The Bulletin

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October 2nd 2005

National Vintage Communications Fair

Now at The National Motorcycle Museum Birmingham

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BVWS team

Chairman:
Mike Barker,
59 Dunsford Close,
Swindon. Wilts.
SN1 4PW
Tel: 01793 536040
chairman@bvws.org.uk

Bulletin Editor/Designer:
Carl Glover, c/o Aleph,
33 Rangers Square,
London SE10 8HR
Tel/fax: 020 8469 2904
bulletin_editor@bvws.org.uk

Sub Editor:
Ian Higginbottom,
5 Templewood, Ealing,
London W13 8BA
Tel/Fax: 020 8998 1594

Treasurer:
Jeremy Day
9 Rackham Drive
Luton, Beds LU3 2AF
Tel: 01582 576124
treasurer@bvws.org.uk

Ordinary Committee Member:
Jon Evans
Tel: 0121 5447006

Membership Secretary:
Graham Terry
26 Castleton Road
Swindon, Wilts SN5 5GD
Tel: 01793 886062
membership@bvws.org.uk

Events Co-ordinator:
Mike Barker,
59 Dunsford Close,
Swindon. Wilts.
SN1 4PW
Tel: 01793 536040
events@bvws.org.uk

Technical TV Correspondent:
David Newman,
405alive_correspond@bvws.org.uk

Electronic Media Production:
Terry Martini,
122b Cannon Street Rd,
London E1 2LH
Tel: 07947 460161

Members' Advertisements Committee Secretary
Guy Peskett,
13 Warneford Road
Oxford Oxon
OX4 1LT
Tel: 01865 247971
secretary@bvws.org.uk

Webmaster:
Paul Stenning
webmaster@bvws.org.uk

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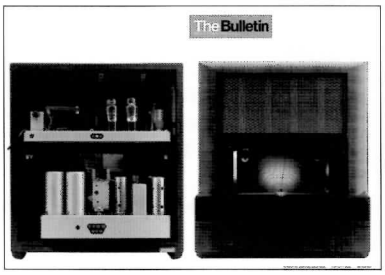

Front and rear cover: Marconiphone 561 photographed by Carl Glover

Graphic design by Carl Glover and Christine Bone

Edited by Carl Glover
Sub-Edited by Ian Higginbottom

Proof-reading by Mike Barker,
Ian Higginbottom and Peter Merriman

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From the chair

Just recently, we have been very concerned over the number of postal items sent out by the Society that are being lost. A whole rift of Spring Bulletins did not reach their destinations. Almost thirty separate items went missing with the May 2005 NVCF postings, both to and from the NVCF management. It would appear that posting and receiving things in London is getting less reliable all the time. To this end we have moved all NVCF postal correspondence to a PO Box in Hereford, kindly offered by Paul Stenning. The Bulletins will be reviewed if we have any more problems.

I am happy to report that a new Organiser of the Harpenden events has been found. Starting with the September event, Vic Williamson, who will be known to many people as one of the Harpenden helpers, has offered to take over the running of the event. The Committee would like to thank Vic for volunteering his services and look forward to many future events under his organisation.

I have barely had time over the last few months to get to grips with repairs and restorations, but recently whilst sitting listening to some music, on the Quad 22 system in the conservatory, I noticed some background growling noises coming from one speaker. Investigations pointed to the pre-amp unit and then to the push buttons. These are well known for their un-reliability, so off with the cover to clean the contacts etc. I found that the blade of the switch in question had not oxidised but had worn a deep groove in the brass. Obviously this button had been heavily used over the years. Somehow, I had not noticed this or any problem a few years before when the unit was purchased and restored. A quick transplant of another unused blade and the unit was as good as new again and I can once again annoy the neighbours with my organ music!

Another rather unexpected restoration appeared a couple of weeks ago in the form of a Bush TV62. The set had worked some thirty years ago but had not been used since. All the usual restoration tasks were tackled and a day and a half later an extremely bright well focused picture was on the screen. The set worked fine for about a week of good use each night, and then whilst on, the picture disappeared leaving everything else working as normal. The fault was quickly traced to the EY86 EHT rectifier. The valve filament had gone open circuit. A replacement was fitted and the EHT voltage checked and all has been well since. You may well have seen the set working in the front entrance at Harpenden.

It is no secret that all collectors clubs have seen a downward trend in prices and attendance to meetings over the last two years. This is also true of the BVWS and NVCF. We hope that future planned events, like the Harpenden Outside Broadcast truck will help to ride the current lull and entice still more new members with new ideas into the interest.

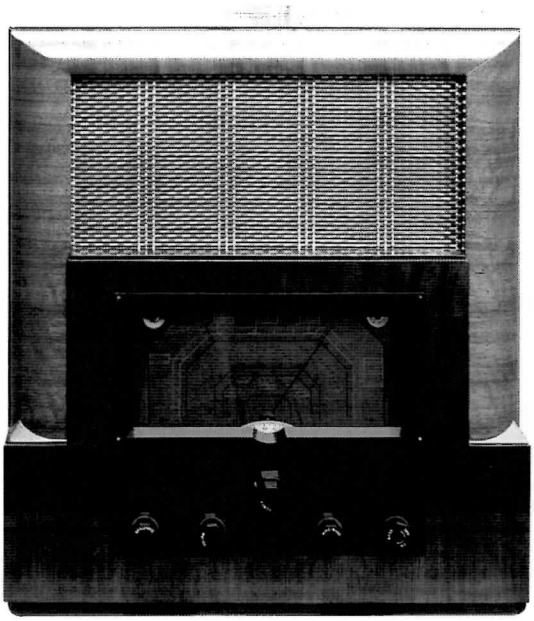
NVCF moves to the National Motorcycle Museum, Birmingham

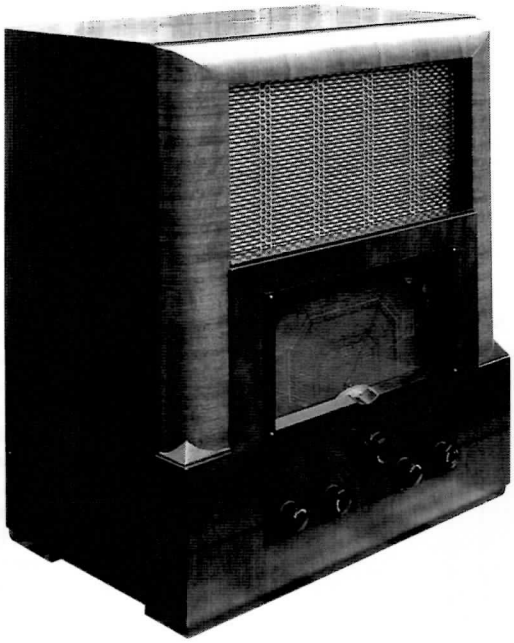
The NVCF will no longer be held at the Birmingham NEC. Instead, from the 2nd October 2005 it will be held at the NMM. This move has come about because of the ever-increasing cost of hiring the NEC, the raised costs of their catering and most of all, the unacceptably high cost of parking for our visitors. Parking at the NMM is FREE! Despite communications with the NEC management, and their promises to look into our complaints, no positive action has come. This only shows that they are uninterested in our business and clearly from news reports, other businesses too. I have to tell you that over the last two years of the BVWS owning the NVCF, the event has not made any profit over that of paying for itself and paying back the initial start-up loan made by the BVWS to the NVCF organisation. This is largely due to clearing the debt with the BVWS as quickly as possible and should not be seen as all doom and gloom. The original plan was for this to take three years to do and not two so we should be able to see a return earlier than expected. Hopefully, the following will answer most of the immediate questions about the move to a new venue.

Where is the National Motorcycle Museum? Opposite the NEC, on the same Motorway Junction.
Will I be able to drive into the hall? No, The NMM does not allow vehicles into the buildings. You will be able to drive right up to the outside of the hall to unload with plenty of space. You will need to consider bringing you own trolley (NOT a shopping trolley). We plan to have a few porters available to help disabled exhibitors to unload, but this may be subject to a small charge to cover their cost.
Will I be able to park close to the hall? Yes, the Museum is much smaller than the NEC. Exhibitors will be able to park in reserved parking behind the hall and visitors will be able to park all around the hall area so no long walks back to cars with items.
Can I still have my usual table? We will try to accommodate everyone in a like for like table position comparable to your previous stands at the NEC, but this is subject to a different layout which gives more wall tables than before.
Is there a Restaurant or Café? The NMM has a 150-seater Restaurant. A separate seated snack bar is being set up especially for our event in an area connected with the halls.
What about a cash machine? We are looking into getting an ATM machine on site for the event.

The best of British: The Marconiphone 561 by Gary Tempest

I'm sure there are readers who would disagree. "What about the Murphy A52, with double 'supie' on short wave and motor drive?" Yes! But to me the 561 is better looking and is still excellent on short waves. Let's agree then that it is certainly amongst the best of British. Wouldn't it have been great if they had had the chance to do a motor drive version? But events occurred that curtailed such a possibility. Or did they? (See Performance and Conclusions)





It was also made as the HMV 650 and the chassis was incorporated into console and radiogram versions (see Addendum). These were even more expensive than the table models, which cost 24 guineas; worth more than £800 today (source Office of National Statistics).

Introduced in 1937, it was at the pinnacle of the valve radio era. After the war, the technology had improved with wartime developments, but then there were shortages and very few had the money for exotic radios anyway. It is a 10 valve chassis or 11 if you include the magic eye tuning indicator.

To start off with there is a tuned RF stage prior to a frequency changer with separate oscillator, then two IF amplifiers and so 6 tuned circuits. The first two transformers have variable selectivity, working on the eddy current loss principle. Measure the IF gain alone and it's up in the 95 dB region. This radio pulls in stations with no aerial at all, just the few inches of internal wire to the grid of the RF amplifier. After the IF stages comes a D63 double diode for detection and delayed AVC. The audio output goes to an amplifier driving an inter-stage transformer. This has separate secondaries supplying the grids of KT63s in push–pull. These and the full wave rectifier are on a separate chassis.

I found this one on eBay, the Internet auction site. They are rare as probably being so expensive not many were sold. In five years, I had only seen one other and knew about two more. The other one was very rusty and in poor shape. Having worked on the main chassis I wouldn't want to deal with a really bad one. I think doing a complete strip for chassis re-plating, and getting it back to specification, would be quite an undertaking. It could be done, but much of the wiring is solid pieces of metal, for SW performance, so very difficult. Better to get a 'good un', if you can find it.

Another reason that makes them hard to come by is that if you own one you are unlikely to want to sell it. Graham Gosling, of East Coast Wireless, who is a great fan of this radio, jokingly told me "I'm having a special coffin made to take mine at the head end". I have this lovely picture of a skeletal hand reaching around, and tuning in whatever AM stations are still operating. Just imagine ghostly music rising up through cracks in the gravestones!

My one was good, as it had come from a boys' boarding school, where it had sat for 60 plus years. Andrew Denton (another long-term aficionado of EMI larger radios) told me it was just not coincidence that the radio came from a school. Apparently during 1937, the Central Council for Schools Broadcasting selected the 561/650 and the 8 valve 538/469 from the EMI range as *Approved for Schools Usage.* It had been sold at a school's charity auction and the lucky purchaser, who knew nothing about radio "but I know a good thing when I see one" bought it. No doubt he made a tidy profit but I was just happy to make the winning bid.

I collected the radio; no way was I going to risk the Parcel Wreckers. It was as described, complete and with a good cabinet. No worm and just the nicks and dents that one would expect. Inside, the chassis was dirty but with only a little rust. This was nearly all confined to the back. I have a theory on this common ill: it is because radios were placed against a cold outside wall. Having lived in a home without cavity wall construction I know all about the condensation that can occur.

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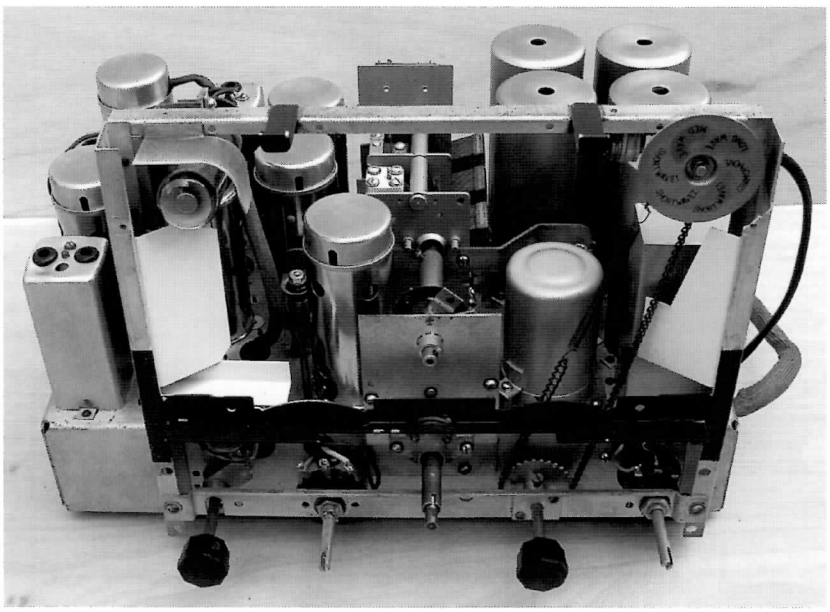
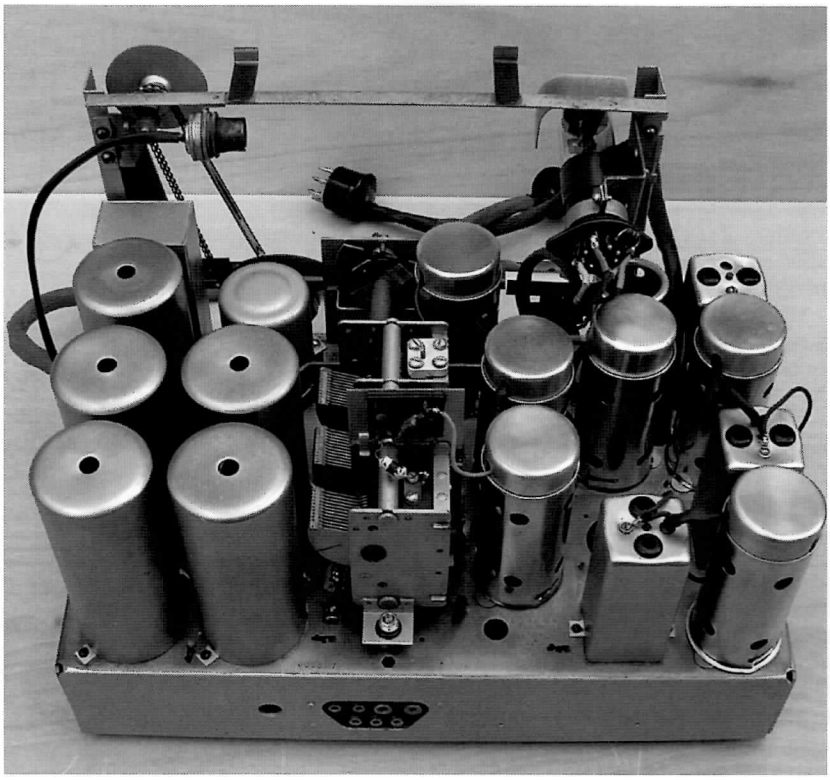
Radio Specification

A little on the radio specification: MW, LW, two SW and one "Ultra Short Wave". The SW are 11.3 – 34 and 34 – 107 metres and the Ultra is 4.85 to 12 metres. This was intended for reception of TV sound from Alexandra Palace at 7.2 metres. There is an excellent reduction drive system and logging scale, so tuning in anything is easy even for the ham fisted. Nothing on the TV sound channel now but I tried to align it just the same. Adjusting trimmers at 50 odd MHz is really tricky but I guess the people in the factory got used to it. Would ladies have done alignment at that time, or would it have required a man's supposed superior technical aptitude?



Chassis front view



Chassis rear view

There is a large scale, which was lit from behind by a 15W torpedo bulb, which is no longer available. The scale is very well detailed and has an aperture for the magic eye on the left side. Balancing this, on the right, is one for a rotating disc showing the waveband. This is driven by a chain and toothed wheels from the shaft of the waveband switch. The scale is disappointing to me. It is made from what looks like thin Paxolin with the lettering silk–screened on the front face. Unlit it really looks like, well, 'nothing' and lit it is just a bright splash directly in front of the bulb. This has to be a pygmy type nowadays but I did try another option; more on this later.

I have now got an HMV 650 (with a terminal condition cabinet, so if some one has one?) and the dial on this one is so much better being silk–screened and edge–lit glass. Even without illumination it looks good. This chassis also has an unused valve holder fitted, whereas there is just a hole in the chassis of the 561. Perhaps the use of a valve phase-splitter was being considered rather than the inter-stage transformer. I am told that this would have been in line with RCA practice and EMI were 52% owned by them.

Controls include treble and bass. That for treble (or "Brilliance" as EMI call it) is ganged to a toggle switch which selects the IF bandwidth. With the control at minimum 'cut' then the bandwidth is at its widest. Turn the control a little clockwise and the switch clicks over to reduce the bandwidth and then the control dulls the higher frequencies in the normal way.

The inter-stage transformer primary is centre tapped with the bass cut potentiometer, wired as a variable resistance, across the lower half. The coupling capacitor and the primary inductance form a high pass filter. As the resistance reduces then the effective inductance is reduced and so response at low frequency falls.

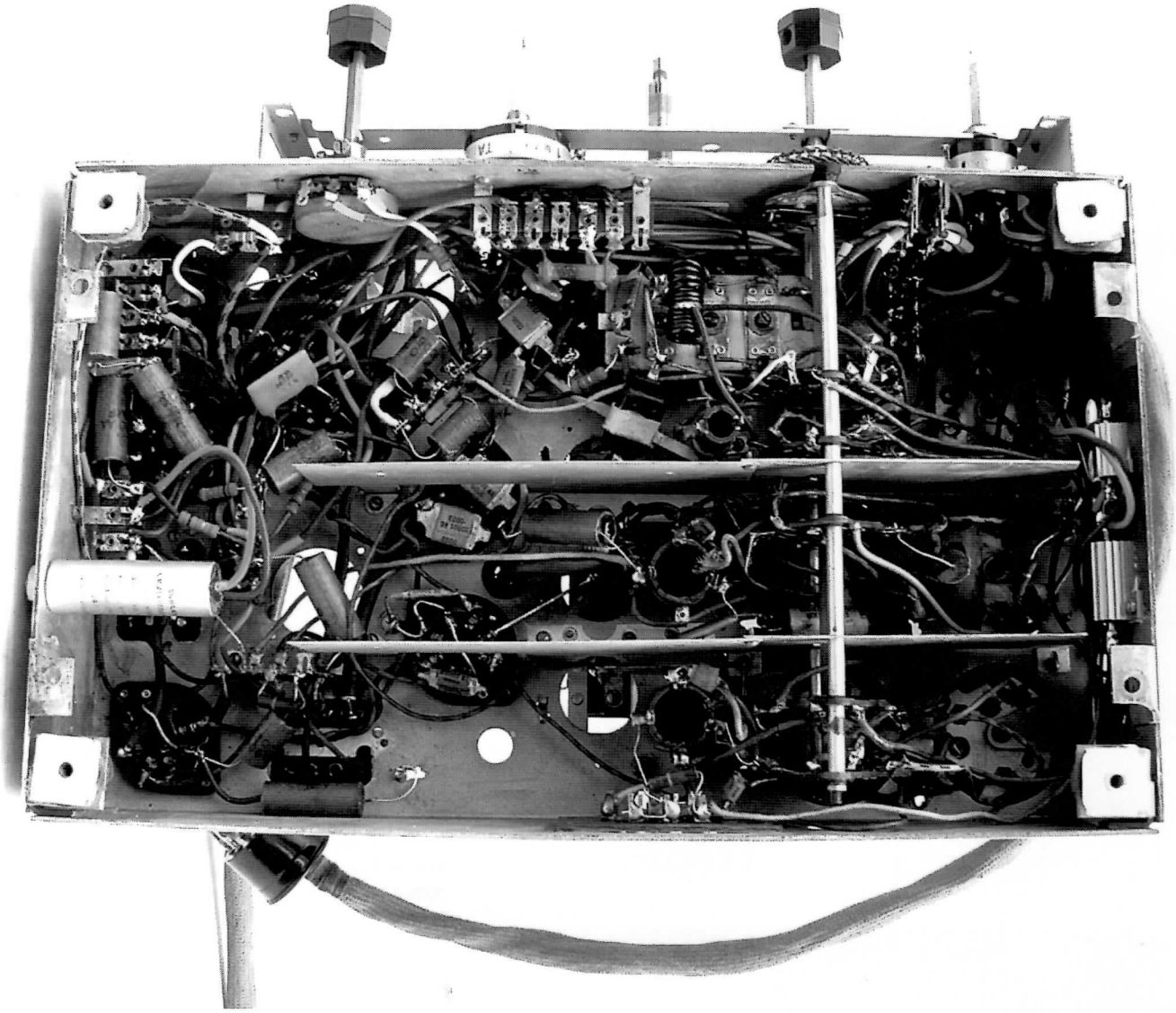
Output Valves and Power Supply Chassis

The obvious place to start was with the power and output chassis. It was basically fine apart from some poor wiring insulation, the dreaded rubber–covered on the transformer and choke fly wires. These had rust on the clamps the best thing was to remove the lot. The rust got treated, followed by nice new paint and wire or heat shrink sleeving. The more you take off a chassis the easier it is to clean. I still like the finest plastic pot scourers and Swarfega hand cleaner.

Graham Gosling had given me a copy of the Broadcaster Service Manual, dated January 1938. This was most useful and was made more so by a trip to the library. I used a photocopier to 'blow up' the schematic portions to fit on A3 sheets. It is worth mentioning that my chassis deviated from these in quite a number of places.

A couple of the electrolytics had gone missing, to be replaced by a large, probably 50's, can type. Several attempts had been made to solder the clip to the chassis, at last with success. Back then drilling a hole, in stout steel, was quite an undertaking. I remember as a lad, using one of those large hand wheel braces, complete with a breastplate, to drill holes. It was a struggle and the brace was affectionately known as "the gut buster", which was about right. Now we just pick up a battery powered drill, with masses of torque, and the jobs done. Anyway, it took a large iron and lots of solder wick to remove the mess left behind by the soldering. I followed this by polishing with emery cloth and finally masking off the wound area and spray painting.

Fortunately, for the capacitors, I had a couple of the upright single screw fixing types on an old RGD chassis, so all three got re-capped and the chassis 'looks right' again. Three are needed, as two chokes are used, with a separate feed for the oscillator circuit and the output valves. These are operated in class A so their HT current will be almost constant. Thus a



Main chassis underneath

steady voltage supplies the critical oscillator circuit. For the other valves, some are controlled by AVC and so their HT current can be expected to vary.

The final interesting touch was the piece of 5A fuse wire wound around the holder. This is in the transformer HT centre tap and should be 1A.

Loudspeaker

I decided to tackle the loudspeaker next. This is a large 12 x 7 elliptical with a permanent magnet. The dust bag had some holes in it and perhaps this had allowed quite a lot of metal fragments (war time shrapnel perhaps?) into the gap, around the pole piece. Of course I tried the tricks of greasy strips of thin card and air dusters but neither worked. Some descriptions of speaker repair 'fudge' what to do next by saying remove the magnet assembly and then clean the gap and the voice coil. It's a fudge, as in most cases you can't get a spanner under the cone, through the access holes in the frame. Even if you can, then getting enough purchase, as the bolts will have been locked up tight and be by now partly corroded, is almost impossible. But I don't fear removing the cone first, on this era of speaker, (see the Andrea article in Bulletin Vol. 29, No 4) and once this is done then removing the magnet assembly with socket spanners is easy. Another thing I read about speaker repair is not to remove the keeper plate, as the magnetism will rush off into space and all will be gloom and doom. Nonsense of course and having gone this far, there is no way I would not disassemble. In this case it would have been the only way to remove the deep seated swarf. Also, the pole piece actually had some small rust bubbles. These were lightly sanded down with emery cloth and treated. All this was done immediately and the keeper plate soon replaced.

The cone was ahead of its time, having an aluminium inner section bonded to the normal card for gluing to the frame. This was good, apart from the voice coil actually having abraded wiring, where it had rubbed on the swarf. It also had bubbles in the old shellac wire insulation. These I gently rubbed down, with fine grit paper, before touching up with shellac and a small brush. Once rebuilt, and with a new dust bag, the speaker tested and sounded good.

Main Chassis

Nothing for it now, than to get stuck into the main chassis. There is a lot on this and it is crowded and tricky in parts. With me, most things come off the chassis topside. Dirt and nicotine have had years to accumulate and the tuning cap mountings are always end of life. One super thing, (thank you EMI engineers) all the RF and OSC coil cans are held on via small, on top, L brackets and self- tapping screws.

Next, lots of chassis cleaning and then wiping off with 'meths' before spraying with Zinser Bullseye Shellac and a matt acrylic topcoat (see the Andrea article). This was a good thing to do, as EMI were not generous with their 'cad' plate. The rusted back

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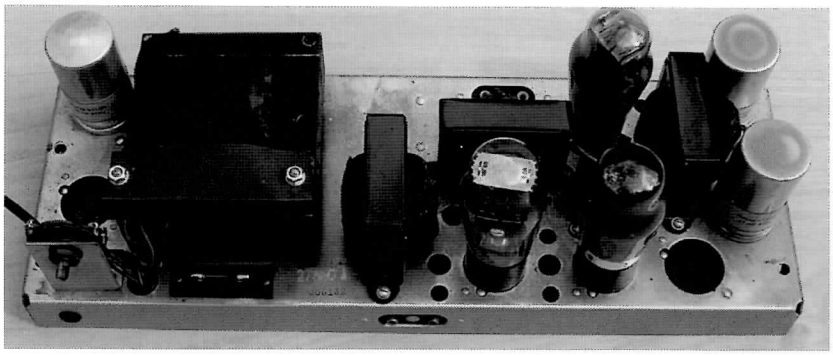
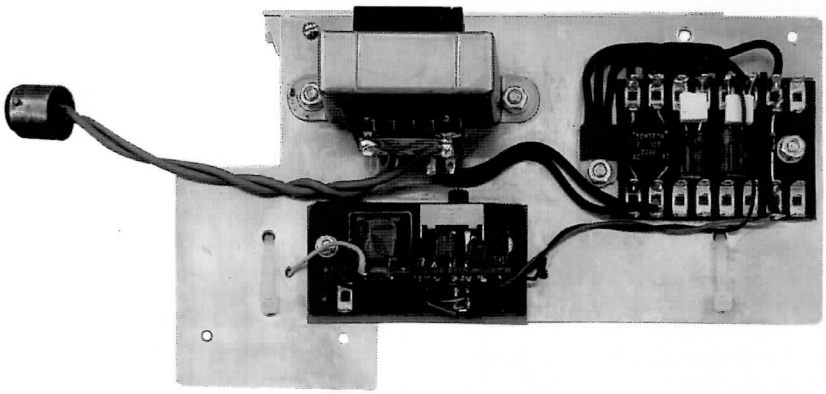
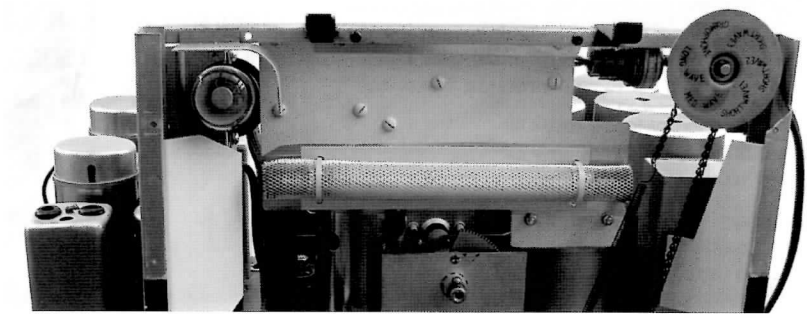


Power and output stage chassis



Lamp circuit without covers



Lamp front view

of the chassis was treated and spray painted.

The valve screening cans were, as usual, rusty and so I took them to an excellent plating shop I've found. They were re-plated in satin nickel and look beautiful. All but one was missing its aluminium 'top hat' to screen off the grid connection. An enjoyable visit to Gerry and a rummage through the stores soon found all I needed.

Back to the radio. Once the topside items were replaced then underneath work began. I gave it a clean up, by suspending it and spraying judiciously with switch cleaner. This, worked around with a stiff artist's brush, works wonders. It cleaned up the fabric covered wiring, restoring its original bright colours.

