USER MANUAL

MODEL 570-R8/570-R16
580-R8/580-R16

100Base-T (CAT-5)
Surge Protectors

PATTON Electronics Co.

An ISO-9001 Certified Company

Part #07M570/580RC-A
Doc# 074101UA
Revised 2/13/97

SALES OFFICE
(301) 975-1000
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(301) 975-1007
http://www.patton.com

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 570/580 Rack Mount 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 Service: **(301) 975-1007**; **http://www.patton.com**; or **support@patton.com**.

Note: 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-Rx. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

1.2 CE NOTICE

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

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

- Optional 8 or 16 port surge protection
- 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 -40 dB at 100 MHz
- Shunts surges directly to chassis ground
- Easy to install
- Made in the U.S. A.

2.2 DESCRIPTION

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

Model's 570-Rx and 580-Rx support a wide range of balanced interfaces from RS-422 to 100Base-T4. Highlights include a low insertion loss (less than 0.4dB at 100MHz) and minimal near end cross talk (better than -40 dB at all frequencies up to 100 MHz). Grounding is accomplished via a braided ground strap that provides a separate unit-rack connection. The customer is responsible for ensuring a proper rack to earth ground connection. For proper grounding, the resistance from the supplied ground lug to the rack frame ground should be less than 2.5 milliohms. Contact Technical Support if further details are needed for this measurement.

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

3.0 INSTALLATION

Model's 570-Rx and 580-Rx 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 Model's 570/580-Rx protect all eight pins on a 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 Applications Model 570-Rx)

The Model 570-Rx is designed for 100MHz point-of-use installations that use networking standards such as 100BaseT, RS-422 or 100VG-AnyLAN. Typical installations are shown in Figures 1 and 2, below. For best results the Model 570-Rx should be connected as close as possible to the communication port of the device to be protected .

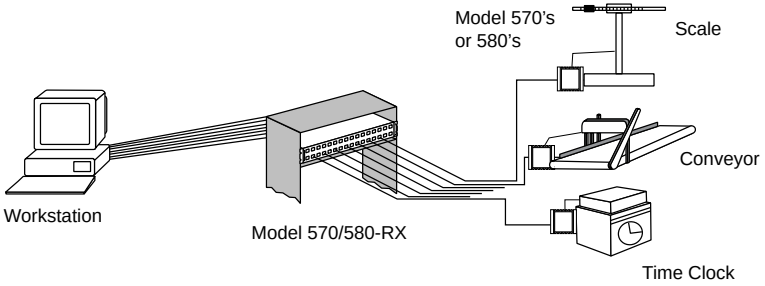

Figure 1. Model 570-Rx in a Typical RS-422 Point of Use Application

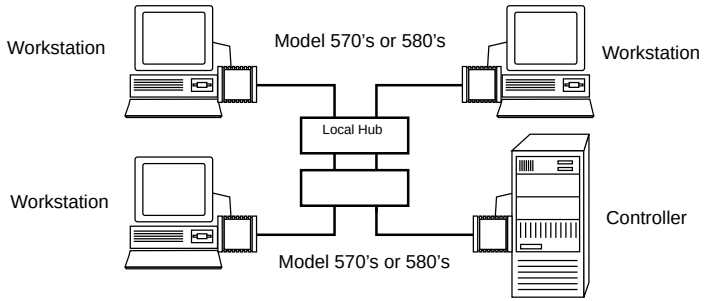

Figure 2. Model 570-Rx in a Typical 100Base-T Point of Use Application

3.1.2 Barrier Applications (MODEL 580-Rx)

The Model 580-Rx is a more robust protector than the Model 570-Rx, 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-Rx.

The Model 580-Rx is also well suited for use in severe lightning areas, heavy industrial environments, and situations where heavy machinery is in the direct vicinity of sensitive LAN equipment and cabling. Figure 3 below shows a typical application for the Model 580-Rx. For best results, the braided grounding strap(s) on the rack should be attached to the grounded metal frame of the rack structure.

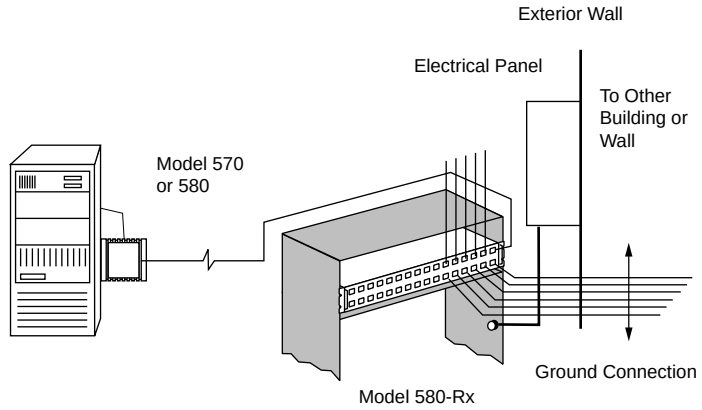

Figure 3. Barrier Application for 580-Rx

3.2 INSTALLATION PROCEDURES

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

3.2.1 Connecting the Model 570-Rx or 580-Rx 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 surge protector between the incoming UTP line and the protected equipment (see Figure 4, below). This installation requires a **straight through** Cat-5 patch cable with modular RJ-45 male connectors .

