

Lighthouse

FOUNDED 1990

ISSUE 67
JUNE 2001



The Magazine of The Eddystone User Group



New Stratton Model Revealed
During Factory Clearout

EDDYSTONE S900 Tx

DO MY EYES DECEIVE ME ?

EDDYSTONE USER GROUP

A non-profit-making
group for Eddystone
Radio Enthusiasts
Founded in 1990 by
Ted Moore
Issue 67. June 2001

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Eddystone All Wave Four, A very rare 1933 battery model as featured in EUG Newsletter No 58, Christmas 1999. Very good original condx inside & out. Two coil sets. Photographs of this RX can be viewed at [URL:-
http://www.btinternet.com/~struthio/allwave4](http://www.btinternet.com/~struthio/allwave4)
Price: Offers in the region of £180 + buyer arranges collection or pays carriage. Contact John Struthers, GM8CVN, QTHR (Edinburgh) Tel (Day) 0131 335 7231 e-mail: john_struthers@agilent.com

Eddystone 1002 with home-brew PSU, £70. Eddystone dial (type 898) unlettered, ex-G2DAF Tx; enquire, swop, W.H.Y. Call John G8UNZ o1206 794656 (Essex)

BACK-NUMBERS of EUG NEWSLETTERS (1990-2000) AS DESCRIBED IN OUR DECEMBER AND APRIL ISSUES of LIGHTHOUSE are available on CD-ROM. Check issues for prices and details.

WANTED

I need the aerial/earth connection plate for a 640. Your price+post paid. Brian Cauthery VE3DFC, RR#1 Caledon, Ontario, Canada L0N 1N0

Eddystone 830/7 in good condition only; your price paid. Phone Peter 0141 649 2328

Eddystone EC10, 870/870A. Call Geoff 0151 489 7427

Eddystone 840C. Call Peter G4IXY on 01727 839908

Eddystone 670C or Mimco 2232A or 3873A or Marconi Elettra or EM34 (all are lookalike). Call Graeme G3GGL on Bewdley (01299) 403372. MUST BE IN excellent COSMETIC CONDX.

Panoramic Display for 1837/2 or 958. May exchange 1837/2 for 1830 & 958 'scope. Call John G8UNZ on 01206 794656 (Essex)

CASE FOR Eddystone 940 or 940 for spares. Call Ed Doyle MØBSP, on 0788 0691530 (B'ham)



LIGHTHOUSE

JUNE 2001

ISSUE 67

Welcome to another wonderful issue of the "Lighthouse". It was pleasant to meet so many of you at the NEC Vintage Communications Fair on Sunday 29th April, although I must admit to succumbing to the effects of "jet lag" before the show closed. I met up with a number of ex-Eddystone employees, one of whom told us some interesting "stories" which if I know Graeme will eventually find their way into the "Lighthouse" at some stage in the future. It was very nice to meet up with one of my ex-employees Stan Carney who is the only other person I know who has an Eddystone Short Wave Two (although I believe Graeme has information about its correct designation).

Last year Stan held a garden party for ex-employees, unfortunately it was the day we went on holiday. He has offered to do the same this year and I shall make sure that we are able to go. It will be great to see so many old friends and ex-colleagues. It is so easy to lose touch with people. Unlike Graeme, Simon and Dave, I resisted buying anything at the show. Although I did see an old Marconi Atlanta for sale and remembered on ex-customer of mine who is quite senior in the broadcasting industry and who said he was looking for one to remind him of his merchant radio operator days. Apparently he had found one in Norway of all places.

One thing I did do at the show was to take out a subscription to Radio Bygones. I used to get a copy when I was with Eddystone but reading through it again at the show prompted me to take the plunge. I don't collect old radios myself (I admit to having a mint condition R208 "Sputnik Special" 10-60MHz in the garage as a reminder of my very first radio in the late 50's), but I love reading about them and Radio Bygones does a fantastic job of reminding us all what once was. Another couple of useful reference works for ex Services equipment are the Wireless for the Warrior volumes, published by Radio Bygones a couple of years ago. It was from those that I found out that the R208 was part of an anti-aircraft battery communications set.

Graeme is publishing what we called a profile sheet from Eddystone in the late 1980's. Just looking at it brings back memories, dressing the sales guys up in TA uniforms to be photographed with the Orion Transceiver. Making an Eddystone Video with the help of a local school and going the Radio Wyvern in Hereford to get some studio shots. We even had the music written by the school students. One day I will get around to writing a short piece about that particular venture. The profile was used in the GEC Marconi Communications catalogue to show the capability of each of the participating companies in the group.

I had the renewal notice for the G6SL call sign this week and could not understand why they were not asking for any money. When I rang SSL up they said that because I was older than 75 I did not have to pay. Apparently they assumed that the fact that Eddystone had had the licence since 1921, meant that the licence holder must be very old indeed. Vanity made me tell the poor girl that I was not that old and did not mind paying up my £15 to keep the licence going.

Well that's enough from me for this edition. If anyone is interested I am about to pour the concrete for the new mast in the garden and I reckon it will be transmitting by the end of July.

My best 73's

Chris Pettitt - GØEYO,

Patron (chris@g0eyo.freemove.co.uk)

Eddystone User Group

LIGHTHOUSE ISSUE 67, JUNE 2001



FOUNDED AND PRESENTED BY TED MOORE

Formatting & Distribution by Graeme Wormald G3GGL

Computer Processing by Simon Robinson M5POO

TED'S MAILBOX

TEMPUS FUGIT

Eleven Years of EUG, how time flies ! And yes, under Graeme's supervision it gets better. Most of my incoming EUG mail expresses satisfaction with both the 'Lighthouse' and EUG in general so why change it ? Just one letter last month asking why we do not publish a list of Group 'Officers' — simple answer here is that we do not have any, John. We all do whatever we can.

I noticed with interest the item in the last issue re- Canadian postal delays. It took EIGHT days for my Lighthouse to come across country from Bewdley. Possibly the fact that although posted in Bewdley it had both a Coventry and a Cambridge postmark. Yes, the address was perfectly correct.

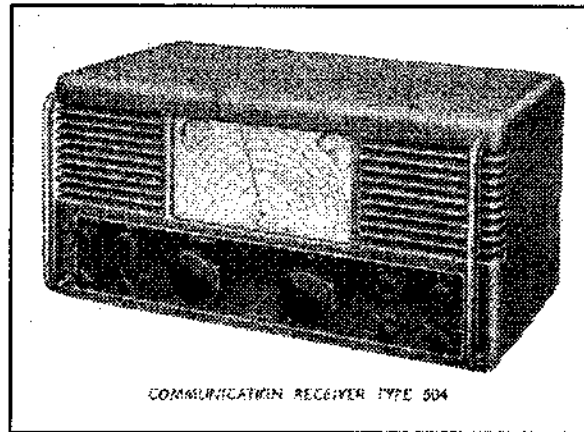
The present practice of putting small pictures of the various models mentioned in the Lighthouse is an idea of Graeme's, very good too, since, as he says, many EUGers do not know enough about the many models to recognise them from text.

Ted.

504 SCALE PLATE

There are not many 504s out there from what I know but assuming you have one and the scale plate is showing signs of

age then there is hope. They start off black, then with exposure to daylight turn brown, red, pink and then zilch Ken O'Brien can supply you with a good



photocopy of the 504 dial in exchange for a large (A4) sized S.A.E. His address is 18, St Helens Rd, Dorchester, Dorset, DT1 1SD.

S.1806/2 HANDSET AMPLIFIER

This is a self contained small Eddystone unit which Ken O'Brien was given recently. It was still in the original factory packaging.

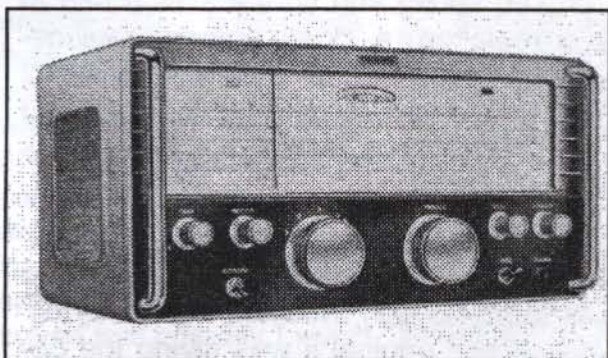
Ken is asking for any EUGer who can provide info on this item to please contact him at the above address, or via TED or GRAEME. Ted.

THE 840C MAGIC EYE

Very often when one buys this model second hand the one bad point will be

the lack of effective operation of the magic eye, in this case a DM70.

Having gone to the trouble of buying a replacement valve, cost plus p&p, the disappointment was intense when Bryan found that it made not one iota of difference, still minimal display. It finally dawned that the fault was NOT a duff DM70 but some other component in the circuit.



Going over the diagram it appeared that the possible bits were quite limited. In the event it was found that the grid feeder resistor was open circuit. Looking at the circuit it appears that a leaky grid capacitor could have equally caused such a problem. The moral has to be that before splashing out on a new magic eye valve do measure the passive components in that part of the circuit. This would apply for other valves such as the EM80 or EM34 used in older models.

Ted.

THE 820 FM/AM TUNER

Following on from the article in last is-



sue about this Feeder/Tuner we have a reminder from James that a very vital component is not shown on the circuit in the Eddystone Instruction Manual.

This is C67, a 3 pF ceramic condenser which goes from pin 3 to pin 7 on the V2 valve base. This is very necessary as this injects the local oscillator signal to the mixer grid, so do not chop it out! Ted.

CARBON TRACKING (cont'd)

From my namesake (Ted) comes the following; à propos the use of proprietary switch cleaner fluid to clean the carbon deposits from valves and valve bases. These products shift the carbon okay but they do contain some lubricant to prevent undue wear on cleaned switch contacts.

This residue could form a film to retain any future carbon deposits and so Ian may find that his problem returns in a few months. He should preferably utilise some cleaning fluid which does not contain a lubricant. Ted's own choice is Genkleen, a trade name for trichlorethane. Used in a well ventilated area there is no health problem.

Ted.A 'CASED' 820

Joe says that his 820 is slightly different from the one depicted in Issue 66, and in the factory manual. This one has chrome handles as per most of the receiver models and it also has a properly manufactured case.

This case almost certainly was made 'in house' as the 820 was a presentation model to a Birmingham College from the Eddystone Co. I wonder whether any more got out like this ??? Thanks for the interesting info Joe. Ted.

REAR PANEL LINK MISSING

Interesting point here. Several letters

from EUGers since it was mentioned in a recent Lighthouse. All from rather sheepish, in one case rather irate, members who have found that their set lacks the aforementioned AE to E link.

Nothing to be embarrassed about as we have all been caught out by such silly mistakes in our lifetimes. I have to admit to having spent hours working out why one particular Eddystone was deaf as a post. Yes there was a link in the right place on the back panel.

I tried everything that evening and it was only towards bedtime that I thought to check that link. Whereas most of them were black this was brown and proved to have no connection between the two pins!

In effect it was an aerial/earth plug supplied for use with twin-lead feeder and not a 'link'. If I could have kicked myself Anyway soldering a wire link across solved the problem, as usual, easy if you know how (or what). Ted.

TWO FOR THE PRICE OF ONE

This lucky EUGer was offered the 'collection' of a Silent Key recently. The main station Rx was a Kenwood R2000 but there were two other RXs, a 940 and an EB35 MkIII.

He declined the Kenwood but offered £80 for the 940 and was given the EB35/II with it.

Fair enough as the EB35 was reportedly not working. Too true; when he got it home it was definitely dead when connected to the mains. A quick check by removing the mains psu showed that the 4 way plug/socket ('POO knows which one !') was simply disconnected.

Plug them together and, Hey Presto, the set was fine, a good receiver for nowt.

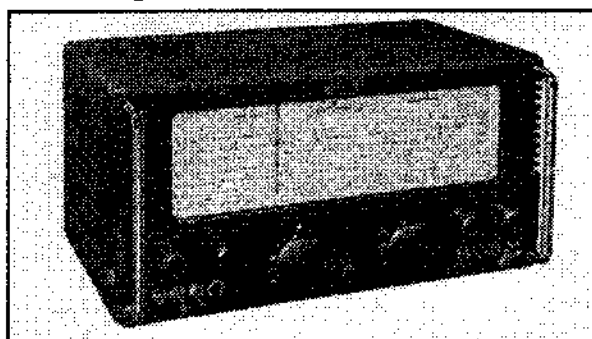
Ted.

888 AVC PROBLEM(S)

When you buy a new (to you) set it is always best to give it a full check-out before putting it into full use. In the case of this 888 the only apparent problem appeared to be a duff front panel switch, the AVC switch.

The toggle was stuck in the 'up' position. This seemed to be caused by a broken spring and so the switch had to be replaced, a close enough replacement was found at a rally, but nickel plated instead of chrome. It was fitted and the set was tested, something was wrong !

It was found that this apparently equivalent switch had differently placed tags so that although mounted 'right way up' as per the original it was giving the opposite effect, i.e. AVC was OFF when the toggle indicated AVC ON. This was corrected, accompanied by a little swearing.



But then there was a new problem, intermittent loss of signals with the BFO on when the set was knocked on the left-hand side of the chassis.

This was found to be due to a wire broken off from the new switch when it had been turned upside down, or right side up.

The wire was just touching the switch tag and was jolted each time the chassis was thumped. Easily re-terminated and the set was put back in its case and into daily use. Three years on and an-

other switch has packed up, evidence that this set has seen plenty of use during its past ownership, and that toggle switches do not last for ever.

A new switch is being sourced but getting one with the correct shaped 'dolly' is not so easy.

Ted.

640 AND A METAL 6F6

Ray has had this 640 for several years and has had no cause to open it up, it worked OK and satisfied his occasional listening needs.

A recent decision to re-valve the set, treat it to some TLC after a dozen years of use, and some perplexing discoveries.

Not only is the output valve a metal one, it is also not a 6V6 but a 6F6. And yet owners are advised not to use a metal-cased bottle in the output of these sets for fear of getting a shock if pin 'one' is used for an HT tie point.

A test was made from chassis to the metal case with an old 'AVO' and no voltage showed. The matter of the 6F6 was settled by a letter to Ted. This valve takes a much lower heater current and even slightly lower HT current and so was sometimes substituted for the power-hungry 6V6, with no ill effects. *(Note from Graeme - I think Ted's got the heater ratings reversed; the 6F6 is 0.7 amps, the 6V6 is 0.45)*

Taking the valve out of its socket showed another anomaly, pin 1 had been snipped off short close to the base, this of course was a drastic effort to eliminate the problem of the possible utilisation of pin 1 on the socket for other purposes.

A glass tubular 6V6GT is now fitted and the set is back in use with ALL new valves. One interesting point for Ray is that two of them are of a hitherto unheard of brand name. Stamped vertically

on the side of the glass of two of the EF39s is the name ESTA. But nowhere does it state country of origin. They both came in plain white cartons with just the type EF39 printed on the end of the cartons. (Information as to this brand name is sought. Ted).

VERY RARE ONE !

The 659 is almost unheard of amongst EUGers and yet John has one which he has had for many years. It sees only occasional use but appears to be in good condition.

This came out in 1947 and appears to have some similarities to the 670 or even the 740. It DOES have a Noise Limiter but does NOT have a BFO. This makes it neither a basic broadcast set nor a communications receiver.

It uses the usual (for that era) 6.3 volt Mullard Octals but this one has Brimar 6V6 and 6X5 types. The only recorded faults have been several sets of three dial bulbs to replace silvered over, and hence dimmed, bulbs.

The 659 was originally bought together with a rather nice Stentorian speaker cabinet housing an eight inch speaker but several years ago a matching die-cast speaker was purchased at a club sale.

For an eight valve, including magic eye, short wave receiver this set acquits itself well on today's crowded bands, the negative feedback giving good quality reception on stronger and QRM-free signals.

The serial number is DY0241 which places it in April of 1947. Strangely neither manual nor circuit appear to be available as a letter which came with the set was a reply from Strattons to the original owner apologising for the Company's inability to supply either. A much worn copy of R&TV Servicing has been bought to provide basic service info

should the set ever misbehave.
Ted.

ALERT! SUBSTITUTE IFTs

A letter from Dave to remind owners of some versions of the EC10 that different specification Toko coils will be needed if you are trying to fit replacement IFTs made from these modern coils.

The EC10A series of marine receivers, that is the EC10A/2, EC10A2/1 EC10A2/2, and EC10A2/3 all have 720 Kc/s IFs and not the 450 or 465 Kc/s as with the rest of the EC10 & EB35/6/7 sets. *(I don't think TOKO do 720 kc/s IFTs - Graeme)*

It appears that these sets were designed for use aboard ship by the Swedish Merchant Navy in the days when the Ship-to-Shore services used CW and MCW on frequencies around 450 to 500 Kc/s. They don't turn up very often in the UK. Ted.

S.770U with BFO

This 770U has some claim to being rare enough. It has a crystal controlled BFO fitted. Definitely original factory fitted and not tunable, the BFO appears to serve no real purpose as neither SSB nor CW were often used in the 150 to 500 Mc/s range as covered by this set.

A plate on the rear of the 770U indicates that it was the property of Manchester University, and so used in Laboratory work. The owner would like to hear via EUG of anybody having previous knowledge of this set, serial number GK0420. I make this out to be October 1956. Ted.

P.S. - Could this have been used by Jodrell Bank???? Ted. *(Note from Graeme - the 770Us were widely used by laboratories rather than for conventional communications.)*

THE 1161 PANORAMIC DISPLAY UNIT

A rack mount bracket fitted, but cased 1161 panadaptor has surfaced in Swansea. Not the property of an EUGer but of interest nonetheless.

This one is not yet working but the owner is hopeful of getting it going. It appears to be complete and fairly clean and a manual has been sourced (from whom ? Ted) so work can begin as soon as some preliminary swotting up has been done.

The 10.7 Mc/s input frequency means that it may will be usable with many of today's sets. We have been promised further information as the work progresses. This panadaptor uses a large LCD display unit in lieu of the more usual (for us wrinklies) CRT. Ted.

