge (ESD), and noise), *ground-loop currents,* and *surges.*

Although only a lightning arrestor can protect against direct lightning hits, a surge protector can guard your equipment against damage caused by *induced* lightning. To understand the need for this protection, consider the enormous magnitude of energy that a lightning strike generates. As this large current flows through conductors, the expanding magnetic field causes induced current to flow in nearby conductors that could then carry damaging impulses to computers.

A surge protector can also guard against the second type of induced transient, *electrostatic discharge (ESD).* What we commonly think of as static is that zap we get when we grab something metallic after walking across a carpet during the winter. This static is actually called triboelectricity, from the Greek word *tribo,* which means rubbing. When two unlike materials rub together, the electrons from one and
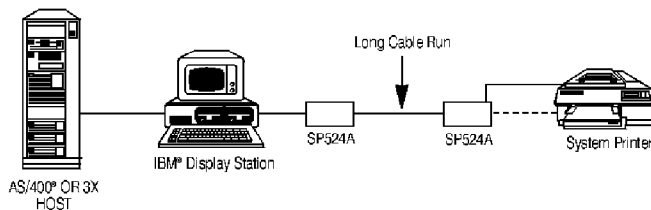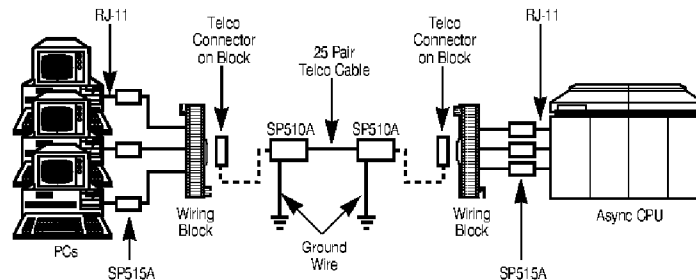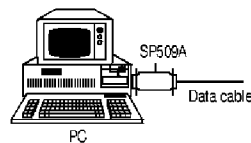
the electrons from the other produce a negative charge (or electrostatic discharge), causing a potential difference between the two surfaces. The excess electrons look for a discharge path, which they find in any good conductor. The excess energy can damage your equipment.

A third type of induced transient, *noise,* can also damage your equipment. Noise is a signal appearing in a circuit other than the desired signal. It can result from lightning or ESD, but more commonly results from other events happening in the environment. Noise of a low magnitude will not bother a PC, but noise or impulses of a high magnitude can interfere with data processing or can damage internal components. Noise as it appears on power lines comes in two varieties: normal-mode and common-mode noise. Turning large loads off or on, or shunting utility power-factor

correcting capacitors across the line, creates normal-mode noise. Lightning and tripping and reclosing utility breakers, poor grounding techniques, ground faults, radio transmitters, time clocks, and machine tools can cause common-mode noise.

Another hazardous form of power disturbance is called a *ground loop.* A ground loop is formed when a potential difference exists between any two places that are, by definition, at ground potential. A ground loop may form in a circuit when the circuit contains two or more different ground connections. This circuit may also be formed between boards inside a PC or in a local area network. Whenever there is some impedance existing between two points, voltage can appear across these points and current can flow. Ground loops can also develop because of the length of a circuit wire.

The final type of power disturbance which the protectors guard against is, quite obviously, *surges.* A surge is a short-term voltage increase that exceeds established upper limits for less than 2.5 seconds. Each type of electrical interface contained in your datacommunications equipment has an acceptable operating voltage range. Voltages above the range of the particular device's interface can damage the device in two ways. First, a massive voltage (called a spike) can immediately damage your equipment. Second, multiple smaller out-of-range voltages can gradually damage your equipment over time.

Our high-speed surge protectors provide an immediate (less than ten nanoseconds) path to ground, so power disturbances go straight to ground instead of to your equipment.

*The Twinax Surge Protector guards a twinax device for System 3X or AS/400®.*

Several models are available for RS-232 and RS-422 devices with various connectors—the RS-232 application shown here uses RJ-11 and RJ-21 50-position plugs.
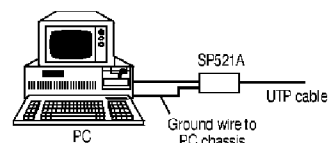
Models are also available to protect Token Ring interfaces, both data connectors and UTP connectors.

