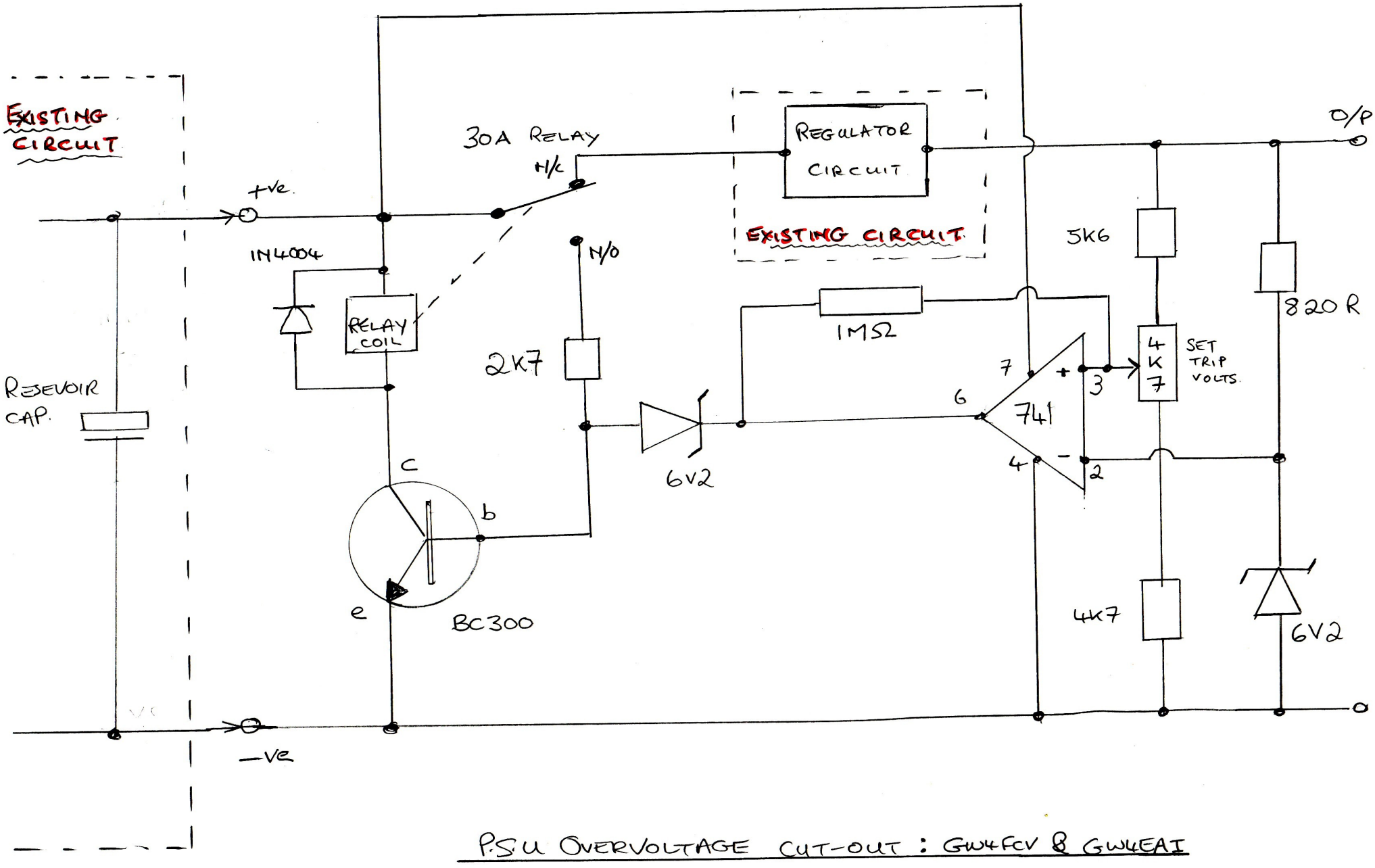
AN OVERVOLTAGE TRIP FOR 13.5V LINEAR P.S.U.'s

Most LINEAR (*NB.* This circuit is NOT suitable for switch mode PSU's) power supplies (typically rated at 13.5v at 20/25 A) used by radio amateurs do not have overvoltage protection. The author has encountered a number of such PSU's where the O/P voltage has become erratic, this is often as a result of a "noisy" voltage setting potentiometer on the front panel, but more often as the result of a similar problem with an internal voltage setting preset on the regulator board. These are often of the open "skeleton" preset type which can become unreliable after a number of years. It is strongly recommended that these are replaced with better quality enclosed types (or better still use fixed resistors throughout if the variable voltage facility is not needed--- there is little point in having a variable voltage O/P if you are only using the PSU to power an H.F. rig for example).

