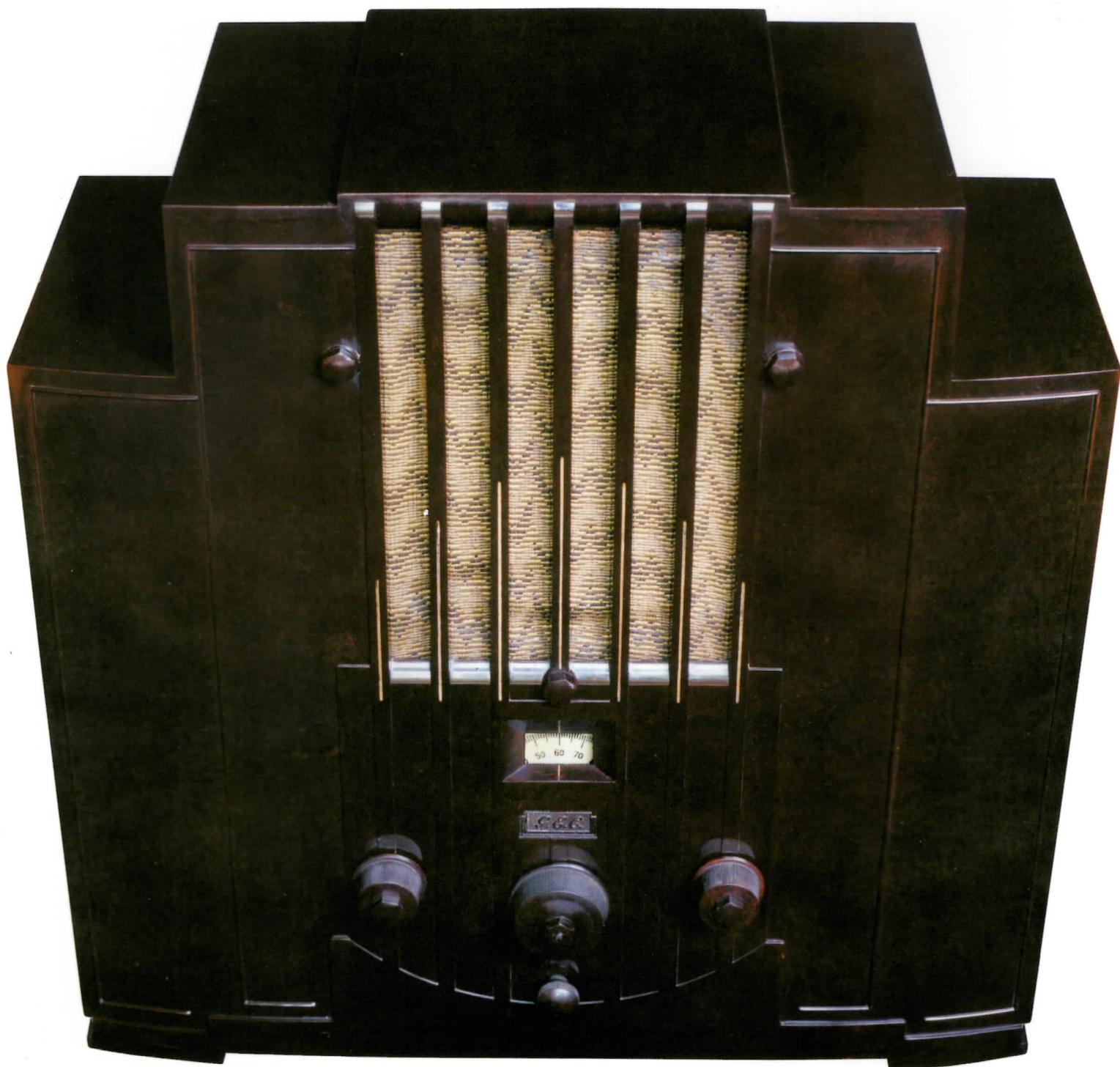


# BVWS bulletin

Incorporating 405 Alive / vol. 27 no. 3 Autumn 2002 [www.bvws.org.uk](http://www.bvws.org.uk)



## The Vintage Wireless Museum

23 Rosendale Road, West Dulwich London SE21 8DS  
Telephone 020 8670 3667

Proprietor: Gerald Wells. Please make appointments beforehand



# The History of the BVWS

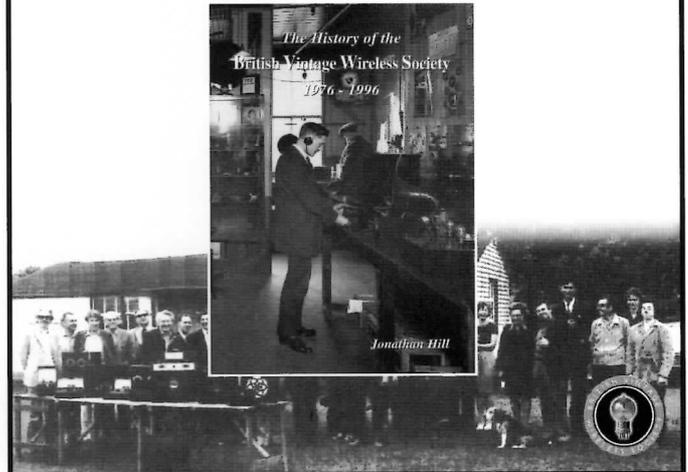
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## From the chair

Bulletin of the British Vintage Wireless Society  
Incorporating 405 Alive  
Volume 27 No.3 Autumn 2002

www.bvws.org.uk

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So far the summer has been an extremely busy time. What with all the preparations for the Wootton Bassett event which hosted a large auction of items, the likes of which have not been seen in the past few years, and certainly not in the same quantities and superb condition, and the many events and visits I have been making to members houses and the like.

The recent "Friday Night is Music Night" evening at Gerry's was a great success, with everyone sitting out in the evening sunshine listening to a varied selection of music accompanied by Gerry's tales to remind us of the Golden days of Radio, and the service trade and good food laid on by Eileen. Thanks Eileen! How does Gerry remember all those stories! The Wootton Bassett event saw the BVWS hosting the first significant auction of complete collections of serious value from single vendors. We are increasingly being asked to stage such events, and so we have decided to look into logistics of doing further special auctions at events, and to set out some guidelines both for the vendor and the BVWS auctions. This will come to light very soon in the Society minutes.

I have the pleasure of announcing the appointment of Paul Stenning to the Committee. Paul has recently taken over the management of the 405 Alive website and is developing it further. We have asked Paul to look into the possibilities of linking this into the BVWS website and also to research ways that the secure payment of BVWS Subscriptions, and online membership applications may be made available as Paul already has significant experience in these areas.

A recent invitation to the Alexandra Palace television studios came as a bit of a surprise. Especially as it was to attend an event that would forge together a group, to be known as "Friends of the BBC studios". The aim of the group which includes the Alexandra Palace Charitable Trust management, the BBC, Simon Vaughan of the Alexandra Palace Television Society and members of the original BBC staff who worked there, is to create a visitor centre in studio A (EMI studio) for the general public. I'll keep you informed of the progress.

Due to the unfortunate lack of 405 Alive material in the last Bulletin, we are redressing the balance here with a bumper amount for you to read in this issue. This does however mean that part 2 of the current excellent series "From Crystal sets to 405 line televisions" has had to be moved to the Winter Bulletin. This of course also gets me off the hook for my current article entry and gives me another couple of months

before I have to get it to Carl. So keeping this brief, as I know we are pushed for space in this issue, I'll sign out by reminding you all to check the diary page for the forthcoming events, as I'm sure to see you there. Mike



## Society Constitution and Bylaws

From time to time the Committee are questioned on the conduct of members either in or outside of Society events where behaviour may not be fitting with the aims of the Society. Over the years, the Committee has reviewed and adjusted the Society Constitution as required.

