Eddystone User Group Newsletter

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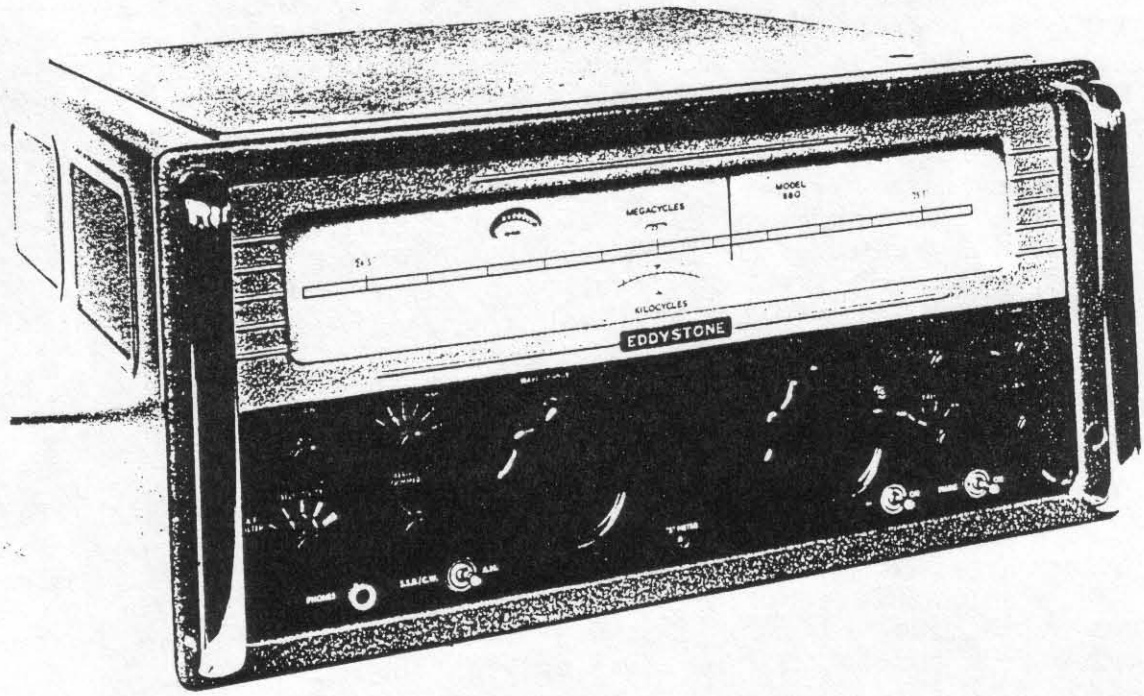
Featured Model:
Eddystone 880/2 High Stability Receiver



*A non profit newsletter for Eddystone Users
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Well here is the Xmas edition of the newsletter. We fully expect you to get it in time for you to have a good read over the Xmas break, especially as it is going out with issue 45 which unfortunately was delayed due to sickness at the works preventing any major copying being done for a couple of months. Anyway we are all back to normal now and I wish all of our readers every happiness for Christmas and the New Year.

The success of any group in whatever field depends of course on its membership. However I would like to use this opportunity to remind readers of the fortune they have in the dedicated efforts of a few people who make the EUG and the newsletter possible. At the risk of missing someone out, I think we need to pay special tribute to Ted Moore who was the driving force behind the concept of the EUG and is today the main author of the newsletter which over the years has never lost its interest or readability.
Ted gets a lot of support from Jim Murphy and Graeme Wormald. Graeme stepped in to fill the gap that was in danger of sinking the EUG when I decided that I could not answer the members queries as well as organise the distribution of the newsletter. Graeme has proved unflappable and dedicated in his organisation of the EUG. I should also remind readers that most of the Eddystone effort put into the EUG is the work of two ladies at the works. Pat, my secretary, looks after the books, the bank account for the members subscriptions and despatches the newsletters (some 350 per issue), Christine, who runs our technical publications section, prints all the newsletters (very professionally) and the many requests for back issues and manuals. Without the willing assistance of these two ladies, your EUG would cease to exist. Me, well I don't do much anymore, except sign the cheques and write this occasional piece for the newsletter, although I have been known to lug a few old Eddystone radios around the factory and at the NEC.

The Christmas supplement this year will be a delayed until later in the year because of large print load of doing two issues together. In small recompense we have included a copy of our "Broadcasting Capability Profile" which we published in the early 90's. We have not quite made up our mind of what to offer for the Xmas supplement but have a couple of good ideas to work on.

Subscriptions
Subscriptions are £10 per year UK and £11 per year overseas. Metal EUG badges are available at £2 each. Any remittances for subscriptions, badges or manuals must be by cheque or money order and in sterling. Make your cheques payable to **Eddystone User Group.** Subscription rates will be going up from issue 49 onwards, see previous newsletters for details.

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- Issue 46 - Christmas 1997 -

Here it is, another Issue with another Supplement. I hope that all members have this Newsletter prior to the Holiday so that they may sit back and read it over the Festive Season, whilst digesting their turkey, or whatever.

It has been nice to have so many early cards and letters wishing myself, and EUG well and thanking us for the N/L. The real thanks as always must go to the Ladies at the Factory who do the hardest work, the copying and enveloping, then lugging the copies down for the post. The size of EUG now means that the full printing makes a formidable load, so THANKYOU Ladies.

By now the complete, reconstituted, 880/3 manual will have been checked, by me, and returned to Graeme for copying purposes. I have my own copy also for reference but if anybody needs a copy of the COMPLETE 880/3 manual then write to Graeme. Don't be fooled by the title as what we have here is a Marconi version called the H.2301, despite what it says it is an Eddystone and was manufactured at the Bath Tub.

The very necessary info about the 'rogue' version of the HF comms; receiver model 1650 has been passed onto the Hobby Mags; by Graeme. Hopefully this may save a few pennies for those who might have been considering the purchase of one of these apparently bargain priced receivers. But the saga is just beginning for those who had already acquired such a 1650. In my post is one letter from a Leeds member who did not realise until he had it at home just how daunting a task it would be to get this version 'on air'. He has given up and says that it shall remain in his shack as a collectors curio, unpowered unfortunately. This is unlike any of his other sets which number 17 Eddystones so far. All of these have power connected and can be turned on at will. Who knows but maybe someday some enterprising EUGer will come up with a 'quickfix' for this version of the 1650, so says Ivor. But don't anybody hold their breath, please.

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- The 870A -

For such a simple receiver this model generates quite a lot of mail. From Trevor who has just an 870A and no other receiver, which he uses as a bedside set to while away his sleepless nights we go to Sam who has both an 870 and an 870A and delights in pitting the two together for Dx reception, and on to those who have one or other as a part of a larger collection. Being the simplest of all post WW II sets this receiver rarely has problems. Occasionally with accrued age the dropper resistor will give up the ghost but in the main all components including the valves last almost 'for ever'.

Stan has one of the last 870As to be manufactured, he also has an early 870 and a later version 870 differing only in the colour of the case and panel. When using one or other he often finds it advantageous to use one of the others alongside where the two are on one aerial lead. This way by tuning the second set higher by 465 Kc/s, radiation from the local oscillator of the second set is fed back through the coupled aerial sockets to provide a 'sidetone' for CW or SSB reception. Living on the west coast Stan can hear and read both Shanwick and Shannon Airmet with no difficulty. The 870A has become an integral part of his 'listening post' alongside a venerable 1947 Bush broadcast set which has been used successfully for Transatlantic Dx-ing.

Stan comments that his 870s have never needed valves since he bought them years back, but that both have had to have replacement mains leads when the old leads cracked and began to disintegrate. All his sets, Eddystone and Bush work from the one commoned aerial lead in from a very long, long wire down the length of the back garden. No ATUs are in use, just straight

in through the window frame and then into the receivers via wander plugs and a paralleled jumper lead. He has found that for best use on SW the Bush needs to be switched to LW so as to prevent maximum damping of the aerial and the 870 used as a BFO needs very fine adjustment (nimble fingers) for SSB on the other. Just think though Stan what improvement in 'S' levels you could expect with a 'tuned' aerial system via an ATU !

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- An Errant 888 -

There is a saying that Eddystones don't go wrong, often. Well one can add a rider to that to the effect that "When They Do, They Really Do !"

Having been in the family since new, Ted's 888 had become his property after the death of his Dad, some twenty years back. With never a protest the 888 had functioned perfectly all of these years. These last couple of months Ted has suffered two long periods off the air, having to rely upon an OBB* for his listening pleasure.

First signs of age came when the mains ON/OFF toggle switch simply refused to 'toggle' - remaining obstinately in the OFF position. It was 'hot-wired' whilst a number of Mayday letters went out to various dealers. In the event it took several weeks before a suitable replacement was found. Only days later and the set refused to function on Range 1. Now there has been some evidence of increased activity on '10' of late and Ted felt this lack keenly so it was necessary to diss the power etc; and remove the outer case. Many hours later, spent on fruitless component testing and then 'Eureka'. It became apparent that C45 was reading a complete short circuit. Now this is a tubular
ceramic condenser with a value of 30pf capacity. On the newfangled Digital Capacitance meter it read S/C and on the old but trusty AVO 8 it read a mere 24 ohms. This is unusual for ceramic 'tubbies' but as said above, when they go, they really go. A modern ceramic condenser of recent manufacture was fitted and the local oscillator on Range 1 was checked for tolerance with a DFM. Going by the Factory data from the manual a tolerance of $\frac{1}{2}$ of 1% is the norm, this was easily catered for by minimal adjustment of the trimmer. It is not often realised that at frquencies such as 28 - 30 Mc/s (Range 1) this $\frac{1}{2}$ % tolerance equates to 280 - 300 Kc/s !

The 888 is back working again, no further symptoms of its age, and the usual pleasure is being obtained from using this fine piece of equipment.

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- The Model 909A-

Not many of these available in the UK, at least not in the hands of EUGers.

This one belongs to an OT who has used it for monitoring the 2182 'distress' channel for many years. Bryan has an 830/9 for general coverage but the 909A is always on to monitor any marine Mayday calls.

A recent problem was varying levels of hum from the speaker, low enough to be tolerable at switch on but increasing during several hours of operation to the point where it became just 'too much'.

This set is 'different' in that it has limited coverage over the Coastal Marine Bands, just two ranges of 2.7 - 4.7 Mc/s and 1.6 - 2.7 Mc/s. This is rather reminiscent of that mysterious YACHTSMAN set is it not ?

