This is the low power QRSS beacon. The construction is "ugly" or "ground plane" using baked bean can tin
as the substrate. All components are direct from the junk box! The photo below right shows the setup. At that time, I was powering the transmitter via a
12V PSU
via a 10K potentiometer so that I could test output at various supply voltages and currents. In series with that, was a 100 ohm resistor, which I measured the voltage across to get a reasonably accurate current reading. The two coax cables at bottom right, take the output to my

homebrew ATU
and my frequency counter.

{gallery}qrsslpconstruction/photos{/gallery}

Circuit

The transmitter circuit diagram is very simple. It uses a single BC107 transistor which naturally, doesn't even get warm. I adjust the 1M preset potentiometer between base and collector, for best waveform and best output. The 50pF trimmer capacitor sets the frequency. The 4.7pF sets the size of the FSK pattern. 5Hz should be ideal. I later found that the 4.7pF capacitor was too big and replaced it by a "gimmick capacitor" consisting of a few centimetres of wire twisted together to form a capacitor of a few pF. You can then adjust the "height" of the FSK pattern by untwisting or twisting a few turns. The 5mm red LED acts as varactor diode . The FT50-43 provides some kind of match to 50 ohms, the turns were determined by trial and error.

The whole idea of the design was to get low current consumption, but best overall efficiency. I didn't want to waste power in series resistors for example. In the end, I measured 1.86V supply voltage, 1.5mA current consumption, and 1.8mW output into 50 ohms. This is a 65% efficiency which doesn't seem at all bad for such a simple circuit.

{gallery}qrsslpconstruction/circuit{/gallery}

The FSK pattern is generated by a simple 2-transistor astable oscillator (above left). All the resistor values are very high, so it consumes minimal current. One of the collectors feeds to the

LED and causes a change in capacitance which creates the shift in frequency.

Here's the distinctive "signature" pattern generated:

A 30m 10.140MHz was used at that time, with Argo software and my QRSS Receiver project to display this "local reception" report. No reception reports were received on 30m. The transmitted power is just too low for DX, and the 30m skip distance is generally too far for European reception. So I later changed the crystal for a 40m crystal (shown in the photo above). For a while, the frequency was around 7,014,130 from my 7014kHz crystal. Most 40m QRSS'ers are using 7,000,850 +/- 50Hz but I didn't have a suitable crystal at first.