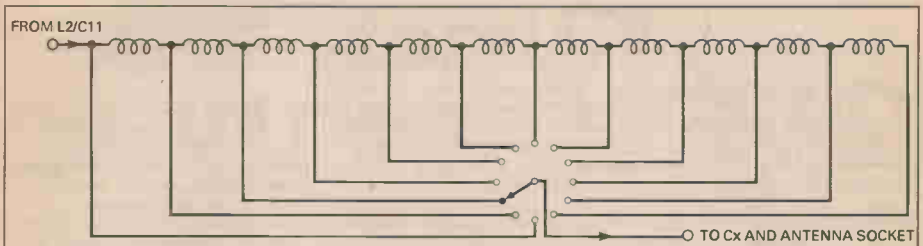
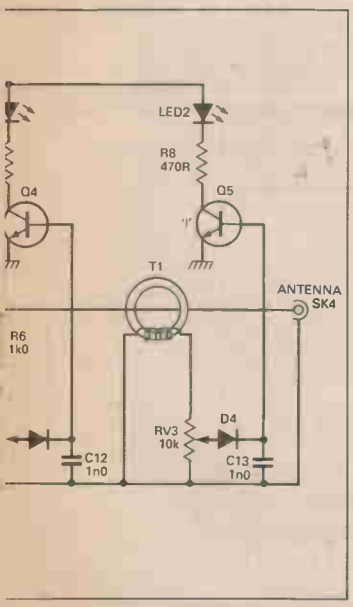


Fig.2. Detail of Lx.

rotary switch for SW1, giving the opportunity to use crystals of random frequencies picked up at rallies or in magazine advertisements. Position 6 could be brought out to a miniature crystal socket on the front panel to give even further flexibility.

SW2 allows a small frequency shift to be applied to the crystals to dodge QRM. About 2kHz was obtained in this circuit. Most published designs use a variable capacitor, but for the sake of miniaturisation a three-position toggle switch proved satisfactory. Newcomers might like to build this part of the circuit first to get their hand in, listening for the signal on their portable receivers.



Power Amplifier

A VN66AF power FET was chosen for the PA. It is capable of producing up to 5W output in this circuit, but for reasons of battery economy, heatsinking, and the lack of a desire to blow it up, was throttled back to 2 to 3 watts.

Build this section next, disregarding for the moment Q2 and its associated keying components (connect C5/R2 direct to ZD1/Q3) and the sidetone bleeper/SW3. Q3 is mounted on a small heatsink, which for a CW transmitter doesn't need to be very big. If you have visions of using this Tx as a D/F source, or running RTTY, then pay a little more attention to heatsinking. No need to bother with Lx, Cx etc for now. Just terminate 2/C11 (ie point 'X') in a 50 ohm load or (preferably) a power meter that can read accurately to below 5W.

Adjust RV1 to the bottom of its slider and apply 12V from a power supply through an ammeter. Ensure the oscillator is running, then carefully adjust RV1 until 250mA (approx) is being drawn. At least a watt of RF should be indicated on the power meter. Carry on with the keying stage.

The Keyer

Various techniques have been used with QRP transmitters to achieve clean, chirp free keying. Keying the oscillator by inserting the key in the emitter circuit works quite well, but can cause 'chirp' at extremes of crystal 'pulling'. A key inserted in series with the PA transistor is acceptable up to the 100 mW level, but ½ amp through all but the most rugged of ex-MoD keys will soon burn the contacts. Some circuits use a series PNP keying transistor in the PA supply lead, but this causes a considerable volage drop and degradation of PA efficiency.

Finally a blocking transistor approach was decided upon, which only allows DC bias and RF drive to reach the PA when the key is down.

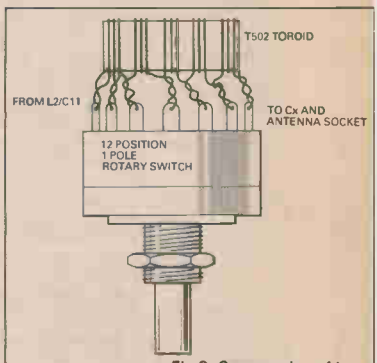


Fig.3. Construction of Lx.

The ATU

Most modern transmitters are designed for a 50 ohm output, requiring an extra vswr meter and atu. What's the point in building a tiny transmitter such as this one, then lugging around add-on goody boxes which are as large and heavy as the transmitter they serve?

Lx and Cx allow matching to a wide range of impedances while the two tuning leds give a more than adequate indication of maximum power transfer into the antenna.

There is no need for a measurement of vswr, merely an indication of maximum current flow into the antenna, which corresponds to the maximum radiated power. (Remember, long before the days of vswr