In the event it became vital that the 909 be opened up, this was the first time since Bryan acquired the set. The usual checks of insulation were made around the input mains circuitry as this is one of those AC/DC, or

Universal mains sets. No surprises here luckily and so it was necessary to dig deeper.
The receiver was 'on' whilst some probing was done under the chassis and it was discovered that the braiding for the screened lead from the grid of V6, the AF amplifier, to the centre tag of the volume control was corroded and was not making good contact at the pot; end. The soldered joint had some greenish goo around it and this had progressed several tenths of an inch up the length of the braid, there was no continuity between the pot; case and further up the braid.

It was decided to completely replace this piece of screened wiring and upon a further test the hum problem had cleared completely.

Whilst the receiver was opened up on the bench it was decided to take up the offer of a fellow EUGer and so all valves were removed and wrapped carefully before being taken for testing on the Mullard Valve Tester. All seven of them were okay, at least within the green segment and so were replaced in the set.

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- The 940 -

There were two versions of this basic model, not a lot of difference but some external signs as to whether it is one of the earliest or one of the latest manufactured.

Does the 940 have toggle switches with those plastic extensions to the toggles ? What is the logo over the crystal phasing control, just simply Phasing or is it Crystal Phasing ? Does the 'phones socket have a black plastic panel top or a chromed one ? Are the centre inserts in the knobs grey or 'brushed satin' ? You may also find that upon opening up there were two brands of mains transfo used over the years.

There is absolutely no difference in operating parameters or performance between these two versions of the 940 but the version with the plastic toggle ends is somewhat more rare in this country.

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- Spares Availability -

The only known source of new and unused spares is Centre Electronics of Brum, Howard will also supply used parts if they are available. What you need to realise is that certain parts are common to many models. IFTs are an example, audio transfos are another. Some variable condensers are common to other models as are the RF and Mixer coils. So, just a tip here. Don't just advertise, or ask for, e.g. - "an IFT for an 830". Quote the part number and maybe even external dimensions and any values. The reader of your ad may not think he has what you need but then he may have the identical part from another scrapped model.

The reason for this homily ? Well Alan has been after the 2nd AM/IFT for an EB35 for months now, he has just discovered that a pal has a cannibalised EC10 which - surprise - has the very IFT that he needs.

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- 740 Problems -

A very reliable model this, rare to hear of anything more than valve changes being necessary. In Harry's case he has gone through two sets of valves plus one extra EZ40 rectifier. This time it was more serious as the

reservoir condenser had 'blown' and HT going to chassis had taken R36 'out'. This is a wire wound 400 ohms type and replacements are easy enough to get, make sure of the power rating of the replacement though, a 7 watt type will suffice and these are readily found.

The e'lytic was a 50 muffs, 350 volts working and suitable 47 muffs, 450 v.w. was purchased, the difference of 3 muffs is well covered by the +/- tolerance of these items.

Repair took mere minutes really once the bits had been obtained, and the 740 was burbling away happily again. A few voltage checks were made to compare against the table given on the service sheet. Some surprises here, V1, V2 and V3 screens were way down and the relative screen dropper resistors proved to have gone 'high'. It was decided to swop these before the 740 was recased and this brought up the voltages to within tolerance. Upon powering up, and testing on certain 'test' signals it was noticed that there was a definite increase in liveliness. The decrease in performance had come about so gradually that it had gone unnoticed. Another twenty years ? Well Harry hopes so.

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-An FM Tuner Repair -

The 820 was a mono AM/FM tuner unit designed to feed one of the high fidelity valve amps so common in the mid fifties.

Dave has used his 820 on and off over the years but after a house move some months back it was put aside. Then the time came for the 820 to be wired up to Dave's Mullard 10 Watt amp;
in a built-in enclosure. First tests went okay but then the 820 decided to rebel, valves lit up but no AF output at all. A quick test with a finger (!) showed there was HT. DON'T USE THIS TEST, IT HURTS !

Using an ex MoD AvoMinor some simple tests were made , this soon located the fault to C63 the output coupling condenser.
It was a moulded mica 0.01 muff but apparently open-circuit. The damage was NOT simply a failure, it was physical, caused either in transit or whilst fitting the unit into its new enclosure. One end tag had broken off. A replacement was found in the junk box, tested, and then fitted. This brought the 820 back on line immediately and the full set-up of 820 plus Mullard Amplifier was found to be working well. Installed in the 'shack' it provides light music for listening to whilst doing bench work.

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- Tuning Drive on a 640 -

Occasionally the co-axial pointer system will become 'blocked' so that both pointers attempt to move when either tuning knob is rotated. The cure is remarkably simple, just one single strategically placed drop of light oil on the point where the central axle enters into the hollow outer axle. Don't go overboard with the oil, just one drop is enough, let it permeate through the co-axial pointers and then put the case back on and Voila ! a complete cure - so says Ken.

The correct thing to do is a light coating of grease on the inner axle before it is inserted into the outer, hollow, axle. Ted.

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- Featured Model, 880/2.-

The 880/2 is an updated version of the 880 and is a high stability professional, general coverage comms receiver. It covers from 0.4 to 30.6 Mc/s in thirty 1 Mc/s ranges with overlap at each end of the ranges.

Dial readout is accurate to 1 Kc/s on each of the linearly marked ranges and the frequency is resettable to within 500 c/s anywhere in the full coverage.

The scales exhibit a linear readout characteristic and tuning is by variable inductance rather than variable capacity as in most other comms receivers.

The RF input is mixed with a fixed crystal generated local oscillator to give a tunable 1st IF of either 2.5 to 3.5 Mc/s on the 'odd' ranges or 3.5 to 4.5 Mc/s on the 'even' ranges.

A second fixed IF at 500 Kc/s has variable selectivity and a BFO tunable at +/- 7 Kc/s around the IF. A further panel control provides suitable switched offsets for both LSB and USB operation.

Two switched crystal filters enable provision of five positions of selectivity in total.

There are two separate audio channels for feeding a remote lines 1 milliWatt at 600 ohms and another for feeding phones or speaker, a miniature monitor is provided on the front panel but an external speaker may be used.

Great care has been taken to eliminate external radiation and most parts of the circuit are either double or triple screened for this purpose. This also enables the 880/2 to be built into rack mount diversity units, the necessary circuit provisions being made.

The 880/2 was followed by two special versions, the 880/3 was badged for sale by Marconi/MIMCO and few left the factory with lighthouse logos. The /4 was also slightly different in the filter dep't and was destined for use by GCHQ - this DID have the Eddystone logo.

No attempt willbe made to do a block schematic due to the innate complexity of this model.

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Active Aerial Model LP3382.

Graeme has now obtained one of these and has provided me with some very explicit photos of both the internal and external details. It appears to be a 3 transistor RF amplifier fed by a single telescopic whip, the whole housed in an Eddystone diecast box sufficiently large to permit the addition of a PP3 battery to provide the 9 volts required. However there is also provision for an external supply via a 3.5mm phones socket.

My immediate criticism was that using the single whip there was none of the local QRM balancing out as is possible on, say the Datong type AA. But then we have no idea of the use for which this was intended, do we ? Any ideas out there please to put us right ?

The top panel states ACTIVE AERIAL TYPE LP3382 and has the Eddystone logo. The side of the box has a sticker saying

DESIGNED AND MANUFACTURED FOR
Eddystone Radio Limited by
BARNETT & LONGMORE LIMITED
COVENTRY.

Does any other EUGer have one ? have we a circuit anywhere for this so chinese copies can be made by EUGers ?

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Eddystone Mods.

Don't blame me, I only do the Newsletter ! This letter from a non-EUGer in France asks whether there are any Company mods available for replacing the valves in a 940 with FETs. If so may he please have a copy together with details of parts availability and costs.

I mean to say, the 940 is a bit past it's sell by date and to expect any company to provide such services now is asking a lot. I have said before and will say again that I do not approve of any such mods myself, even if I knew of them existing.

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Those Strattons PSUs.

An EUGer from Derby, Tim, has an ex-WD HRO receiver which has the original supplied mains PSU which bears the STRATTON nameplate and which has had no repairs done since Tim acquired it in the '60s, apparently none before that either since the wiring and components look to be original. He acquired a similar 6 volt DC psu many years ago for possible repair and Field use but has never found a suitable Vibrator unit until a few weeks back. Tim has a Winter Work Plan to renovate and repair the DC psu to operate the HRO whilst on caravan holidays, he has promised further info when the job is done. Ted.

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EC958/7E.

In answer to several queries about the various analogue and digital versions of this model I have delved into files and so far as I can make out the /7E was the first version to have the digital readout of frequency. I stand to be corrected on this but so far as I can find here the above is correct. The photo of a /6 that I have is analogue, the photo of the /7E is digital but was there a /7 (minus E) and what was it, analogue or digital ? If you know otherwise then let me know.

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The 31A Measuring Receiver.

This set was built to a Post Office Engineering Dep't design and specification, not designed by Eddystone. It was manufactured by the Company to this design and spec; and was later marketed under licence. It was sold both in the UK and abroad in the mid '70s, a few examples exist in EUGers collections but it is a 'rare bird' so if you are a collector and see one for sale do not hesitate. The 'civvy' versions do have an Eddystone badge in the lower left hand corner of the front panel, the P.O. versions did not have this but may have a plate or stencil bearing the number W6912 somewhere on the outer case. This was the Spec; number from the P.O. Okay then George, now you know as much as I know, oh yes, the /12 was an ISB version with a front panel 1.75 inches taller than the normal 958 you have.

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- Aerial Systems for Use with the Eddystone Models 770R & U

The choice of aerial for use with a VHF/UHF receiver such as the 770R and 770U is dependent entirely upon the reception facilities required. Although the manufacturer can suggest a number of approaches to the problem, final selection of the most suitable aerial rests with the user. The alternatives suggested here are by no means exhaustive and it will be profitable to make reference to detailed works on both theoretical and practical aerial design. A number of suitable publications are listed at the end of these notes.

General.

Aerial systems can be compared with one another on the basis of their operational bandwidth, effective gain, directivity, and polarisation. Of these four factors, the first three are most important since any one can be altered without affecting the polarisation of the array.

Changing any of the first three characteristics usually alters the other two so that the initial choice of aerial must be made on the basis of bandwidth, gain and directivity. Polarisation is not usually important at this stage since most conventional designs are easily arranged for either vertical or horizontal polarisation.

In different sets of circumstances, either bandwidth, gain, or directivity may become the deciding factor in selecting a suitable system. For general coverage over a wide range of frequencies, bandwidth is obviously the main consideration and if an aerial of this type is essential, it can only be produced at the expense of directivity and gain. If high gain, or sharp directivity are required then the aerial will of necessity have a relatively narrow bandwidth.

