Application Note # 126
Supplemental PSTN Line Protection

INTRODUCTION

This application note briefly details PSTN (Public Switched Telephone Network) line protection requirements. Several acceptable FCC Part 68 and UL 1950 compliant variations are discussed herein.

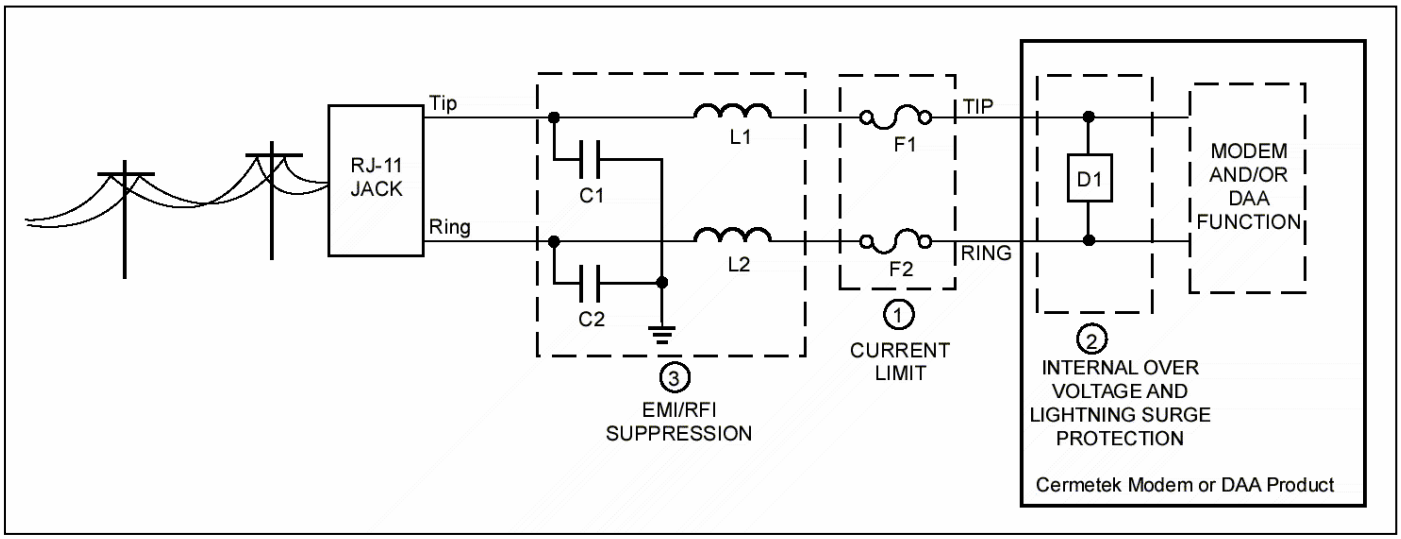

Figure 1. Typical PSTN protection configuration utilizing internal surge protection.

PSTN PROTECTION REQUIREMENTS

Current Limiting PSTN Protection Line Device.

Current limiting devices are mandatory to meet UL safety standards. To maintain conveyed FCC Part 68 approval, any added current limiting components must also survive FCC Part 68 surge testing.

For the case of internal surge protection, include the current limiting devices as recommended in Figure 1. If the surge protection is provided external to the modem or DAA product, include the current limiting devices as recommended in Figure 2. If internal surge protection is provided, but additional external surge protection is desired, use the configuration in Figure 3. Consult the specific product data sheet to determine whether surge protection is provided within the purchased modem or DAA product.

A. The Current limiting devices identified as F1 and F2 in dashed box #1 are required to meet UL safety standards. A Raychem Polyfuse TR 600-150 (rated at 0.15 amps) is preferred because this device resets automatically upon removal of the current flow and passes the FCC Part 68 surge tests. Non-resetable devices such as Littlefuse, type 2200003, or WICKMANN 19397-038 are also acceptable.

B. Resistors (10Ω carbon film, 1/8 watt minimum) may be used in Canada as Canada has no requirement that PSTN equipment be operational after a Type B surge testing.