Token Ring Data Connector

Token Ring RJ-45 UTP

Hot Topics

Choose the model to suit your application from our complete line of in-line surge protectors described below.

The following models are available:

- ◆ In-Line Surge Protector DB25 (SP140A)—This model protects your DB25 interfaces.
- ◆ RS-232 4-Wire Data Line Protector (SP141A)—This model protects pins 2, 3, 7, and 20 of your DB25 RS-232 interface.
- ◆ Twinax Protector (SP162A)—This model protects your twinax devices.
- ◆ SP-CO (SP165A)—This model protects your IBM® 3270 coax systems.
- ◆ Thin Protector ST® (SP350A-R2)—This model protects your 10BASE2 ThinNet coaxial devices that use a straight connection.
- ◆ Thin Protector L (SP351A-R2)—This model protects your 10BASE2 ThinNet coaxial devices that need to use an angled connection.
- ◆ DB25 Surge Protector RS-232 (SP360A)—This model protects all 25 pins on your DB25 RS-232 interface.
- ◆ DB9 Surge Protector RS-232 (SP361A-R2)—This model protects RS-232 ports that use a DB9 connector.
- ◆ AUI Surge Protector (SP362A)—This model protects your DB15 AUI interface.
- ◆ Surge Protector-Telco (SP365A-R2)—This model protects dialup Telco interfaces.
- ◆ SP-TNC (SP500A)—This model protects your non-Ethernet networks.
- ◆ Thin Protector T (SP501A)—This model protects your devices that use a T-style connector for 10BASE2 ThinNet.
- ◆ ARCNET® Protector-ST (SP502A)— This model protects your ARCNET devices that use a coax, straight connection.
- ◆ ARCNET Protector-L (SP503A)—This model protects your ARCNET interface that requires a coax, angled connection.
- ◆ ARCNET Protector-T (SP504A)—This model protects your ARCNET interface that uses a coax T-style connector.
- ◆ ThickNet Protector F/F (SP505A)—This model protects your 10BASE5 interfaces that require female N-connectors.
- ◆ ThickNet Proetctor F/M (SP506A)— This model protects your 10BASE5 interfaces that require male N-connectors.

- ◆ DB15 RS-232 Protector (SP507A)—This model protects your RS-232 ports that use DB15 connectors.
- ◆ DB15 RS-422 Protector (SP508A)—This model protects your RS-422 or X.21 ports that use DB15 connectors.
- ◆ Token Ring Protector (SP509A)—This model protects your Token Ring interfaces that use data connectors.
- ◆ 25-Pair RS-232 Protector (SP510A)— This model protects 25-pair RJ-21 interfaces.
- ◆ 25-Pair Ethernet Protector (SP511A)— This model protects 25-pair RJ-21 interfaces that use 10BASE-T Ethernet.
- ◆ 10BASE-T Protector (SP512A-R2)—This model protects 10BASE-T interfaces that use RJ-45 connectors.
- ◆ T-1 Non-Span Protector (SP513A-R2)— This model protects T1 interfaces that use RJ-45 connectors.
- ◆ Token Ring Protector (SP514A)—This model protects Token Ring interfaces that use DB9 connectors.
- ◆ RS-232 4-Wire Serial Protector (SP515A-R2)—This model protects 4-wire interfaces that use RJ-11 connectors.
- ◆ Centronics® Surge Protector (SP516A)—This model protects 36-pin Centronics parallel M/F interfaces.
- ◆ CATV Surge Protector (SP517A)—This model protects CATV (cable TV) F/F F59 interfaces.
- ◆ AT® Keyboard Surge Protector (SP518A)—This model protects 5-pin DIN M/F interfaces.
- ◆ PS/2® Keyboard Surge Protector (SP519A)—This model protects 6-pin mini-DIN M/F interfaces.
- ◆ VGA Video Surge Protector (SP520A)—This model protects DB15 HD M/F interfaces.
- ◆ Token Ring Protector RJ-45 (SP521A-R2)—This model protects RJ-45 4-wire (F) interfaces.
- ◆ Token Ring Protector RJ-45 (SP522A)— This model protects RJ-45 8-wire (F) interfaces.
- ◆ Token Ring Strip Protector (SP523A)— This model protects 4-wire Terminal strip interfaces.
- ◆ Twinax Surge Protector (SP524A)— This model protects Twinax M/F interfaces.
- ◆ Twinax Surge Protector (SP525A)— This model protects Twinax F/F interfaces.