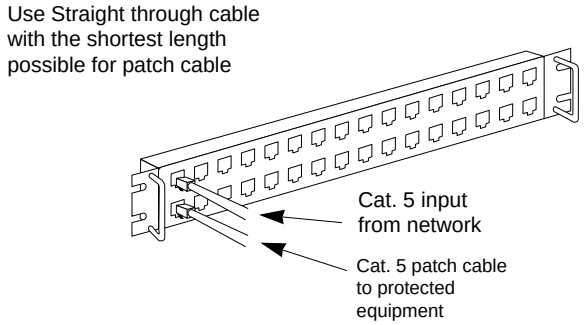

Figure 4 Installation of Model 570-Rx/580-Rx Surge Protectors.

Note: It doesn't matter which port the UTP cable plugs into on the rack, as long as the input is directly above or below the corresponding output.

3. Connect the ground braid(s) to the rack frame as illustrated in Figure 5.

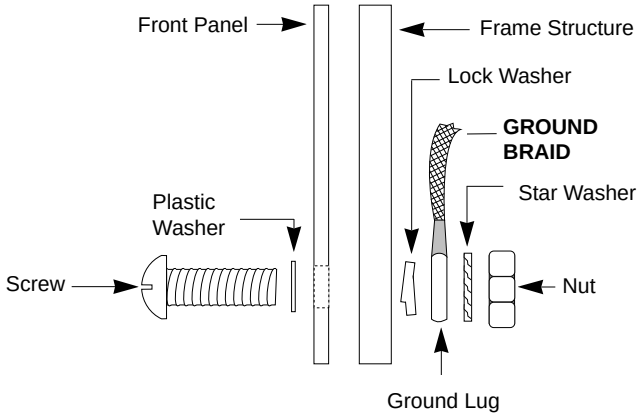

Figure 5. Ground Braid Connection Instructions

4. Connect the rack structure frame directly to earth ground if it is not already connected. The best way to make this ground connection is to attach a thick braided metal strap to earth ground, a metal panel, a wall plate screw or an electrical panel or subpanel, using a hex nut or ground screw. Read the **Caution** and **Important Note** paragraphs below very carefully. If you cannot locate a nearby electrical ground, contact Patton Electronics Technical Service at: **(301) 975-1007**; **http://www.patton.com**; or **support@patton.com**.

Caution: Surge energy may run **both directions** on the ground strap. To provide the best protection, it is essential that the supplied ground strap on the Model 570/580-Rx is connected to the rack frame structure and that the rack frame structure is directly connected to earth ground. **Do not** lengthen the ground strap or connect to an earth ground other than the chassis ground unless instructed to do so by Patton Technical Support.

Important Note: The rack structure must have a direct connection to earth ground. Proper connection of the frame to earth ground should not exceed 2.5 milliohms of resistance.

APPENDIX A

PATTON MODEL 578R8/588 SPECIFICATIONS

Environment:	Category-5 Interfaces that utilize the RJ-45 connector, including RS-422, 423, 10Base-T, Token Ring, Fast Ethernet, 100Base-T, 100Base-T4 and ATM
Connectors:	RJ-45 Female
Response Time:	Clamped to 13V after 0.1µS
Characteristic Impedance:	100 Ohms
NEXT Loss (worst pair):	Better than -40 dB at 100 MHz
Surge Clamping Voltages	Model 570-Rx: 13 V max with 1 KV Input; Model 580-Rx: 15 V max with 2 KV Input
Surge Rating:	IEC 801.5 Standard Level
DC Clamping Voltages:	Common Mode to Gnd, 7.5 V (each line) @ 50 mA; Differential mode, 8.1 V (per pair) @ 50 mA
Insertion Loss:	Less than 0.4 dB (including connector) at all frequencies
Return Loss:	Better than 14 dB on both models
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
PC Board Dimensions:	7.0” x 3.0”
Actual Panel Dimensions:	3.47” x 19.0” x 1.1”
Standard Temperatures:	0 - 50^{0}C/32 - 122^{0}F
Flame Retardance:	Plastic cases meet UL 94-V0 standard

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. Electromagetic 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 Forms	(1.2 x 50 µs) (1.2 x 50 µs)

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

***Note:** All test results are for the Model 570-Rx/580-Rx *alone*, not including any external patch cables that are connected to the unit.

