



## A miniature Eddystone

The name of Eddystone, of Birmingham in the UK, is synonymous with fine communications equipment. Before the Asian invasion of solid state receivers, and although the price might have gone a long way towards the buying of a small car, the ambition of many Australian and New Zealand amateurs and shortwave enthusiasts in the 1950's and 60's was to own an Eddystone communications receiver. Many that were purchased then are still giving good service today.



**Even without the name badge the little 870A cabinet, only 280mm long, would be instantly recognisable as a scaled-down version of a full sized Eddystone receiver.**

Eddystone Radio built their first radios more than 70 years ago, and their founding is a classic example of the way fashion and developments can completely alter the direction and product of long established companies.

It all started in 1860, when the partnership of Jarrett & Rainsford was founded in Birmingham to make pins and small metal components.

Thirty eight years later, in 1898 and coincidentally, at the time when Marconi was founding his Wireless Telegraph company, J&R took on a likely office boy, one G.A. Laughton. Laughton displayed such ability that in 1904 he was made Assistant Manager of a new department, set up to make hair pins or as they were popularly called 'bobby

pins', an essential accessory for women's fashionable long hair.

In 1911, G.A. Laughton was in charge of making flags and badges, in anticipation of the forthcoming Coronation of King George V.

The business of one of their key subcontractors was in a bad way, and deliveries very unreliable. Realising that there could be supply continuity problems ahead, Laughton, with his own money, bought out the ailing firm, renaming it 'Stratton & Co'. Shortly afterwards he was made a director of Jarrett & Rainsford, but continued to run the by-now thriving Stratton organisation.

In 1920, the two firms amalgamated to become Jarrett Rainsford & Laughton — making a wide range of household items,

with a major emphasis still being on the ubiquitous bobby pin.

### Out of fashion

Apparently unrelated events can alter the course of history, and such was the case for JR&L. No sooner had the amalgamation been completed than women's fashions changed. Long hair was suddenly unfashionable and as a consequence, so were long pins.

Diversification was called for — urgently. Laughton's eldest son, George Stratton Laughton, who had recently joined the organisation, provided the answer. Like many bright young fellows then and since, he had been bitten by the radio virus.

George suggested making radio components. The directors agreed, and in 1922 the Stratton plant was put to work making parts which were trade marked with the Eddystone lighthouse as a symbol of endurance and reliability.

Complete receivers were being made by 1923. One of the early models was the 'Eddystone Twin' having two valves, plug-in coils and a glass panel!

Strattons soon realised that their niche was in making shortwave equipment, and when the BBC commenced their shortwave transmissions, Eddystone receivers were the only available British-made radios capable of receiving the 'Empire' broadcasts. These receivers became very popular with expatriates in the far corners of the world, and with enthusiasts who appreciated high quality equipment.

Before long, there were contracts for government and commercial services, and Stratton-made equipment was carrying not only the Eddystone badge, but also prestige labels like STC, Marconi, BBC and Post Office. As well, military,

naval and merchant marine services have long been extensive users of Eddystone made equipment.

Today, with most communications receivers for non-commercial service coming from the Orient, the good news is that Eddystone are still very much in business. The company amalgamated with Marconi in 1965, and are still making professional equipment of the highest quality.

It was during the twenty years following 1950 that Eddystone receivers had their greatest popularity with amateurs and shortwave listeners. A glance through copies of *Radio and Hobbies* during this period will reveal advertisements for mouth watering Eddystone products, selected from a wide range of models. These range from top of the line professional receivers like the 680 and later the 940 (described in this column for March 1993), to more affordable but still high performance sets like the 640 and 750.

There were also their popular components, especially the tuning dial assemblies that were often used in amateur equipment.

Also it is not always realised that Stratton & Co originally developed the familiar diecast metal boxes, now locally made, that add distinction and convenience to small projects.

### A cabin receiver

During 1957/58, a unique Eddystone receiver, the 870 was introduced. Whereas contemporary Stratton equipment was complex and relatively massive, the model 870 had only five valves and if judged only by its circuit, was simply a modest transformerless AC/DC receiver, with much in common with millions of low priced radios intended as second sets, or for bedside and apartment use.

However, the circuit alone is deceptive and there is much more to the 870 than just another utility radio. Immediately obvious is the absence of the plastic cabinet and very basic dial usually found in economy radios. Instead there is the distinctive and nicely proportioned steel cabinet that was almost an Eddystone icon, right down to the chromed handles and full width multiband dial.

