USER MANUAL

MODEL 574, 576, 578, 584, 586, 588

Standalone Hub
100Base-T (CAT-5)
Surge Protectors

PATTON Electronics Co.

ISO 9001

An ISO-9001 Certified Company

Part# 07M57x/58x-A
Doc# 074100UA
Revised 10/18/96

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

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 57x/58x 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**; **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 57x/58x. 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 contact Patton Electronics Customer Service at (301) 975-1007.

2.1 FEATURES

- Optional 4, 6, or 8 port surge protection hubs
- Multi-level surge protection
- Operation at Speeds up to 100 Mbps
- Can support applications having 2, 4, 6 or 8 wire per cable
- 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

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 57x and 58x Series Surge Protectors provide effective surge protection for devices operating in Category-5 Cabling Systems. The Model 57x/58x is specifically designed for point-of-use installation; the Model 57x/58x 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 57x/58x will additionally protect against surges up to and exceeding 2kV/1kA in fail-safe mode.

Models 57x/58x 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 han 2.5 milliohms. Contact Technical Support (see Section 1.1 Service) 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 57x and 58x surge protectors are easy to install and are designed to operate transparently to your network. This section describes cohnnection procedures for both models.

3.1 PRODUCT APPLICATIONS

Both Models 57x and 58x 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 57x)

The Model 57x is designed for installation on LAN equipment in a typical office environment, as in Figure 1, below. For best results, the Model 57x should be connected as close as possible to the communication port of the device to be protected.

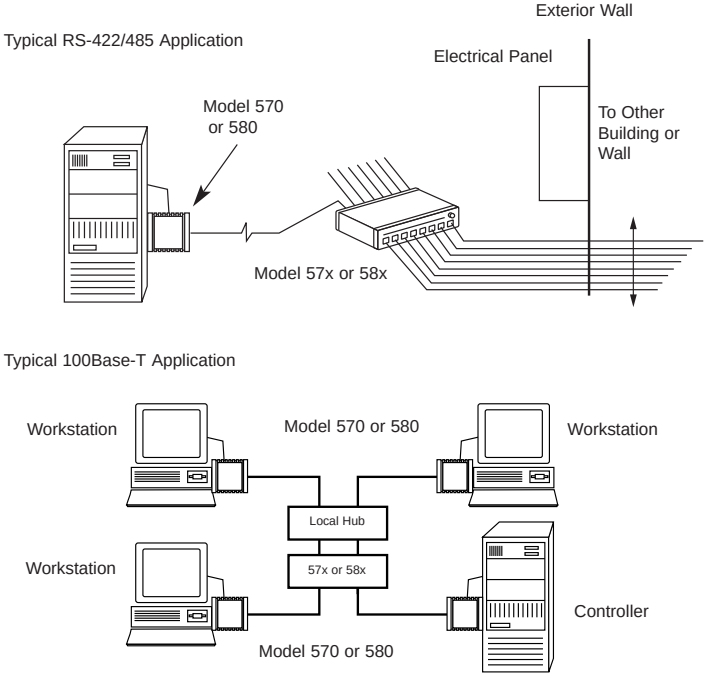

Figure 1. Model 57x58x Point of Use Application

Also, the flat braided grounding wire(s) on the Model 57x should be attached to the grounded metal frame of the device being protected. If it is not possible to attach it to the equipment being protected, contact Patton Technical Support (See Section 1.1).

3.1.2 BARRIER APPLICATION (MODEL 58x)

The Model 58x is a more robust protector than the Model 57x, 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 57x.

The Model 58x 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 2 (below) shows a typical application for the Model 58x. For best results, the braided grounding strap(s) on the Model 58x 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 must be connected to a nearby electrical ground. If a nearby electrical ground cannot be located, contact Patton Technical Support (See Section 1.1).

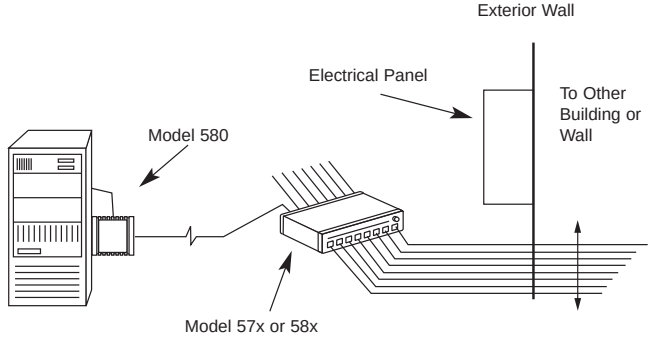

Figure 2. Barrier Application for 58x

3.2 INSTALLATION PROCEDURES

In order to operate as designed, the Model 57x and 58x must be connected correctly to your Cat-5 network. For the safest installation, please read all the instructions below and follow them very carefully.

