

Yet Another Front End Saver

The KD9SV Front End Saver updated.

If you use a separate receive antenna, you need a Front End Saver to eliminate the possibility of blowing out your receiver's front end while using an auxiliary receive antenna. Unfortunately, all the radios produced by Icom, Kenwood, Yaesu & TenTec have the same problem - they do not turn off the receiver during transmit. This protective circuit is designed to disconnect the receive antenna during transmit, ground the receiver input when transmitting thus keeping RF out of your radio and eliminating the chance of blowing your radio's front end.

Basically, there are two ways to protect the front end of your transceiver. Many users suggest installing 1N914 diodes back-to-back across the input of the aux receiver input. No auxiliary control signals, no power supply, no chance to forget to switch on a small device. The main disadvantage is a possible degradation of receiver strong signal performance and harmonics which can affect SO2R capabilities.

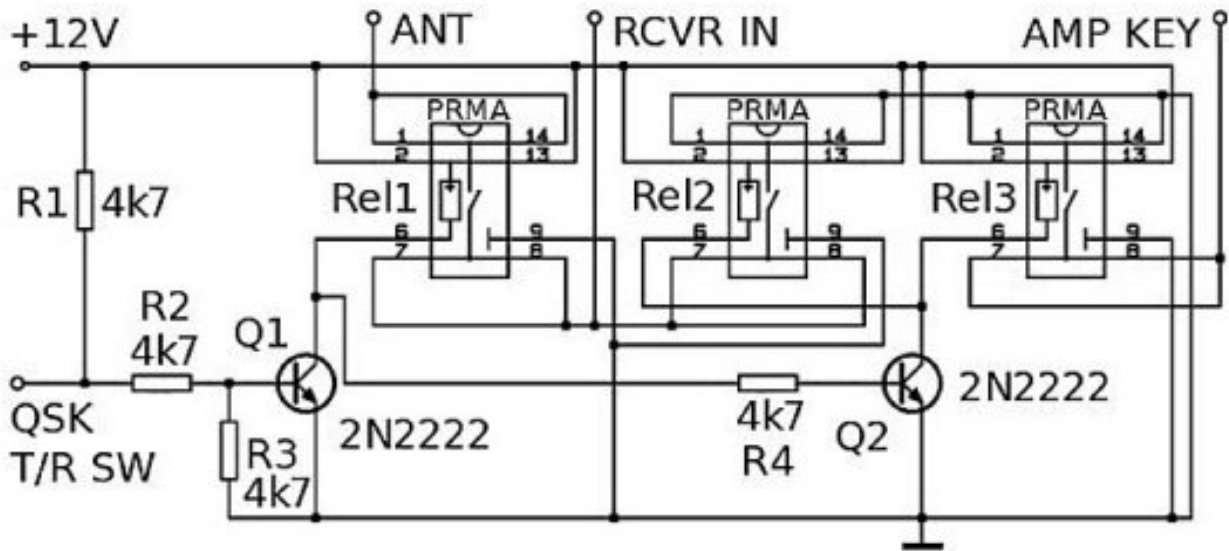
Another option uses fast reed relays which should do the following:

1. Disconnect the antenna
2. Short the receiver antenna input to ground
3. Provide a keying relay to prevent damage to the T/R circuits in the transceiver

A good solution is the Front End Saver designed by Gary Nichols KD9SV, described in CQ Magazine, Feb 1997 - p32, which uses fast reed relays to open the feed-line and short the receiver input to ground. This article can be hard to obtain (at least here) and if you look at the design you find an uncommon, rather unspecified type of SPST 5 Volt reed relay. 'Dry reed' DIP packaged relays are more widely available so Gary's Front End Saver was redesigned using these off-the-shelf relays.

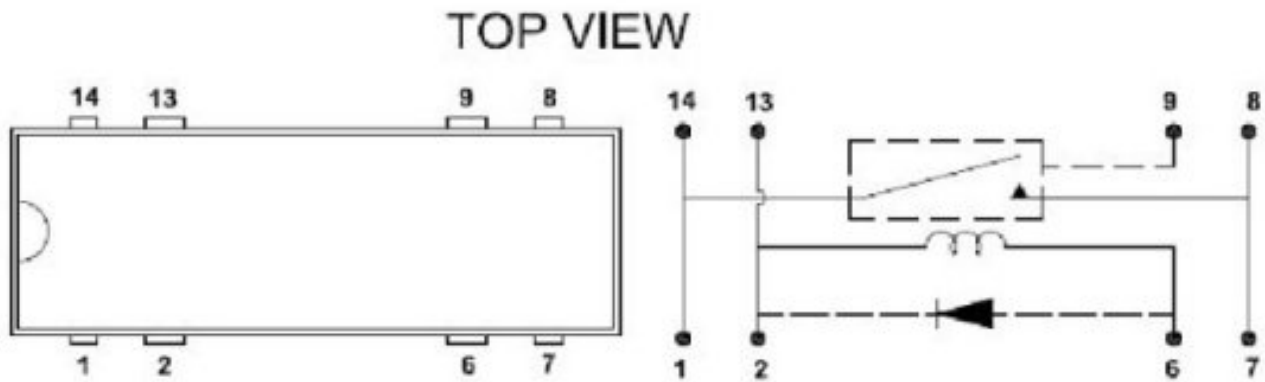
A PRMA reed relay has the same dimensions as a 14 pin DIP package, its expected lifetime is 500 million operations, is fast enough (operation time including contact bounce at nominal coil voltage is less than 1.2 ms, release time less than 0.8 ms) and its capacitance is less than 3pF both across open contact and contact to coil (negligible for 160 and 80m bands). They are available with 5, 12 and 24 Volt coils (you can download the data sheet [here](#)).

