The Bulletin

Vol. 37 no. 3 Autumn 2012


Sunday 12th May 2013
National Vintage Communications Fair
Now in our 17th year!
10.30 to 4.00 £6 admission (under-14s Free),
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Up to 250 Stallholders
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NVCF, 13 Warneford Road Oxford OX4 1LT, UK (enclose an SAE)

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Incorporating 405 Alive
Volume 37 No.3 Autumn 2012

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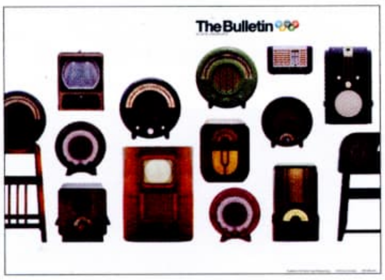
Separations and Printing by Hastings Print



Front and rear cover: A selection of Ekco and Ekco manufactured Radio Rentals sets.

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Proof-reading by Mike Barker and Steve Sidaway

Contents

From the Chair

This time I have to be brief as Carl has not left me much space...

I note with some sadness that BBC Television Centre at White City, London has now been sold to the developers for £200 Million. At least the main doughnut and frontage is under listed building registration so it ought to be protected.

In November it is also the 90th anniversary of the start of the British Broadcasting Company (later Corporation). Recently the Society was asked by a BBC Radio 1 researcher if we would assist in getting the 2LO transmitter (currently in the Science Museum) working again to re-broadcast something historical so it could be received on the latest DIGITAL radio live 'On Air'! After explaining that only a small part of 2LO existed, together with many other technical reasons why this could not and should not be done the conversation closed with her saying "I'll get back to you". Since then there has been Radio Silence!
Mike...

Dispelling a stereotype

Book review by Malcolm Baird

The three dimensions of John Logie Baird
Douglas Brown
Radio Society of Great Britain
ISBN 9781 9050 8679 5
Paperback, pp. 208 in mono and colour, published May 2012
£14.44 to members of RSGB,
£16.99 to non-members

John Logie Baird died in 1946 but television historians are still divided about his contributions. In some quarters he is stereotyped as a minor figure who only worked on mechanical television and contributed nothing to modern technology. This view is widely held in the USA and for a while it was put forward in the UK by retired engineers from EMI, who felt that their role in developing electronic television had been neglected. In 1966 the EMI retirees appeared in a BBC documentary which portentously concluded that Baird did not invent modern television. Since then, the mechanical stereotype of Baird has gradually been dispelled by careful research on his achievements in electronic television. This research has been published in many articles and books, and it was featured in a BBC documentary in 2002 ("JLB – the man who saw the future", available on YouTube). Prominent among the recent books is Dr.Douglas Brown's "Images Across Space – the electronic imaging of Baird Television" which I reviewed in the Spring 2010 issue of the BVWS Bulletin.

This new book is a sequel to "Images Across Space". Dr. Brown, who took early retirement from the University of Strathclyde last June, is an expert on a form of 3D television known as volumetric imaging (VI). This creates a moving image in three dimensional space, as opposed to a two-dimensional screen. The volumetric image can be viewed from any angle without the need for special glasses. Dr.Brown is the inventor of both a UK and US patented system in this area and took part in a multi-million dollar collaborative project on 3D imaging, involving the University of Strathclyde, Glasgow School of Art and a major American car company. It was during research for his M.Phil. thesis on "The contributions of John Logie Baird to Television and Related Technologies" in 1994, that Dr. Brown first became aware that J. L. Baird was the initiator of the VI concept.

Dr.Brown's latest book goes into a lot of technical detail on Baird's colour television. His first patent in this area was applied for in 1925 based on the mechanical system. His last colour patent, demonstrated in 1944, was the Telechrome, the first colour cathode ray tube in the world. The book also covers the development of 3D, from the early systems which relied on special glasses worn by the viewer, to VI. Baird's first VI patent (1931) used mechanical scanning but a much more advanced one, taken out in 1943-44, used cathode ray tubes. The technical material includes coloured diagrams and lucid explanations which make it understandable to anyone with a good basic knowledge of physics and optics.

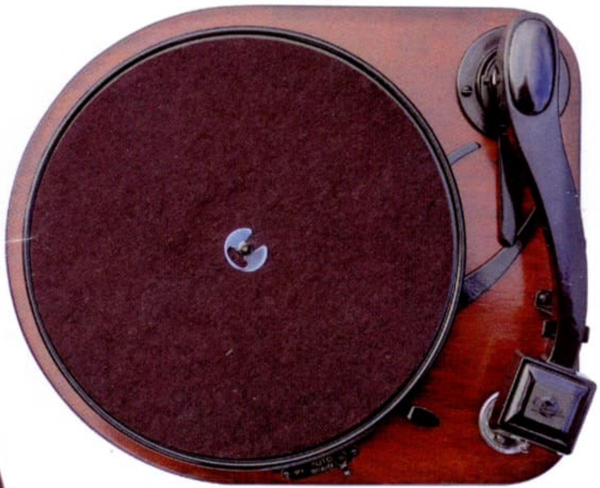
A jaded reader may say "this is all very well, but so what?" That question is capably answered by Dr.Brown who has traced the impact of Baird's patents on later technology, down to the present day. The chronologies are clearly set out for colour television in Figures 7.14(a,b,c) and for VI on pages 145-147. VI has yet to be introduced to the consumer and it is hoped that when this eventually happens, Baird's achievements of seventy years ago will not be forgotten.

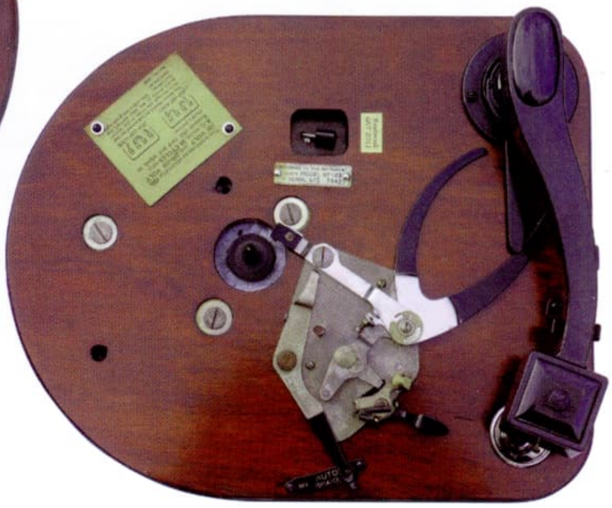
Let me close this short review on a personal note. Early in 1941 my father suffered a heart attack and his health was precarious for the last five years of his life. I remember him visiting us in Cornwall as a frail, tired figure in need of rest and fresh air. Photographs from this time show that on some occasions he was so thin as to be almost emaciated, but at other times he was overweight. His financial health, as well as his physical health, was deteriorating. At the start of the war, his personal savings were £15,000, but by 1944 his bank balance had fallen to £4,400. He told my mother that it was like "watching myself bleed to death". Hindsight suggests that it would have been safer for my father to have conserved his health and his money by waiting out the war years in a quiet residential hotel. A best-selling American television history book ("Tube", 1996, p.251) has described my father's last years in just this way! This glaring inaccuracy shows that we cannot believe everything that we see in print about John Logie Baird. However, Douglas Brown's latest book helps to set the record straight.

Another HMV Record Player, Model 122, from 1939

by Gary Tempest

This is the second of these players that I have restored and a comprehensive article is in the Bulletin, 2009, Winter edition. Accordingly, I will keep this article short. Any interested members who joined after that date may be able to obtain a back copy or if this fails then feel free to contact me for a printable PDF.





This player was bought from Ebay for a relatively small sum and once again was an enjoyable restoration with a few new things learnt. They look quite a simple item but restoration is challenging and lengthy due to the number of parts that have to be attended to with most requiring rust treatment before re-spraying.

It was designed to be connected to any radio fitted with 'gram' sockets. That way you could enjoy another source of entertainment from your set. It was sold for just under two old pounds, presumably at minimal profit, as the idea was to boost the sale of 78 RPM records. It was a cheap option compared to buying a radiogram, which would have cost typically ten times as much for a modest purchase.

Work done

The Motor Type 26200 (various suffixes)

The player has a hysteresis motor comprising a rotor that is a smooth cylindrical steel tube having special magnetic properties, and a four-pole stator. Around each of these is a coil, two of which are connected across the mains supply (See note below) to produce fields, in their respective pole pieces,180 degrees apart. Across each of these coils, in series with capacitors, are ones for the other two poles. This produces fields separated from them by 90 degrees, with the net result that the motor has four rotating fields nominally spaced 90 degrees apart.

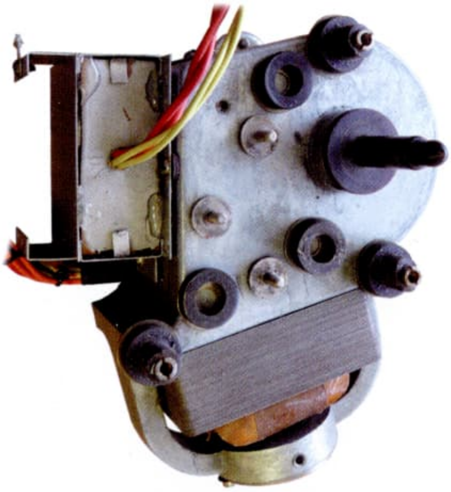
The rotor uses a steel with a high hysteresis meaning a lag or delay effect. Thus the flux induced into it lags that which produces it so it has something to chase and so rotates. Once it gets up to synchronous speed the steel is in a constant state of magnetisation and acts as a permanent two-pole magnet. Full-speed performance is therefore exactly the same as in a permanent-magnet synchronous motor. The outstanding feature is the production of nearly constant torque during starting making it ideal for record player turntables, where smooth starting torque reduces record slippage.

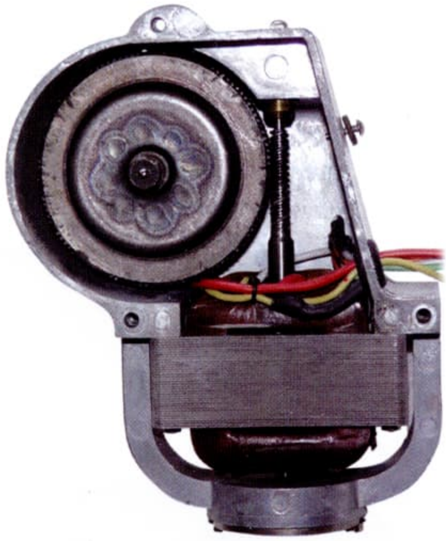
As can be seen in the picture the motor has a worm reduction gear drive to the turntable.

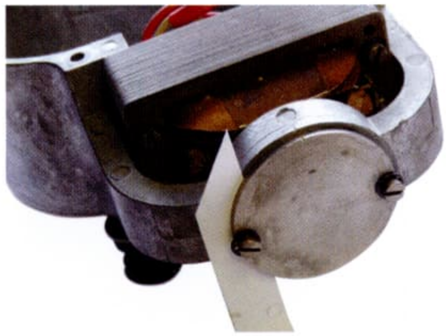
Note: This unit still had its cardboard cover in place over a connection panel for the motor windings and the mains supply. It allows series connection for 200 - 250V operation and parallel for 100 – 130V.

Dismantling and repairs were carried out as for the first turntable and described previously. However, what was not said was that I did make a special screwdriver for the wide, thin slotted screws that hold the motor to the motor board. This was an old carpenter's driver that was ground down to be a perfect fit in these screws. It was well worth doing as anything else would badly mutilate the heads and the screws were fitted and removed many times before correct height and a level turntable was achieved.

After the motor is reassembled it's necessary to adjust the position of the stator





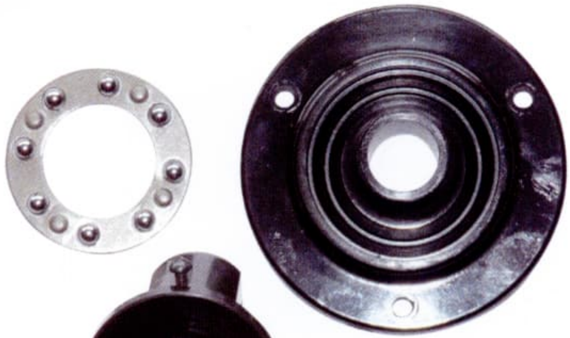


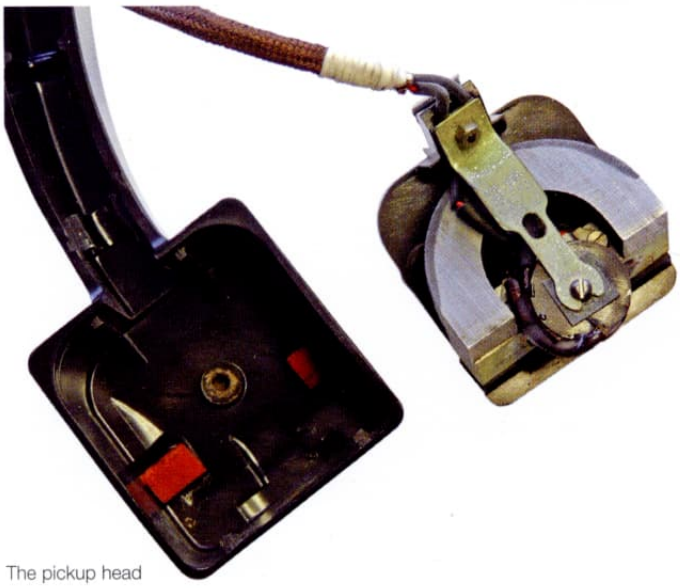
Far left: The motor and fixings

Left: Inside the motor

Above: The motor shim

The special screwdriver





The pickup head

The pickup bearing

assembly to minimise noise. Presumably unless the rotor sits central to the magnetic fields vibration and noise occurs. There is not much movement, with machined screws, but the rotor end–bearing cap is also slotted so there is some adjustment there as well. For this particular motor I had to add a thin shim under one side presumably due to distortion of the casting over the years.

The pickup (affectionately called the "Blunderbuss pickup").

This is of the moving iron type. The ferromagnetic armature is pivoted between pole pieces magnetised by a horseshoe shaped magnet. Surrounding the armature is the pick up coil. As it is mounted within the tube of the armature, when the needle moves, the flux lines between the pole pieces are disturbed and a voltage is induced into the pickup coil. In series opposition with the coil is a 'hum-bucking' coil that's there to cancel any hum voltages induced into the former.

Restoration was carried out as with the first unit. I have included here pictures of the inside the pickup head and the arm ball bearing mount.

The cabinet

It is most unlikely that one of these undervalued units will be found where the cabinet is good enough to just be touched up and this one was no exception. But they are relatively easy to strip and refinish. As usual I used Mohawk cellulose lacquer.

Putting the unit back together for a first try

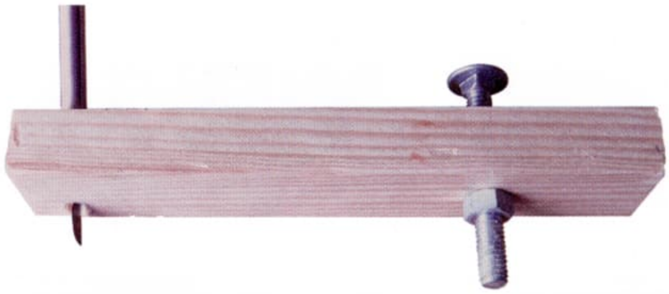
Cleverly the drive to the turntable is cushioned by the use of a rubber washer that also acts as a safety feature, allowing slip, if the turntable is jammed. Fortunately, this washer was still satisfactory otherwise I would have made one from a rubber chassis mount as used also for mounting the motor to its cabinet. The turntable should rotate freely on the motor spindle and some corrosion and dirt were removed to allow this.

The motor is mounted on rubber bushes; almost certainly pure rubber, that appeared to be good (see picture). For the first unit I hadn't realised that the special screws could be removed and treated them and the spindles they screw into as studs as this was how they had disassembled. Juggling them into position from the top with the bushes wasn't easy. Assembly was much easier putting the studs into the motor casing first as the makers intended.

The main problem with the rubbers was that the turntable was not level with the motor board. It actually sagged by 5mm on the heavy side of the motor. So once again I turned to the gum rubber chassis mounts from AES (Antique Electronic Supply, Arizona, USA). I used 1/8" (P-H186) thick washers underneath and 1/4" (P-H185) thick washers on top with pieces of Hellermann sleeve between the two. This worked well, they really could have been made for the job. The turntable was level

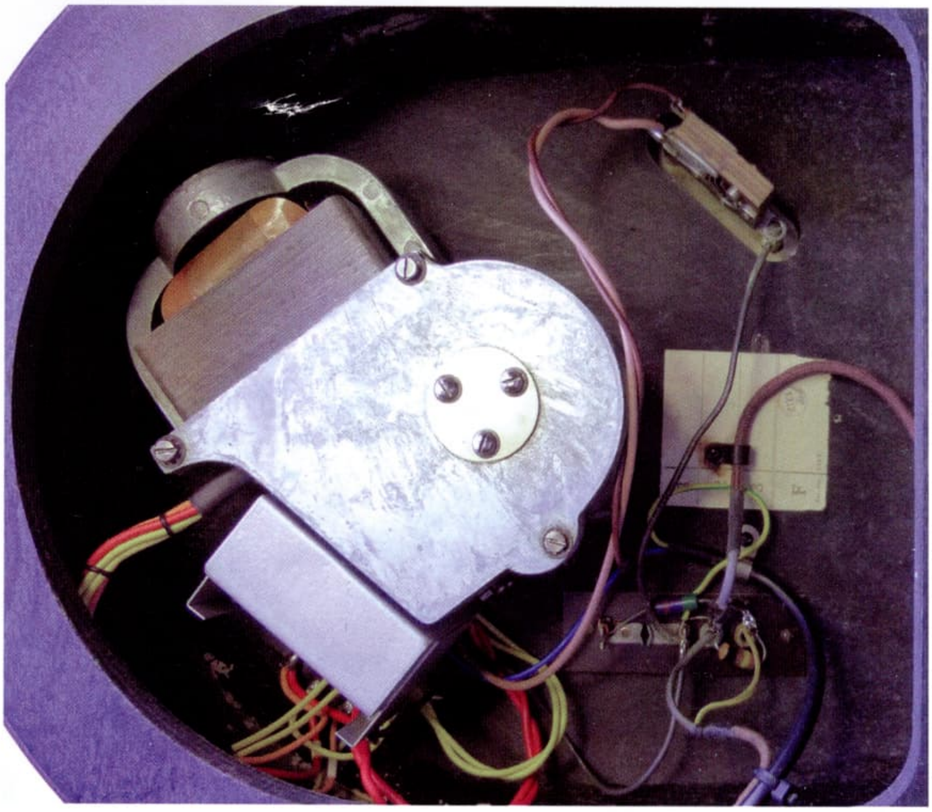

The cutting–out board


The craft knife


The cutter

The spray adhesive


The cloth in position


Inside the cabinet

to within 1.0 mm on all 4 sides, measured with the depth gauge on a vernier calliper.

Cutting out a turntable mat

For the first turntable the mat was reasonably good and is still in use. But as this one was moth eaten and torn a new one had to be cut. Luck was with me as a friend had some felt cloth; rescued from inside the lid of a scrapped HMV radiogram. I had hoped to cut two mats from the piece but the good area was only large enough for one so I had to get it right first time.

I did muse about making a suction table using a vacuum cleaner to hold the cloth taut but this was going to be far too much work for a one off. So I settled on spray adhesive applied to a stout cutting out board. This was actually a piece of old workbench that was melamine covered. In tests, I found that if it was sprayed with glue then the cloth, if not left for long, could be peeled off leaving it nearly clean and with only a slight loss of flock.

The masked off board is shown in the picture, with a hole drilled for the spindle of the improvised cutting tool. This was made from a length of softwood with two holes, with one at an angle, for a craft knife that was a tight fit, and the other for a bolt with nuts for the spindle.

I was now ready to cut the cloth but first I had to punch a centre hole for the spindles of the turntable and the cutting tool. This was easily done with a metal punch. Now the board was lightly sprayed with glue and the cloth placed in position smoothing it out with a warm iron. I was surprised how well the cutting tool worked; one pass with firm pressure and I could then peel away the outer scrap material.

The final step was to remove the mat and give the underside another light spray with adhesive and place it carefully in position on the turntable fitted to the playing desk. There were small amounts of glue on the outside edge of the mat but this was removed by dabbing it off with the sticky side of masking tape.

Conclusions and a look inside

The unit has a removable bottom panel with a diagram that shows where to apply the oil can. No doubt this was often done more liberally than was necessary. At the top right can be seen the switch for the automatic motor cut-off. Note that it is fitted with an earth wire as is the motor. Below it is the pickup connection panel with a fixed shunt 100K Ohm resistor and a 7K5 that can be used, for matching (reducing volume and treble) by insertion of a loose plug from the top. Below the motor is the box containing the two phase shifting capacitors.

The highlight of this restoration was successfully cutting the turntable mat as I had worried that I would not be able to get a perfect circle. I had seen someone else's attempt at cutting one with scissors. It was about as good could be expected but the eye can pick out the tiniest imperfections and to me it was simply not good enough. My effort is pleasing perfect.

These players are a useful and attractive addition to a radio and provide remarkably good reproduction if you can find some unworn and unscratched records.

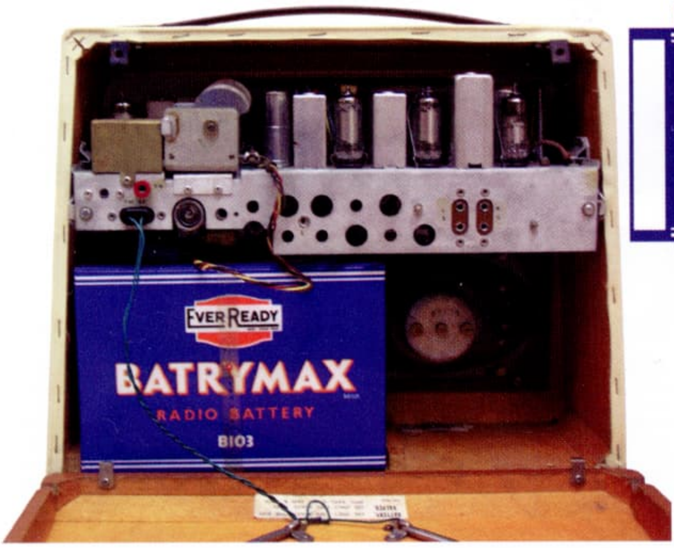
Reproduction Radio Batteries by Robert Darwent

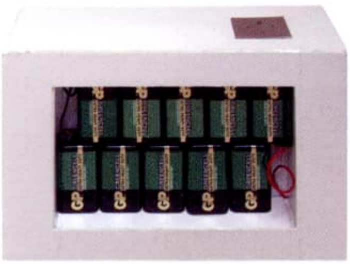
A focus of the vintage radio hobby for me are battery valve portables. I have quite a few such sets in my collection and I find the types of batteries they used often just as interesting as the radios themselves. Consequently, whenever I restore one of these portables I don't really consider it complete until I have furnished it with an authentic looking set of batteries to demonstrate how it was originally intended to operate.

It will be appreciated that the HT and LT batteries types used in valve portables have long been obsolete and unobtainable for purchase from the shops. However, it is possible to substitute a combination of readily available modern batteries to provide the voltages required. For example, as is widely known: a chain of 10 x 9 volt PP3 size batteries connected in series will suffice to supply the 90 volt HT required by many valve portables.

Simply hard-wiring the ten batteries together is probably the simplest solution, but I prefer to make a stiff card inner to house the modern batteries hidden inside a sleeve of the correct dimensions, which on the outside shows a reproduction of the appropriate manufacturers livery.

For the purposes of this article I am going to concentrate on four battery valve portables in my collection and the reproduction batteries they specifically required and I produced for them. The construction methods I employ however, are equally applicable for virtually any other type of obsolete HT or LT battery that was commonly used and can be easily adapted to suit.





Berec Commander

One of the first reproduction batteries I produced was for a Berec Commander (export version of the Ever Ready Sky Emperor) which uses an Ever Ready B103. The B103 is a large battery at 203 x 138 x 79 mm in size. It is also a combined type, meaning that both the 90 volt HT and 1.5 volt LT supplies are within the same battery housing although still internally separate of course.

The large size of this battery gave plenty of room and much scope to accommodate the modern substitutes inside. I decided to use one face of the battery for the HT with 10 x 9 volt PP3's interconnected in series, one battery to the next, giving a total of 90 volts from the spare terminals at either end. The opposite face was used to mount four D-cell holders interconnected in parallel to provide the 1.5 volt LT supply.