C. Although CSA CS-03 Part I (Canada) follows the requirements of FCC Part 68 (USA), Cermetek recommends contacting DOT (Canada) and/or a certified independent lab to verify compliance. For Canada, use either 10Ω resistors (carbon film or SMD parts 1/8 watt minimum) as described in paragraph B above, or non-resetable fuses or resetable Polyfuses as described in paragraph A above.

Over Voltage and Lightning Surge Protection.

Over voltage and lightning surge protection is mandatory for FCC Part 68 compliance. Typically, Cermetek includes the surge protection (identified as D1 in dashed box #2) within the modem or DAA product. However, this is not always the case. Consult the specific product data sheet to determine if the product purchased contains surge protection. If the data sheet indicates that external surge protection is mandatory, then the purchaser must include some form of surge protection as described below to maintain conveyed FCC Part 68 approval.

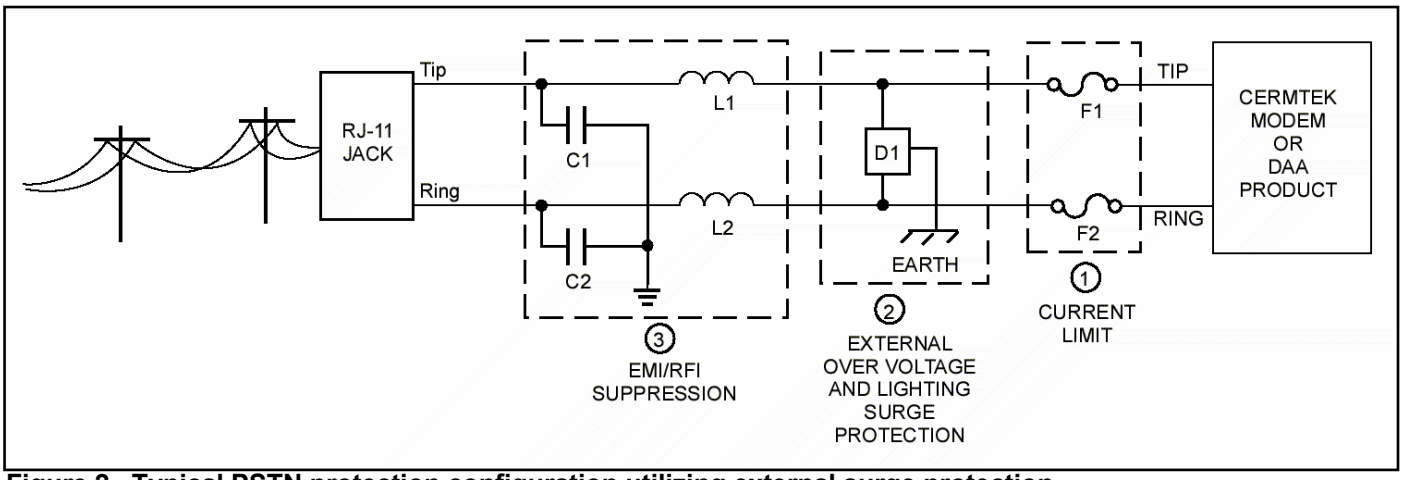

Figure 2. Typical PSTN protection configuration utilizing external surge protection.

