

the flying power socket. There is no antenna plug supplied with either rig so check that you have an N-type for the IC45-E before leaving your local emporium.

Circuitry

IC-25E. The circuitry of the 25E, apart from the micro-controlled functions is fairly standard, possibly with more discrete devices that would be expected. Signal frequency passes through the PA low pass filter, RF amplification (MOSFET), and the now obligatory four stage helical filter, before being applied to a Schottky double-balanced mixer. The mixer is also fed with 127MHz from the PLL unit, to convert to the first i.f. of 16.9MHz, followed by a 2-pole monolithic crystal roofing filter, and some more amplification. Another conversion down to the second i.f. of 455kHz follows (MOSFET mixer), the conversion signal coming from a crystal controlled oscillator at 17.355MHz.

The main selectivity follows, using a CFU455E ceramic filter — in a rig at this price something with a tighter specification might have been expected as on the air results at normal 25kHz channel spacing did give some adjacent channel interference with local stations up to several miles away (although this is unlikely to be a problem when mobile).

A straight IC limiter follows, then a ceramic discriminator. This is a little unusual, as most FM transceivers tend to use multifunction IC's such as the MC3357/3359. The present arrangement pulls adequate audio from very noisy signals. Part of the output is used for the noise squelch, operating at around 25kHz, and the remainder, after deemphasis is amplified up to around 2W output.

Transmit

"16.9MHz signals are oscillated by Q6..." — maybe we ought to stick to our own version?

FM signals are generated by applying the shaped audio to a varactor diode, in series with a 16.9MHz crystal, before passing to the same mixer as is used for receive (compare this with the 45-E method of modulation). Adding the 127MHz PLL frequency, takes it up to



144MHz, with the other response removed by the receive helical filter. Three stages of driver amplification follow, thence to a hybrid PA stage, delivering a stated 25W to the antenna via diode TR switch and low pass filter. While a hybrid stage is convenient for the manufacturers, it may not be such a good idea in the event of it needing replacement.

An ALC circuit is used to keep the output power reasonably constant with fluctuating load or voltage, and the same circuit also controls the high/low power output function. If needed to drive a high power amplifier, the high power output could be re-adjusted to say 10W if required.

PLL Unit

A 40.677MHz crystal controlled signal, tripled up to 122.03MHz forms one signal for a FET mixer, the other input coming from the VCO running at around 127MHz. After low pass filtering, the resultant signal around 5.1MHz is applied to a programmable divider, controlled by the four bit CPU. A separate (but on the same chip) 5.12MHz oscillator is divided by 512 to give a 10kHz frequency, which in turn is fed to a phase detector, and any resulting phase differences used to generate a dc control voltage for the VCO to lock.

The CPU uses a scanned matrix to increase the number of functions available — anyone interested in how it works is not advised to consult the description in the handbook!

IC45E

Starting at the receive input, signals from the antenna are routed via the PA low pass filter through a cascode MOSFET/FET amplifier pair, then via a bandpass filter (not helical) to the first MOSFET mixer. The first IF is 21.8MHz, with roofing selectivity supplied by a pair of crystal filters. After IF amplification, an MC3357 sees to the second local oscillator, for the 2nd IF of 455kHz, and to the second mixer, limiter, quadrature detector, and active filter functions. The internal 3357 squelch function is used, running at 20kHz for noise detection. Main selectivity is once again provided by a CFU455E ceramic filter. Audio output is via the same process as for the 25E.

On transmit, frequency modulation, unlike the 25E, is derived by modulation of the VCO itself, on the face of it not a very satisfactory process. The result, among other things, is likely to be a variation in the deviation over the 8MHz of 70cm, and this was confirmed with another station — audio quality being markedly worse at the top end of the band, presumably due to over-deviation. *I would be surprised if this were the cause — Ed.* Both transceivers use a shaped, limited, filtered audio circuit after the microphone.

The VCO runs at half the transmit frequency, and after doubling is first amplified to 200mW, then to 10W by a hybrid IC, with low pass filtering interspersed. A similar