The card inner was essentially made as a rectangular box with deep indentations on either side to hold all the batteries. I used 1 mm thick card and strengthened the voids inside the structure with a lattice work of card strips. The end result was a strong rigid box, yet remaining relatively light in weight.

The four pin connector at the top was marked out using the opposing plug from the radio as a template. Each pin had a coil of wire wrapped around it several times to make a spring like connector. These springs were then fixed underneath the four connector holes and secured in place with liberal amounts of hot glue, taking care not to fill the insides of the coils. Once solid a reliable battery socket was created.

The outer sleeve was given a reproduction livery of Ever Ready's 'Batrymax' series of radio batteries. The livery was produced using a graphic software package and appropriate images of real batteries as a guide, then printed on to good quality photo paper with an inkjet printer. To seal the ink each sheet was then covered with clear self adhesive film. Each section was carefully cut out with a craft knife and assembled with glue and double-sided tape.

Bush EBM60 (Ref. 1)

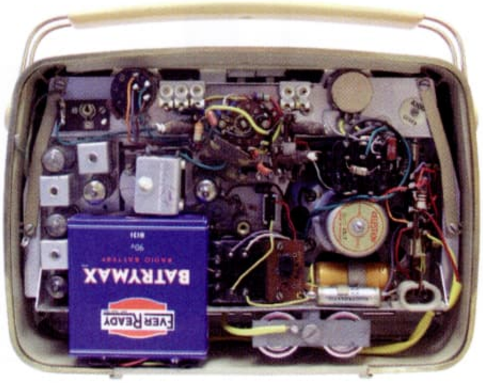
Familiar to Bush MB60 owners, this set is the rare export version of that more common model using separate HT and LT batteries. The HT type being a 90 volt Ever Ready B131 and the 1.5 volt LT provided by 2 x D-cells in parallel. The B131 is only 95 x 34 x 94 mm in size so, bearing in mind the dimensions of a single PP3 battery are approximately 49 x 27 x 17 mm, fitting ten of them into the overall confines of the B131 is something of a problem! However, after a few attempts I eventually managed it.

I found that by interconnecting the PP3's in two blocks of five stood back to back, I could accommodate them in a minimal card surround that just had sufficient spare room to hide the wiring and mount the battery connectors on top. Despite the lack of space to add any substantial strengthening, the card surround is still strong enough to be refillable when the PP3's require replacing.

Vidor Vanguard CN436

Another battery valve portable that required separate 90 volt HT and 1.5 volt LT batteries. In keeping with the manufacturer of the radio, I made both reproduction batteries in the Vidor livery. The HT type specified was the L5515 (Ever Ready B117) and the LT type was the L5041 (Ever Ready AD4).

The L5515's dimensions are 130 x 111 x 86 mm and the L5041 are 67 x 67 x 98 mm, giving ample room to construct two rigid card surrounds. Adopting the two blocks of five interconnected PP3's approach as before, I produced a surround that each held one of the blocks of five on opposing faces. One of these faces also mounted the two connectors.



Similarly, the corresponding LT battery surround held two C-cell holders on each opposing face, internally connected to link all four cells in parallel. The two-pin connector at the top was a reused original salvaged from a similar type of battery.

Philips Colette LD562AB (Ref. 2)

This large 1950s multi-band valve portable was produced for the German market. It requires three sets of batteries to make it operate. For the HT, a 90 volt type specified as a Pertrix Nr 78 or equivalent. With in parallel for the LT, two 1.5 volt D-cells, plus in addition a 1.5 volt rechargeable nickel-cadmium cell often referred to as a DEAC (Deutshe Edison-Akkumulatoren-Company) after the manufacturer.

The DEAC was found in many mains/battery valve portable models designed in Europe at the time, though virtually unheard of in this country. It was specifically employed in the mains derived LT power supply circuitry as a form of voltage stabilisation. Without it in circuit the LT voltage, whilst the set was being powered via the mains, could easily rise high enough to destroy all the valve filaments.

The dimensions of the HT battery were deceptively quite large and I initially thought it a simple matter to interconnect PP3's, one to the other, as before. However, due to the unusual placement of the two battery connectors on one of the large faces at the bottom there was insufficient space to adopt this approach. Instead I resorted to a deep recess on the face opposite to the connectors and stood the PP3's in two rows of five, each interconnected with an individual clip.

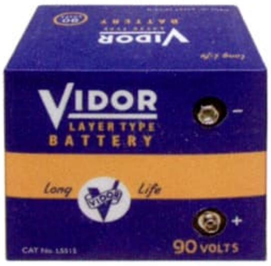
To substitute the DEAC, I used a modern 1.2 volt rechargeable nickel-cadmium D-cell mounted in a plastic battery holder. A card surround of appropriate dimensions was built around this holder and suitably strengthened. Original DEAC's use circular nuts to secure spade connectors to their terminals at the top, I employed modern nuts and bolts to achieve a similar appearance.

Conclusion

I must admit, I get as much enjoyment out of designing and constructing the matching reproduction batteries for my valve portables as I do from restoring the radios themselves. I think the attention to detail in providing an authentic looking set of batteries only serves to enhance the desirability of any battery valve portable and I believe is well worth that extra effort.

References

1. Variations on a theme: The Bush MB60 family - BVWS Bulletin, Vol.35 No.4, Winter 2010 issue.
2. Colette's Makeover: The Philips LD562AB - BVWS Bulletin, Vol.36 No.1, Spring 2011 issue.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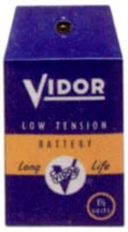
BATTERY
Long Life
90 VOLTS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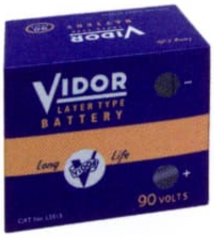
LOW TENSION
BATTERY
Long Life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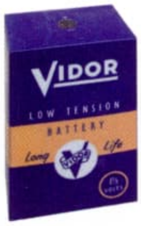
Long Life
90 VOLTS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BATTERY
Long Life


VIDOR
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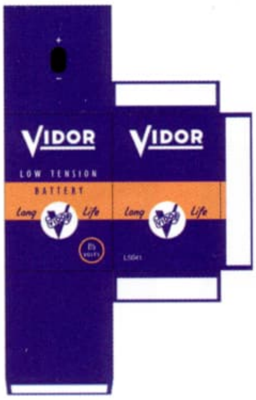
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Long Life
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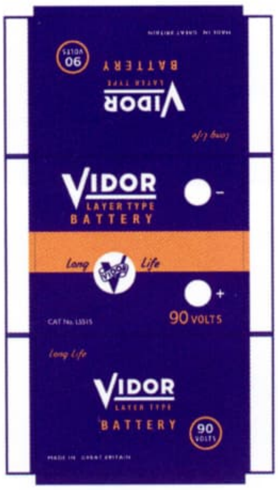
Long Life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LAYER TYPE
BATTERY
Long Life
90 VOLTS
VIDOR
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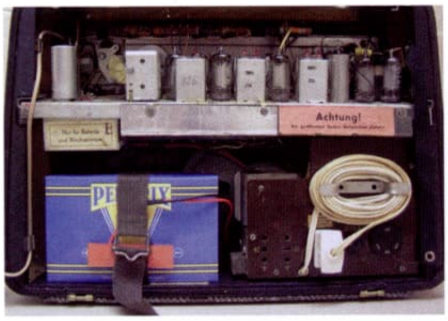
BATTERY
90 VOLTS
MADE IN GREAT BRITAIN


Achtung!


DEAC
NICKEL-CADMIUM
AKKUMULATOR
gasdicht
D6
MADE IN GERMANY


DEAC
NICKEL-CADMIUM
AKKUMULATOR
gasdicht
D6
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DEAC
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PERTRIX
Nr 78
MIKRODYN
Anodenbatterie 90 Volt
PERTRIX
für
Licht u. Radio
90V
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Germany
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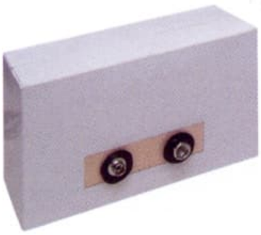
DEAC
GASDICHTE AKKUMULATOREN
für Rundfunk-Koffergeräte,
Hörhilfen und
Meßgeräte aller Art
Niedrige Betriebskosten,
günstige Voraussetzungen für gleichmäßig
gute Betriebseigenschaften und
lange Lebensdauer Ihrer Geräte,
besonders der Röhren
DEAC
Alkaline
Accumulator
D3,9 - 1,25 V



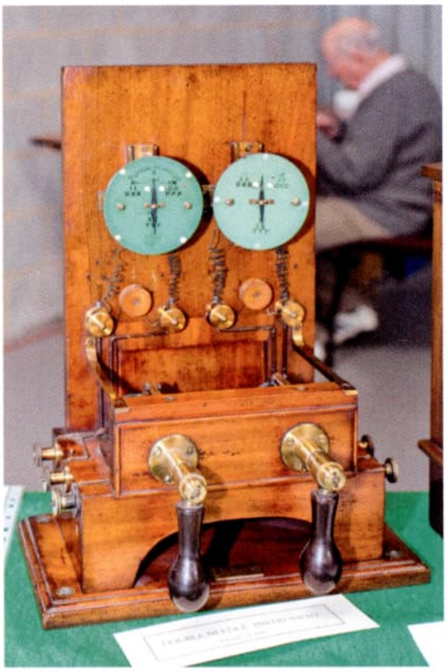

PERTRIX
PERTRIX
für
Licht u. Radio
90V

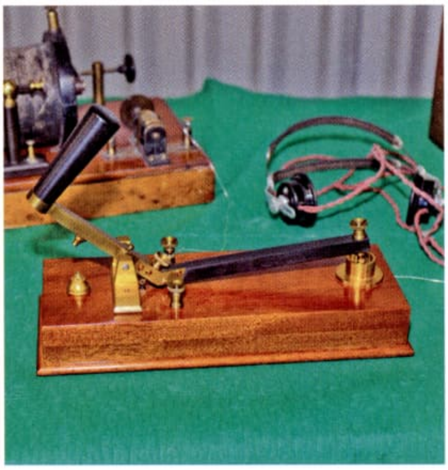
NVCF! photographed by Lorne Clark


WIRELESS WORKSHOP
(SHEFFIELD)


EDISON
CONCERT
PHONOGRAPH


"COMMANDER"





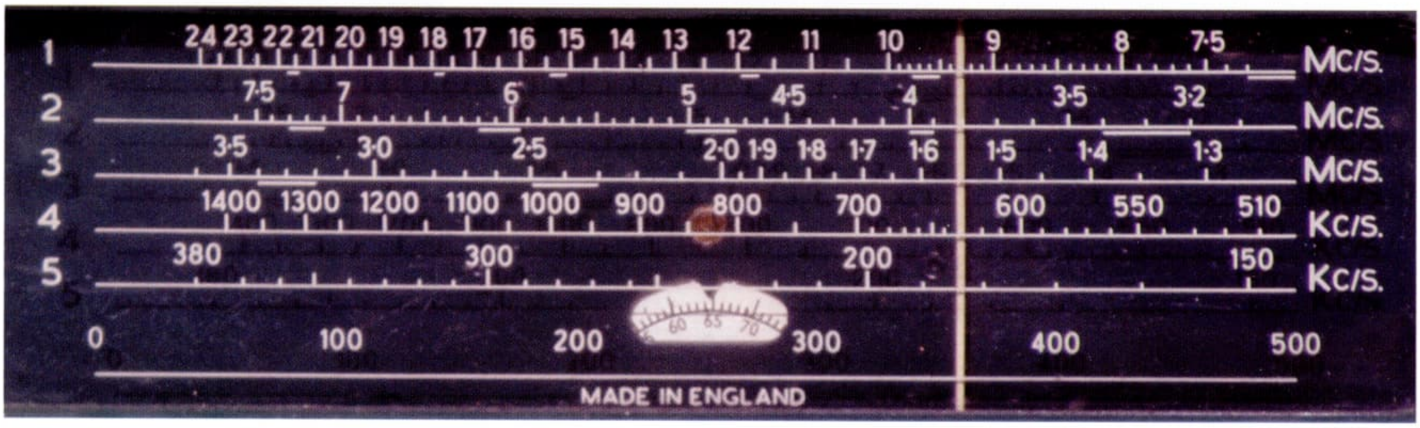
The Eddystone 870 and 870A Receivers

by Stef Niewiadomski

Most collectors of Eddystone radios will have their favourite model. The 'small valved' 870 and 870A radios, intended as ships' cabin and 'cult' domestic radios hold that place for me. They are valve-based, compact, light, simple to operate, and self-contained. Although they are AM-only and do not possess any recognisable 'communications' features – such as a BFO – they are nevertheless very useful sets. They would not look out of place in the home and while AM broadcasting in the UK on the long and medium waves continues they are capable of very good service.

Figure 1(left): The front view of my green 870A showing the slide-rule dial and simple controls.

Figure 2(below): The frequency ranges of the 870A, showing the compression of frequency coverage towards the high frequency end of each band.



A detailed history of the 'Eddystone' name can be found at the Eddystone User Group's (EUG) website, see the link at the end of this article. Very briefly, Stratton & Co. can ultimately trace its roots back to 1860, making small metal objects in Birmingham (the city with which the company was always associated throughout its long and varied life) and decided to cash in on the radio home construction boom in the early 1920s, when it started to make radio components. It also designed and manufactured complete radios and kits, from 1924 onwards. Stratton's first radio-related patent was filed in February 1925, as was the trademark 'Eddystone' and the familiar lighthouse logo, representative of strength and reliability. In 1965 Stratton & Co. was sold to The Marconi Company, at which point it changed its name to 'Eddystone Radio Ltd'.

Stratton and Cabin Radios

The 870/870A was not the first foray into ships' cabin radios by Stratton & Co. The 670 radio had appeared in 1948, initially 'for export only', helping improve Britain's post-war balance of payments. The radio covered the standard 'communications receiver' range of 520kHz – 30MHz, operated from 110V/220V AC (using a selenium rectifier) or DC mains, and used U-series 100mA heater valves. It was in production from 1948 until 1954. An interesting accessory offered with the 670 was the 'Eddystone Pillow Speaker', catalogue number 1419. The speaker 'is a special type. It takes the form of a smooth, flat Bakelite grille .... When slipped under a pillow, speech and music can be heard by a resting person with extraordinary clarity but will not be audible to other occupants of the room'. Successors to the 670 were the 670A (with a slide-rule dial) and the 670C, in production until 1964. Of course during this period the company was also producing 'tea planters' sets and state-of-the-art communications receivers in various models covering HF, VHF and UHF.

By the mid-1950s the need arose for a more modern, smaller, lighter and cheaper cabin radio, still with same requirement for 'universal' mains operation. I think the intention was that by making the radio small and light it would also sell for domestic use as a 'midget receiver'. After a relatively quick development by the Stratton team the Eddystone 870 began production in 1956. Measuring 11-inches wide by 6¼-inches wide by 7-inches deep, and weighing in at a mere 11lbs, the set covered four bands, specifically:

Figure 3 (top): My green 870A (with five bands) perched on top of an earlier 870 (with four bands) in grey.

Figure 4 (bottom): A maroon 870A, courtesy of Gerry O'Hara.

Band 1: 18MHz – 5.9MHz
(16.66 – 50.7 metres)
Band 2: 6.3MHz – 1.95MHz
(47.6 – 153.8 metres)
Band 3: 1500kHz – 540kHz
(200 – 556 metres)
Band 4: 380kHz – 150kHz
(789 – 2000 metres)

I find it confusing with Eddystone radios (it's the same with my 840C and the transistorised EC10, for example) that band 1 is usually the highest frequency band. The convention seems to be that band 1 is at the top of the dial. I'd say that with most other manufacturers band 1 would be the lowest frequency band, whether or not it was at the top of the dial.

I presume that in those days radio listeners at sea were more familiar with the various shortwave bands, having listened to them at home. Alternatively perhaps the ships' operators provided leaflets on what frequencies to listen to, and at what time of day. Certainly the BBC could be found in most of these broadcast bands.

Time for a Refresh

By 1959 the set was ready for a 'refresh' and the similar-looking 870A (see Figure 1) was developed and stayed in production until 1966. There had been requests for a higher upper frequency limit to cover the 15m (18.9MHz – 19.02MHz) and 13m (21.45MHz – 21.75MHz) broadcast bands and so the short wave band coverage was 're-jigged', and a fifth band added with a maximum frequency of 24MHz. The full ranges of the 870A's five bands therefore became:

Band 1: 7.5MHz – 24MHz
(40 – 12.5 metres)
Band 2: 3.2MHz – 7.5MHz
(93.9 – 40 metres)
Band 3: 1.3MHz – 3.5MHz
(230.7 – 85.7 metres)
Band 4: 510kHz - 1400kHz
(588.2 – 214.3 metres)
Band 5: 150kHz - 380kHz
(2000 – 789.4 metres)

According to my copy of the 'Listener's Guide to the Radio and Television Stations of the World', 1954 edition, compiled by B B Babani and published by Bernards Ltd, the 13m band contained 51 stations worldwide, including the BBC 'Overseas Service' stations GSH, GSJ, GST, GRZ, GVR, GVS and GVT. These stations were originally set up to broadcast to the Empire for the benefit of 'an attentive audience for programmes dedicated to the ideal of objective truth'. I'm sure that sea-farers (whether subjects of the British Empire or not) were welcome additions to the audience. 'The Wireless World Guide to Broadcasting Stations, 5th Edition', published in 1949, stated: 'British short-wave transmitters are located at Daventry, Northants; Skelton, Cumberland; and Rampisham, Dorset. Frequencies, calls and power of all BBC stations, marked with an asterisk (this included the ones mentioned above) are interchangeable'. See Reference 1 for details of the short wave broadcast bands.

Solar Cycle 19

Interestingly solar cycle 19 (lasting officially from April 1954 until October 1964 and peaking in about February/March 1958 when intense red aurora displays were visible around the world) produced the highest number of sunspots (both peak and averaged counts) 'since records began' in 1755, and since. This must have made the 15m and 13m bands particularly 'lively' and effective for long distance reception in the daytime between about 1956 and 1960. Maybe it was this that triggered the request to extend the upper frequency limit of the 870. See Reference 2 for more details of this exceptional solar cycle.

Tuning Linearity

If you look at the highest range (7.5MHz – 24MHz) of the 870A shown in Figure 2 you can definitely see the compression of frequency coverage towards the high frequency end of each band. This is especially noticeable on Band 1: the 8MHz – 9MHz segment covers 19mm of the dial, whereas the 23MHz – 24MHz segment covers only 6mm. The broadcast bands are marked with a line below the calibrated scale, though the bands are not identified, like you find on many other radios which cover these bands.

The density of stations (by this I mean the internationally-agreed frequency spacing of broadcast stations) stays constant no matter which band you are tuning, so a compressed dial at the high frequency end of the band definitely makes it harder to separate broadcasts and tune them in accurately. To some extent the smooth slow motion drive of Eddystone receivers helps, but this certainly doesn't entirely solve the problem, and this compression at the high frequency end of radio dials is a common problem with lower cost receivers.

Just to see how this compression can

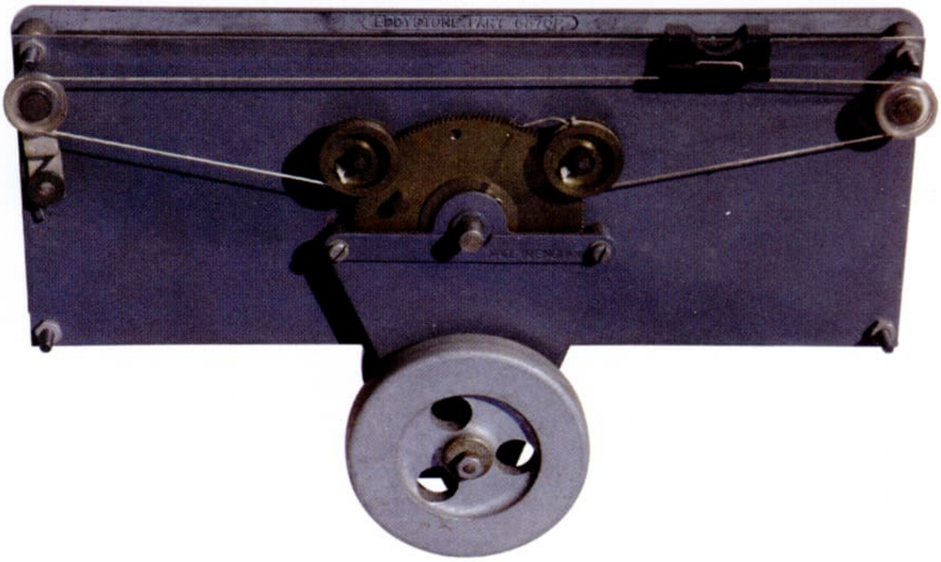
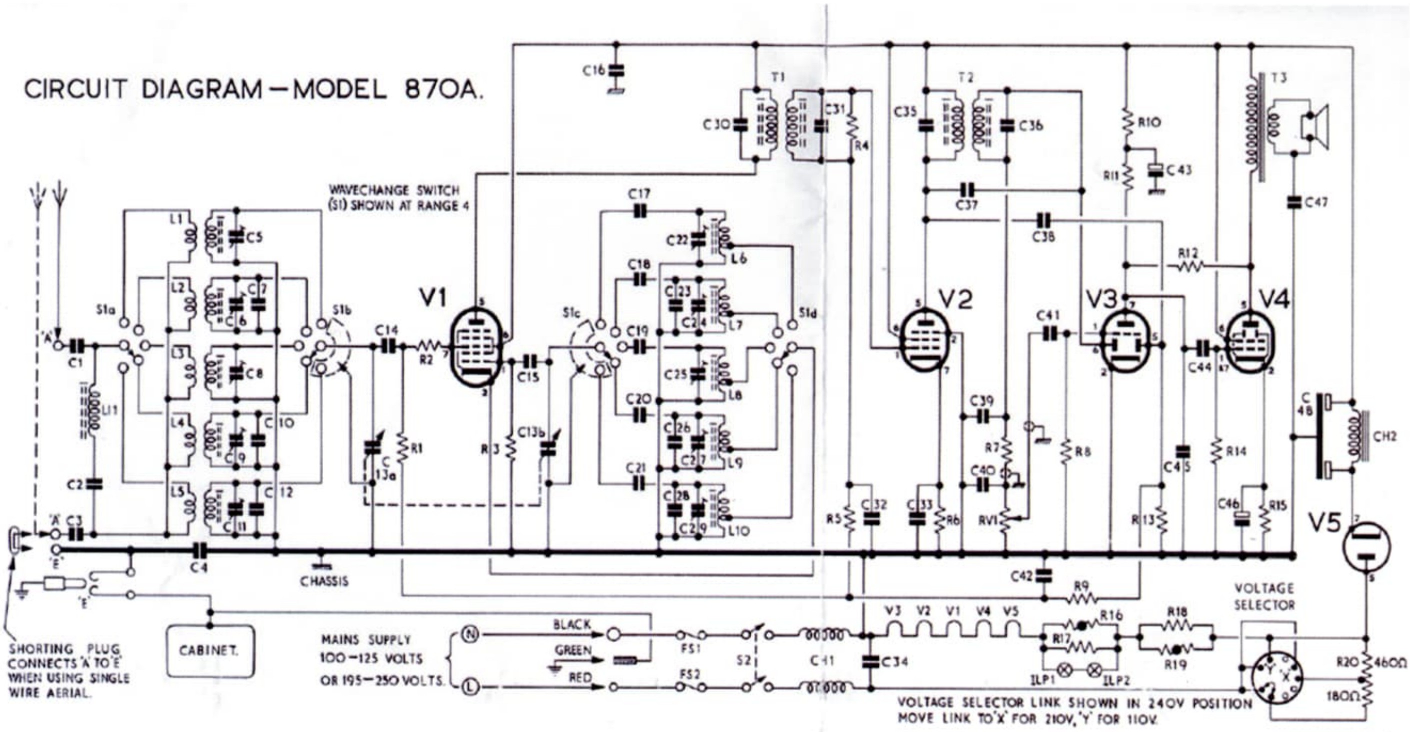
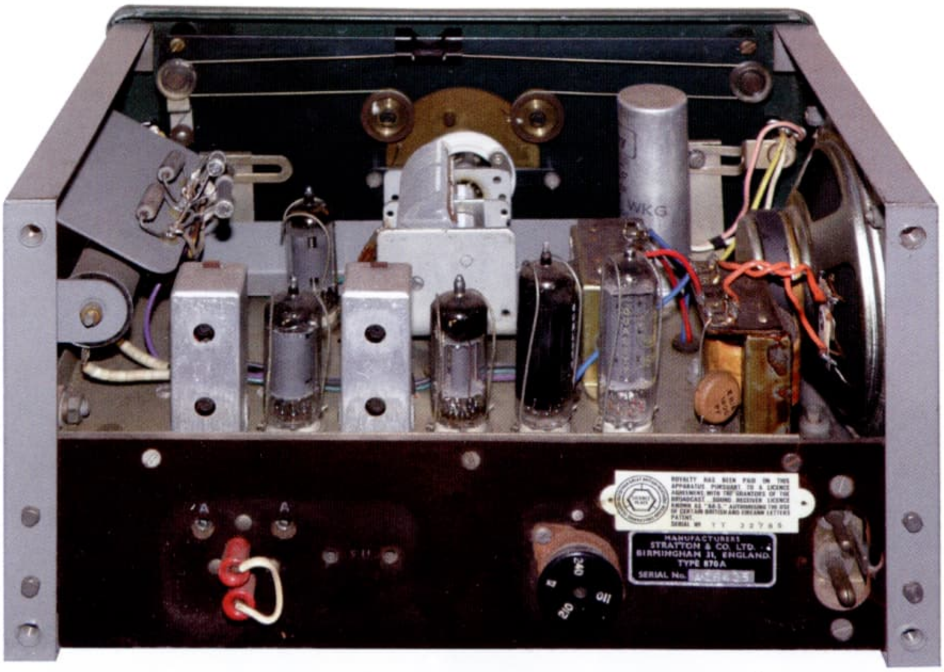