The schematic of the redesigned Front End Saver is here. Don't be confused with the rather complex drawing showing the relay internals, the basics are just the same as the initial KD9SV's design (see [here](#)).



Front End Saver schematic

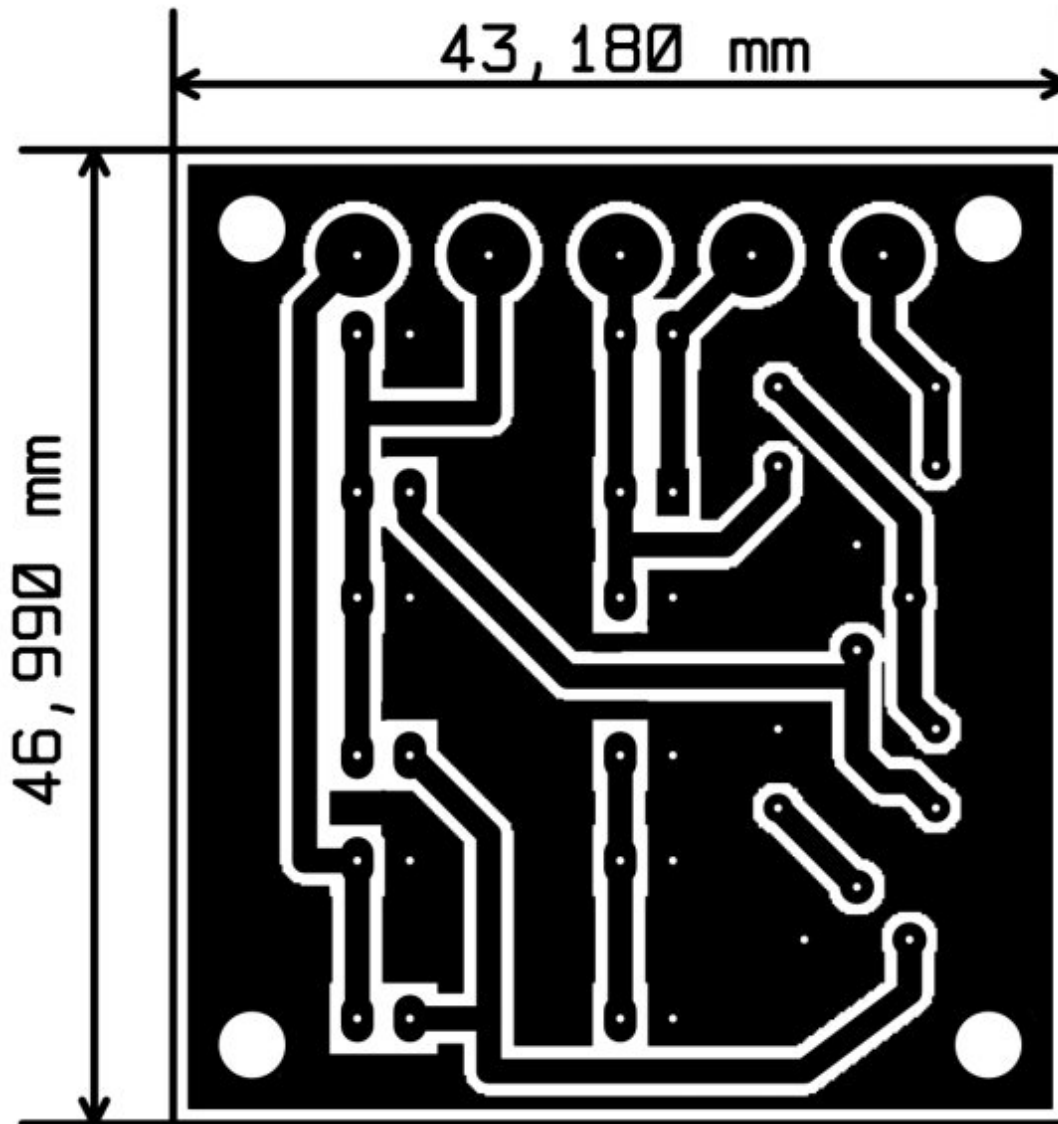
Here is the pin layout of the PRMA relay.