METRIC-v-IMPERIAL

This letter from a EUGer who had best remain Anonymous. He had purchased his first ever Eddystone, a nice enough 840A which did need cleaning both inside and out. There were several screws missing, i.e. two of the large chromed type which hold the case in place.

Having located two suitably sized screws with large but unchromed heads he tried to screw them in, with little luck. Thinking that he had them cross threaded he took them out and tried again with the same result, yet they seemed to be the right size.

He persisted and got the one in, albeit with a badly damaged screwdriver slot. At this point his pal pointed out that the original screws were B.A. sized and that he had 'managed' to force in a metric sized screw. Our EUGer is now suitably penitent but explains that he is in his late 20s and born after B.A. sizes had become obsolescent.

I can't help thinking about one of my regular tasks here. Changing a paper roll on a Fax machine. The rolls all carry a label clearly stating their size as being '216mm X 30.0m X 1/2 inch'. Honest!

Either we should adopt metric or stick with Imperial but should NOT mix them. Ted.

(Note from Graeme; see my article "Has Anybody Got a Screw Loose?" on page 27 in this issue.)

MILLI = MEGA

More of the same really, if you read Farmers Weekly then you may have spotted this one last month.

The article quoting several very well known boffins goes into extreme detail about renewable energy, specifically Wind Power. Just a couple of quotes will explain why I fell about laughing.

"Electric Company INNOGY will need to supply 1500 mWatt of wind generated power by the year 2010. At the moment it produces only 150mWatt".

Or, "the current models of Wind Turbines in use produce an average of 150mWatt each. Sites for over 1000 turbines will have to be found".

If they really mean what they are saying then that figure of 1000 turbines needs to be multiplied by a factor of millions.

The cost of generating wind power electricity is quoted as being £1 per mWatt per hour.

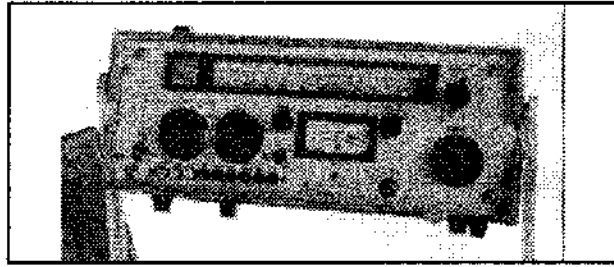
Nuff sed.

Ted.

THE EDDYSTONE 40A NOISE MEASURING RECEIVER

Ken O'Brien was lucky enough to buy one of these recently, complete with both manuals (Instruction & Workshop) and a Battery box.

The interesting point here is that there was also a four page set of mod sheets which enable the 40A to be modded



quite easily for use on SSB, both upper and lower being switched. If Graeme has the space this will be somewhere in this issue. Ted.

(Held over until the next edition of 'Lighthouse', —Graeme)

EUG ANNUAL ACCOUNTS

Graeme's careful stewardship of EUG's finances has again meant that we finish the financial year with a comfortable surplus which will take us into next year with a useful cash cushion, very necessary in these days of rising costs, printing, postage etc.

An audited annual account sheet signed by Graeme and by our Honorary Auditor Jesse Wright arrived recently and I can but commend them both for their dedication to EUG and its membership. Thanks Jesse and Graeme. Ted.

CLEANING TIPS.

From Michael we have the following anent muck removal from chassis etc. His suggestion is to try Electrolube's "FOAM CLEANSER 30" in aerosol form. He says that this foam seems to eat into the dirt and grime much in the way of oven cleaner.

A cotton wool swab can then remove the detritus, with cotton buds for the awkward corners. He adds that there are no unhealthy fumes. Sounds good. The cleaner can best be sourced from Maplin or RS Components although it may be available in some computer shops.

Michael asks also whether there is any truth in the rumour that the 870 Cabin

Receiver came in the two colours, maroon and green, representing port & starboard? His letter was dated March not April 1st.
Ted.

CORRECTION – IF BREAKTHROUGH ON 640s

David, G4 DMP writes in complimenting Graeme and the team for the April Lighthouse. He adds a correction to the article re IF breakthrough problems on 640 receivers.

The problem actually occurs via the phasing condenser spindle and NOT the BFO condenser spindle. So those of you with ideas on this mod please do note. Thanks David.
Ted.

MORE TIPS FROM MICHAEL

This in re the several mentions of carbon tracking on switches and valve sockets and bases.

His comments are that receivers owned, or previously owned by smokers will almost always suffer from this problem as the tobacco smoke carries minute particles of 'gunge' into the receiver case via the ventilation holes and these particles gravitate to points where HT exists.

His final words are that "Tobacco smoke and Electronics just do not mix!"
Ted.

THE DEAF 870 FROM LAST ISSUE

John Gomez is one who has written in with his thoughts on this deaf Rx. I have forwarded his comments to the owner and hope to hear that the set is now "hearing well". One suggestion I must mention is that some of the sets do not have the two-pin link from A to AE. Instead they have a "one leg and one hole" version which is screwed, via the hole, onto the earth terminal. Maybe ???

He also suggests the following possibilities. Is the decoupling on the AVC line defunct and is the AVC line bunging

back some out-of-phase AF backwards?

Another; is the tuning gang Okay, as he has experienced problems where the dried up old lubricant grease has caused an open circuit between the spindle for the moving vanes and the frame of the condenser, hence no (or wrong) capacity in the tuned circuits? Worth a try. Ted.

PLEASE HELP AN OLD MAN

Okay, my memory may be going so I need help here. I have had several HRO sets in the past.

HRO Senior and HRO M. They were either the 6 volt heater or the 2.5 volt heater version but I do seem to recall that they had a similar HT supply of 180 volts. Am I right or am I going senile?

Just that Graeme has come across some info re the Strattons-manufactured psu (model S.427 Power Supply) for those lease lend HRO-M sets and it has an HT of 260 volts. So SOS somebody. Ted.

AND NOW, THE BAD NEWS

Because of a very imminent move I may have to take a brief "Sabbatical" from your LIGHTHOUSE.

Problems over typing my usual input may last for several issues and I deeply regret this. Be assured that I shall get myself sorted out just as soon as possible.

73s. Ted.

In the meantime send your MailBox questions, stories and chit-chat to Graeme, G3GGL, at the Bewdley QTH shown on page two of your favourite magazine!



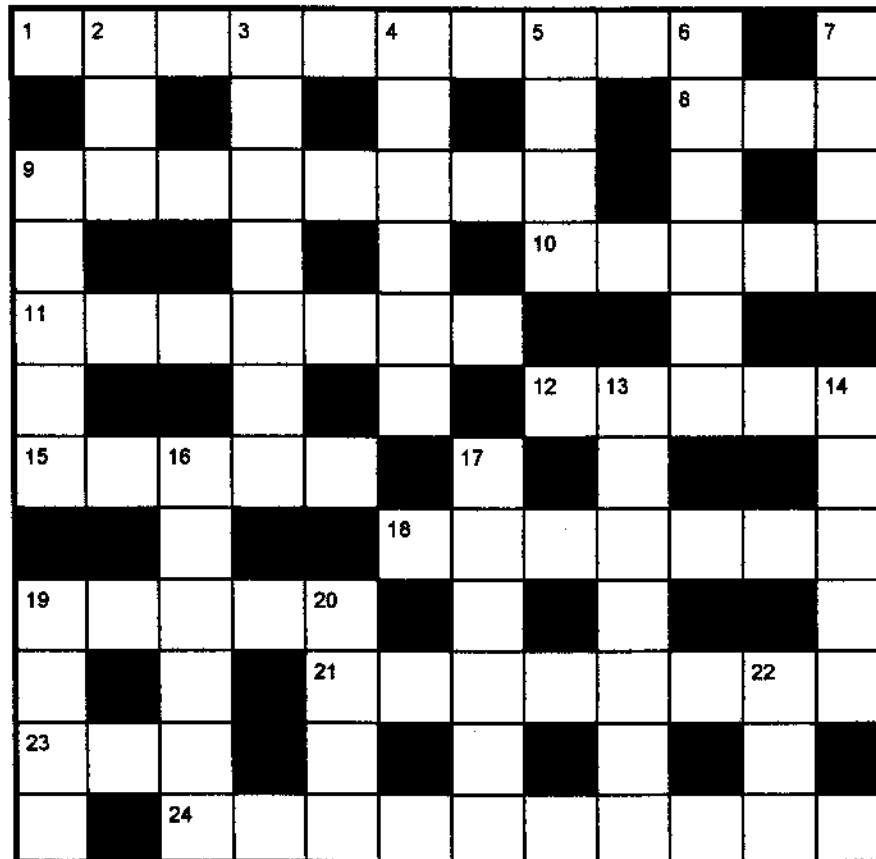
E.U.G. PRIZE CROSSWORD No.2

COMPILED BY COLIN CRABB G4HNE

The first five correct entries to be opened on 20th July, 2001, will each receive a free De-Luxe Eddystone User Group lapel badge. You may photocopy this page or just write out the answers, so as not to spoil your copy. Send your entries to Graeme Wormald, G3GGL at 15 Sabrina Drive, Bewdley, Worcestershire DY12 2RJ. The Editor's decision will be final.

ACROSS

- 1 An Eddystone with scope for display (10)
8. Association of broadcasters in Europe (3)
- 9 Maritime or aeronautical mobile could take place in this craft! (8)
- 10 Look sharp for an early type of changeover switch (5)
- 11 Re-invest in the latest computer technology (7)
- 12 Definable circuit section (5)
- 15 Deceptive test meter reading due to poor calibration (5)
- 18 Critical remark heard over the radio (7)
- 19 A request from Graeme concerning your EUG subs! (5)
- 21 Relay station (8)
- 23 Variometer, in short (3)
- 24 "Stray thoughts from an absent mind" (10)



DOWN

- 2 Highly successful wartime fighter pilot (3)
- 3 Current terminology (7)
- 4 Radio amateurs' dinner-dance (1, 3, 2)
- 5 Dx'pedition (4)
- 6 Light sensor comprising of rods and cones (6)
- 7 American thermionic device (4)
- 9 Minor abrasions to a refinished wireless cabinet (5)
- 13 Original source of the BBC victory V signal during WW2 (7)
- 14 Specific request for computer data (5)
- 16 Valve arrangements for a particular radio (4, 2)

17 Facilitate energy transfer by means of mutual inductance (6)

19 The fliers of Oz, in short (4)

20 Naval woman, names bird (4)



**WINNER OF EUG PRIZE
PUZZLE No. 1**



**The Lucky Winner of a
free year's subscription
to the
Eddystone User Group
was Jack Read of
Nantwich, Cheshire.**



Congratulations, Jack!

Solution to EUG Crossword No. 1

ACROSS

- 1 Capacitance. 6 Needle.
9 Mild. 10 SA. 11 AL.
13 Electrons. 14 SOS.
15 Electro. 18 DTI.
19 AR. 20 Ring.
21 Police.

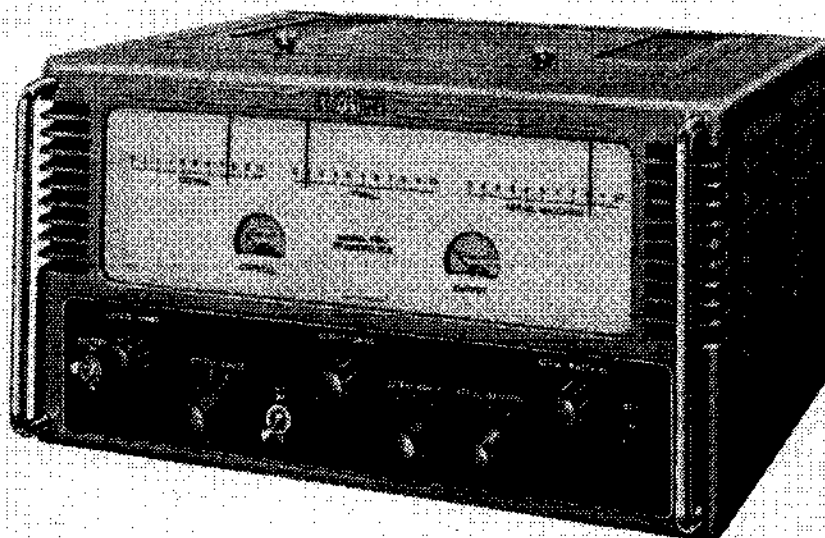
DOWN

- 1 Condenser. 2 Presets.
3 TX. 4 Nails.
5 Eddystone. 7 DAC.
8 Earclip. 12 LO.
15 ET. 16 CAL. 17 Tri.
18 DG.

Eddystone's Answer to Heathkit?

The Model 900 Mobile CW Transmitter

A recent visit to the Eddystone Factory produced some old photographs taken for publicity purposes. This particular one caught my eye at once. Why hadn't I heard of such a smashing little number before? Why had Stratton's hidden their light under a bushel? A phone call to Bill Cooke, memory man and former Chief Engineer revealed all – and there wasn't much to reveal!



Well, it seems that around 1955 Arthur Edwards, G6XJ, a keen CW man and Eddystone's Sales Director, had been making one of his periodic sojourns to the old Empire in Africa. Bill isn't quite sure at this distance if it was Kenya, Uganda, Nigeria or the Gold Coast, but that's immaterial.

The fact is that someone suggested that there would be a good market for a low power HF mobile CW transmitter, to match the 680X (which isn't very mobile, but don't ask!). When Arthur returned to the Bath Tub he lost no time in briefing the troops in the 'model shop'.

"Do me a mock-up of a 10-watt crystal controlled transmitter in a 680X case" he said. "Don't worry about the details or the tuning drives, just make it look good for my con-

tact in Katanga. I want to send him a photo of it."

Like most radio-amateurs he sometimes let his enthusiasm get ahead of his better judgement. The photograph was duly despatched. The query came back: "Where's the microphone socket? We can only see a keying jack!"

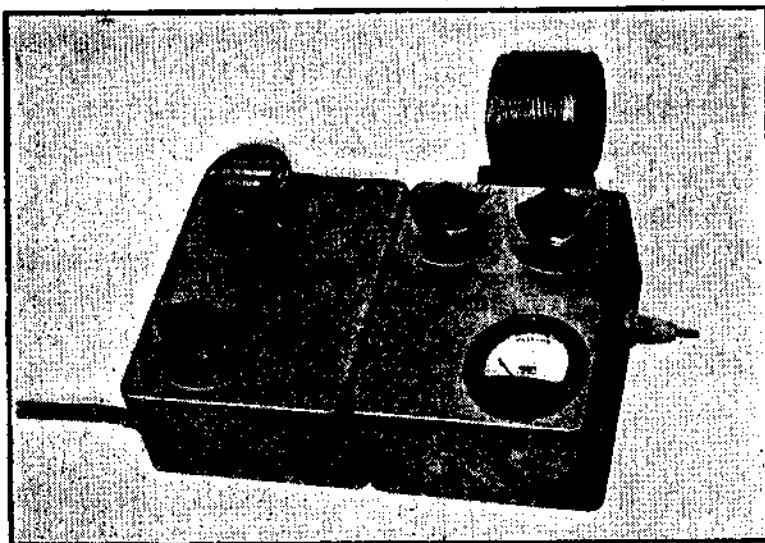
Yes, you've got it; the customer wanted a fone rig, not CW. Arthur had got it wrong. No way could the Company include a modulator within the price guide-lines. The project bit the dust. The factory Blue Print (circuits) Register of the time has the set listed, but the file is empty!

Could it be coincidence that Jerry Walker, G5JU, one of Eddystone's "project designers", published the following circuit shortly after?
GRAEME G3GGL

COULD THIS NEAT LITTLE "EDDYSTONE SPECIFIED" TRANSMITTER USE THE CIRCUIT ORIGINALLY INTENDED FOR THE S.900 MOBILE TRANSMITTER?

Jerry Walker, G5JU, was a Stratton engineer . . .

CONSTRUCTIONAL



Miniature Transmitter

for

3.5 and 7 Mc/s

by J. N. Walker (G5JU)

THIS transmitter has been designed on compact lines, yet is capable of producing a respectable amount of radio frequency power. Good results are obtainable with an HT voltage of 200 or 250 and quite a small power unit will serve. In fact, one of the main reasons behind the design is to enable an ordinary receiver supply to be utilised, this being a definite advantage when portable operation is contemplated. In addition to its suitability for portable work, the transmitter performs the following functions:—

- (i) a permanent transmitter for the 25 watt licencee, particularly where space is restricted
- (ii) a useful standby to a high power transmitter
- (iii) an exciter unit for driving a high power transmitter.

It is probable that the high degree of screening inherent in the construction confers a useful measure of TVI proofing. The transmitter is arranged to match into a wide range of aerial impedance.

General Information

The transmitter is built into two *Eddystone* diecast boxes, one holding all the components associated with the oscillator stage, with the sole exception of the crystal. The other box contains the PA stage, the tuning coil being external, partly because there is insufficient room inside the box for an efficient coil and partly to enable a quick change of band.

The oscillator valve is an *Osram Z77* which has been found most efficient as a crystal oscillator. The circuit is a little unusual, being arranged to ensure complete cessation of oscillation in the key-up position, a condition

not always found when the screen grid supply is keyed. The bias developed across the cathode resistor R2 is not applied to the control grid (R1 is returned to cathode, not to chassis) but it is applied to the screen grid *via* R3, when the key contacts are open. Although only a few volts, this definite negative bias is sufficient to cut off anode current. Keying is clean and the tone of excellent character.

The inductance of L1 is such that two band operation is possible with the one coil. Resonance at 7 Mc/s occurs with the condenser vanes well out and at 3.5 Mc/s when the vanes are nearly fully meshed. The coupling condenser (C5), grid leak (R7) and grid stopper (R8) for the PA stage are contained in the oscillator box.

PA Stage

The major items in the PA box are the tuning and matching condensers, a miniature moving coil meter and two *Osram N78* valves, connected in parallel. The N78 requires but little drive and works well at a comparatively low anode voltage. The two valves handle 60 mA at 250 volts with ease and it is probable that the input could be raised well above this figure for intermittent operation, since the permitted dissipation is 9 watts per valve. For safety, the HT voltage is removed from the coil and the aerial terminal.