The purpose of this was to ensure it reflected the needs of the Society and allowed those managing the day to day affairs, and the membership as a whole to enjoy a Society that is open and consults its members, and acts on the requests of the membership to improve the Society if practicable.

Since the 1996 Society Constitution was adopted (the first in the current format), we as a Society have grown considerable and continue to grow. We have been very fortunate in setting up good relations with professional bodies such as the IEE and the Museums communities. This has been achieved in a number of ways, but mainly through the "talking About Wireless" events at Harpenden.

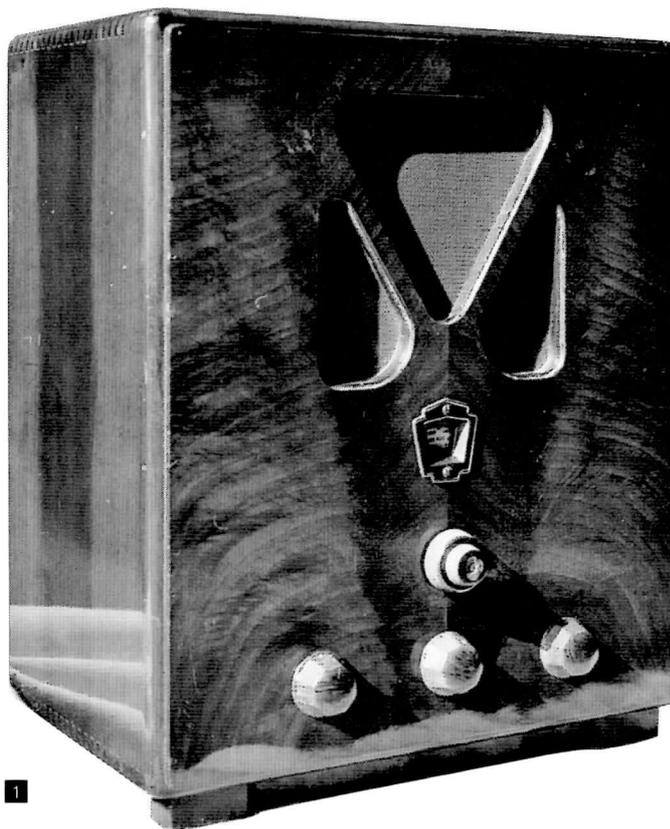
We now find ourselves, as a Society with strong links to other organisations as mentioned and seen as a professional and capable Society by these communities. This however does mean we must have a supporting Constitution and procedures that reflect and uphold this position. I take for example the IEE, RSGB, BATC (British Amateur Television Society) and SIS (Scientific Instrument Society). These organisations all have Bylaws as part of or in support of their Constitutions and ensure that their governing bodies are able to act where necessary and insure the stability and fairness of the members and Societies activities.

The Committee has therefore decided to create and maintain a set of BVWS bylaws and disciplinary procedures to support our Constitution. We expect to draft these out in the coming months and be in a position to publish them by the end of this year. I believe that this is long overdue for a Society of our size, whilst remaining adamant that any bylaws will not affect the friendly 'club' atmosphere that we are used to and proud of.

# Brighten your home with a Sunbeam

By John R. Sully, Photography by Leslie K. Chatterton.

I had owned my example of the Sunbeam U35 for many years, but restoration had never been started because three of the four valves were clearly not original, to the extent that even the bases had been changed, and I had no circuit diagram with which to ascertain the original valve line-up. On a visit to the Vintage Wireless Museum in Dulwich, Gerry Wells looked the receiver up in his service data library, and found a service sheet from his archive of "Broadcaster" sheets indicating that the receiver had initially used the 2018 series valves, a range rarely seen in UK receivers.



The 2018 series of valves were manufactured in Hungary by Tungstram during the very early 1930's, and as the number range suggests, the valve heaters were designed to run at 20v and draw 0.18A of current. The range was actually intended more for DC receivers, where each valve would drop 20v of the supply voltage, and the remainder would need to be absorbed by dropper resistors or similar. They could be used in AC/DC sets by provision of a metal rectifier or rectifying valve, the latter configuration being used in the Sunbeam U35 receiver shown. The valve range is very rare, in fact after a fair amount of investigation I can find no other manufacturer other than Sunbeam who specified them for use in their receivers. Other minor manufacturers of the era did fit and specify Tungstram valves, for instance Pegasus Radio utilised a series including HP4106 pentode and APP4120 output pentode for their AC "Table Model". However this set was a superhet receiver with 4v heaters, and the valves are marked as having been made in the UK, whereas the 2018 series are all marked as having been made in Hungary. At this time valves used in UK receivers were all meant to be British Made, perhaps Sunbeam were simply too small for the BVA to bother with.

Two other manufacturers also marketed a range of valves in the UK with 20v heaters designed to draw 0.18A. Mullard produced a range that included the HL20 triode, SG20 screen grid and the Pen20 output valve, this series being used for a short while in Philips DC mains only receivers such as the 630C and 830C. Whilst the Pen20 output valve is occasionally seen, the first two valves must have been produced in very small numbers, as they are not even listed in the AVO VCM Valve Tester Manual (1957 edition). The other manufacturer to market a range of 20v 0.18A valves for use in the UK was Triotron. Their series included a S2034N variable-mu pentode, S2035N pentode and P2460 output valve, and are to be found in the Lotus model 66 AC/DC receiver. Investigating this set was

something of a curiosity as the service data in the "Broadcaster" series (November 1935) clearly states that these valves were manufactured by Tungstram, whereas the "Trader" service sheet (41, May 1935) lists the valves as having been made by Triotron. In fact the "Trader" sheet was correct, even though it was published before the "Broadcaster" sheet, as a check in a valve data book also lists the series as having been made by Triotron (apart from which it is not credible that Tungstram would have allocated a different number sequence to its 2018 series). The short lifespan of the 20v 0.18A valves in the UK could form an article in itself, so at this point I'll return to the Sunbeam U35, hopefully with the point made that they are pretty rare!

Fig 10 shows a leaflet produced by Tungstram in the early 1930's listing the valves in the range, and Tungstram's view of why they were superior to other types. The fact remains though that British manufacturers were unimpressed, and only small numbers were used in commercial sets. This had the effect of rendering the series obsolete within just a couple of years, which is why drastic replacement has taken place on the receiver shown. The replacement has clearly taken place as each valve failed, since each of the new valve bases was fixed by different nuts and bolts, coupled with the fact that the replacement valves apparently originate from different periods in valve development, as can be seen by the close-up in fig 2.

It is possible that one or more replacements were made as a result of war shortages. The replacement of valves and bases at this time was a common necessity, indeed many valve data and equivalent books of the time devoted specific sections to the subject. For example, the "Valve Replacement Manual" published by Farnell and Woffenden in August 1941 devotes 14 pages to the subject of emergency valve replacements, (but however does not

Fig. 1: View of Sunbeam U35 receiver cabinet

Fig. 2: Close-up of valve line-up prior to restoration

Fig. 3: View of restored chassis top

Fig. 4: Circuit diagram from The Broadcaster



It is possible that one or more replacements were made as a result of war shortages. The replacement of valves and bases at this time was a common necessity, indeed many valve data and equivalent books of the time devoted specific sections to the subject.

mention the 2018 series). Even the preface to the book seems designed to reinforce the “keep it going” spirit of the war; commencing: “Mr Radio Service Engineer, Dear Sir, We believe the information contained in this book will be a help to you in these difficult times, when many valve types are no longer obtainable. Hundreds of valve variations are possible by an intelligent application of the Characteristic Chart combined with our various tables”.

