

Rugged Low-cost 2m FM 'Talk-box'

For those newly licenced with a class B ticket, a cheap way of getting on the air is usually the first priority, and more often than not the band is 2 metres, and the Mode FM. This mode has gained a wide popularity for local nattering, mobile and repeater use,

series — the photos and drawings show a case suitable for both purposes, which is easily made. PCB's and kits of parts are being made available for both the Transmitter and Receiver, with crystals readily available from any of the usual adver-

transmissions on the image frequency (around 124MHz) will also be present at high amplitude, and will cause interference. To achieve a high rejection of such signals, a 3-cavity pre-aligned High-Q helical filter has been placed following the RF amplifier, matched into the following Mosfet Mixer (Q2) via R28. This is an easy way of getting the needed rejection and flat in-band response, with no alignment required, as an alternative to using yet more tuned circuits all of which need alignment.

The first I.F. of this receiver is 10.7MHz, and conversion is via Q2 fed with oscillator injection from the oscillator/multiplier chain Q3/4. Signals in the range 134.3 — 135.3MHz are needed for coverage of 145-145.8MHz (the FM portion of 2 metres — although the receiver can be used down to 144.5MHz if needed). The crystal oscillator (Q3) uses series resonant 45MHz crystals, with the output then tripled to the required frequency by Q4. Exact adjustment of the crystal frequency is by means of the series trimmer provided for each of the six crystals.

Because of the availability of low current and versatile integrated circuits for use at 455kHz, plus cheaper filters for this frequency, we have used a second I.F. of 455 kHz for amplification and detection. However, prior to the second conver-

Perhaps you've recently passed the RAE but the idea of building your own 2m rig seems an impossible dream? Or you're an old hand with the soldering iron but VHF and Semiconductors seem rather a rich mix? Whoever you are, relax, lay back and let Tony Bailey, G3WPO, and Chris Gaston, G4KEI, take you step-by-step through the construction of a neat little FM transceiver — without blowing your mind or your bank account. Seriously!

with a phenomenal range of commercial equipment now available. Here is our alternative to going out and buying a Black Box. It features a crystal controlled Transmitter and Receiver, with up to 6 channels maximum, and uses readily available crystals.

The receiver is sensitive (better than 20dB quieting at 0.25uV input), and features a multiple helical filter at signal frequency for freedom from image response problems. No coil winding is involved — all coils can be obtained pre-wound and alignment can be performed using only a multimeter. The Transmitter, for which full constructional details will be supplied in next months HRT, runs 1 watt or so output, and features a dedicated speech processing chip to assist mobile communications. Where possible the construction has been simplified with only a few coils to wind. If you are reasonably competent with a soldering iron, and possess a multimeter, you should be able to build either unit following the comprehensive instructions given.

Once built, the Transceiver can be used as a base station rig (or just the receiver alone as a monitor), driven from a +12v power supply (14v max), or even used mobile. Alternatively, a portable rig can be constructed, with internal NiCad bat-

tisers (see parts list).

Description

We could have made the receiver simpler, but performance would have suffered, and with the crowded nature of the 2 metre FM at present this did not seem a good idea.

Signals at 2 metres are capacitively coupled via C1 and C2 (for a 50 ohm input match) to gate 1 of the dual gate RF amplifier Mosfest, Q1 (3SK51 or 3SK60), configured in grounded source mode. With only one tuned circuit present at this stage, unwanted signals such as adjacent PMR

The assembled receiver PCB

