The Eddystone "640" Receiver

Magazine Test Report

WE are glad to be able to discuss what is the first British-made communications receiver *designed* in the true sense to be offered to the British amateur. There have certainly been attempts in the past to make the indigenous product available, but they have failed either because of a lack of manufacturing facilities and other background resources, or because the design was the eternal compromise between an ordinary short wave receiver of no particular merit and the full communications specification.

Indeed, it was at one time thought by some British manufacturers that the addition of a BFO with pitch control and a mechanically clever slow motion drive qualified an ordinary receiver for the communications title. This has done the British product a good deal of harm.

The Eddystone 640 is a radical departure from these notions. It has been designed by engineers for good amateur band working as the prime consideration. It is therefore fitted with properly arranged electrical band spread, a crystal gate, noise limiter and stand-by switch. The valve line is right up to the best ideas in the field of circuit design.

General Specification

Inclusive all valves, the "640" is a 9-valve job with one tuned RF stage, FC, two IF stages, detector-AVC-1st audio, 2nd audio output, noise limiter, BFO and rectifier. The valves used, in that or der are EF39, 6K8, EF39, EF39, 6Q7, 6V6, EB34, EF39 and 6X5. These are all international octal based on the Mullard or Brimar versions and are therefore easily replaceable.

The EF39 in the RF stage gives high gain with low noise, and the 6K8 with its high conversion factor is a very suitable choice as FC for the HF ranges. The IF frequency is 1·6 mc, with the crystal filter in the first stage. The crystal itself is vacuum-mounted for high Q and the associated circuit has been specially designed for this receiver; with proper operation, an adjacent channel attenuation of about 45 dB can be obtained, with little loss of strength of the signal on tune.

The RF gain control functions on the RF and both IF stages, and non-delayed AVC is applied to the first IF. The series noise limiter can be switched from the front panel and has been arranged to give the minimum of signal loss when in action.

The BFO, audio and rectifier circuits follow normal practice.

On the output side, the receiver will give 3 watts of audio and is arranged for a speaker with a 2·5 ohm speech coil or HR headphones. The headphone jack mutes the speaker and attenuates the input to the telephones. The stand-by switch cuts HT to the receiver on "transmit" and can be used to operate the transmitter change-over relay, for which connections are provided on the rear panel.

Band Spreading

An ingenious arrangement of the drive motions produces band set and band spread on the same dial. Two sets of paralleled three-gang condensers—band set and band spread—are used, driving concentrically mounted scale pointers. The larger is for band setting and the inner pointer for band spreading.

The band set scales are calibrated in megacycles, with the limits of the various amateur bands marked, and the band spreader moves over a semi-circular scale divided 0-100. Some approximate band spreading figures against this scale are: 28 mc, 45/100; 14 mc, 65/100; 7 mc, 50/100; 3·5 mc, 80/100. On 1·7 mc, the band setter is used for tuning, with the 'spreader as a vernier if required.

The tuning range of the receiver is 1,700 kc to 31 mc continuous, obtained in three slightly over-lapping bands. The 28 and 14 mc amateur bands are on Range 1, the 7 mc band on Range 2, and 3·5 and 1·7 mc on Range 3.