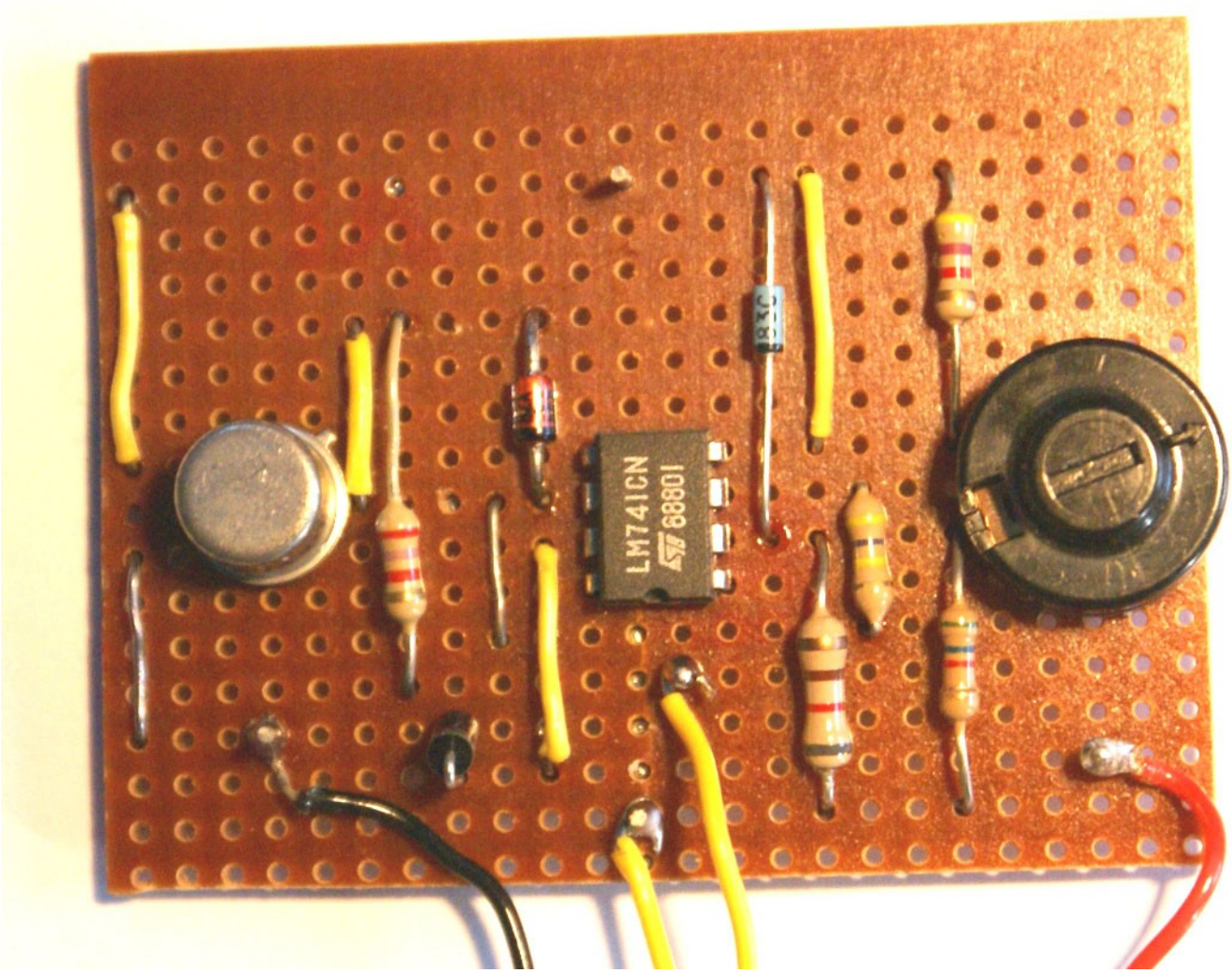
The use of an overvoltage trip can provide a degree of "peace of mind" if the PSU is used to power a £1000+ rig. The circuit shown offers an alternative to the thyristor "crash bang" crowbar circuit. It uses a 741 op-amp as a voltage comparator and transistor driver to energise the coil of a high current capacity relay if an overvoltage is detected.