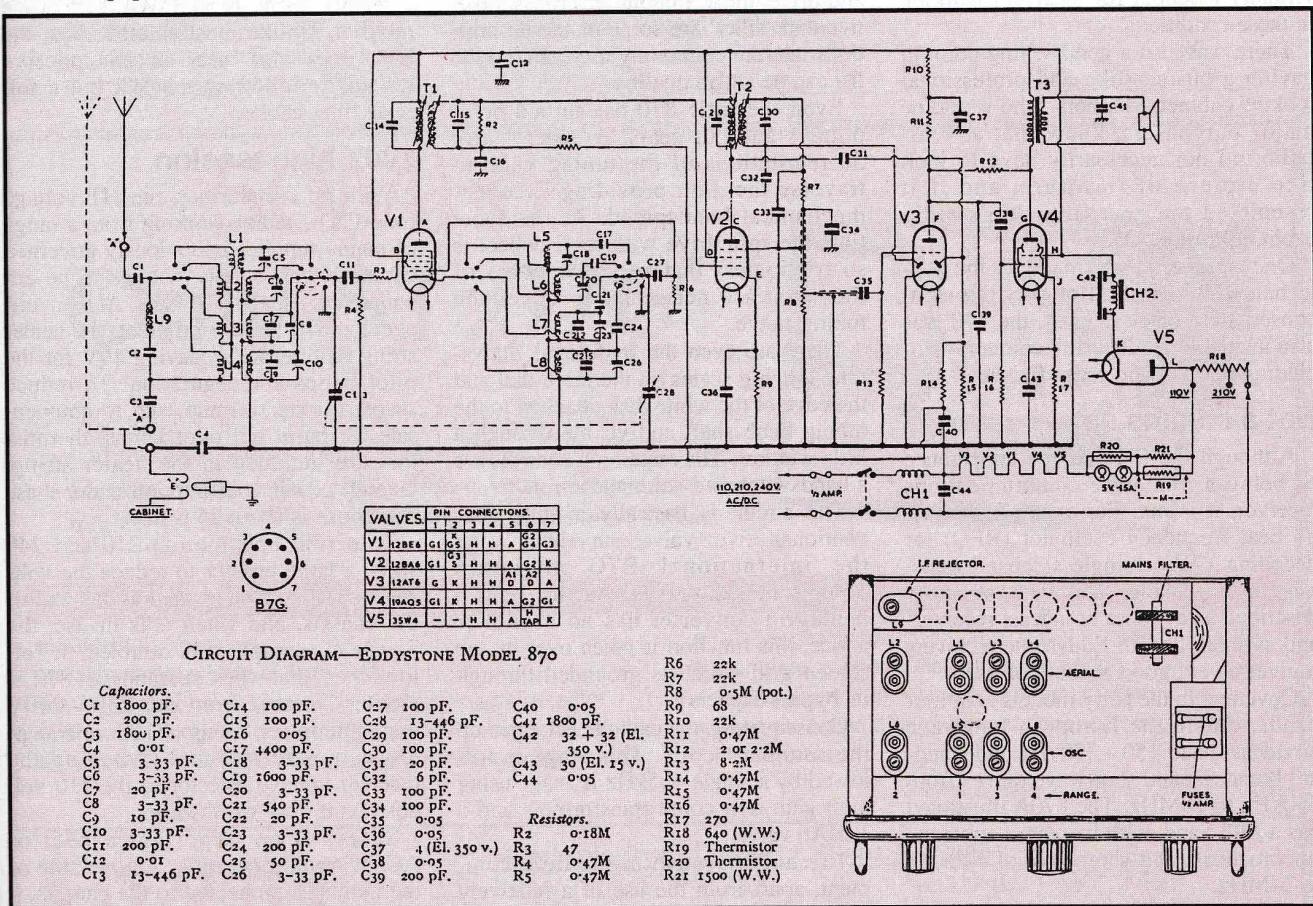
Cost saving was a major reason for

building receivers without power transformers, as these were often the most expensive individual component in valve receivers. Even so, the English price of the 870 was about £30, more than double that of everyday budget priced radios.