Construction

Because of the restricted space in the metal boxes, it is to be expected that more than ordinary care is required in the construction. There is nothing difficult about it but the valves must be positioned carefully, to ensure that they are free of other components and can be inserted and withdrawn easily.

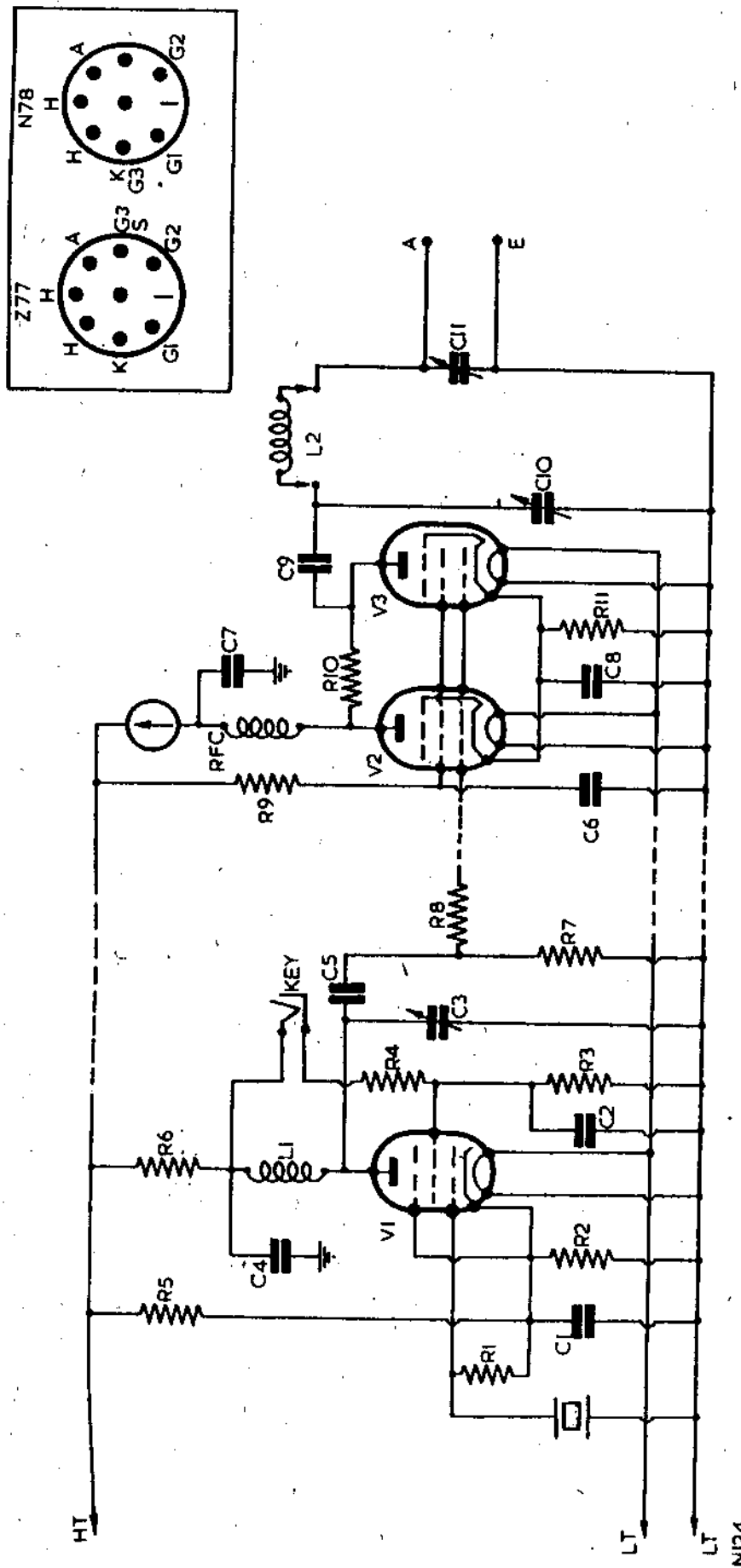


FIG. 1: CIRCUIT DIAGRAM OF THE COMPLETE TRANSMITTER.

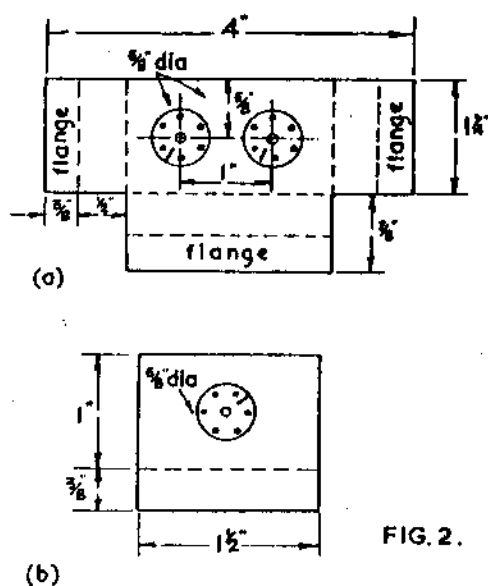


FIG. 2.

FIG. 2: DIMENSIONS OF THE BRACKETS REQUIRED FOR MOUNTING THE VALVEHOLDERS. IN THE CASE OF (a) THE SIDES ARE BENT UP TO FORM A SORT OF OPEN THREE-SIDED BOX, AND THE FLANGES BENT OUTWARDS FOR FIXING PURPOSES. THE ORIENTATION OF THE VALVEHOLDERS (LOOKING AT THE UNDERSIDE) IS INDICATED.

Taking first the oscillator unit, the valveholder is fitted to a small metal bracket made up as shown in Fig. 2. This bracket is bolted to the floor of the box, its position being judged from Fig. 4. The coil consists of 30 turns close wound 28 swg enamelled wire on an *Eddystone* Cat. No. 763 former, any two of the pins being used to anchor the ends of the winding. The coil is fixed to the side of the box with a small metal bracket, in a position well clear of other components and spaced away from the lid when the latter is screwed down.

The crystal base has sockets to take holders with either $\frac{1}{2}$ " or $\frac{3}{4}$ " pin spacing and room should be allowed for crystals of the round or flat types.

Turning to the PA, the two valveholders should be wired up before the fixing bracket is bolted into place—its position can be gauged from Fig. 4. The size and shape of the bracket and the orientation of the valveholders have been designed to minimise feedback. The wires to the grid tags should be very short and kept clear of other wiring, some of the latter being arranged to act as a screen between the grid and anode leads.

There is insufficient room for components to be fitted direct to the valveholder tags and leads from the cathode and screen are brought out through small holes to a tag strip, to which are attached C6, C8, R9 and R11. A small hole is drilled in the metal surround near pin 5 of each valveholder, and the anode leads

passed through. One lead goes to the stator of C10, via a fixed condenser, which must be of physically small dimensions. The other anode lead is taken to the RF choke. The two anode tags are connected together with a small resistor—if a straight wire is used, parasitic oscillation at a very high frequency is probable, especially when an anode voltage exceeding 250 is employed. A length of flexible wire is left attached to the grid-wires, and passed through a hole drilled in the wall of the box. The RF choke is held by two single tag strips.

The method of mounting the PA tank coil is left to individual choice. In the writer's case, a strip of polystyrene 2" long holds two sockets spaced $1\frac{1}{2}$ " apart. The polystyrene is held away from the wall of the box and the tips of the sockets project through holes into the box, only very short leads then being necessary to the stators of the tuning condensers. Several coils have been made, using different size formers fixed to two pin bases. The coils which have proved most suitable are 10 turns for 7 Mc/s, and 22 turns for 3.5 Mc/s, both on 2" paxolin formers.

The hole for the miniature meter is given as $1\frac{1}{2}$ " diameter, which is correct for the *Hobut* instrument, but other makes may have different dimensions. If possible, a meter having a full scale deflection of 100 mA should be obtained but any lower value can also be used. The one illustrated is 10 mA F.S.D. and has been shunted with a piece of resistance wire of a value to bring the F.S.D. up to 100 mA. The terminals on the *Hobut* instrument are unduly long and originally fouled one of the N78 valves. Each terminal was therefore reduced to a length sufficient for one nut to take good hold, a soldering tag being placed beneath the nut. Good clearance was obtained in this way.

Fixing Together

Holes to match are made in each box at the top corners, and further holes made for the grid lead and power leads to pass through into the oscillator box. After passing these wires through, the boxes are firmly bolted together. The connections are made to the appropriate points inside the oscillator box and a three-core cable fitted for feeding in the power supplies. In the illustration, the cable is of the flexible metal-sheathed type, which is beneficial if TVI trouble are being experienced. The power requirements are 6.3 volts, 1.6 amperes and 250 to 300 volts at up to 80 mA. The lids are screwed on, after drilling a number of ventilating holes in that part of the lid near the N78 valves.

Testing

Initial tests should be carried out with a reduced anode voltage—say 200. A check should be made to ensure that oscillation is obtained

with both 7 Mc/s and 3.5 Mc/s crystals, the indication being given on the anode current meter. The standing current, with no drive applied, will be in the region of 60 mA and this will drop to perhaps 20 mA when drive is present and the anode circuit tuned to resonance.

A 15 watt mains lamp should now be connected between the aerial insulator and chassis, to act as a dummy aerial load. To commence with, C11 should be set at maximum capacity and resonance obtained with C10. If little or no output is secured, C11 is progressively reduced and C10 rotated to restore resonance. This process will result in a steady increase of anode

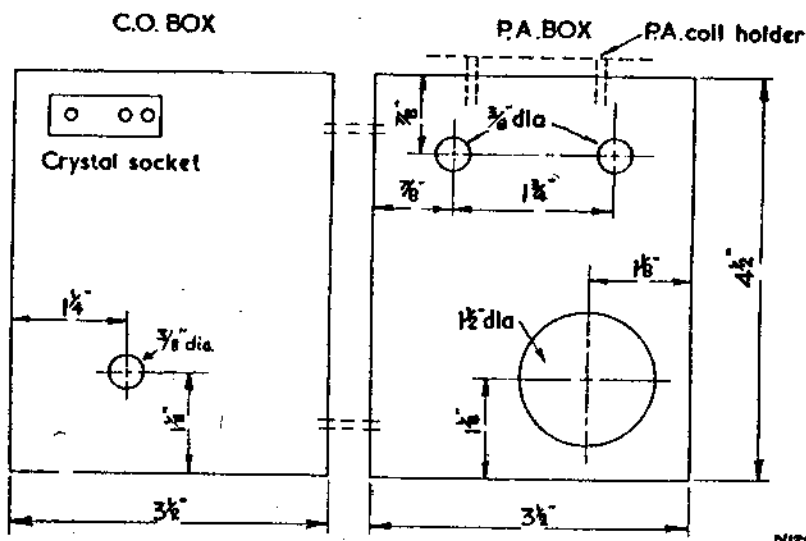


FIG 3
DETAILS OF MOUNTING HOLES IN THE FACES OF THE TWO BOXES.

LIST OF COMPONENTS AND VALUES

- Diecast Metal Boxes. Cat. No. 650 Eddystone
- 3 Condensers (C3, C10, C11) 140pF Cat. No. 586 Eddystone
- 3 Knobs and Dials. Cat. No. 425 Eddystone
- 1 RF Choke. Cat. No. 737 Eddystone
- 1 Coil Former (for L1). Cat. No. 763 Eddystone
- 1 Lead through Insulator (aerial terminal) Cat. No. 695. Eddystone
- 1 Moving Coil Meter (see text) Howard Butler
- 3 Valveholders B7G type XM 7/U McMurdo
- 1 Valve Z77 (V1). Osram
- 2 Valves N78 (V2, V3). Osram
- 1 Jack type P72. Igranic
- 1 Crystal Holder

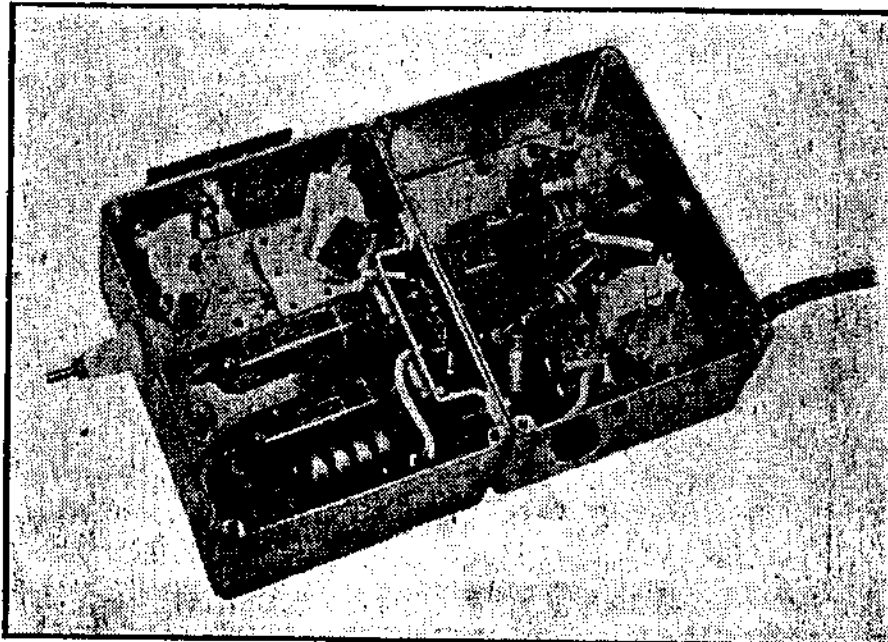
1 Crystal 3.5 or 7 Mc/s. Q.C.C. or Brookes

Fixed Condensers (Moulded Mica)
.001 or .002 μ F., C1, C2, C4, C6, C7, C8.
50 pF C5 (Ceramic)
.0005 μ F. C9

Resistors
10 ohm. R10
22 ohm. R8
100 ohm. R11
2,000 ohm. R2, R6
5,000 ohm. R9
27,000 ohm. R7
47,000 ohm. R1, R4
100,000 ohm. R3, R5
All 1/2 watt except R11 which is 1 watt, wire wound.

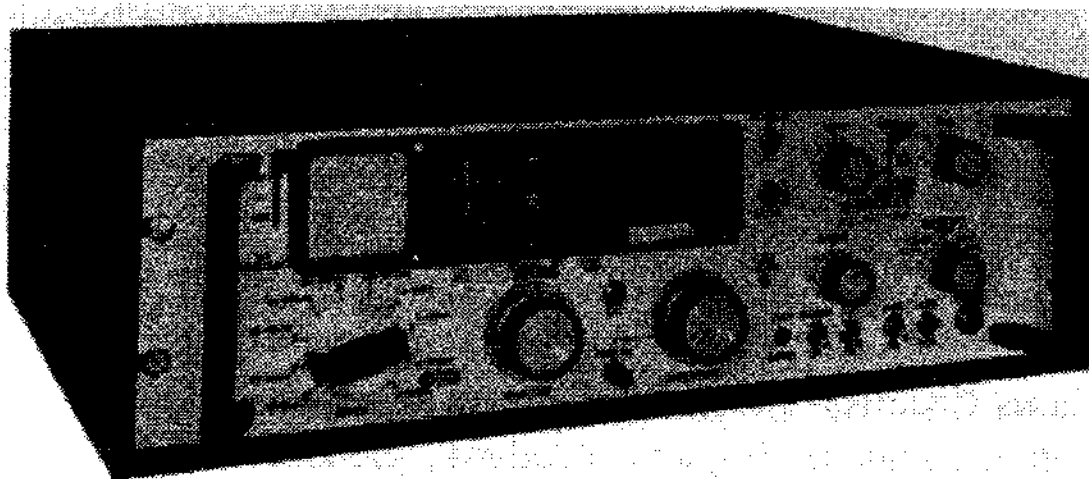
current and an adjustment will be found at which maximum radio frequency output is obtained. This point will coincide with a still reasonable amount of dip in the anode current—the output valves should not be loaded up to an extent which results in little or no dip being seen.

The transmitter is now ready to go on the air. If desired, the HT voltage can be increased to a maximum of 300. It will be found possible to accommodate almost any length of aerial by suitable adjustment of C10 and C11. Whilst the transmitter can be used without any earth connection it is desirable to earth



THE EDDYSTONE EC958/7E

BY DAVE JONES MW1DUJ



Back in the misty past, EUG NL14 (1993) to be exact, the EC958 was covered as the featured model. However, little was said about the /7E model, which differs from its predecessors by having an electronic digital display for the last three or four (selectable) digits of the tuned frequency. It was felt that the added complexity and attraction of this version merited a separate feature of it's own. This set can also be found as the MARCONI H2311.

Production of the 958 series commenced around the end of the sixties, but the set described, hereafter called the /7E, did not appear until 1973. Production ceased around 1980 when it was replaced by the superb 1837 series, although there seems to have been some overlap between the above dates. The specification list makes impressive reading, frequency coverage is from 10 KHz to 30 MHz in ten switched bands, no less than six of these covering the frequencies below the HF end of medium wave, making it a superb receiver for those who like to use the LF and VLF parts of the frequency spectrum.

There are those who say the 958 series are the finest receivers Eddystone ever produced, but I personally think these statements may be a little misinformed. The list goes on, selectivity can be chosen from the following at

6dB down: 8, 3, 2.4, 1.3 and 0.4 KHz, something there for everyone.

Sensitivity is quoted as less than 1 microvolt 20dB SINAD CW. A switchable 10 / 20 / 40 dB attenuator is fitted. Image rejection is quoted as more than 60dB between 18 and 30 MHz, and 75dB between 10KHz and 18MHz, and stability of less than 20Hz after warm-up ensures that the set will remain on frequency for long periods. The receiver is of the multiple superhet type, being single, double or even triple conversion depending on the range selected.