Most applications calling for aerials for use in the VHF/UHF region permit the use of directional arrays since operation is usually restricted to certain well defined bands where good use can be made of any available aerial gain, especially when working over difficult signal paths.

Omni-directional reception is normally used in mobile services and in this case simple ground plane aerials are well established, a fair selection of commercial designs being readily available. Omni-directional aerials are also required for general monitoring services but in this case much greater bandwidth is required and commercial discones and bi-conical dipoles are used extensively.

The use of high gain arrays is advantageous in many ways. First and foremost of course is the improved signal to noise ratio which is obtainable. This is due not only to the greatly increased signal voltage but also to the reduced pick-up of local man-made interference when its source lies in a direction other than that of the wanted station. Interference due to stations working on the same frequency can often be eliminated depending on the relative directions of the wanted and unwanted signals. The greater 'Q' of a highly directional aerial adds selectivity to the input circuits of the receiver and effectively increases its image rejection capabilities. spurious responses are also less likely to occur.

Practically all narrow band VHF/UHF aerial designs can be duplicated quite easily by using standard domestic TV aerial fittings and tubing. (N.B. this was in the days of Band I Tv but nowadays use VHF/FM aerial parts,-Ted). Cost is therefore comparatively low and a wealth of design data will be found in most aerial handbooks.

It should be noted that precautions must be taken to prevent corrosion on the surface of the elements since the performance of an aerial will suffer due to the reduction in conductivity of the surface on which the signal currents will be concentrated.

Gold and silver plating is used to some extent since gold does not corrode and oxidised silver remains a good conductor. Aluminium can be protected with a thin layer of polystyrene to retard the efects of corrosion. Paints etc; should not be used because of their poor dielectric constant.

The operational bandwidth of a narrow band system can be increased by a small amount if wide element spacing is employed.
This giving a smoother reactance/frequency curve. Wider spacing of course increases the physical size of an array and that may not always be convenient.

Thicker elemenets are also helpful in this respect but the improvement obtained is small in comparison to the effect of wider spacing so that there is little point in using elements thicker than say half an inch. In reflector type arrays, a wire mesh reflector used in place of the normal parasitic element reflectors will broaden the response considerably. Care should be exercised when altering the thickness in Yagi arrays since such an array is very sensitive to such changes and it will be found that performance figures differ widely with differing element thickness.

Where broadband reception is essential, gain and directivity must be sacrificed. Aerial design and construction becomes more complex and recourse must often be made to commercially available designs since published data is in most cases not sufficiently detailed to provide the basis of a practical design without the need for prolonged experimentation. One possible exception is the Discone aerial, the potentialities of which appear to have been exploited to a greater degree than other broadband designs.

An important consideration often overlooked in the selection of a VHF/UHF aerial is the 'Wavelength Factor'. It is not generally realised that a dipole for say 200 Mc/s will collect only half as much signal energy as one cut for 100 Mc/s. This of course assumes equal field strength at the two frequencies, the effect being a function of aerial length in which collected energy decreases with increase in frequency due to the shorter aerials employed.

When using directional aerials, the 'wavelength factor' is of little consequence since the smaller physical size of the array at the higher frequency simplifies the mechanical problems involved in the addition of extra elements, stacking identical units and rotation of the complete array if this is necessary.

Supporting structures for VHF/UHF antennae may take the form of tubular masts or sectional towers, the former generally being adequate for heights of up to 40 feet. Where a number of arrays are to be mounted on the same support, a sectional tower may prove more convenient since antennae can be more easily attached after erection. Spacing of aerials on the same support requires careful attention if interaction is to be avoided. This is especially true of antennae cut for the same or harmonically related frequencies. A spacing of approximately twice the wavelength of the lower frequency array will in most cases ensure complete freedom from distortion of the polar diagrams.

The feed line should preferably be made up of semi airspaced coaxial feeder and the shortest possible run of cable should be arranged so that the line loss is reduced to the lowest possible figure. Sharp bends should be avoided and cable joints if required should employ properly matched waterproof junction pieces. Open patch connections may introduce line losses of up to 2-3 dBs.

The input impedance of both the 770R and the 770U is close to 75 ohms at all frequencies and care should be taken to achieve the closest possible match. Accurate matching can conveniently be checked by using a sweep generator in conjunction with an oscilloscope if more elaborate equipment is not available. The same set up can be used to check the match between the feeder and the antenna.

If balance to unbalance transformers are employed it should be borne

in mind that such devices are inherently frequency sensitive and appropriate allowances should be made. In certain circumstances it may be more convenient to use a tunable matching unit to simplify connection of the aerial to the receiever. This arrangement is preferable when twin wire lines are used to feed the receiver. Such lines will generally exhibit lower losses than coaxial types but must be chosen carefully if large variations are not to occur due to water collection during wet weather. Lines having a hollow tubular construction are generally better than the cheaper ribbon types. Open wire lines with the minimum of spacers represent the optimum for UHF work but are difficult to construct due to the close spacing involved.

The restrictions imposed by the 'wavelength factor' on omni-directional systems is fairly obvious . Little or no gain can be obtained with aerials of this type and it may be found desirable to provide high gain directional antennae to supplement the general coverage antenna on the higher frequencies. In such an installation, provision must be made for rapid changeover from one system to the other and also for rotation of the directional antennae, preferably from the operating position.

A further point to note is that any general coverage monitoring application calls for both horizontally and vertically polarised arrays or provision for tilting a standard array to suit the polarisation of an incoming signal.

The location of the aerial system for a VHF/UHF receiver station is a factor of great importance if worthwhile results are to be obtained. If at all possible, tests should be done with temporary aerial arrays to ascertain the suitability of a site prior to erecting a permanent aerial system. This is particularly important when general coverage omni-directionalreception is called for since the aerials used will exhibit little or no gain to compensate for a poor location.

Placing an aerial at a great height is not always the solution to poor signal strength since any increase in height necessarily means a longer feedline and therefore greater losses.Any extra gain produced by raising an antenna may therefore be lost in the extra feeder required. Tests of this nature should always be carried out using a fixed length of cable to avoid misleading effects. It will be found that the signal level generally varies in a random manner with change in height and that variations are likely to be different at different frequencies.

TYPES OF VHF/UHF ANTENNAE.

The greater proportion of VHF/UHF antennae are based on three main element configurations, either used individually or in combinations. The three basic types are the colinear, broadside, and endfire arrays.

In the colinear array, all elements are in the same line, end to end, either vertically or horizontally depending on the polarisation required. Element currents are in phase and adjacent elements are usually connected by means of quarter wave stubs.
A power gain of 8 can be achieved with an array six wavelengths long (or high) but since this would amount to nearly 55 feet at 100 Mc/s, the system, if horizontally polarised would be unsuitable for rotation. As a fixed system with horizontal polarisation the polar diagram is bi-directional but can be made uni-directional by the addition of a screen of reflectors behind the driven elements. This also provides an additional 3 dB of forward gain. A vertically stacked arrangement would provide all round reception with vertical polarisation.

The broadside array comprises a group of elements all in the same vertical or horizontal plane and lying parallel to one another. Element currents are in phase and adjacent elements are connected by matching sections

transposed as necessary and providing a balanced feed point. An array four wavelengths long (or high) will provide a power gain of 10. At 100 Mc/s this would call for a length (or height) of nearly 40 feet and assuming the system to be horizontally polarised would necessitate a mast 50 feet tall to give a mean aerial height of 30 feet. The system could be rotated as a bi-directional array or made uni-directional by the addirion of a suitable reflector screen. As in the colinear array this increases the forward gain by some 3 dBs.

Because of the inconvenient dimensions of the colinear and the broadside arrays when used individually to provide reasonable amounts of gain, standard practice is to combine a number of colinear and broadside elements (usually with parasitic reflectors) to provide an array having more convenient dimensions for rotation. For example 10 dBs forward gain can be obtained with an array comprisong 12 elements, 6 driven and 6 reflectors, arranged as a 'broadside three-double colinear system'. At 100 Mc/s the full frontal area would be some 10 feet square.

Construction is relatively simple and a balanced feed impedance of close to 300 ohms is obtained. This facilitates connection to standard 75 ohms coaxial cable when a simple 4-1 coaxial matching transformer is connected to the aerial feed point.

A wire mesh reflector used in place of the element type reflectors will increase the bandwidth and increase the forward gain of the aerial by something less than 1 dB.

Two 12 element arrays of the type just described can be stacked to provide an additional forward gain of 3 dBs and a lower radiation angle. If a sharper polar diagram is required in the horizontal plane, two arrays can be mounted side by side and fed in phase. The extra 3 dBs forward gain will still apply.

The number of possible combinations of broadside and colinear elements would appear to be theoretically limitless, but in practice a restriction is imposed by the difficulty involved in feeding the array. Common practice is to use two or more 8, 12 or 16 elemenets group fed with a suitable matching harness. Although extra gain is secured by stacking or grouping a number of basic arrays, the main advantage is the added directivity which is obtained. Bandwidth is of course decreased with the greater number of elements and it is of interest to note that some 120 elements (60 driven and 60 reflectors) are required for a forward gain of some 20 dBs.

The frontal area of such an array makes it a practical proposition at 300 Mc/s (15 x 9 feet) but its dimensions at 100 Mc/s (45 x 27 feet) are prohibitive mainly because of the windage inherent in such a large structure. Windage is a factor which must always be borne in mind, especially in highly directive arrays since periodic swaying of the aerial will produce signal changes at the receiver and these changes may be so severe that readability is impaired.

An array having lower windage than any other system for comparable gain is the Yagi. This is an extremely popular aerial for narrow band applications and is a derivation of the endfire class of aerial array.

The basic end-fire system is of little practical use because of the difficulties involved in feeding the elements with progressive phase shift. This disadvantage is overcome in the Yago array by arranging the elements as parasitics which are in effect shock excited by a single driven element.

Yagi designs can be divided into two main classes, namely the 'short yagi' and the 'extended yagi'. The latter is capable of extremely high gain and very sharp directivity. The short yagi will be of the order of one wavelength long and provide a gain of some 8 - 1- dBs. An extended yagi five wavelengths long (15 feet at 100 Mc/s) and having 16 directors will have a gain of approximately 17 dBs. Its frontal area will be no greater than the length and diameter of the elemenets used.

Extended yagis present difficult mechanical problems in rigidly supporting the rather long boom to which the elements are attached. Vertically polarised systems are likely to suffer unusual effects if the top section of the mast is metallic. Wooden mast sections are to be preferred in this type of array but where this is not possible some experimentation with the positioning of the elemenet boom in relation to the mast may reduce its influence.