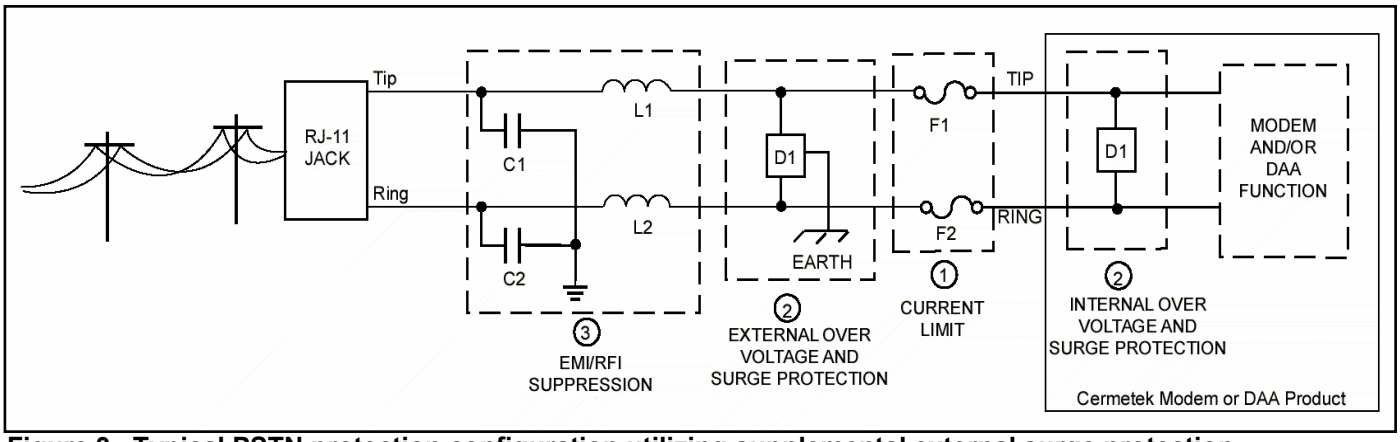

Figure 3. Typical PSTN protection configuration utilizing supplemental external surge protection.

In most environments, 2 terminal surge suppressors are adequate. For these applications, Cermetek recommends the use of Teccor Sidactor P/N P3100EB or equivalent. For severe environments, use the 3 terminal Teccor Sidactor P/N 3203AB or equivalent.

EMI/RFI SUPPRESSION

Cermetek has designed its products to minimize EMI/RFI noise generation. External EMI/RFI suppression circuitry is not required to maintain FCC Part 68 conveyed approval but it may be required to meet other FCC requirements.

A. To provide adequate EMI/RFI suppression, the capacitor/inductor network contained in dashed box #3 should be located as close to the RJ11 Jack as possible. Further, this network should be provided with an excellent ground path to the chassis.

B. Capacitors C1 and C2 should not exceed 0.005μf. They must have a rating of 1.5 KV and typically are 0.001μf +/- 20%. Recommended devices for inductors L1 and L2 are Fair-Rite 2644666611 or 294466661 or equivalent. For UL applications, choose capacitors and inductors that are UL 1950 listed. The actual values of the components used may vary depending on the end product design.

RECOMMENDED SUPPLIERS

FERRITE BEADS

P/N 2944666661 (Single Line)
P/N 2644666611 (Dual Line)
Fair-Rite Products Corporation
P.O. Box J
1 Commercial Row
Wall Kill, NY 12589
TEL: (888) 324-7748
FAX: (888) 337-7483
Web: www.fair-rite.com

RESETTABLE FUSES

P/N TR 600-150
Raychem
A Division of Tyco Electronics
P.O. Box 3608
Harrisburg, PA 17105
TEL:(800) 272-9243
FAX: (605) 886-8995
Web: www.tycoelectronics.com

NON-RESETTABLE FUSES/RESISTERS

P/N 2500003
P/N 2200003
Littelfuse World Headquarters
800 E. Northwest Highway
Des Plaines, IL 60016
TEL: (847) 824-1188
FAX: (847) 391-0894
Web: www.littelfuse.com

P/N 19397-038
Wickmann Corporation
4100 Shirley Dr.
Atlanta, GA 30336
TEL:(404) 699-7820
FAX:(404) 699-9176
Web:www.wickmann.com

VOLTAGE SURGE PROTECTION

P/N 3100SB
P/N 3203SB
P/N 2600SB
Teccor Electronics
1800 Hurd Drive
Irving, Texas 75038
TEL: (972) 580-7777
FAX:(972) 550-1309
Web: www.teccor.com

P/N XXXXXXX (VARIOUS)
SGS-Thomson-ST Microelectronics
1060 E. Brokaw Road
San Jose, CA 95131
TEL: (408) 452-8585
FAX: (408) 452-1549
Web: www.st.com

CURRENT SURGE PROTECTION

P/N XXXXXXX (VARIOUS)
Bourns, Inc.
1200 Columbia Ave.
Riverside, CA 92507
TEL: (909) 781-5690
FAX: (909) 781-5273
Web: www.bourns.com

For a complete list of recommended suppliers, refer to Cermetek Application Note # 130, Summary of Recommended Suppliers.

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