Range 1, 19.8 to 30 MHz, range 2, 9.8 to 20.1 MHz, range 3, 4.0 to 10 MHz and range 4, 1.6 to 4.1 MHz are all triple conversion, range 5, 680 to 1650 KHz, range 6, 280 to 690 KHz and range 8, 53 to 126 KHz are all double conversion, whilst range 7, 125 to 285 KHz, range 9, 24 to 55 KHz, and range 10, 10 to 24.5 KHz are single conversion.. The intermediate frequencies are : 1st, tuneable as incremental tuning at 1235 to 1335 KHz, 2nd 250 KHz and 3rd 100 KHz, although the tuneable IF is not used on the double conversion ranges, and the 250 KHz IF is not used on the single conversion ranges. Additionally, it is possible to receive in a high-stability mode on the triple conversion ranges 1 to 4, and the digital display too, is operable only on these ranges. The construction is modular,

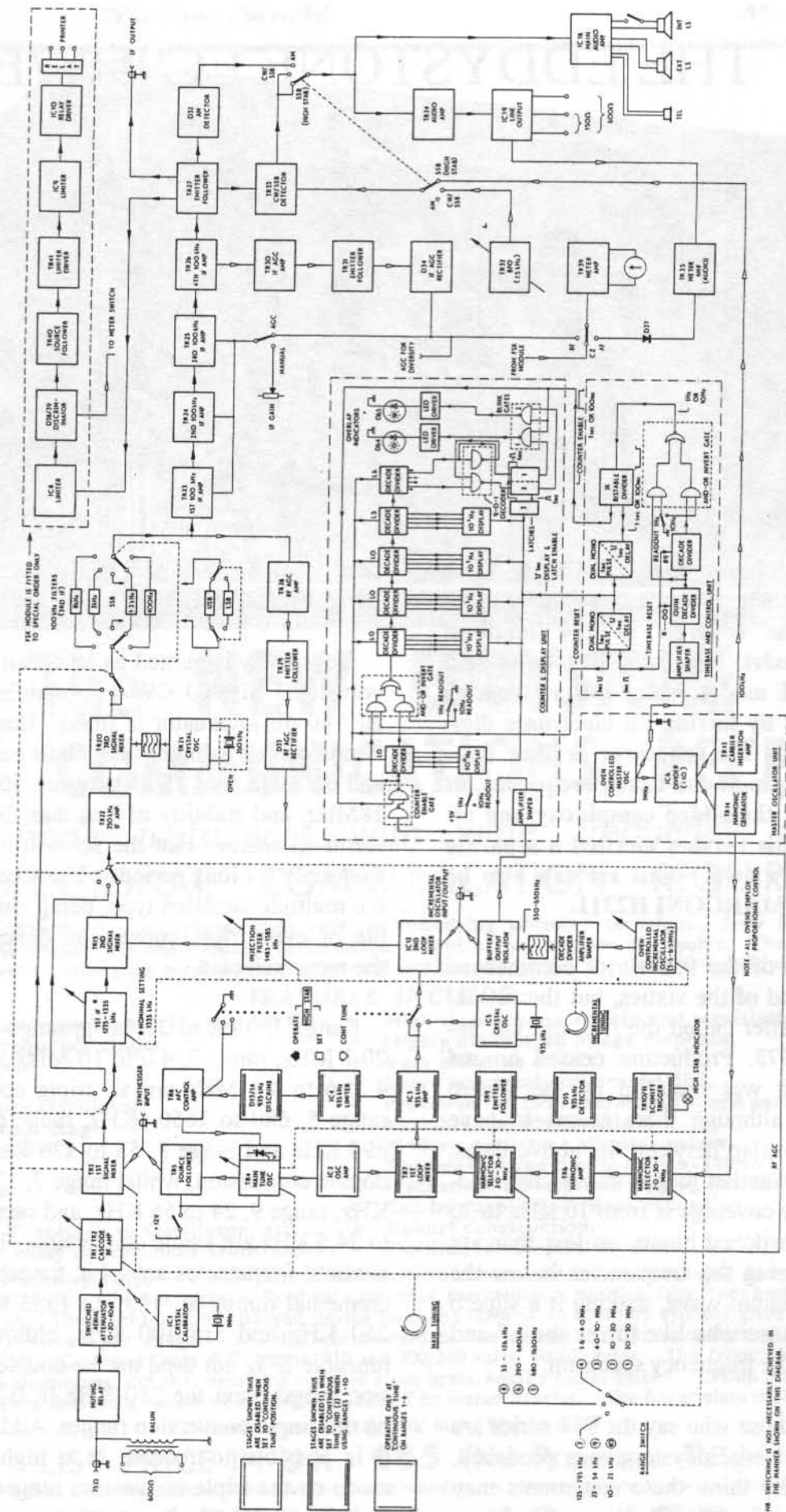


Fig. 2.12 Block Diagram of Complete Receiver

consisting of a number of mostly small, steel-enclosed housings interconnected by plugs and sockets, which are ALWAYS the first place to look when faultfinding on the 958 series. The ends of the cables, especially the co-axial ones, tend to disintegrate into a gungy green mass normally referred to as "GREEN GOO".

The 958/7E is a much more complex and able receiver than the earlier models of the 958 series, this stems from commercial requirement for the reception of complex data modes such as PICCOLO and LINCOMPEX, which meant either a channelised receiver, or one which could be set to within 10 to 30 Hz accurately to ensure continued and stable reception. This was virtually impossible with traditional analogue tuning methods, so the interpolating oscillator was made to drive a digital readout which would allow for easy and accurate tuning.

The digital display was actually a frequency counter, so it read what the oscillator was actually producing, not what a microprocessor said it should be! The oscillator was built into a large, temperature controlled unit for greater stability, and a stability of only 1 or 2 Hz per degree Celsius was obtained in practice. A block diagram is included overleaf, I did say it was complicated!!

There was a comprehensive list of options available for the set, it could be supplied as a rack mounted unit, or in a desktop cabinet. There was a plinth speaker, or an extension speaker unit. A shock absorbing mount, a drip-proof cowl, an FSK unit, a 12 /24 Volt transistorised power supply unit, the list goes on...

They are truly magnificent sets, anyone buying one will certainly not be disappointed with the performance or the audio quality, although to get the best from it, you need a good extension speaker. To further increase the functionality, two of these receivers can be wired together to give diversity reception. Just a few operational tips, you should never tune around the bands with the HIGH STAB. / CONT.TUNE switch set to HIGH STAB. po-

sition, as you are then fighting against the set for control, and you will lose!! When tuning around, the incremental tuning switch should be set to the ZERO position, I.E. with the digital display reading 000, and the 1Hz / 10Hz readout switch set to the 10Hz position. This assumes you are using the set on a range covered by the digital tuning, range 1 to 4. When you have tuned in the desired signal, the PEAK-RF control can be used to obtain the maximum signal strength, although if you have tuned a long way away from the frequency where this control was last set, you can stop tuning and rotate the RF peak control for maximum noise, just to get you roughly in the right place. The power supply is switchable between 110 / 220 Volts, 50 / 60 Hz, MAKE CERTAIN you have it in the correct position, a lot of these sets were used on ships, where 110V is the norm, and catastrophic deconstruction would almost certainly result.

The mains on / off switch does not switch off the power to a lot of the circuitry, including the PSU and controlled oscillators, so be careful when working inside. You can operate the receiver from an external synthesizer, and a switch is provided at the rear of the set. If used without an external synth., make sure this switch is set to normal. You would not be the first person caught out by this when examining a non functional set. If you ever decide to use the external synth, the input frequency on ranges 5,6,8 should be the required signal frequency PLUS 250KHz, and on ranges 7,9,10, it should be the required frequency PLUS 100KHz. If you have the internal FSK module fitted, it will only work with the mode switch set to CW/SSB, as there is no supply to it otherwise. The tuning mechanism is best left well alone, unless essential maintenance is needed, to quote from a recent article, it has more moving parts than a clock!!

I hope that a few more members will get these sets, as they seem to be getting rarer now, so hurry before it is too late. The price depends on condition, but don't be afraid to look inside, because doing this could make a lot of difference later if you find a lot of corrosion. ★

RADIO RAMBLINGS

Gettings from my Notebook

By
Graeme
Wormald
G3GGL

JUNE 2001

Greetings to all EUG members old and new. It was a pleasant change meeting many of you at the Vintage Communications Fair at the NEC in April. The biggest problem was lack of time to have a decent chat with anybody and I must apologise to those members who I saw hovering to have an eyeball and who had to leave without one . . .

ANOTHER RIG FOR THE SHACK

I managed steadfastly to resist temptation until the very end, when I lost my halo and bought the Heathkit DX-40 which was still standing forlornly on a half-dismantled table.

This was a 1960-vintage self-contained 75-watt CW/AM transmitter aimed at the American novice market. It covers the five standard pre-WARC bands and is crystal controlled, with a built-in pi-coupler, to help reduce TVI-causing harmonics. My model is crystalised for the 3625kcs vintage AM net (Saturday mornings at 09.30 UK time, for those who want to take a listen).

And those of you who say I'm unfaithful to the Bath Tub must remember that no Ed-dystone transmitter ever hit the High Street. The S.888, *et al*, were built to go with the DX-40!

Actually it has one novel piece of circuitry which I've never seen used before. The 500v supply for the 6146 PA valve is used for the Oscillator and Driver stages both connected in series!

TROUBLE AT THE OFFICE

I've got some disappointing news about the recent members' survey. First of all, the question of making members details (ie

names and addresses) available in the Lighthouse. Out of 330 members receiving questionnaires, 128 were returned. 66 requested anonymity. 21 failed to answer the question, which left 55 who said they would like their details published.

But several of these requested that only names and e-mail be given; some said names and phone numbers only. Some said either of the above plus County!

And then I tried to make my members' database print these out. You've never seen such a mess! No way could I make it produce the required directory! So I think I'll abort that exercise and leave it for some-one else to do. Any volunteers?

The next part isn't quite so bad. It's just that the survey of members holdings isn't yet complete. I've started to work it out several times, but I keep running out of space. Ed-dystone has been far too prolific in its variants! And in any case, lists are still coming in. Promise to have it finished for the next issue of Lighthouse. Honestly!

Now the third item is a grovelling apology! As most of you are obviously aware, most membership renewals take place in May. This is actually a left-over from earlier times, because now we take on members at any time of the year and they renew 12 months later. As a matter of curiosity you will see a month written on your address label, this is an *aide memoire* to me to include a renewal form with that edition of 'Lighthouse'. (Never try and renew unless you get a coloured form asking you, or you will confuse the system - as some have discovered!)

What I'm getting round to saying is that lots of you take the opportunity to drop a



note with your renewals. I also get about 20 EUG e-mails a week. And I have an Electoral office to attend to plus an involvement with our Carnival which also takes place in the first week in June!

Will all of you who are still awaiting a reply to any of your mail please be patient! I am a bit snowed up . . .

EXPAT's REPORT

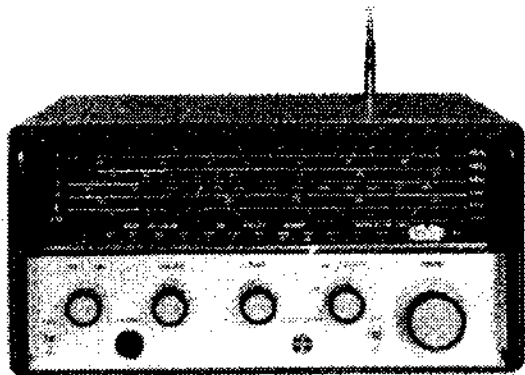
Tony Grogan, WA4MRR, reports from North Carolina that in the early sixties he used to work for Bill Cooke and Harold Cox at the Bath Tub. He used to align the 830/4, 830/7, 770R and 770U and 888A as they came off the assembly line.

He also remembers working on the design of the EC10/EB35. An early memory he has of the latter was a 'special' to be installed by Webbs of London in Prince Charles's new sports car. Apparently the EB35, although not made for automobile use, was a "hot ticket item" with the jet set, according to Tony. Well, there's always something new to discover!

ANOTHER SURPRISE

Speaking of the EB35, I've just had a letter from our Scandanavian correspondent, Tor Marthinsen in Tønsberg, enclosing an Instruction Manual for the Marconi Marine cabin receiver type EB.35 MK.III. I suppose I should be used to any Eddystone/Marconi 'mix and match' combination by

Solid-State Broadcast Receiver
Model EB35 Mk III



now, but I always wonder about the fact that sometimes they give it a new name, sometimes they don't!

But the surprise was that I hadn't realised that I'd never previously seen the hand-

book of the EB35/III and didn't appreciate that it was radically different from the EB35 and EB35/II.

The Mk III version uses an IC IF strip (TBA 570) and a ceramic 455kHz IF filter as well as a totally different transistor line-up. In fact it couldn't be less like its predecessors, so don't ever make the mistake of thinking it is!

As a valve-ham, born & bred, I shall steer well away from it (I don't do ICs!).

680 REVIEW

Thanks to another observant member we have the original *Wireless World* September 1949 review of the Eddystone Model 680, or, as it is sometimes known, the 680/2. This was to distinguish it from the first Model 680, announced in the W.W. for October 1947 but which never emerged!

This was because, in the rush to get a top-grade professional model onto the High Street, Stratton's publicity machine jumped the gun. The first 680 was a failure. Among other things it had a distressing tendency to burst into flames . . .

But all's well that ends well and the 680, followed by the slide-rule 680X and its military derivative, the 730, set the pace at the top of the range for over a decade.

But I do have one problem, I have mislaid the kind reader's name & QTH, I just have his copy of W.W. to return to him. Please report in and let me know!

ARTICLES REQUIRED!

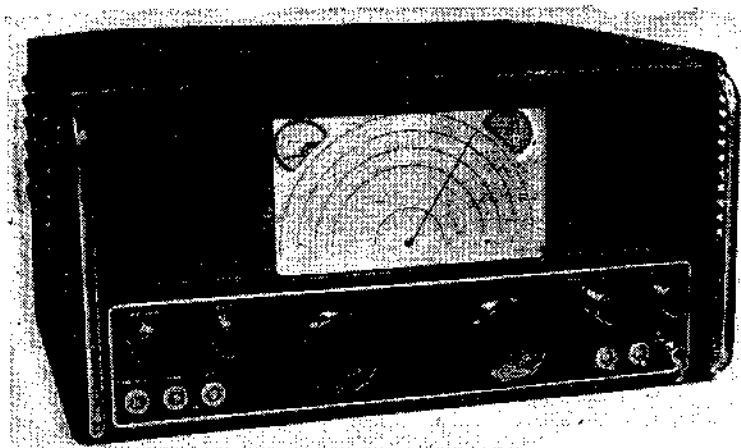
As you will have seen in Ted's MailBag, his output will be curtailed for a few issues. But we still have forty pages to fill. The past year has seen many and varied features submitted by members and, as you will have seen, they vary enormously in style and content.

But do you know which arouse most interest? It's the personal reminiscence items, started by Bob King G3ASE, when he wrote for us in 1997 about his adventures as a teenage SWL. He joined the Radio Security Service in 1941 aged seventeen and was monitoring German Intelligence for Station X on an Eddystone All World Two!

Check your memory banks; a little goes a long way when it's put in 'Lighthouse'!

Vy 73 es bcnu, Graeme G3GGL

O.K. FOUND IT! G3GGL



TEST REPORT

EDDYSTONE MODEL 680

The Model 680 has its essential controls neatly and conveniently arranged. Note the large turning knob with one of similar size for the wave-change switch.

The selectivity is changed in steps, five in all, and these give bandwidths of 15 kc/s, 7 kc/s, 4.5 kc/s, 2.5 kc/s and a few hundred c/s respectively, for an

Fifteen-valve Super-heterodyne of Advanced Design

THOUGH intended primarily for the exacting needs of professional communications this set possesses an indefinable quality that cannot fail to appeal to the discriminating amateur who is looking for a really sound general-purpose receiver. Neither in conception, nor in coverage, nor in cost is the set in the least "amateurish" and its specification will bear comparison with that of any other set designed for a similar purpose.

It has 15 valves, all but two of which are the latest miniature all-glass type with B7G bases. The frequency coverage is very wide, but perhaps not quite so extensive as some of the sets in the same class because it does not take in the longer wavelengths, necessary for some kinds of professional communications. The frequency coverage of the Model 680 is 480 kc/s (625 m) to 30 Mc/s (10 m) so that it just takes in the 600-metre band which is used extensively for short and medium distance ship-to-shore traffic.

This frequency band is covered by five switched ranges, their individual coverages being 480 to 1120 kc/s, 1.12 to 2.5 Mc/s, 2.5 to 5.8 Mc/s, 5.5 Mc/s to 13 Mc/s and 13 to 30 Mc/s respectively. Although not apparent there is an overlap between all ranges, as the calibrated portions do not in all cases occupy the full length of the scale.

is that it has a mechanically operated selectivity system, or as it is sometimes called, bandwidth control. The couplings between primaries and secondaries of the i.f. transformers, and hence the selectivity of the circuits, is varied by change in physical relationship of the coils. The principle is not new; it may actually have predated the more commonly used electrical systems, but it is nevertheless a perfectly sound one, and moreover, is quite satisfactory as applied to this set.

attenuation of 6 db at the boundaries. The narrowest of all is with a quartz crystal filter.