Wireless magazines of the 1930's and 1940's also devoted articles to updating the valve line-ups in receivers. An item entitled “Valve Replacement Pointers” written by anonymous contributor “The Experimenters” appears in the January 13th 1940 issue of Practical Wireless. Although published during the war the article in fact makes only an oblique reference to the conflict (in its description of new regulations concerning the possession of high power output valves), but rather concerns itself with ensuring that receiver performance is maintained or improved. The subheading to the article advises: “Receiver performance can often be improved by replacing worn-out valves with others of newer types, but certain precautions should be taken when this is done” and continues later in the first paragraph “In the case of a set in which the valves are of fairly old types – possibly obsolescent even if still obtainable – far better results may be obtainable by using valves of

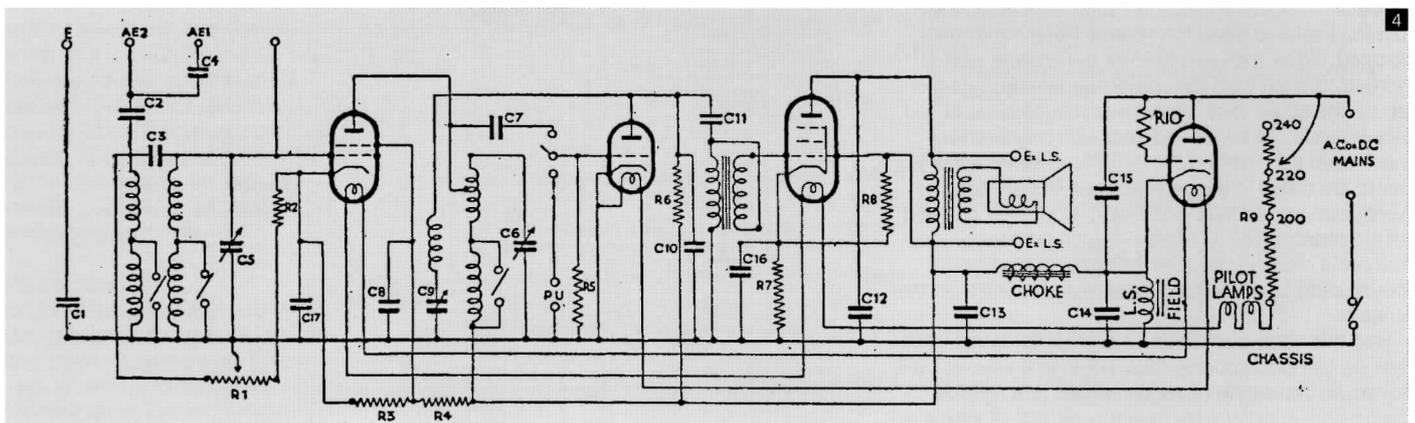
newer or more efficient types”.

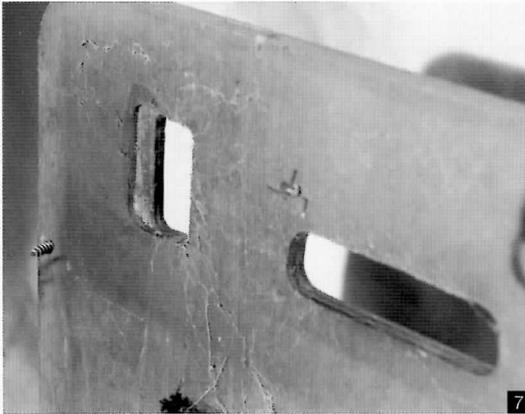
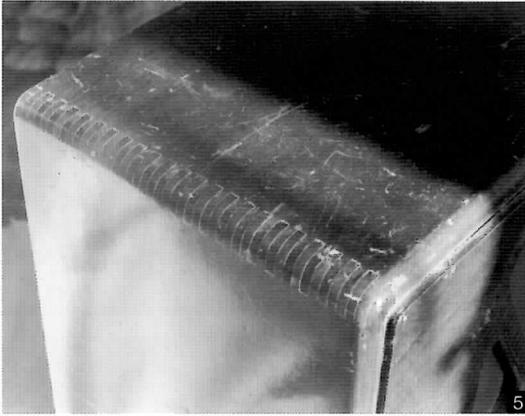
However, in the case of the Sunbeam U35 shown, I think it may be assumed that the replacements have taken place simply because the 2018 series was not popular in the U.K, with the result that they became hard (or at least inconvenient) to source within very few years. The original valve line up, and replacements used in the set can be summarised as follows:

V2118	B5	Rectifier	Still existing	B5
SE2018	B5	H.F. Tetrode	Replaced by EF36	IO
R2018	B5	Triode Detector	Replaced by HL13C	B7
PP2018	B5	Power Output	Replaced by 35L6GT	IO

It can be noted that by the time the three valves had been replaced an assortment of four different heater voltages were now in use on the chassis – 20v, 6v, 13v, 35v.

So to the set itself. By reference to fig 1 it can be seen that it is not especially stylish, but is in fact very well built. The sides of the cabinet are made of 1/4" solid Walnut, chamfered at all cabinet joints, so no overpainting or veneering of joints was required. The mitres at each corner of the sides of the cabinet feature 23 mitre tongues per panel (see fig 5), excessive rather than sufficient joinery it might be said. The front panel is walnut faced ply, multi-layered in places with the result that the speaker fret recesses are almost 1/2" thick. The





machining has even been contoured, instead of being simply perpendicular to the front.

The speaker cloth is the coppery silk very similar to that employed in early 1930's Ekco receivers, and is also used to cover large ventilation cut-outs on the stained plywood back panel. It can be noted that the tuning control knobs are different to the other control knobs. The tuning capacitor is a substantial Polar component of good quality, and features a concentric trimming control to ensure accurate alignment at any point on the tuning scale. The other three knobs are of a different design, but are definitely original. The receiver was reviewed in *Wireless World* June 23rd 1933, where a picture shows the two different knob types in use.

A further unusual feature is the method by which the chassis is fixed in the cabinet. The chassis is retained by a nut and washer around a threaded shaft of both the reaction and volume controls tightened against a recess in the cabinet. (See Fig 6). A single screw from underneath the base is additionally used to hold the rear of the chassis down. As this was a Universal receiver this arrangement would be largely due to safety concerns, and possibly this also made the chassis easier to remove for servicing. However, it must have been at least as expensive, probably more so, to source threaded controls and rout out a recess behind the control knobs to allow the chassis fixing nut to be located, rather than simply to fix the chassis with screws through from the cabinet underside. In fact, since one screw fixes from the cabinet underside anyway, it could be argued Sunbeam might as well have used that method for the other couple. Three large holes are drilled in the cabinet base, to provide ventilation for the heat-generating dropper at one end of the chassis. The 1" holes are covered internally by the same material used for the speaker (and back cover) cloth to provide a degree of protection from the chassis.

Had this been a set with a more conventional valve line-up I would probably have left it as it was, since it forms an interesting historical record of a receiver being kept in service by the replacement of valves as

The speaker cloth is the coppery silk very similar to that employed in early 1930's Ekco receivers, and is also used to cover large ventilation cut-outs on the stained plywood back panel.

Fig. 5: View of cabinet mitres

Fig. 6: View of nut & washer retaining chassis behind controls

Fig. 7: Inner surface of ply back

Fig. 8: Outer surface of ply back. Straight lines of pieced-in section can just be seen around mains input pins

Fig. 9: Period advertisement for Sunbeam U35 (*Wireless World*)

## The set for All Mains



**A.C.  
or  
D.C.  
200-250 volt. Mains**

**SUNBEAM  
SUITS EITHER**

As reviewed in  
"The WIRELESS WORLD"  
June 23rd 1933.

Here is a receiver to which A.C. or D.C. supply makes NO difference. It offers an immediate and inexpensive solution to the problem of the man whose supply is likely to be changed in the near future.

Although designed as a universal receiver the U.35 will be found highly efficient either as an A.C. or D.C. Receiver.

Plugged into either supply the SUNBEAM U.35 (our 1934 model) will, without any alteration or adjustments whatever, operate perfectly and give amazing performance.

Selectivity is more than ample when used under normal conditions. Sensitivity is remarkable, enabling reception of a wide choice of home and Continental programmes.

