A junk-box power supply for the Yaesu FT-817

My trusty FT-817 has given excellent service over the past couple of years. It's a neat rig that packs down, complete with antenna, ATU and accessories, into a small flight bag and thus has proved to be ideal for globe trotting. However, despite working some excellent DX with only 1 W from the internal batteries, I've often needed a little more power. To solve this problem I decided to raid the junk box and build myself a simple and compact power supply that would allow me to run the full 5W output rather than the 2.5W maximum that can be achieved with freshly charged batteries.

Previous experience suggests that, unless you are extraordinarily lucky or extremely careful with the design and layout of a switched mode power supply, the radiated noise can be unacceptable for use with weak-signal modes. Because of this I decided to base the design on simple well-proven linear technology and to accept the extra weight associated with using a 50 Hz mains transformer.

Having decided to build the supply on whatever happened to be available in my junk box I still had one problem to solve, the enclosure. After a little thinking I decided to make use of the power supply enclosure fitted to an old PC. This already had the necessary IEC connectors (one for AC mains input and one for accessory output) as well as plenty of space and ventilation provided by courtesy of the (previously removed) fan. Figure 1 shows the finished power supply ready for operation.

Figure 1 *The finished junk box FT-817 power supply ready for operation*

When operated at full output (and to support charging of the internal batteries) Yaesu suggests that the FT-817's DC supply voltage should be 13.8 V ±15% (i.e. between 11.7 V and 15.9 V). To be on the safe side (and to help reduce dissipation in the '817's finals) I decided to design the power supply for an output of 12.5 V but to make this adjustable so that the voltage can be reduced slightly when operating for long periods with full carrier (i.e. when using RTTY, SSTV and FM). The actual output range is adjustable from about 11 V to 14.4 V. However, with VR1 set at mid-position, the output voltage is approximately 12.5 V.

Construction is extremely straightforward and can be based on tag board, group board or printed circuit techniques. Note that TR3 requires a heat sink but this can be provided by bolting the transistor to the metal enclosure with the aid of an insulated washer kit. None of the component values are particularly critical and, in most cases, near substitutes can be made without affecting performance.

The complete circuit diagram for the power supply is shown in Figure 2. The mains transformer, T1, must be rated at around 50 VA (total) and have its secondary windings configured to produce an AC output of between 12 V and 15 V to the bridge rectifier. Depending on the transformer type this might involve using a single secondary winding or connecting two windings in either series of parallel.

The AC input to the S1 should be connected via the existing IEC connector and its associated low pass mains filter (in better quality supplies these are integral with the IEC connector). The low value resistor fitted in the emitter of TR3, R7, must be a wire wound component rated at 2.5 W. For last-ditch protection, a miniature quick-blow 3 A fuse is fitted in the positive output rail.

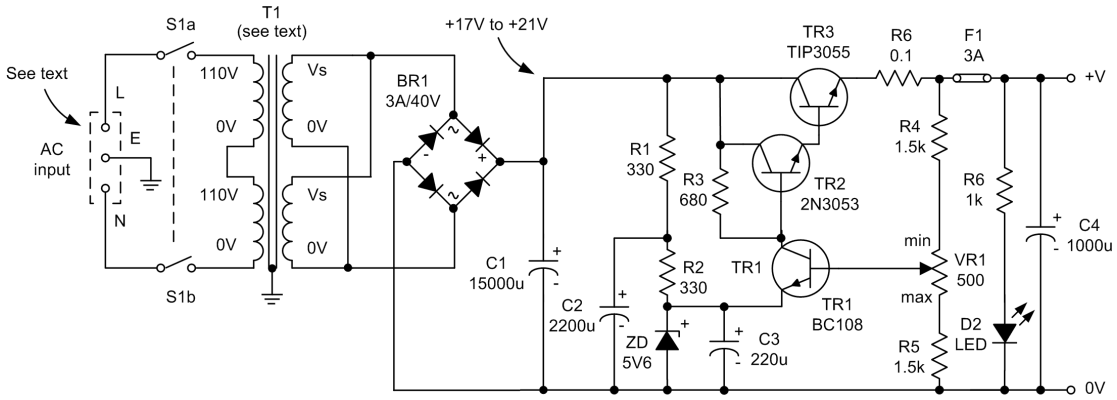

Figure 2 *Circuit diagram for the FT-817 power supply*

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