In common with all modern high-performance receivers, the Model 680 is a superheterodyne and it has two r.f. stages before the mixer. Their main purpose is not necessarily to improve the sensitivity but to give adequate second-channel rejection at the higher frequencies. Coils with adjustable dust cores are used on all ranges in this portion of the set. Waveband switching is by means

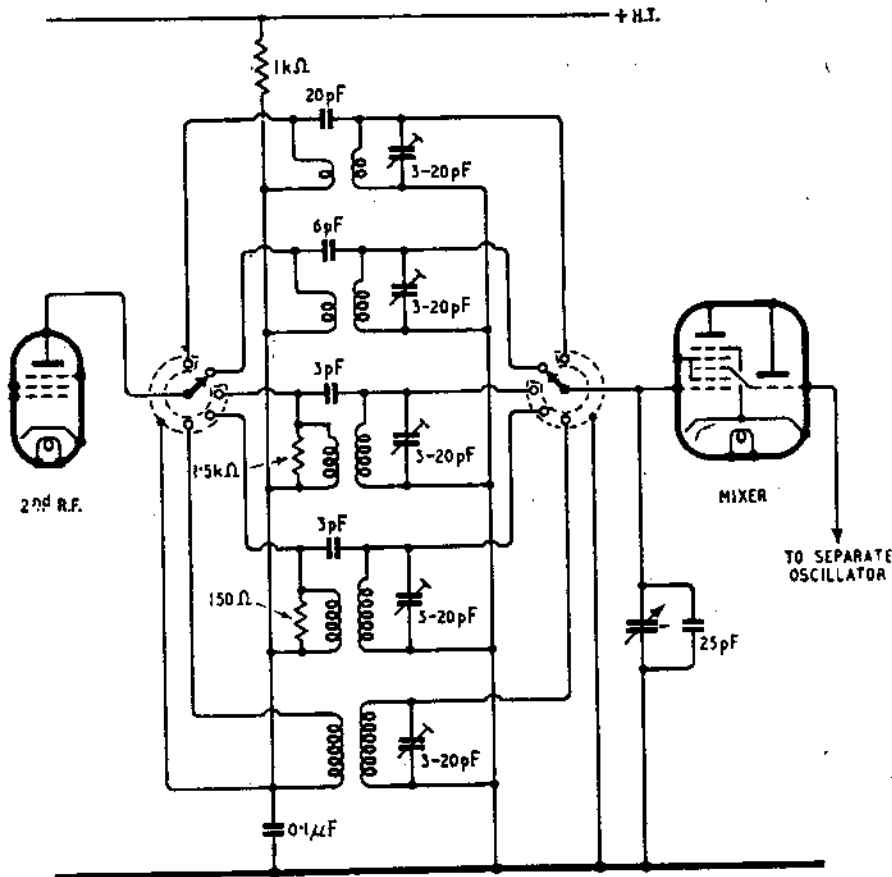


Fig. 1. Typical of the r.f. stages in the Model 680 this interstage coupling is between the second r.f. and mixer valves.

Eddystone Model 680—

of ganged wafer switches and the general arrangement of the circuit is shown in Fig. 1, which depicts the inter-stage coupling between the second r.f. stage and the mixer. It is typical of the other r.f. couplings.

A triode-hexode is shown in the mixer position but a separate oscillator valve is actually employed, only the hexode part giving service as the mixer. Its triode section is ignored although the triode grid pin is utilized for oscillator injection. The idle

is the crystal filter, this being the usual form of bridge-connected circuit with the crystal balancing, or, as it is sometimes called, the phasing capacitor, controllable from the front panel. It can thus be used to give high attenuation of an interfering carrier on either side of the desired signal and this is the so-called "single-signal" technique which will be familiar to users of communications sets.

Included in the circuit of Fig. 2 is the first i.f. valve and the signal strength (or "S") meter and its controlling diode. The

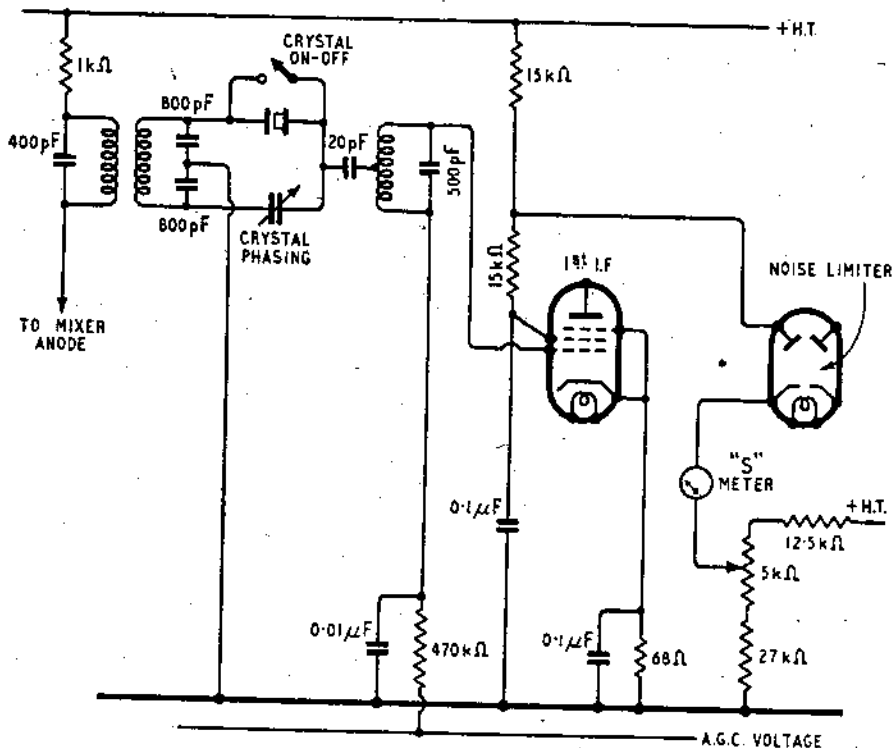


Fig. 2. The crystal filter is included in the first i.f. coupling following the mixer valve. Shown also is the diode and source of voltage controlling the "S" meter.

anode is joined to the cathode. As an alternative to the X81 or 7S7, which are the triode-hexodes favoured, an ordinary hexode mixer, such as the 6BE6 may be used in some receivers. The particular model reviewed here had the X81.

The separate oscillator valve is an 8D3 pentode but triode-connected in an orthodox form of the familiar back-coupled oscillator using shunt-fed anode coils. Fixed tracking capacitors are used on all five ranges and circuit trimming is taken care of by adjustable dust cores and small ceramic pre-set capacitors.

Immediately following the

meter is actuated by the change in G_2 current under the influence of a.g.c. but responds to the voltage drop in this electrode's series feed resistors. It does not, however, function when receiving c.w. or m.c.w. with the a.g.c. switch in the "off" position.

In order to derive the full benefit from a crystal filter, the filter must be supported by a chain of really good tuned circuits. In the Model 680 all the i.f. transformers, like the signal circuits, have dust cores and the grids of the valves are tapped down the secondary windings in order to relieve the circuits of undue damping. Circuits of quite high

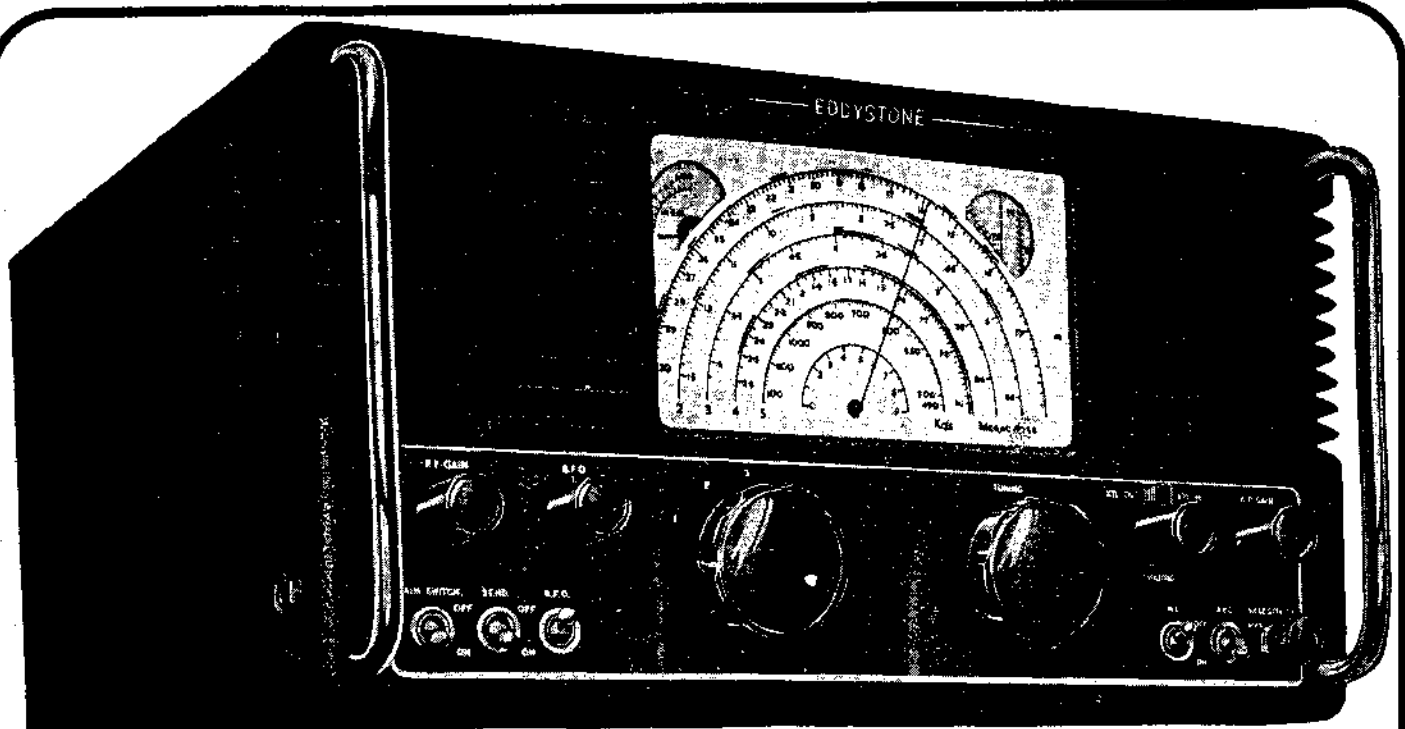
The i.f. amplifier has seven tuned circuits in all, three being in the crystal filter, and they are tuned to approximately 450 kc/s by fixed capacitors of 400pF, the final tuning to this frequency being effected by the adjustable dust cores.

Two stages of amplification are employed using 6BA6 valves, which are the latest button base r.f. pentodes with B7G bases. Both are included in the a.g.c. system, which, with the two r.f. valves, makes four controlled stages in all. Exceptionally good control of the audio output is thus obtained; the a.g.c. characteristic shows that for a change in the input signal of about 100 db the audio output does not vary more than 9 db. Considerable delay is allowed before a.g.c. becomes operative and this amounts to about -13 volts. It is derived from the bias resistor of the output stage and is achieved by joining the cathode of the a.g.c. diode to the cathode of the output valves. This diode is the companion to the detector, which of course operates without a delay voltage, and the two form one of the 6AL5 valves used in the receiver.

The detector circuit is more or less orthodox except that the diode load consists of four resistors joined to a switch which is linked with the bandwidth control. By taking the a.f. output from an appropriate tapping on the diode load for each position of the selectivity switch, some compensation is made for variations in the i.f. gain that inevitably accompany changes in bandwidth, no matter what system is employed.

Further compensation for variation in i.f. gain with change in bandwidth is also provided and this takes the form of adjusting the stage gain of the second i.f. valve. It is effected by switching in different bias resistors, the switch being part of the bandwidth control.

Following the detector is a series-connected noise limiter, the diode being the companion to the one controlling the "S" meter. These two form the other 6AL5 valve in the set. Details of the detector circuit, and of the noise limiter which incidentally



The NEW EDDYSTONE '680' COMMUNICATIONS RECEIVER

A high-grade instrument with wide frequency coverage for PROFESSIONAL COMMUNICATION REQUIREMENTS

The '680' is a fifteen valve superheterodyne receiver embodying advanced technique. New features in the design add to the outstanding and reliable performance of which the receiver is capable. The appearance is impressive, whilst the construction and general workmanship are of the finest in the industry.

FEATURES INCLUDE:

- Continuous coverage from 30 Mc/s to 480 Kc/s.
- Two Radio-Frequency stages.
- Two I.F. stages.
- Crystal Filter.
- Beat Frequency Oscillator.
- Push-pull output stage.
- Variable Selectivity.
- "S" Meter.
- Noise Limiter.
- Standby switch.
- Stabilised H.T. voltage to Oscillator, etc.
- Provision for relay operation of transmitter.
- High signal-to-noise ratio and sensitivity.
- Highly attenuated Image response.
- Very effective A.V.C.
- Large accurately calibrated dial.
- Provision for twin feeder and single aerial.
- Variable dial illumination.
- Modern miniature all-glass valves.
- Flywheel loaded tuning device - 140 to 1 reduction ratio.
- Mechanical bandspread logging device.
- Can be supplied for Rack Mounting.
- Robust construction.
- Finished for tropical service.

The complete frequency range—from 30 Mc/s to 480 Kc/s—is covered by five switched coil assemblies with an overlap between each. The gear-driven, flywheel controlled mechanism is positive, free from backlash and very smooth in action. The mechanical bandspread device takes the form of an auxiliary dial and gives a scale length equal to ninety inches per range. The dial can be read to one degree. I.F. transformers are permeability tuned to 450 Kc/s. Operates from A.C. mains, 110 and 200/240 volts, 40/60 cycles. The front panel and tuner unit chassis are aluminium, and the remaining units of stout brass, heavily nickel-plated. Lift-up lid. The cabinet and front panel are finished a handsome ripple black, set off by plated handles. The finger plate is black and silver.

Dimensions:—16 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ " x 8 $\frac{1}{2}$ " high. Weight 41 lbs.

LIST PRICE IN U.K. £85 (No Purchase Tax)

Government Departments, Official bodies and all interested individuals are invited to write for information folder 1:—

STRATTON & CO. LTD.

EDDYSTONE WORKS, ALVECHURCH ROAD, WEST HEATH, BIRMINGHAM, 31
Cables: STRATNOID, BIRMINGHAM Telephone: PRIORY 2231/4

required, are included in Fig. 3.

From the noise limiter the audio output passes to a volume control, then to a 6AU6 voltage amplifier and from there, though a phase reversing stage, (another 6AU6) to a pair of 7D9 output valves operated in push-pull. Some negative feedback is applied from the anodes of the two output valves to the anodes of the two penultimate valves. The output transformer has a ratio to suit a loudspeaker of between 2 and 3 ohms impedance.

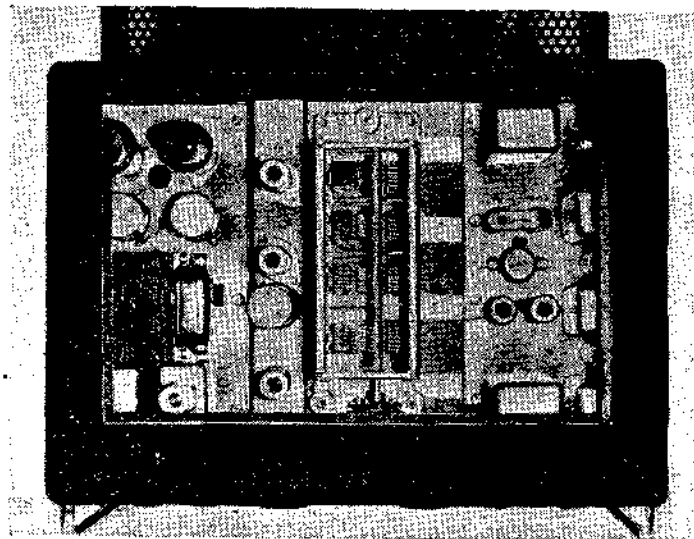
Provision is made for reception with high-resistance headphones, a jack being included in the anode circuit of the first 6AU6 valve and connected so that when the 'phones are plugged in the output and phase reversing stages are isolated.

The b.f.o. valve is a 6BA6 connected as a triode and the circuit is the well-known electron coupled arrangement. This is a particularly stable form of oscillator and so is well suited to a set of this type, which needs a very stable oscillator for heterodyning the signal when the crystal filter is in circuit. Stability is

As the stability of the frequency changer oscillator is every bit as important as that of the b.f.o., the stabilized h.t. is fed also to this valve and to the screen grid of the mixer, but not to its anode

Tappings on the mains transformer provide for operation on 110 and 200 to 240 volts a.c. at normal supply frequencies.

(b) With the lid raised all valves are accessible, so also is the mains transformer for voltage adjustment. To trim the circuits, it is necessary to withdraw the chassis from the cabinet.



which joins to the common h.t. line.

The receiver is self-contained, so far as the provision of all operating voltages is concerned, and it includes a mains transformer, a 5Z4G rectifier, stabilizer, as already mentioned, and adequate smoothing circuits. The

Although the receiver is not in the most expensive class (the price in the United Kingdom is £85) it is none the less a delightful set to handle. The 140 to 1 reduction in the tuning mechanism provides a precision of control that is most essential on the higher frequencies, yet it is not

a tedious control to operate as it embodies a heavy fly-wheel which serves to carry the pointer from one end of a range to the other with but three spins of the tuning knob.

Despite the low gearing, no trace of backlash could be detected, although quite a long chain of gears are used. These are all spring-loaded and of the split-wheel type. Similar gears drive a small subsidiary dial

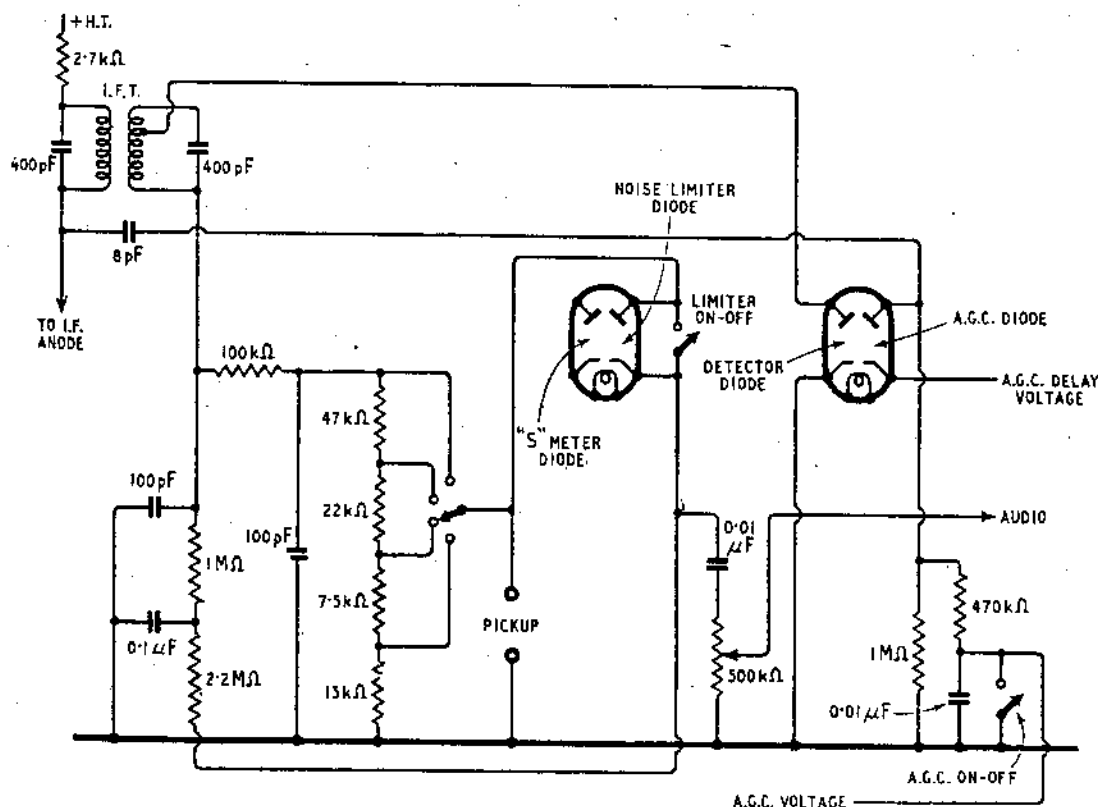


Fig. 3. Detector and noise limiter circuits of the Model 680. Included is the switching of the detector diode load and also the a.g.c. system.

further ensured by stabilizing its anode voltage, the stabilizing medium being a VR150/30 neon tube.

smoothing choke is of generous size and the two associated capacitors are 16 and 40μF respectively, the 16-μF being the reservoir.

which serves the equivalent of band-spreading, at least so far as logging stations is concerned. It is geared eighteen times faster

Eddystone Model 680—

than the main pointer and has ten inclined scales, each 1in long, with a total marking of 100 divisions.

