(g) 21.2MHz
CENTRE FREQUENCY 21.2014MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
100W PEP OUTPUT
CENTRE



CENTRE FREQUENCY 21.014MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
50W PEP OUTPUT
CENTRE



CENTRE FREQUENCY 21.2MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
100W CW OUTPUT
CENTRE 340Hz OFFSET

amplification and the speaker.

On the transmit side, the input from the low impedance microphone is amplified and applied to a balanced Schottky ring mixer, buffered, then via a ceramic SSB filter for conversion in the second mixer to 8.2MHz. If the speech processor is used, the filtering signal is amplified by the receive second I.F. amplifier, clipped and then applied to the mixer. Both processed and unprocessed signals are then filtered through the first bank of filters used for the receive section.

After conversion to signal frequency, further amplification is needed for the 12BY7A valve driver stage, at which some of the signal is available for transverter applications. Preselector tuning follows, driving the 3 × 6146B power amplifier stage, into the antenna via a conventional pi-network coupler. The provision of 3 of this type of valve is unusual — Yaesu claim that third-order IMD products are reduced by a factor of 10 over 2 valve and solid state designs. Certainly, the on-the-air tests went a long way to back this, providing the power output was kept down to the recommended levels, and not pushed to the maximum.

The usual ALC is fitted, but unusual in that a peak hold circuit is fitted, allowing easier reading of the meter.

## The Synthesis system

A new PLL synthesis system is used in the FT-102, primarily to allow the Passband Shift feature to work synchronously with the Width function. It is fairly complex to describe concisely but the main features are as follows:

One of 6 narrow band switched VCO's, feeding the first mixer, is mixed with a 13.715 — 34.215MHz PLL signal, the latter frequency determined by the band, mode, I.F. shift and VFO setting. The 1-4MHz output from this mixer is divided to 500kHz, by a programmable divider, and this output phase detected against a 500kHz signal from a 10MHz reference oscillator. A DC output proportional to the phase difference between the two 500kHz oscillators then locks the selected VCO by means of a varicap diode.

The 13.715-34.215MHz signal is derived from the 10MHz reference and a 19.215MHz VXO, the latter controlled by the mode and IF shift settings, then applied to a premixer which is also driven by the VFO



(h) 24.5MHz
CENTRE FREQUENCY 24.5014MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
100W PEP OUTPUT
CENTRE



CENTRE FREQUENCY 24.5014MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
50W PEP OUTPUT
CENTRE



CENTRE FREQUENCY 24.5MHz
HORIZ 1kHz/DIV
VERT 20dB/DIV
100W CW OUTPUT
CENTRE 395Hz OFFSET