Because of the difficulties mentioned above, short yagis are frequently stacked to provide greater gain than single units and also to simplify support problems. Four stacked arrays will provide a 6 dBs increase in forward gain over a single array but the stacking positions must be carefully calculated from the 'effective aperture' figure for a single unit. The stacking distance should approximate to $\frac{3}{4}$ of the length of the basic array.

The driven elements in such an array are invbariably folded dipoles with all matching devices made from open wire line. The matching harness should always be symetrical with respect to the array.

A balun can be used to feed a coaxial line running to the receiving position or the whole feeder may be open wire line. In the latter case a tuned matching unit or balun will be necessary to connect to the receiver.

Much conflicting design data has been published on the yagi array, but careful analysis suggests that for maximum gain all directors should be the same length. For increased bandwidth (which will still be limited in relation to other arrays) staggered director lengths can be used at the sacrifice of some forward gain. Element thickness and the method of mounting elements are extremely critical factors. A yago built on a conductive boom will have a different performance from one built on a wooden boom whereas theoretically the performance should be the same.

The yagi array is extremely sensitive to local obstructions which will affect the performance to a marked degree. The effect can be reduced by using the so called 'skeleton slot' type of feed in lieu of the normal driven dipole. It is interesting to note that this type of feed is favoured to some extent in broadband yagi design.

The operational bandwidth of a yagi array is greater on the low frequency side of its centre-design frequency than on the high frequency side. Consider an extended yagi four wavelengths long cut for a centre design frequency of 200 Mc/s. Such an array would have a bandwidth of 4 Mc/s if a signal voltage variation of the order of 10:1 is acceptable. Output would be one-tenth of that at 200 Mc/s when the aerial was used to receive signals of equal field strength at 197 Mc/s and 201 Mc/s. Shorter arrays can be expected to exhibit progressively greater bandwidths, 10 Mc/s at 150 Mc/s being a typical figure for a 3 element wide spaced array.

Yagis are ideal for projects of a short term nature since their low cost makes them virtually expendable. Extremely simple construction techniques can be employed if the system does not have to stand up prolonged weathering.

The corner reflectoris another extremely useful and easily constructed array for VHF/UHF use. Its directional properties are very good for forward gain, as high as 8 - 10 dBs is easily achieved. Adjustments are not exceptionally critical and most designs use spaced rods for the reflector to reduce windage.

Rod spacing is normally of the order of one tenth of a wavelength but can be increased to $\frac{1}{4}$ wavelength with only a 3 dBs drop in forward gain as compared with a solid sheet reflector. Fan dipoles are frequently used in a corner reflector to achieve greater operational bandwidth.

Other designs which are in common use and which may prove useful in particular cases are the turnstile and multi-bay turnstile , the halo and the stacked halo. All these types are suitable for horizontally polarised all round reception over restricted frequency ranges. The halo and stacked halo are slightly simpler to feed than the turnstile types.

Rhombics are used to a certain extent as are long wires and Vs but they are not so common as the other systems previously mentioned, primarily because of their size which makes them difficult subjects for rotation but also because of their critical adjustment at VHF/UHF when used over ground of poor conductivity.

BROADBAND SYSTEMS.

As mentioned earlier, practical design data for broadband sytems is rather sparse. Many variations of a number of basic designs have been tried and the main rpoblem appears to be one of integration of electrical and mechanical designs to provide suitable matching over the wide frequency coverages involved. Although in some cases major dimensions may be given for an aerialcut for a certain centre frequency, little or no information may be given for example on the precise method of feeding the system. Very few, if any, photographic illustrations are given to assist in the assimilation of the design data given.
Duplication of such systems must invariably call for considerable experimentation and this can occupy a great deal of time unless suitable test gear is to hand. Complicated tools must be available if accurate copies are to be made of the conical shapes which are frequently employed.

Commercial designs are of course available but are no doubt expensive in view of the lengthy development periods which must be involved. The relatively limited demand must also increase the cost of such antennas.

Two good examples of broadband antennae which are not too difficult to construct are the discone and the sleeve dipole.
The former is an extremely useful design being usable over a 5:1 frequency coverage with a SWR no greater than 2 (1.5 for a 4:1 ratio). The sleeve dipoles and its quarter wave counterpart the sleeve stub are also capable of extremely good broadband characteristics but not to the same extent as the discone. One advantage of the sleeve dipole types is that they allow rugged construction with a minimum of conflict between the mechanical and the electrical aspects of design. The discone, though not so convenient mechanically is nevertheless very popular and is found in both solid and skeleton form. It is perhaps the most convenient broadband system for omni-directional reception with vertical polarisation.

Discone aerials having a cone-apex angle in the region of 60° appear to give the best results. The spacing between the apex of the cone and the top disc has a great effect on the matching of the system as has the area of the cone apex. A practical design should have provision for adjustment of the spacing to allow some degree of experiment in this direction. A suitable starting figure can be obtained by making the spacing three times the diameter of the flat apex. The cone length (measured along the bisector of the cone apex) should be slightly greater than $\frac{1}{4}$ wavelength at the centre frequency while the disc diameter should be of the order of 0.7 of the diameter of the open end of the cone. Too great a deviation from this figure will restrict the bandwidth of the aerial.
The discone is effectively a broadband version of the groundplane operated upside down to simplify the mechanical design. Its radiation pattern at all frequencies is sensibly omni-directional in the horizontal plane but its vertical directicity is likely to vary in a random way with change of frequency.

When horizontal polarisation is called for in a broadband system comparable bandwidth to that obtained with the discone is provided by the biconical dipole. The polar diagram in the horizontal plane is directional so that arrangements would have to be made for rotation if all round reception is required.

Practical design data for this type of aerial is extremely limited and construction is generally outside of the scope of the average workshop. Skeleton cage construction can be used but this does not appear to be favoured commercially at the higher frequencies.

A typical commercial design covers the range 170 - 600 Mc/s with a SWR of under 2.5 using a 50 ohms feeder. Matching and balancing devices are built into a central trunk which serves to support the two biconical elemenets.

PUBLICATIONS.

The following publications will be of interest to all engaged in the provision of aerial systems for use with VHF/UHF receivers.

ANTENNAS - KRAUS - McGRAW HILL.
ANTENNA THEORY AND DESIGN, VOL I & II - WILLIAMS - PITMAN.
AERIALS FOR METRE & DECIMETRE WAVELENGTHS - SMITHS - CAMBRIDGE UNIVERSITY PRESS.
ARRL ANTENNA HANDBOOK - AMERICAN RADIO RELAY LEAGUE.
VHF HANDBOOK - ORR & JOHNSON - RADIO PUBLICATIONS INC:
UHF ANTENNAS CONVERTORS & TUNERS - KIVER - SAMS.
VHF TECHNIQUES - RADIO RESEARCH LABORATORY STAFF - McGRAW HILL.
BEAM ANTENNA HANDBOOK - ORR - RADIO PUBLICATIONS INC.
THE ANTENNA - THOUREL - CHAPMAN & HALL.
RADIO ANTENNA ENGINEERING - LAPORT - McGRAW HILL.

Issued by;- EDDYSTONE RADIO LTD. ALVECHURCH RD; BIRMINGHAM 31.

(circa 1960, - Ted.)

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Green Goo Addenda.

It is even worse than I (we) feared. this dreaded Green Goo that invades the coaxial cables insulation is apparently also to be found alive and well in household mains wiring.

Monty G3 MWL has written in to tell of his encounters with this alien presence. In a house about 25 years old he discovered the Green Goo in liquid form running out of one of the switches. The cable section and switch had to be renewed, and enquiries from a professional electrician friend revealed that this is a common manifestation (infestation ?) in household wiring where PVC or polythene insulation is used. Cutting into lengths of cable revealed the Goo to exist many yards up inside the insulating cover. Wow ! Let's all get paranoid !

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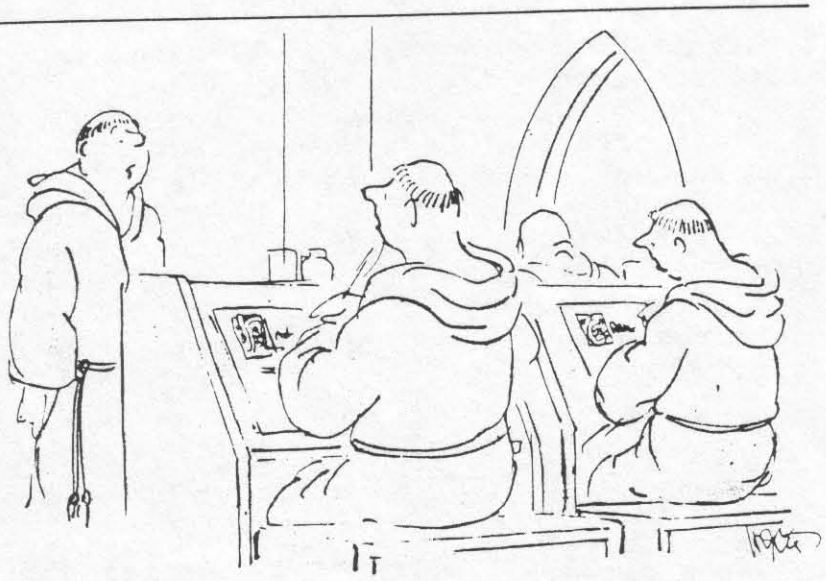
Help !!!!

The IC used in the 1000 series of Eddystone receivers is one of those round, tin can types, definitely a silicon type and it is marked as a Mullard TAA300.

Question, is there an equivalent to this IC ??
And since pins 1 and 10 are shown as going to earth (chassis) which is the 'case' earth ?? Can you help please, Ted.

\- - - -

IS BIG BROTHER STILL AROUND?
SEE PAGE 23, THIS ISSUE.



IF THEY WANT ADS IN THE CURRENT ISSUE THEN WE SHOULD HAVE THE ADS BEFORE THE XXXI OF THE MONTH!

- The BathTub -

The history of this Lido, as it was originally, is undocumented so far as Eddystone and EUG is concerned with the exception of a single item.

This is a copy of the opening programme for the Lido and leisure complex. Believe it or not this place actually was called THE BATHTUB but it contained far more than a swimming bath.

The official opening appears to have been a magnificent affair with a full programme of entertainments by some of the then top figures, pop artists and bands of the era.

The complex was officially declared open by none other than Miss Gracie Fields who was then appearing at the Birmingham Hippodrome. Following the opening came the following programme;-

Preliminary List of Attractions.

THE MIDLANDS GREATEST ENTERTAINMENT VALUES.

Thursday July 1st until Saturday July 10th, including Sunday July 4th.
Personal Appearances.