No messing about, just re-cap all the old wax paper and change all 'dodgy' resistors. A couple had already been changed to two ghastly looking wire wounds suspended in space. These do need to be 'watty', as they form a voltage divider, across one of the HT feeds, and supply the screen of the RF amplifier. I do like those metal clad power resistors. With a little heat sink paste under them, once bolted to the chassis, you can really feel the heat flowing away so there is no local hot spot.

Most of the mica caps look dreadful, being simply covered with now flaking white paint, but actually all measured good. I had chatted to Graham about them. He told me he has never found a bad cap of this type, even though they look so poor. However, I did change a few. They were good for leakage and value but the brass end strips, often folded, tend to break off, when you lift them to replace another component or wire.

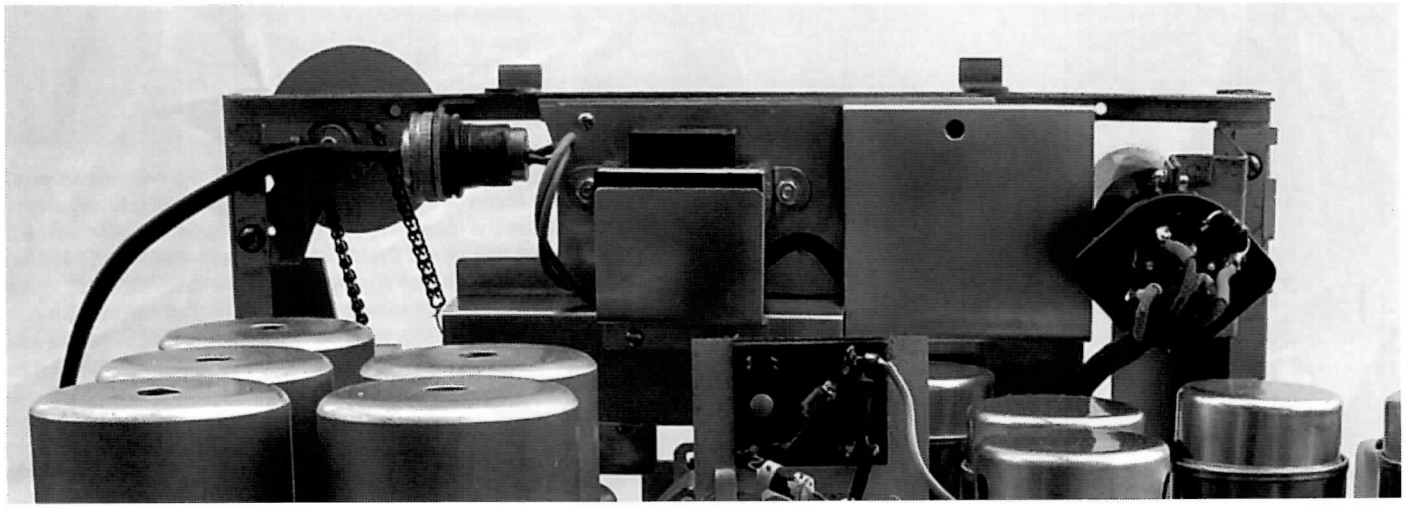
Fortunately, there is very little rubber-covered wire on this chassis. One place that it occurs is on the audio inter-stage transformer. The wires exit, through a piece of sleeving, in the middle of solid looking pitch, which is used to fill the metal can. Some of these wires are long and run the length of the chassis and in my opinion can't be left.

I removed the transformer and it was then that I found it had an open-circuit primary. Graham wonderfully came to the rescue with a spare. For reference this transformer measures 300 Ohms, for each primary half and 3K4 for each secondary. I measured the turns ratio, which if each primary half equals 1 then each secondary winding equals 8, at 1 kHz and flat to beyond 6 kHz.

It's debatable as to the best way to tackle the wires, just sleeving them is not going to stop shorts in the future. You can't get the sleeving far enough down in the exit hole. What I found was that using a pair of side cutters and a small screwdriver the pitch could be broken away. It may look solid but actually is now weak and brittle. Carefully keep going and the wires separate out so insulation is certain. Sleeving could be used but since the wires were in such a bad state I cut them off and joined new silicon rubber insulated, in the same colours, to them. The joint was covered with heat shrink sleeving. I decided against fanning the wires back into a narrow bundle but filled the space in the pitch with hot melt plastic adhesive.

This gives a new problem as the wires won't feed back through the small hole in the chassis, and there is no easy way of increasing its diameter. I resorted to using a pattress, which electricians used to use many years ago, when I helped one in my spare time. It's nothing more than a spacer, hollow underneath, that allows the wiring room to be folded and exit from a relatively small hole. In the old days they were made from wood but I expect now, if used at all, they will be plastic. I made mine from the lid of a coffee jar, with a hole cut in the top. This was large enough so that the transformer wires came through without kinking. Then they were carefully folded and bundled to pass through the wiring hole in the chassis. The lid was just the right diameter for the transformer to sit on, and half an inch thick. This matched the spacers I was going to use under the transformer fixing brackets. Sprayed silver, it looks fine and only restorers who have worked on the chassis would notice it, particularly as it's at the very front.

There is one other area that has rubber insulated wire and that is the screened inner conductors of 'hot' wiring for the IF transformers. I knew from experience, that care has to be taken when replacing this, as they achieved very low capacitance with the original. Add too much extra and it may not be possible to align the IF's. I carefully removed a piece and it works out at only 23 pF/ft. Air-spaced UHF coax is about 16. This, being so stiff, is not a lot of good and the braid is very open weave. I replaced the solid inner wire by pulling through flexible stranded (16 x 0.2mm) and threw away the old PVC casing and screen. I found a very close weave screen in another coax and used this, finishing off with heat shrink sleeving. It was good for the relatively straight wires underneath, but still too stiff for those exiting from the top of IF transformers to valve top caps. However, these are very short and so I used heat shrink and good braid over silicon rubber covered wire. This has a capacitance of 40 pF/ft but only adds 4 pF to the longest top cap lead. Another method adopted by Graham is to use coax from old car radio aerials.



Lamp circuit with screening covers

Switch–on and Alignment

With so much pre–switch–on work I would have been surprised if the chassis had not worked upon power–up. I did this gently through a Variac; I have one so I may as well use it. It did work and the voltages measured out to expectations. Then alignment began and I started with the IFT's in the usual way. The Broadcaster Service Sheet only gives guidance on simply peaking the coils on the narrow position of the band-switch.

Like this, the radio does work but sounds like you have the tone control set for maximum top cut even though you haven't. Once the Wobbulator is hooked up the reason is obvious. Bandwidth was only 4 kHz and on the wide-band switch position the waveform was two horrible peaks and 3 times the width (all bandwidths are quoted at half height).

Surely EMI did not intend it to be like this, and so I did what all Wobbulator users do, I started trying to offset individual IFT's. It could be done at the expense of lost gain, to widen the bandwidth on 'narrow'. Of course you have to keep checking the 'wide' waveform as well. It takes a long time and the result is not really stable; breathe on a trimmer and the waveform edges break up. Then try swapping valves around and you need to re-twiddle.

For controlling bandwidth this design actually uses two coils in each of the first and second IF transformers, in a changeover arrangement. One coil is switched out and the other in when you change from 'narrow' to 'wide'. Was it possible that the band-switch or the coil connections had been wrongly wired? There is no way of testing for this, so I tried swapping coils around, in all combinations at the band-switch. Sometimes I thought I was getting somewhere but in the end decided this was just a false trail and put everything back to normal.

The coil in use is actually shorted out and connected to earth. Thus it takes energy from the transformer and lowers its Q with consequent increase in bandwidth. It seems an odd way to do things: why two coils? Why not resistors and why not the single tertiary winding that is in series with the secondary but in proximity to the primary. In Radio Designers Handbook, by F. Langford Smith, he says this winding may only have 5% of the turns of the secondary and only 0.5% of its inductance. When the winding is switched in, then the increase in coupling makes Q fall slightly and the response peak broadens. I restored an RGD 929 that used this technique and it worked very well.

If you have a Wobbulator, you will know that you can use it like you would a signal generator. So I injected to just look at the third IFT alone. This has a nice smooth curve around 12 kHz wide. Then the signal was injected one stage back and I tried to optimise the second IFT waveform overlaid on the previous. Moving back now to the first stage I decided that this was not going to work either. My notebook has lots of entries labelled "561 Alignment Fresh Start", with different dates, as I battled on.

Time for a break and a talk to Graham. He said that he had achieved a narrow bandwidth of 6 kHz and a wide of around 12, on his chassis. It had taken him a long time and a lot of trimmer twiddling. He also agreed that the result was not what you call stable and if he replaced a valve he would expect to re-do the alignment. He also gave me the IF gain figures, which may be useful to someone else. These are:

V2 grid 10 micro V for 50 mW OIP
V4 grid 500 micro V for 50 mW OIP
V5 grid 10 mV for 50 mW OIP

I knew from playing the set, that it was not short of gain, but I had a check on these figures and mine came out to within a few dB.

I was also given sensitivity figures from the aerial input, but when injecting only a few micro–volts, you need better test equipment than I have. My signal generator has no proper calibration, the case leaks like a sieve, and I don't have a bonded metal box to put the chassis in. However, I knew the radio was sensitive. Even at this stage I could pick up locals and France with no aerial.

However, I knew the radio was sensitive. Even at this stage I could pick up locals and France with no aerial.

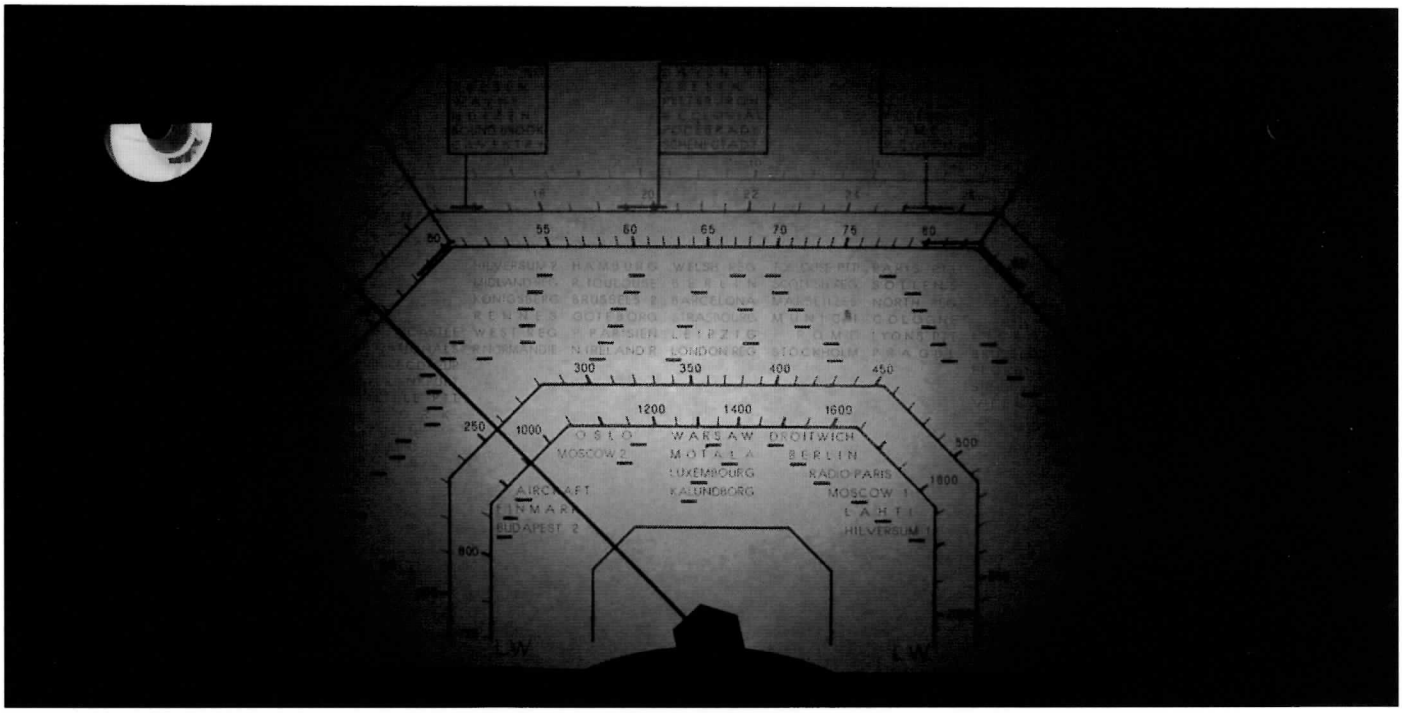
Graham also advised me that when looking at the AM output, from a Wobbulator sweep, you needed to get back to the detector before any coupling capacitors. These would be to the audio amplifier or typically the top of the volume control. Because of the dynamic waveform these capacitors cause it to be skewed. Doing this certainly made the remaining hours of looking at the 'scope' trace easier and more accurate.

Another important point that I found, was the quality of the screening of the D63, used for the detector and AVC diodes. The D63 is the only valve that uses metalising, all the others that need it having screening cans. The effect of poor screening and the earth wire connection can easily be seen on the Wobbulator.

Along the way, I had discovered an oddity regarding the RF amplifier that is worth mentioning. The tuning gang on the output side, for the coils to the frequency changer, has 250 V on its fixed plates. It is directly tied to the RF amplifier anode that is connected to the HT supply via 2K3 resistor.

"561 Alignment Fresh Start", again.

I had been thinking about it and decided that to get better bandwidths I was losing gain anyway, so why



The warm glow from the dial

I had proved that the response could be controlled by a single resistor across the secondary. However, this would not seem to be the whole story when doing the full alignment.

not damp the IF transformers with resistors. On this chassis the IF transformer screening cans can be fairly easily lifted by just removing two topside screws. This allowed tacking physically small resistors across the vertical wires inside the can. These have the primary and secondary coils and their trimmers wired to them. It would not have been a good idea, and I later proved it, to have just put resistors under the chassis. This would have effectively bypassed EMI's screening efforts. With so much gain care needs to be taken.

Results were wonderfully encouraging, even with fairly high values, with the response just peaked on narrow band. With only minutes of tweaking I could get a result that I could almost accept. It sounded nice as well, about 5.5 kHz gives a slightly 'cut' sound and makes switching to the wide position a worthwhile feature for that brighter sound.

Time for another phone call and later a ring back. "You know there are already 'Q killers' shown on the circuit?" I must have spotted them early on but now definitely jaded I had forgotten them. Also, they are soldered high up in the IFT cans, so when I just lifted these a little, they had not been seen. So take one hundred lines: "In future, out of sight must not be out of mind". I then removed the cans completely again for a good check on the components inside. There should be Q killers across the secondaries of the first and third transformers. Also, in the third, there is a capacitor and resistor associated with the AVC diode. These two measured fine but there was a bad joint on the secondary resistor. That across the secondary of the first transformer was missing, it is shown on the circuit diagram as 150K Ohm, which I fitted. These resistors are only tacked across the support wires so perhaps they were adjusted on test.

Once again a fresh start on alignment. The odd thing was that I could not get as good and stable a result as when I had resistors across the transformer primaries and secondaries. I wondered why EMI had used just a single resistor across the secondary windings of transformers. Was it just to save a resistor? I went back to looking at the response of the third IF stage alone. With no resistors at all the response is that of an over-coupled circuit having steep sides and a dip in the flat top. I substituted the 100K Ohm, across its transformer secondary, for 220K Ohm across both windings. The response was similar but the gain lower by around 5 dB. I considered this to be because coupling would not be absolute so the full value of the secondary resistor would not get reflected. This would make the anode load and gain higher.

I had proved that the response could be controlled by a single resistor across the secondary. However, this would not seem to be the whole story when doing the full alignment. The trimmer on the secondary side of the first transformer (IFT1) tunes quite flat whereas that across the primary is very sharp.

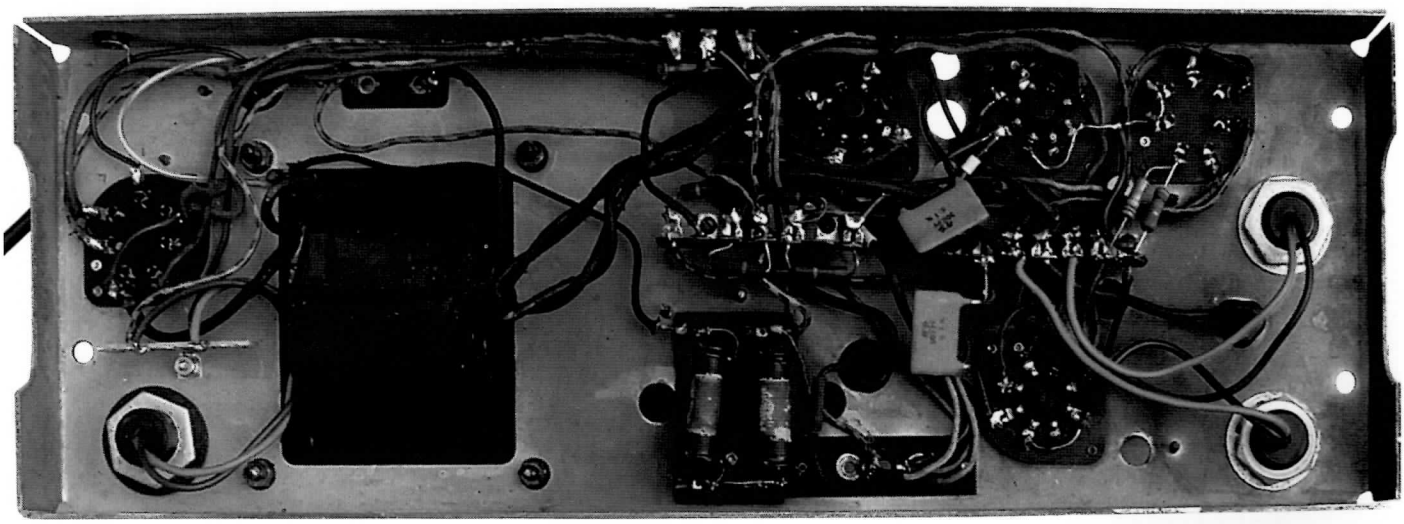
Finally, wanting to wrap this one up now, I ended up as follows:

First transformer (IFT1) primary, 1M5 added, with 150K across the secondary (the value R57 shown on the circuit).
Second transformer (IFT2), 1M5 added, across both primary and secondary.
Third transformer (IFT3) nothing added to the primary and 100K across the secondary (the value R52 shown on the circuit).

This gave the best result so far and it was easy to peak tune and then with just a small amount of individual adjustment achieve a result that satisfied me. This came out as a narrow bandwidth of 5.5 kHz and a wide of 10.8 kHz with 2.5 dB of ripple in the passband. The 'wide' waveform shape alters slightly with the amplitude of the input signal. I adjusted it to be most symmetrical with AVC just operating and slightly skewed at pre AVC level. I tried changing valves in the IF strip and considered that this was possible without re-alignment. The waveforms did change slightly but were still acceptable. On a listening test I would not have been able to tell the difference.

I phoned Graham and passed onto him my conclusions. He had said that whatever I came up with he would try on his chassis. Later he told me that it had worked well; "a radical improvement" was how he put it. He had deliberately mistuned all IF settings but had achieved an optimum result in just minutes.

Some months later he told me that he had given the information to a restorer who only had a signal generator. He was obviously not achieving an alignment that sounded right for both wide and



Power and output stage chassis viewed from underneath

narrow bandwidths. Anyway, apparently he added the extra resistors and said it immediately made all the difference. I don't know how he managed to do it without visual indication (I couldn't) but said that just by peak aligning and a little tweaking by ear he had had success. Wouldn't it be interesting to connect a Wobbulator to his chassis and see what the responses actually are?

Months go by, don't they, in getting a chassis finally back in its cabinet and this one was no exception. I had been using a metal 6L7 for the frequency changer but in the interim had obtained the correct glass 6L7G. I was not going to just plug it in and say "Good! That works". It was out with the Wobbulator and check the IF response before and after. I was surprised that the response on the wide bandwidth had changed considerably, going into a single peak of around 6 kHz wide. No matter though, it took just a few seconds to retune the primary of the first IFT and things were back as they were. I had pencil marked the trimmer position on the top of the can, and estimate it as only about a 20 degree turn.

RF/Oscillator Alignment and Short Wave Instability

The alignment went according to the instructions in the Service Sheet. However, I had already found that I had instability on the short wave bands. This could be heard and also seen by clipping a X10 'scope' probe to the insulated lead to the oscillator grid. If a direct connection was made then the action stopped. The problem showed up, at certain points of the tuning gang, as break up (squegging) and collapse of the oscillator.

What I found was that the grid leak was twice the value it should have been and that the mica screen decoupling capacitor had a fractured connection. I can't be sure if it was making or not but once I changed both components the fault was cured.

Scale lamp

Maplin had a pygmy bulb of 15W that I tried. I didn't like it because it produces a large 'splash' in just one area. Also, I didn't want all that heat in just one place behind a 60-year-old scale. So I thought of other alternatives.

Lots of high brightness L.E.D.s were one possibility but not easy to implement and costly. Another option was a mini-fluorescent and Maplin had a Lantern (ZC11M) dissipating only 4W for less than a 'fiver'. The emitting length of the tube is 4.5 inches and should spread the light more evenly than the bulb. Also, tubes are long lasting and the efficiency is about 5 times greater than bulbs, making the 4W equivalent to 20. Pygmy bulbs seem to fail quite quickly; certainly don't work on a chassis with one in place.

The lantern could not be used as it was. It was necessary to disassemble it and throw everything away apart from the tube and the inverter circuit board. Now I needed to make up a bracket and screening covers for the circuitry and the lamp. For the latter I used aluminium mesh with a grommet at each end. A mesh will provide screening on the "wave-guide beyond cut off principle" (see Note below). I wanted the lamp mains powered (just as the original lamp) and made up a plug to go into the existing lamp holder. This was simply the cut down base from a dud lamp filled with epoxy. On the bracket is included a mains transformer and a circuit board for a bridge rectifier, smoothing capacitors and a 6V regulator. The bracket conveniently screws to the top of the scale framework using existing holes. I would not have drilled new ones and it was their presence that decided me to try this option; this way the chassis is still original. These holes, by the way, are used on the HMV 650 model to mount a half round tube that acts as a reflector and heat shield.

In practice the lamp does not give perfectly even illumination but I doubt if the original torpedo bulb did either. Since the inverter on/off switch is still present it is easy to check for interference and I cannot detect any on any waveband.

Note: There is a story here. For a number of years I worked on the design of military communications equipment. Electronic emissions had to be kept to a minimum but somehow heat had to be allowed to escape. In the documentation describing how this was to be implemented, the phrase "wave-guide beyond cut off" was always inserted. I had worked on weather radar displays long before, and knew a little about microwaves and connecting wave-guides. But the guide end to me was and still is a black art. I expect most readers will have seen pictures of microwave installations but just in case, I should say a little about wave-guides. For me, it simply meant connecting the dish (aerial system) to the output circuitry with 'plumbing'. All the guides I connected were rectangular and either solid or flexible (small pieces of overlapping metal, armadillo fashion) and bolted together by flanges. Obviously dimensions were critical and the waves would not bounce along them efficiently unless these were correct. So I suppose that if you get the dimensions completely wrong you

get no propagation. And this was the principle behind the "wave-guide beyond cut off" phrase. In practice it simply meant that the equipment would contain lots of long thin slots so the electro-magnetic energy would not escape but the heat could. It always struck me as amusing that such a grandiose expression could come down to so little in practice and no one knew the optimum dimensions for the slots!

Cabinet

I had every hope that I would get away with touch up work on this one. But it is so easy to underestimate what needs to be done and so difficult to achieve a result that is satisfactory. In the end it broke down and I ended up refinishing the radio. I have gone away from using cellulose based dye toners except for trim pieces. I find that it is very difficult not to get a patchy look on large areas. So the whole of the cabinet colouring was done with a mix of stains. The only toner used was in the speaker grill mouth, the base of the curved front pieces and the feet. For this I used Mohawk Tone Finish Toner that is completely obliterating. Finally the whole piece was sprayed with Mohawk Satin Cellulose Lacquer.

The cabinet did have a slightly scarred Marconi 'World' transfer. Before starting on the cabinet I scanned this and spent several hours cleaning it up in photo package. It did turn out well and I stepped and repeated it to put 18 on an A4 sized sheet. I had obtained some transfer (decal) paper from Hobby's in London suitable for ink jet printers and was delighted with the printed result. However, it all turned out a waste of time. When I cut around the transfer and tried it, on a scrap cabinet, I found that the base material seen at the edge was slightly opaque. In the end I did obtain some original transfers but testing showed that they would not stand being cellulose lacquered like modern ones. So the transfer was simply applied over the top of the finished cabinet which was apparently often done.

At the top of the cabinet and above the rectifier and output valves was an asbestos heat shield. I was lucky to find a black fibre glass mat, used by plumbers as a heat shield, to replace it. Cut to size and installed it looks right and unobtrusive.

Finding new Japanned wood screws for fixing the Bakelite dial escutcheon was not easy. I did track some down but they were longer than the originals but fortunately not longer than the thickness of the front panel. I carefully drilled deeper pilot holes. However, I did not want to tighten the screws down too hard, as there was just the slightest distortion of the Bakelite. What I needed was some tiny 'O' rings to fit over the screws and cover any gap where the screws were not totally perpendicular to the surface. I actually ended up making some from thin (2mm), self adhesive, neoprene sealing strip. Using a leather punch, set to an appropriate size, I punched out a circle. With the backing paper removed it stuck nicely to the anvil. Then the punch was rotated to the smallest but one size and the middle pressed out. Finally the ring was removed from the anvil and the adhesive tape taken off with tweezers.

The radio had an excellent back cover but as is often the case, the cardboard had opened up at the corners, due to clumsy fitting over the years. An easy and invisible fix is to soak the corners in a mix of equal parts of PVA glue and water. Then quickly place a piece of plastic film around each corner and then clamp with pieces of smooth wood on both sides

Tuning across these SW bands is actually quite tiring; it really did need motor drive to finish it off. Perhaps one was in fact made.

Performance and conclusions

The performance of the radio seems excellent to me and I would chose to listen to it rather than any other old radio I have. On the MW and LW stations I frequent, selectivity and quality is better than the best of the other radios in my collection. On the SW bands sensitivity is such that I can listen to stations from parts of the world where I have no idea what language they are speaking. This is using only a short aerial (the aluminium of an upstairs secondary double glazed window!).

Tuning across these SW bands is actually quite tiring; it really did need motor drive to finish it off. Perhaps one was in fact made. Graham and Andrew remember talking to a man at a National Vintage Communications Fair, a couple of years ago, who said he had seen a 650 with this addition. He even did a sketch showing the positions of the motor and other components that seemed practical. Was it a one–off for a Radio Show or a special for one of the EMI directors perhaps?

One good thing is that the output stage is class A, so there is no crossover distortion and the radio still sounds good at low volume, which is how I often use it. Turn the 'wick' up though and it gives enough distortion free sound to fill any large lounge.

During the day, I can listen to lots of stations with wide IF bandwidth, but at night, generally it sounds better with the bandwidth reduced and some top cut. If you tune in some stations, on the latter, then slight re-tuning may be needed when switching back to wide bandwidth. This is not necessary the other way around.

The bass cut control reduces the overall volume so this has to be compensated for as the control is used. As expected all control is in the last quarter of rotation. What is happening is actually more complex than a simple C and L filter as the turns ratio from the primary to the secondary halves of the transformer, are also changing. However, it works well on those heavy bass, local radio stations (for the short while I can stand listening to them).

I made some measurements from the Gram sockets and found that the overall voltage level, into a resistive load in place of the loudspeaker, falls by about 4 dB with the control fully engaged. Compensating for this, the frequency response starts to fall at around 300 Hz and is 3.5 dB down at 100 Hz and 7.5 dB down at 50 Hz.

Overall I am pleased with this restoration and I hope that I have done it justice. It and the Andrea are to me the best that I have done to date. The cabinet finish is good on both and there are only tiny details that I would like to go back and change. But as artists say, "You have to know when to stop".

The only real negative is that the lady of the house doesn't like the radio. She reckons it is too big and seems to find it truly ugly to behold. This sadly means it may not be on display in the dining room for long but have to go back on a shelf in my crowded den.

My thanks to Graham Gosling, Andrew Denton and Gerry for help, information and spare parts along the way.

