

# USER MANUAL

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## MODEL 570/580 100Base-T (CAT-5) Surge Protectors



**PATTON**  
Electronics Co.

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Part# 07M570/580-B  
Doc# 074091UB  
Revised 2/16/96

SALES OFFICE  
(301) 975-1000  
TECHNICAL SUPPORT  
(301) 975-1007

## 1.0 WARRANTY INFORMATION

**Patton Electronics** warrants all Model 570/580 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 non-warranty 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 Service at **(301) 975-1007**. *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 570/580. 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
- Optional 2,4,6 or 8 wire versions
- 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

### 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 570 and 580 Series Surge Protectors** provide effective surge protection for devices operating in Category-5 Cabling Systems. The Model 570 is specifically designed for point-of-use installation; the Model 580 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 570 and 580 will additionally protect against surges up to and exceeding 2kV/1kA in fail-safe mode.

Models 570 and 580 support a wide range of balanced interfaces from RS-422 to 100Base-T. 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 570 & 580 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 570 & 580 protect all eight 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 570)

The Model 570 is designed for installation on LAN equipment in a typical office environment (see Figure 1, below). For best results the Model 570 should be connected as close as possible to the communication port of the device to be protected (a 6 inch, Category-5 patch cable is provided with the Model 570). Also, the flat braided grounding wire on the Model 570 should be attached to the grounded metal frame of the device being protected.

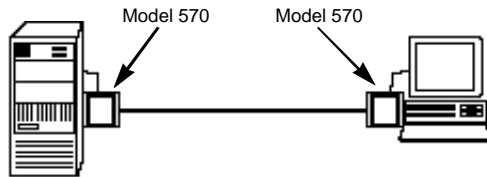


Figure 1. A typical point-of-use application for the Patton Model 570.

##### 3.1.2 BARRIER APPLICATION (MODEL 580)

The Model 580 is a more robust protector than the Model 570, 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 570 (a 6 inch, Category-5 patch cable is provided with the Model 580).

(continued)

The Model 580 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 (below) shows a typical application for the Model 580. For best results, the braided grounding strap on the Model 580 should be attached to the grounded metal frame of the device being protected. When installation is made at a barrier, such as an exterior wall, the braided strap should be connected to a nearby electrical ground.

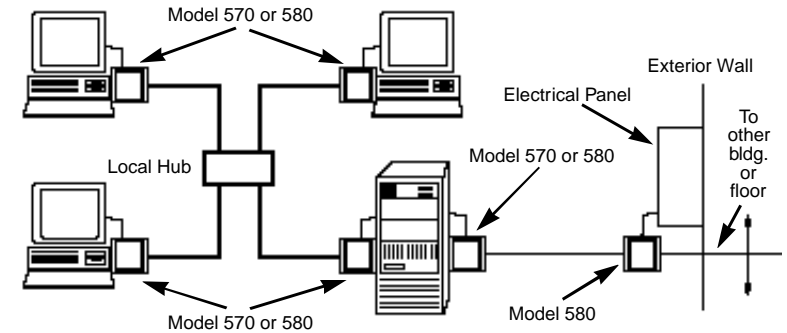


Figure 2. A typical barrier application for the Patton Model 580.

#### 3.2 INSTALLATION PROCEDURES

In order to operate as designed, the Model 570 and 580 must be connected correctly to your Cat-5 network. Please read all the instructions below and follow them carefully.

##### Connection of the Model 570 or 580 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.

(continued)

2. Install the Model 570/580 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:** It doesn't matter which end of the Model 570/580 plugs into which cable.

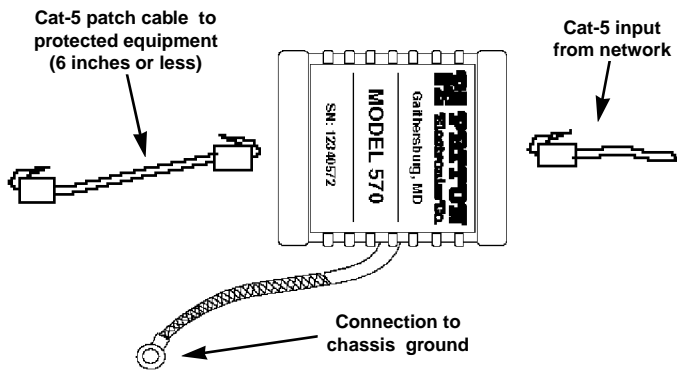


Figure 3. Installation of Model 570/580 Surge Protectors.

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) 975-1000 to discuss an alternative grounding solution.
4. Connect the braided ground strap directly to the chassis ground connection you have located (see Figure 3, above). The best way to make this connection is to attach the braided metal strap using a hex nut or screw on your device.

**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 570/580 be connected to the chassis ground of the protected device. **Do not lengthen the ground strap** of the Model 570/580 or connect to a ground *other than chassis ground* unless instructed to do so by Patton Technical Support.

### Connection of the Model 580 at a Barrier (Wall, Bldg Entrance, etc.)

1. Disconnect the UTP cable from the wall jack or patch panel jack.
2. Install the Model 580 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:** It doesn't matter which end of the Model 580 plugs into which cable.
3. Locate an electrical ground nearest the jack. Often this will be on an electrical panel or sub panel. If you cannot locate a nearby electrical ground, contact Patton Technical Support at (301) 975-1000 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 580 be connected to an electrical ground.