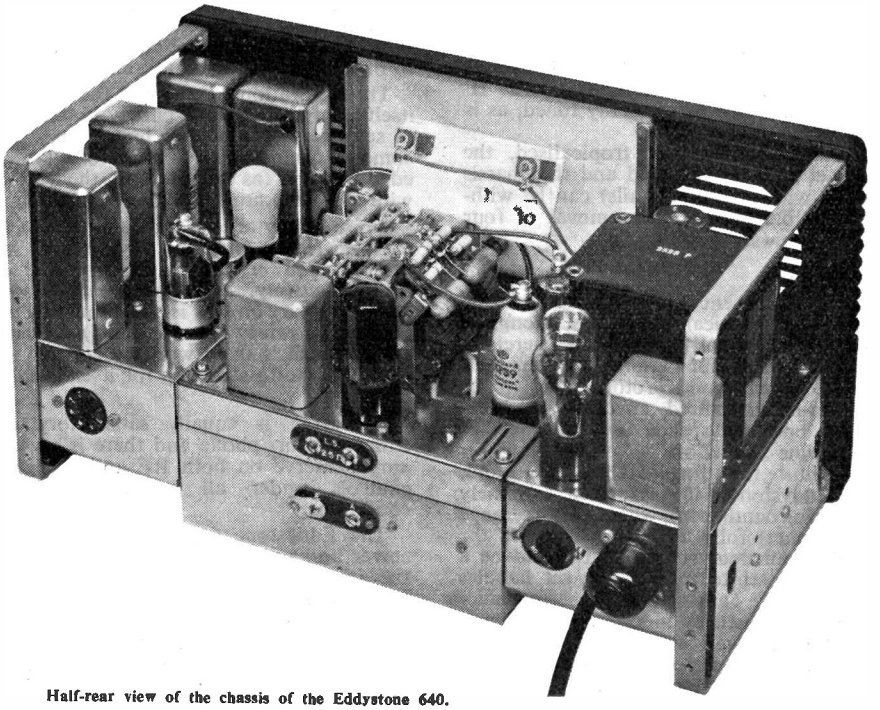
Figures

The overall sensitivity of the receiver is within 2 microvolts in for 50 milliwatts out. The crystal-out selectivity curve gives a drop of about 25 dB at 10 kc off resonance. With the crystal in, a very high degree of selectivity can be obtained with correct manipulation of the crystal phase control and everything tuned "dead on the nose" for CW reception. Image ratios vary from 45 dB down at 30 mc to about 100 dB down at 1·8 mc.

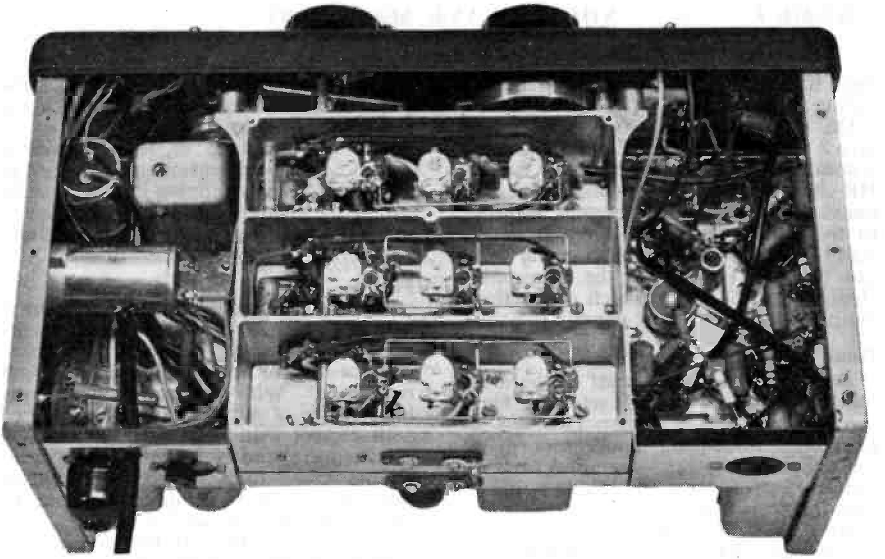
No S-meter is fitted to the receiver, but a socket is provided into which can be connected a meter scaled in the usual way and having a full-scale deflection of 200 microamps.

General Construction

The tuning unit is on a heavy aluminium



Half-rear view of the chassis of the Eddystone 640.



Under-chassis view. Note the heavy aluminium shell in which the tuned circuits are mounted.

casting, the power unit, IF and output chassis being of plated brass. The cabinet is of heavily rust-proofed steel, finished a fine ripple black.

The signal circuit inductances use dust-iron cores and are air-trimmed, while the general design and choice of parts ensures that the factory-adjusted tuned circuits maintain their trim indefinitely. The IF transformers are permeability tuned, as is the BFO coil.

All components are tropicalised, the cabinet is well ventilated and the chassis (fitted with protecting rails) can be withdrawn complete by the removal of four fixing screws.

Performance

The model sent us for test had a long run under practical conditions, alongside four other well-known commercially produced communications receivers and one extremely good prototype design for a non-manufactured amateur band receiver built for special use regardless of cost, time and effort.

Against this formidable background, the Eddystone 640 performed extremely well. In round terms, within its waverange it will meet fully all requirements in the modern amateur station and would be a decided asset to most. The set handles very nicely and all the performance figures obtained by independent measurement check well with the specification; those already quoted above can therefore be accepted as representative.

The layout of the thirteen panel controls is good and the movement of the main tuning motion excellent. The band spreader is on a flywheel which permits of rapid swinging across the band, with smooth, easy and accurate adjustment. Band spread, though not equal from band to band, is adequate on all ranges.

The calibration accuracy of the receiver itself is high, but the accuracy obtainable in setting up on the HF bands could be somewhat improved by the use of a knife-edge pointer (as opposed to the round wire indicator fitted) for the band setter.

Noise limiter action compares well with such devices as fitted on any commercial receiver and certainly suppresses peaks most effectively. The maximum obtainable selectivity on CW is excellent (well up to 20 dB down at 400 cycles off) and any signal which is there with the crystal out can be made to stand up for itself with it in.

Reception is equally satisfactory on either CW or 'phone and there is always ample reserve on both RF and AF gain controls under all normal receiving conditions.

The Eddystone 640 is a beautiful receiver and no operator who understands the amateur band requirement could fail to be impressed by it from every point of view. Because it is so good and the first British design worthy of the British amateur, we are glad to devote so much space to it.