Addendum Models made and quantities for the year 1937 (Source: EMI)

Type	HMV model	Quantity	Marconi model	Quantity
Table	650	5000	561	5000
Console	655	5000	564	5000
Radiogram	660	2000	563	2000

B is for Bush by Gerald Wells

The whole point of this series of articles is to take one of our radio manufacturers and describe what they did, why they didn't, when they didn't, where they did it and did it work when they finally did it.

In the 1930's a Mr Gilbert Dornley–Smith set up a radio manufacturing business in Shepherds Bush, West London. The obvious thing to do was to call it Bush Radio Ltd.

Gilbert Dornley–Smith was a very useful engineer and businessman; he had been with Amplion for some years and had gained a lot of experience in radio design and construction. He realised that most of the sets made in this country at the time were sadly lacking in performance and quality. Even the very big companies were finding it difficult to produce a set with a good inside and a good case.

Having secured some decent premises in Woodger Road, Shepherds Bush, his next concern was to make or find suitable cabinets. If the case isn't pretty it doesn't matter how good the insides are, it just will not sell (with the possible exception of Murphy).

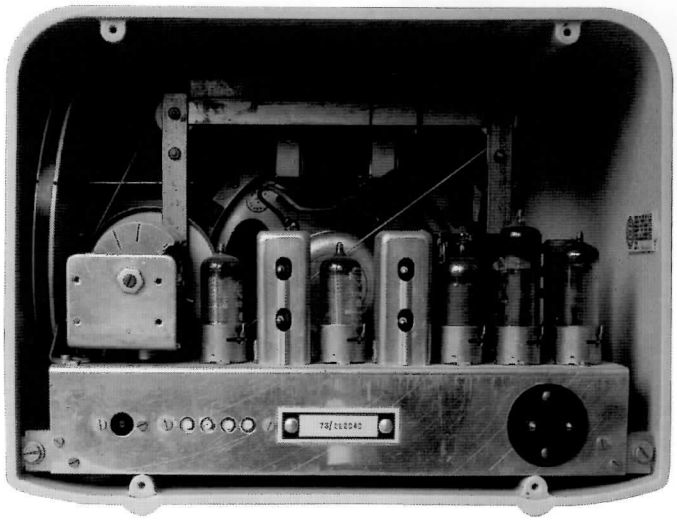
Gilbert Dornley–Smith heard that an American company called Ekophone had produced about a hundred more cabinets than they needed for their previous year's models. They were happy to ship them over to Bush Radio for a modest sum. American cabinets always seemed to be very well made although the designs depended on whether the designer came from the Bronx or the Bible Belt. In this case the latter. It was definitely high church (see Radio Radio fig 360).

Dornley–Smith designed a very good 3 valve plus rectifier receiver to put into the cabinets; they worked very well. The Gaumont British Company were prepared to invest heavily in Bush Radio. One of the first customers for these sets was Archbishop Lang, a relative of the Archbishop of Canterbury. The set was in continuous use up to 1980. I have found that one of the most likely thing to go wrong apart from the electrolytics was the big wire–wound resistance that was the potential divider across the HT coil. It was long and flat and was bolted to the chassis underneath the tuning gang. The only way to change it was to the dismantle the whole tuning assembly and replace the wire–wound beast with several Welwyn resistors. The set should then carry on for another 50 years.

Bush continued to make very reliable sets through most of the thirties. By 1938 they had got involved with Baird to produce television sets. They were known as the Bush Baird and some of them exist to this day.

The only hiccup they had was when they dabbled in push–buttons. They produced a set with eight buttons; two for wavechange and six for preset stations. Each button had its own oscillator and fixed coil. The coils had their own fixed condensers across them. The condensers were all kinds of funny values made specially by an Australian company. They were fine for the first year, then the fun started. The condensers were changing value continually so you found that you were playing a form of radio roulette. You never knew what you were going to get when you pressed a button. The condensers were of a new type, they consisted of two pieces of Paxolin approximately 1/2" x 1&1/16" thick. They both had solder tags and wires fixed to them; they were then sprayed with liquid metal, the two halves were then glued together with a piece of mica in between. The finished assembly was then dipped in wax. All was well for a few months and then they changed value. The Paxolin warped with the heat and the metal coating cracked causing all kinds of funny capacitances to come up. Replacing them was not easy as they were all non–standard values and Bush would only supply parts to accredited dealers. I have had many cases of these sets with loads of condensers strapped together to make up the values. The poor old push–button unit looked as if it had haemorrhoids. As usual Radiospares Ltd came to the rescue with big cards of condensers, six of each of the necessary ones; it could be hung on the wall of your service department and was quite pretty, it had 'Bush Kit' written across the top in big letters. Bush Radio were not amused when they found out the name Radiospares had given the cards.

After the end of the war Bush started to make a short run of TV sets; they were console receivers with either 9" or 12" screens. They were not very handsome but they worked well. The only fault was the failure of the T41 thyratron valves. Most early



televisions had mains derived EHT; it was unreliable and dangerous. Bush designed a high frequency oscillator using a ringing choke to give the very high voltage for the tube. The only thing that gave any trouble was the condenser across the EHT supply.

By 1948 Bush discovered the joys of bakelite. They designed a very pretty jelly–mould cabinet to house a 9" screen table model TV, the first of which being the TV12. I think that they must have made thousands of them. They seem to last forever. In the following years they produced the TV22; it looked similar to the TV12 but utilised a later range of valves. Very many of these televisions pass through my hands every year. Usually all I have to do is change the numerous small wax condensers to bring it back to life.

At the same time Bush produced a series of small radios, like the the TV12 and TV22. They had a charming bakelite cabinet. The colours were ivory, black and brown. The radio was the DAC90 and the DAC90A. A few of these sets were made in bright red bakelite and were used as gifts for the Bush staff. The Bush DAC 10 was of similar build but had five push–buttons on the top. They only came in brown and a large quantity were purchased by the 'Wireless for the Blind Society' because they were reliable and easy to use.

All you have to do to bring these sets up to standard is to remove the wax condenser across the mains, chop out the small condenser connected between the detector anode and chassis (this will improve the top response) and replace the .01 coupling condenser to the grid of the output valve. This should stop the set sounding like a transistor radio.

In 1958 Bush made a transistor radio (the TR82) that was reliable and almost sounded like a valve set. Apart from the usual 'Hunts' condensers that had to be changed, the only trouble you had was the AF117 transistors. They suffered from the 'Quatermass effect'. This is due to the fact that the tin, silicon and germanium weren't sufficiently purified. The crystalline elements inside the transistor kept on growing, the tin casing was sending out tiny little hairs that were touching the collector. The base was also sending out small whiskers that were irritating the collector and the emitter. The quickest way to solve the problem was to snip through the earth wire to the tin case and then hit the the transistor with a screwdriver. These sets would then carry on for years.

In 1963 Bush teamed up with Murphy Radio and the Rank Organisation to form Rank–Bush–Murphy.

In 1967 Bush produced their first colour TV, the CTV25. My first encounter with one of these was in 1968. It came to me without any colour. It was probably the first colour set that I had worked on. It was a wonderful piece of Engineering and I was able to get the full service manual. I treated myself to a small 'scope, pattern generator EHT probe and degauss coil.

I felt completely lost. I telephoned Bush and asked their advice. They gave me a few ideas and suggestions, they asked me to let them know what the fault is when I discovered it. I worked on it for a fortnight before I discovered that there was not any burst pulse coming from the time base chassis to the decoder. All due to a .005 'Hunts' condenser that had gone open circuit. The Bush advice had been of no value.

Bush radio carried on for a few years with R.B.M before it finally folded and got involved with Alba to form Bush Alba PLC. What a sad ending for a fine company.

Loud? Speaker Crystal Sets by LL (Bill) Williams

Operating a loudspeaker from a crystal set without resort to amplification is simplicity itself. All that is required is an efficient loudspeaker and a strong signal. That much is obvious, but can it be done? The answer is a very qualified yes.

Left: All of these loudspeakers have a threshold of Audibility below 10 micro Watts

Below: The test setup

In the 1930's and '40's articles appeared in the popular wireless construction magazines in which the author claimed to have designed a crystal set which could operate a loudspeaker. When assessing these claims several factors must be considered.

Seventy years ago broadcast transmitter–radiated power was much lower than is the case today. Paradoxically this produced a much stronger signal in some areas. Because of the limited transmitter power, stations were often located in centres of population. The Birmingham Whitton station was located in an area of dense housing about two miles from the city centre. This must have resulted in several thousand households getting an overpoweringly strong signal.

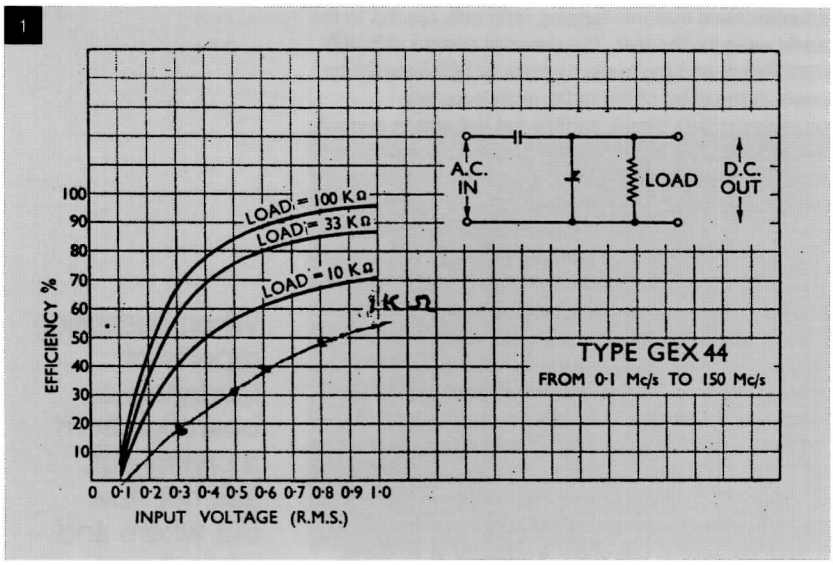
Another factor is how quiet it was in those days, especially in the evening listening period with no road traffic noise and almost no activity of any kind at night. The background noise indoors could easily be thirty or forty dB lower than you would measure today. This could mean that the lowest useable sound power would correspondingly be about a thousand times less.

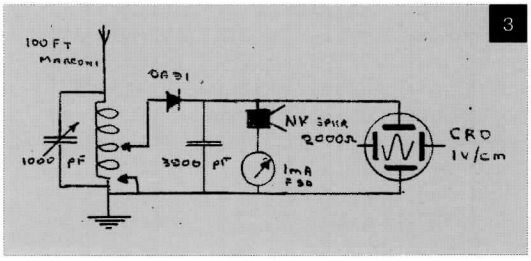
My parents told me of putting the crystal set headphones in a basin in the centre of the table so that the whole family seated round in strict silence could listen to a programme.

The next factor is the electro–acoustic efficiency of some early loudspeakers. With some early battery receivers only capable of a few milliWatts output, speaker manufacturers concentrated upon sensitivity not fidelity of reproduction. Modern speakers with multiple Watt drive available have no such requirement.

I performed an evaluation of my small collection of vintage loudspeakers. A 1kHz audio tone was applied to each speaker and reduced in amplitude

until the tone was just audible to my septagenarian ears about twelve inches from the speaker in a quiet room. The corresponding input power was calculated from the measured input voltage, assuming the load to be a pure resistance equal to the speaker's nominal impedance. The most sensitive was a 1928 German N.K balanced armature cone speaker at 2.5 micro Watts peak. I quote peak rather than RMS because speech and music usually have a high ratio of peak to RMS power. Six other speakers having various forms and driver mechanisms were audible at under



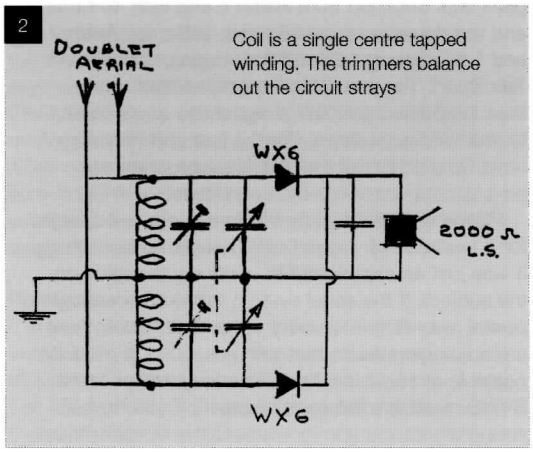


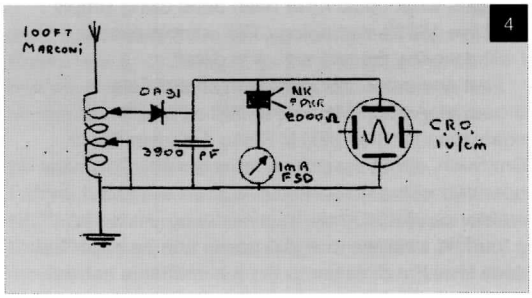
1: Detector efficiency V. Signal Voltage

2: This fully balanced full wave detector was claimed to produce loudspeaker reception

3: LW test circuit

4: MW test circuit





In spite of the foregoing inescapable conclusions there will always be those who believe there must be some ingenious arrangement that will miraculously transform the the tiny power available at an average location into strong audio without need of an external power source.

10 micro Watts. For comfortable listening, a power level 30 dB or more above this measured threshold would be desirable, indicating an audio power of the order of a milliWatt as a desirable target.

I must conclude that some did at least achieve loud speaker reception from a crystal set, but not loudspeaker as we know it in the age of the ghetto blaster.

An inescapable fact of crystal sets is that the maximum audio power can never be more than a fraction of the power available from the aerial/earth system. If the parameters of the aerial system and the local field strength are known the maximum power which can be obtained may be calculated. It will suffice to say that unless a large aerial is deployed fairly close to a powerful transmitter the power available cannot be very large, in fact when compared to the output of a modern audio system, quite tiny.

When an AM signal is rectified, a large fraction of the result is DC which contains no audio. You can easily see this by connecting a micro ammeter of 50 microA to 1 mA FSD depending on how the strong the signal is, in series with the phones. An AM signal at 100% modulation contains 50% of the total in the carrier which produces only DC and 25% in each side band which after rectification and filtering provides audio. The rectification process is of itself not very efficient. Figure 1 shows the maker's curves for a germanium diode which is similar to a good crystal detector. I have added a curve for 1K Ohm load to the data to give a feel for typical crystal set operation between 1K Ohm and 10K Ohm loads. The advantage of a very strong signal is quite clear.

As a rough indication, if you can obtain a DC phone current of 250 micro A or more you should be able to hear faint but clearly audible sound in a quiet environment if you have a sensitive (2000 or 4000 Ohm) speaker. Modern speakers, even with matching transformers, are inferior.

In trying to improve the results you must consider that the logarithmic response of the ear requires doubling of the sound power for a just detectable increase in perceived sound volume. Consider double as hardly worth the effort, and ten times worthwhile but not dramatic. Failure to do so will doom you to disappointment.

In spite of the foregoing inescapable conclusions there will always be those who believe there must be some ingenious arrangement that will miraculously transform the tiny power available at an average location into strong audio without need of an external power source. Various articles have appeared in popular wireless construction magazines in which the author claimed to have acheived loudspeaker reception from a crystal set. A frequent device used in these articles was the full wave detector; often claimed to produce twice the output of a half wave detector. Apart from the fact that doubling the output makes very little difference, this circuit is not capable of producing more power than a single detector. (See letters vol.28 No.4 and vol.29 No.1)

One article of this type I recall, used a doublet aerial to feed a fully balanced circuit with full wave detection (figure 2). Two aerials and two detectors, both halves of the cycle used it, was sure to have a high output. Not so. As I have pointed out, the full wave detection, if anything, produces less output – but what about the two aerials? Assuming that

the doublet aerial was as large as the site could accomodate, a Marconi (inverted L) of the same height and length could produce a stronger signal because the signal induced in the twin down leads of the doublet cancels out in the balanced circuit.

I have a suspicion about this article. I remembered that the author specified the Westector WX6 copper oxide rectifier for the detectors. This device was used as a second detector and AVC rectifier in valve superhets where it handled signals with an amplitude of tens of volts.

If the signal was broadside on and close to powerful transmitter it could produce a signal strong enough to need WX6's to handle it, in which case I do not doubt that strong loudspeaker reception was obtained, but not because of the circuit.

When assessing reports of loudspeaker operation from a crystal set, ask not how but where and when it was done. So much for theoretical considerations. I like to string a few components together and by measurement obtain the result I expected. If I can't I have got something wrong. I wanted to simulate what could have been done using simple effective 1920's technology. For completeness I will describe the test set up in detail.

First and most important with crystal sets, the aerial. A 100ft Marconi at 20ft with optimum orientation for the 198kHz Radio 4 transmitter at Droitwich, about seventeen miles distant. This was operated with a 4ft earth rod with an estimated earth resistance of 40 Ohms. In considering this aerial, if a fourfold increase in signal power can be expected each time the distance to the transmitter is halved, many households even in early broadcast days would have a signal at least as strong as I have.

Next, the tuned circuit. The coil was designed for a series of measurements I intend to perform to compare the performance of twenty or so crystal set configurations in common use. Consequently it was designed to tune in the long wave band with a 0.001 tuning capacitor and 100 ft aerial in parallel and the low frequency end of the medium wave band with the same aerial and capacitor in series. This coil is also equipped with two sliders making many configurations and L to C ratios possible. The tuning capacitor is a modern (1940's) two gang airspaced 0.0005 variable with both stators in parallel. The coil has a winding length of 5 inches; 24SWG enamelled wire close wound on a 2¼ inch outside diameter tube. This measured 841 microH. The unloaded Q was estimated by the delta f method as 200 at 410 kHz; 1920's good practice, but a bit more efficient than an average commercial crystal set.

Finally, the detector. This was definately not vintage. It was an OA91 germanium point contact diode, which has a characteristic similar to a good crystal detector. To make meaningful reproducible measurements, the detector has to be absolutely stable and vintage detectors are not. I was, after all, conducting an experiment and not recreating a classic vintage radio.

The initial test setup is shown on fig 3. The milliameter measuring the DC component of the load is used as a tuning aid. The earthed slider is off the end of the coil so that all turns are in use.

Starting with the detector slider at the aerial end of the coil, the Radio 4, 198kHz signal was tuned in with the capacitor at about half mesh as would be expected. The detector slider was then progressively moved towards the earth end of the coil, making slight corrections to the tuning as necessary due to the changing load on the tuned circuit.

Maximum output was obtained with the detector slider at about 30%. This is the point at which maximum power was transferred from the aerial to the speaker. Note that this tapping ratio only applies to the aerial used for the test. The detector current was 400 microAmps and the audio 1v peak or 500 microWatts peak. In the quiet of the radio workshop, the programme was clearly audible but not strong enough to cope with the workshop fan heater. I consider this result as good as could be obtained at my location. In the much quieter world of my youth with much younger ears I might have called it loudspeaker reception.

A quick search with a general coverage receiver showed very strong signals on 639kHz and 1089kHz. Accordingly the tuning capacitor was disconnected and the earthed slider moved up to short out part of the coil (fig 4). This gives the simplest possible crystal set circuit in which the aerial is brought to resonance by adding inductance.

Initially results were no better than those obtained on 198kHz but the thought ocurred that depending on the location of the transmitter enhanced signals might be possible after dark, and so it proved.

With 63 turns in use and the detector at 40 turns, 450 microAmps and 1.2v peak or 720 microWatts peak was obtained from Radio 5 and with 40 turns and the detector tap at 30 turns, 550 microAmps and 1.6v peak or 1.28 milliWatts was obtained on Talk Sport. The 1 milliWatt target reached more than I expected and had a signal you could listen to in a very quiet room. For the first and only time I had listened to not one but three programmes on a speaker powered by a crystal set.

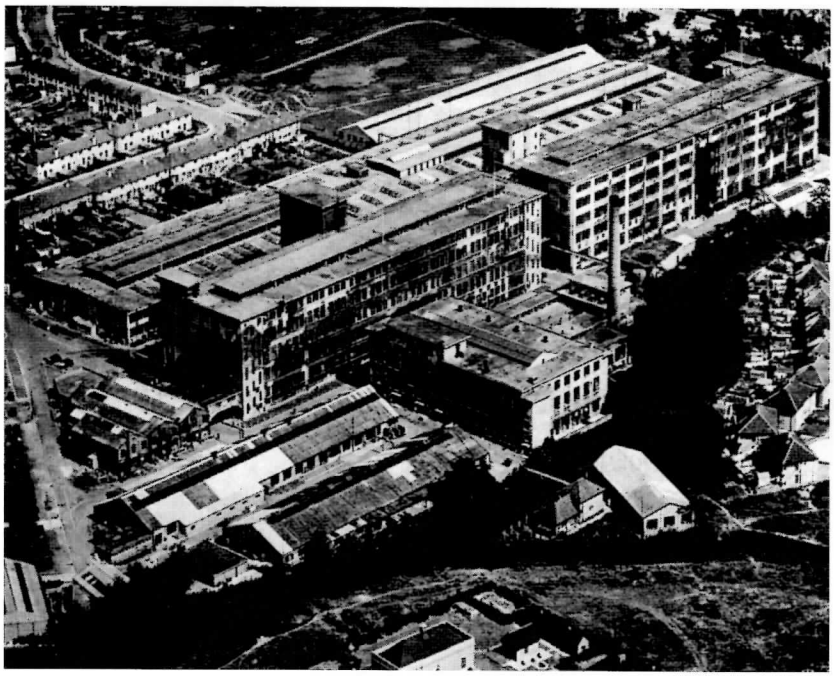
Please do not consider the foregoing as a design for a loudspeaker crystal set. There is no such thing. It was just an experiment to verify my thoughts on the subject. If the aerial system can supply enough power, very simple circuitry will suffice. If not, there are no magic circuits that will make it so. It must be possible at some locations. I am aware that some BVWS members like to experiment. If you have a strong signal and you lack a sensitive speaker there is one possibility you may be able to explore.

On the surplus market at the end of World War II was a device called an Admiralty pattern sound powered telephone. It looks like a single earphone, being both earpiece and microphone. Inside is a very beautifully made miniature balanced armature unit coupled to a very thin aluminium cone. By its nature, since the only power was the microphone output, these devices must be of the highest electro–acoustic efficiency. Couple one of these to a horn and you may have what you need. One snag. I think the impedance was quite low (450 Ohms). Now there is a place for a bit of ingenuity.

When assessing reports of loudspeaker operation from a crystal set, ask not how but where and when it was done. So much for theoretical considerations.

Goodbye Mitchum by Fred Sowan

"There it is" said the van driver as we crested the Mitcham Junction railway bridge. "It" was the 1929 'A' building, awaiting the metrically different 'C', soon to be built of 'mud and hairpins' on the derelict orchard and the remains of a disused tannery (note the local 'Skinners Arms').



I was chaperoning, in 1935, the technical Department's test benches and Weston Model 1 meters from Balham to the fourth floor of 'A'. This move was part of the biggest step yet in the expansion of Mullard valve–making. Stanley Mullard (SRM) had made Mullard valves in a corner of the Z lamp works in Standen Road, Southfields before the MRVCo was registered in September 1920. The first MRVCo factory was in Claybrooke Road, Hammersmith, and second (from 1922) was in Nightingale Lane, Balham, which I joined nearly 74 years ago.

In the company archives is a January 1927 mention of a 'new works at a place called Beddington Corner', that is, at Hackbridge/North Beddington – a neighbourhood with an interesting past but a dull present. The first substantial production at the site seems to have been Philips mains receivers, made by Mitcham Works Ltd (registered in February 1929). This name falsified the geography but screened the 'Dutchness' of the operation. The first directors were Sir Alan Hutchings, Henry Pratt (not to be confused with O.S. Pratt, MRVCo chemist), and Fred Bradley. The company's objective was 'to make valves, ...apparatus etc.

The MRVCo board minutes of November 1928 had mentioned 'new premises at Mitcham'. A Mitcham scheme' was proposed in March 1929: SRM disassociated himself from the scheme and did not vote. He had complained to Eindhoven on 20th February that staff were being taken on at Mitcham without referral to himself. In June 1930 the board decided to delete all reference to the Mitcham scheme. By this time the management of the MRVCo had passed finally out of SRM's hands.

A theory that the MItcham scheme referred to the establishment of a 'British Eindhoven' stretching from Hackbridge corner toward Merton Abbey is almost certainly without foundation.

At a meeting in Eindhoven in June 1929 it was stated that the MRVCo had bought Mitcham Works Ltd for £149,971. That company survived as a subsidiary under various names. In 1973 it became Philips Finance Services Ltd.

Valve–making at Balham, in the heyday of the PM (Philips–Mullard) series and the 4V indirectly–heated series (354V etc., the first two figures being the nominal amplification factor), was insufficient to meet rapidly increasing demands. The two–storey 'new unit', built in 1927, for £10,871 behind the old one–storey Vauxhall glassworks, was a stop gap. In 1932 valve–making started in parallel at Mitcham.

The Mitcham move was a decisive shift into a new regime of greater efficiency, improved quality control, economies of scale, and Eindhoven style management. After small, friendly Balham, it was a new world.

In May 1927 Balham had 110 male workers and 382 female (492 total). By October there were additionally 71 at Mitcham, making unspecified 'accessories'. In a few years all the Mitcham buildings were occupied by thousands of workers making many products in vast numbers. Mitcham was a major event for Mullard and for valve–making worldwide.

The detailed 65 year story of those hugely productive years awaits a historian and the discovery of a more encouraging archive than I was shown nearly twenty years ago.

So from one who loved you little,
GOODBYE MITCHAM!

Mitcham post–Mortem

What sent me back to New Road, Hackbridge, on 17 August 1994? Masochism – a wish to 'see it come down', thus laying the ghost of my probably unfair dislike of the place, and ensuring that I need have no further irrational fear of being re–posted there?

And what sent me back on 19 September? I had heard that the Beddington Corner Community Action Project (what a mouthful) in association with Sutton Borough Council was holding a 'Mullard reminiscence day' to collect material, before it is too late, for an exhibition and a history booklet. I had already thought of writing at least an essay on the history of that remarkable industrial venture.

I found my interviewer rather inclined to collect anecdotage rather than fact. She harped on about a ghost (human) and a ghost (canine), both of which I dismissed as rubbish. However, the project is sensible and serious.

Valve–making is at last achieving respectability in the Industrial world. Speakers on Wandle industries have, for years and years, gone on about snuff mills etc., and have looked blank when I have said "What about wireless valves?" Mullard Mitcham was far and away the largest industrial activity that the Wandle has seen or ever will see.

An old lady who joined me at the New Road gate to look at the half–demolished 'C' building, told me that some of the buildings (presumably 'C') had been 'shipped in from Holland' (some ship!). The penny dropped. The plans for 'A' would have been in imperial measure and the Dutch plans for 'C' in metric; so, yards for 'A' would have been in imperial measurements, the Dutch plans for 'C' in metric thus explaining the curiously increasing steepness of the 'A' to 'C' bridges.

For the record (1994)

Demolition: Callaghan demolition Ltd.
Redevelopment: Farview New Homes PLC
A fairer view and more sunshine for Orchard Avenue!
Goodbye, Goobye Mitchum!

I found my interviewer rather inclined to collect anecdotage rather than fact. She harped on about a ghost (human) and a ghost (canine), both of which I dismissed as rubbish.

