USER MANUAL

MODEL 571/581

100Base-T (CAT-5) Surge Protectors

PATTON Electronics Co.

An ISO-9001 Certified Company

Part# 07M571/581-A
Doc# 074300UA
Revised 1/9/97

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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 571/581 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment. This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 SERVICE

All warranty and nonwarranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Support: **(301) 975-1007**; **http://www.patton.com**; or, **support@patton.com**.

Notice: Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 571/581. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact Patton Electronics Customer Service at (301) 975-1007.

2.1 FEATURES

- Multi-level surge protection
- Operation at Speeds up to 100 Mbps
- Four-wire protection on lines 1, 2, 3, and 6 on Cat-5 RJ-45
- EIA/TIA TSB-40A Category 5 Compliant
- N.E.X.T. better than -43 dB at 100 MHz
- Shunts surges directly to chassis ground
- Easy to install
- Made in the U.S.A.

2.2 DESCRIPTION

Devices that connect to Category-5 cabling systems are routinely threatened by unwanted electrical energy (lightning, AC power induction, ESD and more). Higher speed devices–such as those operating at 100 Mbps–are especially vulnerable to the effects of these hazards, which can include data loss and hardware damage.

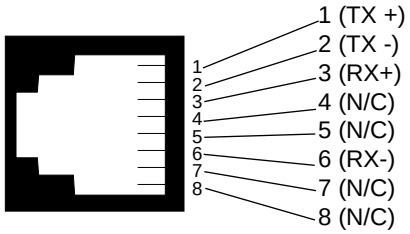
The Patton Model 571 and 581 Series Surge Protectors provide effective surge protection for devices operating in Category-5 Cabling Systems. The Model 571 is specifically designed for point-of-use installation; the Model 581 is designed to be installed at the building entrance. Both models use a multi-stage Silicon Avalanche Diode circuit, and will continue functioning while handling the appropriate IEC 801.5 surges applicable to their use (see the tables in Appendix B). Both the 571 and 581 will additionally protect against surges up to and exceeding 2kV/1kA in fail-safe mode.

Models 571 and 581 support a wide range of balanced interfaces running over 4 wires. Highlights include a low insertion loss (less than 0.4dB at 100MHz) and minimal near end cross talk (greater than -43 dB at all frequencies up to 100 MHz). Grounding is accomplished via an external ground strap that provides a separate unit-ground to chassis-ground connection.

> **Warning:** This product will not provide complete protection should your equipment or building be subject to a direct lightning hit.

3.0 INSTALLATION

Patton's Model 571 and 581 surge protectors are easy to install and are designed to operate transparently to your network. This section describes connection procedures for both models.



3.1 PRODUCT APPLICATIONS

Both Models 571 and 581 protect 4 pins on the modular RJ-45 Cat-5 interface, and work in environments with data rates up to 100 Mbps. The following descriptions will give you a general guideline for installing the units in your Cat-5 environment.

3.1.1 POINT-OF-USE APPLICATION (MODEL 571)

The Model 571 is designed for installation on LAN equipment in a typical office environment (see Figure 1, below). For best results the Model 571 should be connected as close as possible to the communication port of the device to be protected . Also, the flat braided grounding wire on the Model 571 should be attached to the grounded metal frame of the device being protected.

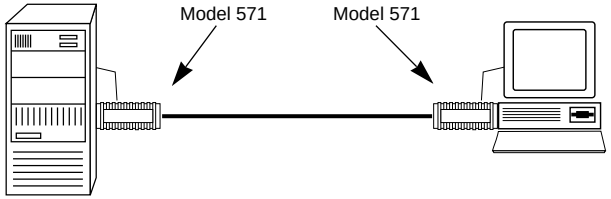


Figure 1. A typical Point-of-Use Application for the Patton Model 571.

3.1.2 BARRIER APPLICATION (MODEL 581)

The Model 581 is a more robust protector than the Model 571, and is designed for use as a barrier protector on LAN equipment in campus networks. Applications include cable runs between buildings, cable runs between floors on multi-story structures, and as a higher capacity replacement for the Model 571.