3.2.1 Connecting the Model 57x or 58x to an I/O Port

1. Turn off equipment power and 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, as in Figure 3, below. This installation requires a **straight through** Cat-5 patch cable with modular RJ-45 male connectors . Use shortest length possible.

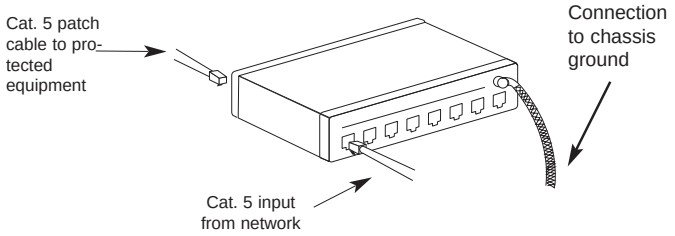

Figure 3. Installation of Model 57x /58x Surge Protectors.

Note: The ports are bidirectional. Therefore, the input cable must be directly across from the output cable.on the Model 57/58x.

3. Locate a metal chassis ground. This is often a hex screw on a D-shell or an AUI connector. Sometimes, a metal backpanel is attached with screws, one of which can be used with chassis grounding. If you cannot locate a chassis ground equipment on your equipment, contact Patton Technical Support (See Section 1.1) to discuss an alternate grounding solution.

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

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 57x/58x is connected to the chassis ground of the protected device. **Do Not** lengthen the ground strap or connect to a ground other than chassis ground unless instructed to do so by Patton Technical Support.

3.2.2 Connecting the Model 58x at a Barrier (Wall, Building, Entrance, etc.)

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

2. Install the Model 58x between the UTP line and the jack. This installation requires a **straight through** Cat-5 patch cable with modular RJ-45 male connectors.

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

3. Connect the ground braid(s) to the rack frame according to Figure 4 connected to earth ground. **Do not** lengthen the ground strap or section describes connection procedures for both models.

4. Connect the rack structure frame directly to the earth ground if it is not already connected. The best way to make this ground connection is to attach a thick braided metal strap earth ground to a metal panel, a wall plate screw or an electrical panel or subpanel, using a hex nut or ground screw. Pay close attention to the important note in Figure 4. If you cannot locate a nearby electrical ground, contact Patton Electronics Technical Service (see Section 1.1)

   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 57x/58x is connected to the chassis ground of the protected device. **Do not** lengthen the ground strap or connect to a ground other than a chassis ground unless instructed to do so by Patton Technical Support.

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, 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 57x: 13 V max with 1 KV Input; Model 58x: 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 57x/58x *alone*, not including any external patch cables that are connected to the unit.

APPENDIX C

EIA/TIA TSB-40A COMPLIANCE

The Model 57x/58x 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	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 57x

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 58x

***Note:** All test results are for the Model 57x/58x *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 57x

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 58x

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 57x

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 58x

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 57x Series 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 58x Series Insertion Loss Measurement

Dear Valued Customer,

Thank you for purchasing Patton Electronics products! We do appreciate your business. I trust that you find this user manual helpful.

We manufacture one of the widest selections of data communications products in the world including CSU/DSU's, network termination units, powered and self-powered short range modems, fiber optic modems, interface converters, baluns, electronic data switches, data-line surge protectors, multiplexers, transceivers, hubs, print servers and much more. We produce these products at our Gaithersburg, MD, USA, facility, and can custom manufacture products for your unique needs.

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.

Web:	http:www.patton.com
Sales E-mail:	sales@patton.com
Support E-mail:	support@patton.com
Phone - Sales	(301) 975-1000
Phone - Support	(301) 975-1007
Fax:	(301) 869-9293
Mail:	Patton Electronics Company 7622 Rickenbacker Drive Gaithersburg, MD 20879 USA

We are committed to a quality product at a quality price. Patton Electronics is BABT and ISO 9001 certified. We meet and exceed the highest standards in the industry (CE, UL, etc.).

Please contact us and let us know how we may provide you with the answers to your needs.

Thank you.

Burton A.Patton
Executive Vice President

P.S. Please tell us where you purchased this product.

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