**APPENDIX A  
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

**Connectors:** RJ-45 Female

**Response Time:** Clamped to 13 V after 0.1  $\mu$ s

**Characteristic Impedance:** 100 Ohms

**NEXT Loss:** Model 570 - worst pair Better than -46 dB at 100 MHz;  
Model 580 - worst pair Better than -43 dB at 100 MHz

**Surge Clamp Voltage:** Model 570 - 13 V max with 1 KV Input;  
Model 580 - 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

**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:** 2.25" x 1.69" x .75"

**APPENDIX B  
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.

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	(1.2 x 50 $\mu$ s)
Forms	(1.2 x 50 $\mu$ s)

**Figure B-1.** IEC Threat Levels as a Function of Class.

**\*Note:** All test results are for the Model 570/580 *alone*, not including the standard 6" patch cable that is normally shipped with the unit.

**APPENDIX B  
EIA/TIA TSB-40A COMPLIANCE**

The Model 570/80 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\*.

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

SOURCE/VICTIM PAIRS							
FREQ MHz	1-2/3-6 dB	1-2/4-5 dB	1-2/7-8 dB	3-6/4-5 dB	3-6/7-8 dB	4-5/7-8 dB	SPEC dB
1	>80	>80	>80	>80	>80	>80	>65
4	77	74.0	>80	73.0	>80	74.0	>65
8	73	63.0	>80	68.0	75	69.0	62
10	67	67.3	>80	62.0	68.9	66.0	60
16	65	69.0	>80	58.0	68	62.0	56
20	64	63.0	>80	57.0	72	61.0	54
25	62	61.0	75.0	56.5	64	62.4	52
31.25	59	61.0	77.0	54.0	62	57.0	50
62.5	53	59.3	77.0	49.0	54.7	50.0	44
100	64	52.0	69.0	45.4	51	46.0	40

Figure C-1. N.E.X.T. measurements for Patton Model 570.

SOURCE/VICTIM PAIRS							
FREQ MHz	1-2/3-6 dB	1-2/4-5 dB	1-2/7-8 dB	3-6/4-5 dB	3-6/7-8 dB	4-5/7-8 dB	SPEC dB
1	>80	>80	>80	>80	>80	>80	>65
4	78	71.0	>80	75.0	73.0	77.0	>65
8	75	66.0	>80	70.0	77.0	66.0	62
10	70	63.0	>80	68.0	74.0	69.0	60
16	66	59.3	>80	64.0	80.0	72.0	56
20	65	57.6	>80	62.0	>80	66.0	54
25	64	56.0	>80	60.0	71.0	63.0	52
31.25	62	54.0	>80	58.0	66.0	61.0	50
62.5	54	48.6	80.0	51.0	60.0	58.0	44
100	48	52.0	59.0	45.0	56.0	43.0	40

Figure C-2. N.E.X.T. measurements for Patton Model 580.

**APPENDIX B (continued)  
TSB-40A COMPLIANCE TESTING RESULTS  
TYPICAL ATTENUATION MEASUREMENT**

FREQ MHz	PINS: 1-2 dB	PINS: 3-6 dB	PINS: 4-5 dB	PINS 7-8 dB	SPEC dB
1	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.1
16	0.0	0.0	0.1	0.0	0.2
20	0.0	0.0	0.1	0.1	0.2
25	0.1	0.0	0.0	0.0	0.2
31.25	0.1	0.0	0.1	0.2	0.2
62.5	0.2	0.0	0.3	0.3	0.3
100	0.1	0.1	0.3	0.3	0.4

Figure C-3. Attenuation measurements for Patton Model 570.

FREQ MHz	PINS: 1-2 dB	PINS: 3-6 dB	PINS: 4-5 dB	PINS 7-8 dB	SPEC dB
1	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.1
16	0.0	0.0	0.0	0.0	0.2
20	0.0	0.0	0.1	0.0	0.2
25	0.1	0.0	0.0	0.0	0.2
31.25	0.1	0.1	0.1	0.2	0.2
62.5	0.2	0.1	0.2	0.3	0.3
100	0.2	0.2	0.3	0.3	0.4

Figure C-4. Attenuation measurements for Patton Model 580.

\*Note: All test results are for the Model 570/580 *alone*, not including the standard 6" patch cable that is normally shipped with the unit.

**APPENDIX B (continued)**  
**TSB-40A COMPLIANCE TESTING RESULTS**  
**TYPICAL RETURN LOSS MEASUREMENT**

FREQ MHz	PINS: 1-2 dB	PINS: 3-6 dB	PINS: 4-5 dB	PINS 7-8 dB	SPEC dB
1	27.3	27.6	28.5	28.0	23
4	38.2	37.2	48.6	42.4	23
8	42.0	40.4	39.4	40.4	23
10	41.4	38.6	36.4	38.6	23
16	38.8	32.7	33.4	35.3	23
20	37.0	28.4	31.8	33.4	23
25	34.9	25.2	30.7	32.2	14
31.25	35.0	22.0	31.4	33.0	14
62.5	27.0	25.3	24.0	25.0	14
100	21.5	25.0	19.8	21.8	14

Figure C-5. Return Loss measurements for Patton Model 570.

FREQ MHz	PINS: 1-2 dB	PINS: 3-6 dB	PINS: 4-5 dB	PINS 7-8 dB	SPEC dB
1	27.4	27.6	28.4	28.0	23
4	37.3	38.0	49.0	42.5	23
8	40.8	42.3	37.8	38.7	23
10	39.6	40.0	35.7	35.4	23
16	37.0	34.0	32.3	33.0	23
20	35.0	30.8	31.0	31.6	23
25	34.5	24.4	29.8	30.4	14
31.25	35.0	23.5	30.0	30.5	14
62.5	24.2	28.7	22.0	22.5	14
100	19.0	27.0	18.3	19.0	14

Figure C-6. Return Loss measurements for Patton Model 580.