Positive Feedback

by Geoffrey Dixon-Nuttall

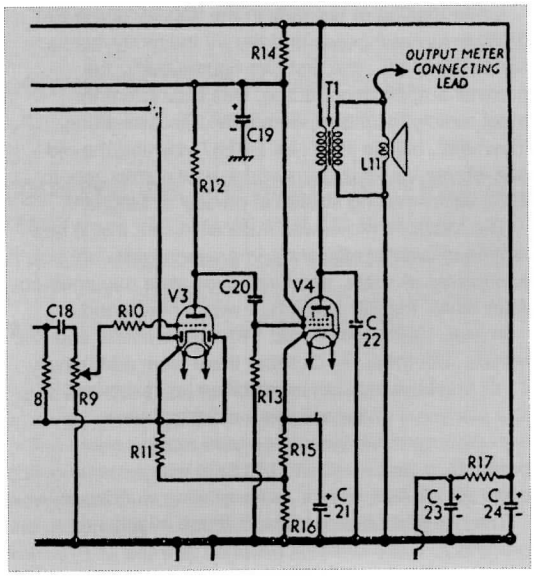


Figure 1

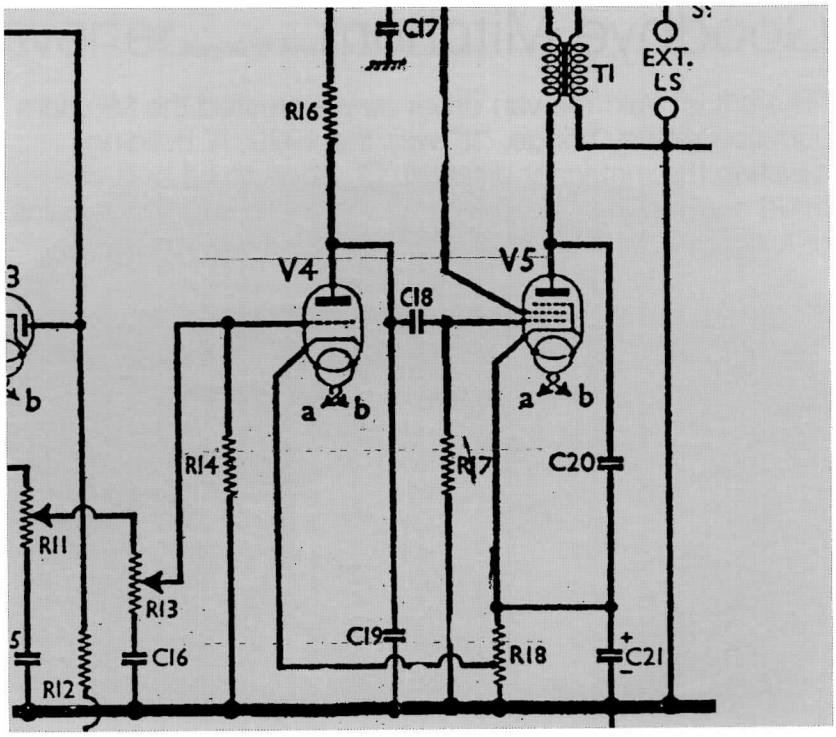


Figure 2

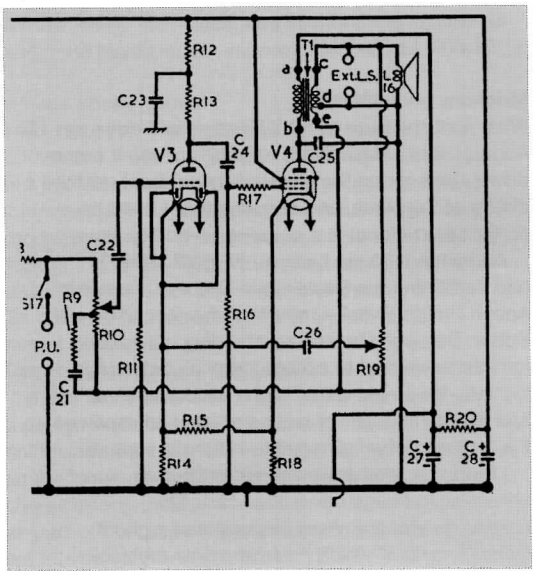


Figure 3

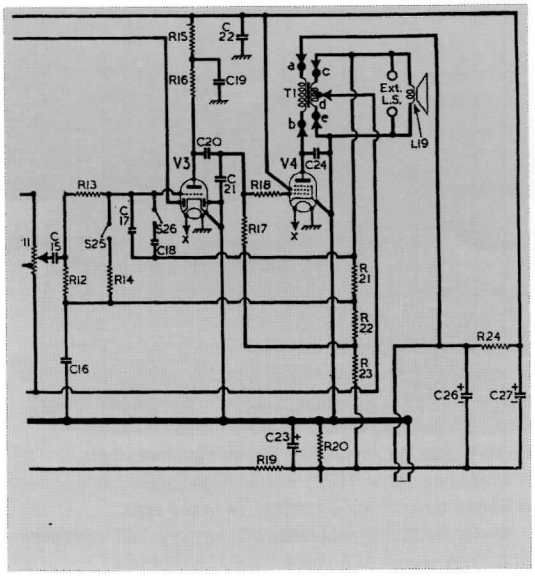


Figure 4

Negative Feedback reduces distortion, and also gain. Positive feedback conversely increases both.

Most of us are aware that negative feedback is a good thing, but what about positive? The most common form of this is good old-fashioned reaction, the effects and benefits of which are well known. The usual effect of accidental positive feedback is instability, which we have all met from time to time, sometimes with ear-shattering effect. I am told that the latest fashion among Hi-Fi enthusiasts is to abolish feedback, but chacun à son thing.

I am told that the latest fashion among Hi-Fi enthusiasts is to abolish feedback, but chacun à son thing.

I first met deliberate positive feedback in the ST700A (7), a design from the one and only John Scott Taggart, which has a potentiometer to control the amount. I have never met the actual radio, but am curious as to what it can have sounded like, and what the point was.

The Murphy A100 (Fig 1) was claimed by the manufacturer to have positive feedback to give bass boost, but in spite of trying very hard I have never managed to find any. The same circuit was used in the Ekco AC86 in 1935 (Fig 2), and they never claimed any advantage for it. Varying the cathode capacitor from 2 to about 1.000 µF has no effect, so if anybody can find any bass boost I would like to meet it.

Of course the pioneers in feedback are Messrs Philips, and they have produced some ripe specimens. A good example is the A310A and its clones (Fig 3). These have a tapped winding on the output transformer, producing negative and positive feeedback which are balaced by the tone control. (Some of their other circuits baffle me completely; can anyone tell me how a 400A (Fig 4) works? Also the 645A (Fig 5)?

I have a feeling that Philips did this sort of thing for fun, and to show that they could, although the 643 service sheet contains a number of modifications, which implies that they had occasional problems.

These sets don't go unstable, so why? If you have negative feedback, the gain is reduced, so adding enough positive feedback will put the gain back to what it was. Ah, but what about the distortion? In fact a little distortion is not a bad thing. Blasphemy? I will explain.

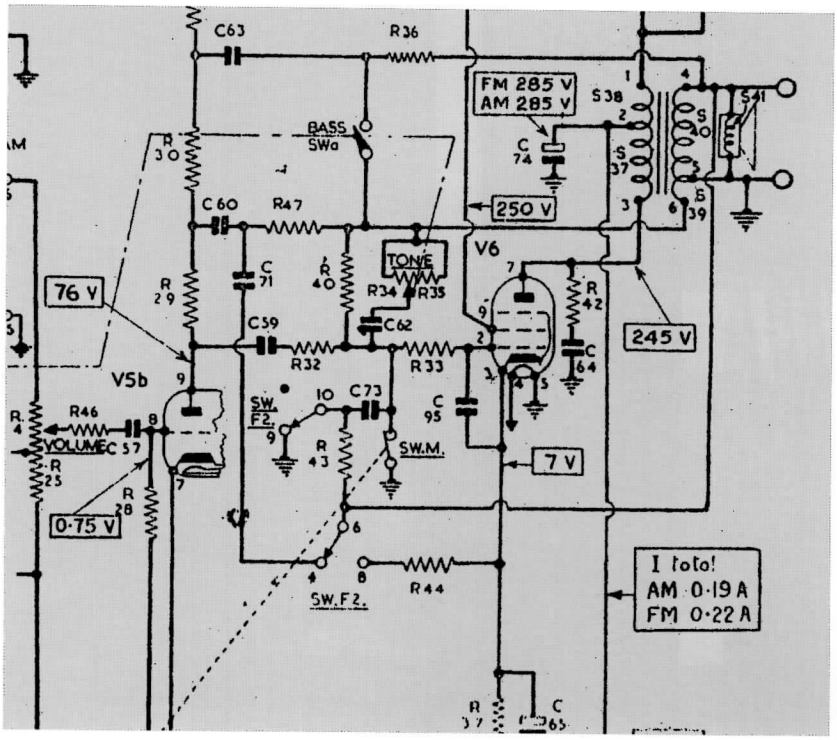


Figure 5

Of course the pioneers in feedback are Messrs Philips, and they have produced some ripe specimens.

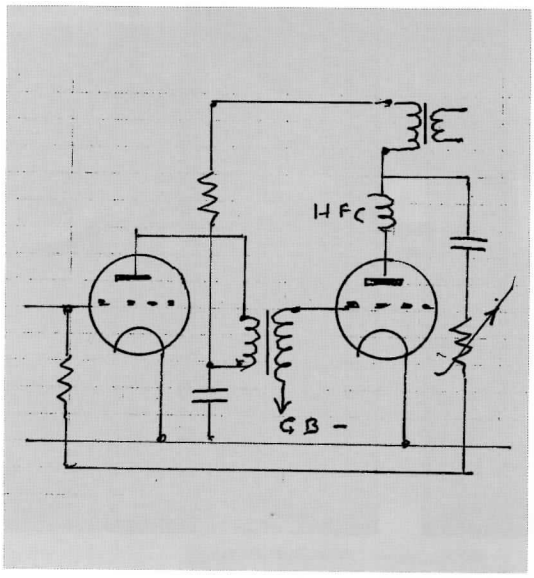


Figure 7

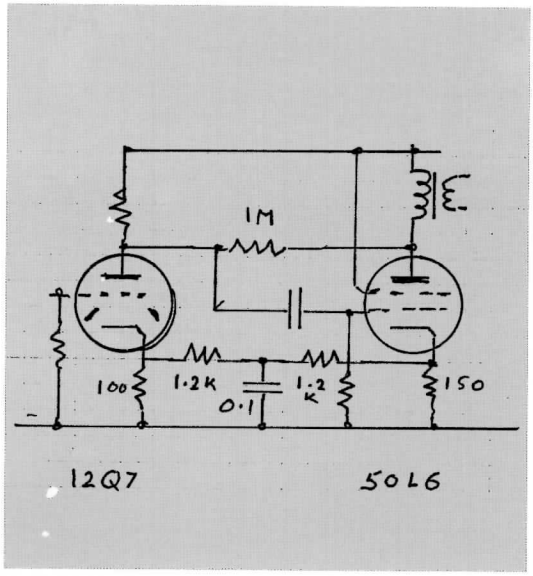


Figure 6

At low frequencies the output runs off the end of the speaker response, but if a little distortion is added the ear hears the harmonics of the bass notes and imagines the fundamental, which is absent. We are not talking about Hi-Fi here, but about listening to a cheap little table model radio, which will be lacking in anything below about 100 Hz. Bass boost will improve the sound of a small loudspeaker considerably.

Some time ago I came across this circuit in an American magazine, and tried it out. I thought the result was quite pleasant (Fig 6).

So nothing is absolute. A little distortion in the right place can be a good thing!

Don't Shoot! by Dicky Howett

Dicky Howett's Missus, Margaret, aims a lethal looking turret plate. The plate is a cosmetic item usually found attached to the front of the circa 1956 EMI 10764 Orthicon camera, seen here reposing on a pallet at the National Museum of Photography, Film & Television's special store. Note behind also two EMI 204 colour cameras on the shelf. Best place for them...

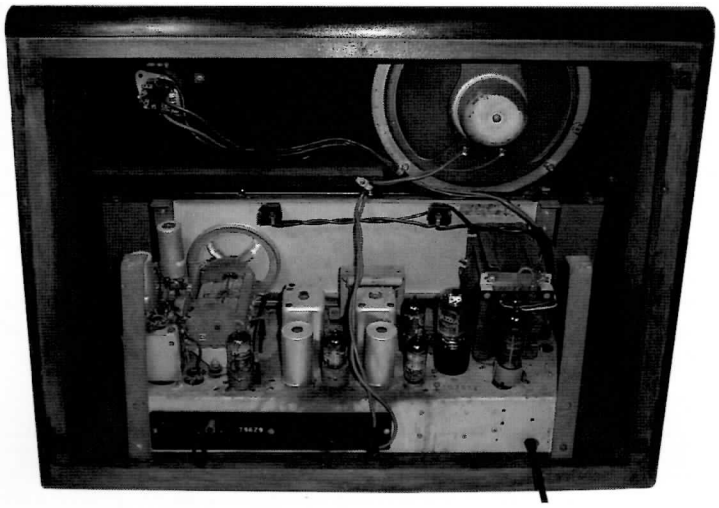
Images from the West of England Vintage Wireless Fair - Willand village hall - 17 April 2005 by Barrie Phillips

Opening day Dicky Howett comments.

Dicky Howett writes: Here's a little novelty. This rather murky picture shows the official opening of BBC Television in studio B at Alexandra Palace on November 2nd 1936. Despite contrary publicity, the worlds first high definition service was in fact opened using a lowish definition German/US film system and a Baird 'spotlight' scanner all running at 25fps-240 lines.

However, what is never reported (and the BBC always like to promote the 'all British electronic' EMI system) is that J L Baird had also in studio B, a Farnsworth 'Image Dissector'camera. This can be seen on the left of the picture attended by a couple of technical attendants in white coats. Whether this electronic camera was actually working at the time is not reported. The official 'programme as broadcast' sheets only mention the Intermediate Film Camera and spotlight system. Note also that the gentleman speaker pictured is facing front, towards the IF camera and not the electronic camera, so it seems entirely possible that the Farnsworth machine was there only as set dressing. Of the entire (two) opening ceremonies no moving images were ever recorded but it's just possible that some wealthy individual took a movie from the screen. This priceless footage is now perhaps awaiting serendipitous discovery in an attic or garden shed. We live in hope.

Rebuilding a Murphy A242 by Paul Stenning



Introduction

This set was a gift from a neighbour of my parents. OK, maybe the word "gift" gives the wrong impression - for this radio it was either me or the rubbish bin!

It had been stored in a damp garage or shed for several years. The case was falling to pieces, and one corner showed signs of woodworm and rot. As soon as I received it, I wrapped it securely in polythene bin bags and left it in the garage. I wasn't letting it into the house until the woodworm was treated, and that would have to wait until the weather was reasonable.

Most of the veneer on the front had come away, but the person who rescued the set had retrieved all the pieces she could find and put them in a plastic bag. The tuning scale was broken, but fortunately near one end where there are not many markings. Apart from that, the set appeared to be complete and showed no obvious signs of previous repairs.

Disassembly

When the weather was better the set was unwrapped from the polythene - still in the garage. The top and two sides of the case were loose and were just lifted away, as was the back. I then set about removing the chassis from the front/base assembly. The magic eye and speaker were held in place with screws, which came out with no problems.

It is interesting to note that the top and bottom edges of the speaker had been cut away by about 1/4" each, so it would fit into the cabinet. I initially thought it was a replacement speaker, but there were no signs of previous fixing holes and the soldering looked original. The cutting away was clean and tidy - probably too good to have been done as a repair, so I concluded that this must have been done in the factory.

The knobs were fitted using grub-screws. Three came out OK, but the fourth would not budge. I applied some WD40 and left it for a few minutes, but this didn't help.

I tipped the set onto one end and removed the access plate from the base. Fortunately the jammed knob was on the tuning control, and by releasing the screw holding the flywheel onto the shaft, the shaft could be released. I had to loosen the tuning drive cord by releasing the spring from the wheel on the tuning capacitor, and could then remove the knob and shaft as one assembly. This would, of course, have to be sorted out properly before the set is reassembled. But for now it allowed me to continue.

The chassis was fixed to the base with four large screws, which came out with no problems.

Woodwcrm Treatment

The woodworm holes seemed to be confined mainly to one corner of the cabinet. There was no sign of new woodworm activity, even though the set had been in the warm garage for most of the summer. However I was taking no chances!

I sprayed a generous quantity of Cuprinol Woodwork Killer (the type that comes in an aerosol can with a pointed nozzle) into every flight hole I could find. As well as the main areas on the side and base, there were a couple of other holes in other panels. Although they were probably not woodworm holes, they were treated anyway. The whole job used over half a tin of the woodworm killer.

The pieces of the cabinet were then left in the garage (on polythene on the bench) for several days to dry out.

Chassis Initial Checks

Before going too much further, I decided to give the chassis a quick check over for any major (expensive) problems that could make the whole job not worthwhile.

Initial resistance checks on the mains and output transformer showed no problems. I connected the capacitor reformer to the main smoothing capacitor, which came up OK after a few minutes.

Time for the real test: I connected the speaker and an aerial, and then connected the chassis to the mains via the lamp limiter. A test meter across the HT showed nothing unusual, and after the usual warm-up delay I was rewarded with static and crackles. Operating the waveband switch and the tuning capacitor bought in a few stations. It was clear that the set worked fairly well on MW and LW, but not at all on VHF. This is probably the reason the original owner stopped using it years ago. A quick voltage check on the grid of the output valve showed the usual few volts positive due to the leaky coupling capacitor. I cut one lead and temporarily soldered a modern replacement in its place, which solved that problem.

This was sufficient to tell me there were no major problems. I will probably need one or two new valves for the VHF tuner, and it could also do with a new magic eye (the existing one is very dim).

Cabinet Reassembly

Several months later (longer than planned, but other jobs got in the way) I returned to the cabinet. The woodworm killer had dried completely and, although the weather had been warm, there were still no signs of woodworm activity. I brushed off the worst of the dust, and brought the pieces into the workshop.

Before I could start reassembling the panels I had to refix the sections where the plies of the plywood were coming apart. This was done by the usual method of squeezing in Evo-Stik woodworking adhesive, pushing it into the gaps as far as possible with thin card I then clamped the layers together between pieces of wood (using polythene

between the cabinet and clamp pieces to prevent sticking), and either clamps or heavy objects to hold it while the glue sets.

There were a number of sections that required this treatment so it had to be done in several stages (I only have six clamps). Although the glue bottle states that it takes 24 hours to fully set. I found that after about two hours I could remove the clamping and the bond would stay in place on its own, so I could move on to another section. I also glued several small triangular corner pieces that would be inaccessible when the cabinet was reassembled back into place. It was not possible to clamp these so I simply pressed them into place and let gravity hold them there while the glue dried. This whole process took a day (on and off).

The two fabric-covered sections of the front panel are held into the frame with a number of screws. I considered removing these to make the job of refinishing the rest of the cabinet easier, but most of the screws would not budge so I decided against this idea. Also, these panels seemed to be the only things holding the front frame together now the case was in pieces.

The following day I started on the actual reassembly. Because some of the panels were slightly warped it was clear from a dry-fit that I would not be able to secure the whole thing together in one go. I started by fixing the side panels to the base/front assembly using more Evo-Stik woodworking adhesive. This was held together with clamps on the front edges and a bungee strap (length of elastic with a hook at each end) right around the cabinet near the bottom to pull the back corners in to the base. To help keep the assembly square, the top was slotted approximately into place as a support. A couple of corners were still not sitting snugly but I couldn't find a way to hold them in place with the limited selection of clamps I have. Instead I used a couple of small panel pins, hammering the heads below the surface with a punch. I already had plenty of woodworm holes to fill later, so a couple of nail holes didn't matter!

After about three hours I released the clamps etc., and glued the top panel into place. This was the most distorted and needed four clamps along the front edge and a couple of heavy transformers to hold the back corners. The bungee strap was used again to pull the sides in, and a couple more panel pins held the awkward corners. I then checked for square at the back, by measuring the diagonals and by checking the back fitted correctly.

Once this had been drying for a couple of hours or so I glued the corner support blocks back in place. They were light, and the wet glue was sufficient to hold them in place in the top corners. I then left the cabinet for several days to ensure the glue was fully set, before moving on to tidying it up.

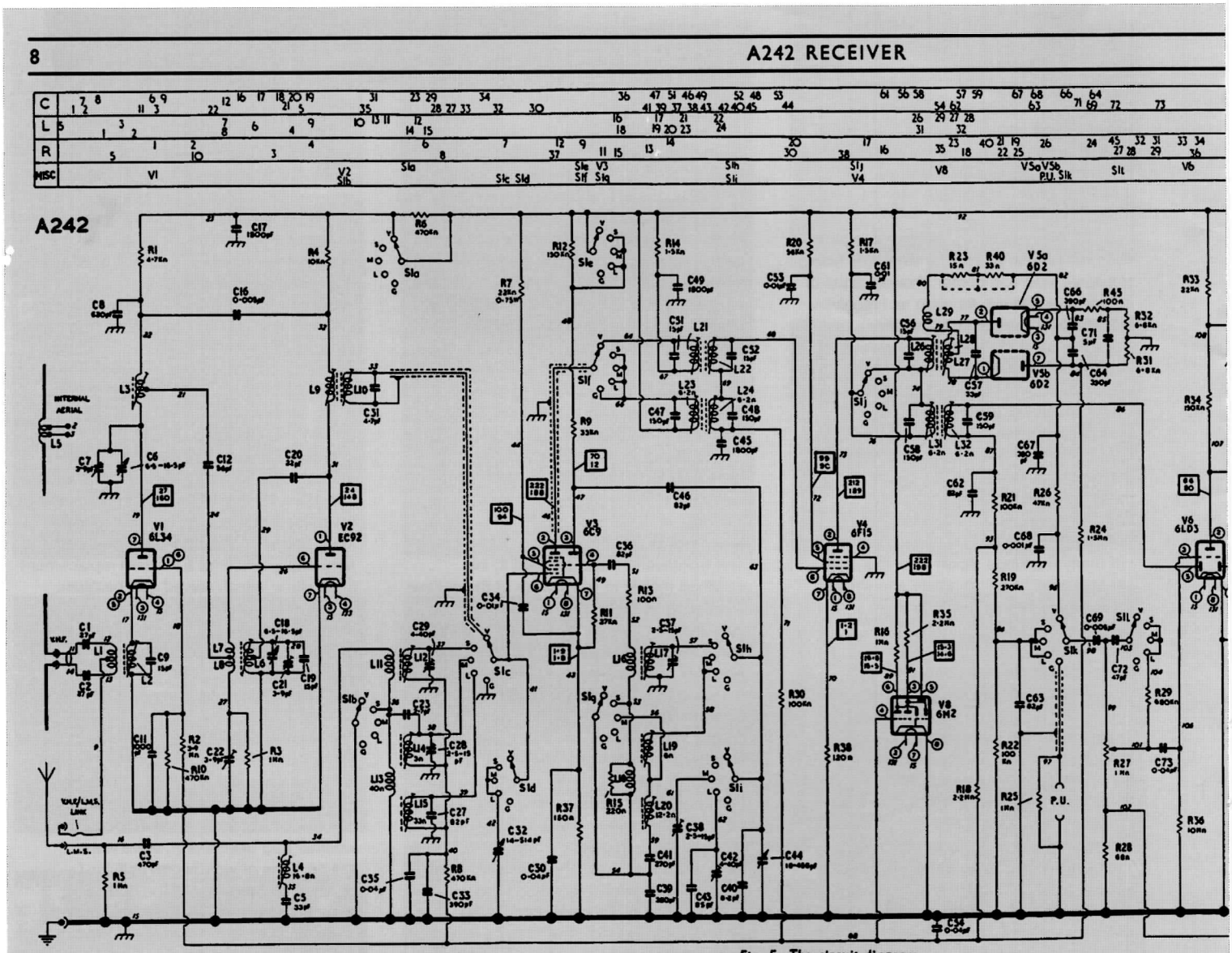


Fig. 5. The circuit diagram.

The Waveband switch (S1a–S1l) is shown in the V.H.F. position and the Tone switch (S2) is shown in the minimum h.f. response position.

Circuit voltages are shown within rectangles and were measured under no-signal conditions using a 20KΩ/V meter, with the receiver switched first to the M band and then to the V.H.F. band. Where the readings differed appreciably, both are quoted with the M band reading at the top.

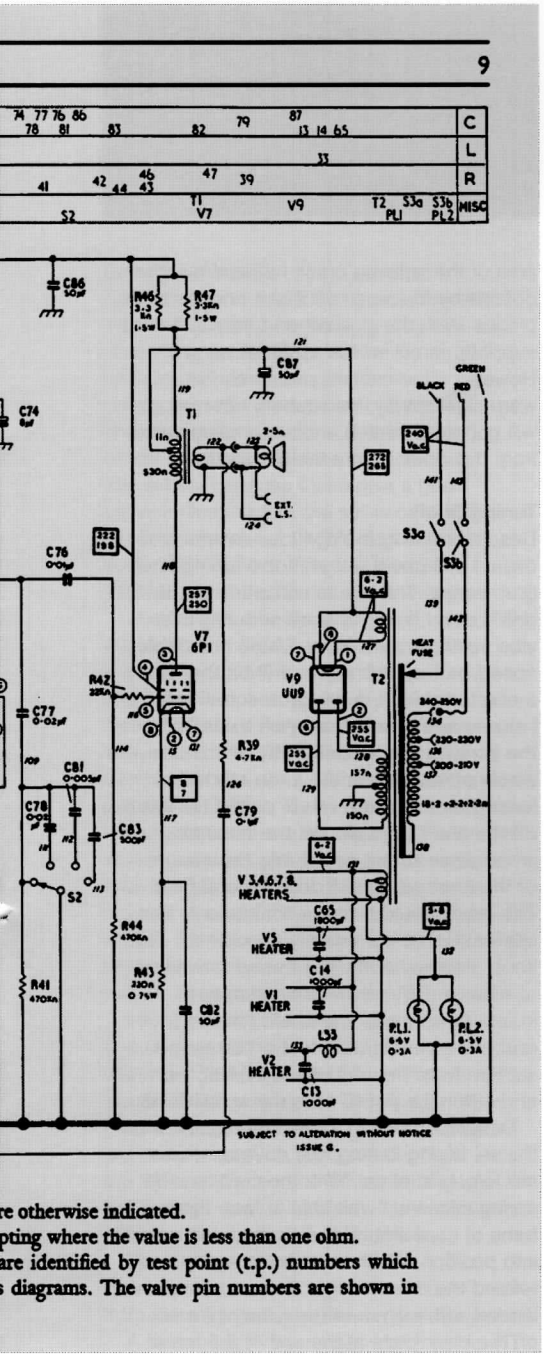
All resistors are rated at 0·6W excepting whe
The d.c. resistance is quoted for all coils exc
Component terminals and connecting leads
correspond with those appearing on the chass
small circles.

Cabinet Repair and Refinishing

The proper way to approach a cabinet like this would be to replace all the rotten/damaged wood with new panels, apply new veneer if necessary, stain the new woods to match the original and then refinish the cabinet in a style matching the original appearance. The result would be a very nice set.

This would involve significant expense, and would also require carpentry tools (such as a router), ability and experience that I don't have. If this were a classic set from the 1930s or a rare model from the 1920s, this sort of restoration would be viable, and indeed would be the only appropriate approach.

However this isn't such a set. It's a run-of-the-mill set from the mid-1950s, and examples with reasonable cabinets are still available at swap-meets for about £30. It therefore did not make sense to spend a fortune restoring my set, particularly since the result would probably still not be as good as an original. I decided that I would do the best I could with the materials to hand, and maybe spend up to £20 or so on materials if necessary. Fortunately I already had a reasonable accumulation of stains, wood fillers and polishes etc.



re otherwise indicated.
pting where the value is less than one ohm.
are identified by test point (t.p.) numbers which
s diagrams. The valve pin numbers are shown in

Repair and Filling

I filled the woodworm holes, nail holes, gaps in the joints and other damage with wood filler. The bottom front corner of the left panel was quite badly rotten. I removed the flaking pieces that were beyond hope, then started to rebuild the section using wood filler. This had to be built up in several layers because the filler will only dry to a depth of about 3mm. Once I had achieved about the correct shape it was shaped and flattened with a file.

The pieces of veneer that were still in place were re-glued (again with Evo-Stik woodworking glue) where they were lifting, and held with masking tape while the glue dried. Some of the loose pieces could be pieced into place, and the remaining bits were just sufficient to finish the top edge and two side edges. This gave consistent colour to these areas.

The bottom edge was veneered with some new veneer that I had left over from another job. It was a lighter colour but I hoped I could stain it to give a passable match. At least being a separate complete run it wouldn't matter so much if it didn't quite match. I also glued a piece of veneer over the wood filler repair on the side panel (again not an exact match but better than filler). The slight gaps where the veneer pieces fitted together were filled with wood filler.

Stripping

The next job was to remove what remained of the original finish. This appeared to be a sprayed varnish, and much of it had already flaked away. Most of the remaining finish was scraped off using a sharp paint scraper. I found it most effective to scrape at about 45 degrees to the grain.

The varnish on one side was a bit more stubborn so I had to use some chemical stripper. Because I was doing the job indoors I wanted something that was not too smelly. I also wanted something fairly gentle since I am only trying to remove one thin coat of varnish, not several thick coats of gloss paint. I purchased a bottle of Nitromors "Super Strip" which claimed to be "safer to use" and "low odour". The instructions said that some paint removal may occur after 1-2 hours but for best results leave for 4-6 hours, so it is obviously a fairly gentle and slow-acting product. I found that it had softened the varnish sufficiently to allow it to be scraped off after only 20 minutes, so this is a good choice of stripper for our purposes. It also has a brush in the cap that makes application easier, and it doesn't burn if you get it on your skin (as long as you wipe it off straight away). The stripped area was then cleaned with meths to remove any residual stripper.