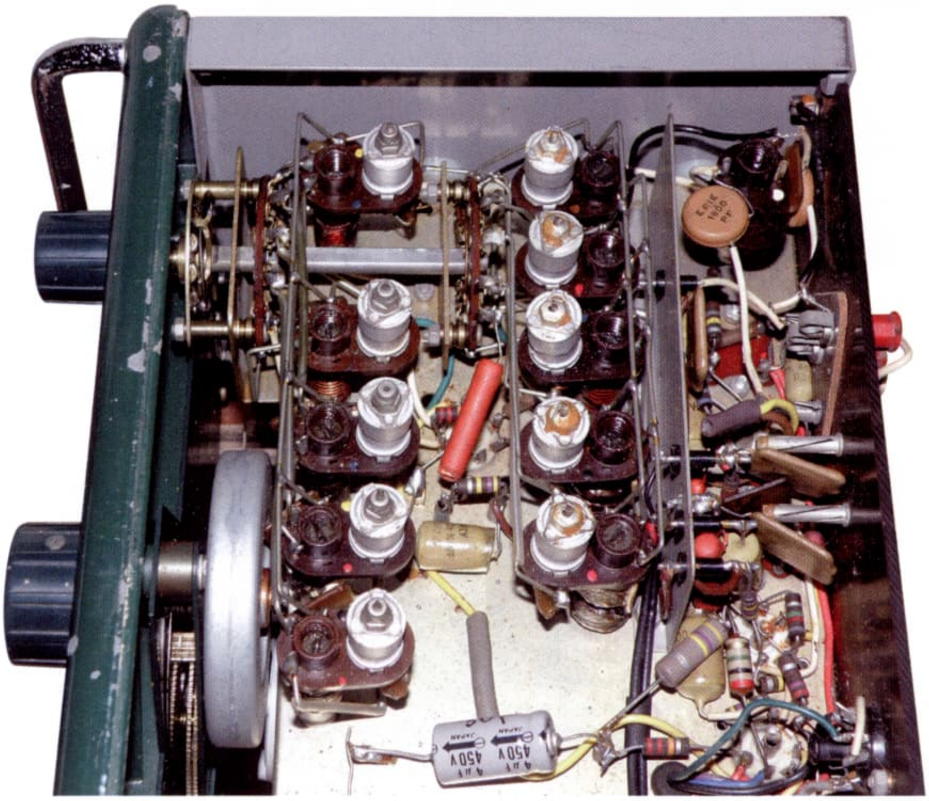
Figure 5 (top): The 870/870A high quality drive mechanism. The pulley on the left hand side is spring loaded, thereby tensioning the pointer string.

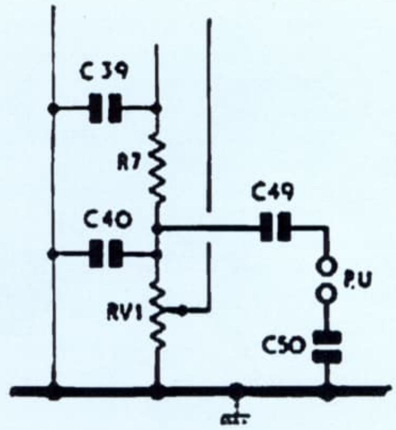
Figure 6 (above): Rear view of the 'No.898 Geared Slow Motion Drive Assembly' 110-to-1 reduction ratio drive/dial, identical to that used in the 870/870A radio.

Figure 7 (below): Schematic of the 870A, very similar to that of the 870. The 870's schematic can be found on the EUG's website.









This receiver is now provided with " Pick-up " sockets which allow it to be used as an amplifier in conjunction with a standard high impedance gramophone unit.

The diagram shows the circuit addition involved and the values of the extra capacitors are as follows :

C49 0·01 mfd Ceramic ± 25% 500V DC wkg.

C50 0·02 mfd Ceramic ± 25% 500V DC wkg.

External connections should be made with screened cable terminated in suitable plugs. The screening should be connected to the left-hand socket.

Figure 8 (top left): Rear view of the 870A showing how the components are neatly arranged on the compact chassis to fit into the small cabinet.

Figure 9 (left): Under chassis view of the 870A, showing the aerial and local oscillator coils, and beehive trimmers. The disk in the bottom left hand corner is the drive mechanism's flywheel.

Figure 10 (above): The modification to the 870A to add a safe 'pick-up' socket, made on models produced from about November 1963.

be avoided on a higher quality (of course this also equates to higher cost) receiver, I took a look at the Eddystone 840C dial, introduced in 1961. On the highest range (13MHz – 30MHz) both the 13MHz – 14MHz and 29MHz – 30MHz segments cover the same dial width of 16mm. The 1MHz steps in between aren't exactly 16mm wide (some are slightly narrower), but the linearity of the band is impressive. This was achieved by careful use of trimmer and padder capacitors in the aerial and local oscillator tuned circuits.

To demonstrate that potentially you still have the same problem with a transistorised receiver, on the highest range on the EC10, the 18MHz – 19MHz segment covers 45mm of the dial, whereas the 29MHz – 30MHz segment covers only 9mm.

Colour Schemes

As part of the mid-1950s rebellion against the drabness of the early years of the decade it was decided that brighter colours than grey or black should be offered for the cabinet finish. The final production colours were arrived at in an unusual, democratic way. Several of the development models were painted in various colours such as pea green, red, blue and maroon. The 'girls' on the production line were then consulted for their favourites, and maroon won. A little later British Racing green was added to the available colours. Figure 3 shows my green 870A on top of a grey 870. A maroon version of the 870A (in extremely good, original condition) is shown in Figure 4 (by courtesy of Gerry O'Hara).

As you can see from the photos of the radios the front panel finger plates were a lighter colour than the main cabinet. The cabinet / finger plate combinations were: grey / light blue; British Racing green / pale green; and maroon / cream. I've also seen a light grey main cabinet colour with dark grey finger plate, but I'm not sure whether this is an original factory finish.

The knobs were in the 'main' colour, so they contrast well with the finger plate. The perforated side panels, for ventilation on one side of the cabinet and for the sound to 'come out of' on the other, were painted in the same colour as the finger plates. I think these combinations of a darker 'main' colour with a lighter 'secondary' colour work very well. The two handles, one at either side

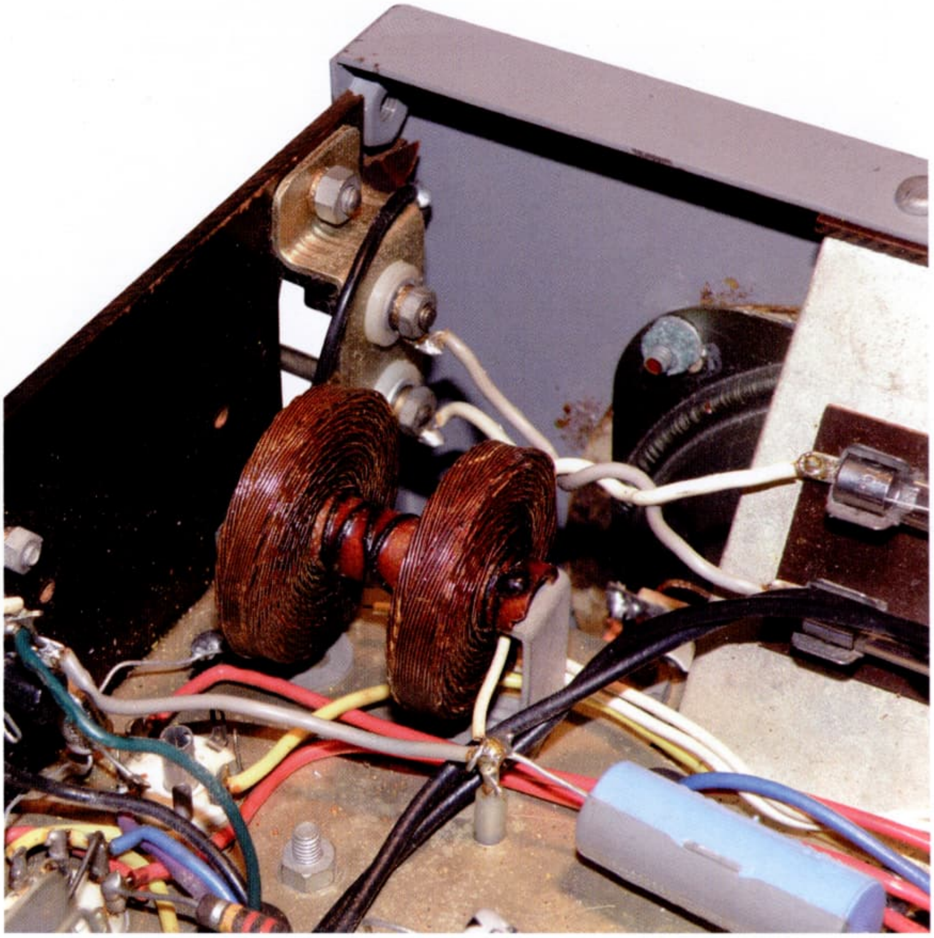


Figure 11 (above): One of the two paxolin washers insulating the chassis from the case. This area looks particularly dusty and could do with a clean.

Figure 12 (right): The high quality chokes (CH1 on the schematic) in series with the mains.

Figure 13 (opposite page): Webb's advert for the 870 from Wireless World for November 1957, along with its contemporaries the 888 and 840A.

of the front panel, were always chromed. Apart from some areas of exposed metal the chassis of all the sets were painted grey.

The Eddystone 898 Drive

The 870/870A dial drive mechanism, shown from the rear in Figure 5, is what gives the set the slide-rule dial, and the very smooth feel to the tuning. This drive mechanism became a classic in itself and was offered to constructors as the 'No.898 Geared Slow Motion Drive Assembly' 110-to-1 reduction ratio drive/dial, as shown in Figure 6. This drive was mainly in competition with Jackson Brothers, who were making a range of dials and slow-motion drives at the time. The dimensions of the 898, including the usable dial length, match those of the 870 exactly. In fact if you look at the 870A carefully the plate of the 898 drive holding the gears, flywheel, etc is screwed to the rear of the front panel, and so the drives are identical, apart from the front panel glass which for the 870A is integral with the radio's front panel. A front panel bezel and glass were supplied with the 898 drive, along with drilling and mounting details.

As you can see from the front view of the 870 and 870A the drive/dial mechanism has a logging scale marked 0-500 in steps of 100 on the dial itself, and also has a small dial just above the tuning knob. This dial is calibrated 0-99 and rotates exactly five times when the radio is tuned from the left hand to the right hand extremes of the dial. The user can therefore 'log' a station with a resolution of one-in-500 anywhere across the tuning range. This is exactly replicated on the 898 drive.

Home Radio were selling the 898 drive in the June 1959 issue of Practical Wireless for 58/-. Over the years this drive was designed into many high-performance amateur receivers and transmitters (perhaps the G2DAF designs rank as the most famous) and must have been bought in the thousands. So popular was the 898 that it was amongst the last four Eddystone components (the other three were die-cast boxes, the No.892 epicyclic ball-bearing driving head and the No.50 flexible coupler) shown in the 1968 catalogue (drastically reduced in content from the 1965 catalogue, after the acquisition by Marconi). No.898 drives still come up for sale regularly and command a high price.

Other Small Valve Sets

The 870/870A sets were not the only Eddystones to use this compact 11-inch wide case format. They had been pre-dated when the introduction of VHF-FM broadcasting by the BBC in 1955 triggered a demand for FM tuners as high quality radio front ends for Hi-Fi amplifiers. Stratton and Co. responded with the eight-valve case-less 820, covering the FM band of 87.5MHz - 100MHz, and two medium wave and one long wave pre-set stations. This was in competition with the likes of Jason, and kit manufacturers such as Denco, Weyrad and Heathkit.

The 820 stayed in production until 1958 by which time it was somewhat out of date. The company didn't take the opportunity to update it, having sold about 1,000 820s in total.

There was also the type 890, an AM-VHF radio microphone receiver developed for the BBC. Production runs of this radio were very small and consequently they are very rare today. The 930 was very similar, again used for radio microphones and intelligence-gathering (a euphemism for 'bugging') and was produced in many VHF ranges to cover bands 'of interest'. There was also the prototype-only 901, a Radiosonde AM receiver, covering 27MHz - 28.8MHz.

A similar small case with a 'slide-rule' dial was used again for the 12-inch wide transistor sets of the 1960s and 1970s, such as the EC10, EB35, EB36, EB37 and EY11. Interestingly the case design used was 1-inch wider than the 870A but the designers managed to make the dial length of the transistor sets equal to 8½-inches, which is almost 2-inches wider than the useful width of the 870/870A dial.

The Valve Line-Up

The circuit diagram of the 870A, which isn't too different from the 870, is shown in Figure 7. All valves are miniature B7G with 150mA heater currents. The first two digits of each valve code indicate the heater voltage. V1 is a 12BE6 in a standard mixer-oscillator front end design. Quality parts were used in its construction and with careful layout it allowed useful and reliable operation on the short waves up to 24MHz. V2 is a 12BA6 IF amplifier stage. V3 is a 12AT6 AM detector, AGC and first audio amplifier: separate diodes were used for the audio detection and AGC circuits, in contrast to many low-cost sets which used a single diode for these functions. V4 is a 19AQ5 audio output stage driving the audio output transformer T3.

The use of a 19AQ5 valve for the output stage - rather than a valve with say a 25V or 50V heater, as used in many AC/DC sets originating in the US - seems like an odd choice. The reason for this is that the set's designers wanted it to be capable of running from 110V DC (rather than the 117V mains in the US) and also wanted to incorporate thermistors in the heater chain to give a degree of stabilisation, and dial lamps, and so 19V was all they could allow for this valve's heater. That was fine in the mid-1950s but nowadays the 19AQ5 is an uncommon valve. It's possible to source one, but not at eBay-type prices. Luckily the 19AQ5 has proved to be robust and the design of the radio's heater circuit prevents switch-on current surges through the heater chain, which can affect the long-term life of valves' heaters.

Finally V5 is a 35W4 half-wave rectifier in the power supply circuit. The main improvements over a standard domestic AC/DC set's power supply are the installation of an effective supply-line noise filter and two thermistors, the latter providing both surge protection and a degree of HT stabilization to the set, this being desirable for improved oscillator stability when the set was used on its highest frequency range up to 24MHz.

Figure 8 is a rear view of the 870A showing how the components are neatly arranged on the chassis to fit into the small cabinet. On the left hand side you can see the heat deflector plate for R20, the heater voltage dropper resistor, and this plate also carries the thermistors in the heater circuit. The original MES dial lamps were specified at 5V 150mA, which are difficult to source today. Commonly available 6V 150mA bulbs seem to be a good substitute.

My 870 contained what looked like the original 4Ω, 4-inch Elac 'Made in England' speaker but the speaker in my 870A seemed to have been replaced at some point by a 'Foster Made in Taiwan' speaker.

The Aerial Circuit

The aerial circuit allows the use of balanced aerials connected between points 'A' on the back panel, or a single wire aerial when C3 needs to be connected to AC earth via a shorting plug. L11 and C2 form a wave trap, designed to reject any signals at the set's IF frequency of 465kHz that may be picked up by the aerial system. The aerial and local oscillator coils, and beehive trimmers, are neatly arranged around the wave change switch as shown in the under chassis view of Figure 9.

Pick-up Socket

As you can see from Figure 7 no method is shown of connecting a 'gramophone' pickup into the audio stages of the 870/870A (which the 'old' 670 had, along with a 'G' position on the band switch). Some keen (and foolhardy) audio enthusiasts tried making this connection, which could be risky with an AC/DC set. For this reason later 870As, manufactured from about November 1963, were fitted with a 'Pick-up' socket, connected to the 'top end' of the volume control, and suitably isolated from the chassis by 500V capacitors, as shown in Figure 10. As far as I can tell there was no sixth position added to the wave change switch and so presumably the user had to tune the radio to a quiet spot in the band.

Use On-Board Ship

I was intrigued by how these sets were installed and used on board a ship. There seems to be no surviving data on exactly how this was done. Presumably it was left to the radio manufacturers' agents or the cabin fitters to make the sets work in the cabins. One can imagine a power socket, typically 220V DC in an officer's cabin, or that of a first class passenger, but how about the aerial? Were avid listeners simply expected to throw a wire out of the cabin's port-hole, if indeed they were lucky (or rich) enough to possess a port-hole?

I contacted Geoff Arnold to tap into his considerable experience in radio and nautical matters (see his fascinating book, Reference 3).

Rather than paraphrase Geoff's words I've decided to quote them verbatim:

Broadcast receivers installed privately in crew

cabins on board ship, whether of Eddystone types or more commonly small domestic types from manufacturers such as Philips, did at one time indeed use aerials consisting of a length of wire thrown out of a porthole!

Depending on the layout of the ship, this could be difficult for some cabins, and could be extremely dangerous where the ships involved were oil-tankers. For this reason, marine radio manufacturers developed systems using an RF amplifier feeding coaxial distribution lines (up to four lines) which went to each crew-cabin where they were terminated in a socket outlet containing a matching network for aerial and earth.

These systems were known as 'CAS', standing for Communal Aerial Systems. CAS was initially fitted in passenger liners built in the 1950s, but was later adopted for newly built oil-tankers. The main manufacturer of CAS fitted to UK-built ships was Redifon.

Performance of the systems was generally reasonably good, but sometimes a crew member would 'hack into' the outlet box, bypassing the matching network to get a stronger signal. This would unfortunately upset the matching of the coaxial line, so that other users of the system on that line would get a poor signal. Fault-finding to try to locate these unauthorised modifications was an absolute nightmare!! We tried sophisticated methods such as Time-Domain Reflectometry, but the way the systems were wired, using spur-connections to some groups of boxes, meant that TDR just did not work.

Regarding the mains supplies on board ship, these were at one time 110V DC on cargo ships and tankers, or 220V DC on larger passenger ships. The supply was theoretically balanced about 'Earth', so that a single leak or short-circuit to earth would not immediately blow any fuses – it took two faults to cause a problem! Post-WWII passenger ships often had a small 230V AC supply generated by a motor-alternator driven from the DC supply, and used to power sound-systems and other AC-only equipment. Later, all supplies went AC, which made life a lot easier, and the equipment cheaper, though depending where the ship was built, the supply voltage and frequency might be to European or to USA standards (sometimes to a weird mix of the two!!).

If readers have more information on these installations I'd be interested to hear their tales.

On some ships lesser passengers had to make do with a loudspeaker with a volume control and a couple of selectable 'channels' bringing piped music and public announcements into their cabins. These speakers were driven by power amplifiers located in the ship's radio room.

The 870/870A Power Supply

Having previously mentioned that the power supply was 'universal' it's worth looking at its design in a little more detail, and highlighting the differences from more conventional domestic radios of its time. When I first encountered an Eddystone AC/DC power supply, on an 840C, I was surprised because you don't normally find such an arrangement on a radio with lots of exposed metalwork. Normally great care is taken to ensure that the user can't come into contact with exposed metal, which these Eddystone sets have in abundance, so it's worth exploring what is different about the Eddystone design.

In Reference 4 Gerry O'Hara answers the $64,000 question: 'Why on earth would a company with Eddystone's philosophy on manufacturing premium-quality sets produce several lines of AC/DC sets for over two decades? - this type of set usually being considered to be the bottom rung of the radio quality ladder'.

The thinking behind the development of radios capable of running from AC or DC mains were: firstly, cost: the mains transformer was probably the most expensive single component in a radio set; secondly, weight: the weight of a mains transformer can be considerable; thirdly, size: the mains transformer is a bulky item and would have meant a larger case for the 870; and finally, the availability of AC mains: many locations still had DC power supplies. All these reasons were equally valid for the hundreds of thousands of AC/DC domestic radios produced during this period. Also, more significantly for the target market of the Eddystone radio, many ships had DC supplies.

On DC mains (of 110V or 220V) the set won't work if the mains lead is connected the wrong way round, because of the operation of the rectifier valve. However on AC mains it will work whichever way round the mains is connected, though the Instruction Manual states that 'one method of connection may result in a hum appearing at the output'. This clearly doesn't seem to be a reliable way of telling whether the supply is the wrong way round, and therefore the circuit has to be designed to be inherently safe.

The way this is achieved is by isolating the metal chassis from the metal cabinet: the chassis can become 'live' by the mains lead being connected the wrong way round, but the cabinet still remains safe to touch, and in fact connected to earth if a three-pin plug is fitted. See the bottom left hand corner of the schematic shown in Figure 7 for how the cabinet appears on the circuit as a separate entity from the chassis.

Looking carefully into an 870 or 870A you can see the techniques the designers used to ensure that the chassis was electrically isolated from the cabinet, specifically: installing a paxolin rear panel. The power socket, voltage selector and the aerial/ground connections are mounted on this panel; placing a strip of paxolin under the metal plate supporting the fuseholders to one side of the chassis; installing two paxolin insulating washers on the opposite side of the chassis (see Figure 11), and; ensuring that the control knob shafts did not contact the front panel by use of nylon bushes, and insulating the shafts from the users' fingers by the use of plastic control knobs.

Again, different from how most AC/DC set manufacturers designed their power supplies the 870/870A power supply includes a smoothing choke, rather than a cheaper resistor, between the smoothing capacitors in C48's can. Of course all this sophistication costs money, hence the higher selling price of the 870 in 1956, compared to other AC/DC radios.

Mains-borne interference could be a major headache on board a ship where the electrical machinery could induce various forms of noise into the mains distribution cables. The 870 and 870A were designed to reject this sort of noise by use of series chokes (CH1 on the schematic) and a shunt capacitor C34 in the mains live and neutral circuits. Figure 12 shows the size and quality of the choke. According to the instruction manual 'measures have been taken to reduce mains-borne interference to a minimum, and long, reliable service can be expected in any climate'. For use in installations where mains-borne interference was too excessive for the internal filter arrangements the Eddystone Mains Filter Unit catalogue No.732 was available.

Webb's Advert and the Competition

Figure 13 shows the Webb's advert for the 'small in size – mighty in performance' 870 from Wireless World for November 1957. The price is £34.16.0 including purchase tax. How did this price compare with its contemporaries? That's not an easy question to answer: who else offered a robust metal-cased radio when many manufacturers had moved to plastic or Bakelite for their AC/DC sets: who else offered two short wave bands when the trend was to remove short wave bands and add the new VHF-FM band? Assuming a compromise in construction quality and frequency coverage could be accepted my estimate is that a competitor's radio would probably have cost about half what the 870 cost.

Modern Communal Aerial Systems

The problems of operating radios on ships haven't changed over the years, except that no doubt today's passengers also expect satellite TV, films on demand, internet access, and so on, in their cabins. I Googled 'communal aerial systems ships radios' and found many hits describing modern systems which solve this problem. One company is the Marine Radio Co Ltd of Korea which makes communal aerial systems for MF/HF/SW and VHF (for FM radio) and UHF TV.

The Eddystone User Group

Much of the information for this article comes from the Eddystone User Group's (EUG) website at: http://www.eddystoneusergroup.org.uk/. The EUG keeps the name of this great British company alive, and their website is an extensive source of information on the history of the company and the Eddystone sets and components it produced. Scanned copies of the Eddystone catalogues and radio manuals referred to here are available on this website.