MANTOVANI & HIS DANCE ORCHESTRA.

July & August
ROCHEZ'S "MONKEYVILLE"

Week Commencing July 12th
THE WHIRLWINDS DEATH DEFYING SKATERS

Week Commencing July 19th
KIT-KAT KITS CONCERT PARTY

Week Commencing July 26th
SYDNEY KYTE & HIS BAND

Week Commencing August 2nd
Capt STRELSKY & HIS COSSACK ORCHESTRA

Week Commencing August 9th
THE SELECT SET CONCERT PARTY

Week Commencing August 16th
AL WRIGHT'S COMEDY CIRCUS

Week Commencing August 23rd
"FARCE CONCERT PARTY"

Week Commencing August 30th
LOU PREAGAR & HIS ORCHESTRA

Week Commencing September 6th
LAVENDER FOLLIES CONCERT PARTY

Week Commencing September 13th
MAURICE WINNICK & HIS BAND.

Music was provided daily (Sundays incl;) by The Bath (K)nights Orchestra.

This formidable list was followed on page 2 by a programme for the opening day.

OPENING CEREMONY
Thursday, July 1st, 1937.
At 9 p.m. Doors open 7.30 p.m.

7.30 - Mantovani personally conducting his famous Recording and Radio Dance Orchestra.

7.30 (!) - The Bath Tub (K)nights Sextette, Leader Jack Gibson.

8.15 - Wilkie & Victoria, Blackpool's most Famous Divers & Swimmers.

9.00 - Personal Appearance of Miss Gracie Fields from the Birmingham Hippodrome, who will formally open the Bath Tub in a Novel Fashion.

10.0 - Wilkie & Victoria, in a further novel Aquatic presentation.

10.30 - Firework Display.

The Entire Programme will be Compered by Fred Culpitt, of Douglas Wakefield Road Show fame.

The owner and operator of this leisure complex was a MR Percy W. Hollier who "took pride in presenting to the Midlands Metropolis the Bath Tub".

Some interesting Facts & Figures were as follows;-

1,- The first and only Lido in Birmingham.

2,- Situated just off the main Birmingham to Redditch road about 7 miles from the City Centre and about the same distance from Redditch.

3,- The Swimming Pool itself is 180 ft by 90 ft. (as large as the Empire Pool at Wembley); the depth of water at the shallow end starts at 9 ins gradually deepening to 14 ft under the Diving Stage. The whole width of the shallow end is approached by three semi-circular Sun-bathing terraces, which rise from a Shingle Beach and the grounds beyond. Round the remainder of the Pool there is a large Terrace for bathers and above this is a still wider Terrace for spectators.

4,- The most modern and up to date Filtration and Heating Plant is installed, and the whole of the water is changed every six hours as against twelve hours at some Pools.

5,- The Dressing rooms comprise changing accommodation for approximately one thousand people per hour, and instead of the usual boxes or racks used at so many Pools, which apart from being unsatisfactory for storing clothes, are in the opinion of the Owner of the Bath Tub, unhygienic, a special system of canvas bags has been installed, which not only has a division for shoes but is so constructed that the suit or dress can be hung up. Further, every bag is disinfected before re-issue. Incidentally, the cost of these special bags is five times as large as that of the cardboard boxes.

6,- The Cafe Ball Room is 70ft by 35ft opening on to

Terraces at ends, one looking over the Pool and the other overlooking the Grounds. It will have accommodation for three to four hundred people.

7,- The Grounds, which are about 11 acres in extent, are being tastefully laid out, and comprise Putting green, Archery, and Childrens Playground.

8,- There is room for at least 10,000 people.

9,- A large Free Car Park is Provided.

10,- The whole of the design, plans, specifications and bills of quantities in connection with the Bath Tub have been executed by Mr T.R. Robinson, the Chief Surveyor at the office of Messrs Percy W. Hollier & Co.

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The above excerpt from the Official Opening Programme is but a part of this very interesting document which has come to EUG from Chris Pettitt the Managing Director of Eddystone Radio. My copy is far from good enough to provide a decent reproduction for use in the N/L but if any member has access to computer enhancing equipment then I would very much appreciate his help in getting a reproduction good enough to enable us to have the whole programme re-issued in the N/L, any offers out there ? Ted.

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- EC10 Mk II Fine Tuning -

This facility was only provided on the Mk II version and it was quite a simple device consisting of a BA111 silicon diode whose capacity was varied according to the reverse voltage applied across the diode.

There is little to go wrong in this system where the -9 volts is dropped across a potential divider consisting of a 10K pot and a 6.8K resistor. The centre of the pot goes to a 0.01 muff to chassis and to the anode end of the BA111. The kathode end of the diode goes to chassis through a 1 Meg resistor and also to the local oscillator section of the tuning gang via a 27 puff condenser, that is it. Not much to go wrong. But time plays tricks with components and in this case the 1 Meg had gone open circuit so that the diode no longer had an earth (chassis) return. The cure was simple enough, replacement of R16a by a new metal oxide type of resistor. The fine tuning now worked okay albeit operation at one end of the pot brought in some frequency jumping. A second check through the associated components with an Avo located a slightly leaky 0.01 muff, C49a, which appeared okay at the lowest applied volts but 'leaked' when it had almost the full nine volts applied. This was swopped also for a new condenser, tested before insertion with 220 v DC applied. All was now back to normal with the fine tuning of this EC10 II.

Before boxing it up again it was noticed that the two back to back connected diodes in the aerial circuit had been snipped away at one end. The diodes were tested individually and found to be okay so why had they been dissed ? For safety two new 1N4001 diodes were fitted here, thought necessary as they are a protective device against high static volts. The set was boxed up and after a thorough bench test lasting several hours it was put back into service. Jim.

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- H.A.A.R.P -

Another of those acronyms that we hear so little about but which may/can affect our lives. In this case the High Altitude Aurora Radio frequency Project is based up in the wilds of Alaska and the general idea seems to be to experiment with the effects on missiles/warheads of beams of very high powered radio energy aimed up into the stratosphere.
lIt seems that one of the effects noticed so far is that these beams cause artificial aurora displays, the ionisation of particles in the upper atmosphere or stratosphere.

Nothing has yet been said though of the effect on the intended prey of missiles or their payload warheads, maybe they will have to wait for WW III to prove or disprove the theory.

Meanwhile I wonder just what frequencies they are utilising for those RF beams - and what effect they have on general HF Communications ? Has any EUGer heard about this experiment ?

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- Low Altitude Loop -

When Tom was looking into the possibilities for new aerials in his rather restricted garden he was taken by the possibilities of using the galvanised wire fence which bounds the three sides of his garden, which is in turn surrounded by a field usually put down to hay. Some measuring with a tape measure sneaked from the XYLs sewing box and he discovered that by using the three sides of the fencing plus two lead-in lengths to his ground floor 'shack' he came up with just over 42 metres. Electrically this sounded good, the top single strand of GI wire was about a half centimetre thick and was supported by concrete posts with holes through which the wire was passed. These holes were a good $\frac{1}{2}$" diameter and so the first step was to slit some polythene tubing lengthwise so it could be fitted around the wire. Six inch lengths were then slid into the holes on each post so that the wire was pretty well insulated from the concrete. this was also done at each end with longer lengths where the wire was tied off by twisting. Resistance checks in fairly dry weather showed no leakage on an AVO, in wet weather there was some but it was far to high to worry about.

At each end post where the GI wire was tied off, a heavy duty solder gun was used to solder a length of heavy gauge copper wire to the GI wire. These wires led up from the four feet six height of the wire fence to twin holes drilled in the perspex window of the shack which were at about seven feet above ground.

Inside the shack the copper lead in wires went directly to the balanced input of a home-built ATU, thence to the EA12.

Tests showed that compared with the previous 40 feet random wire at about twenty feet up, the new 'loop' was several 'S' points better on all except 21 and 28 Mc/s, with the ATU set for balanced series capacity tuning even on the above mentioned bands the loop performed better than the previous random wire.

The cost was NIL, necessary for one made redundant, and the improvement in listening pleasure is enormous. All for one Saturday afternoon's work. When the XYL was prevailed upon to turn the garden hose on the fence, whilst watching the 'S meter there was only a minimal change in meter reading and NO change in audio output. The lower length of GI wire is some 15 inches down from the one used and some thought has been given to experimenting with either earthing this or soldering it in parallel with the top length, worth a try.

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- Audio & Mains Transformers -

A note from Peter Lepino to the effect that Douglas Electronic industries of Louth, Lincs; - Phone 0507-603643 - can supply a range of both HT & AF transfos suitable for valve circuits. This could be of interest to those like Pete who have put away their cherished Eddystone receivers whilst awaiting a Christmas Fairy to wave her magic wand and produce a replacement for a duff transfo. They also do AFTs for trannie equipment.

Pete has been seeking a replacement for the transfo in his 659/670 for several years now, it is jury-rigged with a rather ugly Radiospares one from the -50s but he says that this is too small by far and gets over warm.

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- One Lung QRP Tx -

Graeme has mentioned that there are apparently two versions of the ESWM Number 4, one ends with an article of VHF aerials whilst the other ends with an article on the construction of a One Valve Transmitter designed for use by the Reserve Forces in the -40s. Caught me out again Graeme ! I had not noticed this but in answer to the suggestion I shall be doing this RNWAR & RAFCWR transmitter as it will make an admirable companion for those EUGers who are intending to use one or two valve receivers on the EUGnet. The article mentions use on Top Band, Eighty, Forty, or Twenty. No it just ain't band switched pal. To change bands you change the anode coil and maybe the crystal if this latter cannot be made to produce enough drive on a harmonic. Might get it in this issue if I can get things sorted, if not see issue 47 in February.

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- Price of an EA12 -

Well I did ask ! According to the EUG resident statistician, aka Graeme Wormald, if we use my usual 'yardstick' which is the price of First Class stamps we get a currency multiplication factor of between 15 and 20. This gives us, wait for it, a current price of circa £3,000 for the then £185 priced EA12.

In those days it was only a daydream for me, and most others, to own one - a bit like the last version of the 1650 I guess, at £3.5k.

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- Another 870 QTA -

This is a late letter re the simple 870 set and it is worth mentioning it for the sake of those who do have this model.

Jake bought his 870 from a club sale for just £10.50, the 50p went to club funds and the £10 to the original owner.

Whilst it did work okay when bought Jake decided that it was not quite right on the Long Wave Band. With the R4 signal coming in at about 220 Kc/s he thought maybe some 'mad-twiddler'

had been having a go at it.

He opened up the set and checked around but all looked to be untouched since manufacture, quite clean too considering its age. His letter to me asked for possible causes for this one band being apparently off frequency, high by 22 Kc/s.