Pin layout of the PRMA relay.

The PRMA relay has also moulded rugged construction and an internal back-EMF protection diode. They are cheap (~ \$1.20) and are manufactured by Comus, Clare, SRC and many others. Most rigs provide 12 Volts, so use the **PRMA 1A12** version.

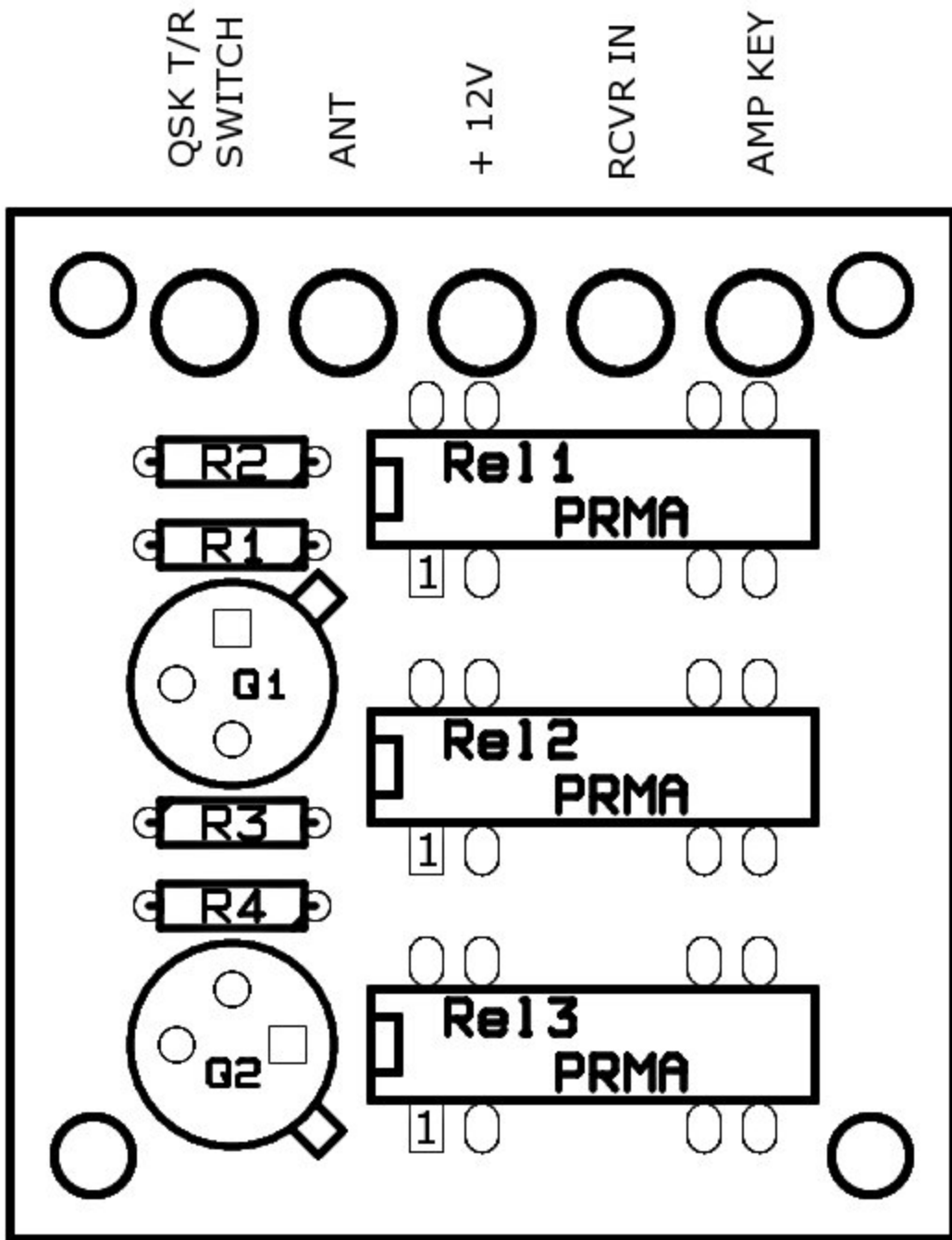
The PCB is very small (43.2 x 47 mm), therefore inexpensive.



The Front End Saver PCB.

Click [here](#) to download a high resolution, TIFF image.

The parts placement layout is given below:



The Front End Saver parts placement.

Three short coax cables with RCA (phono) type plugs on each end are normally the only other things required to hook this unit up to the rig (+12V, RX ANT and TX output) plus another cable to provide amplifier keying. This small circuit will solve fried RX input problems for good.