Between 1990 and 2006 the EUG published 96 issues of a newsletter (latterly called the Lighthouse). Each issue of the newsletter tended to feature a particular Eddystone radio and included many articles on the 870 and 870A over the years. A full scanned set of these newsletters can be found on the EUG website.

Conclusions

The Eddystone 870 and 870A radios are very neat and useful sets dating originally from the mid-1950s, and were available in bright colours. According to Eddystone records around 3,000 870s and 4,000 870As were built up to the end of production in 1966. These relatively modest volumes indicate to me that the goal to achieve sales in domestic use as a 'midget receiver' was not realised, presumably because of the cost of the set compared to those of inferior quality from the competition.

870s and 870As regularly come up for sale at reasonable prices on eBay and at vintage radio auctions and are worth investing in as you can be pretty sure they will maintain their value. Their 'universal' power supplies were designed to give the sets appeal to those still on DC mains, the US market on 117V AC (and DC) and on board ships, where Stratton & Co also had a role in supplying the 'radio room' with high quality communications equipment (see Reference 5).

It would have been great to include a picture of an 870 or 870A actually in a passenger's cabin on some liner of the 1950s or 1960s. Sadly I have not achieved this as photographs of the inside of passengers' cabins seem to be very rare. Most official photos which survive were of the communal areas, such as the lounges and dining rooms.

A look at various cruise operators' websites generally shows in-cabin TV and radio, and 230V UK-style 3-pin and 110V US-style 2-pin socket. I suppose you could smuggle your 870 or 870A on board for your next cruise and re-live the past by listening to the world after connecting up a length of wire for an aerial.

References

Reference 1: Details of the short wave broadcast bands can be found at: http://www.hamuniverse.com/shortwavebands.html

Reference 2: More details of solar cycle 19 can be found at: http://en.wikipedia.org/wiki/Solar_cycle_19 and http://www.solen.info/solar/cycl19.html

Reference 3: 'A Lifetime in Radio – A Personal History' by Geoff Arnold. Published in 2004 by Wimborne Publishing Ltd).

Reference 4: 'Technical Shorts – AC/DC Set Lore' by Gerry O'Hara. A comprehensive treatise on AC/DC power supplies, available on the EUG website.

Reference 5: 'Eddystone Radio and the Queen Mary' by Graeme Wormald, G3GGL. Radio Bygones No. 104, Christmas 2006. Describes how the IMR.54 / Eddystone 700 receiver was developed for use in the RMS Queen Mary's radio room.

Other Useful References
Gerry O'Hara, G8GUH / VE7GUH, has written extensively about the 870/870A series of radios. Links to these articles can be found on the EUG website. Some of Gerry's writings are:

'Little Blue Boy – Fixing-up an Eddystone S.870'. Gerry describes the restoration of a grey 870 which he repainted in blue - one of the 'prototype colours' that didn't make it to production.

An Eddystone 'Cabin Set' – or the 'Neat Case' of the S.870/S.870A Series'. A detailed history and technical analysis of the 870 and 870A.

'The Lonely Receiver (Christmas Tale)'. A 'tongue in cheek' story of the rescue from a skip of an 870A and its restoration.

'The Eddystone 870 and the 19AQ5 Valve' by Peter Lankshear. Published in the Lighthouse issue 92, August 2005.

'The Eddystone Dial Drive Mechanism and Gear Box'. A detailed description of the mechanics of the drive/dial mechanisms fitted to many Eddystone sets.

A Stratton catalogue featuring the 680X, 750, 840A, 820 and 870 can be found on the EUG website.

'The Eddystone Ultimate Reference Guide', available on the EUG website, is a comprehensive guide to all Eddystone radios.

'Wireless on the RMS Queen Mary' by Geoff Arnold. Radio Bygones No. 16, April/May 1992. Describes the pre-WWII fitting out of the RMS Queen Mary's radio room, and her large array of aerials.

The £64,900 Enigma

Exceptional results for 'Technical Antiques & Toys' in Cologne, Germany: The legendary 'Enigma' ciphering machine from 1938, which influenced WWII dramatically, was the top lot at Auction Team Breker's Spring sale of vintage Science, Technology & Toys on Saturday 26 May 2012.

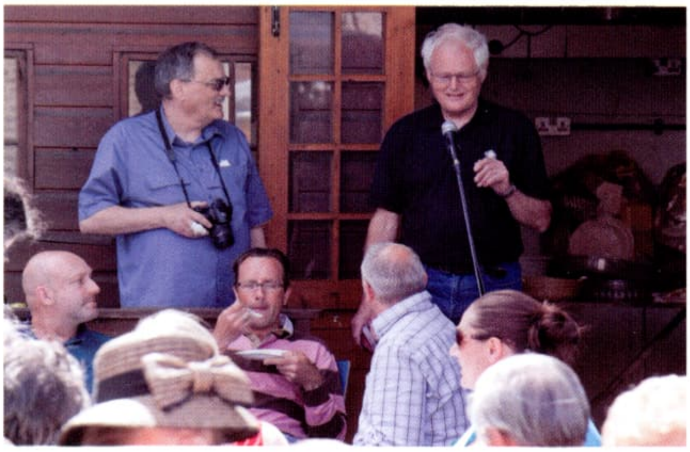
The iconic three-rotor machine, patented by Dr. Arthur Scherbius and built by Chiffriermaschinen A.G. Heimsoeth und Rinke of Berlin, sold as Lot #14 to a private buyer for £64,900, over ten times the published reserve and one of the highest prices ever paid for an 'Enigma' machine at auction. So complex are the Enigma's 22 billion possible combinations, an original prospectus claimed, that it would take one man working continuously day and night, and trying a different cipher-key every minute, 42,000 years to exhaust all the possibilities.

Auction Team Breker
Otto-Hahn-Str. 10
50997 Koeln / Germany

Garden party June 9th at the British Vintage Wireless and Television Museum

photographed by Carl Glover

The 'New Foxtrot Serenaders'



These should last for 'decades' to come!

Replica Ekco A22T (A22 export model)

by Robert Darwent

I first became aware of the existence of the Ekco A22T whilst carrying out research into the different types of dial used on the A22 model a couple of years ago. More recently, my thoughts again returned to this rare export model when I fortuitously acquired a semi-complete A22 chassis and the feasibilty of making a replica version became a much more realistic proposition.

Figure 1: an original brown and bronze A22T

Figure 2: an original black and chrome A22T

Those who have read some of my earlier articles in The Bulletin will not be surprised to learn that I am very keen on the 'round' Ekco's. So much so, that gradually over time not only have I acquired examples of complete models, but have also amassed various useful bits and pieces from the sets as well.

For the A22 model in particular these spares included a walnut brown bakelite case, a couple of back covers, and several control knobs. These parts would finally be utilised to good effect during the course of this project.

In common with all export sets, the model dispenses with the long wave band in favour of additional short wave ranges. Specifically, the wavebands offered on the A22T are - medium wave (M) 550-1550 kHz and two short wave bands, (S2) 3.0-8.5 MHz and (S1) 8.5-23.0 MHz.

Therefore, to successfully build a replica not only would I have to reproduce the correct dial used by the A22T, but calculate and wind the appropriate short wave aerial/oscillator coils required, then carry out a complete rebuild of the coil-pack/band-switching section in order to offer the correct wavebands.

Other than those two major differences, the A22T is virtually identical to the standard A22 model (Figs.1 & 2). The only further minor difference of note, is the additional voltage tap selections found on the mains transformer.

Creating the dial

The dials are such a prominent and attractive feature of the A22 models that without being able to produce a satisfactory reproduction, proceeding with the rest of the project was somewhat pointless. After extensive searches of the internet, I eventually found several images of the A22T suitable to work from.

An auction listing showing a complete image of an original A22T, along with the others accompanying it showing magnified sections of the dial, proved most useful. I was able to combine the segmented images into a collage of an almost complete dial face, good enough to obtain the detail I required to begin attempting a reproduction artwork.

I also came across the website of radio amateur, PY3 CNQ and his Brazil Museum of Radio - Radios Antigos (Ref.1) which has a series of images of the A22T model. Unfortunately too small in size and resolution to be really helpful with anything except overall appearance, but very useful nevertheless.

With reference to my earlier Reproduction Ekco Dials article (Ref.2), I set about producing a reproduction A22T dial using exactly the same techniques and methods I outlined there. I will however, be expanding on that information showing the various steps involved in greater detail that are required to create such a dial from just a set of images, rather than from a scan of an original.

Despite only having a limited number of A22T dial images to work with I could still place the dial legends and details fairly accurately. This was achieved by loading the dial face collage into my graphics software and noting the X,Y co-ordinates of all the major detail; frequency markers, station name positions, and so on.

From this co-ordinate information, and by already knowing the co-ordinates of the exact centre of the dial, I could calculate using trigonometry the angular position of all the dial details to transfer to my reproduction. At this point I assigned an arbitrary colour to each waveband legend, in this case black for MW, red for S2 and green for S1.

The exact shades are not important at this stage, when the artwork is complete the legend colours and the background shade can be varied independently of each other to achieve an acceptable visual colour match that approximates the colours of the original dial.

The reproduction dial artwork is basically created in a series of steps, with each of the main steps broken down further into several sub-steps. Essentially adding layers of detail, a little at a time, until the final artwork is eventually produced (Fig.3 to 10).

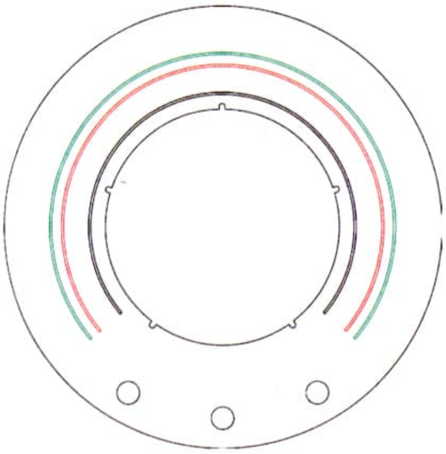


Figure 3: Step 1

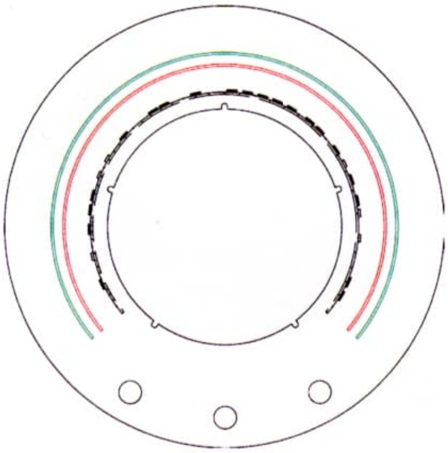


Figure 4: Step 2

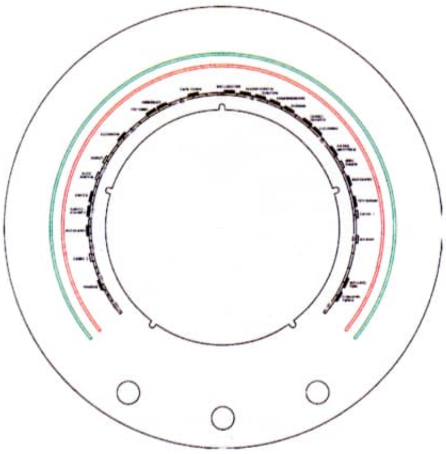


Figure 5: Step 3

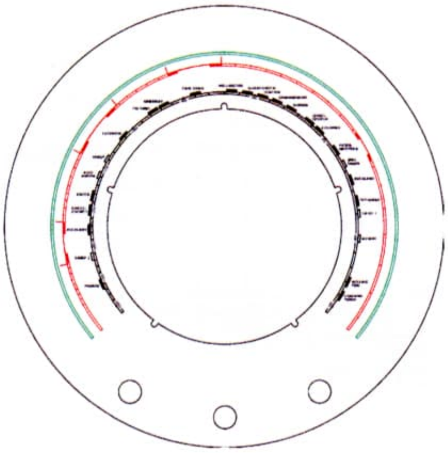


Figure 6: Step 4

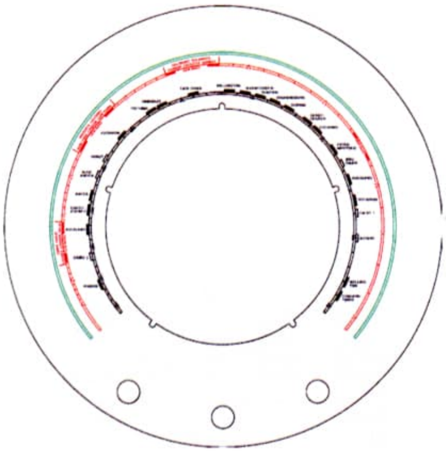


Figure 7: Step 5

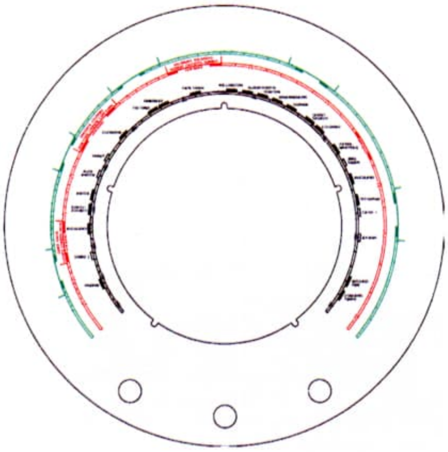


Figure 8: Step 6

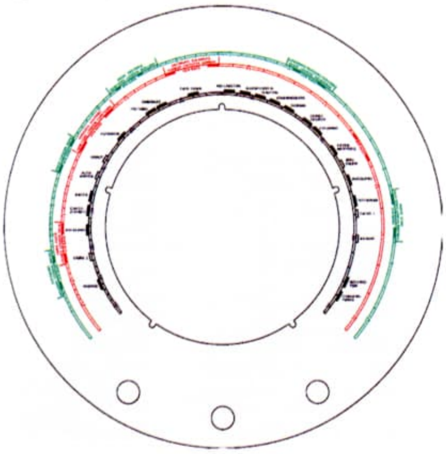


Figure 9: Step 7

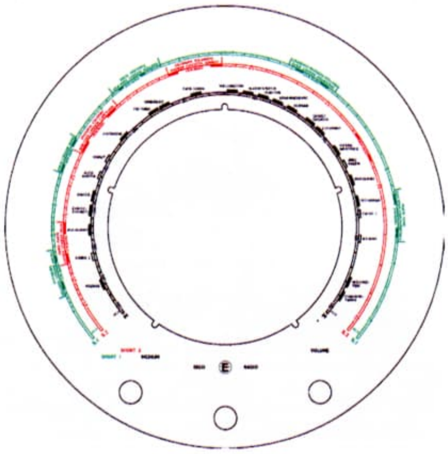


Figure 10: Step 8

Colour–matching the dial

With the detail of the artwork complete, the legend colours and background shade now require modifying to visually approximate those used in an original dial. This introduces the problem of colour variation. It will be appreciated that the exact colour shades displayed by one computer monitor will vary with respect to another. In the same way, the actual colours that are printed by a particular printer will similarly vary with respect to those shown by a monitor.

In order to achieve the correct colour values required I first printed several colour

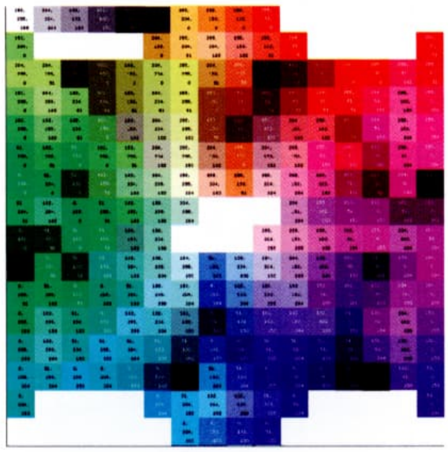


Figure 11: Colour swatch

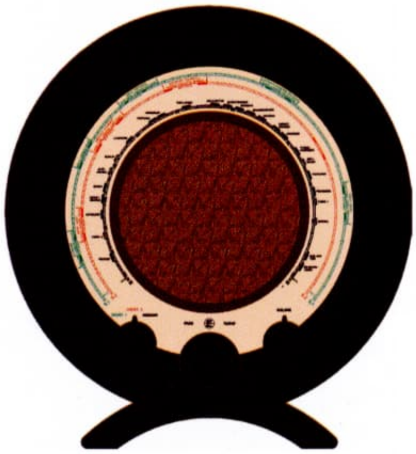


Figure 12: Virtual A22 for testing dial background colours

swatches (Fig.11). Each square of colour has its RGB values printed on it, and when printed by your printer will give you a permanent reference chart so you can determine exactly how your own printer will produce a specific colour combination. It is necessary to print on exactly the same sort of paper and with the same printer settings as those intended to print the artworks with or the resulting colour chart will be invalid.

The problem of colour-matching is not only confined to the differences between what a particular monitor displays and what a particular printer actually produces. The human eye perceives colour hue and saturation differently in response to contrast.

Put in terms of colour matching a reproduction dial, if a dial artwork is viewed

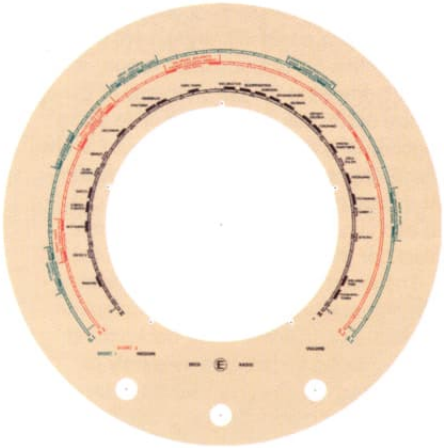


Figure 13: colour matched artwork

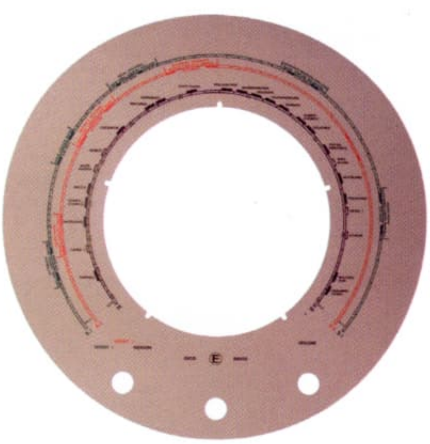


Figure 14: reproduction dial printed

S1 band		Aerial		Oscillator	
Inductor L		0.716 uH		0.646 uH	
Tracker C_T		40.43 pF		45.25 pF	
Padder C_P		none		none	
Dial kHz	Cv pF	Calc. kHz	Error %	Calc. kHz	Error %
limit	451.7	8394		8795	
8500	433.5	8550	+0.58	8957	−0.08
9000	381.0	9035	+0.61	9481	+0.16
10000	300.9	10035	+0.34	10493	+0.26
11000	243.0	10980	−0.17	11466	+0.00
12000	197.2	11953	−0.39	12463	−0.01
13000	160.6	12948	−0.40	13478	+0.09
14000	131.8	13933	−0.47	14479	+0.09
15000	108.5	14920	−0.53	15474	+0.06
16000	89.2	15918	−0.51	16476	+0.06
17000	73.2	16916	−0.49	17472	+0.03
18000	60.0	17899	−0.56	18445	−0.10
19000	48.8	18882	−0.62	19413	−0.26
20000	38.9	19901	−0.49	20408	−0.27
21000	30.3	20934	−0.31	21409	−0.26
22000	22.6	22010	+0.04	22443	−0.09
23000	15.6	23147	+0.63	23525	+0.25
limit	10.7	24057		24384	

Figure 15: S1 band table

S2 band		Aerial		Oscillator	
Inductor L		5.792 uH		4.895 uH	
Tracker C_T		34.17 pF		39.62 pF	
Padder C_P		none		3400 pF	
Dial kHz	Cv pF	Calc. kHz	Error %	Calc. kHz	Error %
limit	451.0	2972		3434	
3000	437.8	3012	+0.40	3475	+0.27
3500	313.5	3497	−0.09	3961	−0.11
4000	231.4	3984	−0.40	4453	−0.27
4500	172.2	4496	−0.09	4971	+0.12
5000	130.9	4998	−0.03	5479	+0.25
5500	101.0	5489	−0.20	5973	+0.13
6000	77.4	5998	−0.03	6483	+0.27
6500	59.7	6489	−0.17	6971	+0.07
7000	45.6	6980	−0.28	7454	−0.14
7500	33.3	7513	+0.17	7974	+0.10
8000	24.0	8010	+0.12	8451	−0.16
8500	16.0	8525	+0.29	8942	−0.26
limit	10.8	8920		9311	

Figure16: S2 band table

Figure17: Coil winding

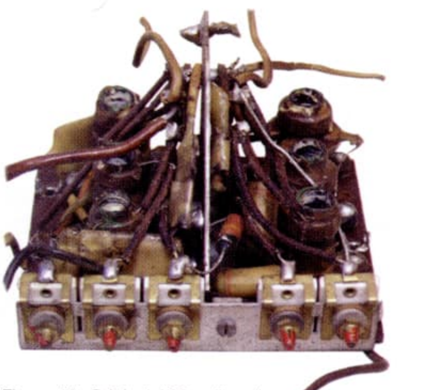


Figure 18: Original A22 coil pack

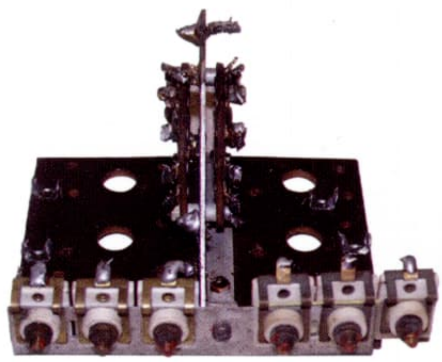


Figure 19: Stripped coil pack

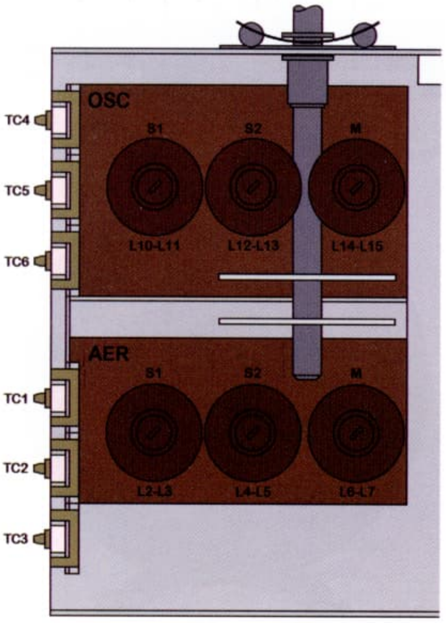


Figure 20: Layout of coil pack

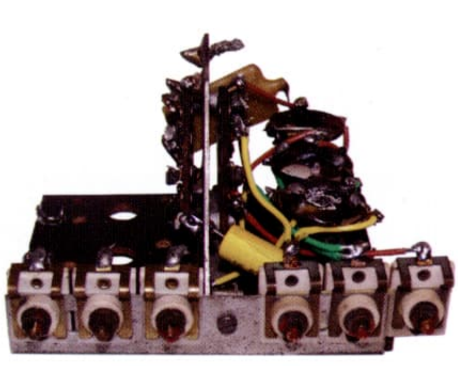


Figure 21: Rebuilding coil pack

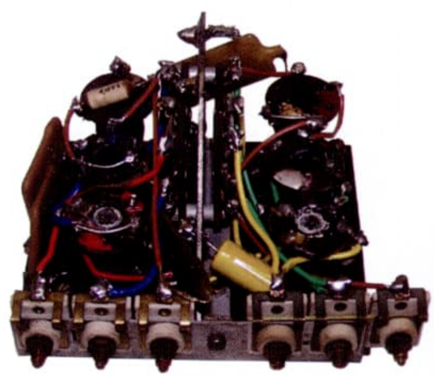


Figure 22: Finished replica A22T coil pack

against a light backdrop then the shade used for the background of the dial will appear darker than if the same artwork is viewed against a dark backdrop.

I had not realised just how striking this effect can be until I began experimenting with printing my reproduction dials a couple of years ago. Often the background shade of the artwork that came out of the printer looked too dark against the white of the photo paper I was using, until I trimmed and test fitted it into an actual bakelite case when the same dial background then looked too light.

To overcome this problem I created a graphic version of a bakelite A22 case (Fig.12) that I could test fit the artworks into 'virtually' before physically printing them out. This method is not perfect, but what it does do very well is give a close 'ball-park' figure for the RGB colour values of the required background shade. It is then a case of 'tweaking' this value until a final shade is found that is visually pleasing and acceptable (Figs.13 & 14).

