MFJ-998 modification for disabling the Elecraft KPA500 amplifier during TUNE or High SWR
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The MFJ-998 has an amp-disable feature whereby the MFJ-998 opens the amp-key line prior to tuning, or if SWR exceeds a target set-point. However, as this occurs by opening relay contacts, there is a delay of 5-10ms due to the relay operating time. This is normally not a problem, as the MFJ-998 waits until well after the amp-disable relay operates before beginning to tune. However, if the SWR exceeds the MFJ-998 set target value, there can be amplifier high power for the time it takes for the MFJ-998 to sense the high SWR condition and the time it takes for the amp-disable relay to operate. Further, some amplifiers use RF sensing of the input which keep the amplifier from unkeying if RF is present, even if the amp-key line goes high.

The Elecraft KPA500 has the normal amp-key phono jack input (PA KEY). However, if you use the special AUX cable between a K3 transceiver and the KPA500, you can key the KPA500 through this cable. This bypasses the normal amp-disable feature of the MFJ-998 as no separate amp-key cable is used. Additionally, the KPA500 also has an RF sense which inhibits amp switching in the presence of RF even if the PA KEY line has gone high. This is to prevent hot-switching of the amplifier. However, the KPA500 also provides an input on AUX1 connector PIN 11 that disables the amplifier within 1-ms when this line is pulled low. Therefore, I decided to drive the KPA500 amp-disable input directly from the solid-state relay driver within the MFJ-998.

The amp-disable relay in the MFJ-998 is driven by Q31, a SMD transistor located by relay K31. I added a phono jack to the back of the MFJ-998, and connected a 1N5711 shottky diode between the phono jack and the collector of Q31 (cathode or banded-end of the 1N5711 on Q31 collector). The parts list is shown in Table 1.

Table 1: Parts Needed

QTY	Description	Mouser Part Number
1	1N5711 schottky diode	511-1N5711
1	2-pin terminal strip	534-802
1	Phono jack	161-1053

A convenient place to tack solder the 1N5711 cathode-end is on the ungrounded end of C164. Add a bit of solder on the ungrounded end of C164, tin the cathode (banded) end of the 1N5711, and tack solder the 1N5711 cathode to the ungrounded end of C164 (see Photo A). The terminal strip for the 1N5711 anode-to-phono jack connector interface is mounted by a conveniently-located ground screw (Photo B). I used shielded cable, but this is really unnecessary. Photo C shows the new phono jack on the back of the MFJ-998. Labeling was done using a Casio labeler and “Black-on-clear” labeling tape.

NOTE: The MFJ-998 must be turned on when using the KPA500, regardless of whether the tuner is needed or not. Leave the tuner bypassed, or leave it in full-auto and it will decide if it is needed. If the MFJ-998 is turned off, the new amp-disable output is pulled low by the internal MFJ-998 circuitry when it is unpowered.

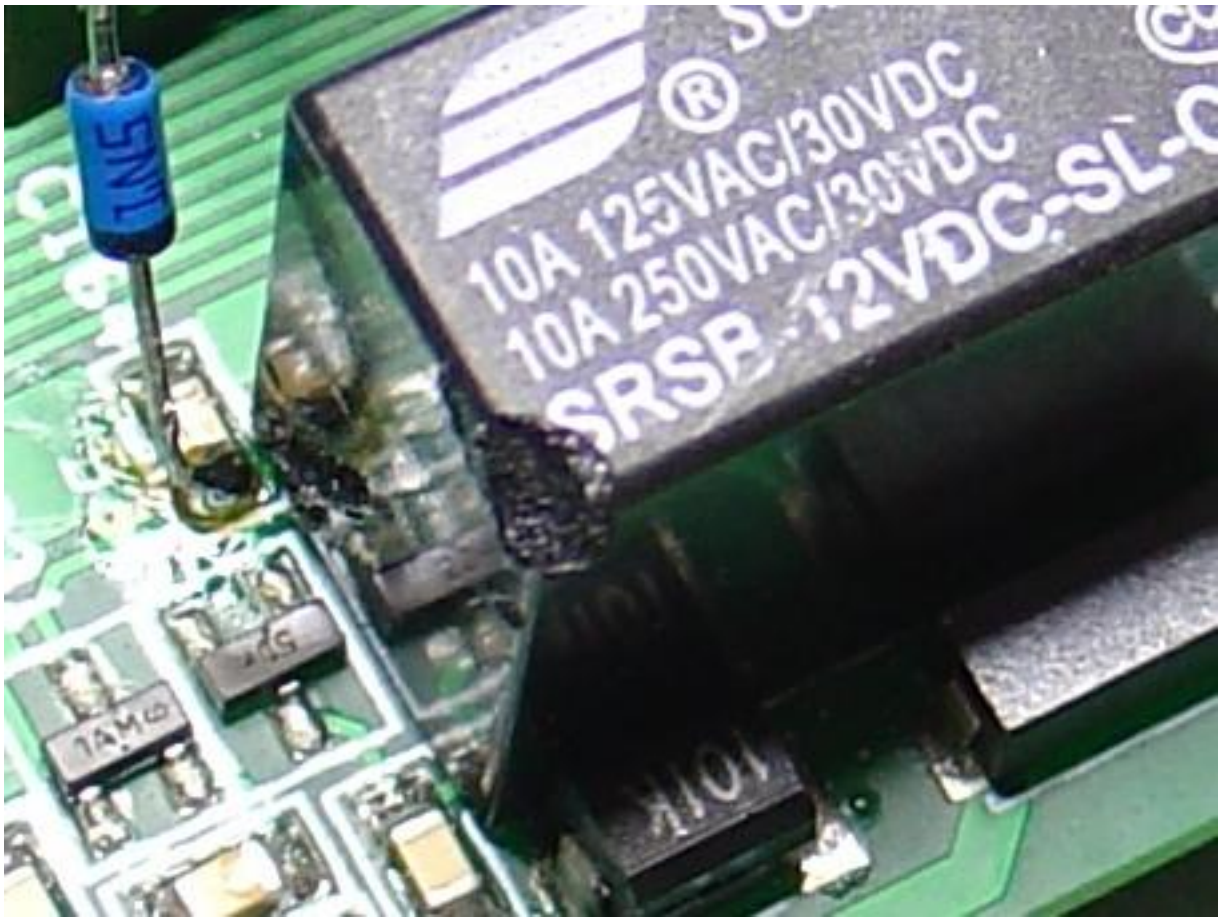

Photo A: 1N5711 tack-soldered to ungrounded end of C164 (I accidentally touched the relay with my soldering iron – but I didn't damage the relay!)

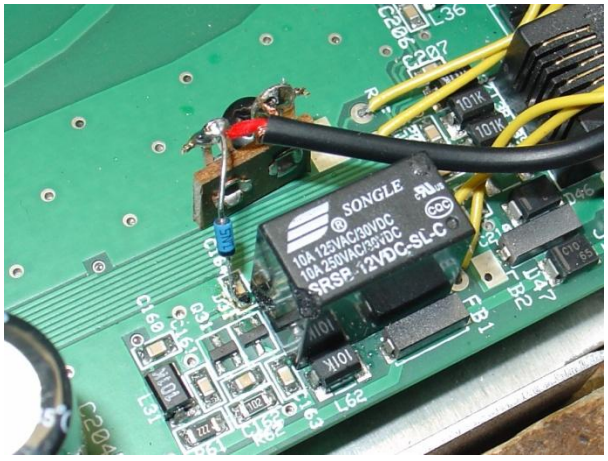

Photo B: 1N5711, terminal strip & key-cable

Photo C: New KPA500 disable connector