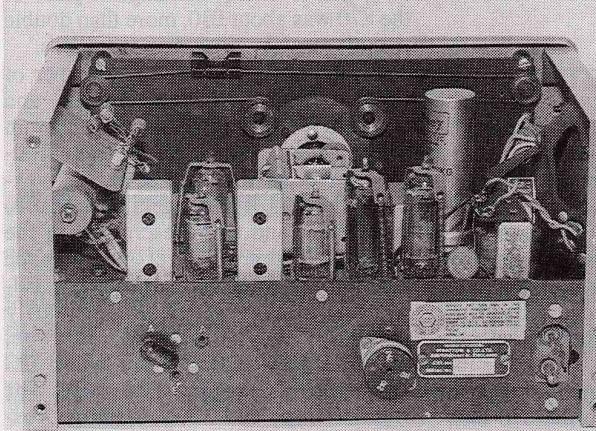
In fact, there were quite a number of other AC/DC Eddystone models, and economy was really not a factor in making the 870 transformerless. Strattons were, as we have seen, very experienced at building marine radio equipment, and their description of the 870 as a 'Cabin Receiver' provides the clue as to its intended purpose. The Eddystone mini receiver was primarily intended as a shipboard receiver, where traditionally there were DC supplies — around 100 volts for smaller ships and 220V for large vessels. Obviously mains transformers are of little value in marine receivers.

Shipboard environments are very hostile to radio reception. With all manner of commutator motors and contacts going snap-crackle-pop and making frying sounds.

Mains-borne interference is quite serious, demanding stringent screening



Although there are a number of refinements, the basic circuit of the 870 is that of a simple five valve AC/DC receiver. It is most desirable to use a mains isolating transformer when working on this type of receiver.



**The valve retaining springs indicate that this is a receiver capable of withstanding vibration and handling. Some of the high quality machined parts of the dial drives are visible in the centre.**

and filtering. Metal cabinets and thorough filtering of mains leads were virtually essential for receivers working in these conditions.

There was also a good selling point in having a businesslike and professional looking cabinet. Mariners, who would be major purchasers, knew that a 'real' radio did not necessarily have to look like a piece of furniture, and if it resembled the gear in a ship's radio cabin, it must be OK.

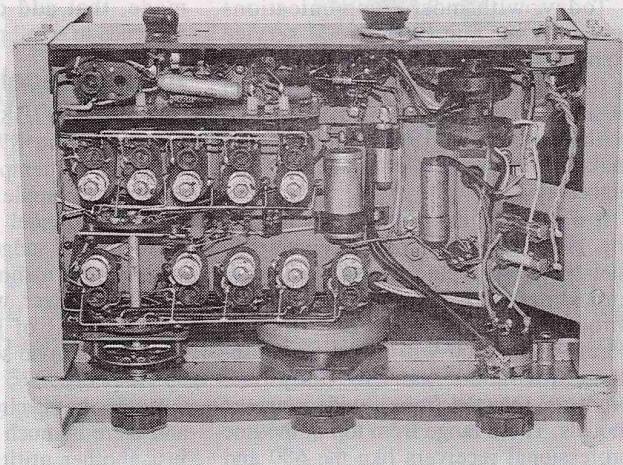
One concession was made for the non-technical user. Instead of only the usual conservative black or grey, the 870 was also available in 'cheerful' colours — including maroon and green finishes.

### Not a comms set

Although the 870 has the appearance of being a miniature communications receiver, it is not. For example there is no beat frequency oscillator (BFO) for decoding CW or single sideband transmissions. In reality, it is what has been described as a 'super broadcast receiver' and as such, like all Eddystone receivers it gives a very good account of itself.

Coverage in the early models is in four bands, tuning the European longwave broadcast band 150 - 350kHz and standard broadcast and shortwave ranges from 540kHz to 18MHz. The 870A illustrated has a fifth band, with increased coverage for broadcast and shortwave of 510kHz to 24MHz.

One turn of the large central tuning knob is sufficient to demonstrate what an Eddystone receiver is all about. Being



**Eddystone receivers always had neat and orderly wiring, and large components are clamped to the chassis. The large coils at the upper right are the line filters, essential for keeping out mains borne interference.**

fine mechanical as well as electronics engineers, Stratton's made superb dials and drive units. Smooth, effortless, positive and 'silky' are some of the descriptions that are commonly used, and to the list can be added quality.

Even the little 870 has turned brass pulleys and cut gears. It takes nearly 50 revolutions of the tuning knob to traverse the dial, providing excellent mechanical bandspread. At the same time the spin drive with its flywheel is so frictionless that very few twists of the wrist are necessary to cover the tuning range.

