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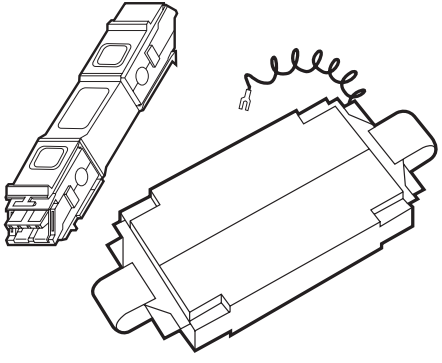
BLACK BOX®
NETWORK SERVICES

JUNE 2000

SP141A	SP501A	SP508A	SP515A-R2	SP523A-R2	SP604A
SP350A-R2	SP502A	SP509A-R2	SP516A	SP524A	SP605A
SP351A-R2	SP503A	SP510A-R2	SP517A	SP525A	SP606A
SP360A	SP504A	SP511A	SP518A-R2	SP528A	SP607A
SP361A-R2	SP505A	SP512A-R3	SP519A-R2	SP600A	SP608A
SP362A	SP506A	SP513A-R2	SP520A	SP601A	SP609A
SP365A-R2	SP507A	SP514A	SP521A-R2	SP602A	SP610A
			SP522A-R2	SP603A	SP611A

In-Line Surge Protectors



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Contents

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1. Specifications

Response Time — SP365A-R2: 240 V; All other models: Less than 10 nanoseconds

Clamp Voltage —

SP350A-R2, SP351A-R2, SP501A, SP505A, SP506A, SP512A-R3, SP516A, SP517A, SP518A-R2, SP519A-R2, SP520A: 8 V

SP361A-R2, SP507A, SP509A-R2, SP510A-R2, SP141A, SP521A-R2, SP522A-R2, SP523A-R2, SP524A, SP525A, SP600A, SP602A, SP604A, SP606A, SP608A, SP610A: 18 V

SP502A, SP503A, SP504A: 30 V

SP508A, SP514A, SP601A, SP603A, SP605A, SP607A, SP609A, SP611A: 7 V

SP515A-R2: 27 V

SP511A: 7.5 V

SP513A-R2: 60 V

SP365A-R2: 240 V

SP360A: 19 V

SP362A: 9 V

SP528A: 7.5 V

Series Resistance — None

Interface —

SP350A-R2, SP351A-R2, SP501A: BNC for Thin Ethernet
SP361A-R2, SP507A: RS-232, DB9
SP502A, SP503A, SP504A: ARCNET BNC
SP505A, SP506A: Standard Ethernet coax BNC
SP508A: RS-422, DB15
SP509A-R2: Token Ring with IBM Type B data connectors
SP510A-R2: RJ-21 for RS-232
SP511A: RJ-21 for 10BASE-T Ethernet
SP512A-R3: RJ-45 with 10BASE-T Ethernet
SP513A-R2: RJ-45 all 8 wires protected
SP514A: DB9 for RS-422, 4-Mbps Token Ring, LANtastic, and Artisoft LANs
SP515A-R2, SP528A: RJ-11 4-wire for RS-232
SP516A: 36-pin Centronics M/F
SP517A: CATV F/F
SP518A-R2: 5-pin DIN M/F
SP519A-R2: 6-pin Mini DIN M/F
SP520A: DB15 HD M/F
SP521A-R2: RJ-45 4-wire (F)
SP522A-R2: RJ-45 8-wire (F)
SP523A-R2: 4-wire terminal strip
SP524A: Twinax
SP525A: Twinax
SP365A-R2: Telco
SP360A: DB25 for RS-232
SP362A: DB15 for AUI

SP141A: DB25 4-wire for RS-232,
pins: 1(ground) (2, 3, 7, 20)
SP600A: 2-wire for RS-232 and Token Ring
SP601A—2-wire for RS-422, RS-423, RS-485, and Ethernet
SP602A—4-wire for RS-232 and Token Ring
SP603A—4-wire for RS-422, RS-423, RS-485, and Ethernet
SP604A—6-wire for RS-232 and Token Ring
SP605A—6-wire for RS-422, RS-423, RS-485, and Ethernet
SP606A—8-wire for RS-232 and Token Ring
SP607A—8-wire for RS-422, RS-423, RS-485, and Ethernet
SP608A—10-wire for RS-232 and Token Ring
SP609A—10-wire for RS-422, RS-423, RS-485, and Ethernet
SP610A—32-wire for RS-232 and Token Ring
SP611A—32-wire for RS-422, RS-423, RS-485, and Ethernet

2. Description

These in-line surge protectors guard your equipment against induced transient or surge energies caused by nearby AC power lines and cables, close lightning strikes, and electrostatic discharge. The protectors are *bipolar*, which means they protect your equipment from both positive and negative surges.