Calculating the LC tank components

I began with the standard equation, found in many text books, for calculating resonant frequency from a specified inductor and capacitor. For convenience modified to accept values in kHz, pF and uH.

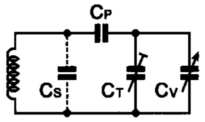
$$F = \frac{1}{2\pi\sqrt{LC}} = \frac{159155}{\sqrt{LC}}$$

However, it is not as simple as rearranging the equation and entering the upper and lower frequency limits to read off the required inductance. The range of frequencies covered in a practical LC tank circuit is determined by the capacitance ratio of the particular variable capacitor being used. This often results in the tuning band extending well outside of the required range.

Ideally what is needed is only the desired tuning band to be covered and for it to be spread out over the full rotation of the variable capacitor. Not surprisingly then, this circuit technique is termed - 'bandspreading'.

The tuned circuits commonly used in superhet designs make use of combined parallel and series bandspreading, by including a parallel 'tracker' (usually an adjustable trimmer) and a series 'padder' (usually a fixed capacitor) to modify the main variable capacitor's capacitance range.

In the generalised LC tank circuit - CV represents



$$C_{NET} = \frac{(C_V+C_T)C_P}{C_V+C_T+C_P} + C_S$$

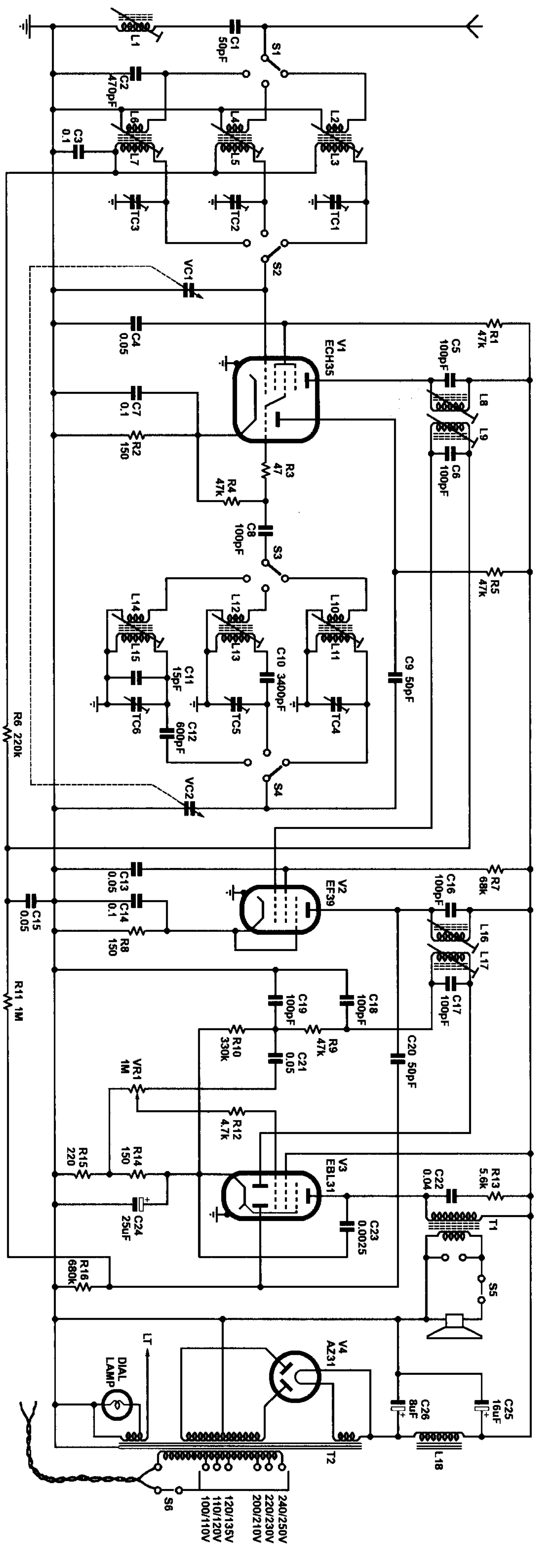
the variable capacitor, CT the tracker (trimmer), CP the padder and CS is any stray circuit capacitance present. Combining all these components gives an overall 'net' capacitance with which the inductance is tuned to resonance.

If you are interested in delving deeper into the subject of bandspreading, paying a visit to Robert Weaver's excellent website - Bob's Electron Bunker (Ref.3) is well worth your time. I referred extensively to the in-depth explanation of the mathematics involved and made use of the on-line resonance calculators available.

Normally a LC tank circuit is designed to cover a desired tuning range, once built a tuning dial is then made to tally with specific frequency points. Unfortunately, my problem was the exact opposite. I already had the dial with specific frequency points marked on it, for which I needed to design LC tank circuits to track those points with a high degree of accuracy.

To begin to solve the problem, I temporarily fitted a test print of my A22T reproduction dial to the chassis and rigged up a suitable power supply for the illuminated tuning arm. Whilst accurately placing the tuning cursor on the major frequency markers on the dial, I noted down the corresponding capacitance reading from a digital LC meter I had connected across the main tuning capacitor. Repeating this procedure for both short wave ranges, I obtained the specific capacitance value that produced a known frequency at many points across the dial.

I now needed to try, by trial and error, various values for inductance, tracker and



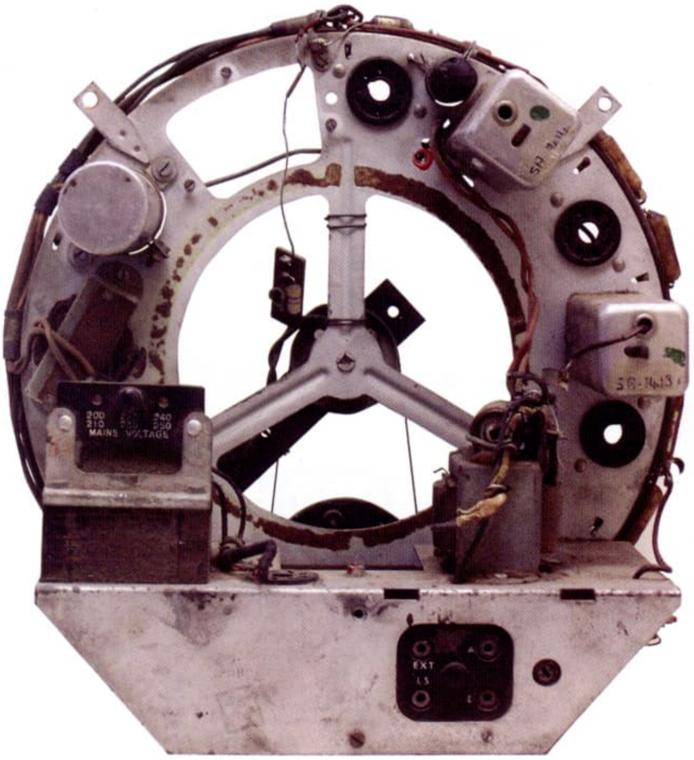


Figure 23: Untouched rear of chassis

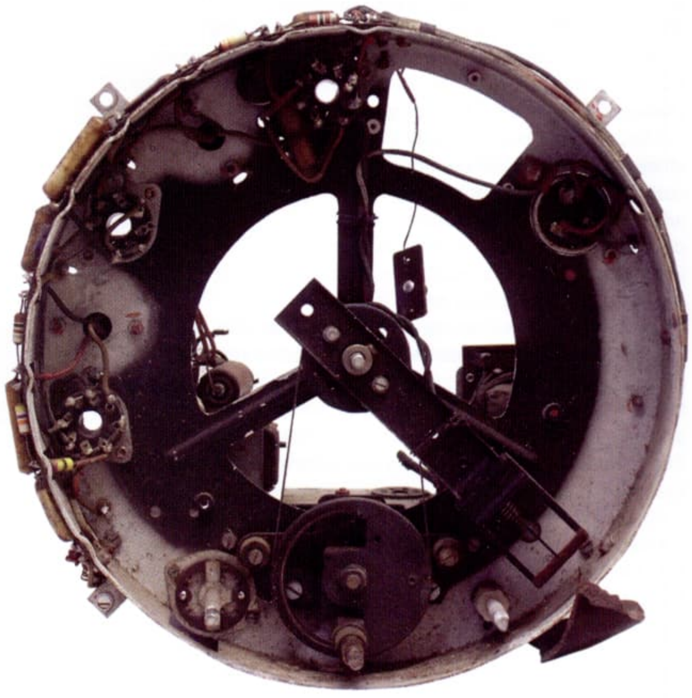


Figure 24: Untouched front of chassis

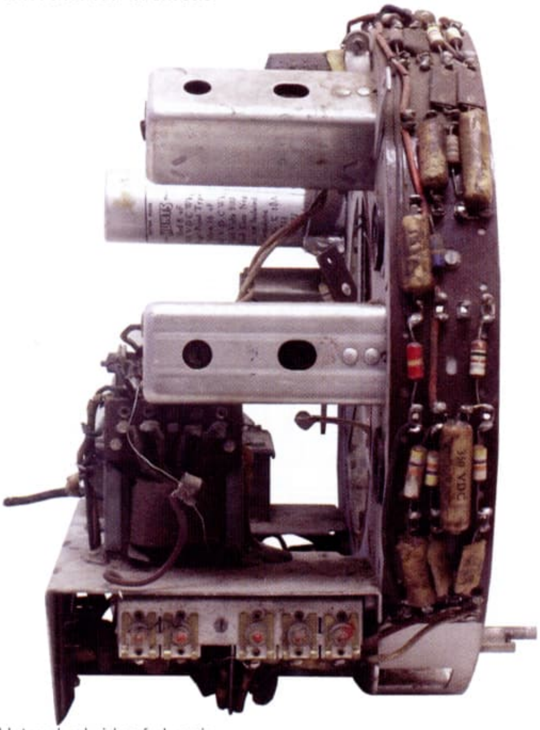


Figure 25: Untouched side of chassis

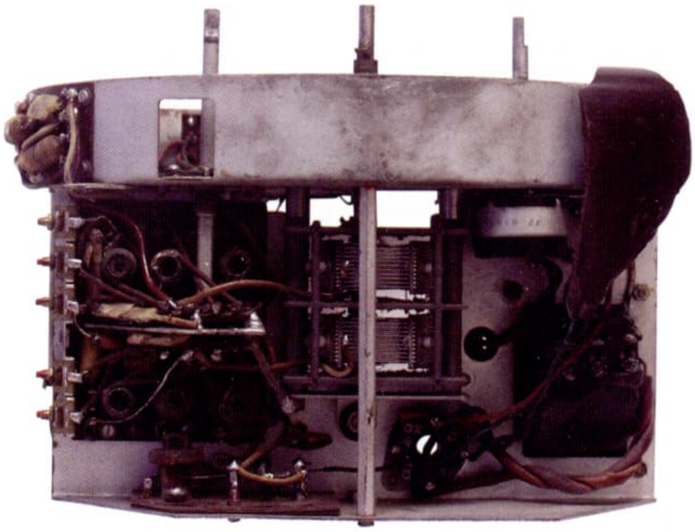


Figure 26: Untouched bottom of chassis

padder that best matched all of the required frequency points as accurately as possible using the previously stated equations. It will be appreciated that many combinations of values needed to be searched through. To do so by hand with only a pocket calculator would have taken a very long time, instead I wrote a small computer program to do the 'number-crunching' for me. Even so, it still took the computer several hours of continuous calculations for each short wave range to arrive at the best match having the lowest error difference between required frequency and calculated frequency.

Surprisingly, the final values found produced a maximum error of a fraction of one percent across all required frequency points for both aerial and oscillator tank circuits on both short wave ranges. More than accurate enough for my purposes, even allowing for the inevitable errors involved in positioning the tuning arm accurately on a dial frequency point and in the accuracy of measurement of capacitance by the LC meter. The final results are presented in tabular form (Fig.15 & 16).

Note; in both tables the calculated frequency values under the 'Oscillator' heading are higher than the specified 'Dial' frequency points or the calculated frequency values under the 'Aerial' heading due to the addition of the 465 kHz intermediate frequency.

At first glance some of those frequency errors may seem quite large, for example; the largest error on the S1 Aerial table is at the 23000 kHz point which actually comes out at 23147 kHz in the calculations. In reality the 147 kHz difference amounts to no more than the thickness of the tuning pointer shadow produced by the illuminated tuning arm, so more than acceptable in practice.

Winding the SW coils

Fortunately I had a head start when it came to making the four 'new' coils required. I already had many reclaimed parts from stripped down Ekco A23 and A28 sets, the A28 chassis in particular was most useful having several bandspread short wave ranges and sixteen coils in its coil-pack. The coils are of the same overall size and shape as those used in the A22, so it was possible to use some of those as

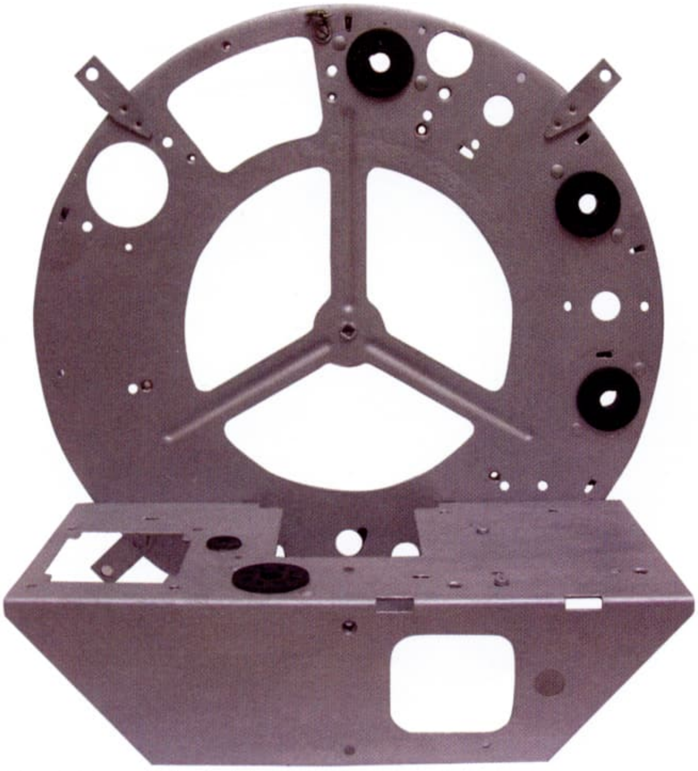


Figure 27: Rear of chassis during restoration

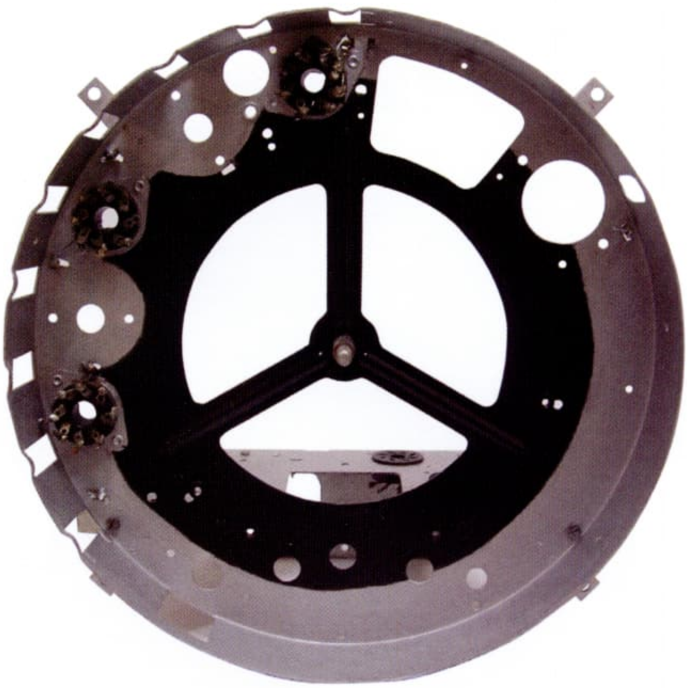


Figure 28: Front of chassis during restoration

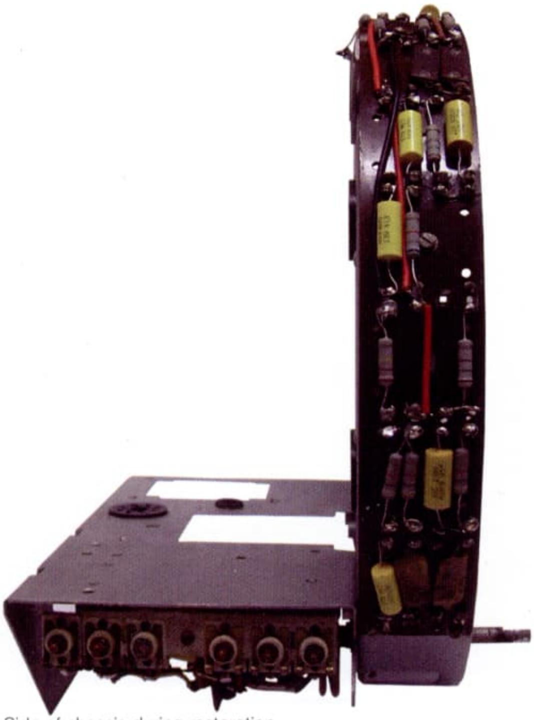


Figure 29: Side of chassis during restoration

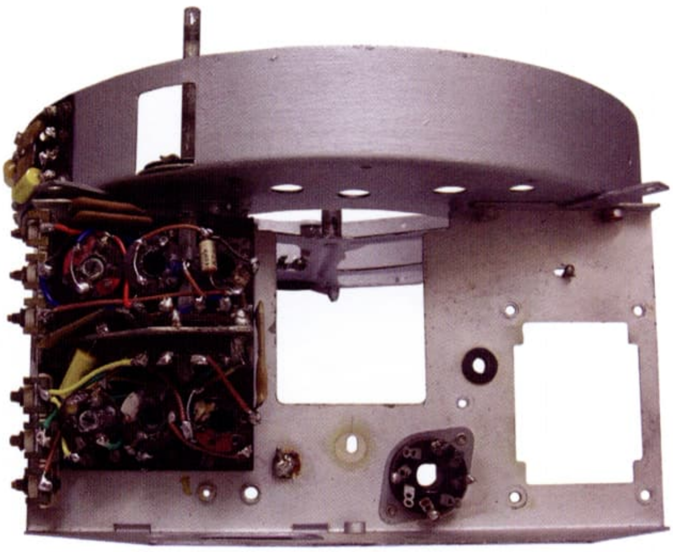
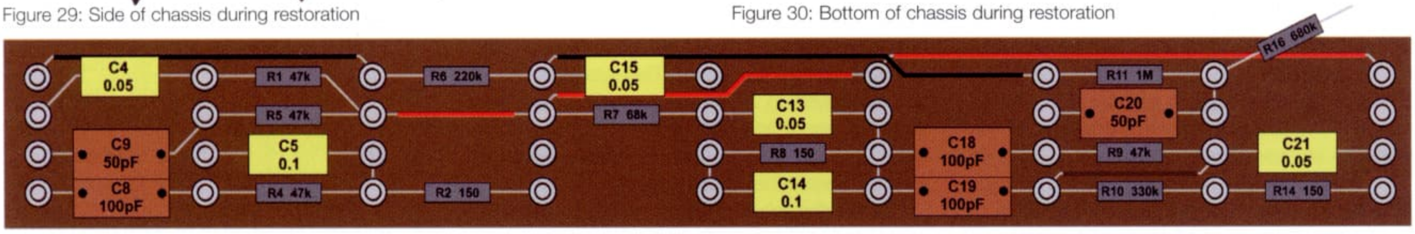


Figure 30: Bottom of chassis during restoration



Component layout on the tag-board

'donor' coils rather than start completely from scratch with a bare coil former.

I found three donor coils that gave the inductance values I had calculated simply by rotating the alignment slug in or out, the value needed being comfortably within the coil's existing range. For the fourth, the best match I had was a donor coil that was slightly higher in inductance, but by removing a couple of turns of wire from its winding I brought the value down into the required range.

It was a simple matter to remove most of the wax sealing the coil winding with a soldering iron, unsolder one end and take off a couple of turns. I was careful to ensure that enough wax was left on the winding to keep the other turns firmly in place whilst carrying out this operation.

Each of the four coils now needed a coupling winding adding over the main inductance winding. From unwinding a spare coil, I determined that this coupling winding consisted of approximately five to six turns evenly spaced on top of the main winding.

Using a similar gauge enameled copper wire, I carefully added this coupling winding. Each end of the winding was terminated

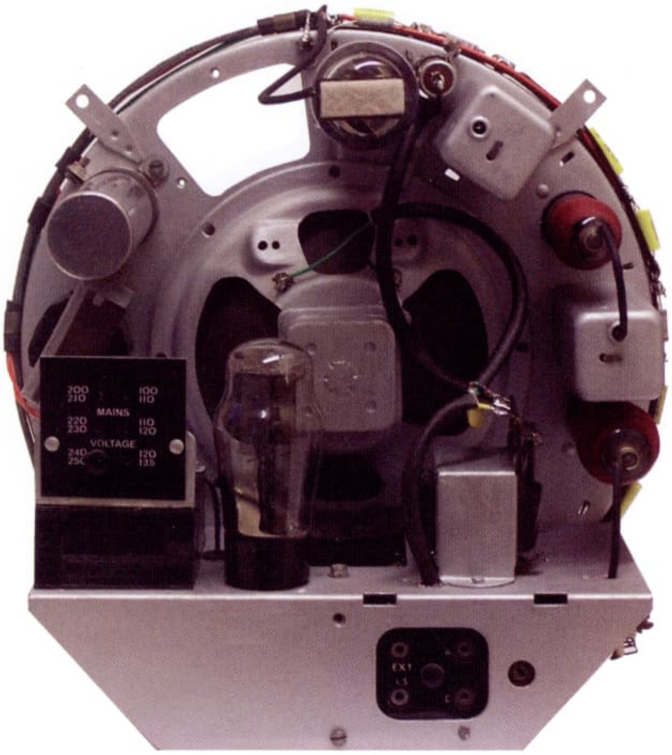


Figure 31: Completed rear of chassis

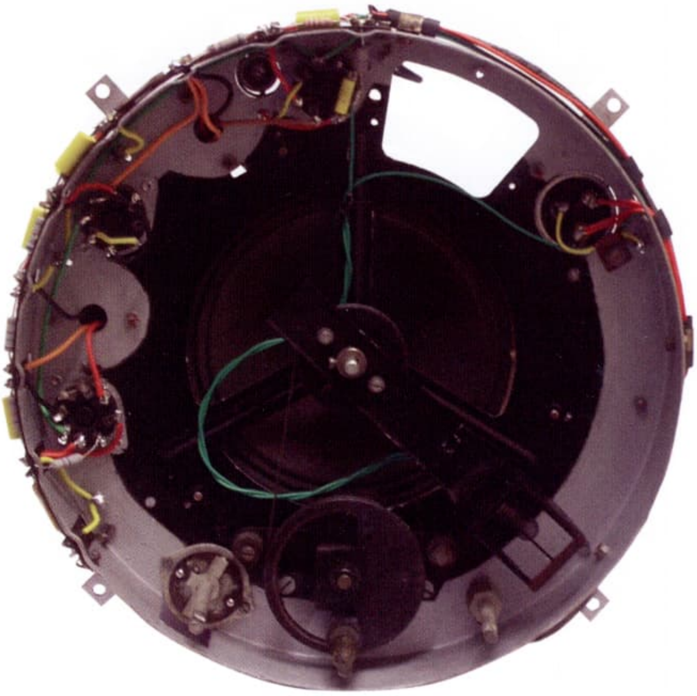


Figure 32: Completed front of chassis

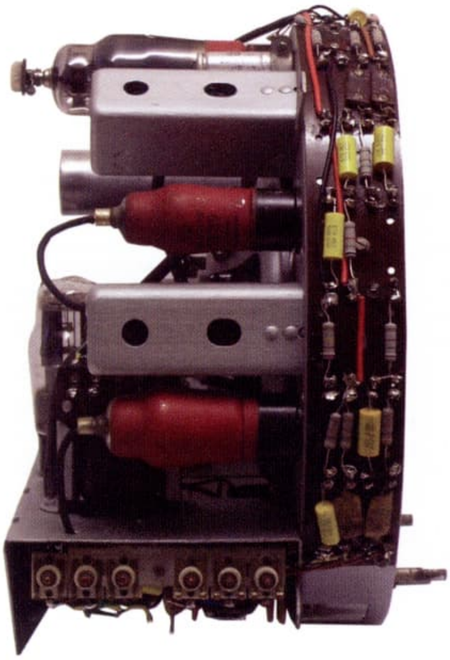


Figure 33: Completed side of chassis

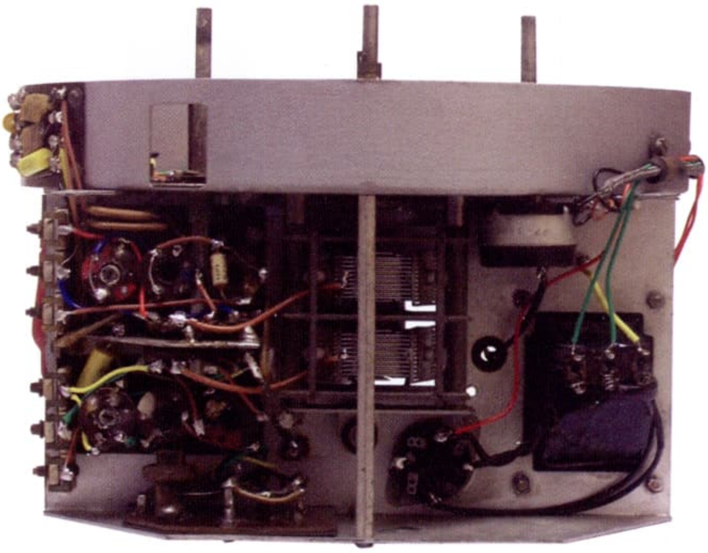


Figure 34: Completed bottom of chassis

by feeding through unused holes in the top of the former (Fig.17). After securing the ends to solder-tags to provide a connection point, the coil was resealed with wax to keep everything stable.