Since Jake said it looked untouched I went for either a duff condenser in the local oscillator tuning circuit or a fault on the coil. Then I recalled a similar problem with an 840A, so I added a P.S to my letter. You got it ! The P.S was the problem. The ferrite core in the local oscillator coil had come adrift in the former and was moving up and down in response to jolts. It was a simple enough job to reposition it using the R4 signal as a calibration guide. A check on France Inter at the low end and on Flamboro' Head marine beacon at the top end showed that the trimmer cap did not need tweaking. What could have proved a difficult fault to track down turned out to be pretty easy after all.

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- Panadaptors -

Again, another letter from somebody who wants to use an EP20 with his 740. Well this set was certainly never designed with the idea of using it to drive a panadaptor but there is no reason why not ! Ever resourceful we are at EUG.

There was an Eddystone convertor unit to change the 450 Kc/s IF of such models down to 100 Kc/s for use with the EP20. It is listed in the catalogues and I have a copy of the blueprint number BP 1136 and the unit number was S.929. It could be used to convert the 500 Kc/s of, say, an 880/2 to 100 Kc/s when it used a crystal of 400 Kc/s to down-convert. It could also be fitted with a crystal of 350 Kc/s and retuned so as to down-convert from 450 Kc/s to 100 Kc/s.

Ah but ! say some. The 740 has no IF output ! Okay then use the often mentioned trick of lifting the kathode bypass and inserting a 100 ohms resistor between it and earth (chassis). In this case you need to do it on V3 and it is C20. A mini co-ax lead fed back and out through the rear panel will convey your IF signal.

The convertor is a simple two tranny job, well within the range of any amateur builder with a soldering iron and a modicum of grey matter, so I am sending a copy to Jake.
Best of luck Jake ! Let us know how you get on. Ted.

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Late Advert

FOR SALE: Eddystone Model 840C, good condition, £80 o.n.o.
OR EXCHANGE for 770R, Telephone Howard (Notts) 0115 970 4184.

MORE MEMBERS' ADVERTS ON PAGE 32

- An 840 Problem -

Ken has owned his 840 for several years now, bought for £25 at a Rally, it is considered to have been a bargain. No servicing of any kind has been necessary despite nightly use and two house moves.

This hot summer though appears to have proved too much as the dropper expired, just the top half which drops from the UK mains to the US standard of 110 volts. The decision had to be made whether to remove the original and replace it with a new dropper, if available. Or maybe to attempt a mod using capacitive dropping ? Or how about series silicon diode dropping of the surplus volts ?

In the end none of the above were employed. A toroidal transformer which was intended for a QRO HiFi was available in the junk box. This was rated at 240/120 primary and 55+55 secondary at 50 watts. The 840 is rated at 30.25 watts when used on 110 volts. Ken's mains supply is now rated at 230 but has never been measured at more than 225 even in off-peak periods, less at peak times. It seemed a fair enough decision to utilise the transformer as both a 'dropper' from mains to about 112 (measured volts on load) and to obtain by this means the facility of an isolation transfo. The transfo was thus wired up with both primaries in series for mains voltage and both secondaries in series for the receiver supply. It was discovered that the transformer had a built-in 'static shield' between primary and secondary so that a further degree of isolation from mains borne QRM was there for free.

The transformer was fitted in a suitably ventilated metal box that had formerly contained a car battery charger, the old current meter on the box was fitted with a new hand-drawn scale and wired with diodes and multiplier so that it now read output volts.

Three months on the 840 is still behaving impeccably and Yes, there is less mains borne QRM from a household computer. The final cure for this has been a 0.1 muff 350 VAC rated condenser across the primary. Total cost was nil and hours of work some 4-5.

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- 888A ID -

Chas has written to ask whether the case on his 888A is original since it does NOT have the lift up lid as seen on another 888A and as depicted in all PR pictures he has seen of the set.

I can only say that all 888A sets that I have seen, and that makes quite a lot ! - have had the case with a lift up lid. Now I did once see a 770 for sale at a Leicester Rally years back which had a mismatched case with a lift up lid, and I am pretty sure it had never belonged to a 770 before. I would hazard a guess here and say that your 888A case is not the original, but if it fits ! Better than none at all, and only a purist would know the difference Chas. You make no mention of colour matching ? does it match the 888A colour ? if not match it up with a spray can from your Car Parts shop. Best to degrease the case properly before spraying and please do the job out of doors or in a very well ventilated place - did you hear what happened to the guy who did his respray job on a newspaper in front of the living room fire ? I AM SERIOUS ! He did just that to his 730/4 and wondered why the flash fire that ensued caused so much damage to himself and the room.

Ted.

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More Strattons History.

I should by now have learned my lesson. I should by now know that there will always be something new that I can learn about the Strattons/Eddystone Company. Serves me right for being such a 'bighead'.

After mention of those Beacon receivers I received some more gen from Richard G4 ICP, c/O Graeme.

The info concerns the history of the BBC from 1922 onwards and it records that when the War clouds loomed and preparations had to be made for continuation of broadcasting during hostilities the BBC decided there was a need for many low power local transmitters. Strattons produced a number of these and one interesting point was that the use of metal was minimised, where wood could be used in the construction it was. Components being in short supply there was little in the way of standardisation. These transmitters once they left Strattons went to locations in large towns and cities and the Tx and its aerial was located in many different types of premises. Schools, Laundries, Police Stations, Water Company premises etc; all were linked by land-line courtesy of the then Post Office Engineering Dep't for their programme feeds.

After the War - according to Graeme - these self-same Txs were utilised to bring the newly introduced Third Programme quickly on line. The official name for these stations was "H Group Stations", but the important bit for me is that the Txs, or some of them, came out of Strattons. Now why have none of the older employees to whom I have spoken over the years come out with this gem of information ? Geoff Woodward was there at the time and whilst a proliferous source of Company facts and figures no mention ever of this.

There must be many other such items that EUG needs to know about so come on, if you know anything connected with the history of the Stratton/Eddystone Company then please share it with us. Thanks Richard, and Graeme.

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Coincidences.

I recently met a delightful lady who during our conversation let out the fact that her Dad had been Polish, had been in the RAF in the early '50s, and had been in Egypt at about the time that I was there. It turned out that she had been born in Married Quarters, had lived at the other end of the Suez Canal to where I was stationed, at about the same time. More yet, her Dad had later been at RAF Stanbridge shortly after I was there. It really is a small world as I discovered also that he is still the owner of an Eddystone 640 bought out of his Demob pay.

I understand that he will be joining EUG so Thanks Sylvia, and hope to welcome your Dad soon.

The 640 as mentioned above, this set still has a faithful following even after all the years. Many EUGers get pleasure from using it on todays crowded bands and they say that it can still cope admirably. I have many articles from SWM etc; where mods or add-ons are described for the 640, at the time it was the only REAL amateur Rx being produced in the UK and it had to compete against such as the HRO, the SX28, or the several Hammerlund models that had been produced by then. That it did so, and competently is a tribute to Strattons engineering quality.

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Valve Theory.

This is a pet moan of mine, it was even before I retired from a job in Electronics.

The simple fact is that electronics engineers these days are not taught anything about thermionic valve theory or practice. Graduate students coming for a job look askance when asked if they do know about valves. Yet valves have always, since the onset of the semiconductor era, been around us. In today's Hi-Fi scene they are becoming increasingly more common and this fact may be judged from the announcement that a factory in the former USSR (the CSSR now ?) has announced plans to manufacture an increased range of valves.

I have no hesitation in stating that I am a valve fan, call them tubes as do our transatlantic cousins, call them bottles as do the hobbyists, they have always been my choice over 'trannies' and ICs.

Why this statement ? Well the fact is that I had a letter recently where I was taken to task for not featuring more about the very latest models to leave the Eddystone Factory.

I started EUG and this Newsletter to perpetuate the products of, and the history of the Strattons/Eddystone Company. The latest models whilst interesting to me are not YET a part of the history of the Company. If and when we get info on these new items then they will get a mention here - take the case of the 'rogue' 1650 version. By and large though the contents of the N/L will be those valve models and the early first and second generation transistor models that came out prior to 1970. Very few of us can repair todays sets anyway, and even fewer members will have the knowledge or testgear required to delve into the recently produced sets, even IF they appear on the second hand market. 'Nuff Sed ! Ted.

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Big Brother is Here !!!

A strange case this, Don tells me that whilst not a licensed amateur he does have several aerials adorning his property.

A 2 metre crossed element Yagi on the chimney, plus a long, long wire supported on two flagpoles at top and bottom of his garden. He has just recently mounted a home-brew circular loop for NDBs on a 15 ft high pole in the middle of the back garden.

Arriving home from work recently he was called in by his next door neighbour to be told that two 'men' had been asking questions about Don's aerial farm. The neighbour had spotted them looking in through a downstairs window and had challenged them. They had then proceeded to ask about Don, why the aerials, what was his job, his interests. When asked for some ID they had backed off and left, walking to a car parked along the road.

Apparently they were not the usual type who might be interested in a burglary job, interested in Don's Eddystones, but were well-dressed and quite 'respectable-looking'. So what gives ? Don rang the local Council, the Police, asked somebody at his local club if they had been similarly targeted. The answers were negative and Don is, in his words, flummoxed. Oh yes, he lives on the outskirts of Cheltenham ???? Ted.

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EA12 'S' meter.

The pointer on the large 'S' meter on this model should NOT, definitely not, slam hard over to the right when mains power comes on. Ivor says that this has begun recently but that nothing has been done to the receiver, no movement from one place to another, no repairs or valve changes.

The mains switched is toggled and then as the heaters warm up the needle goes 'slap' over to the end stop where it remains for a few seconds before moving back to read normally. Ivor has not noticed any difference in 'S' meter readings on several well known 'test' signals such as local Hams and so he is at a loss to account for this manifestation of 'gremlinitis'.

A first look at the schematic leaves me a bit perplexed also Ivor. I have no memory of this ever happening on any previous EA12 that I have handled. There is little different in the circuitry of this model's meter from such as the 730 or 830 models so had it happened on one of these I might be able to come up with a reason. I can see possibilities where the needle might go right over, several. But for it to work correctly after warm up ?

If any EUGer has observed this can they write in and let me know so that I can pass on the gen to Ivor. Ted.

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O-V-1 figures.

Memory plays tricks on all of us but I have to say that when I first read the O-V-1 figures that Graeme has produced I had to think hard. They did seem to go against my personal memories of the simpler models that I had produced years ago.