On the highest range, which is the longest or outer scale on the main dial, a scale length of 10in is available and, with the subsidiary dial 20in total. But as the subsidiary dial makes nine complete revolutions for the pointer's coverage of the main scale, it provides the equivalent of 90in. of scale on this range. On the lowest frequency range, which is the inner calibrated scale, the effective length becomes 43 ins. In addition to the frequency calibrated scales there is a small logging scale on the main dial engraved 0-9. Thus to log a station it merely suffices to record the range (e.g., 1-5) the area on the 0-9 scale and the setting on the 0-100 bandspread scale. For example, a station on 9 Mc/s can be recorded as R2397½ as it is in range 2, comes in division 3 on the 0-9 scale and tunes in at 97½ on the bandspread dial.

So many receivers have smallish tuning knobs that it is a welcome change to handle a set with one of generous size. The two principal controls on this set—the tuning and the wavechange switch—are 2in in diameter and have fluted edges into which the fingers sink comfortably.

Subsidiary Controls

Grouped on either side of the large knobs, and in two rows, are the subsidiary controls. On the left the upper pair of small knobs are for r.f. gain and b.f.o. pitch control, while below, are three toggle switches which, reading from left to right, serve the functions of power on-off, send or receive and b.f.o. on or off.

For reception the send-receive switch has to be in the down position and h.t. is then supplied to the valves. In the up, or off, position the h.t. supply is interrupted, but the heater supply to the valves is maintained. In addition, a second pair of contacts on the switch close and they can be used to operate a starting relay in a transmitter, either locally or at a distance. A pair of terminals at the back of the set join to these contacts.

The right-hand group comprise the crystal phasing capacitor and a.f. gain controls in the top row, and below, three switches for (from left to right) noise limiter on-off, a.g.c. on-off and bandwidth selection. Immediately above the crystal phasing capacitor is a flush-type thumb-operated switch for bringing the crystal into use when required.

This disposes of all the controls on the front panel, but there are two more located at the rear of the set. One, which is adjacent to the mains input socket, is an unusual fitting, as it is a small rheostat for adjusting the brightness of the dial light. At the opposite end of the set, and close to the loudspeaker connections, is a screwdriver slotted spindle for "zeroing" the "S" meter. This spindle is normally covered by a screw-on cap. The telephone jack is not very obvious as it is located on the left edge of the front panel, which, in this set, is slightly

dished with short, straight sides which rabbet into the main body of the metal cabinet.

The performance of the set on all wavebands should satisfy the most fastidious, and whether one is searching for a particular station, be it for traffic purposes, for a broadcast programme, or may be for an elusive and rare amateur DX station, the "680" has an uncanny knack of pulling the wanted signal out of the jumble that exists on most well-used bands.

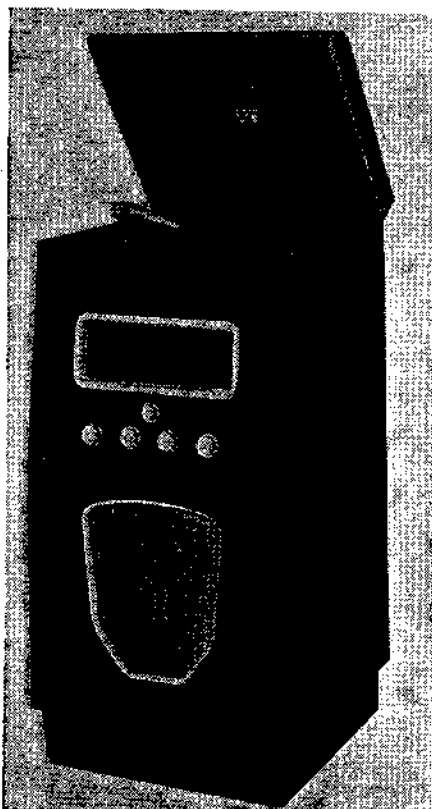
When using the b.f.o. for c.w. reception it is necessary to have the a.f. volume control well advanced and regulate the output by the r.f. gain control. If the a.f. gain is turned too low the heterodyne beat appears to be very weak.

It has previously been mentioned that the output stage is push-pull, but this does not mean that a great deal of audio power is available. The pair of 7D9 miniature pentodes take about 16 mA each only, and for traffic handling, where a little distortion is of no consequence, an audio output of 5 to 6 watts is available. For high-quality broadcast reception this should be reduced to about 2 watts for distortionless reproduction over the widest possible range of audio frequencies.

A few words regarding the cabinet may not be out of place here. As befits a professional type of receiver, it is functional rather than ornamental, although this does not mean it is unpleasing in appearance. The rounded edges of the front and back actually tend to make the set look somewhat smaller than it actually is. The controls are conveniently placed, the dial is large but not overpowering and the louvred front and sides give adequate ventilation for all purposes.

The cabinet and front panel are finished in black crackle enamel with chromium plated carrying handles. All knobs are black. Overall dimensions of the set are: 16½in wide, 13½in deep and 8½in high. The weight is 41lbs. Access to the inside of the set is given by a flush-fitting hinged lid in the top of the cabinet.

The makers are Stratton and Company, Eddystone Works, Alvechurch Road, West Heath, Birmingham, 31.

NEW RADIOGRAMPHONE

Formerly made only for export, the H.M.V. Model 5302 with bandspread tuning on short waves and automatic record changer is now available in the home market, the price being £72 4s. 10d. (including tax).

"Has Anybody Got a Screw Loose?"

(I'll rephrase that: "Has Anybody Got a Loose Screw?")

Every Eddystone radio set made by Stratton & Company (and quite a lot made after the Marconi acquisition) used B.A. screws exclusively. Have you ever wondered how the ubiquitous "6 B.A." came into being? It was Britain's first (and only) home-grown metric system and here's how it started.

By Graeme Wormald G3GGL

Member of the British Weights and Measures Society

THE BRITISH ASSOCIATION, or to give it its full title "The British Association for the Advancement of Science", was formed in 1831 at an inaugural meeting in the city of York.

It was created to promote national interest in science and technology and was an association of men eminent in the different disciplines of science. They were divided into sections and sub-committees which reported annually to the main body. The organisation has probably been best known for the controversial topics discussed at these meetings – in particular the famous one at Oxford in 1860 on the theories of Charles Darwin on the Origin of Species.

Bishop Wilberforce – the son of William Wilberforce, and known as Soapy Sam – asked Darwin's most energetic disciple, T. H. Huxley, whether he was descended from an ape on his grandfather's or his grandmother's side!

However, I digress. In 1881 the Association established a committee to determine: "a Gauge for the manufacture of small Screws used in Telegraphic and Electrical Apparatus, in Clockwork, and for other analogous purposes"

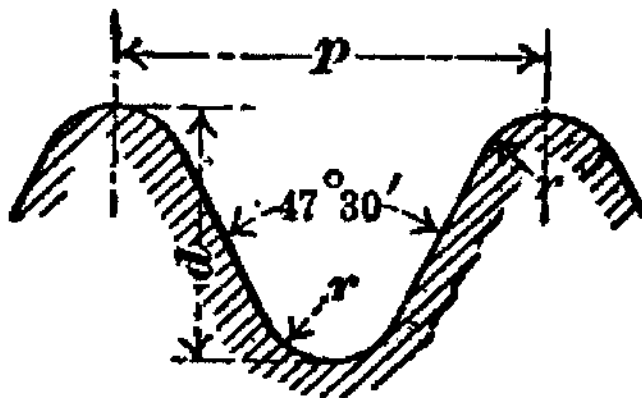
The leading figure among a group of eminent engineers was Sir Joseph Whitworth (famous for his heavy engineering screw thread). A close study was made of the best existing continental small screw standards (mainly Swiss) and the most favourable pitch, threads per inch, strength versus depth of cut, and finally the question of using Imperial machinery, was considered.

For small screws the units of measurement are academic, as to produce a 'series' to a set

formula produces some very odd measurements indeed.

Accordingly it was decided to use a metric-based system which would be compatible with many European standards, and also to base it on the Imperial 1/1000th inch, or 'mil' as it is generally known.

In 1884 it was recommended that for all screws from 1/100th inch to 1/4th inch a series of numbered threads starting at No 25 (being 0.25 mm or 10 mils diameter) and increasing to No 0 (being 6.0 mm or 236 mils) should be adopted. They had the same diameter and pitch as the 1878 Swiss Thury standard, but with slightly different "rounding".

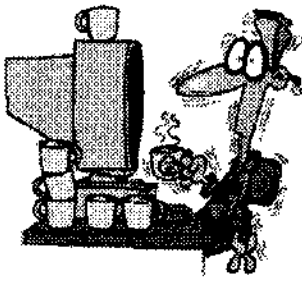


These became known as 6 B.A., 4 B.A. etc., and the sizes recommended for general use were 0, 2, 4, 6, 8, & 10. In practice, sizes smaller than 17 B.A. were never used.

By the C.20th "B.A." had become universal throughout the British Empire. The USA, however, retained the rather cumbersome Imperial fractional system, which those of us who have ever built a 'Heathkit' know all about!

It seems a pity that in recent years a less elegant new metric system has been imposed, after four generations of British Association metric threads.

Incidentally, for traditionalists such as myself, 4 and 6 B.A. (3.6 & 2.8 mm) nuts and bolts are still available from Maplin (and other) stores. It is worth noting that the new 'M6' metric (6 mm) will mix with 0 B.A. (6 mm), although the M6 nuts will be a little 'firm' on B.A. screws, and the B.A. nuts will be slightly slack on M6 screws. This is acceptable for hobby use when there is no alternative. ★



POO'S PONDERINGS

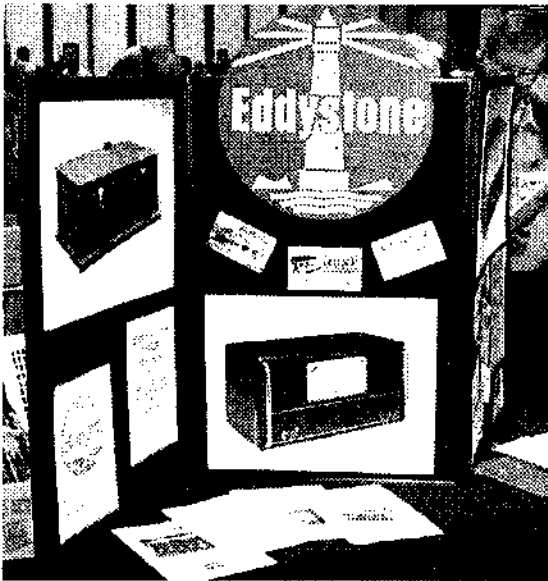
'Stray thoughts from an absent mind!'
by Simon Robinson M5POO

The weather up at 'POO this week is truly wonderful, far too sunny to be sat in front of a computer screen! Our local weathermen promise sunshine for the Bank Holiday coming up so unfortunately I WILL have to cut the lawn.

Whilst preparing "Ponderings" for the new issue our esteemed Editor said I could 'go large' this issue so I have! Rather than pages of text I thought you might prefer a few pictures instead. This is quite handy as we have several taken at the NEC by David Oakden G3UFO – wow, what a callsign!

National Vintage Communications Fair – April 29th 2001

This year's NVCF was frankly quite a 'belter' as I think all those who had missed the autumn show due to fuel shortages had made the extra effort this time. Hall 11 was truly buzzing both before and after the doors opened.



It was wonderful to meet so many members who had only been a voice on the telephone or an E-mail message on the computer.

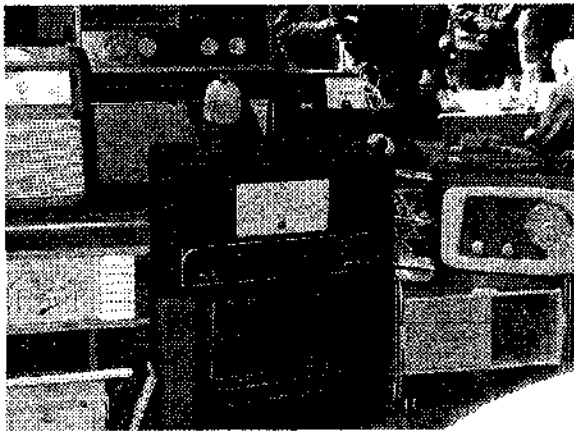
Many people had travelled great distances to attend the show especially Joe LeKostaj who had come all the way from the good old US of A.

Manning the Stand this year were Chris G0EYO, Graeme G3GGL, Dave and myself. We had the opportunity to meet some ex-Eddystone employees who had

called in to see what all the fuss was about and of course we asked them kindly to drop us a line for the magazine with some of their experiences at Eddystone. Several members called in to renew their subscriptions and we also added some new members to our ever-growing list.

Virtually everyone commented on how much they enjoy "Lighthouse" and that is good to hear. Everyone connected with the magazine tries his best to give you a good read every two months. The vast majority of "Lighthouse" is put together and edited by Graeme who deserves special credit for his dedication to the EUG. Things could be quite different if he did not have the time to put your magazine together every two months. Other newsletters I receive simply pale in to insignificance in comparison.

There were not a huge number of Eddystones on sale at the show but a few EUG members had their own stands with some very reasonable offerings.



On the left, hiding among some domestic beasties is a once common model S640. This one was a little rough round the edges but intact otherwise.

Even the common sets are starting to dry up a bit now.



On another stand we spotted a model 750 side by side with Heathkit and KW gear. This one was pretty good in fact and one of our members was glad to add it to his collection.

A nice set is the 750.

In addition to the above we noted a fairly rough 740 complete with speaker and 'S' meter, a 770U and a

730/1A. Not many Eddystone components were on hand but several members managed to find some coil formers to build up early replica sets.

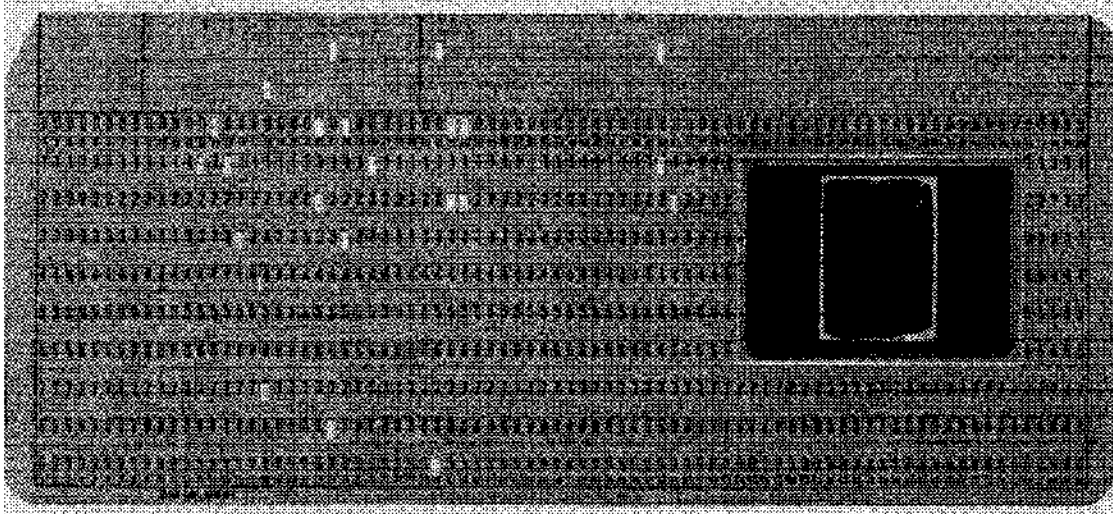


If you didn't make the NEC this year do try and make a date for next year. It really is a treasure trove of vintage radio, ephemera, gramophones, telephones, books and lots of other rare goodies.

Joe from America commented that it was "like Christmas" for him and that he'd been yearning to come for some time.

A Plea for Help

Some weeks ago now the EUG were given about 20,000 punch cards containing Microfiche type photographs by Eddystone. We have tried several avenues to find a method of transferring these to CD-ROM for everyone.

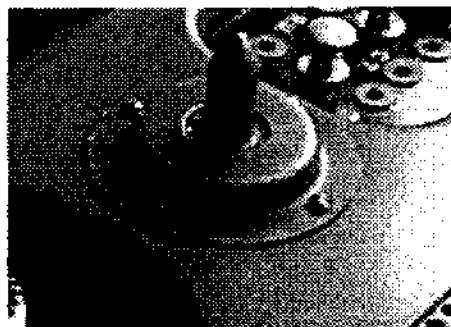


The picture above shows a representation of the card known apparently as a "35mm Aperture Card". The holes contain a reference to the image and the image needs high resolution scanning. Somebody, somewhere must have a machine, which will automatically feed and scan these cards. Putting 20,000 through a scanner manually would take a lifetime.