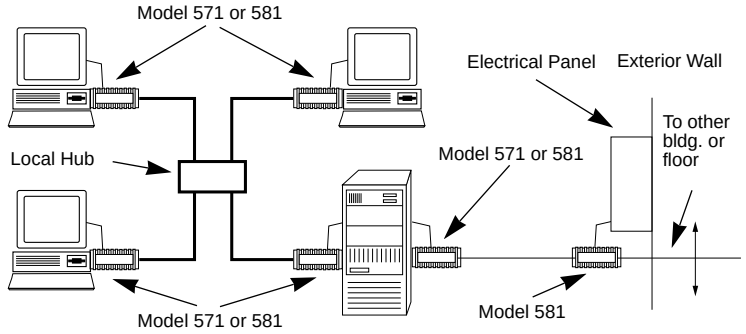


Figure 2. A typical barrier application for the Patton Model 581.

The Model 581 is also well suited for use in severe lightning areas, heavy industrial environments, and installations with heavy machinery in the direct vicinity of sensitive LAN equipment and cabling. Figure 2 (above) shows a typical application for the Model 581. For best results, the braided grounding strap on the Model 581 should be attached to the grounded metal frame of the device being protected. When installation is made at a barrier, such as an external wall, the braided strap should be connected to a nearby electrical ground.

3.2 INSTALLATION PROCEDURES

In order to operate as designed, the Model 571 and 581 must be connected correctly to your Cat-5 network. Please read all the instructions below and follow them carefully.

Connection of the Model 571 or 581 to an I/O Port

1. Turn off equipment power and unplug (disconnect) the existing connection between the UTP cable and the equipment's I/O port.

2. Install the Model 571/581 between the incoming UTP line and the protected equipment (see Figure 3, below). This installation requires a **straight through** Cat-5 patch cable with modular RJ-45 connectors (supplied with unit).

   Note: The Model 571/581 provides bi-directional clamping protection. Therefore, the network and equipment cables may be connected to either end.

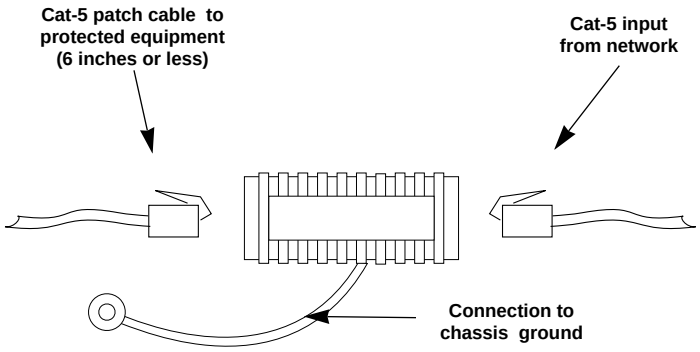


Figure 3. Installation of Model 571/581 Surge Protectors.

3. Locate a metal chassis ground on the equipment to be protected. This is often a hex screw on a D-shell or AUI connector. Sometimes a metal back panel is attached by screws, one of which can be used for chassis grounding. If you cannot locate a chassis ground connection on your equipment, contact Patton Technical Support at **(301) 975-1007**; **http://www.patton.com**; or, **support@patton.com**.

4. Connect the braided ground strap directly to the chassis ground connection you have located (see Figure 3, above).

   Caution: Surge energy may run **both directions** on the ground strap. To provide the best protection, it is essential that the ground strap on the Model 571/581 be connected to the chassis ground of the protected device. **Do not** lengthen the ground strap of the Model 571/581 or connect to a ground other than chassis ground unless instructed to do so by Patton Technical Support.

Connection of the Model 581 at a Barrier (Wall, Bldg Entrance, etc.)

1. Disconnect the UTP cable from the wall jack or patch panel jack.

2. Install the Model 581 between the UTP line and the jack. This installation requires a **straight through** Cat-5 patch cable with modular RJ-45 connectors (supplied with unit).

   Note: The Model 571/581 provides bi-directional clamping protection. Therefore, the network and equipment cables may be connected to either end.