I had a delightful O-V-2 that I made in the '40s and it performed very well on the HF bands, but then realisation set in. The receiver characteristics would no doubt have been very similar to those produced by Graeme but one other parameter had changed. The bands in the '40s were EMPTY, compared with those of today. Hardly to be wondered at that I experienced no problems with poor selectivity is it ?.

The extreme selectivity available on Top band, or MW Broadcast band, would certainly be a help today when BC Dxing and cost would be minimal. How about a winter 'home-brew' exercise then ? There is a multitude of available circuits for this simple type of receiver and the feeling of using a home made receiver is one only understood by those who have done it. Go on, these winter eves are ideal for construction work and the parts are available from dealers advertising in the hobby mags. One or two cheap valves, some resistors and condensers, a pair of 'phones, little more is needed.

If you do then please remember us, write and tell us how it all went, what you heard, whether you got it going first time - or not.

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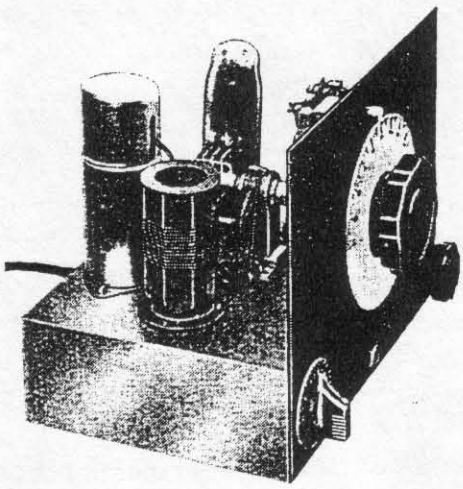
THE AMATEURS SHORT WAVE TWO
Featured in Eddystone Short Wave Manual No 4
A review by GRAEME - G3GGL



This set, originally featured in the autumn of 1938, has provoked much interest recently in spite of the fact that it seems to have been published as an 'afterthought'. I say this because it has by far the worst graphics of any pre-war Eddystone project; in fact it hasn't really got any at all, merely a rather small smudgy photograph of the underside. And they hadn't got a 20K pot for the reaction control so they used a 50K (from their other projects in ESWM #4) and shunted it with a 40K fixed resistor! But it has several distinctions; it is the only Eddystone two-valve set to feature 6.3 volt valves. This, I would suggest, makes it more attractive in this latter day when 4 volt heaters and battery valves are a bit out of fashion. But (I hear you say) we've never heard of the EF6 and the EL3. Perhaps not (although they are still available, even though the sockets to hold them are rare), but their octal versions, the EF36 and the EL33 are much more familiar, as are the many other types which may be substituted (6J7, EF39, 6K7 etc., for the detector; 6V6, 6F6, KT63 etc., for the output stage). It is also the only set for which coil-winding details are given, enabling sure-fire tuning and reaction. And it's the only Eddystone to use electron-coupled feedback (cathode-tap reaction) and one of the very few to use voltage-control to achieve regeneration (a potentiometer instead of a condenser).

So; it's a bit different from the run-of-the-mill two-valver, but does it work any better? There's only one way to find out (as the actress said to the bishop), and that's to give it a try. Everything needed can be found at a Radiophile rally, vintage radio fair, or a good junk box. I did my own metal-bashing, using an Eddystone diecast box obtainable from Centre Electronics in Birmingham, but it's possible to contract it out to 'Isoplethics' (see EUG Newsletter 45). I also built the mains PSU featured in ESWM No 4 and recommended for this set. Same sources for materials (although Maplin are now stocking new components for valve PSUs).

It's easy to build, lots of space, and it should go first time, barring faulty components. And does it go? It certainly does! It's everything that Stratton claimed it to be. A few

words here about component values; if any other output valve is used, the value of the cathode bias resistor, R8, needs adjusting as they all have different bias requirements. Instead of the LF choke the primary of a valve-type speaker transformer may be used, with the added advantage that a low impedance speaker (or phones) may be run off the secondary, there are plenty of signals which will drive it. The 1uF condensers, C6 and C9, may be substituted with a 0.22 to 0.68 tubular for C6, and a small electrolytic (say 25uF at 50 volts) for C9. The tuning and bandspread condensers, C1 and C2, may be the nearest values you can find. Keep the rest about the same (nearest 'preferred value'). One other item which has caused comment is the value of the detector grid leak, 0.25 megs. Members consider it to be very low; a more usual figure for similar sets is 3 megs. All I can say is that I've tried it, and anything much higher than 0.25 megs drives it crazy!! It starts to oscillate, not only at RF but at AF, and becomes progressively ineffective as a receiver. I presume the low value must be associated with the electron-coupled reaction.

And now to performance. Not easy to describe in conventional terms but try this:-

Background noise: Very quiet; slight hiss in regeneration.

Sensitivity: 1 uV will produce a perfectly audible headphone signal in the heterodyne mode (CW & SSB). This is very good.

Reaction: Velvet smooth with no backlash.

Images and spurious responses: Nil.

Hand Capacity effects: None, so long as you keep your hands in front of the panel!

Modes: AM, CW, and SSB.

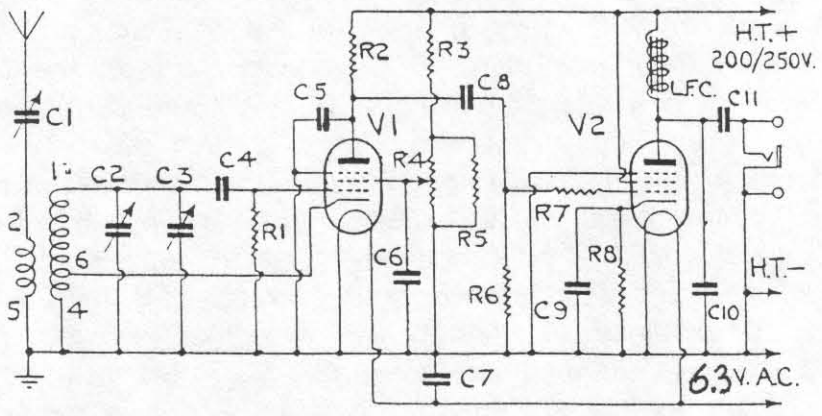
Selectivity: Depends on signal frequency; the lower the frequency, the greater the selectivity. In the most sensitive condition for AM, i.e. just short of oscillating, the following 6 dB points were measured using a signal generator, a frequency counter, and an output meter:-

Signal Frequency	6dB points
7100 kc/s	5.9 kc/s
5500 kc/s	3.0 kc/s
3600 kc/s	2.0 kc/s
2650 kc/s	0.9 kc/s

Remember, these figures are for AM (CW & SSB is better). They are probably very dependent upon the L/C ratio of the tuner (these figures are all for the same coil). But the other side of the selectivity coin is swamping (skirt selectivity); the ability of a very strong signal to make itself weakly audible over a broad frequency range. This manifests itself around the broadcast bands and leads us on to my criticisms . . .

This set was intended for the impecunious SWL and, although remarkable for what it **can** do, it cuts some corners. The first one which shows itself is the aerial trimmer C1. This is a preset under the chassis. It would be much better if it were fully variable and knob-controlled. This would cope with the breakthrough problem. It could still be under the chassis but projecting from the side. The next problem is due entirely to its own success! When taking morse, headphones are better than the speaker. Morse can only be read when the set is in its most sensitive (i.e. loudest) state. It blows your head off and the need for an audio gain control becomes apparent. Instead, one must make like the wartime WS38 (walkie-talkie) operator, who also missed out on a gain control and had to ease the headset onto his cheeks for strong signals. R6 could be turned into a logarithmic potentiometer with great advantage; although the presence of an aerial trimmer as described might work in lieu. The last problem is a design fault: mains hum is especially noticeable when using 'phones. This is due to hum pick-up on the rather long lead between the detector grid condenser (C4) and the top-cap grid connection. It may be eliminated by screening the lead, although this is carrying RF and therefore becomes part of the tuned circuit, limiting the higher frequency end of the tuning. Another ploy would be to put C4 directly onto the grid clip and shunt the leak across it; or a more radical solution would be to convert to a single-ended RF pentode for the detector (6SJ7, 6SK7, 6AC7, 6SH7, etc.).

In conclusion, I'd like to say that there is nothing, absolutely nothing, as satisfying as messing about with a few valves and a soldering iron. Just keep it simple!



Theoretical circuit. Amateurs Short Wave 2.

C1...3-30pf trimmer C2...160pf variable bandset
C3...18pf variable bandspread C4...100pf C5...300pf
C6...1uf C7....005uf C8....006uf
C9...1uf C10...002uf C11...1uf
R1...0.25M ½w R2...100K ½w R3...100K ½w
R5...40K ½w R6...1M ½w R7...50K ½w
R4...50K linear wire-wound potentiometer R8...150 ohms 1w

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RADIO RAMBLINGS

By Graeme - G3GGL

SEASON'S GREETINGS

First of all may I wish all EUG Members and their families the Very Best for Christmas, and Health and Happiness in 1998. This especially includes Ted Moore, founder and compiler of our Newsletter, which some say is the best radio-read they have ever seen. And also to the troops at Eddystone, whose unstinting help keeps our Group rolling along with information, printing, packing and posting. Well done everybody, especially Christine who is back with us after a long convalescence.

BRAND NEW SET

I've just helped a Member with his 730/4 restoration, an ex-military set which was electrically good, with no wear on the fingerplate, but dreadfully scratched paintwork. So we carefully removed all the hardware from the front diecasting (making sure not to get the bits mixed up) and sent it, along with the case, to the sandblasters (selected from the yellow pages). For the sum of £7 it was blast cleaned with eggshells. Then it was hawked around car body repair shops until one agreed to spray and bake it with the next grey car they were mending. Price £20. The result: a set that looks as if it's just come off the production line at the Bath Tub. A really super job.

80 METRE NET

The First Sunday EUG Net in November got off to a poor start. The band was hopping with good condx (a mixed blessing at the weekend) and I called myself hoarse (not really) without a single reply! I even went to see if the giant loop aerial had fallen down, but no, it was still holding up from last winter's repair. Then EUGer David phoned in from Rugby and said HE could hear me on his EC958 . . . The First Thursday (6th Nov) was much better; the band was still open but no contests or log-jams. A quick 'CQ EUG' on AM using the K.W.Vanguard (30W carrier) and Eddystone EA12 Rx produced an instant reply from Paul G3JDM in Stafford at 5 & 9 plus. At 10.00 hrs we changed over to LSB (me on the 15-year-old Trio TS-530S) and continued the natter. We were then joined by Rod G3ZEH in Lowestoft and two non-EUG members (Peter G3ASQ in Norwich and another Peter G4EVY in Rochester, Kent) who were so pleased to hear valve and vintage chat that they couldn't resist joining in.