The following models are available:

Model No.	Name	Interface
SP350A-R2	Thin Protector ST	10BASE2 ThinNet coax, straight connection
SP351A-R2	Thin Protector L	10BASE2 ThinNet coax, angled connection
SP361A-R2	DB9 Surge Protector (RS-232)	RS-232 ports using DB9
SP501A	Thin Protector T	T-style coax connector for 10BASE2 ThinNet
SP502A	ARCNET Protector-ST	ARCNET coax, straight connection
SP503A	ARCNET Protector-L	ARCNET coax, angled connection
SP504A	ARCNET Protector-T	ARCNET coax T-style
SP505A	Thicknet Protector F/F	10BASE5 N-connector

IN-LINE SURGE PROTECTORS

Model No.	Name	Interface
SP506A	Thicknet Protector M/F	10BASE5 N-connector
SP507A	DB15 RS-232 Protector	RS-232 ports using DB15
SP508A	DB15 RS-422 Protector	RS-422, RS-423, and RS-485 ports using DB15
SP509A-R2	Token Ring Protector	Token Ring interface using data connector
SP510A-R2	25-Pair RS-232 Protector	25-Pair RJ-21-style interface
SP511A	25-Pair Ethernet Protector	25-Pair RJ-21 interfaces using 10BASE-T Ethernet
SP512A-R3	10BASE-T Protector	RJ-45 for 10BASE-T
SP513A-R2	T-1 Non-Span Protector	RJ-45 for T1
SP514A	Token Ring Protector	DB9
SP515A-R2	RS-232 4-Wire Serial Protector	RJ-11 4-wire
SP516A	Centronics Surge Protector	36-pin Centronics M/F
SP517A	CATV Surge Protector	CATV F/F F59
SP518A-R2	AT Keyboard Surge Protector	5-pin DIN M/F
SP519A-R2	PS/2 Keyboard Surge Protector	6-pin mini DIN M/F

Model No.	Name	Interface
SP520A	VGA Video Surge Protector	DB15 HD M/F
SP521A-R2	Token Ring Protector RJ-45	RJ-45 4-wire (F)
SP522A-R2	Token Ring Protector RJ-45	RJ-45 8-wire (F)
SP523A-R2	Token Ring Strip Protector	4-wire terminal strip
SP524A	Twinax Surge Protector	Twinax
SP525A	Twinax Surge Protector	Twinax
SP365A-R2	Surge Protector—Telco	Telco—RJ-45 8-wire (female) (RJ-11 4-wire pigtail into the RJ-45 on the equipment side)
SP360A	Surge Protector—RS-232	RS-232 ports using DB25
SP362A	AUI Surge Protector	AUI ports using DB15
SP141A	4-Wire RS-232 Surge Protector	RS-232 ports using 4-wire DB25
SP600A	4-Wire Terminal Strip Protector (2 center terminals active only)	RS-232 and Token Ring
SP601A	4-Wire Terminal Strip Protector (2 center terminals active only)	RS-422, RS-423, RS-485, and Ethernet

IN-LINE SURGE PROTECTORS

Model No.	Name	Interface
SP602A	4-Wire Terminal Strip Protector	RS-232 and Token Ring
SP603A	4-Wire Terminal Strip Protector	RS-422, RS-423, RS-485, and Ethernet
SP604A	6-Wire Terminal Strip Protector	RS-232 and Token Ring
SP605A	6-Wire Terminal Strip Protector	RS-422, RS-423, RS-485, and Ethernet
SP606A	8-Wire Terminal Strip Protector	RS-232 and Token Ring
SP607A	8-Wire Terminal Strip Protector	RS-422, RS-423, RS-485, and Ethernet
SP608A	10-Wire Terminal Strip Protector	RS-232 and Token Ring
SP609A	10-Wire Terminal Strip Protector	RS-422, RS-423, RS-485, and Ethernet
SP610A	32-Wire Terminal Strip Protector	RS-232 and Token Ring
SP611A	32-Wire Terminal Strip Protector	RS-422, RS-423, RS-485, and Ethernet
SP528A	10BASE-T Surge Protector/RJ-11 4-Wire	RJ-11 4-wire

