through to G2, than with offering any amplification. The input resistor, R64, provides correct matching to the preselector with which it connects in transmit via a C/O relay. As arranged the transistor provides a low distortion, DC controlled attenuator. With a piece of equipment such as this transceiver, it is a very good idea to keep signal lead connections to the front panel at an absolute minimum. The transformer in the drain circuit comprises eight turns of fine guage wire, centre-tapped, wound on a readily available ferrite choke bead which looks like a tiny transformer.

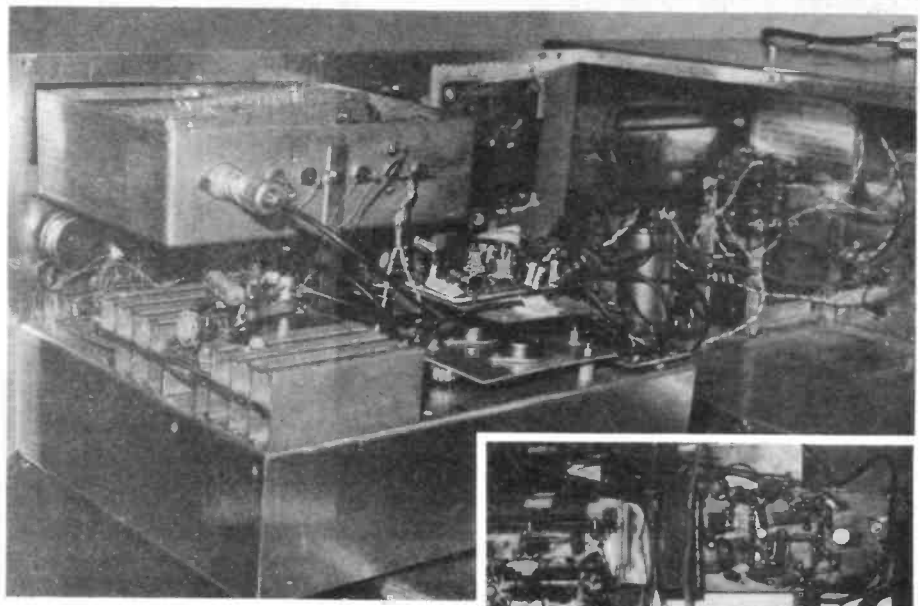
Assessing cores

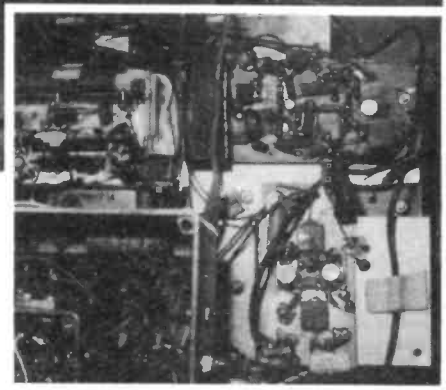
This leads nicely to a general point about assessing the suitability of a ferrite core or bead for a particular task. My method is to connect up an HF receiver to a signal generator through a Pi type arrangement. This comprises two 47 ohm resistors and one turn of wire passing through the bead under test.

The one turn choke wound on the core under test occupies the top section of the Pi arrangement, the two resistors being placed in parallel with the receiver and generator respectively.

The output from the signal generator is adjusted to the minimum frequency of interest — in this design it would be just under two Megs — and at a level which produces an S3 output on the receiver S meter. The bead is simply shorted out and the new level noted. If the signal level indicated by the S meter goes up by one point, you could make a very rough guess that a single turn on the core has an impedance in the order of 50 ohms. Therefore, two turns will show an impedance of 200 ohms and four turns, 800 ohms, etc. As a rule of thumb, broadband ferrite based circuits require an inductive reactance of at least twice the operational impedance of the cirucit at the lowest operating frequency.

The remainder of the transmit pre-amp circuitry is conventional bipolar with no surprises. T2 is a 2:1 transformer comprising four turns on the primary, two on the secondary (28SWG wire). The core type used was of the square 'slab' type with two parallel holes. The core measured roughly a cm square. T3, the output transformer, is made the same way as T2. Most of the frequency conpensation is carried out by selective feedback from the collector of the 2N3553 output transistor to its base circuit. The precise response can be tailored by alteration to R75, C55 and the 20 turn inductor wound on a small resistor. CW keying is achieved by turning off the second transistor, a 2N2369 by disconnecting the emitter return. C52 provides protection against key clicks.





Inside of the transreceiver (above). The bird's nest. PA stage can be seen in the front of the picture.
Right: detail of PA driver.

Driver stage

The transmit driver circuitry, **Fig. 14** is equally conventional. For lowest second harmonic distortion, the 2N3866 transistors should be matched for DC hfe — just as would be the case with a push-pull audio amp. C62 and the small inductor in series with it provides a bit of peaking towards the 10 metre band. The amount of peaking can be controlled by adjusting the turns on the inductor. The ubquitous square ferrite cores are used once again.

As shown the diriver circuit runs at about 20mA quiescent rising to 200mA or so on speech peaks. So far, heat sinking for the devices has not proven necessary although it might be prudent if a great deal of RTTY operation was being considered. The Fig. 14 driver stage operates from the 24V rail, not the 15V rail shown. There is quite a lot of voltage gain available so that passive frequency conpensation networks could be considered as part of the input circuitry to the stage.

PA circuit

Once again, it's completely conventional (see **Fig. 15**). The diode bias chain should be in contact with the output transistors' heatsink, a dollop of silicone grease between diodes and heatsink ensuring good thermal coupling. The bias transistor is a TIP41 power audio device. It has to dissipate a couple of Watts and pass a couple of hundred milliamps when the transmitter is at full chat. It should therfore be mounted on a heatsink.

The one ohm resistors in series with the output transistor bases offer protection against parasitics and should never be left out of circuit, particularly when using transistors a long way below their transition frequency. It goes without saying that the resistors should be carbon composition, low inductance types. It is better to use four 4.7 ohm resistors in parallel if high frequency drive is not to suffer.

The input transformer is a single