Don't let a possible change-over of supply deter you from now purchasing a receiver. Become a possessor of the U.35 and have the satisfaction of knowing that there will be no further expense.

*Obtainable only from our appointed agents. (Name and address of nearest local Agent, also literature, will be sent on request.)*

**SPECIFICATION.**

Type.—Straight three-valve with universal power unit for A.C. or D.C. mains. Magnetic coil loud speaker. Internal or external aerial. Provision for gramophone pick-up.

Circuit.—Screen-grid H.F. with tuned audio amplifier and detector with reaction; remote output ratio; 11.4 megohm hi-frequency section.

Controls.—(1) Illuminated tuning dial calibrated in wavelengths. Two range switches with volume. (2) Reaction. (3) Volume and on-off switch. (4) Switch for long-short-wave. Cabinet.—Bright enamel, nickel plated and well finished.

**SUNBEAM  
MODEL U.35  
£9:9:0**

Can be purchased out of income for 17/9 per month.

**SUNBEAM ELECTRIC LTD.**  
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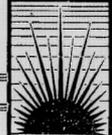
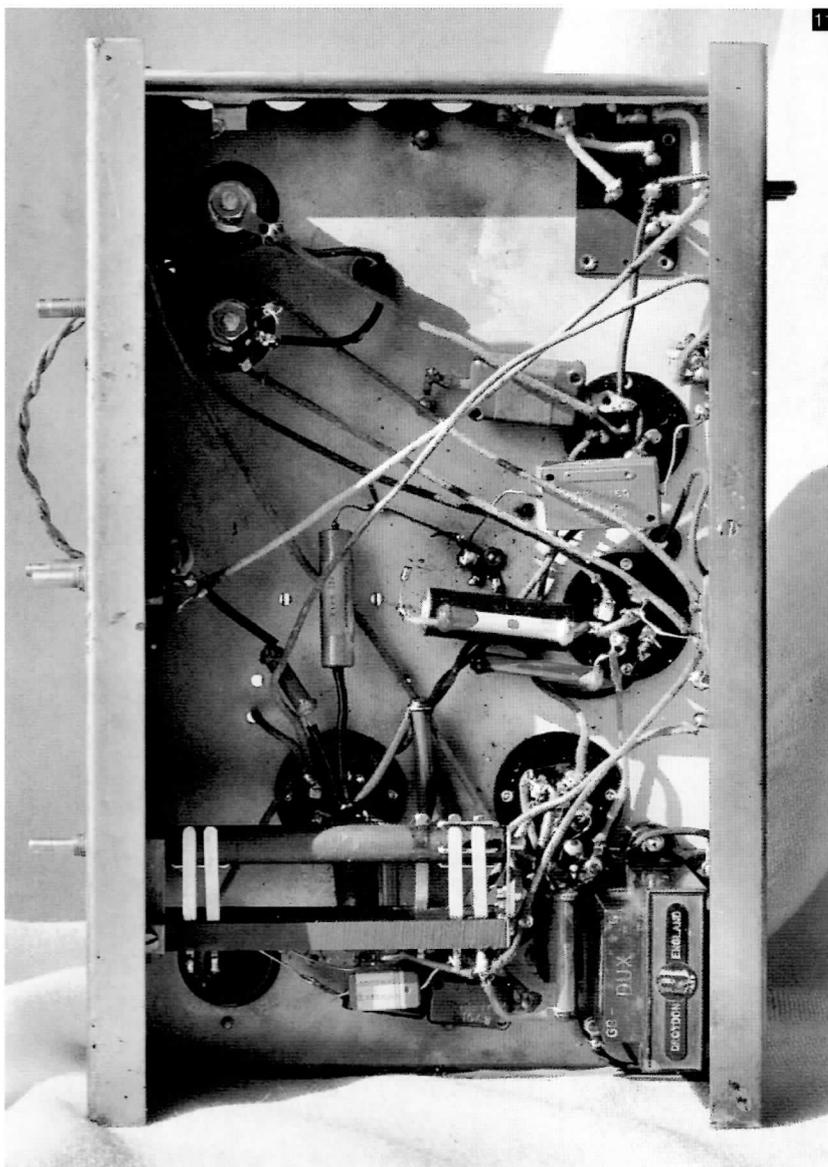


Fig. 10: Tungram Leaflet outlining 2018 valve range

Fig. 11: Chassis underside after restoration

AC/DC UNIVERSAL VALVE RANGE									
Tungram Type No.	Use	Filament Volts	Filament Currents	Impedance	Amplification Factor	Slope	Undistorted Output		
R 2018	Triode	20	0.18	13,000	40	3.5	—		
P 2018	Power	20	0.18	3,000	10	4.0	1.0		
PP 2018	Small Multi-Grid Output	20	0.18	7,000	80	2.6	1.4		
PP 4118	Large Multi-Grid Output	40	0.18	5,000	80	3.0	3.4		
MH 1118	Heptode Frequency Changer	10	0.18	—	—	0.5	—		
HP 1118	Variable Mu HF Pentode	10	0.18	1 meg.	1,650	1.65	—		
HP 1018	H.F. Pentode	10	0.18	700,000	1,250	1.5	—		
HP 2118	Steep Slope Variable Mu H.F. Pentode	20	0.18	1 meg.	2,000	3.0	—		
HP 2018	Steep Slope H.F. Pentode	20	0.18	2 meg.	5,000	3.0	—		
SS 2018	Steep Slope Tetrode	20	0.18	300,000	900	3.0	—		
Tungram Type No.	Use	Filament Volts.	Filament Currents	D.C. Output	Applied R.M.S. Volts				
S 2018	Tetrode	20	0.18	300,000	450	1.5	—		
V 2118	Half Wave Rectifier	20	0.18	75mA	250				
PV 3018	Two-path Rectifier	30	0.18	2 x 50 mA	250 (or 2 x 125 as voltage doubler)				
D 418	Single Diode	4	0.18	Suitable for demodulation and A.V.C.			100		
DD 818	Double Diode	8	0.18	For demodulation and delayed A.V.C.			100		



they failed rather than as a result of a general update of the valve line-up. However, as it uses the rare 2018 series and the remainder of the receiver was largely original I decided to assess the possibility of procuring the original valves. The rectifier V2118 was still in place on the chassis, and tested ok, so the other three were the problem. Gerry Wells found an R2018 in his stores, and later also a S2018, indicated in valve data books as being directly equivalent to the SE2018 listed on the service sheet. However Gerry did not have the PP2018. I also tried other UK suppliers and collectors, however none could help with the PP2018 output valve. Out of curiosity I then tried an internet search using just the string 'PP2018' and was amazed to find a site in The Netherlands that had a PP2018 for sale. Valve wireless sets may be steeped in character, but you can't knock the efficiency of modern technology! The site proprietor only had one PP2018, but it was new in its box, and as it would complete the restoration to original specifications, I ordered the PP2018 from Holland. Mind you, postage and packing, currency conversion and bank charges cost more than the valve itself. The valve was received in good condition, and ironically was presumably intended for sale in the UK as the box is printed with the price 13/6, and a further sticker has been added indicating the total cost with Purchase Tax to be 16/3.

Obviously the valve bases would need to be reverted to those originally fitted, and the one original base remaining was a round, black B5 base. Gerry was able to supply them, though not in black as used by Sunbeam. However, after painting both sides of the base in Humbrol enamel, it would be difficult to spot the difference. The bases were then riveted to the chassis.