3. Installation

Take the following installation precautions:

1. The protector must be installed directly on the communication port of the equipment being protected with no additional connections between the protector and the communication port. Any additional connections or wire length between the protector and the communication port will reduce the effectiveness of the protector.
2. A protector will only protect the port to which it is connected. Other ports on the equipment will not be protected unless they too have a protector installed.
3. The green ground wire on each protector must be securely attached directly to the chassis ground of the equipment being protected. Any additional connections or wire length will reduce the effectiveness of the protector.
4. The equipment chassis ground must be connected directly to the building electrical-safety ground through a proper three-prong equipment power cord. You can tell whether the power cord is properly grounded by measuring for continuity between the metal chassis and the round prong of the unplugged power cord using an ohmmeter.

5. Each piece of network equipment being protected must also have an appropriate AC-power surge-suppression device with common mode and normal mode protection.

6. The electrical distribution system of the facility must be properly wired at each and every outlet served by the same branch circuits that supply power to network equipment. Improper wiring (for example, wiring with no ground wire, or with the neutral and ground wires reversed) is the most common problem affecting protector performance. Verification of proper electrical wiring, bonding, and grounding can be achieved by consulting a licensed electrician with experience in computer network wiring, grounding, bonding, and shielding.

7. The electrical distribution system of the facility must have a proper single-point earth-ground rod with sufficient amps and soil conditions to meet the requirements of the National Electric Code (NEC).

Make sure you follow the above precautions. Improper protector installation can result in damage to the equipment and/or protector.

Follow these steps to install your surge protector:

3.1 SP350A-R2, SP351A-R2

These models protect equipment connected to Thin Ethernet cabling.

1. Disconnect the T connector from the network interface card (NIC).
2. Attach the surge protector to the NIC.
3. Connect the ground wire to the equipment chassis.
4. Reconnect the T connector to the protector.

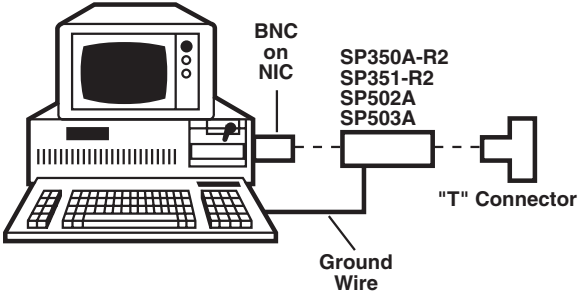

Fig. 3-1. Typical Application of the SP350A-R2, SP351A-R2, SP502A, or SP503A.

3.2 SP361A-R2

This model protects a PC with a DB9 serial port.

1. Disconnect the cable from the PC's serial port.
2. Connect the surge protector to the PC's serial port.
3. Connect the ground wire to the equipment chassis.
4. Reconnect the communications cable to the surge protector.

3.3 SP501A

This model replaces the standard T connector on the network interface card (NIC) to protect the attached workstation from surges.

1. Remove the old T connector.
2. Attach the surge protector to the NIC.
3. Connect the ground wire on the protector to the equipment chassis.

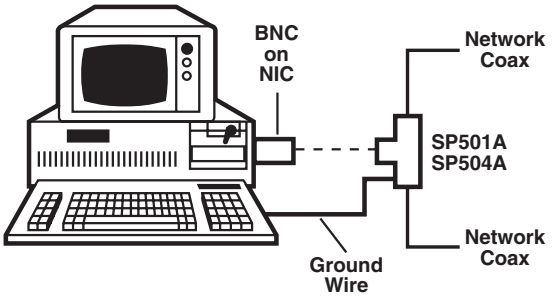

Fig. 3-2. Typical Application of the SP501A or SP504A.

3.4 SP502A

This model attaches to your network interface card (NIC) to protect your equipment from surges. (Refer to Fig. 3-1.)

