

Replacing Mechanical Relays with IR's PVT412L Microelectronic Relay in Fax/Modem Designs

By Andy Serkuczewski, International Rectifier

Here is information on how our PVT412L microelectronic relay (MER) will save time and money while improving performance and reliability in FAX/Modem designs.

Figure 1 is the schematic of a basic modem showing K1 mechanical relay. It is the equivalent of a hook-switch in the traditional telephone set and in this case, K1 is either an electromechanical relay (EMR) or a reed relay. Because such relays inherently cause contact bounce upon contact closure, R1, C1 debouncing circuitry is required. While the 560 resistor is small and inexpensive, the 1KV capacitor is both bulky and expensive. Additionally, there are two 10 Ohm fusible resistors (R2 and R3) in series with the Tip and Ring lines that are required for this circuitry to pass the FCC's Part 68 lightning surge test of up to 1000-volt, 200-Amp short-duration pulse. Without these resistors the K1 relay would almost certainly be destroyed due to contact welding during such surge.

When the K1 electromechanical or reed relay is replaced with our PVT412L MER, as in Figure 2, the following cost and space savings are realized.

- R1, C1 debouncing circuitry is no longer needed. Solid-state switching is bounce-free

because there are no physical parts making and breaking the contact.

- R2 and R3 fusible resistors are no longer required thanks to the internal active, current-limiting feature of the PVT412L. Even more important than the savings in space and cost, should one or both of the fusible resistors fuse open in a lightning surge, the modem would fail and require costly repair or replacement. This situation is avoided by using the PVT412L in place of an electromechanical or reed relay.

The initial cost differential of approximately 15% between the PVT412L and a typical EMR (at high volume OEM pricing) will be more than offset by:

- reduction in component count (3 resistors, 1 capacitor)
- savings of printed circuit board real estate
- elimination of costly failures due to lightning surges.

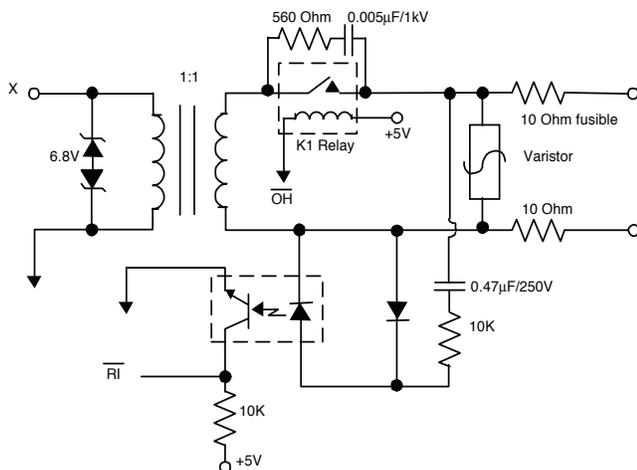


Figure 1. Basic Modem Using Mechanical EMR

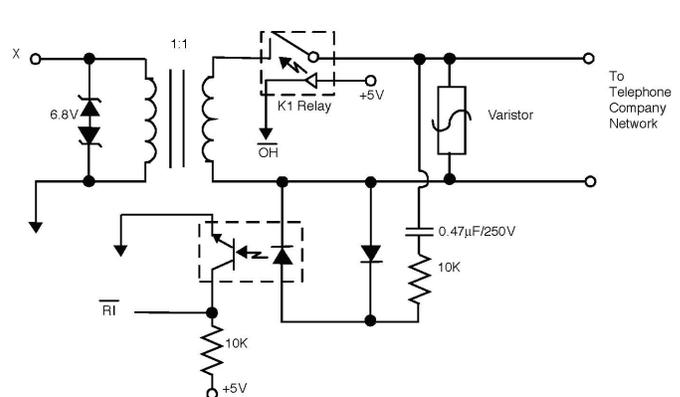


Figure 2. Basic Modem Using IR's Solid-State PVT412L MER