Two large can type electrolytics were fitted to the receiver. One was an original TCC component but was emitting gunge from its base so was clearly no good. The other had been replaced by an equally ancient component, but this was also leaking and did not match the TCC component. Gerry was able to supply a similar can to the original TCC component, so I set about de-constructing the can in order to insert a modern component inside. It was whilst offering the replacement up to the chassis I learnt the lesson that the mounting spigots that are fixed through the chassis are not all the same size, and my replacement

from Gerry was slightly too big to fit through the chassis hole. Yet another visit to Dulwich, and this time I made sure the donor electrolytic was a TCC, and took a stencil of its destination mounting hole just to be sure! As mentioned, the two electrolytics are fixed directly through the chassis rather than having a retaining clip encircling the base, and hence they could not be opened by cutting through the circumference of the can and disguising the cut with a clip afterwards. Therefore in order to locate the replacement electrolytics in the original can a series of 1/16" holes were drilled around the base of the can, until the remaining aluminium was weak enough to lever away, thereby enabling the removal of the original capacitor innards. Having inserted new components in the can the opening join is hidden by virtue of the fact that the base is directly fixed to the top surface of the chassis.

Where possible the other original components were tested and reused in the positions indicated by the "Broadcaster" service sheet. The newer components that had been fitted during the receiver's life were removed and Gerry supplied and fitted a selection of "period" resistors and capacitors to replace those changed during the valve updates. The receiver can be directly operated from either AC or DC mains. When operated from AC mains the V2118 acts as a half-wave indirectly heated rectifier. When operated from a DC supply the rectifier becomes a low value resistance as it is heated.

The model U35 clearly went through several incarnations during its life. The review in *Wireless World* June 23rd 1933 pictures a 3 valve chassis, but the receiver is minus the V2118 rectifier, and instead is fitted with a Westinghouse metal rectifier (see fig 12). This has meant the electrolytic capacitors are mounted in a slightly different location on the chassis, as is the smoothing choke. By the time the review was published in "The Broadcaster" in March 1934 (fig 13) the chassis looked similar to that featured in my set, although the electrolytics are now in cardboard cartons under the chassis and the smoothing choke is in yet another location. Most importantly though the cabinet is different, featuring a larger tuning escutcheon and different speaker fret. (Fig 14) From the two articles it would look as though my receiver would have been made at a time between those shown in the two contemporary reviews, therefore sometime towards the end of 1933. One would have thought the company would have used each change to allocate a new model number, especially as the changes were not insignificant. As other companies were in the habit of introducing a new model each year, it would seem to be a lost opportunity, as most manufacturers would want to be seen to be selling the latest developments during a period of rapid innovation. That said, on checking the inventory of exhibitors for the Radio Show Olympia 1933 Sunbeam does not appear to have been represented anyway. The only reason I can see for continuing with the U35 designation is that the plate that carries the model and serial number is screen-printed on a metal plate riveted to the chassis, obviously incurring a cost to produce. Could it be that having had a batch of these plates manufactured, Sunbeam was determined to use them all up irrespective of the fact that the receiver itself no longer had a metal rectifier, and was housed in a different cabinet made in a later year!

Another oddity is the mains input connector. This is clearly in its original chassis position, and yet it looks as though the ply back has been modified. Presumably the cut-out for the mains input connector was made at the wrong point on the back, but what's surprising is the trouble that has been taken to move the cut-out. The back panel is made of 5 layer ply, and hopefully reference to the photographs (see page 6) will make the following explanation clearer. Fig 7 shows the inner surface of the plywood back, where it can be noted that the machined cut-out has been extended leftwards about 1/4" inch. Fig 8 shows the outward-facing side of

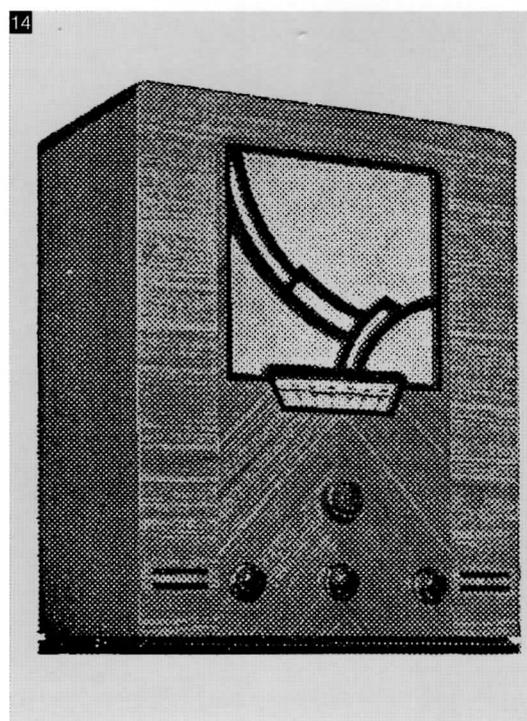
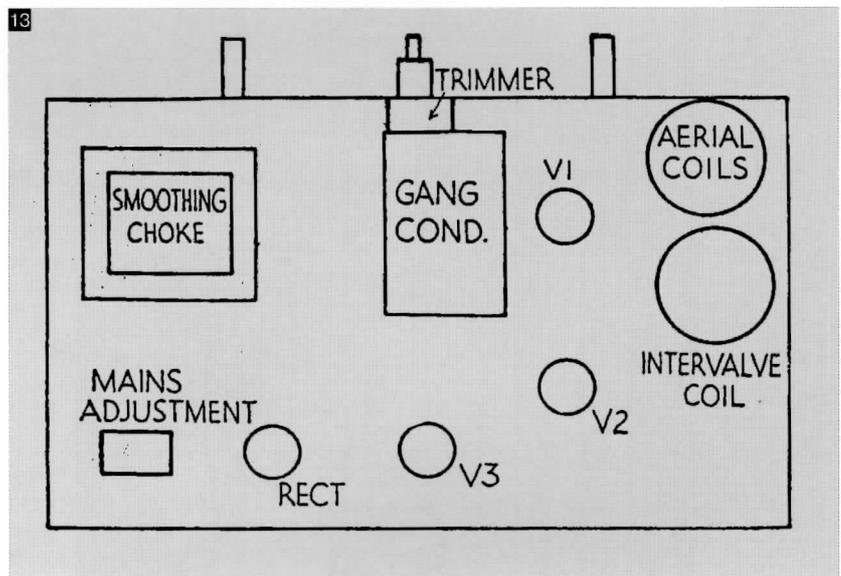
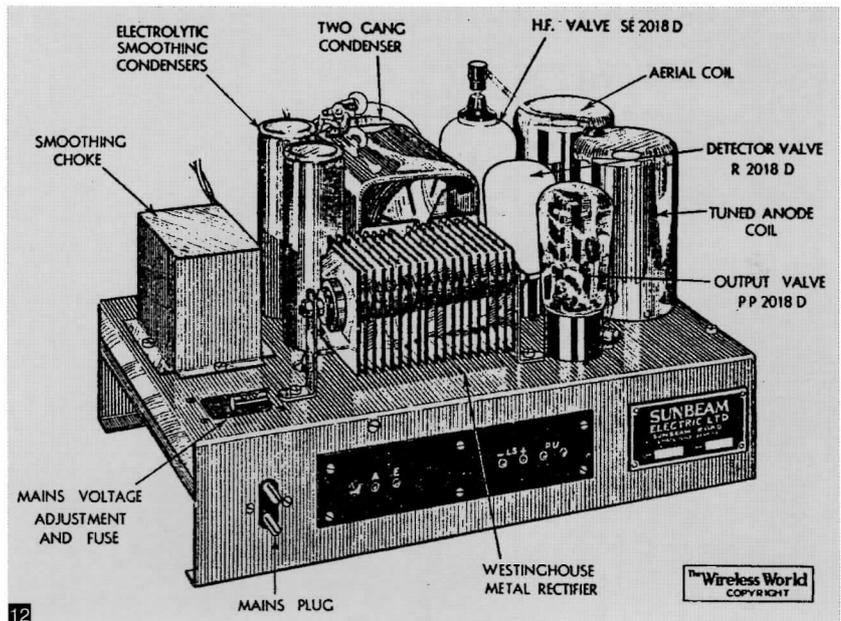


Fig. 12: Chassis diagram from *Wireless World*

Fig. 13: Chassis diagram from *The Broadcaster*

Fig. 14: Later version of the U35 from *The Broadcaster*

The set is generally well put together, build quality being much better than might be expected from a small manufacturer with presumably low production runs.