1. Disconnect the cable attached to the NIC.
2. Attach the surge protector to the NIC.
3. Connect the chassis ground strap.

3.5 SP503A

This model attaches to ARCNET network interface cards (NICs). (See Fig. 3-1.)

1. Disconnect the cable from the NIC.
2. Attach the surge protector to the NIC.
3. Attach the ground wire to the equipment's chassis.

3.6 SP504A

This model replaces the "T" adapter to protect equipment attached to an ARCNET network interface card (NIC). (See Fig. 3-2.)

1. Remove the old "T" adapter.
2. Attach the surge protector to the NIC.
3. Connect the ground strap to the equipment's chassis.

3.7 SP505A, SP506A

These models protect equipment attached to Thick Ethernet. (See Fig. 3-3.)

Intrusive taps:

1. Remove the terminator.
2. Connect the protector to the end of the segment.
3. Reconnect the terminator and ground the protector to the terminator ground.

Nonintrusive taps:

1. Disconnect the trunk cable from the transceiver.
2. Connect the cable to the protector and connect the protector to the transceiver.
3. Attach the ground wire to the transceiver.

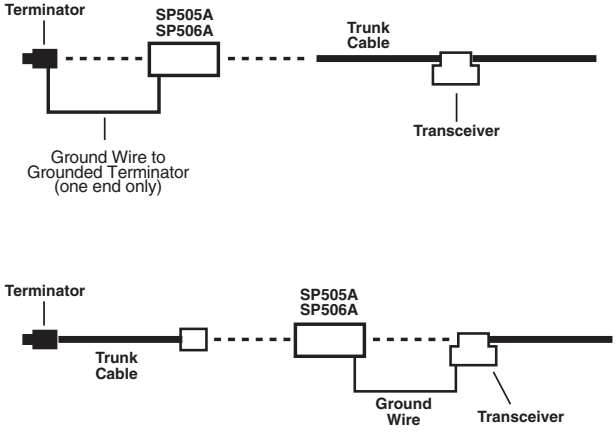

Fig. 3-3. Typical Application of the SP505A and SP506A.

NOTE: For both transceiver types, install an AUI Surge Protector (SP362) between the transceiver and the drop cable.

3.8 SP507A

This model protects RS-232 interfaces that use a DB15 connection.

1. Unplug the data cable.
2. Plug the protector directly into the equipment.
3. Plug the data cable into the surge protector.

NOTE: You must ensure that the equipment chassis is connected to the connector housing.

3.9 SP508A

This model protects RS-422 interfaces that use a DB15 connection.

1. Unplug the data cable.
2. Connect the protector directly to the equipment.
3. Connect the data cable to the surge protector.

NOTE: You must ensure that the equipment chassis is connected to the connector shell.

3.10 SP509A-R2

This model protects Multistation Access Unit (MAU) ports from surge damage. (See Fig 3-4.)

1. Unplug the data connector from the MAU.
2. Connect the surge protector to the MAU port.
3. Connect the data cable to the surge protector.

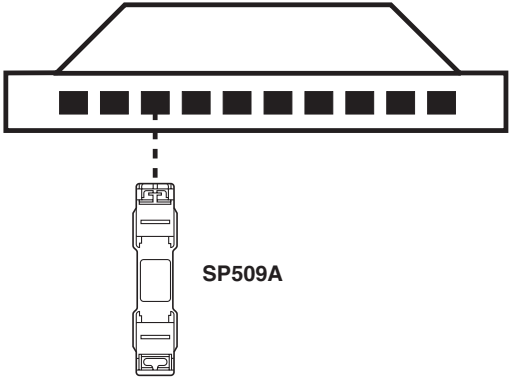

Fig. 3-4. Typical Application of the SP509A.

3.11 SP510A-R2

This model protects RS-232 connectors using the RJ-21 50-position plugs. (See Fig. 3-5.)

1. Unplug the existing 50-pin cable.
2. Attach the surge protector directly to your equipment.
3. Connect the chassis ground strap.
4. Connect the cable to the surge protector.

NOTE: Use with SP515A individual in-line surge protectors at the peripheral devices. Ground differences can occur because the SP510A protectors are not grounded to the equipment's same electrical ground.