The only section that was not stripped was the inside edge surrounding the front panels. The varnish here was in reasonably good condition. This section is a lighter colour than the rest of the cabinet, and I felt that by leaving the varnish untouched it would act as a mask if I accidentally got wood-stain on that area. The rest of the cabinet was then lightly sanded with fine (120 grit) sandpaper.

Staining and Finishing

I tried the wood-stains I had on a piece of scrap plywood to get an idea of the colour. The best one I had was Indian Rosewood. This seemed to be dark enough to bring the various odd coloured sections together, although it was possibly a bit too red. I added some of this to a nearly empty tin of American Walnut (which on its own was too dark). This gave a combination that was not so red and also not too dark. I applied this with a rag as instructed, and left it over-night to dry before rubbing off the excess. The result was very pleasing. As I had hoped, the colour was reasonably consistent, and the sections that were obviously different previously now toned in very well.

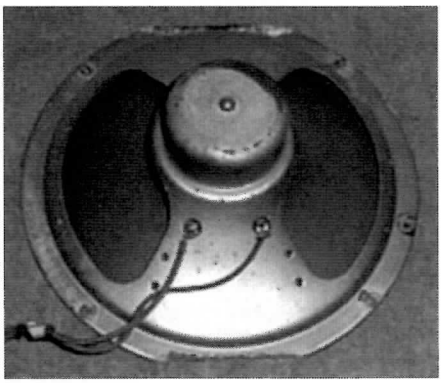
Since the set originally had a varnished finish, I felt it was best to stay with this. Varnish also has the advantage that it will soak into the wood and give a bit more support to the slightly flaky plywood corners when it dries. Because the front sections were in place I felt spraying the varnish would not be a good idea because it would be difficult to mask the area completely. Also it was now approaching winter and too cold, damp and windy to be outside doing the job with aerosol cans.

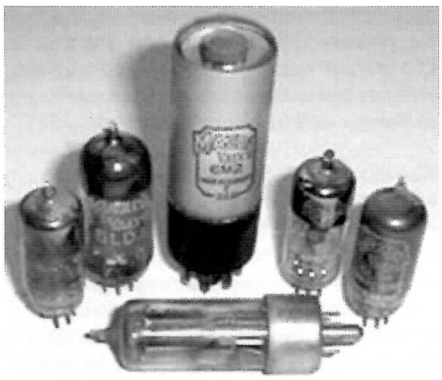
I purchased a tub of Cuprinol Varnish for interior wood, in a satin finish. I selected the Antique Pine colour because this was about right for the unstained section and I thought the slight aged yellow effect might soften the new stain look a bit. The product claimed to be "low odour" which is an advantage when working indoors, and the brushes can be cleaned using water. I also bought two B&Q fine finish paint/varnish brushes (12mm and 25mm), because I wanted to avoid visible brushstrokes as much as possible. These items, together with the stripper mentioned earlier totalled to about £20, which was the figure I had budgeted for.

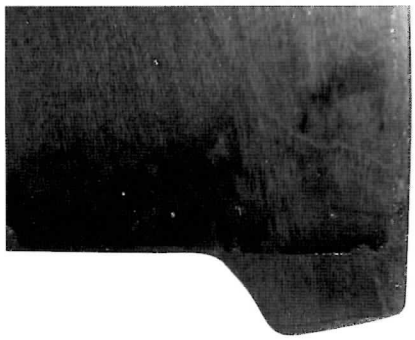
Although it gave a reasonable finish, I found the varnish tended to dry rather quickly. It was therefore necessary to apply it fairly quickly and to avoid overlapping any varnish that had been applied more than a minute or two ago. For this reason I would not recommend this product for refinishing valve radio cabinets. Something slower drying would be a better choice. However, after three coats (24 hours between them) I had achieved a satisfactory finish. The solution was to leave the window open, the door shut and the radiator off for 24 hours before applying the final coat, so the room was cooler, and the varnish dried slower.

I wrote to the manufacturers explaining what I was doing and the problem I had, and asked their advice on applying the product or for suggestions of alternatives. They sent back a standard apology letter and a £10 voucher, and did not answer any of my questions!

Once the varnish on the cabinet was fully dry, the brass strips were polished with Brasso wadding and the other fixed trim was cleaned.







Murphy Badge

While waiting for various glues, stains and varnishes on the cabinet to dry, I tackled some of the other trim. Part of the red enamel from the Murphy badge had chipped away. I removed the badge from the cabinet (it was a press fit) and filled the offending areas with appropriate coloured enamel model paint. To achieve the correct shade I had to mix some red with a small amount of black and an even smaller amount of a reddish-brown. After a week (to ensure the enamel was fully set) the excess was cleaned away using Brasso wadding.

Tuning Scale

The two sections of the broken tuning scale were carefully cleaned on the outside only. I used foam cleaner (applied to the rag not to the glass) to remove the worst of the muck, then a paint scraper to remove the remains of Sellotape adhesive (presumably a previous attempt at repair) and other dried dirt. I then used Brasso wadding to clean the specks the paint scraper didn't get, then polished off with a soft duster. The edges of the crack were cleaned with isopropyl alchohol.

With the dial face up on a piece of tissue paper on the bench, I carefully positioned the two pieces together. A strip of masking tape was then placed along the join and pressed firmly down. I then turned the whole assembly over. By lifting the broken area the joint would open, and it would close correctly when laid flat. I opened the joint this way and applied some superglue along both edges (the version with a brush in the cap is the best for this job) then laid the scale flat and left it for half an hour. With the tape removed the result felt secure, although it obviously isn't very strong. The crack can be seen if you get the light at certain angles, as would be expected.

Loctite also produce a glass adhesive that has the same refractive index as glass and claims to give invisible repairs, but this needs UV light or bright sunlight to cure. I didn't have any of this glue to hand, and I also don't have a UV lamp and there isn't much bright sunlight approaching winter!

The print was slightly chipped by the break, but since this was in an area of the dial that is mainly black it was an easy matter to paint this area black again using enamel model paint.

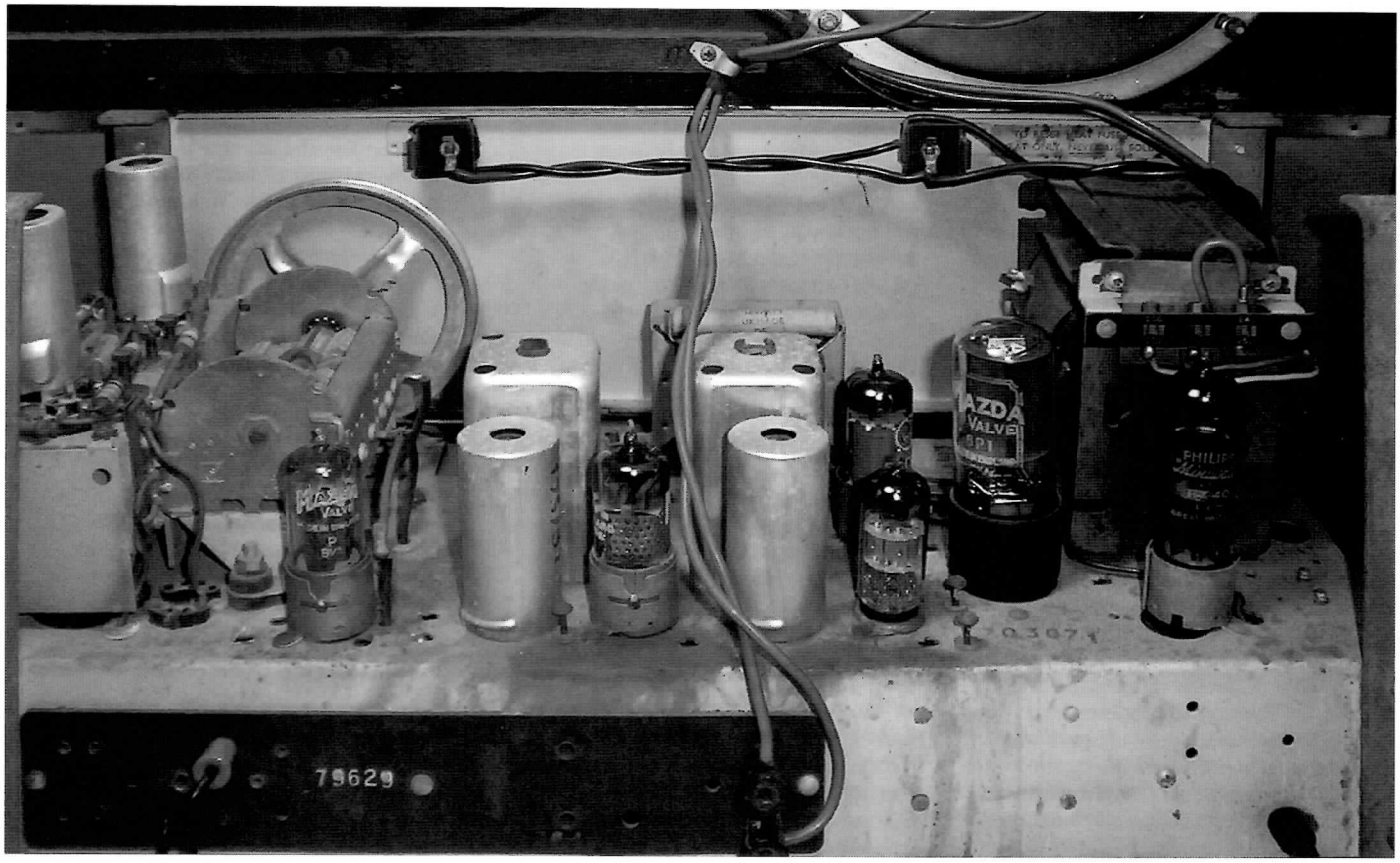
The scale was originally fitted into the cabinet by four metal brackets pressing onto small rubber pieces fitted onto the edges of the glass. The rubber pieces had become hard, so I used four rubber sleeves slit along their length. When I came to fixing it into place however, I found that the front of the cabinet was not flat. The scale was in contact with the cabinet in the centre but raised at the ends. If I were to use the original fixings I would stress the glass and probably break it. The break I had repaired was close to one pair of fixings. I assume that the cabinet was either warped when made or more likely became warped over time, stressing and eventually cracking the scale.

Clearly I couldn't use the original fixing method. Instead I needed something that would support the glass without applying any stress to it. With the cabinet laid face down I laid the scale into position and supported it with some pieces of cardboard so that it was slightly away from the cabinet in the middle and spaced away equally at both ends. I then fixed it into place with a few small dollops of hot-melt glue. In the area of the repaired crack I placed the glue dollops by the repair so that it bridged both pieces. With the glue set and the cardboard supports removed the scale felt secure. However if the cabinet should continue to warp significantly, the rubbery hot-melt glue will hopefully stretch and become unstuck from the wood before the glass breaks.

Tuning Shaft

Despite soaking in WD40 for several days, I still could not shift the tuning knob grub screw. There was no option but to drill it out. I held the shaft securely in a vice having plastic jaws. Using a variable speed battery drill and a drill bit that was a comfortable fit in the grub screw hole, I slowly and carefully started to drill into the screw. I had to drill away almost the whole screw before the knob started to loosen on the shaft. I then pulled the knob off the shaft then wound the remaining small piece of the screw into the centre of the knob using the drill bit hand held. The piece could then be shaken out. The shaft survived completely unscathed. The knob also had sufficient thread remaining to allow a 2BA screw to be screwed in and able to grip the shaft. I made a grub-screw by cutting a short threaded section from the end of the 2BA screw and cutting a slot to take the screwdriver.

Despite operating the tuning capacitor on the set during testing, the drive cord was still largely in place. With the cord tension spring released I was able to loop three turns of cord around the shaft and fit it back into position. When the tension spring was refitted the drive worked fine, and the pointer landed within 1mm of the reference mark on the back-plate at the end of the travel.



Electrical Repairs

Several months ago I had concluded that there was nothing seriously wrong with the chassis, apart from the lack of life on VHF and the very dim tuning indicator. Before continuing with the repairs, I tested the chassis again, to make sure I was starting where I had left off. I also replaced the dial lamps, because these give a good visual indication that the set is on and live. I noticed that the voltage selector was set to 220-230V, so I moved it to 240-250V to suit the national mains voltage.

I had ordered new replacement valves for the VHF head (EC92 and 6L34), together with a so-so used 6M2 tuning indicator from Valve and Tube Supplies, so the first job was to try these and see if they made any difference. They didn't. The FM ratio discriminator detector diodes are a 6D2 valve, so I replaced this with a CV140. The heater did not light so I wiggled the valve a bit. This got the heater working and bought about some crackles. With the set switched off I applied some contact cleaner to the valve socket, then refitted the valve. VHF now worked, although the volume needed to be set at nearly maximum to get a reasonable sound level.

I tried the original valves again in turn. The original 6D2 worked but the sound was distorted. The original 6L34 was also OK, but the EC92 was dead. The EC92 is the FM oscillator so if this stops working there will be no reception, whereas the 6L34 is the RF amplifier so something should still get through even if it is fairly low emission. I left the three new valves in place.

The tuning indicator was lit (an improvement on the original!), but didn't move from the minimum position on any waveband.

A few voltage checks showed that the HT was only 145V - it should be at least 250V. The transformer output voltages were OK, so I suspected the rectifier valve. This is a UU9, so I tried an EZ40, which is a direct equivalent. The HT was then 275V, but this made no difference to the performance of the set. Nevertheless, the EZ40 remained fitted.

Waveband Switch

There was one previous repair evident. The section of the waveband switch that selects whether the HT is routed to the VHF tuner head or the AM mixer-oscillator valve anode (via 33K resistor), had presumably suffered from tracking, because the connections had been removed and linked together. This meant that the HT was applied to both circuits whatever waveband the set was switched to. The set seemed to work OK wired this way. I wondered whether this might have something to do with the lower audio level on VHF, but disconnecting the 33K resistor (so the circuit was as it would have been on VHF with the switch connected) made no difference. I decided to come back to this later.

Further checks showed that it was not actually very loud on the AM bands either - the volume control was above half-way for a reasonable listening volume. This had to be due to either the triode amplifier or the output pentode.

I replaced the 6LD3 double-diode-triode with a new EBC41 (direct equivalent), which was a vast improvement. Voltage checks around the output pentode (6P1) showed that this was also a bit down on emission (the cathode voltage should be 8V but was only 6V), however it was working well enough and I didn't have a suitable replacement to try, so I left it.

So that's four valves needed (five actually replaced), plus the tuning indicator. It is possible that the voltage selector being set incorrectly damaged them. Or maybe the voltage selector had been set to a lower setting to get the radio working again as the valves aged.

Capacitors

Considering the fact that the set was full of Hunts capacitors, most of which were falling to pieces as these tend to do, it was actually working fairly well. However it was still not quite right. The tone control only gave reasonable sound in one position and crackled badly as it was operated (even after applying contact cleaner). Tuning, particularly on VHF, was not as precise as it should be. And the tuning indicator was still not responding.

Since I was going to change these capacitors anyway, I decided to do this now, because I expected this to solve the outstanding problems. There were about fifteen in total, most of which I replaced with dipped polyester types intended for PCB mounting (because they were the cheapest I had).

One capacitor was visible on the top of the VHF head, so I used one of those beige coloured translucent Wima capacitors which looked better than a more modern part. I also replaced the small 5uF electrolytic capacitor in the FM ratio discriminator detector circuit.

Volume Control

While I was replacing the capacitors, I discovered another previous repair that I had missed before. The volume control pot had been replaced. The engineer

had cut the tags from the faulty control and soldered them onto the tags of the new pot. This was done neatly, because I only discovered it when unsoldering the connections to change a capacitor.

I also found a capacitor with one end completely disconnected. By reference to the circuit diagram, this was part of a treble-boost circuit around the volume control, which is switched in on the AM bands only. The related resistor was missing. I wondered whether this circuit had been removed due to another switch fault, but there was no sign of discolouration on the switch. I reconnected the circuit as it should have been, knowing that if there were problems I could remove it again.

Unlike many sets, this chassis is easy to work on. The mounting brackets extend upwards at the front and rear forming support brackets that allow the chassis to be placed upside down or stood on either end steadily, with no risk of damaging components.

Further Tests and Repairs

Following the capacitor replacement session, the set worked a lot better. In fact it sounded really good - and this was with the speaker just sat on the bench.

I then returned to the HT switching section of the waveband switch. As with the other section that had been disconnected, I could see no discolouration. I cleaned the switch with some contact cleaner and a toothbrush, then reconnected the circuit as it was supposed to be. It worked fine on all wavebands, and there was no crackling or rustling after a few hours soak testing.

So why had the switches been disconnected? My guess is that the set required repairs for a crackling or rustling sound, and the engineer focused on the likely sources of this fault (tracking on switches) before eventually realising that the problem was the on/off/volume control (possibly the switch section). Once this was replaced the set worked, so the engineer didn't bother to reinstate the original connections. Maybe he had spent enough time on the job already.

The only electrical job remaining was to replace the mains flex. The original cable was a three-core type with the earth connected to chassis, and I fitted a three-core replacement the same way. The original cable clamp was a wedge-shaped sleeve, which is slid over the cable (it's a snug fit) and pressed into a hole in the chassis from the inside. Although it seems a bit uninspiring, it actually worked very well on the new cable. It would however be possible to push the cable into the set and loosen the grip, so I applied a bit of Superglue where the sleeve fits into the hole to give it some extra support.

Chassis Cleaning

On the home stretch now! The chassis was originally covered in a thick layer of brown dust. The worst of this had been brushed off before I started, and more had been removed during the electrical repairs, but it was now to time to give it a thorough clean, including all the inaccessible gaps. I used an old toothbrush and a paintbrush to clean every speck of dust I could get to. Small gaps between and underneath components were cleaned with cotton buds, small paintbrushes, folded tissue paper and anything else that would fit.

Underneath the dust the chassis was in very good order. It had originally been plated, and this plating was still sound so there was no rust anywhere. I decided against any further (wet) cleaning because it looked presentable as it was. The HT decoupling resistor mounted on the output transformer consisted of two 3K3 2W carbon resistors in parallel. These were absolutely filthy, and attempts to clean them resulted in the markings being removed while the dirt still remained! They looked a mess so I replaced them with a single 1K8 10W wirewound resistor. This was a grey RS type probably made in the 70s, which didn't look out of place.

The white metal plate behind the tuning scale pointers was anything but white! The paint was badly discoloured in one patch, and looked very dirty. I removed it from the chassis for attention. It wouldn't clean with foam cleaner, and T-Cut did not have any worthwhile effect. I painted the whole plate with aerosol car paint in Ford Sierra Beige (I had a part-tin left over from another job), and left it to dry overnight before refitting.

The valves, which had been removed for safety while cleaning the chassis, were themselves carefully cleaned (taking care not to disturb the markings) before being refitted.

Reassembly

Once the knobs were cleaned with foam cleanser and Brasso, the set was carefully reassembled. Everything went together with no problems.

The only section I did not bother to resurrect was the internal VHF aerial. This consisted of foil strips glued inside the top and sides of the cabinet, most of which was now missing. The piece of cable linking this to the socket on the chassis had been cut short and the plug was missing. This sort of aerial never works very well in my experience anyway, so I decided to stick with an external wire aerial.

Operation

The finished set sounds really good. It was clearly an expensive radio when it was originally sold (£26 5s in 1955 according to the Trader sheet), and the original owners must have been very pleased with it. There were many sets that received the new VHF band, but few did it justice as well as this set.

Unfortunately it only tunes up to 101MHz so it won't receive Saga FM. However the first test was on a Sunday afternoon, so I tuned it into BBC Radio 2 and thoroughly enjoyed listening to the music played on Desmond Carrington's All Time Greats and the following programme, while I finished typing up this report (this was some time ago before Radio 2 ruined their Sunday programme lineup).

The tone control is a four-position switch that applies varying degrees of treble cut. I think it sounds best on position "1", maximum treble. Position "2" softens it a little and is still very pleasant. Positions "3" and "4" were probably intended for those listeners at the time who were not used to the bright sound of VHF broadcasts and preferred a more mellow tone. MW and LW are also surprisingly clear without being shrill or sounding off-tune. The treble boost circuit on these bands probably helps here. Even weak stations on MW and LW sound good.

Conclusion

Well, at the end of that epic I had turned a pile of rotten junk that was destined for the skip into a presentable radio that also sounds good. At a cost of...

Six valves (probably £30 if I had to buy them all), fifteen capacitors (about £5), cabinet materials (£20 spent plus lots I already had), etc. Plus probably 40 or 50 hours work. And the result is a set that's worth probably £30 in auction.

No, it doesn't add up. In pure financial terms, radio restoration is rarely worthwhile, particularly if you have to consider the time at an hourly rate. But to us radio collectors and restorers, that's irrelevant.

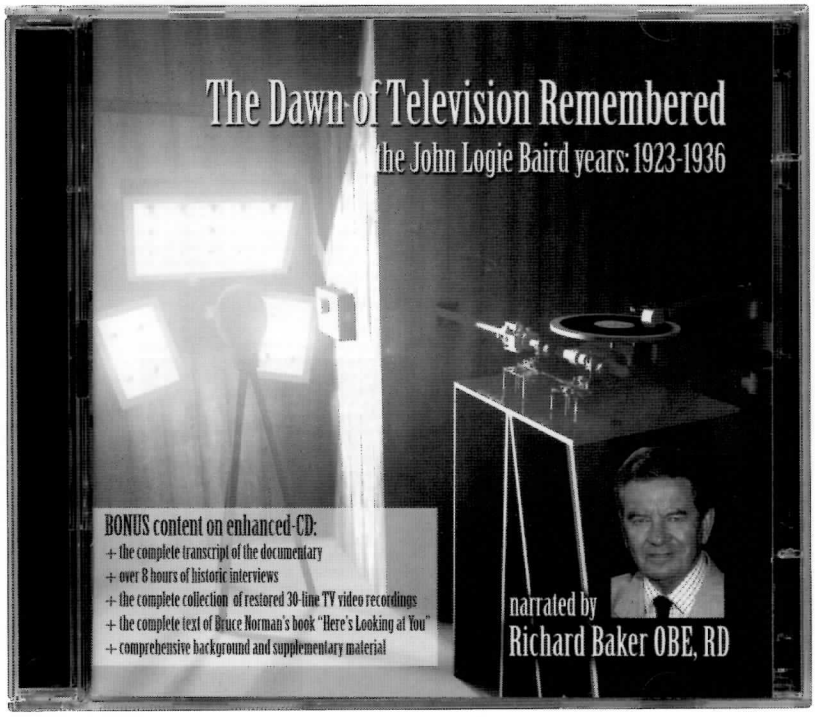
Restoring sets like this is a useful exercise, because you can learn from your mistakes before tackling something that is actually worth some real money. Probably the main mistake on this set was the choice of varnish. The satin finish and the colour was OK, but the drying speed was too quick.

Some of the repairs are visible, but I think that's unavoidable with the way I tackled it. For example, the join between the original wood and new veneer on the bottom corner of the side is visible. The solution would be to completely veneer the side. If it were a more valuable set, this sort of thing would have to be done differently.

But despite all that, I am very pleased with the result.

CD review
The Dawn of Television Remembered (Double CD, audio plus Enhanced CD)

Donald F McLean
Narrated by Richard Baker
Reviewed by Jeffrey Borinsky CEng FIEE



Some of you will have read Don's book *Restoring Baird's Image.* When I reviewed this book a few years ago I said that it really needed a companion CD for the moving images that Don had recovered from 30 line recordings. We now have much more than this in a 2 CD set.

If you enjoyed the book, you will certainly want these CDs

What do you get for your money? All of disc 1 and some of disc 2 is audio from material recorded by more than a dozen pioneers including Tony Bridgewater, Marsland Gander and Ray Herbert. The narration and links are impeccably done by Richard Baker. This is a fascinating collection of reminiscences from the 30 line era continuing into the start of the high definition service from Alexandra Palace and Baird's later work on colour TV.

The remainder of disc 2 is a substantial resource, primarily of material relating to Baird and British mechanical TV. I emphasise British. The author admits that it would have been beyond the scope of these CDs to cover work in other countries. I don't want to repeat the complete contents list but you certainly get more than you might expect.

First and perhaps most important are the restored results of all the known 30 line recordings. Many of you may have seen some of them in Don's lectures but it's wonderful to be able to view them at leisure. You can also listen to them. A 30 line image occupies only audio bandwidth and anecdote suggests that some TV pioneers could tell you roughly what was on the screen simply by listening to the "video" signal! A hefty bonus is a complete PDF of Bruce Norman's book *Here's Looking at You*. There is also much for the serious researcher in the field of early TV. The unedited recollections of Bridgewater and others, as used for the audio presentation, are included as MP3 files. The author himself admits that these will be of interest to only a tiny minority but the publication in full of such significant primary source material is unusual and commendable. Explanatory notes and a comprehensive bibliography round off a comprehensive view of this period of TV development.

The booklet is well designed and informative. The CD format puts booklet space at a premium and the twelve pages of closely packed information can only be the barest introduction.

These CDs (and Restoring Baird's Image) are much more than a technical history. The technology is inseparable from the social context. In almost 80 years, television has developed from an impossible dream to the all pervasive medium we have today. If you enjoyed the book, you will certainly want these CDs, if you don't have the book I will take the liberty of quoting from my own review:

Scholarly research and "can't put it down" writing are rare companions. Don McLean has succeeded magnificently in conveying the excitement of unearthing and restoring recordings of Baird's 30 line TV pictures.

On a technical note, you can listen to all the audio tracks on any CD player but you will need to use a computer (PC or Mac) to access the other material on disc 2. The CD can be bought directly from the author via his web site at www.tvdawn.com. The UK price is £15.50.

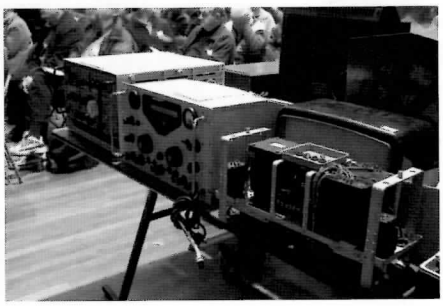
Also from:
- Kelly Books: 01884 256170 www.kellybooks.co.uk
- Many BVWS meetings
- National Museum of Film, Photography and Television at Bradford.