Rebuilding the coil-pack

Next came the task of stripping the existing A22 coil-pack (Fig.18). After careful removal of all the components I added an extra trimmer capacitor to the stripped board (Fig.19). This was necessary due to all three coils in the aerial section requiring a tracking trimmer. As the coil-pack in an original A22T also has this sixth trimmer, I adopted the same layout (Fig.20).

I found that I could modify the mounting arrangement used by the group of two existing trimmers

to securely hold it in place. This leaves the trimmer standing a few millimetres higher than the others and off of the end of the board, but since its fixing was mechanically sound I considered it acceptable.

I began the rebuild with the slightly less complicated 'Aerial' side of the board, adding the three coils one at a time and soldering the required connections between the bank of trimmers running down the side and the band-switching wafer mounted in the middle (Fig.21).

Continuing in similar fashion, I rebuilt the 'Oscillator' side of the coil-pack. This section was more difficult due to having to accommodate the additional large padder capacitors in the limited space available.

Note: the two large 6800 pF 1% mica capacitors on the left hand edge. These are connected in series to make-up the calculated 3400 pF padder value required for the S2 oscillator range (Fig.22).

I should add that none of the original coils and padder capacitors were used in the rebuild and have been carefully saved, even the medium wave coils used were reclaimed components. Therefore, these coil-pack modifications are completely reversible should it be so desired.

Chassis restoration

As stated earlier, the A22 chassis which forms the basis of this project was acquired semi-complete. Most notably it

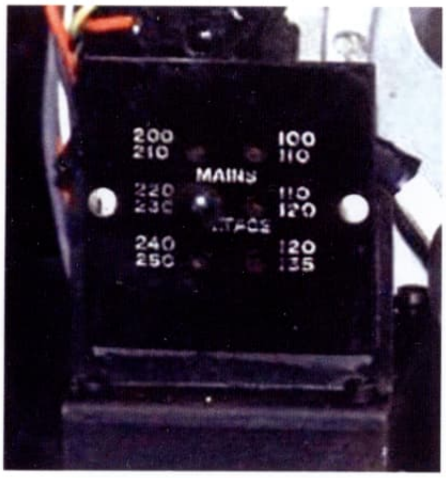


Figure 35: Original A22T voltage selector

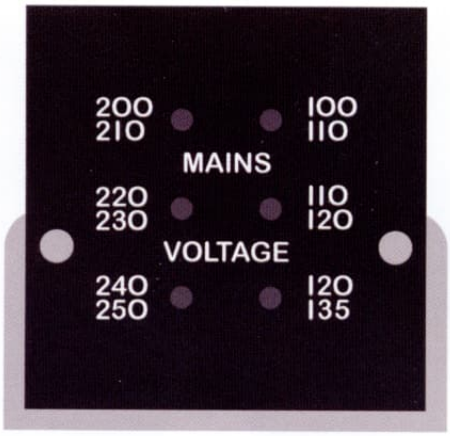


Figure 36: Graphic of A22T voltage selector

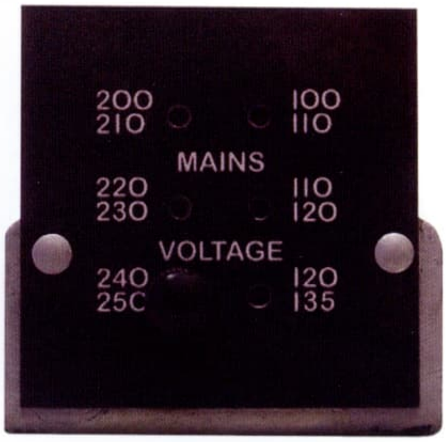


Figure 37: Reproduction A22T voltage selector

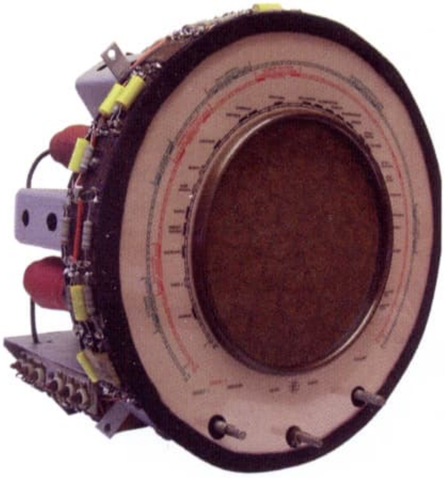


Figure 38: Reproduction dial fitted to chassis

March 1947 advertisement

was minus a dial, loudspeaker and a set of valves. However, I was fortunate that the metal trivet that mounts the dial and speaker cloth was still present. Less so with the bronze speaker ring that covers its circumference, which was absent.

Generally the chassis was dirty and the wiring had obviously seen better days, but was otherwise complete (Fig.23 to 26). It even had a chunk of its original broken bakelite case still attached!

I adopted the same approach that I followed in my Ekco A22 rebuild article (Ref.4), which was to completely strip the chassis and undertake a full restoration. All the important wiring connections were first labeled and marked for each of the major components before they were removed.

Working steadily and methodically in this way, I quickly had the chassis completely stripped whilst being certain of exactly how everything was originally connected.

I could now begin the task of cleaning and painting the two major sections of the chassis. After a thorough clean and the removal of any flaking original paint, each part received a coat of silver or black smoothrite paint, as appropriate (Fig.27 & 28).

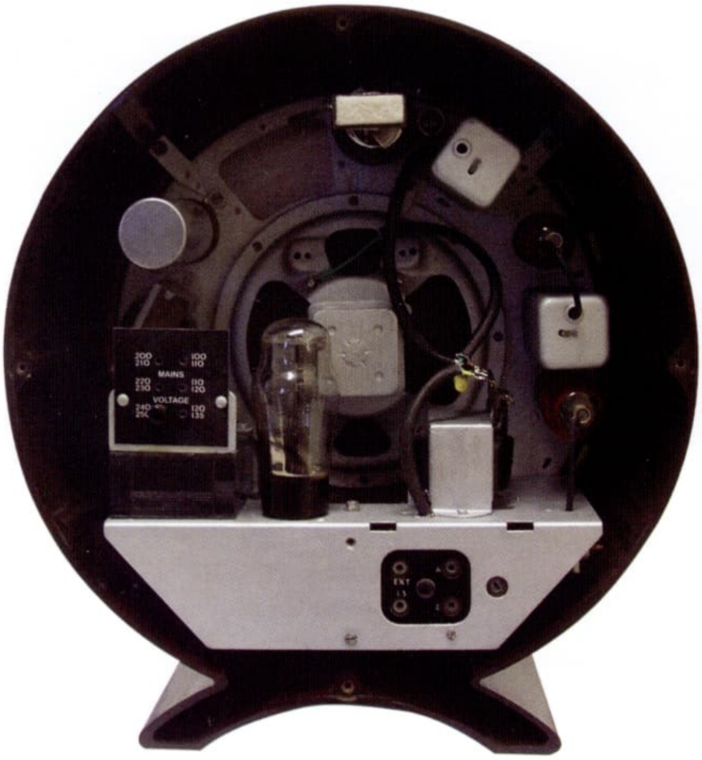
I also began the replacement of all the resistors and the wax type capacitors used on the tag-board that attaches around the edge of the circular chassis. Renewing with modern 2W carbon resistors because of their similar dimensions to the originals, and yellow 630V rated polypropylene capacitors (Fig.29).

An unforeseen problem was encountered when I attached the rebuilt coil-pack board and tried to insert the band-switching spindle. I found that the medium wave oscillator coil was fouling the clean rotation of the spindle (Fig.30 - upper right with the capacitor across it).

After a number of attempts at repositioning the coil and wiring, I eventually solved the problem by the inclusion of several small washers under the two mounting bolts that secure it. The washers raised the height of the coil a few millimetres which proved just enough to clear the spindle.

Continuing, I renewed all the wiring between the major components mounted on the circular chassis and the tag-board and then fully rebuilt the chassis (Fig.31 to 34).

Fortunately, the original screening



braid which carries the wiring between the tag-board and volume control was in good condition and could be reused, it was just a case of carefully threading the new wiring along its hollow centre.

Regarding a replacement for the missing loudspeaker. I was fortunate to already have a 6.5 inch diameter, 3 ohm speaker amongst my previously mentioned spares. Although not from an A22, it originally came from a related Ekco model, it was exactly the type required.

> Although not necessary in terms of making the set work, I felt the cosmetic modifications worthwhile.

The bronze speaker ring was more problematical. I didn't have one and a number of possible solutions were contemplated during the course of the several months this project took to complete. None proved really satisfactory, then quite unexpectedly an original bronze A22 ring was listed and purchased via eBay. The final missing piece of the jigsaw had been found!

Modifying the mains transformer

A standard A22 has three tapping points on its mains transformer to select different voltage ranges, the A22T being an export set has an additional three. The body and size of the two types of transformer are identical, the A22T just has a much larger voltage selector panel fitted.

Obviously I couldn't replicate the additional three lower voltage tappings, but I could replicate the appearance by making an appropriate reproduction A22T voltage selector fascia and fitting the existing A22 selector panel to its rear.

This would involve extending the existing wires between the transformer winding and the selector panel and rotating the selector itself from the horizontal and refitting vertically in the centre of the new fascia.

The reproduction voltage selector consisted of two parts, the existing paxolin panel which the tap selector was attached to and a graphic of the A22T selector fascia, printed and laminated several times to achieve an appropriate thickness, fitted in front.

The 'U' shaped metal bracket that forms the front of the transformer, mounting the selector panel with two rivets, had to be fitted the opposite way around in order to provide the clearance required from the transformer windings.

The rivets were carefully released using a modellers drill and a burr tool. This enabled them to be reused to secure the new selector panel. Observant readers will note that they have been refitted a little lower and should actually be in-line with the middle voltage taps. This was a necessary compromise due to the 'U' bracket used being approximately a quarter of an inch shorter in height than the one used in an original A22T (Fig.35 to 37).

Although not necessary in terms of making the set work, I felt the cosmetic modifications worthwhile. The voltage selector panel along with the dial are the only two things that visually differentiate the A22T from the A22, so I thought it important to try and reproduce them both for the sake of authenticity.

Initial testing

The time had finally arrived to switch the set on! After double-checking everything I connected a temporary aerial and applied power via a lamp limiter with the set switched to the medium wave range. No indications of anything amiss from the lamp and twenty seconds or so later I'd got a definite background hiss from the loudspeaker. Switching out the limiter and tuning around brought in several stations loud and clear.

I'd expected this of course, or rather hoped. The cores of the medium wave coils and the two IF transformers had been untouched, so providing my component and wiring renewal was carried out correctly the set should have worked on this band. But what of the two 'new' short wave ranges.

Trying the S2 range first produced little until I reached the 10 o'clock position on the dial, when suddenly a foreign language station came booming out of the loudspeaker! Further careful tuning found several fainter stations as well. Switching to the S1 range produced very similar results. Clearly both ranges were working, which was something of a success in itself. Whether they were in the correct band of frequencies was unclear at this point, but I was very encouraged by what had already been achieved.

Alignment

Adopting the alignment procedure outlined by Ekco in their service data for the A22 as a guide, I began with the I.F. alignment. Using a signal generator coupled to the grid (top cap) of V1 (ECH35) via a 0.1 uF capacitor, I injected a modulated signal at 465 kHz. As instructed, the set was switched to the medium wave range and the tuning capacitor was fully meshed.

I don't have an audio output meter, so the adjustments were simply gauged by ear. Working backwards from the second I.F. transformer, cores L17, L16, L9 and L8 in that order, were each peaked for maximum audio output. As expected, the I.F. alignment was pretty much perfect already and no significant adjustments needed to be made.

Next came the I.F. filter consisting of L1 and C1. Injecting a 465 kHz into the aerial socket, the core of L1 was adjusted for minimum audio output. Again the alignment was close to ideal already, as L1 had also not been disturbed.

Then the adjustments for calibrating the three tuning ranges. To begin with, the physical position of the dial needs adjusting so that when the tuning capacitor is fully meshed the shadow of the pointer on the illuminated tuning arm coincides with the calibration spot just under 'M' on the lower right of the dial. I had already ensured this was the case when fitting the dial earlier (Fig.38).

S1 range (8.5-23.0 MHz) - Dial tuned to and signal injected at 22.0 MHz, adjustment of oscillator trimmer TC4, followed by aerial trimmer TC1 - Dial tuned to and signal injected at 9.0 MHz, adjustment of the core of oscillator coil L10/11, followed by the core of aerial coil L2/3.

In the final analysis, I considered the extra effort made early on in the project was well worthwhile. It made the sense of achievement in completing this replica all the more satisfying and special.

S2 range (3.0-8.5 MHz) - Dial tuned to and signal injected at 8.0 MHz, adjustment of oscillator trimmer TC5, followed by aerial trimmer TC2 - Dial tuned to and signal injected at 3.5 MHz, adjustment of the core of oscillator coil L12/13, followed by the core of aerial coil L4/5.

MW range (550-1550 kHz) - Dial tuned to and signal injected at 1500 kHz, adjustment of oscillator trimmer TC6, followed by aerial trimmer TC3 - Dial tuned to and signal injected at 600 kHz, adjustment of the core of oscillator coil L14/15, followed by the core of aerial coil L6/7.

All the adjustments were made for maximum audio output and repeated until no further discernible improvements could be made. The medium wave range needed little adjustment because it had not been disturbed, and surprisingly the two short wave ranges were close to their optimum settings as well.

I attributed this to the fact that I had carefully adjusted the coil inductances and trimmer capacitances as accurately as I could with a digital LC meter during the rebuilding of the coil-pack board, setting them to their calculated values.

Using the signal generator to inject various frequencies on both short wave ranges confirmed that they were accurately operating within the required band of frequencies. Tracking was as good as I had hoped for, with all frequency points matching the dial markings to within a couple of widths of the tuning pointer shadow.

Conclusion

This project pushed me further than any other restoration I had previously undertaken. I broke into new ground in terms of calculating/making the coils and rebuilding the coil-pack for this set. something I hadn't even contemplated attempting before. In the final analysis, I considered the extra effort made early on in the project was well worthwhile. It made the sense of achievement in completing this replica all the more satisfying and special.

References

1. http://www.radioantigo.com.br/ekco.html
2. BVWS Bulletin, Vol.36 No.4, Winter 2011 issue
3. http://electronbunker.ca/Bandspreading.html
4. BVWS Bulletin, Vol.36 No.3, Autumn 2011 issue

The Champion Model 881 by Peter Nash

Champion Electric Corporation. One of the less well known radio manufacturers that enjoyed a few years of activity before the name vanished in the mist of mergers that beset the British radio industry in the late nineteen fifties and early nineteen sixties.

Certainly, Champion is not listed as an entrant in the 1959 catalogue for the Radio Show at Earls Court in London. Go to any swapmeet and the tables are not exactly sagging under the weight of Champion sets in the same way as they are with say, Bush or Ekco. It is a pity that the survival rate is so low despite the name. Many of their products seem to have been aimed at the budget end of the market, but a glance through the Newnes Radio and Television Servicing books informs that some radios and record reproducers boasted frills like electrostatic tweeters, bass and treble tone controls and even triple speaker systems. I think they must have been one of the last manufacturers to produce a TRF design for a medium wave receiver in the mid–fifties (model 832) and this alongside a VHF/FM adaptor (model 835). Champion produced a good range of radio equipment, but so far to my knowledge, I have only found details of one television related product. This was for a band 3 to band 1 converter unit - allowing older single–channel televisions to receive the 'new' commercial channel, ITV from 1955.

I reproduce a copy of a Champion sales leaflet from about 1954 for interest.

The subject of this article, the Champion 'Sonata' model 881 from 1958 was unearthed in a shop mainly specialising in postcards and stamps. As the proprietor remarked, the plug on the end of the mains lead was probably worth the asking price of the set. It was an unusual device which could either be used as a normal two–pin mains plug, or by twisting the outer shell, the pins would retract and a bayonet fitting emerge so that the plug could then take power from a standard light fitting.

The radio itself represents a typical, economically priced receiver of the time. It has a 6 valve AC/DC AM/FM circuit on a PCB housed in a compact rectangular wooden cabinet. Waveband coverage is MW and VHF only – this is one of a handful of receivers at the time to drop the LW band. True, the BBC's Light Programme on 1,500 metres long wave could be picked up quite well over large parts of the country, but with another outlet on 247 metres for many areas and VHF coverage gradually improving, it could have been felt that long wave coverage was superfluous. Certainly the chassis was rationalised without incorporation of LW.

> Some sensible economies are evident in the receiver build. The cabinet is walnut veneered but the veneering on the cabinet top, where it would notice more, is of a significantly superior grade to that used on the sides.

The circuit

The circuit, which is of a standard pattern, utilises the common Mullard U80 series valves. The VHF tuner is headed by double triode UCC85 acting as RF amplifier and mixer oscillator. A UCH81 follows as IF amplifier on FM and frequency changer for AM fed by a rotatable ferrite rod aerial. Pentode UF89 provides IF amplification for both systems. Triple diode triode UABC80 handles AM and FM detection, AGC voltage derivation and audio amplification. The output valve, UL84, feeds around a couple of watts of power into an 8" x 5" speaker whilst the HT is supplied by half wave rectifier UY85. The valve heaters are series fed and rated at 0.1A. Completeing the series chain is the scale lamp (MES 19v, 0.1A), a couple of thermistors and some additional resistance. Incorporation of the thermistors offers some protection against the cold switch on current surge (caused by valve heaters with a positive temperature coefficient). Also, one of the thermistors is wired across the scale lamp and is able to maintain continuity should the lamp fail. There is no provision for gram input or extension speaker but a socket has been fitted to allow connection of an external VHF aerial.

Construction

Some sensible economies are evident in the receiver build. The cabinet is walnut veneered but the veneering on the cabinet top, where it would notice more, is of a significantly superior grade to that used on the sides. Interior cabinet bracing at each side is built up of blocks which are slotted to allow the pcb which is simply slid into the cabinet and held in place by a woodscrew on each side. Another block with a protruding threaded stud is fixed to the cabinet top to provide a pivot for the rotatable ferrite rod. A perspex dial is used at a time when some others were still using glass. A hardboard base is stapled into place rather than being made removable. The speaker baffle is held in place by spring clips and the dial is fixed by chunks of rubber wedged in behind the blocks that hold the pcb. The cabinet is a little lightly built but it does borrow some rigidity from the speaker baffle and the cabinet back.

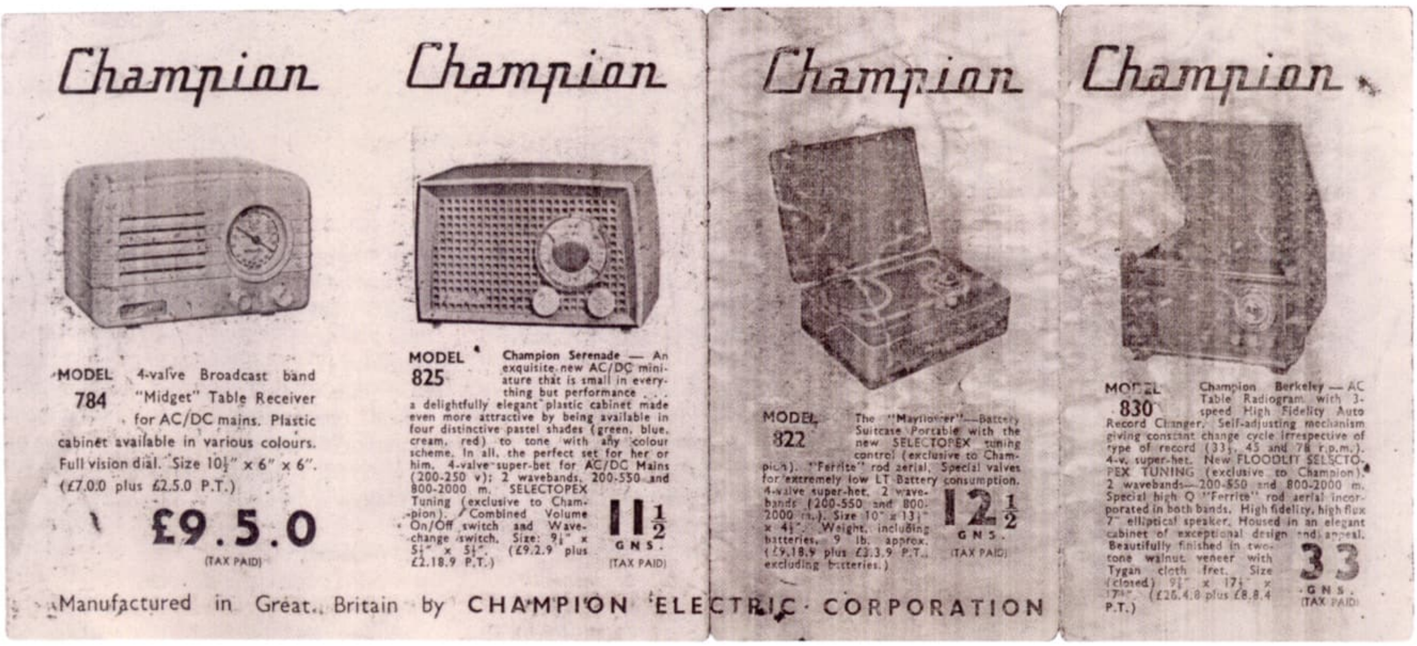
A good quality pcb has been used with the adoption of a clean layout. The output transformer and the extra dropper resistor and selector for 230–250 volt mains are mounted remotely from the pcb. This not only saves space but also spreads the heat and removes the burden of the transformer mass supported on the pcb. Even correctly sited in their holders, the valves assume jaunty angles relative to each other, so we are obviously not talking precision engineering here! One real criticism concerns the placement of heat dissipating resistors too close to the circuit board. The series limiter for the rectifier may be found to have caused some discolouration to the pcb. If this is the case, it should be remounted on longer, stout leads to stand it away from the board. About three quarters of an inch is fine. Use should be considered of purpose made stand–off pillars to resist lateral movement.

Repairs

My receiver was acquired in a condition fairly typical for its age. There was nothing wrong that some normal remedial work wouldn't fix. The lacquer on the cabinet was very dry in places and had started to flake away from the top. Three capacitors had already been replaced (FM ratio detector electrolytic, mains RF bypass and FM de–emphasis). After having replaced the last two components again with something more suitably rated, a trial revealed a very harsh grating reception of MW which would fade away to nothing after about a minute. Nothing was attainable on VHF.