'4EVY uses an all-valve 'seperates' station, the British built KW202/204 SSB combination of the 1960's. What's more he already has 3 Eddystones and is joining the Group. Welcome aboard, Peter, we hope you enjoy the trip. The net closed at 11.40 after almost 2 hours of pleasant time-warp chat.

PLUG IN COILS

Formers for these are available from Isoplethics on octal bases, so there is no excuse for delaying that vintage project, BUT, at the October Vintage Fair at the NEC I found some Eddystone 6-pin coils but NO sockets! (I did use them in my Mark I Tx in 1949 but I seem to have mislaid them since then). So this leads me to:-

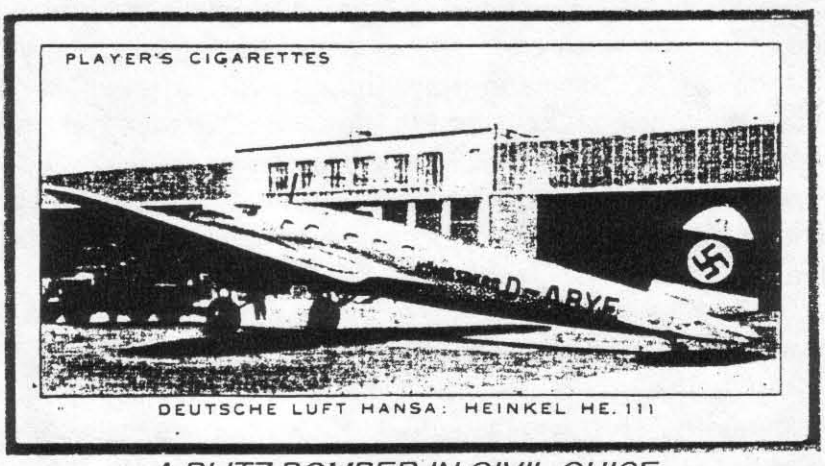
WANTED, Eddystone 6-pin coil SOCKETS. Call Graeme on 01299 40 3372

BLIND LANDING SYSTEM

Graeme - G3GGL - looks back to early days.

In the last issue of EUG Newsletter (page 7), Ted made reference to a two-valve beacon receiver housed in a flat diecast box manufactured by Eddystone during World War Two. He thinks it was the R1125 and asks if anyone can remember . . .

In the early 1930's Deutsche Luft Hansa, the German national airline (and secret training ground for Goering's Luftwaffe) was striving to beat the competition. The biggest problem was finding the destination and landing in bad visibility. The Lorenz radio company produced a blind landing system which was pretty well foolproof: the Beam Approach (later modified for the accurate pin-point bombing of Britain). It was installed at London's Croydon International Airport in November 1935 using equipment manufactured by Standard Telephones & Cable (S.T.C.). It was known as the Standard Beam Approach and was adopted by the RAF, using a 6-valve, six channel VHF receiver (R1124) for the Main Beam and a two-valve single fixed-channel receiver (R1125) for the Marker Beacons. These sets used the 8D2 series of 13-volt valves developed by Brimar (S.T.C.'s domestic subsidiary) for British car radios, which mainly used 12-volt electrical systems (as opposed to American 6-volt systems).



A BLITZ BOMBER IN CIVIL GUISE

The Korean war started in 1950. Most people thought it could lead to World War Three. National Service was extended and the R.A.F. increased pilot training tenfold. Wartime airfields were re-opened and aircraft brought out of mothballs. In 1951 I found myself at R.A.F. Dalcross, Inverness, on a flying training course. To my surprise we were to use Airspeed Oxfords, introduced in 1937 as trainers for bomber pilots. They were equipped with wartime TR1143 VHF four-channel R/T and the pre-radar, pre-war Beam Approach, including the R1125 Beacon Receiver. This system had to be mastered to qualify for 'wings'. The aircraft were fitted with orange windows, whilst trainees wore blue goggles. The result was that they could see the instruments but the windows looked black. The instructor, on the other hand, could see quite clearly and save the day if everything went pear-shaped (which it often did).

continued . . .

BLIND LANDING SYSTEM . . . continued

This is how it worked. The airfield had a 'main runway', usually north-east to south-west, to suit the prevailing wind. At the far end was a VHF AM tone-modulated transmitter. It had a vertical dipole with two reflectors, one to the left and one to the right. Each reflector had a relay in the middle which, when open, negated its effect. Thus the aerial was a simple switchable beam which could 'look' left or right depending on which reflector was active. The relays were keyed alternately so that a 'slow, slow, quick quick, slow' rhythm was continually transmitted. This had the effect of sending a morse letter 'A' (dit dah) to one side and a letter 'N' (Dah dit) to the other, with a very narrow equi-signal zone (constant tone) along the runway and a cone of silence above it. The carrier frequency was in the band 33.5 - 40.5 mc/s and the range about 30 miles to an aircraft at 10.000 feet. The receiver had no automatic gain control so the signal strength could be judged aurally. The switching of the beam was arranged so that the letter 'N' was always on the north side of the runway.

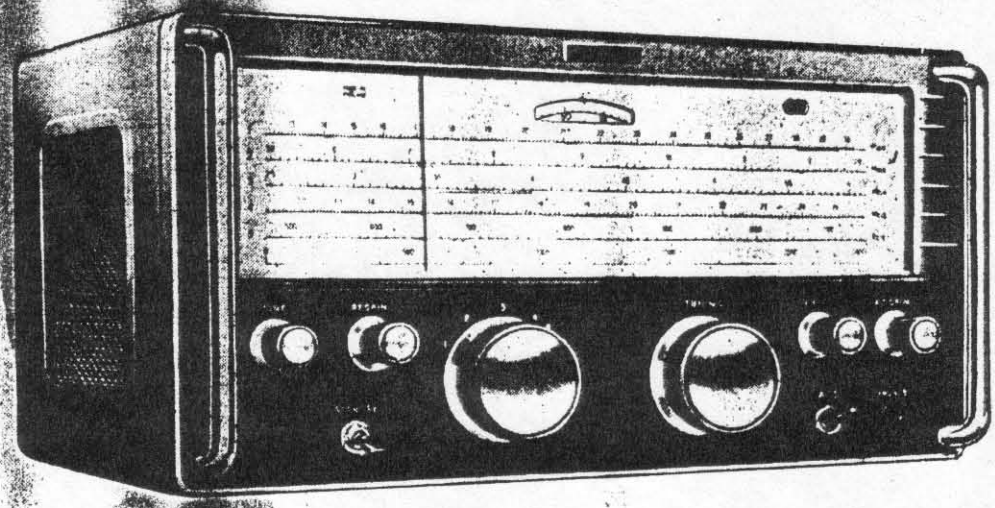
Assuming no other radio aids, (such as direction-finding reports to guide one towards the airfield), one switched to the desired channel. If you heard N's you turned south, if you heard A's, you turned north. Sooner or later the signal became a steady tone and you then turned left or right and flew along it. If it got weaker you were going the wrong way and so made a 180 degree turn. You then kept flying 'in the beam' (in the equi-signal zone) until the tone suddenly faded and returned (the cone of silence). At this point you knew you were over the bottom of the runway and you started a slow left turn, entering the 'A' zone and flying through 360 degrees, re-joining the 'beam' about ten miles down-wind. You then let down the wheels, put on half flap, slowed down and descended to 500 feet. Now we come to the little two-valve Eddystone beacon receiver. This was fix-tuned at 38.0 mc/s and consisted of a detector and LF amplifier. The output from the main receiver was fed into the LF stage and thence to the pilot's headset.

Sited downwind of the runway were two marker beacons. The 'Outer Marker' was two miles from touchdown. It continually transmitted two dashes per second at 700 c/s; a gentle low note. This was the signal to lower full flap, descend to 100 feet, and adjust the speed to about 20 knots above landing speed. Keeping in the equi-signal zone you then continued until you heard the 'Inner Marker' beacon, situated at the start of the runway. This had an urgent six dots per second at 1,700 c/s and was the signal to cut throttles and brace oneself. Hopefully the runway lights would have been spotted and the touchdown would be under VFR (visual flight regulations).

It was a simple, reliable system which worked without any radio contact taking place (although it was nice to notify the tower so as to avoid potential collisions). In the 1940 Blitz the Luftwaffe used two 'main beams' mounted on turntables a hundred miles apart. Using high power transmitters they set them to intersect over the city which was the target. It achieved pin-point accuracy not reached by the R.A.F. for another three years. The full and fascinating story of the Battle of the Beams is told by Professor R.V.Jones in his book 'Most Secret War'. It tells how the BBC Television transmitter at Alexandra Palace was fired up on the beam frequency, radiating spurious dots and dashes.

END.

EDDYSTONE



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FOR SALE,- EP14 Panadaptor, rack mounting case, working order and good exterior, with manual, £100. Please phone 01226-288718, evenings only, South Yorkshire area.
FOR SALE,- Massive unused Gardner AF output transformer, 50watts push-pull and multiratio for valves. Also matching 250 mA choke. Both very heavy so must collect. £15 the two items. Ring Pete on 01792-232782, GW6 AYM QTHR.
FOR SALE,- 'Minimitter' HF, valve, transmitter, 80-10 metres in 5 switched bands, on board VFO and mains psu, complete but no info available. Suitable for renovation project, will sell for £50 or swop for Eddystone Rx or W.H.Y. Please call Richard on 01376-584478 (Essex area). Thanks.
FOR SALE,- Eddystone EC 958 receiver at £375 plus carriage. This is serial number LX0476, it has cream front panel, rectangular black metal case. It is in excellent condition, boxed and with full manual - Ad will be in January Radcom so please call soon. Please call G3 AZW, on 01225-752655, Tnx.
WANTED,- scrap 940 for spares, or spares for 940. Phone Rob on 01636-686392 (Notts;).
WANTED,- Eddystone model 1000 or 1001 in G.W.O. Please phone Martyn on 01460-76143 (Somerset).

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END IT - END IT.

There you are, two whole Issues for Xmas and the New Year. So sorry for the delay in getting the October Issue out to everybody but it was the first such happening in 8 years so we have been lucky.

I feel sure that every member of EUG will join me in wishing a very Happy Christmas and Prosperous New Year to all at the Eddystone Factory. To Christine Surman, our very best wishes Christine for your recovery - Yes, we missed you Pal.

To all EUGers where ever you may be in the World, hope that 1998 is a good year for you, take care. Ted.

- - - -

P.S. - Any items for next issue to get to me before the end of January, or else ! T.