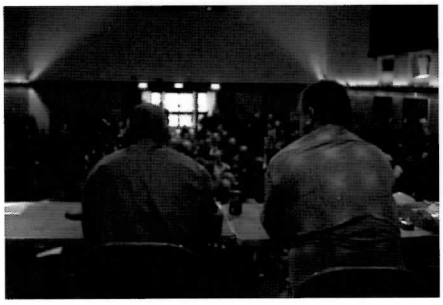
If you do not have Don's book you can buy it directly from the IEE at £29 (discount for IEE members) or from the IEE book stall (discounted for all) at some BVWS and NVCF meetings

Restoring Baird's Image
Donald F. McLean
Institution of Electrical Engineers
ISBN 0 85296 795 0

Harpenden Auction March 6 2005

Photographs by Carl Glover



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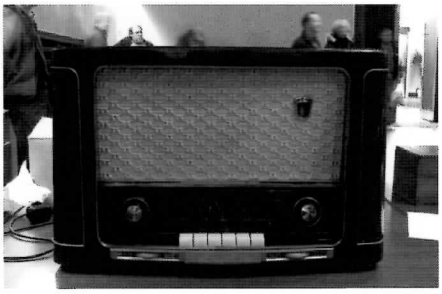


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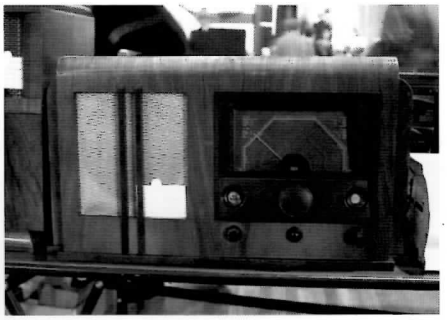


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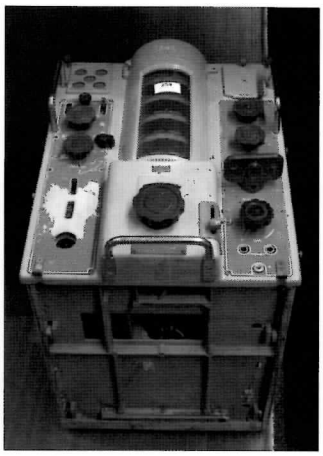


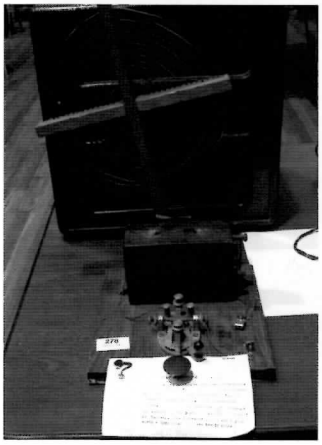



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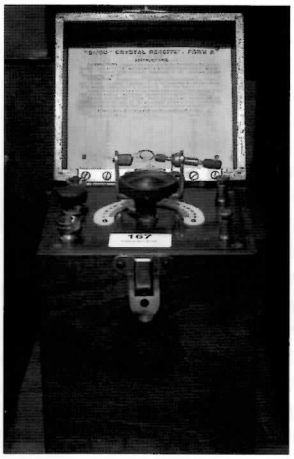
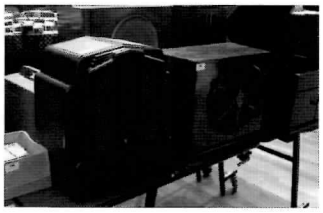
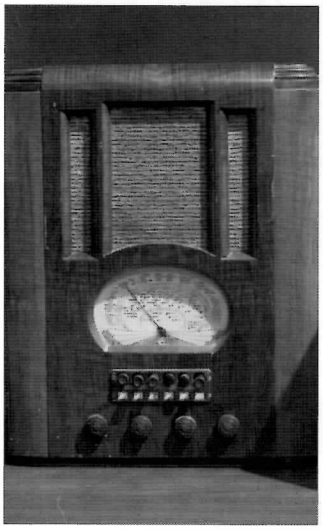





Aurora Standards Converter

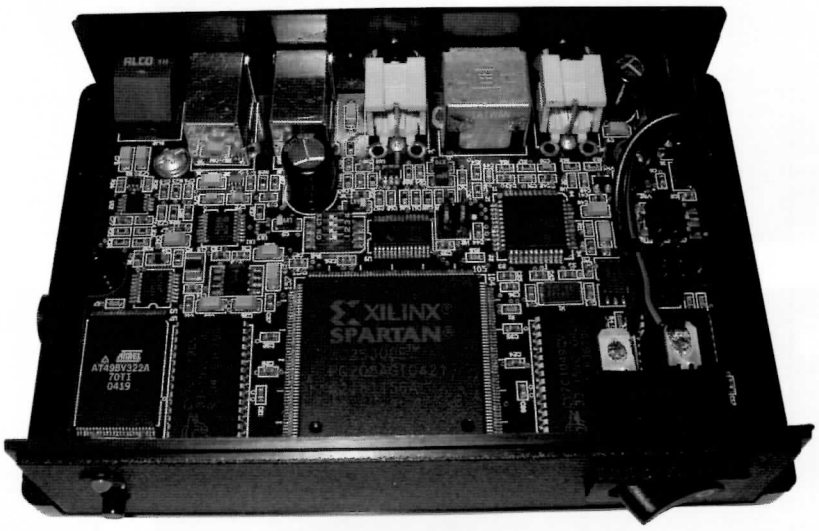
A review by Jeffrey Borinsky FIEE C.Eng.

It's standards converter time again! Vintage TV enthusiasts now have a choice of two standards converters. The well established Domino has now been joined by the Aurora. Inevitably I will compare the two products in this review. If you're about to skip to my conclusions I can say now that both are excellent products, each with its own mix of strengths.

Aurora converter

I reviewed the Domino in 2002. It was, and still is, a very good design that has sold well.

The new product is the Aurora multistandard converter, designed by Darryl Hock who lives and works near Detroit. This can not only produce 405 line pictures but a whole range of other standards from 819 all the way down to 30 lines. It can also accept PAL, NTSC or SECAM inputs. It does not have a modulator. I have used a prototype unit for this review but I have also seen a production unit. I will highlight any important differences.



Internal view of Aurora converter

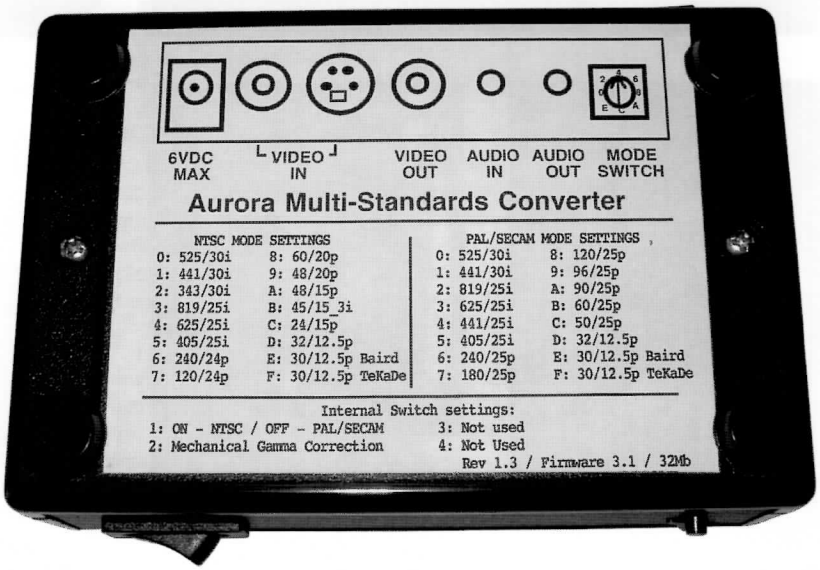
A note about prices

I feel I need to make this point in all reviews of converters. Prices of £300 to £400 may seem high but the economics of small scale production make it inevitable. TVs, computers and other consumer products are only cheap because they are made in huge numbers. PCBs and components in small quantities are a lot more expensive than in bulk. So is assembly, especially for fine pitch surface mount devices as used in Aurora. I reckon that Darryl is making very little profit on each unit.

If you have more time than money there is now a design that could realistically be built by a skilled enthusiast. Darius in Germany has designed and built an analogue converter. The vital line memories are charge coupled delay lines that are normally used as part of the dropout compensator in a VCR. If you are interested you can contact Darius by email at: radio-darius@t-online.de

At least one copy has been built successfully by Peter Scott, a UK enthusiast. You could probably buy all the bits for not much over £100 and some might be in your junk box anyway. There are no PCBs available for this design. Strictly a Veroboard job. I have seen it working and the results are better than you might expect given the simple methods employed. Its main failing is very limited bandwidth. This is inherently limited to about 1.8MHz (at the 405 line output) by the clock frequency used in the delay lines. Fine detail above this frequency is severely aliased which is very obvious on test card but less of a problem on real pictures.

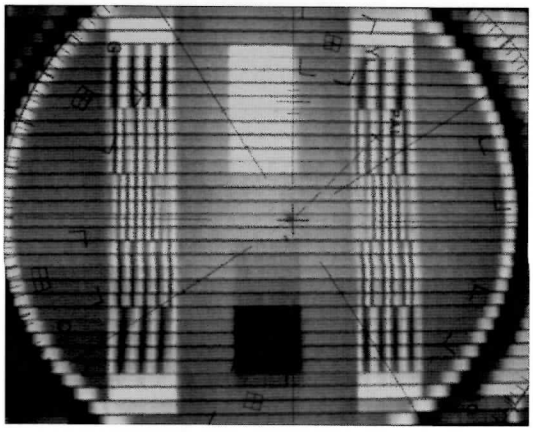
After this digression it's time to get back to the Aurora.



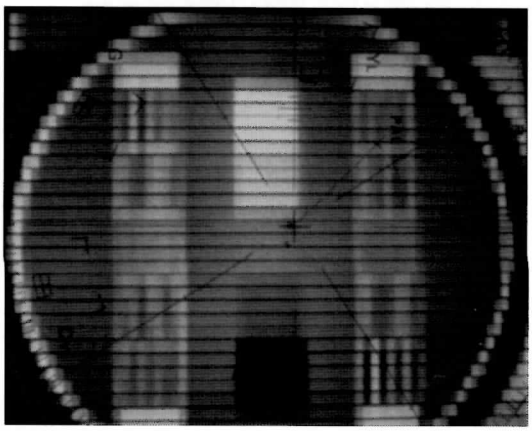
Label on underside showing switch setting for different standards

First thoughts

My first impression of the Aurora was "It's tiny!" About 4"x3"x1.5". The power supply is an external "wall wart". This guarantees electrical safety and is an appropriate choice. The one supplied with Aurora will work on any mains voltage and has interchangeable clip-on adapters for UK, US and several others.



32 line picture from Peter Smith's converter



32 line picture from Aurora converter

It is hard to fault the performance of the Aurora. It has excellent high frequency response, performs well with all sorts of input signals and has excellent interpolation.

The technology under the lid is very modern. All the digital processing is in a Xilinx programmable logic device. This is flanked by some large SRAMs acting as framestores, a Philips SAA7113 multistandard decoder, a flash memory to store the Xilinx code, more flash to store test patterns and a fairly small number of other parts. A hex switch is used to select the output standard. The Xilinx can easily be reprogrammed; more about this later.

Performance at 405

It is hard to fault the performance of the Aurora. It has excellent high frequency response, performs well with all sorts of input signals and has excellent interpolation. For 405 line outputs Aurora interpolates 3 lines from the same field. This gives interpolation quality which is theoretically better than anything except the BBC CO6/509 which used four lines. In practice it is difficult to see any improvement over the 2 line interpolators used in the Domino. Other standards use a mixture of vertical and horizontal interpolation as appropriate.

As with any framestore based converter (Domino, Pineapple) the output will provide stable and continuous syncs regardless of input. This is kind to your vintage TVs.

The original 405 standard did not have equalising pulses. Although this should not be a problem with good receiver design the fact remains that many sets suffered from poor interlace. Production versions of the Aurora have a switch. You can turn EQ pulses on for best interlace or off for complete authenticity.

An unusual feature is a S-Video or YC input. If you have really high quality video sources, including monochrome ones, using this input will maximise bandwidth and minimise colour related artefacts.

The review sample had phono connectors for video. I would have preferred BNCs. Buyers are now offered the choice of phono or BNC.

The built-in test pattern generator can capture frames of still video to use as test patterns. Production units come supplied with test patterns including Test Card C. These are acquired via the analogue video input. I would have liked to have seen some digitally derived test patterns pre-programmed in the flash memory but this is really me being a bit too fussy.

I loaned the review unit to David Boynes for further assessment. David's achievements include the first 625 to 405 line converter to be designed and built by an amateur. He also has a fine collection of pre and post war receivers. I was with David when he displayed the converter output on a 23" receiver. He and I both thought the picture quality was superb, limited mainly by the quality of the vintage material that we viewed. We felt that very few viewers in the heyday of 405 would have seen such good pictures.

30 and 32 line standards

Peter Smith has investigated performance on the NBTVA 32 line standard. Peter has built replica Baird Televisors and made extensive studies of mechanical television. He designed his own dedicated 30/32 line converter in 1989 using simple discrete logic. He used this for comparison in his tests.

For the tests Peter used Test Card C as a source and a Tektronix 602 XY display. This CRT based display makes it possible to assess the converter without any artefacts that might be caused by a mechanical display. TV engineers will recognise the vectorscope graticule which is within the CRT and irrelevant to this report.

Linearity and grey scale were excellent but resolution along the line was lacking. This was not unexpected as the Aurora specification states only 60 pixels on the 32 line standard. This is apparent in the photos showing results from the Aurora and Peter's own converter. For a more realistic test, a 10kHz low pass filter in the output of each converter mimics the best bandwidth that was available to Baird in the 1930s. This reduces the difference between the two converters but the lack of resolution in the Aurora is still very apparent. At the time of writing, Darryl is planning updated firmware which will double the resolution on the mechanical standards. This will be available by the time you read this review. Existing units can easily be updated as noted below.

The only facility Peter found missing was the ability to pan a 3:7 aspect ratio 30 line picture over any slice of 625 line input. This is a very useful facility when converting material from 625 or fine tuning a camera shot when the camera is out of reach.

Unfortunately the unit could only be evaluated on the NBTVA 32 line standard as the firmware update for Baird 30 line and TeKaDe standards could not be fitted in time for these tests. I would expect performance on these standards to be very similar to 32 line.

Other standards

I have not been able to review all the other standards, simply due to lack of appropriate receivers. If any are found to be incorrect it will not be a problem for Darryl to update the firmware and issue a new file which can be used to reprogram existing units.

Sound
Any framestore based converter will delay the video by a relatively large amount, typically 20-40ms. If the accompanying sound is not delayed you can sometimes see lipsync errors. These are all too frequent on today's TV broadcasts and are due to the large amount of framestore based equipment now used in TV stations. The Aurora has an audio delay facility that allows the sound to be retimed with the picture. I'm not convinced that this is a particularly useful facility but it did not add much cost to the design and you don't have to use it. The audio output is potentially more useful for mechanical standards where it is used to send a synchronising signal.

Radio interference
The converter contains high speed digital circuitry which is a potent source of RF interference. The plastic case does not inspire confidence but the use of a multilayer PCB with continuous ground plane should help. I do not have facilities for proper EMC tests but I did not notice any obvious problems while testing.

Poor quality inputs
While I cannot test the unit with all possible poor quality signals I can state that the input AGC copes well with low amplitude down to at least -6dB. Note that the input video and sync amplitudes must be in the correct 7:3 ratio since the AGC measures the sync amplitude. Slightly noisy off air and ordinary VHS replay are fine too. It is always possible that really bad VHS replay could cause tearing or other effects but I have not seen this happen.

Some minor problems

DC offset
This is a very minor criticism and is of no real importance to users. In professional practice the black level of a video signal is at 0V with the sync tips at -300mV. This cannot be achieved without split +/- voltage supplies. The original video output circuit was a rather odd partially AC coupled affair. This has now been changed to a simple DC coupled output leaving sync tips at 0V and black level at +300mV.

Please note that the absolute DC offset of the signal will not cause the displayed picture to have incorrect black level because the signal will always be AC coupled and DC restored or clamped in a monitor or modulator.

Standards selection switch
The prototype had a rather awkward and flimsy rotary hex switch which had to be adjusted with a screwdriver. This has been replaced in production by a more robust part with a small knob. If you change standards frequently I am sure that this will be the first part to fail. Fortunately these hex switches are fairly standard and not too difficult to replace.

Reprogrammability
If Darryl designs any updates for the Aurora the resulting code can be programmed into existing units. All that's needed is a PC and a simple adapter cable attached to a parallel port. I will be able to offer a programming service in the EU for no more than the cost of return postage.

There are some standards that could not be accommodated in the standard Xilinx code. These require special code for the particular standard concerned. Darryl has already demonstrated CBS sequential colour. 405 line NTSC may well be possible.

Modulator
The Aurora has no modulator. This is a disadvantage for the average 405 enthusiast who will have to build or buy one. It would have been very difficult to include a modulator that would work on every standard that the Aurora can produce.

Conclusions
How do you choose between Domino and Aurora, both fine products at comparable prices. The Aurora is a beautifully engineered product and is difficult to fault. The main omission is a modulator. If you have any interest in vintage standards apart from 405 then you have just one choice.

If your sole interest is UK 405 line TV then the Domino converter provides a most effective solution that will do the whole job straight out of the box.

The Aurora is only available directly from its designer:

Darryl Hock

http://www.auroravideosys.com/converter/

darryl@auroravideosys.com

There are further pictures on the web site. The full Aurora manual can also be downloaded from the web site.

Price $599 including delivery to the UK. Prices in other currencies will vary with exchange rates. You can pay by Paypal or credit card. There is also, in theory, a liability to import duty and VAT. My review unit escaped this problem though I have heard of others being subject to £20 and £60. There are no guarantees with UK Customs and Excise!

While I cannot test the unit with all possible poor quality signals I can state that the input AGC copes well with low amplitude down to at least -6dB.

Keep on Truckin'

Dicky Howett reports.

US collector of ancient tv kit Chuck Pharis now has his work cut out (as well as a considerable amount of cash flying from his bank account) in order to recreate and re-equip this classic American 1940s RCA TJ 48 'remote' tv truck. This truck, designed by RCA in 1947, was usually sent on outside broadcasts with two or more RCA TK 30A monochrome 525-line cameras plus production monitors, switchers, cabling and a microwave link. Sometimes, the unit was used as a 'roll-in' facility whereby it was plugged into the local studio as a cost-saving measure. Chuck Pharis says that today in the USA only two of these vans is known to exist.

He has tracked down both (the other is still in original condition with station ident badges and interior equipment, but unfortunately is not for sale). However, in order to refurbish his van, Chuck has most of the broadcasting electronics (Image Orthicon cameras, monitors, switchers etc-all in full working order) but is looking for a microwave dish array plus all the internal structure fittings and external trim. (The previous owner-actually a broadcast tv engineer- stripped it to make a campervan-sounds familar?). Chuck hopes to take his restored van to the large broadcasters fair-the NAB -in 2006 as a fully-functioning exhibit. We wish him well.

Above: This is the truck that Chuck is about to restore.

Below: Not for sale! This truck in original condition is in a garage somewhere in the USA

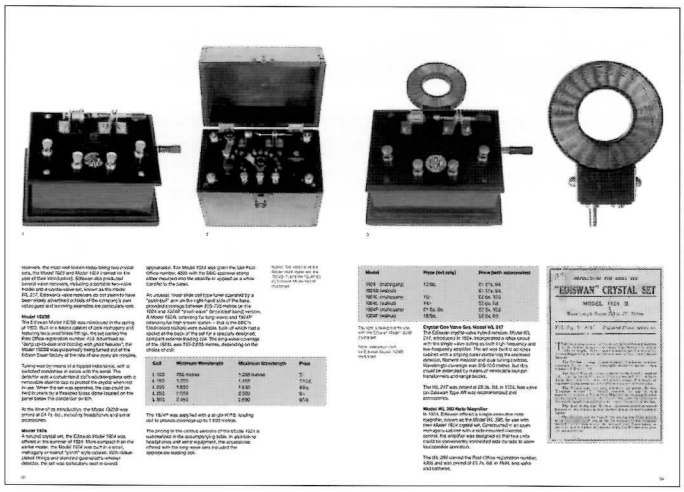
Tickling the Crystal Volume 3 out soon

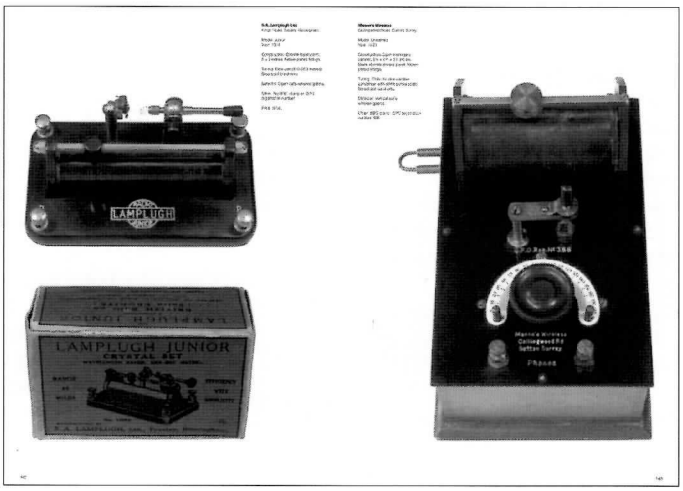
In early April this year, Carl Glover made his way to California to photograph more crystal sets for what may be the final volume in the 'Tickling the Crystal' series. As before, he was greeted by a vast array of early equipment and components.

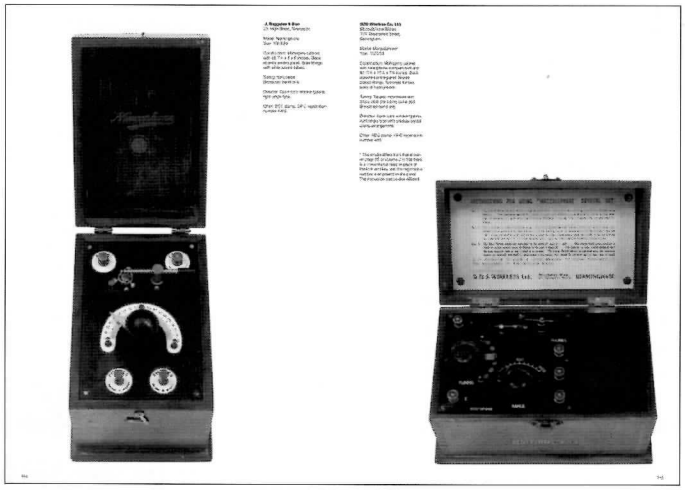
Ian Sanders, the author, has made titanic efforts in researching previously unseen crystal sets. He has also been scouring huge quantities of paperwork and archives in order to find more about early wireless manufacturers which has also helped in his identification of unmarked sets.

Closer in size to Volume 1 (256 pages) rather than Volume 2, the book is now near completion and will make its debut on October 2nd at the NVCF in its new venue: The National Motorcycle Museum, Birmingham. Like the current volumes, it will also be available via the BVWS and will be on sale at all swapmeets and meetings.

Between them the three volumes provide collectors and historians of early wireless with a truly comprehensive collection of information on early crystal receivers. Volume 4? Nothing currently planned, but given that new sets and material continues to be uncovered, never say never...







A brief resumé of British (and several overseas) Finished goods & component manufacturers (as at January 2004) part 5 by Dave Hazell

Eagle products – see B Adler & Sons Ltd.

EAP (Tape Recorders) Ltd. Originally established at Kingsland Road, London, in 1952 by H Lubin & S Larholt for the purpose of making TV test equipment, which was not a success. In 1955, they relocated to larger premises at 9 Field Place, St John Street, London, EC1. In 1955, they were using the 'Elizabethan' brand for their tape recorders. In 1957 they introduced am FM tuner unit. In August 1957, they relocated again, to a larger and new factory at Bridge Close, Oldchurch Road, Romford, Essex. In 1960, the name was changed to Elizabethan (Tape Recorders) Ltd, same location. Elizabethan (Tape Recorders) Ltd, Crow Lane, Romford, Essex (in 1964 & 68). Tape recorders. In 1965, the name changed to Elizabethan Electronics Ltd, to reflect their entry into other fields of electronics. Also see EAP & Dallas.

By the early 1970's, the brand was used on an imported small screen, portable, battery/mains monochrome TV.

EAR – Electric Audio Reproducers Ltd, 17 Little St Leonards, Mortlake, London, SW14 in 1954 and The Square, Isleworth, Middx (in 1955 & 1962). 'Packagram' & 'Ear' portable transistor radiograms and record players, radios, etc. During the 1950's, the company was acquired (for a time) by the Gas Purification & Chemical Co Ltd.

EICO. Electronic Instrument Company, USA – maker of test equipment, in kit or assembled form. In 1965, marketed in the UK by Direct TV Group, 126 Hamilton Road, London, SE27.

EIL – Electronic Instruments Ltd, 17 Paradise Road, Richmond, Surrey, (in 1947). Maker of test equipment (e.g. the 'MicOvac' test meter). In 1960, they were taken over by The Cambridge Instrument Co Ltd.

EKB Ltd, Bromham, Chippenham, Wilts (in 1971). Maker of power supplies.

Elexel Ltd, Victor Works, Broad Green, Liverpool 14 (in 1948). Maker 'Xcel' electric tabletop cookers.

EMI

Electrical and Musical Industries Ltd, Hayes, Middlesex. Formed in 1931 by the merger of The Gramophone Company (previously The Gramophone & Typewriter Company) and Columbia Industries. Alfred Clark (born in New York, 1874) was one of the founders of the Gramophone Co. – in 1898. He was an American and worked for Edison and then Emile Berliner until he came to England towards the end of the 1890's. Initially, he worked for The Gramophone & Typewriter Co Ltd. In 1909, he became Managing Director of The Gramophone Co. He became the first Chairman of EMI upon its formation. He became a British citizen in 1928 (source WW Aug 1950, the year he died, aged 76). EMI had a close association with RCA and GE of the US, through RCA's takeover of The Victor Talking Machine Co, in 1929 (Victor already had a major shareholding in The Gramophone Company). I think RCA sold some or all of its stake in EMI, circa 1935. Joseph (later Sir) Lockwood became chairman in 1955 and remained with EMI until the 1970's.

EMI made gramophone records and the mastering equipment, computers, radar, domestic appliances, loudspeakers, electronic tubes and valves, 'Emitape' magnetic tape, TV's and radios, broadcast TV equipment (including transmitters), communications Tx/Rx, RF induction heaters, medical (CT – computerised tomography) body scanners, CATV equipment and instrumentation (SE Labs). They also ran a correspondence training company EMI Institutes Ltd. Also see Electronic Tubes Ltd.

In 1957, EMI ceased to manufacture TV and radio sets (produced at Hayes). However, in 1958, they were advertising 'Capitol' HiFi equipment (made in UK). They licensed Thorn to manufacture sets badged HMV and Marconiphone. To this end, Thorn established The British Radio Corporation Ltd, with EMI having a joint interest. EMI then increased its activities in industrial and commercial electronic goods.

EMI was taken over by Thorn in 1980. Thorn-EMI de-merged a few years ago and EMI is now once again, independent (although it is now purely a music company and has explored mergers with AOL-Time Warner in the USA and then Bertelsman of Germany).

By 1958, EMI owned Capitol Records Inc of the USA.

In 1976, EMI were making medical electronic equipment at Hayes, Radlett, Feltham, Frimley, Wells and Windsor.

The loudspeaker factory (in 1969) was at Cae Mawr, Treorchy, Wales.

EMI Ltd, Industrial Electronics, Blyth Road, Hayes, Middx (in 1970).

EMI Ltd, Springfield Road Works, Hayes, Middx (in 1978). Production of electromechanical devices.

EMI Electronics Ltd, Hayes, Middx (in 1967). UK distributor of Sony broadcast quality videotape recorder equipment.

EMI Electronics Ltd, Electron tube division, Bury Street, Ruislip, Middx (in 1975).

EMI Electronics Ltd, Systems and Weapons division, Penleigh Works, Wookey Hole Road, Wells, Somerset (since at least 1951) and at Victoria Road, Feltham, Middx.

EMI Marine, Cramptons Road, Sevenoaks, Kent (in 1972). Maker of marine radiotelephones.

EMI Medical Ltd, Windsor House, Albert Street, Slough, Berks (in 1977).

EMI Records Ltd, 1-3 Uxbridge Road, Hayes, Middx (in 1974).

EMI Sales & Service Ltd, (The Gramophone Company), Hayes, Middx (in 1952). Distributor of HMV TV & Radio sets.

EMI Sales & Service Ltd, Sheraton Works, Wadsworth Road, Greenford, Middlesex (in 1954). Service department. Site believed to have been bought from Philco, circa 1947.

EMI Service Ltd, Sheraton Works, Hayes, Middlesex (in 1936). Maker of test equipment.

EMI Sound & Vision Equipment Ltd (formed in June 1972). Telecommunications, broadcast and studio equipment.

EMI Sound Products Ltd, Hayes, Middx (in 1967). Loudpseakers (not in cabinets).

EMI-Varian Ltd, formed in 1970 to market the two companies products: transmitting and microwave tubes, klystrons, etc. Included Eimac division of Varian.

EMI bought Associated British Picture Corporation around 1970. ABPC owned the ABC cinema chain, Elstree Film studios and 51% of Thames Television (prior to Thames, they owned ABC Television).

EMI bought the CATV interests of Thorn Automation Ltd, in 1973.

EMI Sales and Service Limited, Emitron House, 117, John Bright Street, Birmingham, Tel Midland 5821. The distributing Organisation for The Gramophone Company Ltd (HMV), HMV Household Appliances, The Marconiphone Company, Colombia Gramophone Company Ltd, Regal-Zonophone, The Parlephone Company Ltd, MGM Records.

EMI Service Limited, Sheraton Works, Hayes, Middx.

EMT. Elektromesstechnik Wilhelm Franz KG, 763 Lahr/Schwarzwald, Kaiserstrasse 80, Germany (in 1961 & 65). Test equipment manufacturer. In 1961, they were advertising the Studer C37 tape recorder in Wireless World.