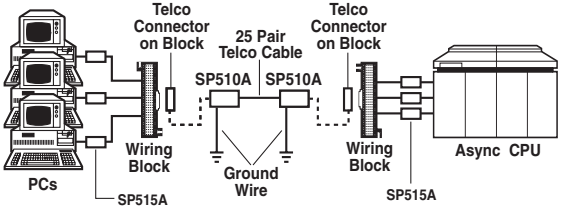

Fig. 3-5. Typical Application of the SP510A-R2.

3.12 SP511A

This model plugs into a concentrator's RJ-21 50-pin telco connector to protect the concentrator from surges on the data side.

1. Unplug the 50-pin cable.
2. Attach the surge protector to the 50-pin connector on the concentrator.
3. Connect the chassis ground strap.
4. Reconnect the 50-pin cable to the protector.

3.13 SP512A-R3

This model protects your RJ-45 10BASE-T interface. It also protects RS-422, RS-485, and RS-423 ports. To install, follow these steps:

1. Unplug the existing data cable from the device.
2. Attach the surge protector, and ground it directly to the equipment's metal chassis.
3. Reconnect the data cable to the surge protector.
4. Velcro fasteners are included for mounting.

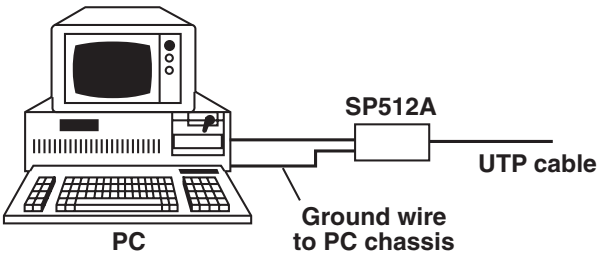

Fig. 3-6. Typical Application of the SP512A-R3.

3.14 SP513A-R2

This model protects your T1 interfaces from dangerous surges.

1. Disconnect the T1 line from the unit.
2. If the unit you wish to protect is metal, plug the surge protector into the unit and attach the ground wire to the chassis of the unit. If the unit is plastic, connect the ground wire to the electrical outlet ground for the unit.
3. Plug the T1 cable into the surge protector.

Fig. 3-7 shows a typical application.

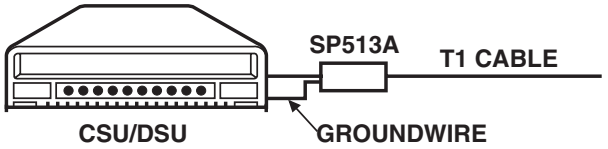

Fig. 3-7. Typical Application of the SP513A-R2.

3.15 SP514A

This model protects your Token Ring interface.

1. Unplug the data cable from the device.
2. Attach the surge protector to the device.

NOTE: For non-PC applications, you may need to install a separate ground wire if chassis ground is not connected to the connector housing on the equipment.

3. Reconnect the data cable.

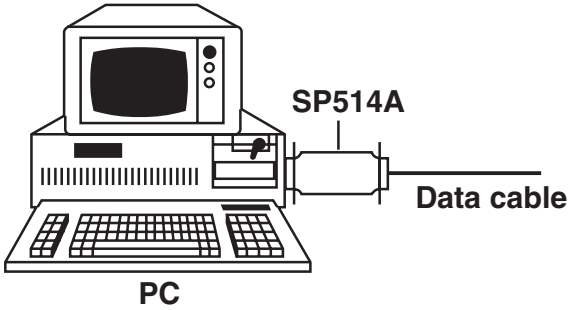

Fig. 3-8. Typical Application of the SP514A.

3.16 SP515A-R2, SP528A

This model protects your 4-wire RS-232 devices. It also protects Token Ring UTP interfaces.

1. Unplug the RJ-11 4-wire cable from the device you wish to protect.
2. Attach the surge protector to the device, and attach the ground wire to the equipment chassis.
3. Reconnect the data cable to the protector.
4. Velcro fasteners are included for mounting.

Fig. 3-9 shows a typical application.

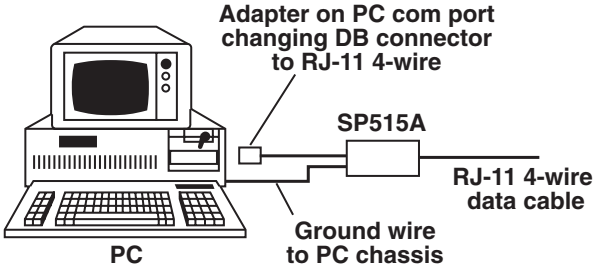

Fig. 3-9. Typical Application of the SP515A-R2.

