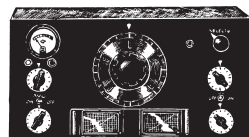


THE COMMUNICATIONS RECEIVER



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The Model 940—the Last Tube-Equipped Eddystone

By Peter Lankshear

New Zealand author Peter Lankshear is no stranger to the Journal pages. In February, 2003 he authored an article on a regenerative receiver with interesting construction features, including coils that plugged in through the front panel.

The Eddystone 940 is a very interesting receiver, a product of the Strattons firm's years of experience in developing and marketing short-wave and BC equipment. The 940 was built and sold from 1962 to 1970, and enough were made that it is considered a common item today. Readers are referred to the web site of the Eddystone User Group www.eddystoneusergroup.org.uk/ for extensive information on this and other Eddystone products.

Dimensions of the 940 are 16½" × 9" × 12". It is not one of the classic, large,

heavy "boat anchors." Nevertheless, a lot of tube-era electronics is included in a small space.

Frequency coverage is 480 kHz to 30 MHz in five ranges. Features include reception of AM, CW, and SSB signals, a variable selectivity IF channel with a crystal filter, two RF stages, and a separate local oscillator. It can be rack mounted with adapters, and is built to withstand rough usage and extreme climatic conditions.

This is a quality product of a well-known British manufacturer, as the attached photos attest. Owners are fortunate indeed to have an Eddystone 940, and perhaps, someday, the writer will join the group—W2DGB.

The English City of Birmingham, about 100 miles northwest of London was, by the mid 19th century, well established as an engineering and manufacturing center. There was a saying that they made everything from needles to anchors. The firm that was to become Strattons had its origins there at that time, and they became proficient at manufacturing jewelry and household items, especially pins. They also developed considerable expertise in diecasting.

During the mid 1920s, there was a serious downturn in the demand for hairpins, largely due to the influence of actress Colleen Moore's bobbed hair styles. With the pin market evaporating, Strattons

turned to making components for the new craze of radio. For these they adopted the trademark symbol of the Eddystone light-house, the epitome of well proportioned rugged reliability and good design. By 1930, Strattons were concentrating on short wave equipment.

Though Strattons specialized in making professional electronic equipment, they also established a reputation for excellent components. The Eddystone dials, especially, became well known world-wide for their quality. Their line of useful diecast utility boxes also became very popular and are still made today by Hammonds.

As with much of the British electronics industry, World War II saw Strattons

extended to the limit. Subsequently, in the early post-war period, they were well positioned to progressively develop a range of communications and non-domestic equipment.

Eddystone receivers were characterized by both their splendid dial movements and their use of die castings for front panels and compartmentalized RF chassis—conferring unparalleled rigidity and stability. Additional electrical as well as mechanical stability were ensured by the use of separate sub chassis for the IF, power and audio sections.

In 1949 Strattons developed the first of a line of very successful professional high performance receivers, the 680 series, which, with some model changes, were to remain in demand for a decade. Up to that time, Strattons had used octal tubes but the new model featured the very efficient glass-button based series.

The 680 followed the classic pattern, pioneered by the ancestral National HRO, of a single-conversion super-heterodyne incorporating two RF stages, separate oscillator and mixer and two IF stages with crystal filter. This concept proved to be popular with many manufacturers of generations of high-performance receivers. The main features were that the two RF stages provided excellent image rejection below about 15 MHz, the separate oscillator tube ensured good frequency stability, and the crystal-filtered two-stage variable selectivity IF amplifier provided high gain and selectivity for operation in crowded shortwave bands.

Around 1960, Strattons' top lines were generally affordable only by governments and large organizations. At the bottom end were good quality general coverage "entry level" receivers. Missing from the product line was a mid-priced high performance communications receiver for the "well heeled shortwave listener and discerning amateur."



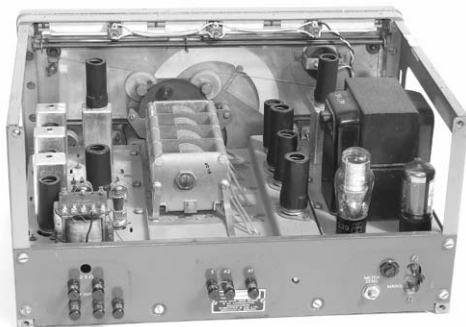
The Eddystone front panel made a handsome appearance. Its large dial with fine and accurate calibrations make retuning and logging a breeze. There is full coverage in 5 bands from 480 kHz to 30 MHz. The base-mounted speaker was an optional but useful extra.