# A man of his time

Interview with Peter Brunning. By John Holloway

I first met Peter Brunning and his wife Daphne at one of Gerry's Garden Parties about three years ago when we were sharing a table and I was struck at the time by the friendly nature that they both radiated on that pleasant Summer's day. The feeling was reinforced some months later when I called to tape an interview with Peter at his home just round the corner from me in Merton Park, Wimbledon.

As soon as you enter the house you are confronted by the evidence of an interest in wireless. There are sets placed around the house reflecting the period just before and just after World War II. With sounds of tea being prepared in the kitchen we settled down to chat about his early life and a career which started in radio retailing at the end of the war and went on to embrace cable distribution systems, CCTV and finally broadcast production for the Inner London Education Authority Educational Television Service.

But to begin at the beginning.

It's June 1930, and in Bethnal Green East London there is a smallpox epidemic and Peter's Mum is moved to an isolation hospital prior to his birth. Although he is premature and in fact catches the disease a few days later, he mercifully survives unharmed and unmarked. The family soon moved to Walworth near the Elephant and Castle and by 1935 he's started at St John's School. By the time the war had started the family had already moved again, this time to Brockley near Lewisham, and like many children of that time the horrors of gas mask fitting and the smell of the unit remain indelibly etched in his memory.

There now followed a period of evacuation which took him to Wales via periods in Oxted, East Grinstead, Bletchingly and Limpsfield in Surrey. Whether this was to confuse the enemy or because he was a handful Peter didn't enlighten me but it was around this time that he began to develop an interest in radio. Where the stimulus for this came from is difficult to say but people wanted to hear the news from the war, however depressing it was in those early days. There were few sets available for sale at the time and his father had started to make and sell sets for local people to listen to the news and to the growing number of radio shows aimed at keeping up the morale of both the civilian and military population.

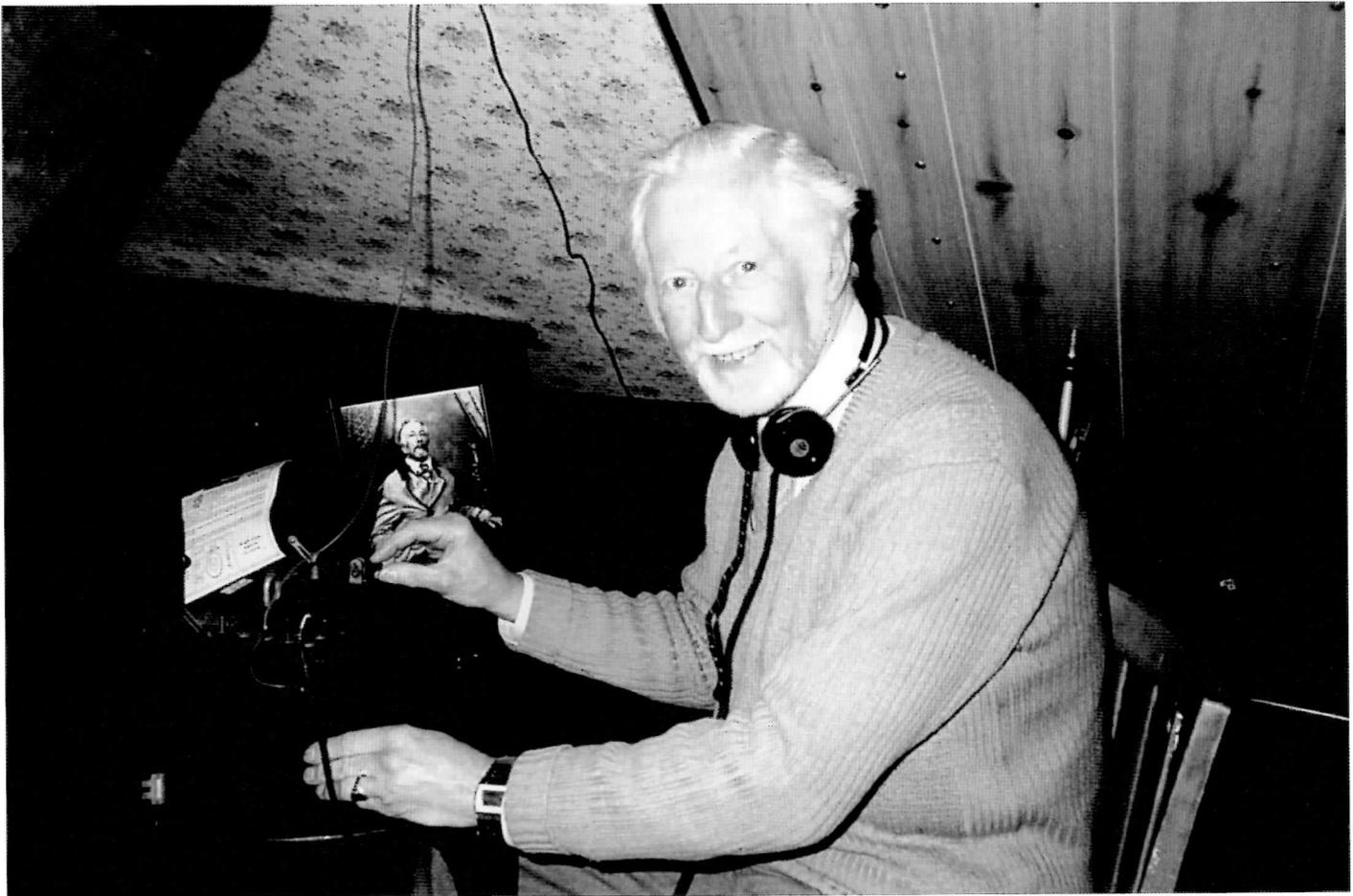
At his boarding school in Surrey one of his fellow students had made a crystal set and this, combined with his father's activities, fired Peter's enthusiasm and he too started building crystal sets and one-valvers. On one of his trips back to London at weekends to see his parents he discovered his father had cut down a box which he felt would be ideal for constructing a one valve set powered by a combined 90 volt and one and half volt battery. By not having an accumulator it would be easier to transport back to school and it could be kept on the table next to his bed in the dormitory. There was however a fatal flaw in the practical aspect of the design. Not having a four-pin plug to disconnect the batteries, Wander plugs were employed and the obvious accident happened. One of his fellow students decided it would be a good idea to listen to the radio while Peter was out and plugged the batteries in the wrong way round. Oh calamity! As Roberston Hare would say. No more listening to ITMA tucked up warm in bed.

Despite all the changes caused by evacuation, Peter's education was progressing and combined with fire watching duties at the school and a growing interest in radio, life moved on. One night while watching out for incendiary bombs on the roof of the three storey school house Peter witnessed one of the first Doodlebug raids destined for the capital. To those watching, the missiles droned past within a few feet of the building. Within twenty four hours the whole school had been packed up and moved, this time to Maesteg in South Wales! By the time Peter was fourteen the blackout had been lifted and he was back home in time for VE day. In that same Summer Peter left school to make his way in a very different world to the one he had started out in.

At the start of his working life his position as 'boy' harked back to the days when companies could afford to have someone around to do all the running about, who didn't cost too much and demand a fancy title. His father secured him an opening with the firm he worked for, the London Electrical Company who were situated in the Blackfriars Road and were electrical wholesalers. One of Peter's jobs was to go out to buy

Below: 'On the road with EMI'





the teas and coffees, rolls and sandwiches for his fellow workers. This task secured him a free cup of tea, as there was always some left over in the billy-can he had to carry from the café round the corner. The job was not to his liking and, as he had a growing desire to get into wireless, his father talked one of the customers he delivered to into taking Peter on to learn the trade of wireless repairman.

Carr Brothers had a store in Wandsworth and were a major dealership for most of the well known makes of the time excluding Murphy and Pye. Peter and his family had recently moved to Clapham so it was a better journey and the beginning of a career in electronics which was to last 50 years.