3.17 SP516A

This model protects your Centronics 36-pin interface.

1. Remove the cable from the back of the printer.
2. Connect the surge protector to the Centronics female connector on the printer.
3. Connect the cable to the surge protector.

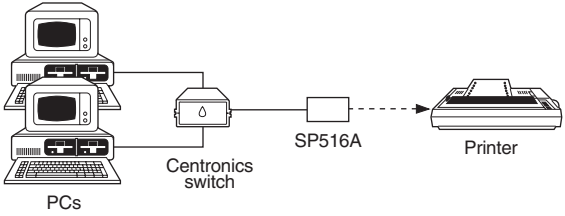

Fig. 3-10. Typical Application of the SP516A.

3.18 SP517A

This model protects your CATV interface.

1. Remove the cable from the back of the TV or VCR.
2. Connect the surge protector to the back of the TV or VCR.
3. Connect the CATV coax from your cable company to the surge protector.

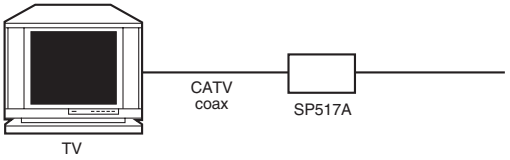

Fig. 3-11. Typical Application of the SP517A.

3.19 SP518A-R2

This model protects your AT® keyboard port.

1. Unplug the keyboard cable from the back of the PC.
2. Plug the surge protector into the PC keyboard port. If you are using a mechanical switch, connect a 5-pin DIN male/male cable between the switch and the protector.
3. Plug the keyboard cable into the surge protector.

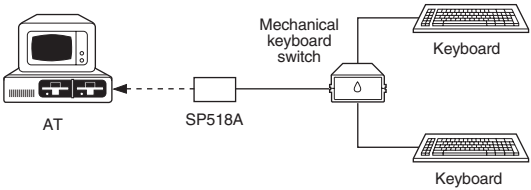

Fig. 3-12. Typical Application of the SP518A-R2.

3.20 SP519A-R2

This model protects your PS/2® keyboard port.

1. Unplug the keyboard cable from the back of the PC.
2. Plug the surge protector into the PC keyboard port. If you are using a mechanical switch, connect a male/male cable between the protector and the switch.
3. Plug the keyboard cable into the surge protector.

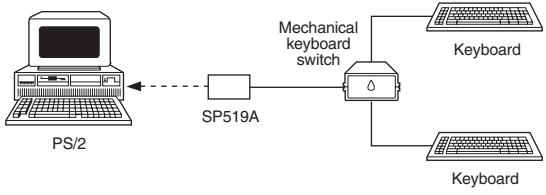

Fig. 3-13. Typical Application of the SP519A-R2.

3.21 SP520A

This model protects your VGA Video Monitor.

1. Unplug the monitor from the video card on your PC.
2. Connect the surge protector to the PC video card.
3. Plug the monitor cable into the surge protector.

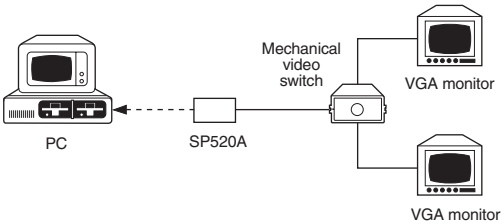

Fig. 3-14. Typical Application of the SP520A.

3.22 SP521A-R2

This model protects your RJ-45 4-wire UTP Token Ring devices. It also protects RJ-45 4-wire RS-232 equipment.

1. Unplug the data cable.
2. Connect the protector to the device you wish to protect.
3. Connect the protector's ground wire to the chassis of the device you wish to protect.

CAUTION

If you do not attach the protector directly to the device, the equipment could be damaged. We strongly recommend AC power protection for the device.