ERG. Erg Industrial Corporation Ltd, 10 Portman Square, London, W1 (in 1946) and Erg Resistors Ltd, 1021a Finchley Road, London, NW11 (in 1945) – both probably sales offices, not factories. Erg was (apparently) named after the 'cgs' unit of energy. In 1969, Erg had a joint venture with American Components Inc, at Maryport, Cumbria, to make precision metal film resistors – Erg-ACI Ltd. By 1964 (and currently) Erg had a factory in Luton Road, Dunstable, Beds. ITW Erg's website states the firm was established in 1942. Until the 1980s, maker of countless thousands of 'mains dropper' power resistors for TV and radio chassis. They also made carbon type resistors and marketed ceramic capacitors. Since at least the 1970's, they

have made reed relays, wire-wound resistors and DIL switches. Recently taken over (circa 2000) by ITW (Illinois Tool Works).

ERI. Electrical & Radiological Instrument. (in 1947). Maker of RF tuner units, coils, IFT's, loudspeakers, vibrators and power transformers.

ERO. This was the brand name of Ernst Roederstein capacitors of West Germany. They became part of the Vishay (USA) group in the 1990's.

ETA. Electro Technical Assemblies, Seaside Road, St Leonards-on-Sea (in 1953). Maker of coils and IFTs.

ETA Tool Co. (Leicester) Ltd, 29A Welford Road, Leicester (in 1965). Maker of coil winding machines.

ETEL – brand used by Electronic Tubes Ltd.

E.V.R. (Electronic Video Recording). The EVR partnership in the UK was formed in 1967, by Ciba, CBS (Columbia Broadcasting System Inc.) and ICI, to promote the EVR format for recording film or video onto thin 8.5mm film (in a cartridge). Rank Bush Murphy made some players, but the format never caught on – eclipsed by domestic and industrial videotape recorders.

Easiclene Porcelain & Enamel (1938) Ltd, Darlaston, Wednesbury, Staffs (in 1954). Maker of 'Easiclene' washing machine.

Easipower Ltd, 213-215 Gloucester Place, London, NW1 (in 1946). Maker of 'Easipower' electric irons – and in 1958, electric fan heaters.

East Grinstead Electronic Components Ltd, Imberhorn Ind Est, East Grinstead, Sussex 9in 1980). Maker of Radiohm variable resistors.

Eberle & Co, Nurmeberg, W. Germany (in 1966). Maker of 'Eberle' process control timers.

EB Instruments, division of Electronic Brokers, 19-53 Pancras Road, London, NW1 (in 1970). Maker (or supplier) of the (mains) 'Keynector'. In 1967, it was made/ supplied by Cybernaut Controls Ltd, 28-30 Rivington Street, London, EC2.

Eddystone. Trade name of Stratton & Co, Eddystone Works, Alvechurch Road, West Heath, Birmingham 31 (in 1948 & 64). They were also at Balmoral Works, Bromsgrove Street, Birmingham (earlier on?). The firm (with origins in the 19th century) originally made hairpins and fancy goods, turning to radio components in 1923. Later, they made radio receivers and became a renowned maker of radio 'communications' receivers, tuning gangs, and wound components. The Eddystone brand was adopted for their components and later, their complete sets. They also made an FM tuner, in 1957. Stratton & Co Ltd was acquired, in 1965, from its parent company Laughton & Sons Ltd, by English Electric and renamed Eddystone Radio Ltd (and operated as a subsidiary of The Marconi Company a member of the English Electric group). Taken over by English Electric in 1965. By 1970, Eddystone Radio Ltd, Alvechurch Road, etc. They also made the famous 'Eddystone' diecast aluminium boxes. They were sold by GEC in 1999, to Megahertz Communications Ltd, of Cambridge. By 1978 ' A Marconi Communications System Company' then a 'GEC Marconi Communications Company' by 1993. Made large quantity of equipment to BBC Designs Department designs mainly VHF amps and drives, stereo coders and receivers in late 70's to mid 80's. Latterly made DAB transmitters.

Edicron Ltd, Redan House, 1 Redan Place, London, W2 (in 1974). Seller of Edicron branded valves and CRTs. In 1978, also sold replacement CRT electron gun assemblies.

Edison (Thomas A) Ltd, Victoria House, Southampton Row, London, WC1 (in 1964). Dictating machines (Dictating & Audio Service Ltd).

Ediswan. The electric filament lamp was invented simultaneously by Thomas Alva Edison in the USA and Joseph Swan in England. In 1881 Swan set up the Swan United Electric Lamp Co in Benwell, near Newcastle. In 1883 Swan joined forces with Edison to form the Edison and Swan United Electric Light Co. In 1886 the company took over the former jute mill at Duck Lees Lane, Ponders End and converted it for the manufacture of electric light bulbs. The Benwell factory closed and Ponders End became the production centre. The light bulbs were originally made with carbon filaments. In 1907 the company pioneered the use of tungsten filaments. The bulbs were originally made of plain glass which resulted in a rather harsh light. To combat this problem the company introduced the opal lamp in 1921, followed by the pearl lamp in 1927.

Research carried out at the factory by Dr Ambrose Fleming (1850-1945) in the eighteen-nineties led to the invention of the thermionic diode valve which was to be a vital component of early radio, television, radar and computers. Radio valves were manufactured in small quantities from 1906 and were mass produced from 1916 (the first British wireless valve factory). The search for a suitable material for making carbon filaments led to the discovery of artificial silk (rayon). It became a part of British Thomson-Houston Co. in 1928, which in turn became a member company of Associated Electrical Industries in 1929. In 1929, the former Metro-Vick Cosmos Lamp (and valve) works at Brimsdown came under Ediswan control and it was turned over entirely to valve production – lamp making relocated to Ponders End. Thereafter, alll consumer valves were then branded Mazda. The Ponders End site began to produce CRTs circa 1930 (in 1936, with the advent of the BBC television service, CRT output increased) but production was moved to Brimsdown, circa 1938. In 1943, a new valve factory was opened on the Pallion Industrial Estate, Sunderland (closed in 1967). In 1955, a new CRT factory at St Luke's Road, Sunderland was opened. The first Mazda colour CRTs were made at Brimsdown in 1966. In 1968, with the takeover of Radio Rentals, Thorn-AEI acquired a colour CRT plant at Skelmersdale (set up with the assistance of RCA). In 1961, AEI merged its Mazda valve and CRT operation into a new company: Thorn-AEI Radio Valves & Tubes Ltd, which also incorporated the former STC 'Brimar' consumer ranges and the Mazda/ Ediswan ranges. Thorn had control of this new business, which also included semiconductors. By 1970, AEI had withdrawn from the venture (possibly a result of its take-over by GEC, in 1967) and the company became Thorn Radio Valves & Tubes Ltd, 7 Soho Square, London, W1. Siemens Edison Swan made transistors (the XA & XB series) in the late 1950's.

The Ponders End factory was closed in 1969 and sold for demolition in 1970. The Sunderland CRT factory stopped making monochrome CRTs in 1974. The short-lived Skelmersdale colour CRT factory closed in 1976. Thorn/Mazda 'New Life' reprocessed colour CRTs were thereafter made in Sunderland. This business was sold in the 1980's to become Vista Electronics (still going in 2002, I believe). Mazda/Brimar valve manufacture continued at the Rochester (previously Brimar/STC) factory until 1976 (in 1972, there was a valve component parts factory at Bromley, Kent). The Brimsdown plant continued to make industrial CRTs (as Thorn Brimar) until it closed in 1984. In 2002, Brimar Ltd, based in Oldham/Chadderton, Lancs, continues to make specialist CRTs.

The Ediswan Head Office was for many years at 155 Charring Cross Road, WC2 (still there in 1962, as Associated Electrical Industries Ltd, Radio Components Department).

Ediswan made a wide range of products, including Mazda (consumer) and Ediswan (industrial) valves, CRTs, Ediswan lamps, pickups, test equipment, accumulators and lighting products. Later briefly manufactured semiconductors.

When AEI took over Siemens Brothers in 1955, it was merged with Edison Swan by 1958, to form Siemens Edison Swan Ltd. From 1960, the AEI brand the previously used Ediswan, BT-H, MetroVick and Siemens.

The Mazda brand (which came to Edison Swan from GE USA via BT-H, after the 1929 merger of BT-H, Edison Swan & Metreopolitan Vickers), was used for 'entertainment' valves and CRTs. It was licensed for use in the UK alone. The Ediswan name was subsequently used solely for UK industrial valve branding and exports.

The Ediswan (by then AEI) Lighting division became part of British Lighting Industries (later Thorn Lighting) in the 1960's.

Ediswan Tungar. Brand of battery charger marketed by Edison Swan Electric Co Ltd, in 1937.

Edwards (F W) Ltd, 18-20 Norman's Buildings, Central Street, London, EC1 (in 1964). Cabinet manufacturers.

Egen Electric. A company owned by E K Cole Ltd (Ekco) and based in Charfleet Industrial Estate, Canvey Island, Essex. Formed in 1946 (when the works manager was Mr H G Cutler, later general manager – in 1958). Made variable resistors, the car radio type of aerial plug and the Belling-Lee type – also aerial isolators for 'live chassis' TV sets. Continued under Pye, then Philips ownership – finally CEI. Now defunct? In 1972, they became the UK agent for Beyschlag GmbH, West Germany – maker of carbon and metal film resistors.

Eimac – Eitel-McCullough Inc., 1211 San Mateo Avenue, San Bruno, California (in 1945). In 1960, of San Carlos, Ca. A maker of transmitting valves. By 1966, a division of Varian Associates.

Ekco – E K Cole Ltd, Ekco Works, Southend-on-Sea, Essex (in 1947). The business was begun by Eric Kirkham Cole in 1922 and was registered in 1926 as E K Cole Ltd. In 1927 a factory was built at London Road, Leigh-on-Sea, Essex. By 1929, the premises were too small and a new factory was built on the main Southend Road (where Ekco was based until 1966, when the site was closed and sold). Other milestones:

1931- plastics moulding
1934 – car radio
1937 – heating
1938 – television
WW2 – a shadow factory was opened at Malmesbury, Wilts. This site also produced telecoms and industrial electronic equipment.
1949 –Hadleigh plant opened
1951 – Canvey Island plant opened (Egen Electric?)
1955 – acquire majority stake in Dynatron Radio Ltd and launch Ferranti Radio & Television Ltd.

In 1944, they were listed in 'Radio Marketing - Service Engineer' (Sep 44 issue), as a maker of the wartime utility radio – address: Green Park Hotel, Aston Clinton, Bucks!! Maker's code U2.

In 1955, also British Victor Division, 5 Vigo Street, London, W1 (cine equipment). The same address was home to Ekco 'Thermovent' Heating offices, in 1955.

Maker of battery eliminators, radios, televisions, industrial electronics (incl. radar), heating equipment (incl. 'Thermovent'), cine equipment, electric blankets and plastics products. Pioneered moulded phenolic resin cabinets in the 1930's. By 1937, they had a joint venture with Marconi called Marconi Ekco Instruments Ltd – test equipment. In Dec 57, they produced their 1,000,000th TV set. 'Merged' with Pye in 1960. In 1964, Ekco Ensign Electric (lighting) – sold to Thorn. He resigned from the merger holding company, British Electronic Industries Ltd, in 1961. Trade mark used until the late 1980's.

Ekco Plastics, the plastics division of E K Cole Ltd, produced plastic masks for domestic CRTs, circa 1958. The company later made babies potties, school chairs and toilet seats. In the 1980's, it was Alcan-Ekco Plastics Ltd. The Ekco name is still going and based in (Amersham?).

Elac. Electro-Acoustic Industries, Stamford Works, Broad Lane, Tottenham, London, N15 (in 1946 and 1982). Formed by E H Stoner and G A Barden (two former Goodmans Industries employees) in 1946. Manufactured loudspeakers, ion traps, line output transformers and TV deflection coils in the 1940's, 50's and 60's. Still going in 1982 (same address). Now defunct?

Elac. Electroacoustics GmbH, of Kiel, West Germany. Manufacturer of pickup cartridges (n 1965). In 1965, their British agent was High Fidelity Centre, 61 West Street, Dorking. The High Fidelity Centre formed a new company in 1965, Mitchell Enterprises Ltd, specifically to handle Elac products in the UK.

Elco. Elco Plastics Ltd, High Wycombe. Injection moulders. Elco produced plastic mouldings, which were used by many firms, including Thorn, who bought Elco. Following the wind down of Ferguson, after Thomson bought the company, I do not know what has happened to Elco.

Elco Corporation, Willow Grove, Pennsylvania, 19090, USA (in 1969). A connector manufacturer. Taken over by AVX in the 1990's. AVX was itself taken over by Kyocera of Japan, in the late 1980's. In March 2004, Elco Europe, a division of AVX Limited, Exning Road, Newmarket, Suffolk, CB8 0AT (the successor to Varelco, a Pye-Elco joint venture?).

Elcom (Northampton) Ltd, Weedon Road Industrial Estate, Northampton (in 1961 & 65). Manufacturer of electronic faders and complete sound mixers. Acquired by Painton & Co in 1965.

Elco Pacific, 2200 Park Place, El Segundo, California, 90245 (in 1970). Connector manufacturer.

Electradix. Brand of battery chargers from Leslie Dixon & Co Ltd, 218 Upper Thames Street, London, EC4 (in 1937).

Electric Audio Reproducers Ltd, Perdio House, Bonhill Street, London, EC2 (in 1964).

Electrical Power Storage (The) Co Ltd (since 1882) – battery makers. By 1946, Pritchett & Gold & E P S Co Ltd, 50 Grosvenor Gardens, London, SW1. See also Chloride.

Electrix. Maker of metal rectifiers.

Electrocomponents Associated Ltd, 13-17 Epworth Street, London, EC2 (in 1973). The public company which included RS Components Ltd, Reading Windings Ltd, Pact International Electronics Ltd, Electroplan Ltd and The Radio Resistor Company Ltd, Harrow, Middx. In 1974, Doram Electronics Ltd, Leeds. It became Electrocomponents plc (still going).

Electrolube Ltd, Oxford Avenue, Slough, Bucks (in 1956 & 72). For contact cleaner and lubricant fluid. Later, a division of H K Wentworth Ltd, at Wentworth House, Blakes Road, Wargrave, Berks RG10 8AW. Circa 2004, relocated to H K Wentworth Ltd, Kingsbury Park, Midland Road, Swadlincote, Derbyshire, DE11 0AN.

Electro Methods Ltd, 12-36 Caxton Way, Stevenage, Herts (in 1955 & 61). Maker of relays, solenoids and (by 1957 – see WW Jan 57, p53) multi-pin connectors (licensed from Winchester Electronics Inc.). In 1960, they also made connectors and this operation was then relocated to Hitchin Street, Biggleswade, Herts.

Electronic Reproducers Ltd, Bletchley, Bucks (in 1958). A new company set up by Camp Bird Industries Ltd, to make crystal pickup cartridges. The Chairman was P J N Collaro. London office at 39 Dover Street, London, W1.

Electronic Tubes Ltd, Kingsmead Works, Fassetts Road, Loudwater, High Wycombe, Bucks (in 1947-1958). A valve and CRT manufacturer based at Kingsmead Works, High Wycombe, Bucks. The brand names were 'Emitron' and 'Emiscope'. An EMI subsidiary or EMI trade names used under licence?

Electroniques – see STC.

Electroniques (Felixstowe) Ltd, Radio Works, Bridge Road, Felixstowe, in 1961 & 64. Electronic component distributors. Was this the company that became Electroniques (Prop. STC Ltd)?

Electroplan Ltd, established in April 1972. The instrument distribution company of Electrocomponents Associated Group, of Orchard Road, Royston, Herts (in 1973). Electrocomponents Associated took over Pact International Electronics Ltd, in 1973 (importer of test equipment). Electrocomponents included RS Components Ltd – started by the RS directors - as a holding company?

Electrosil. Electrosil Ltd., of Pallion, Sunderland, Co. Durham. In 1960, Electrosil resistors were made by James A Jobling & Co Ltd, Wear Glass Works, Sunderland (of Pyrex glassware fame) – under licence from Corning Glass Works, Bradford, Pennsylvania, USA. In 1964, also at Colnbrook Bypass, Slough, Bucks. In 1965, Electrosil Ltd, Pallion, Sunderland, Co. Durham. Maker of metal film resistors, capacitors. In 1966, Electrosil had a microelectronics division at Lakeside Estate, Colnbrook, Slough, Bucks – selling TTL IC's – their 'LU Utilogic' range (Signetics made/licenced?). Still Electrosil in 1973. Was actually owned by Corning of the US for some time (at least 1965) before it changed its name to Corning (the US glass and glass products manufacturer). In 1974, Electrosil Ltd, Corning Electronics Europe. Now defunct?

Electrothermal Engineering Ltd, 270 Neville Road, London, E7 (in 1948, 64 & 71). A maker of switches, valve retainers and relays.

Electrovoice. UK transformer manufacturer – UK arm of US parent? Based in Maple Works Road, Old Shoreham, Hove, Sussex (in 1982). In America, Electrovoice Inc, Buchanan, Michigan – a maker of loudspeaker kits. In 1965, Electrovoice micorphones were

distributed in the UK by KEF Electronics Ltd. By 1982, Electrovoice division of Gulton Inc.

Electroway Heaters Ltd, Loughborough, Leicestershire (in 1958). Maker of electric convector heaters.

Electro-winds Ltd, 123-5-7 Parchmore Road, Thornton Heath, Surrey (in 1961). Maanufacturer of transformers, coils, chokes, etc.

Elgar Products Ltd, Wimbledon, London, SW19 (in 1954). Maker of the 'Elga' coffee percolator.

Elliott Brothers (London) Ltd, Century Works, Lewisham, SE13 (in 1947 & 64). Established in 1800. Maker of electrical chart recorders (in 1947). In 1961, they made a multimeter. They opened a new R & D centre at Elstree Way, Borhamwood, Herts, in 1947 (in 1969, known as Marconi-Elliott Computer Systems Ltd), which was to research into industrial measuring and control devices. In 1951, an aviation division was established at Borehamwood. In 1958, also at Century Works, Connington Road, Lewisham, SE13. In 1965, there was an aviation service and repair division at Airport Works, Maidstone Road, Rochester, Kent. Elliott-Automation merged with English Electric in late 1967.

Elliott-Automation Ltd. Formed in 1957, with the merger of Elliott Brothers (London) Ltd and Associated Automation Ltd. Subsidiary companies included:

Elliott-Automation Microelectronics Ltd, Queensway Industrial Estate, Glenrothes, Fife (in 1967). MOS integrated circuits.

Elliott-Automation Radar Systems Ltd (in 1967).

Elliott Space and Weapon Automation Ltd (in 1967). In 1968, at Chobham Road, Frimley, Surrey.

Elliott-Automation Computers Ltd (in 1967).

Elliott Electronic Tubes Ltd, Elstree Way, Boreham Wood, Herts (in 1966) – a member of the Elliott-Automation Group. Maker of magnetrons, etc.

Elliott Flight Automation Ltd, Airport Works, Rochester, Kent (in 1969). A GEC-Marconi Electronics company.

Elna Co, of Japan. In 1971, a maker of electrolytic and tantalum capacitors and printed circuit boards.

Elon Tape Development Co Ltd, 377 Milkwood lane, Herne Hill, SE24 (in 1955). Tape recorder manufacturer.

Elpico – see Lee Products (Great Britain) Ltd.

Elstone. A transformer manufacturer (in 1947).

Elstone Electronics Ltd – see Tandberg.

Emerson. The Emerson Radio & Phonograph Corporation, 14th & Coles Streets, Jersey City 2, N J (in 1955), a US manufacturer of radio & TV (in the 1950s). They had a UK operation by then. In the 1980's, Emerson had a plant in Swindon, Wilts. Emerson also made industrial equipment. They no longer make consumer electronics but are still going strong. They bought ASTEC (formerly BSR) in the late 1990's. Phil Marrison thinks that he has seen Murphy 'Astra' TV sets badged 'Emerson'.

Emerson Electronics Ltd, Brent Crescent, North Circular Road, London, NW10 (in 1959 & 60). Maker/marketer of TV, radios, record players, etc.

Emihus Components Ltd, Glenrothes, Fife (in 1969). The Glenrothes factory was opened by Hughes in 1960, to make diodes. A Hughes / EMI joint venture? Maker of semiconductors and electronic components. In 1968, Emihus Microcomponents Ltd, Sales Office, Heathrow House, Bath Road, Cranford, Middlesex. In 1973, Emihus Microcomponents Ltd had an office at Clive House, 12-18 Queens Road, Weybridge, Surrey. Originally established in 1960 as Hughes International (UK) Ltd, by Hughes Aircraft Co, USA.

Enalon Plastics Ltd. In 1958, produced a short circuit turn line linearity correction sleeve, which sildes into the rear of the deflection yoke in TV sets. Still going in 1965, at South Premier Works, Drayton Road, Tonbridge, Kent, making piece parts for pushbutton and slider switches, tuner units, eht transformers, coil formers, etc.

Enfield Cables Ltd, Millmarsh Lane, Brimsdown, Enfield, Middx (in 1946). Possibly later merged with the power cables division of STC, to form Enfield-Standard Cables? By 1964, Enfield-Standard Power Cables Ltd (same location). Later also took over Johnson & Phillips Ltd, of Charlton, London, SE7. E-S became part of the Delta Metals group in the 1980's. Merged with Crompton Cables (bought from Hawker Siddeley) in 1983, to form Delta Crompton Cables. Circa 2000, Delta sold Delta Crompton sold to Draka of Holland (a large Dutch cable manufacturer).

Enfield Electronics (CRT) Ltd, 5 Station Close, Potters Bar, Middlesex (in 1959). CRT rebulders.

English Electric Co Ltd, Domestic Appliance & Television Division, East Lancashire Road, Liverpool 10 (in 1952). In 1964, English Electric company London office was at English Electric House, Strand, London, WC2.

English Electric Leo Marconi Computers Ltd, Kidsgrove, Stoke-on-Trent, Satffs (in 1965). The company set up to combine the computing operations of English Electric, Leo Computers and Marconi Company. In 1967, the name was changed to English Electric Computers Ltd.

English Electric Valve Co Ltd, Waterhouse Lane Chelmsford, Essex (in 1955 and 1970). Established in 1947 from the wartime Marconi valve laboratories. In 1965, also at Carholme Road, Lincoln (Ignitrons) – formerly an AEI valve factory, acquired by EEV. In 1967, they acquired a factory at Benfleet, Essex to cope with demand for their CRTs and storage tubes.

Renamed EEV Ltd circa 1988. In 2002, renamed Marconi Applied Technologies Ltd and sold in the same year. Name changed to e2v Technologies, which became a public company in July 2004. English Numbering Machines Ltd, 25 Queensway, Enfield, Middlesex (in 1964 & 68). Numbering systems. Later taken over by Rank Organisation and then sold on.

English Electric. A heavy Electrical Engineering company, established in 1918 (?) by the merger of several companies. It was run by George (later on, Sir, then Lord) Nelson of Stafford, from 1930 (he started with the firm in 1930) when he became MD and later Chairman in 1933) until his death in 1962. His son, the second Lord Nelson, took over at the age of 45. They also made TVs and radios until the early 1950's, domestic appliances (until at least 1968), transmitting and industrial valves and CRTs – including the (in) famous metal cone type. EE had factories in Stafford, Preston, Rugby, Bradford, Liverpool and Accrington (excluding Marconi sites). EE took over the Marconi Company in 1946, but were themselves taken over by GEC in the late 1960s.

One famous part of EE was the English Electric Valve Co Ltd, based in Waterhouse Lane, Chelmsford. Originally formed in 1946 as Phoenix Dynamo Co Ltd but the name changed in 1947. It made TV camera tubes, klystrons, vidicons, image intensifiers, etc. In 1988, it became EEV Ltd. In 1999, it was renamed Marconi Applied Technologies Ltd. It was sold in July 2002, in order to help out Marconi's troubled financial situation.

Ensign Lamps Ltd, Preston, Lancashire (in 1939). Lamp manufacturer. Later taken over by E K Cole Ltd and renamed Ekco-Ensign Lamps. Sold to Thorn Electrical Industries, circa 1964.

Enthoven. H.J.Enthoven & Sons Ltd. In 1947, at Lime Street, London, EC3, with a works at 230 Thornton Road, West Croydon, Surrey. Manufacturers of solder. In 1952, at 89 Upper Thames Street, London, EC4 (in 1946) – with works at Croydon, Rotherhithe & Derbyshire. Makers of 'Superspeed' solder. In 1961 & 64, the sales office and works was at Enthoven Solders Ltd, Upper Ordnance Wharf, Rotherhithe Street, London, SE16 (in 1964). By 1961 the head office was at Enthoven Solders Ltd, Dominion Buildings, South Place, London, EC2. The 'Superspeed' brand is now (2002) used by Frys Metals Ltd (a division of Cookson plc – who also own Alpha Metals).

Epsylon Industries Ltd, Faggs Road, Feltham, Middlesex (in 1965). A member of the Stone Platt group. Maker of magnetic tape type instrumentation recorders.

Ericsson Telephones Ltd, 56 Kingsway, London, WC2 (in 1946) – London office. Factory at Beeston, Nottingham. Taken over by Plessey in the early 1960's. Eventually merged with GEC Telecommunications, in the later 1980's, to form GPT Ltd. This was eventually to become Marconi plc (the renamed GEC plc), circa 2000.

Erie. The British Erie company was established in 1931, as Erie Resistor Ltd, of Carlisle Road, The Hyde, Hendon, London, NW9 (according to p 468 of WW, Oct 1972), by the Erie Resistor Corporation of Erie, Pa, USA – itself established in 1925. The firm relocated to South Denes, Great Yarmouth circa 1946 but 'The Hyde' continued as a London office after that time (e.g. in 1955). In 1961, the London office was 1, Heddon Street, W1.In 1964, the address was, Millora Works, Beevor Road, South Denes, Great Yarmouth. Still called Erie Resistor Ltd, Great Yarmouth, in 1961 & 65 and also had a factory at Tunbridge Wells, Kent.

In 1968, the name of the UK company changed from Erie Resistor Ltd, to Erie Electronics Ltd (still at Gt Yarmouth) Tel 0493 4911 (56122 in 1976). Also in 1968, their London office moved from 1 Heddon Street, W1, to Bilton House, Uxbridge Road, Ealing, W5. The Great Yarmouth factory seems to have opened up in 1947/8. Erie manufactured a wide range of carbon and wirewound resistors, potentiometers, ceramic capacitors, ignition interference suppressors, aerial isolators, thick film circuits, etc. Perhaps the most widely encountered low power resistor is the series enclosed in a white ceramic tube, with the ends sealed by a brown/orange compound. Erie also developed (circa 1958) the component 'PAC', where several resistors and capacitors would be mounted on a small pcb, which plugged (vertically) into the main board. This was around 1960 and several manufacturers used them, including Murphy, in their 'Astra' TV chassis.

Erie also made finished products, such as industrial electronic instruments. By 1957, there was another Erie factory at Holly Springs, Missouri. There was also a subsidiary in Toronto, Canada. In 1961, there was also a factory at Hawthorne, California. In 1977, Erie Technoological Products Inc, had plants at Erie, State College and Carlisle in Pennsylvania; Trenton, Ontario and Nogales, Mexico. I have traced this company back to the mid-1940's but I think it is a lot older than this. The American Erie company changed its name to Erie Technological Products (circa 1962), to reflect its (by then) diverse product range. In the UK, the firm became Erie Technological products Ltd. Erie in the USA continued until it was taken over by Murata of Japan (circa 1984) - was Erie USA already an ITT company, like the British Erie company – did ITT sell Erie to Murata – but why not Erie UK (absorbed by STC). The US company became Murata Eire North America Inc, 644N 12th Street, Erie, PA, 16512. However, the Erie name was soon phased out. There is a company called Erie Controls Inc, Milwaukee, Wisconsin, today (an Invesys company) – this may have originally been part of the Erie Resistor company.

Erie (UK) took over Hunts capacitors electronic components business in 1968, which expanded their product range to include electrolytic and paper/film types. Based for many years in South Denes, Great Yarmouth. In 1969, Erie Electronics took over Davall Electronics Ltd, a maker of potentiometers – renamed Erie Controls Ltd. By 1970, Erie Electronics Ltd was also acting as the UK distributor for Toshiba electronic components. The British Erie company itself was taken over by/sold to ITT (STC) ca. 1976. All Erie products were subsequently re-branded ITT, when the company name was dropped in favour of ITT Components Group Europe (in 1978) – but still at South Denes. In 1980, ITT Mercator (0493 4911) was based at South Denes, and an ad in Sep 80 WW was selling Erie HV modules experience. Later, circa 1984, ITT floated off STC (their main UK company) and the ITT brand was replaced by STC. A few years later, STC sold off most of its component manufacturing operations. Several 'new' companies appeared as a result, including Beck Electronics (ceramics) and BHC Capacitors (electrolytics).