▼ The Complete Package

What you get when you order an In-Line Surge Protector:

◆ In-line surge protector (with ground strap)

◆ User's Manual

▼ Additional equipment you may need

You might also want to order the following:

◆ AC surge protectors

◆ Coax cable

◆ Twinax cable

◆ Shielded twisted-pair cable

◆ Unshielded twisted-pair cable

▬▼ Specifications

In-Line Surge Protectors

Response Time — All models: Less than 10 nanoseconds

Clamp Voltage —

7 V: SP508A, SP514A;
7.5 V: SP511A;
8 V: SP350A-R2, SP351A-R2, SP501A, SP505A, SP506A, SP512A, SP516A, SP517A, SP518A, SP519A, SP520A;
9 V: SP362A
18 V: SP361A-R2, SP507A, SP509A-R2, SP141A;
19 V: SP360A;
27 V: SP510A, SP515A;
30 V: SP502A, SP503A, SP504A;
60 V: SP513A;
240 V: SP365A-R2

Series Resistance — None

Interface/Connectors—

BNC for Thin Ethernet: SP350A-R2, SP351A-R2, SP501A;

RS-232, DB9: SP361A-R2, SP507A;

ARCNET® BNC: SP502A, SP503A, SP504A;

Standard Ethernet coax BNC: SP505A, SP506A;

RS-422, DB15 (X.21): SP508A;

Token Ring with IBM® Type B data connectors: SP509A-R2;

RJ-21 for RS-232: SP510A;

RJ-21 for 10BASE-T Ethernet: SP511A;

RJ-45 with 10BASE-T Ethernet: SP512A;

RJ-45 all 8 wires protected: SP513A;

DB9 for RS-422, 4-Mbps Token Ring, LANtastic®, and Artisoft® LANs: SP514A;

RJ-11 4-wire for RS-232: SP515A;

36-pin Centronics® M/F: SP516A;

CATV F/F: SP517A;

5-pin DIN M/F: SP518A;

6-pin mini DIN M/F: SP519A;

DB15 HD M/F: SP520A;

Telco RJ-11: SP365A-R2;

DB25 for RS-232: SP360A;

DB15 for AUI: SP362A;

DB25 4-wire for RS-232 (pins 2, 3, 7, and 20): SP141A

▼ For these and other components...

Call our expert Technical Support Staff for all your LAN needs. They'll help you find the best equipment for your application.

▼ Ordering Information

This information will help you place your order quickly.

PRODUCT NAME	ORDER CODE
In-Line Surge Protector (DB25)	SP140A
RS-232 4-Wire Data Line Protector	SP141A
Twinax Protector	SP162A
SP-CO (for IBM® 3270 coax)	SP165A
Thin Protector ST®	SP350A-R2
Thin Protector L	SP351A-R2
DB25 Surge Protector (RS-232)	SP360A
DB9 Surge Protector (RS-232)	SP361A-R2
AUI Surge Protector	SP362A
Surge Protector—Telco (Dialup)	SP365A-R2
SP-TNC (for non-Ethernet networks)	SP500A
Thin Protector T	SP501A
ARCNET® Protector-ST	SP502A
ARCNET Protector L	SP503A
ARCNET Protector T	SP504A
ThickNet Protector F/F	SP505A
ThickNet Protector M/F	SP506A
DB15 RS-232 Protector	SP507A
DB15 RS-422 (X.21) Protector	SP508A
Token Ring Protector	SP509A
RJ-21 25-Pair RS-232 Protector	SP510A
RJ-21 25-Pair Ethernet Protector	SP511A
RJ-45 10BASE-T Protector	SP512A-R2
RJ-45 T-1 Non-Span Protector	SP513A-R2
Token Ring Protector	SP514A
RJ-11 RS-232 4-Wire Serial Protector	SP515A-R2
Centronics® Surge Protector	SP516A
CATV Surge Protector	SP517A
AT® Keyboard Surge Protector	SP518A
PS/2® Keyboard Surge Protector	SP519A
DB15 HD VGA Video Surge Protector	SP520A
RJ-45 (4-wire) Token Ring Protector	SP521A-R2
RJ-45 (8-wire) Token Ring Protector	SP522A
Token Ring Strip Protector	SP523A
Twinax Surge Protector M/F	SP524A
Twinax Surge Protector F/F	SP525A