4. Connect the data cable to the protector.
5. Velcro fasteners are included for mounting.

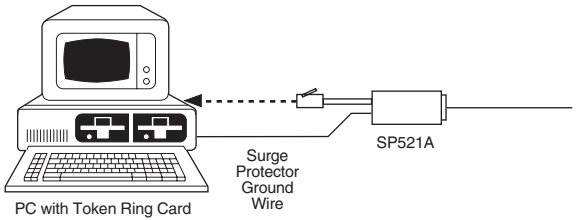

Fig. 3-15. Typical Application of the SP521A-R2.

3.23 SP522A-R2

This model protects RJ-45 8-wire UTP Token Ring devices. It also protects RJ-45 8-wire RS-232 devices.

1. Disconnect the data cable from the device to which you wish to connect the protector.
2. Plug the RJ-45 male pigtail into the RJ-45 receptacle on the device you wish to protect.
3. Attach the green ground wire to the device chassis if the chassis is metal. This ground is extremely important and must be connected for the protector to function properly.

CAUTION

If you do not connect this ground correctly, you might damage your equipment.

4. Attach the data cable to the protector.
5. Velcro fasteners are included for mounting.

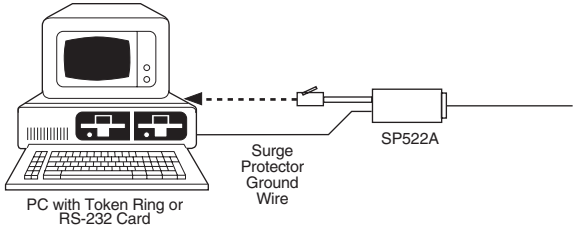

Fig. 3-16. Typical Application of the SP522A-R2.

3.24 SP523A-R2

This model protects Token Ring devices.

1. Remove data cable from the device you wish to protect.
2. Attach a short (1 foot or less) piece of cable from the device to the terminal strip on the protector.
3. Attach the protector ground wire to the device chassis if metal, or to the device electrical outlet ground.

CAUTION

If you do not connect the ground properly, you could damage your equipment.

4. Attach the data cable to the other terminal strip.

3.25 SP524A

This model protects a twinax device for System 3X or AS/400.

1. Disconnect the data cable from the device.
2. Connect the protector to the device.
3. Attach the ground wire to the device chassis if the chassis is metal.

CAUTION

If you do not properly install the protector, you might damage the equipment. We also strongly recommend AC power protection.

4. Connect the data cable to the protector.

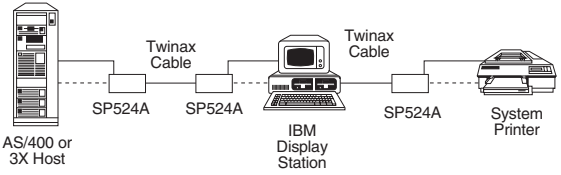

Fig. 3-17. Typical Application of the SP524A.

3.26 SP525A

This model protects a twinax device for System 3X or AS/400.

1. Disconnect the data cable from the device.
2. Connect the surge protector to the device directly. If the device has a female connector, then you may connect a short piece of twinax between the device and the protector. The cable should not be more than one foot (0.3 m) long, because the protector needs to be grounded to the device chassis if metal, or to the electrical outlet ground. Longer cable will reduce the effectiveness of the protector.
3. Attach the ground wire to the device chassis if metal, or to the device's electrical ground.

CAUTION

If you do not properly install the protector, you could damage the device. We also recommend AC power protection.

4. Attach the data cable to the protector.

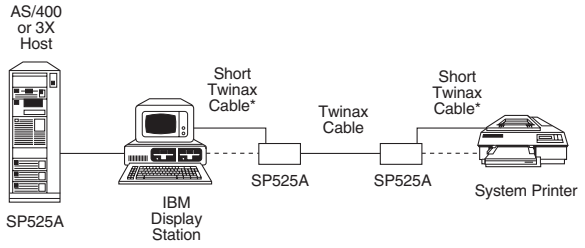

Fig. 3-18. Typical Application of the SP525A.

3.27 SP365A-R2

The Surge Protector—Telco uses high-speed solid-state technology in conjunction with overcurrent circuitry, enabling the protectors to function even under a direct power cross. It protects the center two wires on the RJ-11 or RJ-45 device.

The Protector meets or exceeds UL specification 497A.