Ernest Turner Electrical Instruments Ltd, Chiltern Works, High Wycombe, Bucks (in 1946 and 1973). Established in 1921. Maker of panel meters.

ERO Capacitors Ltd, 165-170 Ravenscourt Arches, Stamford Brook, London, W6 (in 1964). Capacitor distributer (for ERO/ Roederstein of West Germany).

Ether Ltd of Erdington, Birmingham (in 1948? and 1960). In 1960, they acquired the J Langham Thompson group from Camp Bird. In 1960, Ether also owned Electro Methods Ltd. J Langham Thompson was renamed Ether Langham Thompson by 1966. Probably connected to Ether Engineering Ltd. In 1966, Ether Ltd, General Products Division, Caxton Way, Stevenage, Herts – manufacturer of power supplies and relays – later known as Pye Ether Ltd.

Ether Engineering Ltd, Park Avenue, Bushey, Herts (in 1967 & 69). Maker of RF/microwave equipment and transducers and transposers for low power UHF TV relay stations. In 1970, it was renamed Pye Ether Ltd.

Etronic – Hale Electric Co Ltd, Radio Works, Talbot Road, London, W13 (in 1947). Maker of radios. In 1944, there was Hales Electrical Co Ltd, Broad lane, Stamford Road, Tottenham, London N17 - a maker of the wartime utility radio set (manufacturer code U16). In 1950, there was trade name dispute between Hale Electric Ltd and Flowerdale Ltd, who used the name Tronix. It looks like Hale Electric Ltd was wound up in 1952.

Europa Electronics Ltd. In 1964 & 66, at Howard Place, Shelton, Stoke-on-Trent, Staffs. The UK distributor for K'rting products.

Europhon (Radio & Television) Ltd, 174 Pentonville Road, London, N1 (in 1964). UK distributor of Europhon (Italian?) products.

E-V Ltd. In 1958 a Camp Bird company making ceramic cartridges and sapphire stylii – MD was P J N Collaro.I do not know what the initials E-V stand for.

Evco –see McElroy Adams Manufacturing Group Ltd.

Everett Edgcumbe, Colindale Works, London, NW9 (in 1938 & 47). Maker of electrical and radio test equipment (including valve testers in the late 1930's).

Ever Ready. The name has been associated with batteries for most of the 20th century. The first company to use the trade name was established in the USA, in 1889, by Conrad Hubert, in New York. His company was originally called The American Electrical Novelty and Manufacturing Company (AENMC). He made primitive hand torches. In 1905, the company name was changed to American Ever Ready. Meanwhile, in 1886, W H Lawrence formed The National Carbon Co, which soon commenced battery manufacture.

In 1914, National Carbon bought American Ever Ready. National Carbon merged with Union Carbide in 1917, to form Union Carbide & Carbon Corporation. Union Carbide was formed in 1898, to manufacture Calcium Carbide for acetylene lamps. In 1957, the name was changed to Union Carbide Corporation.

In 1901, the American Ever Ready Company must have established a UK operation, or have been associated with the establishment of the UK operation, known as the Ever Ready Company (Great Britain) Ltd (ER-GB). The UK company celebrated its 50th birthday in 1951. ER-GB soon established itself as a major maker of dry cells. It also bought The Lissen Company in 1928, from its founder T N Cole. Lissen made radio components, batteries and radio kits. By the start of WW2, the use of the Lissen name had been discontinued. Ever Ready started making radios in 1935, in association with Pye Ltd. By 1939, the association with Pye had ceased and ER made radios in its own right. This lasted up to the mid-late 1960's, when they were making transistor sets. In 1954, the chairman was E N Rowbotham. Because ER-GB did not own the rights to use the ER name overseas, their export sets were branded as BEREC (British Ever Ready Export Co). In 1956, Berec sets were being sold in the UK, in addition to the Ever Ready brand. Ever Ready also made radio valves – in 1959, The Ever ready Radio Valve Co Ltd.

Ever Ready acquired the radio/electronics side of Burndept Ltd (in 1968). The Vidor battery side was acquired by Crompton-Parkinson.

By 1982, ER were losing out to Duracell Alkaline batteries and the UK company, which was by then known as BEREC (British Ever Ready Electrical Co) was taken over by the UK based multinational Hanson Trust (who also owned/subsequently acquired: London Brick Co, Courage Brewing, Ross/Youngs frozen foods, Golden Wonder crisps, Lea & Perrins, Kidde - USA, SCM Corporation - USA, Amey/ Amalgamated Roadstone and Consolidated Goldfields). Hanson sold off BEREC's European operations in the same year. It didn't prosper under Hanson and in 1992, Hanson sold the UK ER business to Ralston Purina of the USA, who, in 1986, had bought Union Carbide's battery operations in North America and many other areas. Ralston Purina is principally associated with pet food products! Union

Carbide was brought to its knees following the Bophal (India) factory disaster in 1984, when thousands were killed. In the 1990's Ever Ready alkaline batteries were rebranded 'Energizer'. What remained of Union Carbide was taken over by the US Dow Chemical Company in 1999/2000. In 2000, Ever Ready was spun off from Ralston Purina, into a separate US based company – Ever Ready Battery Company Inc, of St Louis, Missouri.

Ever Ready Co (Great Britain) Ltd, Hercules Place, Holloway, London, N7 (in 1954). Maker of dry batteries, torches and radios (also a transistorised record player in 1958). There was a battery factory at Forest Row, Walthamstow, East London, in 1957. In 1958 a dry battery factory at Victoria Works, Dagenham, Essex. Since they could not use the Ever Ready brand overseas, Berec Radio Ltd was established in 1956 and radios were exported under the 'Berec' brand. Berec Radio Ltd, Hercules Place, Holloway, London, N7 (in 1956). Same location as Ever Ready Co (GB) Ltd. By 1964, HQ was at Ever Ready House, 1255 High Road, Whetstone, London, N20. In 1966, they introduced their 'High Power' version of standard zinc-carbon batteries (with red, leakproof metal jackets).

Ever Ready (Special Batteries) Ltd, Hockley, Essex (in 1974).

Evershed & Vignoles Ltd, Acton Lane, Chiswick, London, W4 (in 1946 & 65). Maker of 'Megger' insulation testers, etc. By 1972, a member of the Thorn group.

Evox. A Finnish capacitor manufacturer. Evox was established in 1947. Finvest Oy acquired both Evox and Rifa (of Sweden) in the 1980s and merged them to form Evox Rifa in 1992. In the spring of 2000 Finvest decided to demerge and divide into four companies. One of these is Evox Rifa, which was listed on the Helsinki Stock Exchange 1st of November 2000.

Exel Electronics Ltd, Trafford Road, Reading. A subsidiary of Instant Starter Engineering Co Ltd (ISE). Formed by ISE in 1970, to take over the instrument division of Coutant Electronics Ltd.

Exide/Drydex. Trade marks of the Chloride Electrical Storage Co. Ltd, Clifton Junction, Swinton, Nr Manchester (in 1938 & 47). By 1950, the company name was Chloride Batteries Ltd. Makers of dry and wet storage batteries. The Exide name was used for LT accumulators and Drydex for HT batteries. Later on, with the demise of LT accumulators, the Exide name was used for the standard range of zinc carbon calls/batteries. Exide/ Drydex batteries continued to be marketed into the 1970's. Of late, the Exide brand has re-appeared but they are now made in China (brand owned by Enersys of the USA). There is still a Chloride battery plant at Rake Lane, Clifton Junction, Swinton, Manchester (as at 2002) and it is called Hawker UK & Chloride Industrial Batteries Ltd (A subsidiary of Hawker Energy Storage which was sold to Enersys by Invensys (formerly BTR, who took over Hawker Siddeley) circa 2001.

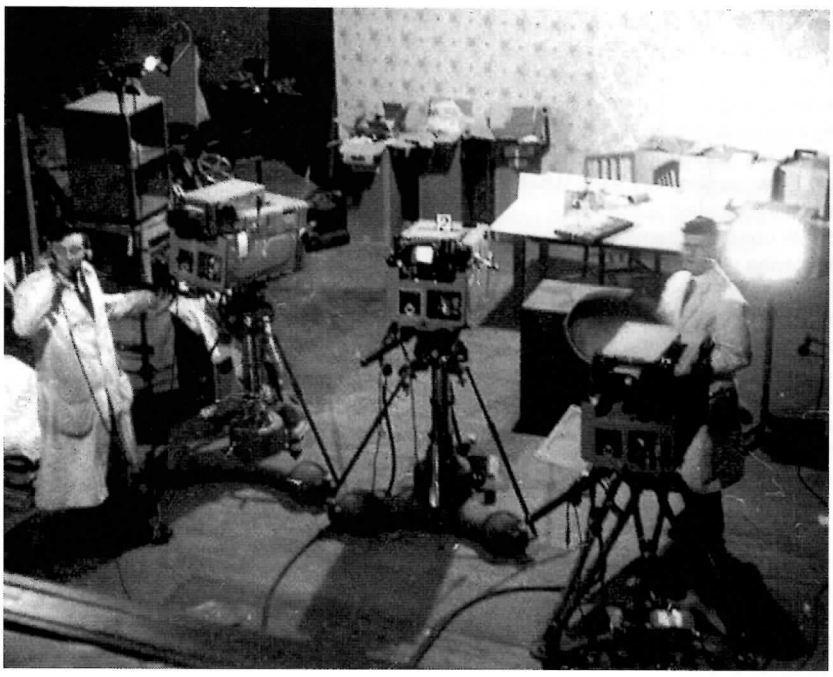
Expert Gramophones Ltd, 'Ingerthorpe', Great North Road, London, N2 (in 1957). Maker (?) of amplifiers, record decks, pickups and tape/disc recorders. Since its inception, the firm was under the technical direction of D Phillips and the commercial direction of Mrs E M Ginn. In 1957, it was acquired by Wolsey Televison Ltd (one of the Gas Purification group of companies). In 1964, Expert Gramophones Ltd, Audio Works, 197 Laleham Road, Staines, Middx.

Extrol Oil Co Ltd, 37 Canning Place, Liverpool 1 (in 1938). Maker of 'Switch Klene' contact cleaning fluid.
and, in 1966, the Pye High Fidelity Division was at St Peters Road, Maidenhead. The firm remained in Maidenhead until the 1970s (under the ownership of Pye and then Philips). Philips sold the brand name to Roberts Radio Ltd around 1980. Roberts replaced their 'Roberts Video' brand with 'Dynatron' thereafter. Roberts is now a subsidiary of Glen Dimplex plc.

Dynex Power Inc. A Canadian semiconductor company which bought some of GEC-Plessey Semiconductors' business units (e.g. Lincoln operations, etc.) in the 1990s.

Nurse, the Screens! Dicky Howett comments.

Yes, even in 1955, television cameramen wore the dreaded and unflattering white coats! Pictured here, operating Marconi Mk III monochrome tv cameras are a group of Marconi men working at Studio 'M', which was the old Viking Film Studios at St Mary Abbots Place, Knightsbridge in London. The reason for Marconi involvement was that in order to familiarise customers with their latest tv kit, Marconis equipped this modest demonstration studio (plus staff) which was used also by ITV companies for training, before and during the start of their operations in September 1955. Later the BBC took over briefly the premises for a little magazine programme called 'Tonight' . I'm indebted to Les Roworth for these historic pictures. Les helped instal equipment at Studio M. He also kitted Alexandra Palace Studio A with the first Marconi colour cameras and then gravitated to AR-TV at Wembley and later Tyne Tees. Busy chap.



Letters

Dear Editor,
Thank you for publishing my article about the South Dorset wireless makers (Winter 2004). There have been a few developments.

A member in the north-west of England has a Smith (Weymouth) three-valver with a sloping front which seems to pre-date the one we know about down here. He will, I hope, send me some pictures, but the main interest is in the fact that another has been discovered!

A very nice HSP (H.S.Phillips) made in Weston-super-Mare in the 1930s has also surfaced (I had a particular interest in this firm, as a lad in W-S-M when my nightly listening was courtesy of an HSP though not that model, and their factory eventually became a Christmas post sorting office giving me temporary student employment). So, thanks to Gary for his co-operation.

There has been however no response to the notion that a register of these parochial sets may be set up (I'm hoping for inspiration as I'm not too clear in my own mind how it would work). The point is that a wireless may be standing up there on a shelf, in the company of many others, just another set, not particularly valuable, and part of the collection - yet it may have an important tale to tell about the place where it was made, it might be a rare survivor representing the industrial archaeology of its home area.

Curiosity led me to bid successfully on eBay recently for an instruction book for a 'Dorchester' all-mains receiver. It has nothing to do with the town, but must have been named after the renowned Park Lane hotel. It was a TRF manufactured by Corey, Parsons & Co of Peckham probably before 1930, available only against the redemption of Kensitas cigarettes coupons issued by J. Wix & Sons Ltd. Now, there's a two-pronged line of research for anyone who can submit a piece for the Bulletin - the story of the manufacturer Corey, Parsons; and the use of wirelesses in promotions etc. I might even do the latter part myself, if there are enough responses from members who can help. What about it, someone?

Finally, on the subject of promotions, an octogenarian friend, Frank G2XQ, recited a Philco trade jingle - one that was used in adverts in the 1930s. He thought it went something like this:

P for Perivale where Philco Radio was born
H for Happy Hour that Philco
brings you each morn
I for Invitation to have a fireside test
L for Local Agent who'll give you of his best
C for Constant service .....
O for Only Philco, Britain's
balanced superhet.

He couldn't recall the whole of the 'C' line. Can any member supply the missing few words?

Yours sincerely
John Rose

Dear Editor,
Greetings from 'Wild Wales' on a 'rolled-up sleeves/fires out day! With clear ionized air here after last night's hour-long 'electro/pyrotechnics'.

Once again 'your' member/my work-a-day neighbour has loaned me 'his' Bulletin for Spring, (while he devours my RB. We've yet to see his 'garage-full' of vintage radios!) a nice way of easing my convalescence (I'm officially among the the 90% of Septagenarians).

To add a little vintage aura to my scribblings, I'm using good old fashioned 'Foolscap' paper, about 43 years old, clearly lined and a little 'short in the leg' as it has been 'chopped' to live with lots of A4 stuff; a far cry from Quarto etc.

Noting the Society's 'Duncan Neale' awards column – well done of course, latter day patrons and benefactors, but of more personal interest – the name of a one-time comrade (he wore RAF blue prior to WWII!) Douglas Byrne, and his continued efforts and sacrifices on the Isle of Wight, at his own hotel, 500ft above miles of sandy beach, at the centrally located barn, Arreton Manor, then the miracle of Puckpool Park with (explosives-safe) storage rooms and a re-created 'Wireless repair shop', where, on the counter stood a crystal set, amply supplied with RF from a long aerial running to the garrison flag-pole, over the lodge to a huge tree beyond the entrance gates. The headphones 'parked' precariously on the wooden cabinet 'playing' loudly all day (and night?) mainly *Radio Victory* (Portsmouth across Spithead) with just a hint of (Southhampton's) *Radio Solent*, merely 100kc's away.

Once whilst at Douglas' museum I was leading a party of visitors at Puckpool Park indoors when a loud CLICK greeted us! Dislodging the crystal set headphones, to clatter onto the 'counter', just as a deafening BOOM assailed our ears! When the ensuing consternation subsided, we heard with considerable relief, the 'cans' still playing via their recently well-rattled soft iron diaphragms. What a tribute to galena! No synthetic 'junction' would have 'detected' that much energy and then nonchalently carried on!

The New Zealand memoirs in the last Bulletin are so reminiscent of my own boyhood 'resourcefullness' in South Wales, about sixty years ago, ceaselessly curious, of necessity, 'hands-on (feet too!) The references to the 'British-coded' rectifier, stirring recent unpleasant memories.

My father's 'Solon' sixty-watter, got heated several times in a glowing coal-fire in homes without the 'lectric' to effect a repair! Or make up 'extensions' to battery leads, enabling the use of larger (more economical and better 'regulated') units to be used, especially LT. Radio Luxembourg needing 'enthusiastic' local-oscillator injection at the upper (or lower?) limit of the receivers Medium Wave range.

As for the 'Tee-shaped' (US) power-connector, the encroaching EV plug is similar and only 10 Amps (kettle-style, until recently – brief duty!). Progress? Ah! Fahstock clips, interesting explanation (still useful for 'Acorn' Pentodes O-V-O) a 1E7GT is a double-Pen. MW ARP transmitters – are they 'legit'? Even though they are in the spirit of BT cordless phone extenders – of surpising 'range' (1/4 ml).

Good to see a Nagra reel-to-reel again. I modified the twenty at TFS (Ealing Studios) to take 1/4 inch GPO jacks using a (gut-buster) wheel-brace! (back in '69) and it's been a decade since seeing one 'recording' a singing festival in an OB van by a lonely chapel, 1000 feet 'up' and ten miles east of here.

What impressive commitment, effort, skills, dedication and photographs. BUT, do 'our' youngsters (even of 40!) have 'what it takes' to carry on such a wide range of vintage skills and technology?

Wyn Mainwaring, I Eng MIIE

Dear Editor,
May I make a correction to John Holloway's fascinating article 'Notes from the past – an unofficial history of broadcast television: part 1 In the beginning' in the Winter issue of 'The Bulletin', the picture on page 20 is not that of Norman Collins as captioned, but of TV pioneer producer Cecil Madden.

Yours Sincerely
Terry Bennett

Dear Editor,
I am writing this letter hoping that somebody can help me to obtain any articles, photographs or even the whereabouts of an Ekco TRC124 console TV, of about 1949/50 period.

It is a receiver I fondly remember in my family home, as a very small boy. When, every Sunday BBC1 TV channel was turned off and the radio selector was switched to the Light Programme, which was one of four pre-selected radio channels, and Sing Something Simple was listened to whilst eating our tea.

I have obtained information about the Ekco TRC139, which I believe is identical circuitry wise, but, I have been unable to find any information about the TRC124. Can anyone PLEASE HELP???????

Yours sincerely
John Campbell
info@radiomaisonbnb.com
29, rue Charles le Goffic,
Plouha 22580, Bretagne, France.
0033 296 202875

Minutes

Minutes of the BVWS Committee meeting held on Friday 17th December 2004 at the Vintage Wireless Museum, Dulwich.

Present: Mike Barker (chair), Terry Martini, Carl Glover, Graham Terry, Guy Peskett, Ian Higginbottom, Paul Stenning, Malcolm Everiss (at Chairman's invitation).

1. Apologies for absence: Jeremy Day, Jon Evans.
2. The minutes of the meeting held on Friday 22nd October 2003 at 59 Dunsford Close, Swindon was accepted as a true record.
3. GT reported that the membership at nearly the end of the Society's year stood at 1740. The corresponding figure last year was 1702. New memberships for 2005 had started to be received.
4. MB reported (in the absence of the Treasurer) that the Society's balance at the low point of the year (all expenses paid but renewal subscriptions not yet starting to come in) was projected to be around £4000, which was satisfactory. The projected income from the renewals for 2005 from calculations within the database was to be £32,664. This plus other income from Auctions, events and donations should ensure a healthy financial 2005-2006. There is however items still to be paid for that were budgeted in this year that have not yet been completed and final payments for those are expected to be made before April 2005.
5. GT reported that there were only a few copies left of the Society's first CD (Trader sheets 1 - 800). PS agreed to produce 100 more to fill the gap until the transfer of all the data (but not the films) to DVD sometime next year.
6. MB tabled a message from Jon Evans detailing the work he had done on the 405-Alive website and the improvements he had in mind. JE also suggested that Bulletin articles on TV could be put on the site once the following issue of the Bulletin had been mailed (after a courtesy call to the author). This was agreed. ME made a case for more pictures of member's sets on the site and agreed to contact members who had suitable working receivers. Significant changes to both the 405-Alive section and the main BVWS websites were under way and the new-look versions would be seen shortly. CG put in a plea for more articles on 405 line TV; he reported that only one was waiting for inclusion.
7. Several names were put forward for the Duncan Neale award. A decision will be made at the February 2005 meeting.
8. MB reported that Gerry Wells portrait was finished and that he would be viewing it before Christmas. It was agreed that the artist be asked to quote for framing the portrait. It was also agreed that the frame would carry a small plaque engraved "Presented to Gerald Wells by the British Vintage Wireless Society January 2005".
9. AOB

(i) PS reported that he intended to upgrade the Internet Vintage Wireless Forum software that resides on his server and is his property, but is kindly made available for members and non-members alike to use. It was once again noted that this forum was not a specifically BVWS run forum and agreed that when the upgrade takes place this point will be made clearer.

(ii) NVCF: A small number of stallholders had not re-booked; MB will contact them to ask why. TM reported that the contract for the May 2005 fair had been signed. He also reported that the NEC was raising the car-parking fee to £7. This was totally beyond our control and the NVCF organizers have written to the NEC in respect of this matter.

A visit to Stoneleigh Park Exhibition and conference center had been made as a possible move of the NVCF from the NEC and was very positive indeed. Unfortunately we were unable to make a satisfactory booking. MB has spoken with Mr. Mike Calvert, Chief Executive of Stoneleigh Park about the experience and expects an answer in early January. Mean time the NVCF remains at the NEC for the May event.

(iii) ME offered to talk to Dave Newman about ways of getting more articles on 405 line TV.

(iv) MB proposed moving the BVWS store to a new location where four times the space could be hired for the current fee. The new site also offered 24-hour access. The move was approved.

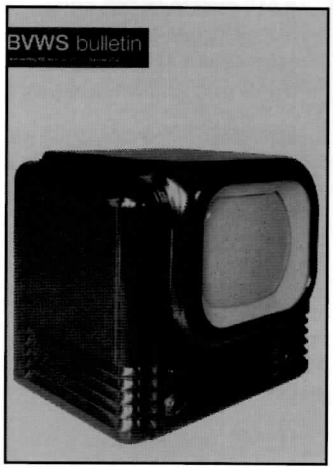
(v) MB proposed that the Society produce and give to members, a wall Calendar for 2006, made up from many Vintage images, also showing event dates pre marked. This was agreed.

(vi) TM was congratulated on the presentation of the DVD sent out with the Christmas Bulletin.

The date of the next meeting was set for the 25th February 2005 at Templewood. The meeting closed at 9.23 pm.

Back issues

Vol 10 Numbers 2, 3 & 4 Inc. The KB Masterpiece, Extinct Species "A Monster Defiant".
Vol 11 Numbers 1, 2, 3, 4 Inc. BTH VR3 (1924) receiver, Marconi's 1897 tests, Origin of the term 'Radio', Baird or Jenkins first with TV?
Vol 12 Numbers 1, 2, 3, 4 Inc. the Emor Globe, The Fultograph, Ekco Coloured Cabinets.
Vol 13 Numbers 1, 2, 3 Inc. Direct action tuning, The Philips 2514, Noctovision.
Vol 14 Numbers 1, 2, 3, 4 Inc. Cable broadcasting in the 1930's, The story of the Screen Grid.
Vol 15 Numbers 2, 3, 4 Inc. The wartime Civilian Receiver, Coherers in action, Vintage Vision.
Vol 16 Numbers 1, 2, 3, 4 Inc. The Stenode, The Philips 2511, Inside the Round Ekcos.
Vol 17 Numbers 1, 3, 4, 5, 6 Inc. Wattless Mains Droppers, The First Philips set, Receiver Techniques.
Vol 18 Numbers 3, 4, 5 Inc. The First Transistor radio, The AVO Valve tester, The way it was.
Vol 19 Numbers 1, 2, 3, 4, 5, 6 Inc. The Birth of the Transistor, Super Inductance and all that, reflex circuits, A Murphy Radio display, restoration.
Vol 20 Numbers 1, 2, 4, 5, 6 Inc. Radio Instruments Ltd., Japanese shirt pocket radios, Philco 'peoples set', notes on piano-keys, the story of Pilot Radio, the Ever Ready company from the inside, the Cambridge international, the AWA Radiolette, this Murphy tunes itself!
Vol 21 Numbers 1, 2, 3, 4 Inc. Marconi in postcards, the Defiant M900, GPO registration No.s, Personal portables, the transmission of time signals by wireless, the Ekco A23, historic equipment from the early marine era, the birth pains of radio, inside the BM20, plastics, Ferdinand Braun, pioneer of wireless telegraphy, That was the weekend that was, the First Bakelite radios, BVWS - the first five years, the world of cathedrals, Pam 710.
Vol 22 Numbers 1, 2, 3, 4 Inc. Another AD65 story, the Marconiphone P20B & P17B, listening in, communication with wires, the story of Sudbury radio supply, French collection, Zenith Trans-oceanics, Farnham show, Alba's baby, the first Murphy television receiver, AJS receivers, Fellows magneto Company, Ekco RS3, Black Propaganda.
Vol 23 Numbers 1, 2, 3, 4 Inc. Sonora Sonorette, Bush SUG3, RNAS Transmitter type 52b, North American 'Woodies', Why collect catalin, Pilot Little Maestro, Theremin or Electronde, The Radio Communication Company, Early FM receivers, an odd Melody Maker, Black propaganda.
Vol 24 Numbers 1, 2, 3, 4 Inc. The Superhet for beginners, Triode valves in radio receivers, History of GEC and the Marconi - Osram valve, KB FB10, Great Scotts!, Riders manuals.
Vol 25 Numbers 1, 2, 3, 4 Inc. Repair of an Aerodyne 302, Henry Jackson, pioneer of Wireless communication at sea, Zenith 500 series, Confessions of a wireless fiend, RGD B2351, John Bailey 1938 Alexandra palace and the BBC, Ekco during the phoney war, Repairing a BTH loudspeaker, The portable radio in British life.
Vol 26 Numbers 1, 2 Inc. How green was your Ekco?, The Amplion Dragon, Crystal gazing, The BVWS at the NEC, Installing aerials and earths, novelty radios, Machine-age Ekco stands of the 1930s, Volksempfänger; myth & reality.



Supplements:

1 'The story of Burndept'.
2 'WW 1927 data sheet'
3 'Seeing by wireless' the story of Baird Television
4 Reproduction Marconi catalogue

Earlier Bulletins and supplements are priced at £2:00 each + postage. Bulletins from volume 21 onwards are priced at £2.50 each. + postage.

Postage: for individual Bulletins add 50p, for 2-5 bulletins add £1, for 6 or more add an extra 20p each.
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London SE21 8DS
Telephone 020 8670 3667.

Cheques to be made payable to 'The Vintage Wireless Museum'.

News and Meetings

GPO registration Numbers

Martyn Bennett has the role of custodian of the BVWS list of GPO Registration Numbers. As many members will know the project of assembling this list was started in the early days of the BVWS and, more recently, has been enthusiastically carried on by 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

2005 meetings

July 3rd Wootton Bassett.
July 10th Workshop at Vintage Wireless Museum.
September 18th Harpenden.
October 2nd NVCF at The National Motorcycle Museum.
October 16th Southborough.
October 23rd Workshop at Vintage Wireless Museum.
November 13th Leeds Vintage Audio Show.
November 20th Harpenden.
December 4th Wootton Bassett.
December 14 'Hidden Broadcasts' a lecture on POW clandestine radio presented by Ralph Barrett at The Institute of Physics, 76 Portland Place, London W1N 3DH 6.30pm

2006 meetings

2nd April Leeds Vintage Audio Show.
2nd July Wootton Bassett.
12th November Leeds Vintage Audio Show.
3rd December Wootton Bassett.

Workshops, Vintage Wireless Museum:
For location and phone see advert in Bulletin. 11:00 start.
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
Leeds Vintage Audio Show: Ramada Jarvis Hotel
Seacroft roundabout A64, Leeds. Doors open 10:00.
Contact Andy Wilcox, 0113 273 2323
West of England Vintage Wireless Fair:
Willand Village Hall (J27/M5). Doors open 10:30.
Contact Barrie Phillips, 01392 860529
NVCF: National Vintage Communications Fair.
See advert in Bulletin. Contact Terry Martini, 07947 460161
www.nvcf.co.uk
Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett.
Nr. Swindon (J16/M4). Doors open 10:30.
Contact Mike Barker, 01793 536040
Southborough: The Victoria Hall, London Road.
Southborough, A21, Kent. Doors open 10:30.
Contact John Howes, 01892 540022 (between 8 and 9PM Only please)
For more details with maps to locations see the BVWS Website:
www.bvws.org.uk/events/locations.htm

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