I did contact one firm who knew immediately what I was talking about and said they had an automatic machine. I called to see them with a card and explained that the EUG was a non-profit organization and that we had 20,000 cards. The engineer said it would not be expensive. A week or so later I called to see if he had a price. He answered quite proudly that they could do them for "only 82p per card sir". I'll let you work out the maths but don't forget to add the VAT on in addition. Can YOU help us find a suitable means to transfer these cards to CD?

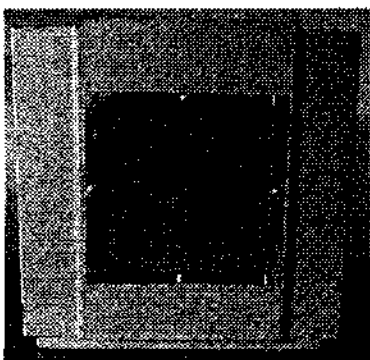
Those Holes in a 730/4

Have you ever wondered what the two sets of four holes were on the back of your 730/4 (and some 770's) are for? The picture on the right shows one of the hole sets in use with nothing less than a shock resistant mount. These were used when the receivers were fitted in racks to absorb some of the 'G' forces when on the move.



All World 8 and Overseas 4 Follow Up

Little did I know that after finding one All World Eight that another would come to light complete with the original speaker! The speaker is currently painted



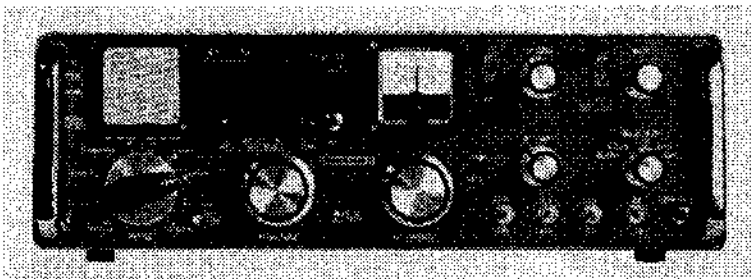
with grey Hammerite, which looks truly dreadful but can be restored. Brown wrinkle (crackle) is available from America and my local Stove Enamellers have agreed to do the speaker and radio cabinets for me including some aluminium welding where extra holes have been added. I would not normally refinish a set this old but it is also painted with Hammerite!

Watch this space!

Last issue I mentioned that I needed some help regarding repairs to an Overseas 4 cabinet that had also been modified and extra holes added. Soon after issue I received a delightful letter from Mr. Angus Vickery who detailed the various methods for completing the work. I was fortunate enough to meet Angus at the NEC and during our chat I suggested his letter really meant, "Get it done professionally". In my opinion his advice is very sound so I will be getting a "man who knows" to do the restoration work properly. Many thanks Angus.

Fun with another 958

The Eddystone 958 in its various forms is my favourite solid-state receiver made at the Bathtub. Many people feel it was their best set. If you ever get the chance to operate a good one I'm sure you will agree. Some time ago I came across an original analogue 958 in non-working condition. The lights DID come on however. In case you ever have a similar fault or faults I'll describe each fault and its remedy. These radios can be tricky especially if 'sticky fingers' have been inside.



The rather good analogue model 958 receiver.

Is it the best?

Intermittent operation on ranges 1 to 6 and 8 – check TR22 (2N4254) in 250KHz IF Module.

No HI-STAB operation – check 100KHz output from Master Oscillator on coax. 'I'. IC6 (FJJ141) may be faulty – use 7490 replacement.

No SSB filter operation – check coax connectors for shorts feeding filter.

Very low sensitivity on 1.6 to 4MHz range 4 – check the correct coils were fitted to Turret Disc 'B' at manufacture (really – I'm not kidding you here)!

Have a wonderful summer, 73 de Simon M5POO

From Ted's MailBox . . .

AVC PROBLEMS ON THE EA12

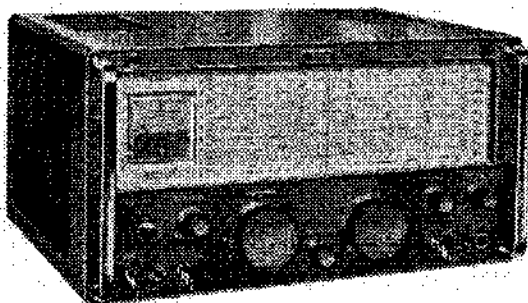
The writer has never owned nor operated an EA12 prior to purchasing this example from a local club member. The asking price of £100 seemed fair enough even if, as he admitted, reception quality was not all it was made out to be.

He was right there, audio was very poor and after just a cursory check through the ranges the set was removed from its case and upended on the table so that some voltage checks could be made. Whilst checking the HT1 and 2 it was noticed that on both the diodes the encapsulating material was cracked across. The HT1 was only slightly low at 243 volts but it was thought best to replace both diodes with more modern types. This made little difference to the HT which was considered to be within specified limits.

The rough audio was now dealt with by the time-honoured method of starting at the output 'bottle' and working back. It was easy-peasy to remove V9, half of this ECC83 is the AF amplifier, and to feed a low level signal into the signal grid of V11. The quality of this injected tone appeared quite pure and so V9 was refitted. Given time to reach operating condition the same procedure was now applied to the signal grid of the AF section, i.e. pin 2. Now the tone was again rough as had been observed at first power up. A replacement ECC83 made no difference and so some voltage checks on the stage had to be made. Modern digital meters can be used here if one realises that their extremely high input impedance can give misleading results, higher than normal voltage readings especially.

It was soon found that the kathode bias as measured on pin 3 of the AF amplifier was much too high and that it varied with the signal level. The electrolytic here is a 25 mF and when tested this had no meas-

urable capacity. Whilst this was still disconnected a check was made on the 6.8 K Ω kathode resistor. This proved to be high by several thousands of ohms, measuring at 8.93 K Ω . This was changed for a more modern 'oxide' type of resistor, incidentally the same physical size but twice the power rating as the old one. With both a new resistor and a new electrolytic the audio was now as it ought to have been, and kathode volts read normal.



More tests 'on air' showed that the EA12 was performing quite well as re both sensitivity and selectivity except on both extreme positions of the AVC switch. These

are the AVC-Slow to the left and AVC-Slow to the right, the former with N/L Off and the latter position with N/L On.

Checking the circuit diagram again showed that the effect of selecting either of these positions of the AVC switch was to connect the one 2 mF condenser to chassis, to increase the hang time of the AVC. This is C96 on the diagram and when it was checked there was a definite leakage. Dissing it brought the AVC voltage up, but left the AVC-Slow position inoperative. The newest to hand was a 2.2 mF and so this was fitted. With the above in mind all of the 'reachable' condensers and resistors were checked out. Three further resistors and a condenser had to be changed. The calibration appeared to be okay and so the EA12 was boxed up and put into use as the station main receiver, replacing a 940. Now six months on the EA12 is still working well and in constant use, it is truly as good as any of the solid state black boxes so far owned, minus those irritating bells and whistles.

Having a super sensitive receiver might be okay for 'one-upmanship' but if you have to insert 20 db or more of attenuation into the front end before you can listen on 10 metres against the high gain. DAVE.

Believe me, my young friend, there is *nothing* – absolutely nothing – half so much worth doing as simply messing about with valves.

With apologies to Kenneth Grahame ("The Wind in the Willows" 1908)

MY ULTIMATE T.R.F.

by Peter Lankshear

Before the advent of the screen grid valve in the late 1920's, the only practical shortwave receiver consisted of a regenerative detector with one or two audio stages. *Lighthouse* readers will not need reminding that this was the time when Strattons entered the field with receivers of just this type.

By the mid 1930's high performance superhets were available, but at a price that put them out of the reach of the average ham or SWL. The far more affordable regenerative grid leak detector receiver with or without an R.F. stage, remained capable of good work, especially with C.W. traffic, and some remarkable performances were achieved. Serious duties could be entrusted to the humble regenerative receiver. In one example, related by Bob Knight in *Newsletter* 41, an Eddystone *All World Two* was provided during the War by the Radio Security Service for him to monitor German radio traffic.

Regenerative receivers were used extensively for merchant marine and naval service, and expeditions to remote areas used them. As noted in EUG Newsletter

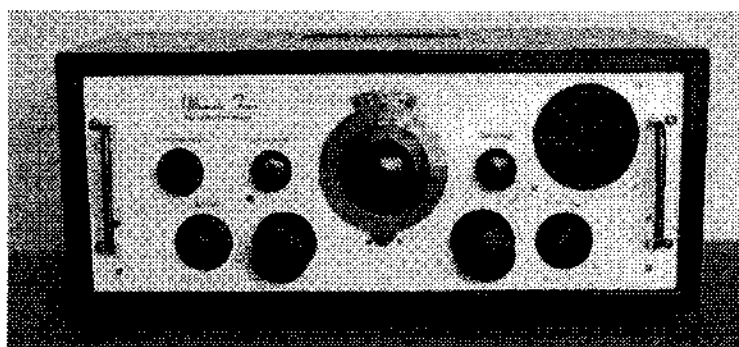
45, Eddystone supplied a *Kilodyne Four* for the Graham Land Antarctic expedition of 1934 – 37. One perhaps surprising use was in the pre war trans Pacific China Clipper flying boats. Clearly Pan-Am could have afforded superhet receivers, but

chose rather to build their own TRF regenerative receivers for this demanding service. Significantly though, Pan-Am relied on Morse transmissions.

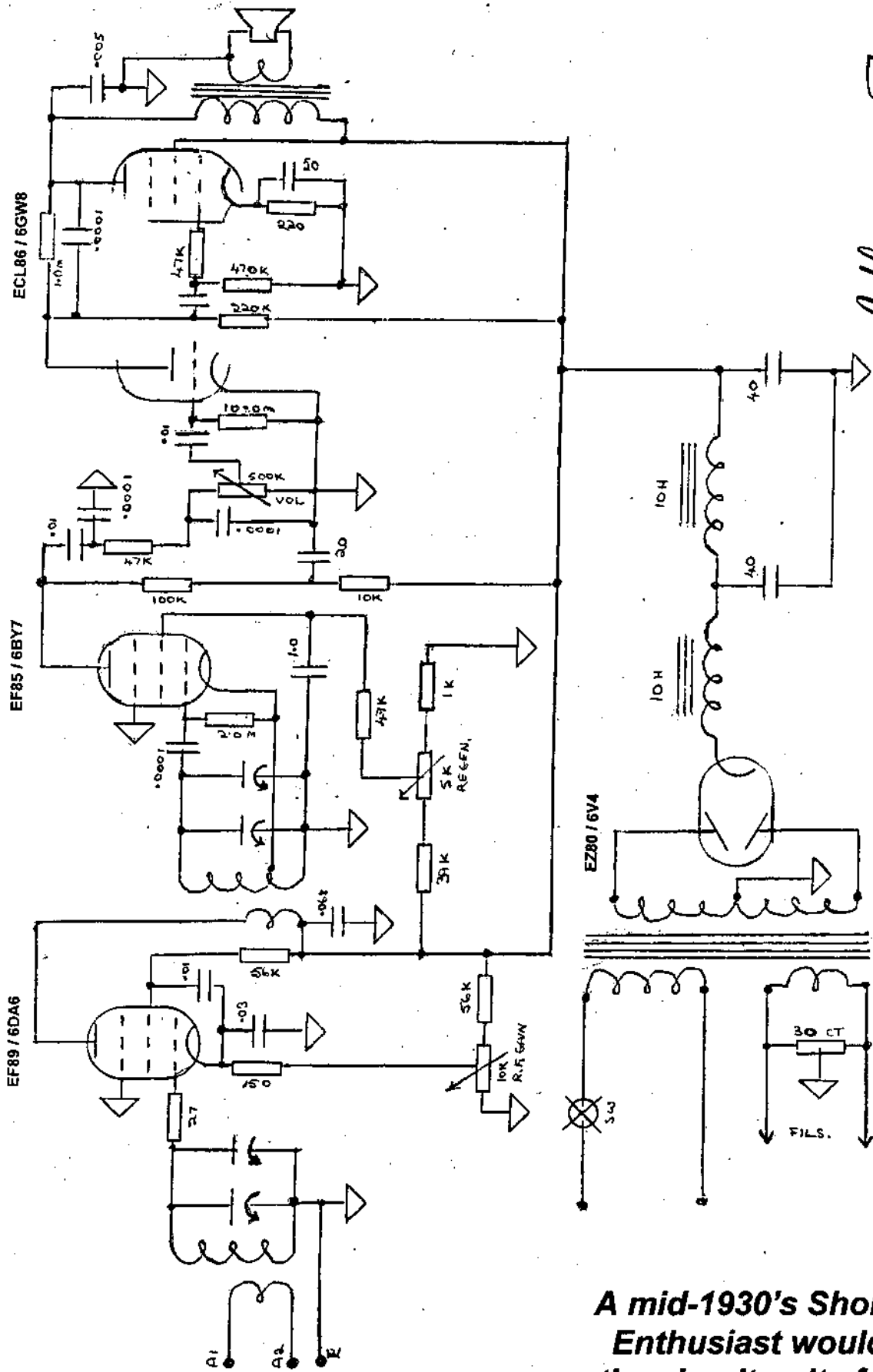
Had they used phone, I suspect that they would have provided superhets.

I BUILD A TRF

In 1947, I decided to build myself a TRF receiver, based on what had long been the standard form that was published in the RSGB and ARRL Amateur handbooks of an R.F. stage, regenerative detector and two audio stages or 1-V-2. Apart from using a pentode rather than a triode detector,



External appearance of the beast



Ultimate Four

Regenerative T.R.F. Receiver

A mid-1930's Shortwave Enthusiast would find the circuit quite familiar

these were direct descendants of the ancestral Pilot *Super Wasp* and Eddystone *All Wave Four*. The result was a receiver that provided a lot of good listening and I had a lot of fun DXing and being entertained by broadcasts from all over the World.

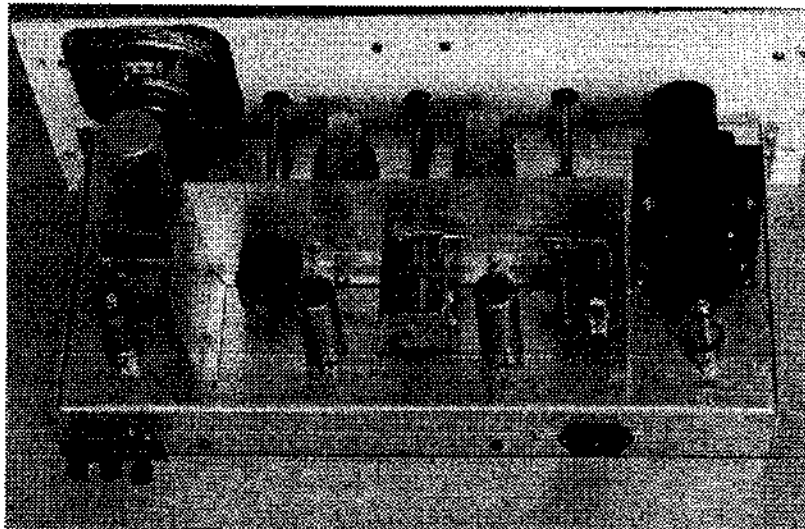
Before long, as related in my recent "Memoirs", I transferred to Quartz Hill where I was surrounded by professional communications receivers, and naturally my humble little TRF was neglected and eventually was cannibalised for parts, but I had become aware of some shortcomings of my amateur methods of construction. I resolved that one day I would revisit the TRF, but meanwhile, my career and marriage would have precedence.

FIFTY YEARS ON!

That project remained on the "back burner" with a very low flame for the best part of half a century, and it was only revived when Graeme commenced publishing articles in the *Newsletters* about TRF receivers using type EF50 valves and some of the pre war Eddystone models. Finally, when a couple of years ago he made a plea for readers to report on projects using Eddystone parts, I decided to see how much my memories of the TRF had been rose tinted by time. Over the years I had accumulated a large hoard of "useful" bits and pieces, more than enough to construct several receivers, but sadly only a few components bore the magic Eddystone label. However I understand that the three flexible shaft couplers that I did use are sufficient to confer eligibility, and the tuning capacitor is identical to that used in the Eddystone 870A.

First though, there was a lot of thought and rejected ideas. Paramount was rigid construction. Thin easily worked metal typical of home constructed receivers was out. As Eddystone type die castings were an im-

possible ideal, I used heavy aluminium alloy sheet, settling for a 2.0mm thickness chassis and shields, and a 5.0mm alloy panel. A cabinet which originally housed standard 19" width test equipment was available, permitting a desirable uncrowded layout. I would have loved to have possessed an Eddystone dial, but had to compromise with a National type N "Velvet Vernier". These excellent dials were in the



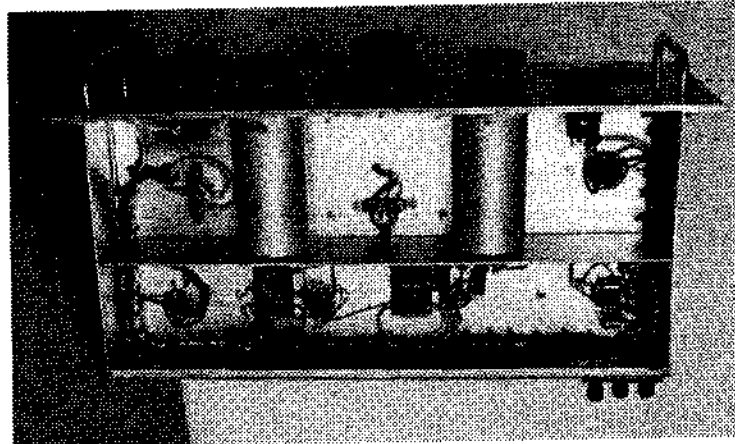
The Interior

National catalogue for more than 20 years and were frequently found on small production run professional equipment. Efficient coils are essential, and switching can compromise short lead length and choice of coil diameter. Time honoured plug-in coils are the most efficient option, but climbing into a chassis for changing them is a chore. Finally it all came together with front panel coil access providing ready changing and short leads. This coil system was borrowed from several commercial TRF receivers including the National 58C and the RAF's R-1082.