In normal operation, the coil is not energised and the unregulated supply (from the reservoir capacitor) is passed through the Normally Closed (NC) contacts to the regulator circuit. If the relay is energised, i.e. when an overvoltage is detected, the NC contact is broken, isolating the regulator (and hence shutting off the O/P of the PSU). At the same time, the Normally Open (NO) contact is made which connects the 2k7 resistor to the unregulated voltage and consequently keeps the BC300 switched "ON" thereby latching the relay. The PSU will now have to be turned off at the mains switch to reset the trip circuit.
The voltage at which the trip "fires" is set by the 4k7 preset (use a good quality one!), it is suggested that this be set at 15V (you will need to temporarily set the O/P of the PSU to 15V –with the rig disconnected – to set the trip voltage).
The circuit uses commonly available components, the relay is an automotive type rated at 20/30AMPS or better (see photos).

WARNING: The inside of the PSU will have wiring carrying mains voltage.



P.S.U OVERVOLTAGE CUT-OUT : GW4FCV & GW4EAI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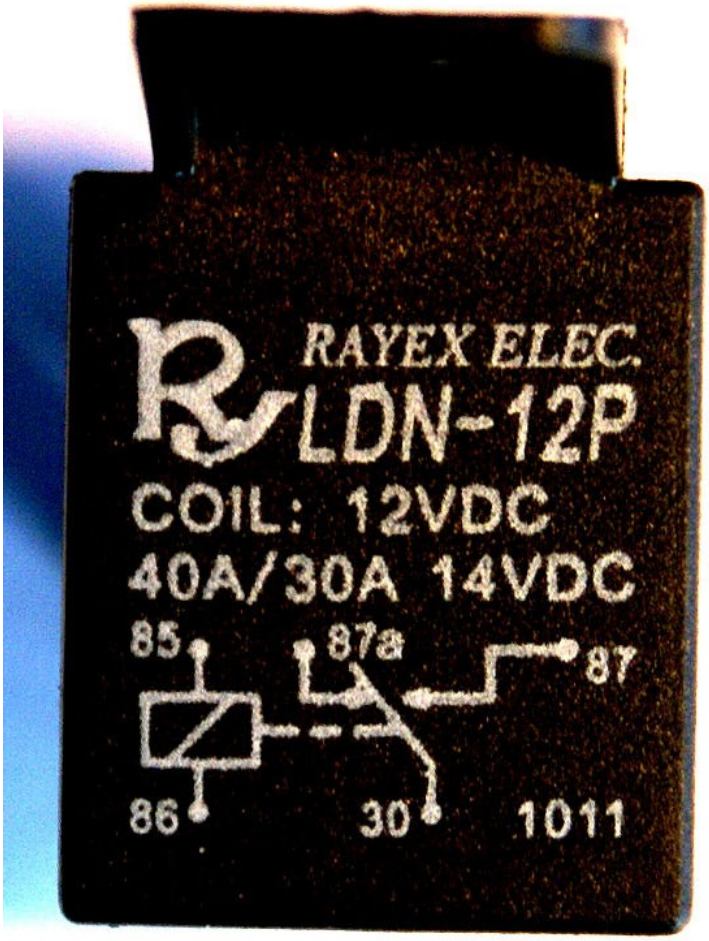
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86
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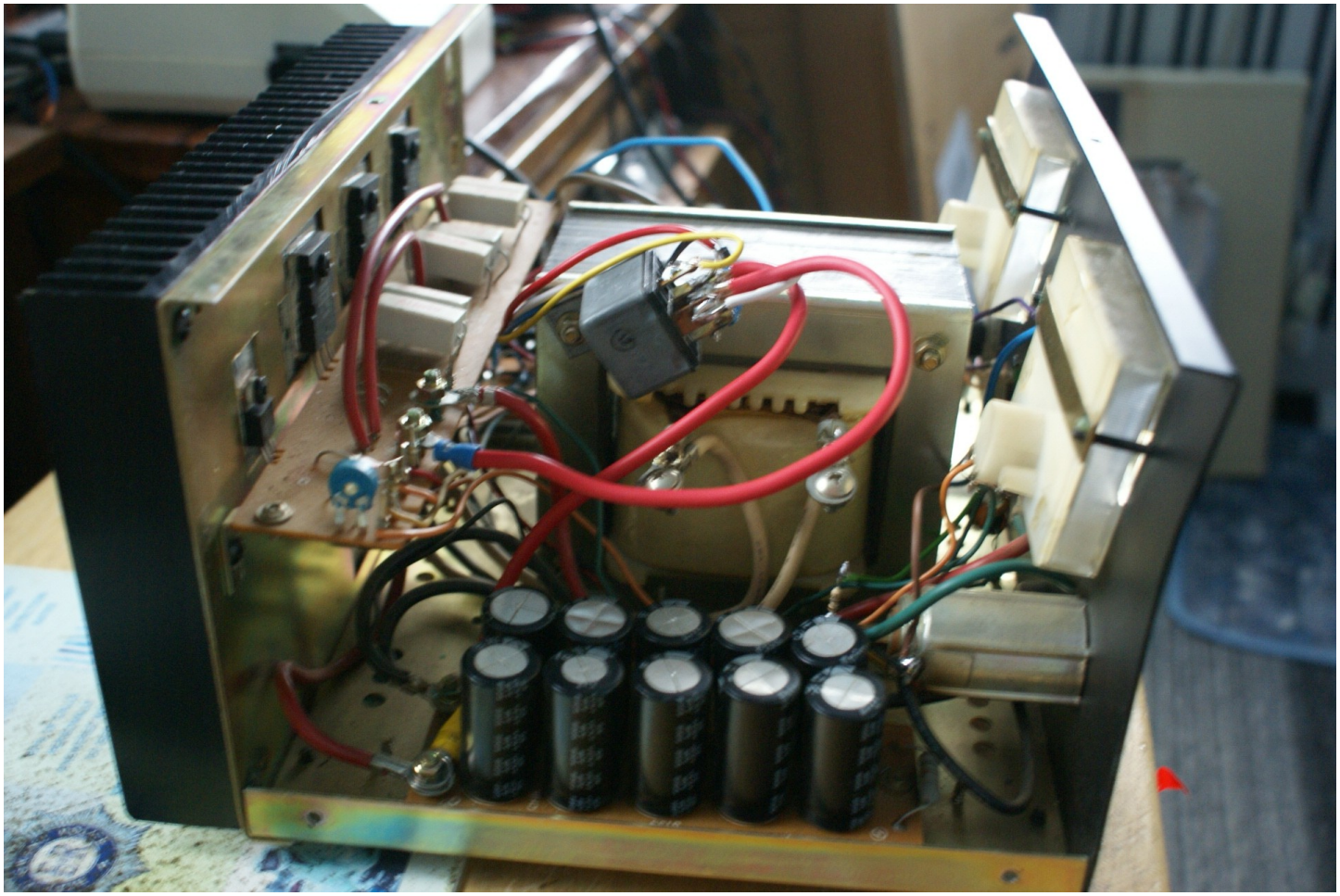

The finished project inside the DAIWA PS-30XMII power supply