Replacement of an intermittent sufflex capacitor within an IF transformer followed by realignment restored MW operation. The fitting of a new UCC85, resoldering a very dry joint under the aforementioned electrolytic and then realignment brought

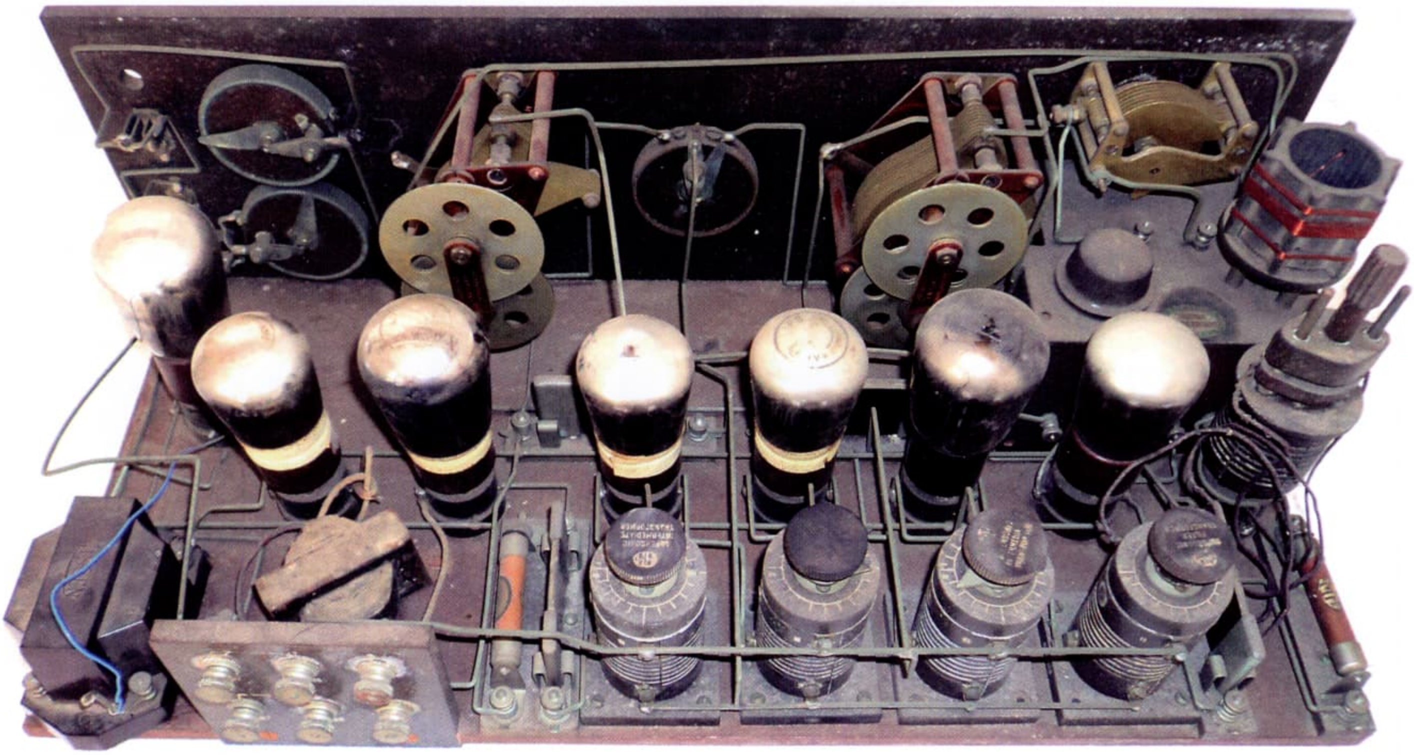
Article continued on page 37

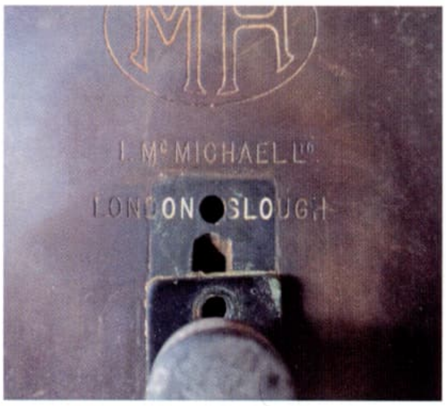


Another McMichael seven valve supersonic heterodyne receiver

by Gary Tempest

The first article on one of these was written by L.L. Williams for the Bulletin Summer 2009 and I certainly recommend it for another read. This receiver, in not so good condition, was found by an internet acquaintance, Carlos Alves, in a flea market, in Aveiro City, Portugal.





Carlos is an experienced restorer and intends to get the set working again but would welcome help from members with a few missing and broken parts; more on those later.

To quote from Mr William's excellent article: *"Seven valves covering 80 to 2000m in four wavebands, variable selectivity down to as narrow as 4kHz, a low noise frequency changer, it will handle signals over a 70 dB input level range. A late 1930's communications receiver? No. This is a 1925 broadcast receiver and it was British"*

This one though was obviously an export model, maybe complete or as a kit of parts, and must be extremely rare.

This is what Carlos said about it:

I think that radio was sold as a kit and assembled in Portugal, by the "CASA PROGREDIOR" company in the city of Porto.

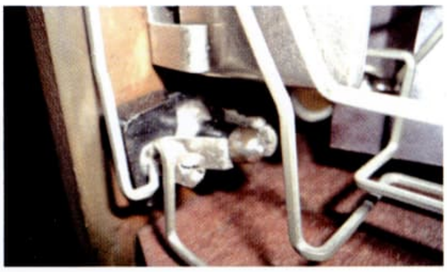
I found one advertisement of the "Casa Progredior" for the year 1934, for this radio. This radio has a switch on the front panel that may be a modification or repair.

Parts required

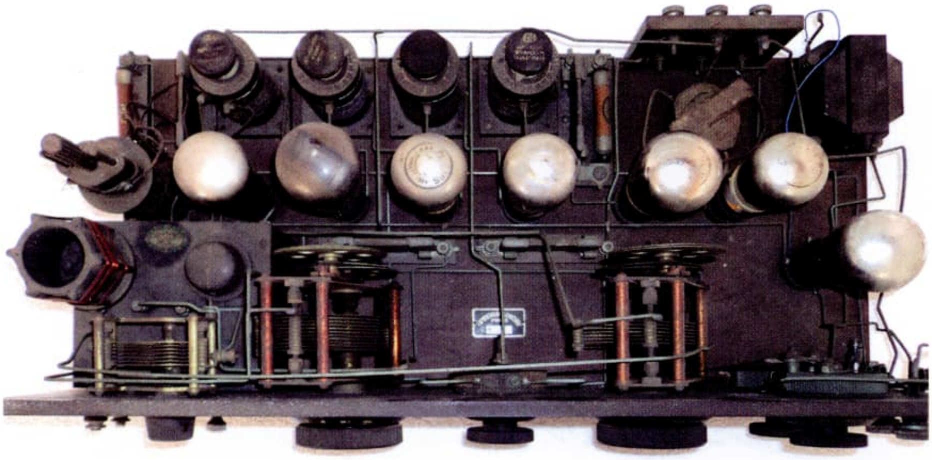
The needed parts are one switch (to fit a 10mm hole), one condenser

Capacitor required for restoration

Front of switch needed for restoration


Rear of switch required for restoration

(.01 mF), and two transformers. The radio has transformers, but one is without a box, and the other is too big. The transformers probably have a ratio of 3/1. Their sizes are 6 cm x 6 cm (maximum). Even transformers that have open windings would be acceptable as they can be rewound. Please e-mail: carlos.edison@gmail.com Many thanks to anyone who can help.



Champion Model 881 article continued from page 35

VHF back from the dead. The speaker needed to be changed as well to get rid of the harsh, grating noise that it produced. The cone was off–centre. Finally, despite the AF coupling capacitor being a ceramic disc type, there was still a detectable leakage at only 15 volts test, so this was exchanged for a modern type.

The radio now being in full working order, it was time to attend to the cabinet. This was refinished using an aerosol lacquer applied over a thinned down, brushed on colourant.

In use

This receiver is served byTrader Sheet number 1404. Despite the sheet's assertion of waveband coverage being MW 200 – 500 metres and VHF 87 – 101 Mcs it is actually a little wider. For instance, the 'Third' position is marked on the scale at 194 metres. Today, this channel is occupied by the local 'Gold' programme, which it comfortably receives. On VHF the dial calibration is accurate to within 0.2 Mc/s yet again it happily receives a local music programme on 102.9 Mc/s without the calibration being compromised. The VHF tuner struggles a little with its own internal aerial, which is a bit small, but just throw two or three feet of insulated wire connected to the aerial socket to form a throw–out aerial makes all the difference, the sensitivity now being very acceptable. There is hardly any tuner drift noticeable either which is very commendable for a low cost receiver. I have found no need to reset the tuning control even after about 90 minutes. MW however is a different matter. At the high frequency end of the band, the tuning drifts about 20 kc/s over the first 15 minutes. MW sensitivity is normal for the type of set, the rotatable ferrite rod being useful here.

Tonally, the receiver is very bright. To my ears, perhaps there is a touch too much brightness for popular music, but for light or classical music it is just about right. The decently large elliptical speaker helps here. A little residual hum is audible on quiet passages with the volume control advanced, but with a good signal it would be unusual to set the volume so high in the first place.

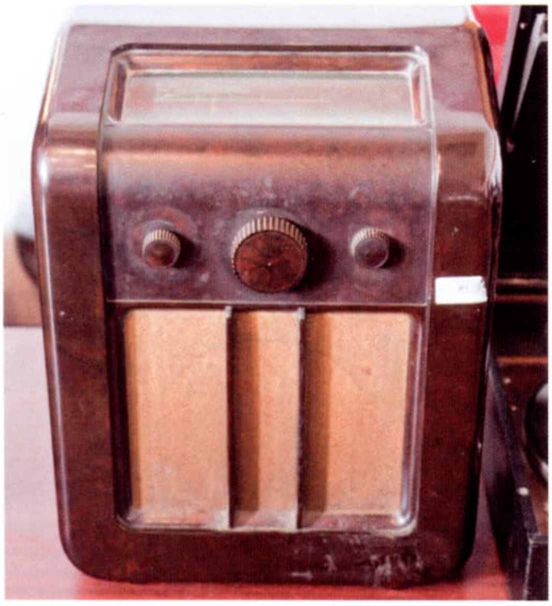
Conclusion

The Champion represents one of the last generation of valved table models from an ailing British industry. As such, it was built economically with a pcb supplanting a wired chassis and lighter cabinet construction. The speaker cloth on my example is quite coarse, something about it reminds me of straw. The workmanship remains good. Early pcbs in valved equipment often suffered a poor reputation owing to its inability to cope with the heat, fragility of the tracks and 'tracking', a breakdown of its insulative properties. The pcb in the Champion remains in good condition and after over 50 years is remarkably free of dry joints. The dial lamp does not cycle through that white hot phase when switching on in the way that makes one fear for the health of the heater chain.

The Champion has its own points of interest. Tuned to some easy listening music and set to a moderate volume it sounds pleasant enough and acquisition of an example is not likely to seriously deplete the finances either.

Harpenden

June 10th photographed by Carl Glover



1001 TVs revisited by Jeffrey Borinsky

David Hall was commissioned by the Ambika P3 gallery to produce *End Piece*. Hall has a long history of video installation art but *End Piece* is far bigger and more ambitious than any of his previous works. It's the sheer scale of the work that matters here. 101 sets would have been very ordinary, 1001 is audacious and overwhelming. Scale also showed in the logistics of the installation. Each set needed physical support, plus power and aerial feeds.

A stay of execution

Simply transporting and manhandling 1001 TVs is a substantial undertaking. Where did they all come from? The sets were collected by DHL Envirosolutions from recycling centres (council tips to you and me) in London and Leicestershire. They were sorted and tested by Sweeep Kuusakoski, a recycling company specialising in electronic waste. After the exhibition Sweeep recycled the sets at their plant in Kent, this includes recovering the lead from the glass in CRTs. I wonder how many were "appropriated".

Perhaps it wasn't a cheat that most of the sets were 14" portables, the earliest I spotted was a Ferguson TX90 from the mid 1980s. A few were larger, including a few 28" widescreen models.

With vigorous recycling like this it could well be that collectors in 2050 will find that 1990s sets will be rarer than 1950s sets are now. This must be a small fraction of the working TVs that are routinely dumped. As an aside, I recently acquired a perfectly good 14" LCD TV which was about to be dumped for no better reason than it didn't have integral Freeview. Works fine as a 1024x768 computer monitor.

The scaffolding frame was rigged and dismantled by professional scaffolders who were also working on a much bigger building project at the University of Westminster, owners of the gallery. The TVs were supported on heavy black netting hung over the scaffold frame. Somebody slim could just about slide around the floor under the sets.

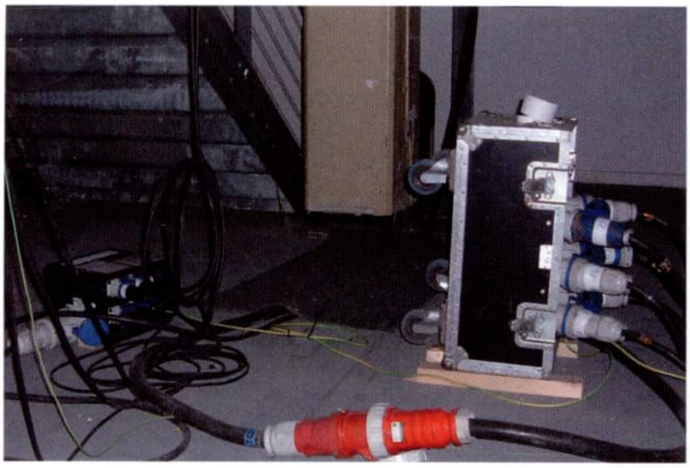
Power distribution

The main power source was via a 125A 3 phase BS4343 connector. This was split to individual phases, fed to several sub distribution units each of which fed several multiway 13A blocks. I estimated the total power consumption as being in the range 40kW to 80kW. No wonder this normally freezing space was warm. Power sequencing was critical. All done manually, this normally took about 40 minutes each morning. Simply powering all the sets together would have almost certainly tripped the main breakers for the 125A supply. Towards the end of the exhibition, a few rows of sets had to be switched off due to problems with water ingress from the building works.

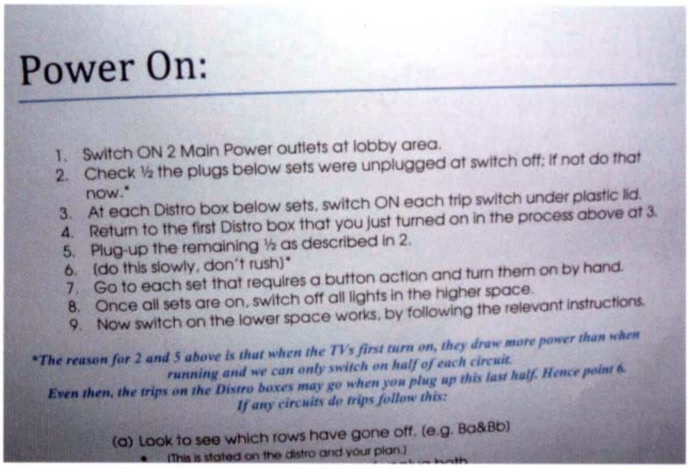
Aerial distribution

Aerial distribution was on the same heroic scale as power. An aerial somewhere unknown picked up the five terrestrial analogue channels from Crystal Palace. A group of CATV launch amplifiers fed a set of 16 way splitters. The gallery space was originally a concrete testing laboratory, complete with overhead travelling crane. This crane was used to support a hefty bundle of over 100 co-axes. Each co-ax fed a local 9 way splitter for a group of TVs. Tam, the helpful technician shown

The installation showing many televisions receiving terrestrial television with about 20% of the screens showing noise

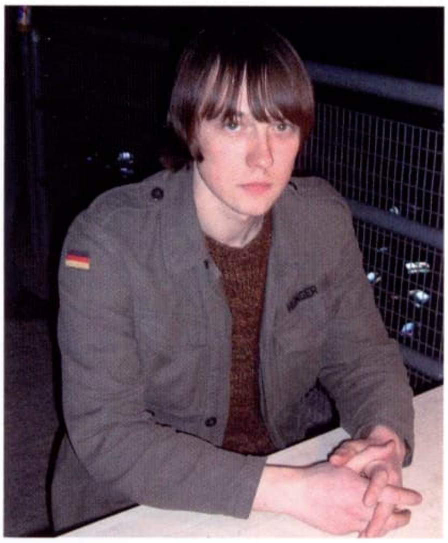


Main power distribution



How to switch on

The final week: analogue broadcasting is now history in London, only white noise remains



Tam, the helpful technician

Part of the aerial distribution

in one of the pictures, spent many hours as part of a team running in the cables and fixing on connectors.

Access to the sets in the middle was difficult after completion. Those least accessible were chosen so that they came up on channel when mains was applied. Sets round the edges could be switched out of standby manually if necessary..

The approach to the gallery was hardly inspiring. On the busy Marylebone Road, opposite Tussauds, next to a public loo, down a temporary metal staircase, past building and plumbing works and into a darkened doorway. From the entrance balcony level you looked down over a sea of screens. All the sets were placed with the CRT facing upwards or very nearly so. If the pictures made an impression it was the sound that assaulted you with a mix of 5 channels echoing round the concrete space. Not surprising that the attendants worked short shifts and wore earplugs.

Stooky Bill

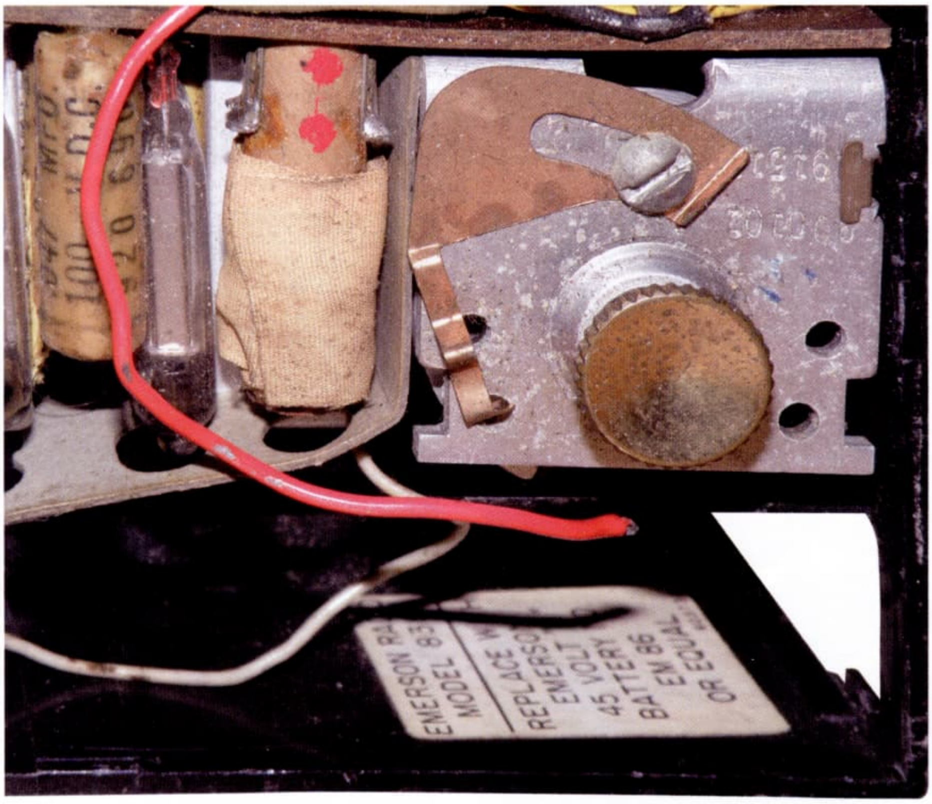
A very few sets were showing an image of Stooky Bill, the dummy head used by Baird in his early experiments. This was another work by David Hall. You could listen on headphones as Stooky Bill and Baird debated their thoughts about the future of television. Two more of Hall's video art installations occupied small rooms near the main exhibit. *Progressive Recession*, dating from 1974 though with what looked like updated hardware, was amusing. About a dozen small cameras, each sitting above a video monitor, followed you as you walked around the room. Where's the fun in that? Each camera was connected to the wrong monitor!

As an engineer I'm usually sceptical about alternative art, even if it involves formaldehyde. *End Piece* impressed this old cynic.

An Emerson 838 for 20p

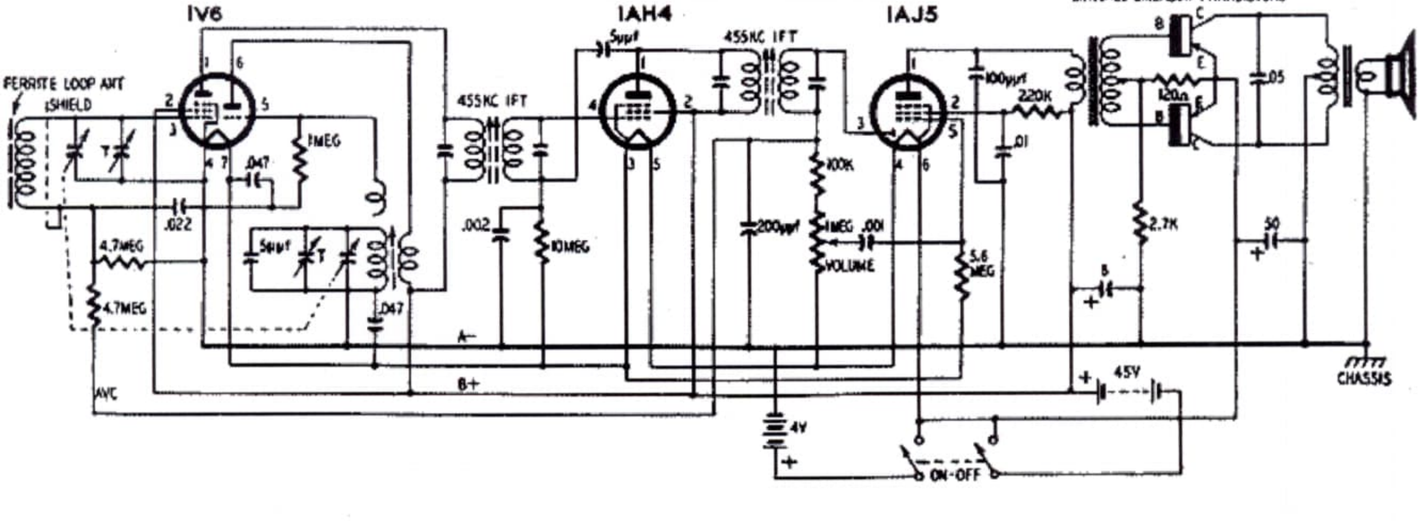
by Stef Niewiedomski

Yes that's all I paid for this rare Emerson radio at a recent radio rally. It was in a box marked '20p for any item' so I wasn't going to argue over the price. As you can see from the photos it's mostly complete including the carrying strap, apart from the dial and the 45V battery compartment cover. The case has no cracks or chips and as far as I can see all the valves and transistors are still in situ in their sockets.



It's commonly accepted that the US-produced Regency TR-1 was the first commercially-sold transistor radio. It was designed and manufactured in the US starting in November 1954 for about a year, and was a four transistor superhet, using Texas Instruments devices. About 100,000 were sold in that year at the not-inconsiderable price of $49.95, a large proportion of which was the cost of the transistors themselves. Although to us transistors are now cheap, and valves relatively expensive, at that time the opposite was true as valves had been manufactured for many years and the industry was just mastering the skills of making transistors in volume.