Follow these steps to install the Protector:

1. Insert it in series between the incoming communication lines and the port of the equipment you wish to protect.
2. Connect the ground wire to the equipment's metal chassis, or to the metallic screw on the bottom side of the device.
3. Velcro fasteners are included for mounting.

CAUTION

You must connect the ground wire to the metal chassis of the equipment you wish to protect. For best results, keep the ground wire as short as possible.

Fig. 3-19 shows a typical installation.

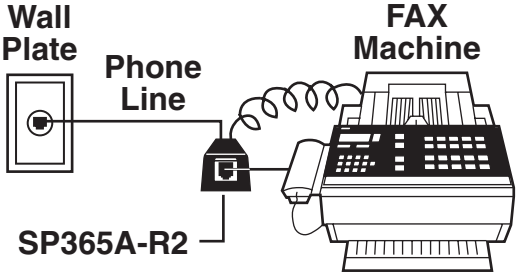

Fig. 3-19. Typical Installation of the SP365A-R2.

3.28 SP360A

The Surge Protector—RS-232 protects your RS-232 interface using a DB25 connector.

Follow these steps to install the Protector:

1. Insert it between the data cable and the I/O port of the equipment you wish to protect.
2. Install a protector at the other end of the data cable.

CAUTION

You must attach the connector shell to earth/chassis ground through a grounded AC power receptacle to assure effective protection.

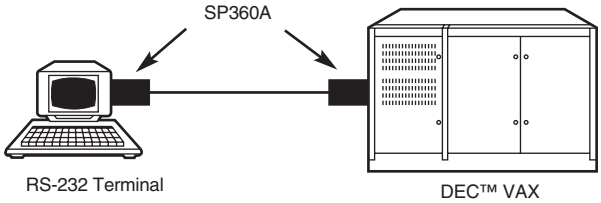

Fig. 3-20. Typical Application of the SP360A.

3.29 SP362A

The AUI Surge Protector guards your AUI ports using DB15 connectors. Follow these steps to install the protector:

1. Insert the protector in series between the data cable and the AUI port of the equipment you wish to protect.
2. Install a protector at the other end of the cable.

CAUTION

You must attach the connector shell to earth/chassis ground through a grounded AC power receptacle to assure effective protection.

3.30 SP141A

The 4-Wire RS-232 Surge Protector (SP141A) protects your RS-232 interface using 4 wires on the DB25 connector. Follow these steps to install the protector:

1. Insert the protector in series between the data cable and the I/O port of the equipment you wish to protect.
2. Install a protector at the other end of the cable.

CAUTION

You must attach the connector shell to earth/chassis ground through a grounded AC power receptacle to assure effective protection.

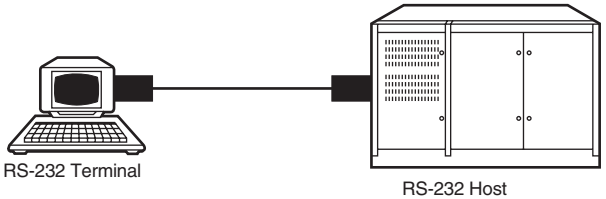

Fig. 3-21. Typical Application of the SP141A.

3.31 2-, 4-, 6-, 8-, 10-, and 32-Wire Terminal Strip Protectors (SP600A-SP611A)

If you have a terminal-strip protector for RS-232 and Token Ring or RS-422, RS-423, RS-485, and Ethernet (part numbers SP600A-SP611A), follow these instructions to install your unit:

1. Insert the protector in series between the incoming data cable and the communications port on the equipment you wish to protect.
2. Attach the protector's grounding wire directly to the metal chassis of the equipment.

CAUTION

You must attach the ground terminal to earth/chassis ground through a grounded AC power receptacle to assure effective protection.

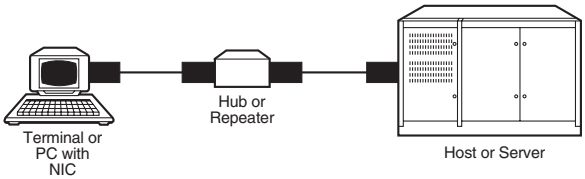

Fig. 3-22. Typical Application of the SP600A-SP611A.

NOTE

2-wire protectors (SP600A, SP601A) have 4-wire terminal strip. Only the center 2 terminals are wired (active).

NOTES