One of the major factors governing the final price of a piece of equipment is its development costs, and keeping these down is a significant way of economizing. The decade-old 680 was now being phased out, but it was still an excellent design. With a few tube modernizations and simplifications it could be "recycled" as a viable new model to be called the 940.

The rest, as they say, is history. The affordable 940 proved to be a winner. It was one of the best-selling Eddystone models of all time, and also the last tube equipped Eddystone receiver in production. It was manufactured until 1970, by which time Strattons had been taken over by the Marconi organization, tubes had given way to semiconductors, and Eddystone equipment was no longer available for private purchase.

In step with developments of a decade, the 940 incorporated some significant changes from the original 680 electrical design, including a simplification of the IF variable selectivity from continuous to switched. Externally the cabinet and dial were modernized, and the traditional lift-up lid disappeared.

Most apparent were some changes in tube types and function. The elaborate double pentode audio voltage amplifier and phase inverter gave way to a simpler



As was standard with Eddystone receivers, there were three sub chassis, the massive RF unit being flanked by the IF amplifier plus detector and the voltage regulated power supply plus audio amplifier.

and better balanced double triode amplifier/phase splitter. The original pentode B.F.O was replaced by a 6BE6 pentagrid oscillator/product detector. An improved triode-hexode, the ECH81/6AJ8 was now the frequency converter, but the most radical change was with the first RF tube.

Since its advent in the early 1930s, the RF pentode had become the defacto standard input tube for all receivers operating below VHF. Modern pentodes such as the ubiquitous 6BA6/EF93 did a good job below about 15 MHz, but above this region, tube-generated noise became an increasingly performance-limiting factor. Straight triodes were just not a practical proposition for noise reduction.

A significant improvement came in TV receiver front ends in the 1950s with the development of the cascode (cascaded triode) double triode RF amplifier. which is effectively a cathode follower feeding a grounded grid amplifier stage. The cascode is a very stable amplifier with as much gain as a pentode and with practically no noise.

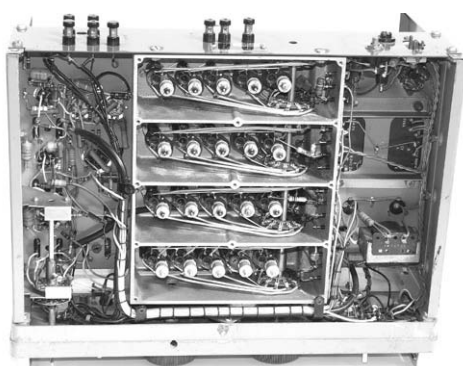
Standard triodes have the serious limitation of a sharp grid cutoff and therefore are not suitable for AVC. However, there was a variable-mu high-gain double-triode especially made for cascode operation, the ECC189/6ES8. It had an impres-

sive transconductance of 12,500 micromhos, conferring both high gain and low noise. With an ECC189 aerial stage feeding a 6BA6 pentode second RF stage, the 940 has a front-end performance unmatched in a traditional receiver.

As can be seen from the photographs, the trademark rugged diecast construction of the attractive front panel and RF chassis was retained. Eddystone dial drives are among the best ever made and that of the 940 is no exception. Silky smooth and “feather light” it features a 140:1 gear ratio. In addition to the large, finely-calibrated dial, there is generously sized logging scale showing through a window.

With this combination, even at 30 MHz it is possible to retune to an accuracy of 1 kHz. Despite the low gearing, a few flicks of the flywheel-equipped tuning knob are sufficient to traverse the full sweep of the dial. The only comparable drive that the writer has used is that of the Hammarlund SP600.

The performance of the 940 matches its construction, being both stable and sensitive. Even today it can hold its own alongside most general purpose receivers and is a fitting model to have been the last of the tubed Eddystones in production. ☐



The bottom cover of the RF chassis and coil box has been removed to reveal the solid diecast construction. As with all Eddystone receivers, the wiring is meticulous. All trimmers are air dielectric “Beehive” types.