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3. Locate an electrical ground nearest the jack. Often this will be on an electrical panel or subpanel. If you cannot locate a nearby electrical ground, contact Patton Technical Support at: **(301) 975-1007**; **http://www.patton.com**; or, **support@patton.com** to discuss an alternative grounding solution.

4. Connect the braided ground strap directly to the electrical ground you have located. The best way to make this connection is to attach the braided metal strap to a metal panel or wallplate screw using a hex nut or screw.

   Caution: Surge energy may run **both directions** on the ground strap. To provide the best protection, it is essential that the ground strap on the Model 581 be connected to an electrical ground.

APPENDIX A

MODEL 571/581 SPECIFICATIONS

Environment:	Category-5 Interfaces that utilize the RJ-45 connector, including RS-422, 423, 10Base-T, Token Ring, Fast Ethernet, 100Base-T and ATM on a 4-wire interface.
Connectors:	RJ-45 Female
Response Time:	Clamped to 13 V after 0.1 µs
Characteristic Impedance:	100 Ohms
NEXT Loss:	Model 571 - worst pair Better than -45 dB at 100 MHz; Model 581 - worst pair Better than -43 dB at100 MHz
Surge Clamp Voltage:	Model 571 - 13 V max with 1 KV Input; Model 581 - 15 V max with 2 KV Input
Surge Rating:	IEC 801.5 Standard Level
DC Clamp Voltage:	Common Mode to Gnd, each line7.5 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 MHz to 100 MHz
Series Resistance:	Less than 400 milliohms
Grounding:	External ground strap provides separate unit-ground to chassis-ground contact
Dimensions:	2.0L x 1.0”D

APPENDIX B

MODEL 571/581 INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) COMPLIANCE

Meets IEC standards 801.2, 801.4 and 801.5 (CE Mark)

Effective January 1996 the European Economic Community will require that all electronic devices be tested and comply with all applicable International standards relating to the product type and category of use. Electromagnetic Compatibility Directive 89/336/EEC specifically addresses communication line surge protection devices, since conformity to immunity standard EN50082-1:1992 is mandatory. The EN50082-1:10992 standard incorporates International Organization for Standardization (ISO) publications 801.2 and 801.4, which describe Electrostatic Discharge and Electrical Fast Transient requirements. ISO 801.5 describes Surge Immunity Requirements and is expected to be adopted as a mandatory requirement under EN50082-1 by the Technical Committee. in 1996. Any protector sold into the international community must meet these standards. This device has been tested* and found to comply with these standards as evidenced by its CE mark.

***Note:** All test results are for the Model 571/581 **alone**, not including the standard 6 inch (15.25) patch cable that is shipped with the unit.

IEC 801-5 Threat Levels as a Function of Class	
Class	**Sym. Lines Coupling Mode** Line-GND, Zs=42 Ohms
1	1.0 kV
	24 A
2	1.0 kV
	24 A
3	2.0 kV
	48 A
4	(n/a)
	(n/a)
5	4.0 Kv
	95 A
Wave Forms	(1.2 x 50 µs) (1.2 x 50 µs)

Table 1. IEC Threat Levels as a Function of Class.

APPENDIX B
EIA/TIA TSB-40A COMPLIANCE

The Model 571/81 series surge protectors have been designed to conform to stringent EIA/TIA TSB-40 standards as required for all Category-5 connecting hardware. These standards specify the capacitance and near end cross-talk (N.E.X.T) to insure proper operation of ALL connected equipment. Specific test results are shown in the tables on the following pages*.