There was one engineer at Carrs and under his guidance Peter began to learn the trade of radio repairman. Training was based on 'watch and do' and that continued until joining the RAF and more formal training as an Air Wireless Mech in 1948. In true military fashion he was intensively trained in the intricacies of the 1154/1155 transmitter and receiver just prior to them being taken out of service and then moved over to work on VHF equipment. By 1950 he was back out in civvy-street returning to Carrs and earning the princely sum of £6 a week. It was here that he saw his first TV a 10 inch HMV 1804 and learned to set the line and frame hold and the masses of other controls that the sets of the time were equipped with! There were still pre-war sets which required servicing including a number of sets which were sold as radios only as the television service had been closed down at the outbreak of the war.

At Carrs, the original staff had gone and though one of his former colleagues asked him to go out to South Africa to run a radio repair shop, Peter, who by now had met his wife Daphne, decided to stay in Britain. This seeming lack of an adventurous spirit was turned on its head a year or so later however when in partnership with Dickie Birdseye, the manager of Carrs, Peter set up a shop in Balham just down the road in South London.

The venture didn't prosper and when a wholesaler asked if one of them would like to go and work at another large retailer, Gurneys in Southall in West London, they decided that Peter would take the job and put half his wages into helping to keep the shop going. It was a punishing journey by motorcycle in all winds and weathers and latterly by one of those motor assisted bicycles which regularly failed and had to be pedalled home. Despite all their hard work they decided to close the business and eventually Peter and Daphne moved to Hayes ready, though they would not have known it at the time, for his next big move.

Apart from a short break working for a company owned by the film and stage star Jack Buchanan, Peter remained at Gurneys in Southall for nearly 10 years during which the growth of domestic television would begin to eclipse radio. Around 1962 Peter spotted an advertisement for electronics engineers at EMI in Hayes. He would be one of some twenty or thirty engineers working in a department that was involved with surveillance cameras, community television systems, communal aerial systems and oscilloscopes.

The mid-sixties saw the beginning of the move towards distributing television via cable. EMI were pioneers in this complex field. The EMI system had flat wideband trunk repeater and distribution amplifiers with a rising response to counteract the fall off of the HF response in the cable. There was no call for such systems in the UK and EMI saw that the USA with its growing number of low power local tv stations was ripe for development.

By the time they had perfected the system the development of new towns here in the UK and the growing resistance to tv aerials littered across the rooftops meant that Town & Country planners were looking to less obtrusive ways of getting the pictures into people's homes. Ironic to think that no such resistance stood in the way of the satellite broadcasters twenty years later!

At EMI Peter was busy installing and maintaining

Apart from a short break working for a company owned by the film and stage star, Jack Buchanan, Peter remained at Gurneys in Southall for nearly 10 years during which the growth of domestic television would begin to eclipse radio.

“I suppose fundamentally the things I like are the things I used to work on. When you’re a kid and you’re working in a wireless shop, sets come in and you think, or I used to anyway, wouldn’t it be lovely to own one of these and it was totally beyond my buying power at the time. Now I buy them if I see them.”

headend equipment and cabling up the tens of thousands of homes being built in towns sponsored by the GLC as over-spill for the growing population of London. In addition there were the communal antenna systems that were providing RF signals to blocks of flats and poor reception areas.

As far as distribution systems were concerned when 625 line transmissions started in the UHF band the co-axial cables currently available were very ‘lossy’ at this frequency and the general practice was to down convert the UHF signals and distribute them with the 405 signals at VHF frequency. The GLC chose to use this method although better cables and repeater amplifiers were in development. As a point of interest, Peter related that the set manufacturers (BREMA) gave the Great London Council an undertaking to produce 625 line sets with VHF tuners specifically for tenants in their home in the new towns which had been cabled up for this very purpose. Apart from a few prototypes there were few if any sets manufactured to this specification and home owners had to have either a set top box to convert to UHF or, as most people did, buy a regular tv and use a set-top or loft aerial.

During this time Peter was also sent abroad to undertake demonstrations and exhibitions along with maintenance of CCTV surveillance systems in mainland Europe.

Although he didn’t know it, all this experience with distribution systems was in fact preparing him for the future along with his next position which was a desk job with the GLC. By this time education had really begun to use television and other audio-visual aids as a teaching aid. Peter was part of a team that looked after all of Greater London with his responsibilities being all of East London; everything from PA systems, to RF distribution, to specialist camera systems in places such as the London College of Print. In addition there were also all the communal antenna systems in the hundreds of council blocks and over-spill towns, those same places where a few year earlier he had been installing systems. The wheel had apparently come full circle. But now there was the chance to fly off at a tangent.

In the mid sixties the Inner London Education Authority had started a programme of linking all the schools in its area to its central studios via Post Office land lines, a truly massive undertaking. It was producing programmes and recording and observing classroom techniques via mobile recording units equipped with full broadcast cameras recording onto 2” quadruplex video recorders.

The cost of land lines was prohibitive and pretty soon the service would rely on the new domestic video cassette recorders to distribute the material to the schools while still maintaining broadcast standard equipment for the originating material. Peter joined the small team of engineers and soon found himself not only maintaining equipment but operating audio and vision mixers running vtrs on cue with all the pressure that the red ‘On Air’ light brings. It was a totally different working environment and a steep learning curve.

The two studios were located in a converted school in Thackeray Road, Battersea in south London and were each about 1,500 square feet. Fully rigged and soundproofed they were installed initially with EMI monochrome cameras. Two mobile units were equipped with Philips plumbicons and a third again with EMI plumbicon channels.

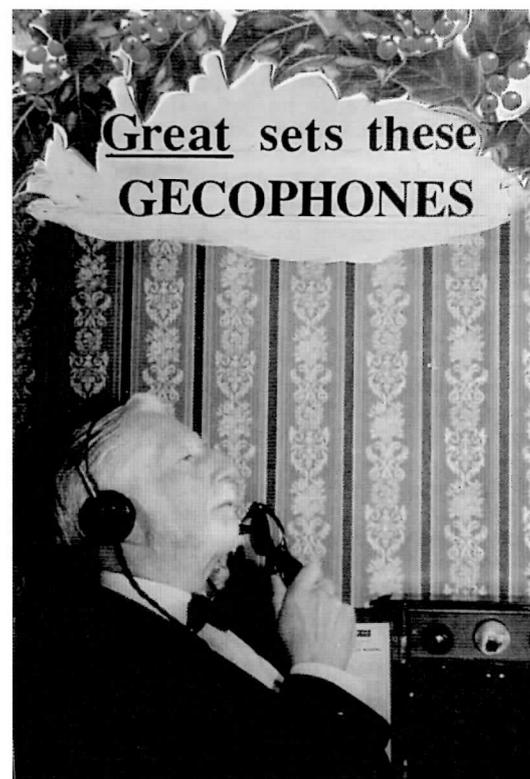
At the time of changing from land lines to video cassette distribution the service went over to colour and 1’ C format replaced the quad machines together with Link colour cameras. These cameras tended to be very temperature conscious but when working well the pictures, to quote Peter were ‘pretty sparkly.’ Eventually the recorders and camera were replaced by the new miracle from Sony, Betacam. These cameras

and recorders were cutting a swathe through broadcast television to become the standard. The subsequent development of Digi Beta is now standard throughout the UK & Europe with apparently the Americans still favouring the analogue Beta SP.

However, back to our story. On the political front, Nemesis, in the shape of Margaret Thatcher, was stalking the existence of the GLC and along with some of the bad things many good things were swept away when the GLC and subsequently the ILEA was disbanded. In 1989 Peter decided to take early retirement and though he went back to work as a freelance at the now privatised studios in Battersea he began to devote more time to a growing interest, that of antique radio collection and restoration, an interest that had been sparked off some years before by a colleague giving him a Gecophone crystal set. Peter was teaching at Night School and took the unit in to show his students who expressed absolutely no interest whatsoever! Together with a set that was a left-over from the shop in Balham all those years ago and had been sitting in the loft, it was to form the basis of a collection which today makes up the Wimbledon Wireless Museum.