Rather than taking the immediate step to an all-transistor design, in mid-1955 the US-based Emerson Company produced a hybrid radio, namely the model 838. This model was an evolution from the all-valve model 747 and used 1V6, 1AH4 and 1AJ5 valves plus 2-off PNP germanium alloy transistors - mounted in sockets - for the audio output stage. This reduced the battery drain from 160mA down to 50mA, more than doubling battery life. A matched pair of Emerson's own transistors was used to minimize distortion. Emerson were being a little economical with the truth when they

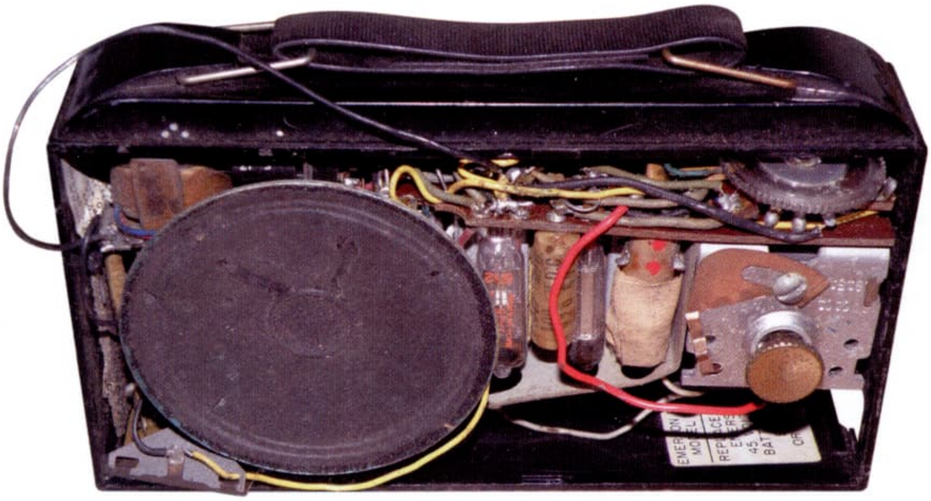


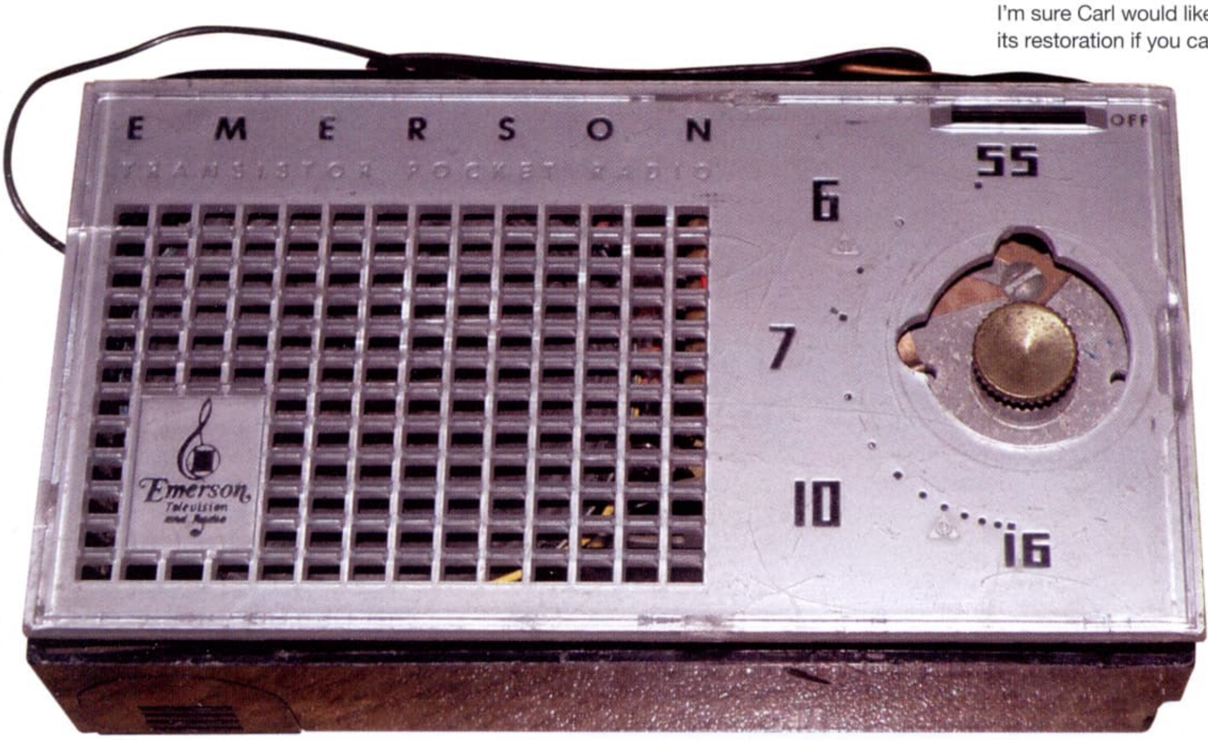
printed 'Transistor Pocket Radio' on the front panel. The radio certainly used transistors but they omitted to mention that there were also three valves inside the case.

The set needed two batteries: a 45V valve HT battery and a 4V mercury battery for the valves' heaters and the supply to the transistor output stage.

An excellent article on the Emerson 838 can be found at: http://transistorhistory.50webs.com/emer838.html, written by Bob McGarrah. This website shows an interesting sequence of photos as the set is dismantled, showing how the set was put together mechanically. Bob's 838 is red and gold, whereas mine is a rather drabber black and silver.

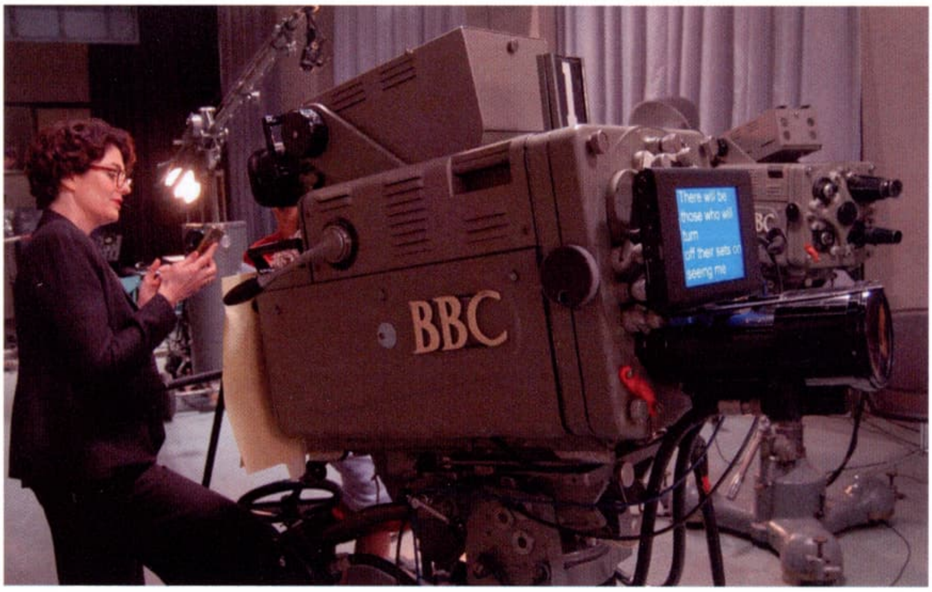
I think restoration of this set is beyond me. If you feel you want the radio and are willing to make an appropriate donation to the British Vintage Wireless and Television Museum, then e-mail me at stef@altera.com. I'll draw names 'from a hat' for whoever contacts me within a week of this offer being published. I'm sure Carl would like to see an article on its restoration if you can manage that.





Why do they never get it right in period dramas?

Dicky Howett writes, Anna Chancellor and an iphone? An LCD autocue? Surely this can't be a tv studio circa 1956? Well actually it is- and it isn't. Pictured on set during a break, Anna (playing Lix in the BBC 2 drama series 'The Hour' (series Two this Summer) consults the digital airways. The 'autocue' itself was placed strateigically on the lens of a Marconi Mk III image orthicon camera in a 'Lime Grove' studio to bolster the confidence of an amnesiac actor. Unfair really, as the cast of 'The Hour' were top grade word–perfect, but with a little help from their friends at Golden Age Tv.



Letters

Dear Editor,
This, as far as I am concerned is a matter of 'Gilding the Lily' where an almost perfectly presented Bulletin can be made 100% perfect. In other words the use of a "Roman Serif" would make it so.

I was Editor of a bulletin connected with the Quekett Microscopical Club for several years, having taken over from a previous incumbent. One of the first things that I did was to change the typeface to 'Baskerville' which I am using in this email at the moment [also in this letter - Editor]. I was congratulated on the legibility of the text. The reason for this is that the eye is guided along the serifs, (especially elderly eyes!). The example that you gave on P. 3 of the recent Bulletin,gave a suitable, favourable comparison - better still if the font size had been increased slightly.

I am still amazed by the wonderful quality of the photographs - congratulations.

Very sincerely
Tony Dutton

J.A.Dutton, FRMS, MRI
Hon.Curator-Archivist for the
Quekett Microscopical Club
at the Natural History Museum, London.

Dear Editor
The latest issue of The Bulletin arrived in the post today and is, as ever, excellent. Mike Barker asked for comments on the serif font used in his editorial. As someone who now needs glasses for all reading and close work, I am not convinced. I did find it readable, but comparing it to the sans-serif font lower down the page, it's not as good. Several pieces of research have looked specifically at how font faces affect legibility for the elderly and the results show that sans-serif is significantly easier for them to read. For example Michael Bernard et al. at Wichita State University tested various fonts on elderly volunteers and found that, increasing the font size made the biggest difference, but for any given size, the sans-serif fonts were always preferred and gave a higher legibility score. Out of 8 fonts, the most effective was 14-point Arial and the worst was 12-point Times. A similar investigation by Kurniawan & Zaphiris at Wayne State University gave much the same result with the best legibility coming from sans-serif. Both these studies related to legibility on screen rather than in print, but I think the broad conclusions will be the same. More generally, research on fonts tends to show that serif fonts give the best results for reading speed, while sans fonts give the best accuracy of reading.

A summary of the paper by Bernard et al can be found at http://www.surl.org/usabilitynews/31/fontSR.asp. A summary of the paper by Kurniawan & Zaphiris is at http://oshkoshberjosh.com/181/fontface.html.

My vote is to stick with the original font. Not only do I find it more legible, but it's simply much more appropriate and satisfying in the context of the page layout of The Bulletin. Using a serif font for everything would make the pages visually more dense and heavy, which would fight the open airiness of the layout and illustrations. Please leave it as it is.

Best regards,
Jack Weber

Dear Editor
Regarding the article 'joker in the pack' by John Holloway in vol 37 No2 of the bulletin

I think it was Alice who was urged to believe in several impossible things before breakfast. i felt much like Lewis Carroll's heroine after reading John Holloway's article 'joker in the pack' in the recent bulletin.

John writes of the magician Neville Maskelyne using a wireless transmitter from a room in Piccadilly back in 1903 to send a morse transmission which was detected by an arc projection lantern being used by De Forest for a lecture at the Royal Institution just under 1/2 mile away.

But hang on a minute ! Think for a moment about this reported event and it must surely appear there are many grave doubts about it's authenticity.

1) In all my years as a cinema projectionist I never heard of a projection arc as being sensitive to EM radiation. The tips of the arc rods are only a few mm apart and a current of perhaps several hundred amps flows in the gaseous carbon gap.

2) even if such an effect were possible, for the radiation to affect the arc, the EM would have to travel via a number of solid London buildings and penetrate the steel housing surrounding the arc projector. So an enormously powerful transmitter would have been needed by Maskelyne.

3) How would Maskelyne know in advance that his transmission would have the desired effect on the arc? and how would he know that the clicks would be interpreted as a morse code signal by the projectionist ?

4) Even the word 'rats' requires a total of nine 'blips' in Morse while the line of doggerel transmitted would require over 60 blips. Was the projectionist experienced enough to write down such a long sequence of blips from his arc lantern ? and what was the audience doing while all this monotonous clicking was going on ?

The only way I can make even partial sense of this reported event is to guess that the current through the projector arc was in fact being switched by some accomplice in the same building and that Maskelyne's wireless transmissions were just a blind!

One other rather carping point: the author writes of Marconi's test transmission from N America in 1901. I assume this is a typo. It should of course have read Marconi's transmission TO N America.

Phil Rosen

Reply by John Holloway,

Dear Editor,
In reply to Phil Rosen's letter following my Joker in the Pack article, the bare bones of the events of that day, as noted in the piece, were taken at face value from an original article in the New Scientist. Prompted by his letter I delved deeper and discovered a review of Signor Marconi's Magic Box by Gavin Weightman published by HarperCollins where the 'facts' originated. I must confess that had I known of the existence of this latter source I would have included the relevant details in the original piece which would have answered at least some of his queries.

It appears that in addition to the events outlined in my article, there was a telegraph ticker tape machine attached to the receiving equipment installed to receive the messages relayed from Poldu which Blok was able to read. Also, it turns out Ambrose Fleming was deaf and neither he nor the audience were aware of the problem. Presumably, Fleming's assistant Arthur Blok kept his mouth shut at the time. In the event the lecture was hailed as a great success by the technical press of the day.

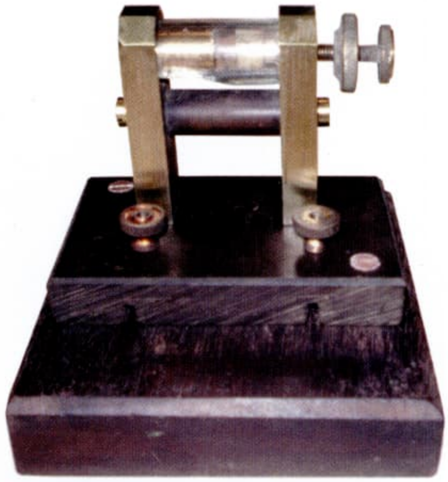
This in no way negates the reservations expressed regarding the behaviour of the projector arcs nor the transmission of the interfering signals from the Egyptian Halls in Piccadilly. Indeed having subsequently spoken with others who agreed with Mr Rosen's analysis I can only concur that in some way Maskelyne, perhaps with the assistance of Eastern Telegraph, was creating an illusion and had tapped into the circuit in a more direct way.

Whatever the facts, this example of industrial espionage, PR spoiler and hacking has all the makings of a grand illusion or as it is would be known today, 'a conspiracy', which it must be said might appeal to Maskelyne's ego as a professional illusionist.

Oh, and yes, it was a typo on my part!

Yours faithfully,
John Holloway

Dear Editor,
Your readers may be interested to know that we have discovered and identified the items used by the Eastern Telegraph Company (ETC) in 1902 to eavesdrop on Marconi's early experiments, as described in 'Joker in the Pack' (Bulletin vol 37 No 2 Summer 2012). In 1902 Porthcurno was the worlds largest submarine cable station - gateway to the Empire for telegraph messages. The ETC, worried by a new technology that might prove a rival, commissioned wireless pioneer Nevil Maskelyne to set up a monitoring station at Porthcurno. Maskelyne intercepted Marconi's signals and published them to show wireless lacked privacy, and 'jammed' the London demonstration proving another weakness. This delighted ETC who could assure the public that undersea cables



could not be intercepted or deliberately corrupted, and were the most reliable means of sending international messages. Maskelyne's discoveries still apply, intercepted wireless signals sent to Bletchley Park helped the war effort, GCHQ monitor other Governments satellite traffic, and some nations still 'jam' BBC transmissions.

A morse inker of a type that could not be used on a submarine cable, a glass tube coherer, and an electrolytic detector, have been found in a nearby farmers barn. Almost certainly relics from these early activities, they are displayed at Porthcurno Telegraph Museum. This circumstantial evidence is supported by the fact that the barn owners grandfather is known to have assisted Maskelyne.

J Packer

Dear Editor,

I was given a pack of playing cards for the radio museum [Richmond, North Yorkshire].

After examining the semi–clad lady on the rear of the cards, you will notice the words 'six-sixty radio valves', also an illustration of the aforementioned valves in each corner. This is a new one on me and my entire career was spent in the wireless trade, I am now retired. I wonder if any members of the BVWS would have any knowledge of 'six-sixty radio valves', by the look of the valves illustrated they would have been manufactured quite a while before WWII.

With kind regards,
Gerald Baker

Dear Editor,
Another McMichael seven valve supersonic heterodyne receiver (see page 36).

Subsequent to submitting the article, I sent the pictures of the Portuguese seven valve radio to Mr L.L. Williams and in discussion with him the following points were made.

It is interesting that there is a mix of English and Portuguese words on the front panel. The radio is different in that the 7 valves are not in a straight line. Also, the front panel has some additional controls.

The radio is from around 1925 and the advert from 1934 is almost certainly not for the same radio although the radio shop, who possibly assembled it, is the same. Looking again at the advertisment, with magnification, only three knobs can be seen. Also it speaks of screen grid valves which are not in this radio (not invented yet) and a tuning range of 15 to 2000m rather than 80 to 2000m.

Gary Tempest

Dear Editor,
Before We Went Wireless

Referring to the book reviewed on page 44 of The Bulletin, Volume 37 No 2.

Some 20 or 30 years ago Ivor Hughes the author visited me, because he had heard of my lecture-demonstrations of Hughes FRS, hence my particular interest in this book.

The book is well presented with copious source references (p373 IET) Hughes FRS invented the microphone and also gave it its name whilst hoping that it would do for sound along similar lines as the microscope for vision. Most importantly the learned Spottiswoode and Stokes had not read the treatise of Maxwell and dismissed the discovery of radio waves by Hughes FRS. I established a Blue plaque on Hughes' house at 94 Great Portland St, London. The plaque mentions only the microphone. Hughes FRS also invented a printing telegraph which made his fortune, his other work he gave freely to science. In the manner of Faraday, Hughes FRS was not mathematcal, his thoughts and ideas were in his hands and fingers.

Sincerely, Ralph Barrett

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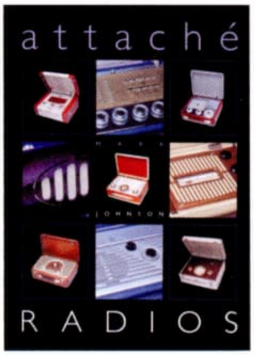

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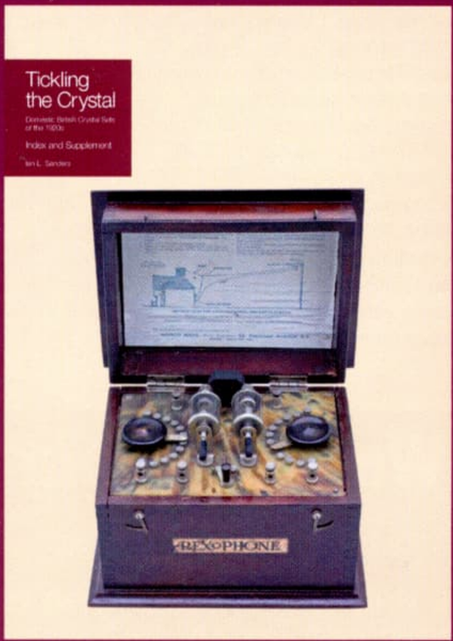

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chairman@bvws.org.uk

23rd September
Harpenden Swapmeet

Harpenden Public Halls, Southdown Rd. Harpenden.
Doors open at 10:00, tickets for sale from 09:30, Auction at 13:30.
Contact Vic Williamson, 01582 593102

MARCONI'S NEW STREET WORKS 1912 – 2012
Birthplace of the Wireless Age

With the centenary of the New Street Works now here ex-Marconi engineer and historian Tim Wander has spent the past two years putting together a history of the famous factory. The book is *now available* direct from the publishers priced at £12.99 – see www.authorsonline.co.uk or www.amazon.co.uk search for 'New Street' or 'Tim Wander'.

At nearly 400 pages and with over 130 photographs the book charts the history and development of the site and tells the stories behind the world beating and world saving technologies that were developed there. New Street was the birthplace of many technologies that have shaped and changed our modern world including radio, broadcasting, television, radar, satellite communications and even the computer and the technology behind the mobile telephone. But most of all the Marconi New Street centenary book tells some of the stories of the men and women who worked there from the 1930's onward. Over a hundred people have contributed to a unique oral history - everything from a paragraph or humorous anecdote through to a career history. With careful editing they have been woven together to form a permanent record of the factory and the people who served there.

Many of the photographs in the book are previously unseen and span the entire history of the New Street site and include some taken earlier this year inside the main factory showing the dreadful state of decay and dilapidation now rainwater has got into the site though the vandalised roof.

For more information on New Street, 2mt Writtle and Tim's forthcoming books on Marconi's early work please see:- **2mtwrittle.com**

News and Meetings

GPO registration Numbers

Martyn Bennett is the custodian of the BVWS GPO Registration Numbers list. As many members know, the project of assembling this list was started in the early days of the BVWS and was carried on by the late Pat Leggatt. Members are strongly urged to help build the list, whenever they get the opportunity, particularly as it is something that will help with the identification of vintage wireless in years to come. The list is by no means complete and the GPO no longer have a record of the numbers granted to wireless manufacturers. The BVWS Handbook contains the current listings - one in numerical order and one ordered by name. Please let Martyn have any additions, or suggestions for corrections, by mail or over the phone.

Martyn Bennett, 58 Church Road, Fleet, Hampshire GU13 8LB telephone: 01252-613660 e-mail: martyb@globalnet.co.uk

2012 Meetings

16th September Murphy Day at Mill Green Museum
23rd September Harpenden
7th October Audiojumble
18th November Golborne
2nd December Wootton Bassett

2013 Meetings

24th February Harpenden
1st June BVWS Garden Party
2nd June Harpenden
7th July Wootton Bassett
29th September Harpenden
1st December Wootton Bassett

The British Vintage Wireless and Television Museum: For location and phone see advert in Bulletin.
Harpenden: Harpenden Public Halls, Southdown Rd. Harpenden. Doors open at 10:00, tickets for sale from 09:30, Auction at 13:30. Contact Vic Williamson, 01582 593102
Audiojumble: The Angel Leisure Centre, Tonbridge, Kent. Enquiries, 01892 540022
NVCF: National Vintage Communications Fair See advert in Bulletin. www.nvcf.co.uk
Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett. Nr. Swindon (J16/M4). Doors open 10:30. Contact Mike Barker, 01380 860787
Golborne: Golborne: Golborne Parkside Sports & Community Club. Rivington Avenue, Golborne, Warrington. WA3 3HG contact Mark Ryding 01942-727428
Mill Green Museum: Bush Hall Lane, Mill Green, Hatfield, AL95PD
For more details with maps to locations see the BVWS Website: www.bvws.org.uk/events/locations.htm

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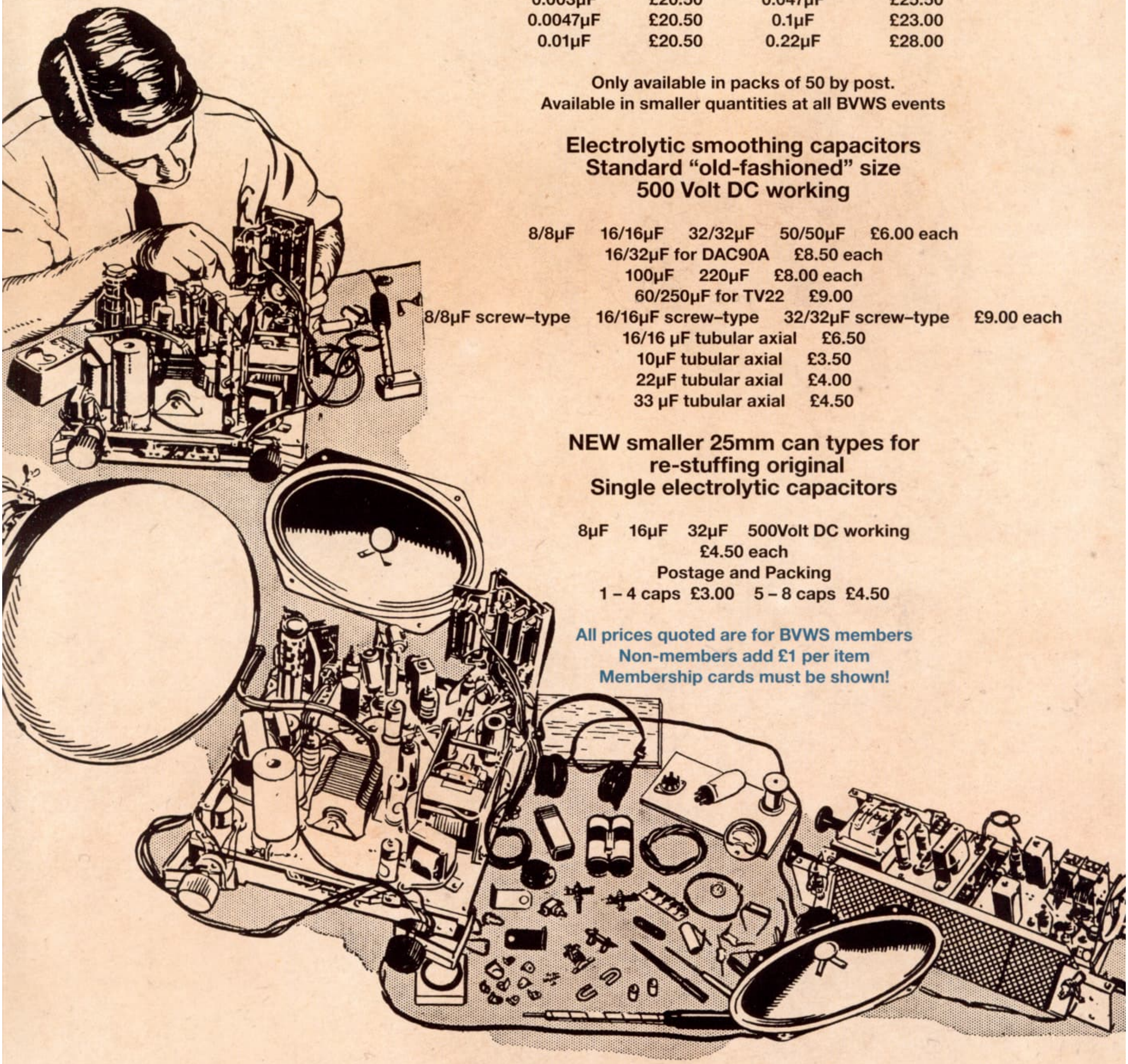

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