APPENDIX C
EIA/TIA TSB-40A COMPLIANCE

The Model 570-Rx/580-Rx 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*.

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	82.0	85.0	85.0	78.0	84.0	82.0	>65
4	74.0	77.0	85.0	68.0	73.0	71.0	>65
8	69.0	71.0	83.0	62.8	67.0	64.0	62
10	67.0	69.0	83.0	61.0	66.0	63.0	60
16	63.0	66.0	79.0	56.0	61.0	59.0	56
20	65.5	64.0	78.0	57.0	66.0	56.0	54
25	62.0	62.0	77.0	53.0	58.0	56.0	52
31.25	56.1	62.0	75.5	52.0	54.6	53.0	50
62.5	46.0	56.0	74.0	44.5	46.0	47.0	44
100	45.0	48.0	57.0	40.5	42.0	49.0	40

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

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	77.0	85.0	85.0	79.0	83.0	81.0	>65
4	70.0	76.0	85.0	68.0	73.0	70.0	>65
8	67.0	70.0	85.0	62.1	67.0	64.0	62
10	67.0	68.0	85.0	61.0	66.0	62.0	60
16	62.0	65.0	83.0	57.0	61.0	58.0	56
20	69.0	65.0	73.0	58.0	63.0	56.0	54
25	59.0	62.0	72.0	53.2	58.0	55.0	52
31.25	57.0	61.0	81.0	51.0	55.0	53.0	50
62.5	51.5	57.0	68.0	45.0	46.0	48.0	44
100	44.0	45.0	54.0	42.0	41.4	49.0	40

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

***Note:** All test results are for the Model 570-Rx/580-Rx *alone*, not including any external patch cables that are connected to the unit.

APPENDIX C (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	0.1	0.1
4	0.1	0.1	0.1	0.0	0.1
8	0.0	0.1	0.1	0.1	0.1
10	0.0	0.0	0.1	0.0	0.1
16	0.1	0.1	0.1	0.0	0.2
20	0.1	0.1	0.2	0.0	0.2
25	0.0	0.0	0.1	0.0	0.2
35.25	0.0	0.1	0.2	0.0	0.2
62.5	0.2	0.1	0.3	0.0	0.3
100	0.4	0.3	0.4	0.3	0.4

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

Freq. MHz	Pins: 1-2 dB	Pins: 3-6 dB	Pins: 4-5 dB	Pins:7-8 dB	Spec dB
1	0.1	0.0	0.1	0.1	0.1
4	0.1	0.1	0.0	0.1	0.1
8	0.0	0.1	0.0	0.1	0.1
10	0.1	0.1	0.1	0.1	0.1
16	0.1	0.1	0.1	0.1	0.2
20	0.1	0.2	0.0	0.2	0.2
25	0.0	0.1	0.1	0.1	0.2
35.25	0.0	0.1	0.0	0.1	0.2
62.5	0.1	0.2	0.1	0.2	0.3
100	0.4	0.3	0.4	0.3	0.4

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

APPENDIX C (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	34.0	28.0	28.0	29.0	23
4	38.0	38.0	45.0	43.8	23
8	39.0	41.0	42.0	42.0	23
10	38.0	41.0	39.0	39.5	23
16	34.0	35.0	33.0	33.0	23
20	33.7	33.0	31.0	31.6	23
25	31.0	30.0	34.0	30.0	14
31.25	28.1	27.0	28.0	27.8	14
62.5	21.0	22.0	22.0	22.0	14
100	17.0	21.0	18.2	17.8	14

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

Freq. MHz	Pins: 1-2 dB	Pins: 3-6 dB	Pins: 4-5 dB	Pins:7-8 dB	Spec dB
1	28.0	28.0	29.0	30.0	23
4	38.0	38.4	47.0	44.5	23
8	39.0	43.8	41.0	41.2	23
10	38.0	44.0	38.0	38.7	23
16	35.0	38.0	30.0	33.4	23
20	33.0	34.0	31.0	31.0	23
25	31.0	31.0	29.0	28.3	14
31.25	29.0	28.0	27.0	28.0	14
62.5	21.8	22.0	21.0	21.0	14
100	17.2	19.3	16.7	17.3	14

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

Appendix C (continued)
TSB-40A Compliance Testing Results
TYPICAL INSERTION LOSS MEASUREMENT

Pin Number:	DC Resistance Milliohms
1	180
2	190
3	180
4	190
5	180
6	120
7	190
8	180

Figure C-7. Patton Model 570-Rx Insertion Loss Measurement

Pin Number:	DC Resistance Milliohms
1	180
2	180
3	180
4	190
5	190
6	120
7	180
8	160

Figure C-8.Patton Model 580-Rx Insertion Loss Measurement