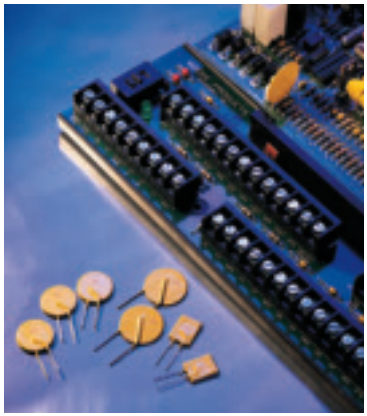
Security and Fire Alarm Systems
Application Overview

Problem/Solution
Security and fire alarm systems have multiple applications for circuit protection. The systems can be damaged by high fault currents caused by a short-circuit or overload condition. Power supply and circuit traces need protection because faults can occur if the installer inadvertently shorts out a pair of wires carrying power to remote components, installs the system backwards, or if the back-up battery is accidentally shorted. Modems are often included in alarm systems to automatically call the fire or police department in an emergency. Telephone lines need protection from the faults that lightning strikes, power-line crosses, or AC power induction on the telephone line can cause. PolySwitch devices—one installed on each extension of the power bus and used in combination with SiBar devices on the tip-and-ring circuit—can help provide protection against these fault conditions.

Typical Protection Requirements
Telecommunication equipment typically requires overcurrent and overvoltage protection. Overcurrent protection requires the ability to survive 600V or 250V with low current. Power supply and trace protection typically require a capability for currents from 1A to 4A.

Typical Agency Approval Requirements
Alarm systems must comply with UL864. This standard states that nonuser-replaceable fuses (soldered-in) are not allowed to qualify a power supply as inherently limited (UL864 Para. 24A.3). The test requires that current be reduced to 8A in less than 5 seconds. If the product has provisions for connection to a tele- phone line, it must comply with UL1950 (UL864 Para. 43.9), in North America, and ITUK.21 elsewhere.

Technology Comparison
Fuses have typically been used in these applications. However, UL864 and UL1950 pose difficult challenges for fuses to meet. Fuses can fatigue under certain UL1950 test conditions, but more significant is that they are one-use devices that must be replaced after a fault has occurred. PolySwitch resettable devices latch into a high-resistance state when a fault occurs. Once the fault and power to the circuit are removed, the device automatically resets and is ready for normal operation.



Device Selection
TR600, TRF600, TS600, and TVB device series are typically used in UL1950 applications. TS250, TC250, TVB device series are typically used in ITUK.21 applications. RUE250U*, RUE300U*, or RGE300 are typically used in UL864 applications for power supply systems not inherently limited.

For non-UL864 or inherently limited power supply applications, use RXE110–RXE160 or RUE250–RUE400 devices, depending on the voltage.

*Contact your local Raychem Circuit Representative for more information.

Figure 1. Typical System Power Distribution