Table 2A. Patton Model 571 Attenuation Measurements

FREQ Mhz	PINS: 1-2 d B	PINS: 3-6 d B	PINS: 4-5 d B	PINS: 7-8 d B	SPEC d B
1	0.1	0.1	0.1	0.1	0.1
4	0.0	0.0	0.0	0.0	0.1
8	0.0	0.0	0.0	0.0	0.1
10	0.1	0.1	0.1	0.1	0.1
16	0.2	0.1	0.1	0.0	0.2
20	0.0	0.0	0.0	0.0	0.2
25	0.1	0.0	0.0	0.0	0.2
31.25	0.1	0.0	0.0	0.0	0.2
62.50	0.1	0.1	0.1	0.1	0.3
100	0.4	0.2	0.1	0.1	0.4

Table 2B. Patton Model 581 Attentuation Measurements

FREQ Mhz	PINS: 1-2 d B	PINS: 3-6 d B	PINS: 4-5 d B	PINS: 7-8 d B	SPEC d B
1	0.1	0.1	0.1	0.1	0.1
4	0.0	0.0	0.0	0.0	0.1
8	0.0	0.0	0.0	0.0	0.1
10	0.1	0.1	0.1	0.1	0.1
16	0.0	0.1	0.0	0.0	0.2
20	0.0	0.0	0.0	0.0	0.2
25	0.0	0.0	0.0	0.0	0.2
31.25	0.0	0.0	0.0	0.1	0.2
62.50	0.1	0.1	0.1	0.1	0.3
100	0.4	0.2	0.1	0.1	0.4

***Note:** All test results are for the Model 571/581 **alone,** not including the standard 6" (15.25cm) patch cable that is shipped with the unit.

TSB-40A COMPLIANCE TESTING RESULTS
TYPICAL NEAR-END CROSSTALK MEASUREMENT

Table 3A. NEXT Measurements: Model 571

FREQ Mhz	1-2/ 3-6 d B	1-2/ 4-5 d B	1-2/ 7-8 d B	3-6/ 4-5 d B	3-6/ 7-8 d B	4-5/ 7-8 d B	SPEC d B
1	77	76	86	85	80	80	>65
4	71	69	84	81	71	71	>65
8	65	63	78	82	66	65	62
10	64	61	80	76	62	64	60
16	60	58	79	75	59	61	56
20	59	56	76	76	58	59	54
25	57	54	76	71	55	57	52
31.25	55	51	74	70	53	57	50
62.50	53	45	64	60	46	51	44
100	54	41	56	48	42	49	40

Table 3B. NEXT Measurements: Model 581

FREQ Mhz	1-2/ 3-6 d B	1-2/ 4-5 d B	1-2/ 7-8 d B	3-6/ 4-5 d B	3-6/ 7-8 d B	4-5/ 7-8 d B	SPEC d B
1	77	76	85	85	81	81	>65
4	70	68	84	83	70	71	>65
8	65	63	77	83	65	65	62
10	63	61	78	79	61	64	60
16	60	58	77	78	58	61	56
20	58	56	75	75	56	59	54
25	57	54	74	73	54	56	52
31.25	55	52	74	70	52	55	50
62.50	52	45	64	60	45	51	44
100	54	41	55	48	41	49	40

APPENDIX B (Continued)

TSB-40A COMPLIANCE TESTING RESULTS
TYPICAL RETURN LOSS MEASUREMENT

Table 4A. Patton Model 571
Return Loss Measurements

FREQ Mhz	PINS: 1-2 d B	PINS: 3-6 d B	PINS: 4-5 d B	PINS: 7-8 d B	SPEC d B
1	28	29	29	27	23
4	34	37	37	37	23
8	31	40	44	44	23
10	30	40	48	48	23
16	26	36	41	48	23
20	25	34	38	39	23
25	24	30	34	25	14
31.25	22	27	28	29	14
62.50	20	19	19	18	14
100	17	23	19	18	14

Table 4B. Patton Model 581
Return Loss Measurements

FREQ Mhz	PINS: 1-2 d B	PINS: 3-6 d B	PINS: 4-5 d B	PINS: 7-8 d B	SPEC d B
1	27	29	29	28	23
4	34	36	38	37	23
8	32	42	47	43	23
10	30	43	48	47	23
16	26	41	41	48	23
20	24	39	38	40	23
25	24	33	33	34	14
31.25	22	27	29	29	14
62.50	20	21	19	19	14
100	16	25	21	18	14

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We would like to hear from you. Please contact us in any of the following ways to tell us how you like this product and how we can meet your product needs today and in the future.

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Thank you.

Burton A.Patton
Vice President

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