The 1930's TRF receivers used first generation pentodes of modest performance, but in later years a wide choice of higher performance valves became available. The EF50 was popular in post war projects, but what about later developments and the frame grid television types? The miniature 9 pin noval series provides a good selection of R.F. valves. Possible choices for the RF stage and detector were ECC189,

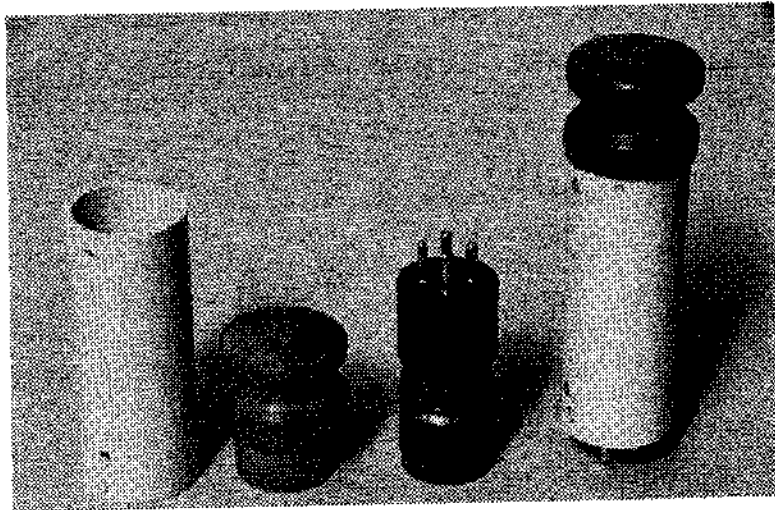
EF80, EF85, EF86, EF89, EF183 and EF184, and by using one of the Noval combined triode/pentode valves a complete audio system would be possible with one valve.

After a lot of experimentation I concluded that the frame grid valves EF183/184 were just too "hot" to tame in a traditional circuit and finally I settled on a EF89 RF stage, a EF85 grid leak detector and a ECL86 two stage audio section. Detector operation in this configuration is centred on the triode operation of the screen grid acting as an anode and very dependent on voltage. I was pleasantly surprised to find that at only 20volts H.T. the mutual conductance between the control grid and screen of the EF85 is no less than 3 ma/v. Only minimal feedback is necessary with this sort of performance, and regeneration can be brought in almost imperceptibly. One of the weakest points of regenerative receivers is that the poor skirt selectivity in



The relatively few components don't take up too much room on the underside

strength of these detectors is their sensitivity and excellence for C.W. reception when regenerating, but as we now have very few Morse transmissions, there is little need for this mode of operation. SSB can be resolved well, but takes time, which can be frustrating with short transmissions. The solid construction has been vindicated as it has created a very stable set, with no hand effect or frequency drift. There is no detuning when the operating receiver is dropped from a height of several centimetres. For local medium wave reception, a few centimetres of aerial wire provides plenty of pickup, and as I write, I am listening to Germany on 17MHz using a metre length of aerial.



Coil Construction

the non oscillating state is insufficient to eliminate strong adjacent signals and at the higher frequencies these can "pull" the nearly oscillating detector away from the required station.

Operating TRF receivers like this one separates the men from the boys and the six controls are all essential. The great

Was the effort in building it worthwhile and how tinted were my spectacles? To provide adequate stability a TRF has to be built to the same physical standard as a superhet and is in reality, no cheaper. It requires a lot of skill to drive and with modulated signals, performance is inferior to that of a good superhet. The TRF filled an important niche in the evolution of the communications receiver, but it has long been superseded. As an exercise in nostalgia it has been worthwhile, but it is significant that Strattons abandoned this type of receiver once they had produced a superhet.

★★

830/9 SERVICING AND CONVERSION TO "STANDARD" 830 AM BANDWIDTH

By Jim Duckworth

"It was only when I started to skim through the manual that I realised the extent to which the 830/9 was special, and different from the mainstream of 830's"

I was delighted to be offered an 830/9 by an EUG member who answered my Wanted Ad for an EC10 Mk II and during the conversation mentioned his other sets for sale, including the above. I was a new EUG member at the time but had read enough back-journals to appreciate the 830 family was considered the 'flagship of the fleet' with its near digital frequency resolution achieved by analogue means.

Well, it so happened I had already obtained my 'duff' EC10 at the NEC which I had started to restore, so resisting the temptation to acquire an immaculate one, I carried away the 830/9 with a very comprehensive set of 830 manuals which the owner kindly passed on with the set.

DIFFERENCES BETWEEN THE 830/9 AND THE REST

Although the owner had pre-warned me, it was only when I started to skim through the first manual that I realised the extent to which the 830/9 was special and different from the mainstream of 830's. Principally there was the provision for synthesised oscillator working.

This meant in practice there were special sockets and switches dotted around to enable/disable this, and more prominently, a chrome lever switch around the main band switch which had to be parked in the manual position for normal reception. Then of course there was the Piccolo filter. I knew nothing about the 'Piccolo' system and wasn't about to learn either as the filter had been removed, which was standard Government practice when they were 'demobbed'

though my manuals gave the circuit diagram and alignment procedure.

None of this bothered me; to the very contrary, it made it more exciting and special to have this version of the set, 830's don't grow on trees anyway!

However there were other not-so-obvious circuit differences which had a direct bearing on my main interest of using the set for high performance SW broadcast station Dx, which I will come back to shortly.

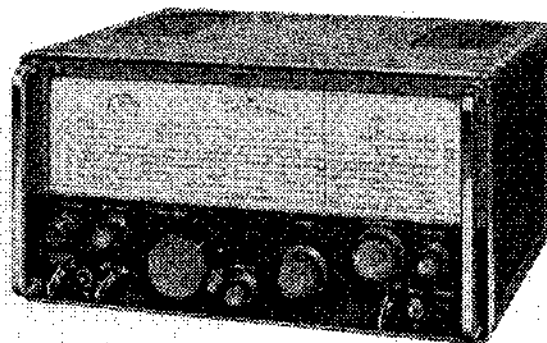
GETTING ON THE AIR AND FINDING OUT THE FAULTS.

Once I had got the hang of the controls and cottoned onto the 'manual' setting for the main crystal switch, the set burst into life using a 40ft picture rail aerial going via a balun into the 75ohm socket at the rear. The performance was not great and almost certainly not to spec.

I noticed when tuning slowly through a station that the meter needle drew a graph similar to the Himalayan mountain range. The sound quality on the widest 'AM' selectivity position, which should have made reasonable listening, was 'boxy' and fatiguing.

On the CW, SSB and N (narrow) selectivity positions it was naturally worse still and from the drop in the meter reading there was a lack of system gain, which should easily have been enough to maintain the output constant.

For all selectivity positions the output of the first 100kHz IFT, T1 went straight to the grid of V5 via the 100pf cap. i.e. switches S8, S9 had been dismantled



along with the Piccolo filter. The bandwidth in each position being determined by the mechanical rod and lever system which varied the coupling coefficient of each IF transformer by moving the secondary in and out.

Clearly, there was a major alignment job to be done here or worse!. In addition the incremental tuning knob was unusable, as the large round scale plate was slipping on its spindle. Also the tuning meter could not be zeroed by the pot on the rear panel. I hardly knew where to start!

FIXING THE PROBLEMS

A change of valves made no difference to the gain problem, so I had a go at aligning the 100kHz IF's. I followed the Manual procedure by removing the Crystal calibrator and gang cover to inject the signal at the mixer stator section of the gang. They did tune up, but T3 in the anode of V5 was very flat.

I stopped to investigate the very cluttered valve holder area where you are also impeded by the selectivity rod running the length of the chassis. Bingo!, the cathode decoupling capacitor joint was completely dried out and the cap doing nothing.

Replacing the item brought up the gain and helped smooth out the 'Himalayas'. But it wasn't perfect and the set sounded no better. Resolving to come back to this, I moved on to tackle the other problems starting with the non-functioning incremental tuning system.

It's not at all obvious how to get at the incremental tuning dial but I managed finally by following the procedure to 'Remove and clean the Dial Scale'. Then you need a long Alan key to reach down into the gear box for tightening.

But before that, the second mixer box has to be opened up so the gang and hence the dial can be set in their correct positions for alignment. This is a lengthy procedure to get right, going backward and forward between the 1260kHz (Red

alignment point) and 1440 kHz end of the scale (Black alignment point).

I used a portable digital receiver as a frequency meter to get the Sig Gen right. I made it in the end and could then enjoy the pleasure of the 830's tuning system. i.e. Crystal calibrating on a 100kHz mark and simply tuning in the remaining kHz on the incremental scale. Great!, but you definitely need the manual for that adjustment!

Next was the non-zeroing tuning meter. This was a much easier fix by comparison, as the 27k R34 had increased to 43k, making the bridge impossible to balance. It dissipates around 850mW strung across the HT so I put three 0.5 watt 82k in parallel which nicely restored the meter zero setting using the pot at the chassis rear.

Other small items included correcting the AGC delay threshold where R50 had increased from 180k to 620k!... it does happen. Also bearing in mind my hang up about the receiver sound, I checked the frequency response of the AF section, finding it basically flat from 200-9000hz with a good waveform. . . no problem there.

IF BANDWIDTH AND RECEIVER 'SOUND'

Returning to the 100kHz IF's and being intrigued with the mechanical selectivity system I dismantled one transformer for inspection to see how the variable selectivity worked!. Well, it's a rugged system built to last but not a high precision one. I could see for myself what some members have commented on.

When the secondary moves back on its slider, pulled by a 6 B.A. adjustable lever system and operated by the crank-arm/front panel knob, it does not stay in a perfectly horizontal axis with the primary. The small angle of deviation causes a change in flux as if the inductance itself were changing, which causes a small frequency change as the selectivity knob is turned.

Fig (1) 830/9 'Piccolo' version. AM selectivity position has no T2. BW is 4kHz

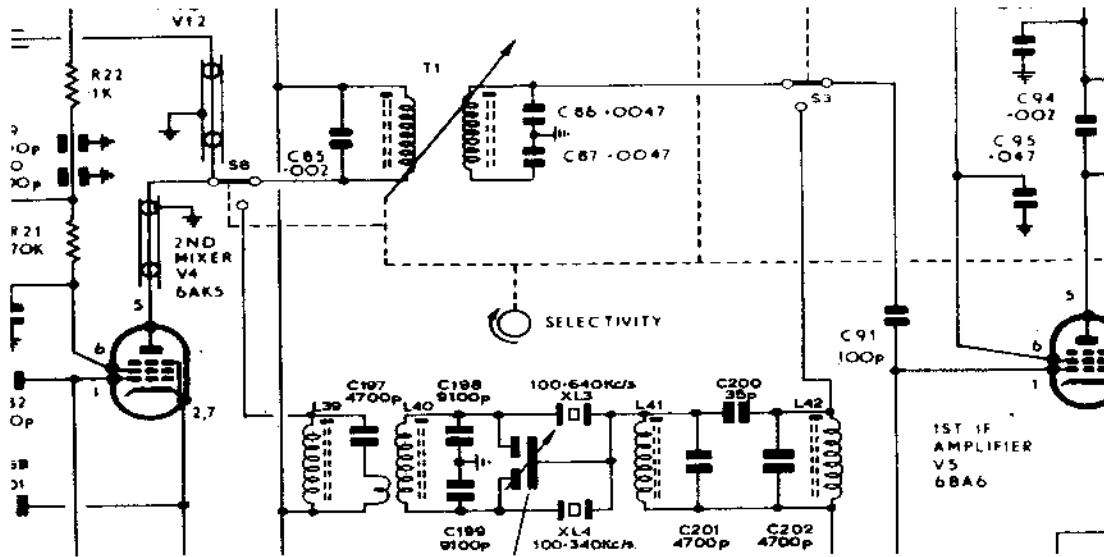


Fig (2) Standard 830. AM selectivity position includes T2. BW is 6kHz

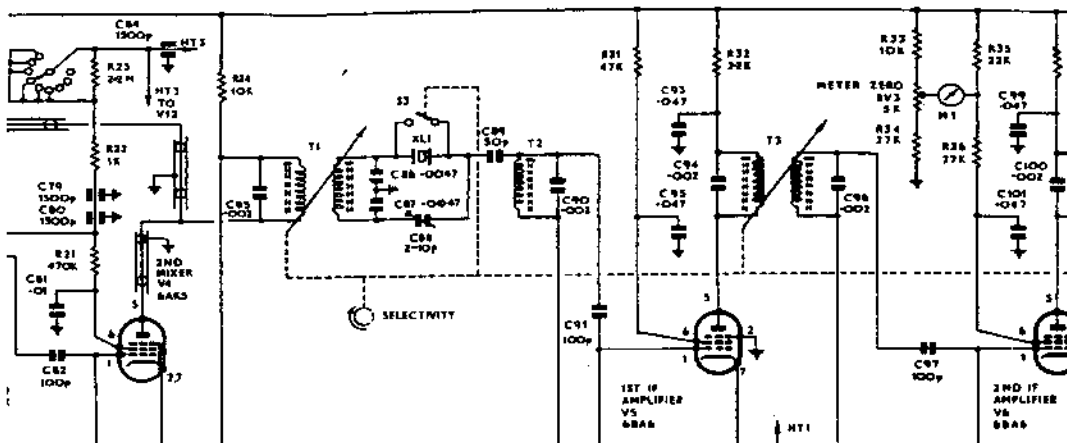
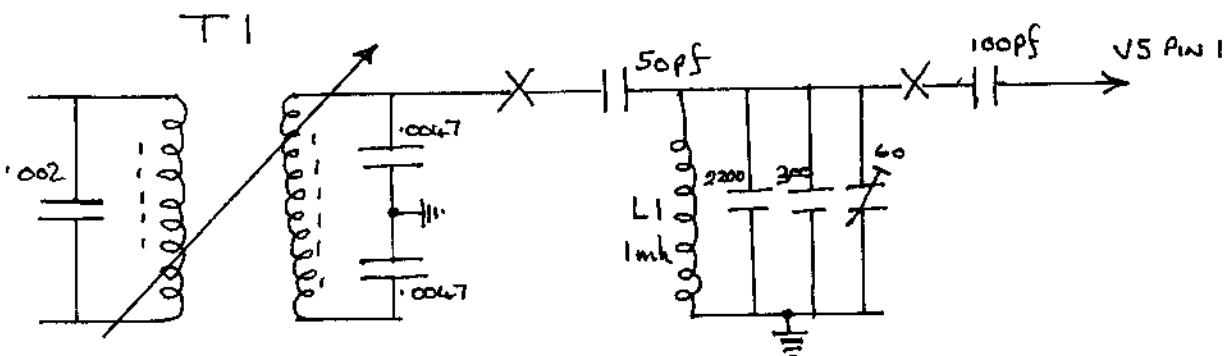


Fig (3) 830/9. Between XX 'T2 Module' is added to spread the Bandwidth to 6kHz



However this was not my main concern, I wanted a flatter-topped tuning characteristic and a better sound in the 'AM' position. What was the factory setting for the IF secondary coils in the AM position? Were they critically coupled for a flat top, or what?

Looking more carefully at the circuit diagram I noticed that T4 was top capacity coupled with 12pf in addition to the magnetic flux, so this one was almost certainly overcoupled, which would spread the bandwidth a bit.

To cut a long story short, I lashed up a 100kHz fet oscillator and made it into a wobulator with part varicap tuning swept by my scope X output. Using this with great care and after a learning curve, I adjusted the 6 B.A. lever setting for each transformer in the AM position, along with the cores to get the best response.

There was now a big improvement tuning through stations (No Himalayas!), but it still didn't sound very good in the AM position. Checking this from my (now working) incremental dial, the bandwidth looked to be no more than around 4khz, but what was the spec for the 830/9 versus the standard version?

BIRTH OF THE 'T2 MODULE'

I put the two handbooks and circuit diagrams side by side, realising I should have done this sooner. The bandwidth spec for the 830/9 was stated as no more than 4khz in the AM position, but for the 830/5,6,7 it was 6khz!. I then spotted the difference.

In addition to the respective Piccolo and standard 830 Xtal circuitry, There is an extra single tuned transformer T2 in the standard version which is (over) coupled to T1 by a 50pf cap, its output then going to the grid of V5 via the 100pf cap. It simply is not there on the 830/9. T1 output couples directly into the grid of V5 via the 100pf!

Figs (1) and (2) show the respective situations for the 830/9 versus the rest. Fig (3) shows my 'bandwidth spreader'

T2 module solution to be added to my 830/9 as I could not locate a genuine T2 which could have occupied the absent Piccolo transformer space.

T2 uses 2000pf to tune to 100kHz so the inductance must be 1.27 mh. I got as close as I could with a Toko 1 mh fixed-tuned miniature inductor with a minimum Q of 75, which then required 2533 pf to tune to 100kHz.

This was made up of a 2200 +300+60pf trimmer in parallel with the coil. This module can be very conveniently mounted on the tagstrip next to T1 and V5, which exists to receive the 2nd mixer output from the anode of V4 via a screened cable. There is a central earth connection and one spare tag, which is ideal. One end of C91 the 100pf cap is lifted off T1 and re-routed to the tag strip, where the module connects to T1 and ground as shown.

The trimmer must of course be sturdily mounted, pointing 'outwards' so it can be adjusted at the same time as the IF cores. I aligned the IF strip once again noting with relief that the module 60pf trimmer peaks the extra tuned circuit nicely within band and it works!

The incremental tuning dial showed the new AM bandwidth to be as close to 6khz as I could tell and it sounded much better!. The Bandwidth on the CW, SSB and 'N' positions was correspondingly narrower as the lever and crank mechanism pulled the main IF coils apart to undercoupled positions, which I use to resolve weak signals sandwiched between strong neighbours . The module can be installed and removed within 5 minutes.

So having an 830/9 is not really the 'short straw'. It's one of the worlds great 'boatanchors'. Mine performs really well after all the work described. However if you want a receiver that's nice to listen to for SW broadcast, and don't want to add either a real or equivalent T2, you should set your sights on one of the others, If of course you can find one.