There are even the traditional Eddystone logging scales on the main dial and the edge of the white disk attached to the tuning knob shaft and visible through a little window. The remaining controls are a bandswitch and volume control.

The circuit is basically a quite conventional five valve superhet, using the international B7G miniature 150mA heater valves. As the 12BE6 pentagrid converter has no oscillator anode, this function is taken over by the screen grid which is grounded through its bypass capacitor.

Consequently, the cathode is tapped up the oscillator coils. This stage is followed by a single 465kHz IF stage using high gain iron cored transformers and a 12BA6 valve.

The audio system needs little comment, apart from the use of a relatively uncommon output valve: the 19AQ5 beam tetrode. This is equivalent to the more familiar 6AQ5 and 6V6, but of

course has a 150mA heater to operate in series with the other valves.

Finally there is a 35W4 half wave rectifier. Unlike most small radios, the 870 does not use an inexpensive resistor for filtering the HT, but a full scale filter choke.

### 100V high tension

With no transformer, the HT voltage for AC/DC radios working from a range of mains supplies is obviously governed by the lowest supply voltage to be encountered, usually 110 volts. At this voltage, the 870 is quite efficient; the heater string requires 91V, leaving 19V for the pilot lamps and regulation. To reduce surges during warmup, and to compensate for burnt out pilot lamps, thermistors are included in the heater string. Overall power consumption under these conditions is about 25 watts.

To permit operation at 210 and 240 volts, a large resistor to reduce the voltage to 110 volts is located at one end of the chassis, and when it is in use, the power consumption is doubled. It follows then, that when operating an 870 or similar receiver from our 230 - 240V mains supplies, using a 110 volt step-down transformer and switching the receiver voltage selector to the 110 volt position is very worthwhile.

Safety is an important aspect of AC/DC radio operation. As one side of the mains is connected to the chassis, it is quite possible for the metalwork of a receiver to become 'live'.

This problem is compounded by the

metal case of the 870, and was solved by insulating the cabinet with nylon grommets around control shafts and cabinet mounting bolts.

It is especially important, therefore that capacitor C4 should have a high voltage rating and low leakage. Other components to check are the small black metallised foil bypass and audio coupling capacitors, and R11, the 12AT6 anode resistor. But otherwise, the conservative design and relative simplicity ensures that it's unlikely much will be found wrong.

Although the 870's absolute sensitivity, image rejection and selectivity can in no way be comparable with a full scale communications receiver, its performance is much superior to equivalent domestic receivers and can be used for quite serious DX work. Indeed it can outperform many much more complex sets.

Do not pass up a chance to obtain one of these cute little receivers, as they make great bedside or desktop radios, are a pleasure to use, and are small enough to take along on holiday, (not forgetting a few metres of insulated aerial wire) for better than normal radio reception.

Before closing, some further information has emerged regarding the Wunderlich valve, which was the subject of last October's column.

Most data available indicates that the planned Wunderlich B valve was to have had the addition of a screen grid. This is confirmed by valve tables appearing in normally authoritative publications from Henny, Ghirardi, Babani and National Union.

However, from John Stokes has come a copy of an article that Norman Wunderlich himself published in the March 1933 *Radio Engineering*, about the planned B valve — and showing quite clearly that the added electrode was to be a diode intended for various AGC applications.

The Wunderlich B would therefore have been a double triode/diode, but as events turned out, was forestalled by the double diode/triodes that remained standard to the end of the valve era. It is unlikely that the Wunderlich B was ever made commercially.

We mentioned also the Sylvania double triode alternatives, and the use of their type 70 in a Sparton car radio. Another receiver, the Midwest 1933 16 valve model has emerged as also using a dual grid detector, in this instance the type 29 Sylvania double triode. ♦

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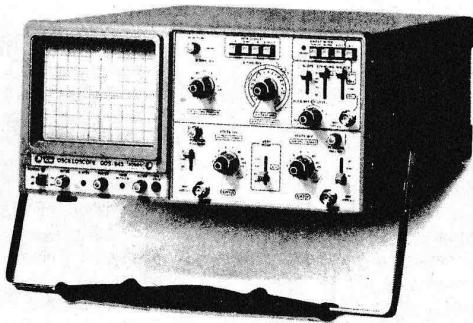
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