When I asked Peter on what basis the sets were chosen he gave an answer which I suspect is common to many members of the BVWS: their early work in electronics or what was in the family home while they were growing up. Peter also identified another reason for some of the choices in his collection of over 63 items on display with a further 20 awaiting repair or restoration. “I suppose fundamentally the things I like are the things I used to work on. When you’re a kid and you’re working in a wireless shop, sets come in and you think, or I used to anyway, wouldn’t it be lovely to own one of these and it was totally beyond my buying power at the time. Now I buy them if I see them.”

The museum is housed in the loft which has been floored and carpeted with the roof being boarded and insulated to protect the precious sets. I noted with pleasure a 1935 Marconi Jubilee model, a set that took pride of place in my own home during the thirties, forties and early fifties. There are also plans for two tableaux, one centred around a Sobell table radiogram which Peter came across in superb



Top left: 'Operating crystal set'

Right: 'Proudly posing with his reproduction Gecophone Smokers cabinet'

condition and in which he was able to re-fit a period single player. The other tableau will be a period display advert for an Ekco AD67 complete with set. So in common with a great many other people Peter is looking for a bargain priced Ekco!

When I asked him if he undertook all the restoration work himself he, like many of us, felt vulnerable when tackling the cabinet making side of the process. "I feel pretty confident when working on the electronics, but the cabinets and things like that, sometime it comes out alright sometime it doesn't and I don't always know why and when it does come out right I don't know why either!"

I commiserated, having experienced just that same feeling of disappointment and frustration. However, on my way down from the loft we called in at another small room and sitting on the table was a beautiful reproduction Gecophone 2001 smokers cabinet which was shown at the first All British Exhibition in September 1922. A two valver, RF and Detector for earphone use it originally used bright emitters. Gerry Wells says they were pretty rotten sets and when they failed people would throw the insides away and use the very attractive cabinet to keep their pipes in! Whether that's true or not there are a few empty cabinets around and Peter was lucky enough to pick one up. An article in the Bulletin with some detailed drawings by Norman Jackson photocopied by Gerry, plus the loan of his own Smokers Cabinet was the basis for some painstaking work which resulted in a working set which Peter likes to let his visitor hear as an example of what you got for £25.00 seventy-eight years ago. I can tell you that having seen the set I really don't think he has anything to worry about when it comes to the quality of his workmanship.

The rest of the collection have been acquired,

usually for a few pounds, at events such as Harpenden. Some have been donated by people looking for a good home for a cherished set, still others, following displays mounted at local museums and trade shows. Some notable sets which caught my eye were a Cossor Empire Melody Maker, a Fullotone radiogram, and a Mullard MB2 battery set. A 1951 Stella which was one of the last remaining items from Peter's shop is also on show along with an Ekco U29 and a Murphy A122 and a Murphy A24C which belonged to Peter's Dad.

Over a cup of tea I learnt that his other interests include membership and editorship of a local Archaeological Society and, he is also known as a professional Santa Claus. I haven't seen him in full costume but having spent a few hours in his company I think I could be persuaded to believe all over again!

Peter is typical of many of us who grew up during the war taking immense technical and social changes in our stride. He is the last person to claim he was anything other than an average member working away at his hobby, continually learning and making progress. But it is the commitment of people like him, both in their enthusiasm for their interests and their lives in general, which should be an inspiration to us all.

If you have a free afternoon and would like to visit the museum give him a call. His number's in the Membership book. I'm sure like me you will spend a pleasant afternoon talking with a man who grew up with many of the sets on display and whose working life was involved with the early practical use of many of the technologies and applications we now all take for granted.

Since writing this article, Peter has now acquired his Ekco which takes pride of place in his living room.

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continued from page 8

the plywood back, where a new section of 3 ply has been pieced in and affixed to the remaining 2 ply section of the original back. To achieve this a section layer of ply about 3" by 2" has been cut from the outward facing side of the back, so the new piece covers the old hole. It has then been stained and filled to match. This must have been done by the manufacturer, but is an extraordinary amount of effort to go to. It is definitely the original back, as there is a Sunbeam inspection label on the plywood back and also in the cabinet of the set itself, and both have the same number pencilled in the same handwriting on them.

The set is generally well put together, build quality being much better than might be expected from a small manufacturer with presumably low production runs. For example, the wooden back panel is rounded on all corners, and the cabinet has been routed to accept even these corners so that the back fits flush with the rebated sides of the set. Likewise, the chassis is of substantial gauge and is cadmium plated; with the aerial and intervalve coil can covers having even been indented with the Sunbeam name. The question might be asked, having put together such a solidly constructed set, why use such an obscure range of foreign valves? Cost would seem to be the obvious answer, but if the set was being built down to a price, then why is the rest of the receiver so well built?

Performance of the set is reasonably good. Sound is delivered from a Rola moving coil loudspeaker, and an output level of about 3/4 of a watt is available from the PP2018 output valve. With an external aerial about a half dozen stations on medium wave can be tuned in, plus one on long wave. In fact there is an internal aerial in the cabinet, but it consists of just 12" of wire, and is completely ineffective. Slightly alarming is the heat generated by the filament resistance: after only

20 minutes use the chassis is really quite hot (on a par with a domestic radiator in fact!). However, it is perhaps to be expected, since the asbestos encased dropper is not so different to an electric fire element, with quite a substantial voltage to dissipate. The resistance is about 7" long, and is bolted to one end of the chassis enabling the metalwork to form a heat sink, with holes cut in the chassis directly above the dropper to allow the circulation of air.

In conclusion, given that the set could operate without modification from either AC or DC mains, and gave reasonable performance for a TRF, it was certainly competitively priced, costing just 9 gns. However, the owner would not anticipated what must have been fairly substantial bills for the modifications due to the early obsolescence of the valves as they failed.

Thanks go to Gerry Wells for his assistance and provision of spares during the restoration of the receiver, and for access to his "Broadcaster" and Wireless World archive.

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Wireless World June 1933, November 1933  
Practical Wireless January 13th 1940  
Trader Service Sheet 41 May 11th 1935  
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# W.A.D.A.R or Wells Amplifier Development and Rentals

By Gerry Wells

A silly name for a silly firm, but it is the only firm that has consistently manufactured valve wireless sets with large valves for sixty years.

I found that in 1942 there was a demand for a very simple cheap radio. At twelve years of age all I could produce was a 2 valve + Rectifier set with reaction.

It sounded quite good, but all it would receive was the Overseas or European Service or The Home Service. Sometimes it would get the Forces programme if the wind was behind it.

The valve line up was an MHL4 triode and MKT4 output tetrode. The rectifier was a U10.

I found I could make and sell about 2 sets a week at a cost of £4.

I could produce quite a reasonable cabinet to house

the chassis and an 8 inch loud speaker out of cheap plywood. Although these sets had quite a nice quality of sound, they would not separate stations very well.

Quite often I would think that I had got it right and was receiving the Forces programme quite nicely when all of a sudden Handel's Water Music would come blasting through. It was the opening music for World Service or the European Service as we called it then.

It was an enormously powerful station and seemed to take up most of the medium waveband. It was surely one of our best propaganda tools.

By 1943 I had managed to produce a simple AC/DC Superhet. It used a TH30C, VP13C, TDD13C and a Pen 36c plus a CY31 rectifier.

As I hadn't got an alignment generator I had to line up the IF stages by ear. This was quite easy as I soon learnt that if a radio had oscillator out of action the European Service would come in all over the dial.

I soon realised that the BBC broadcast on all the IF frequencies. All I had to do was to peak up on the BBC to get good alignment.

It was a good idea for our external BBC services to broadcast on the IF frequencies at high power, because it would penetrate all the sets that were still in use on the continent. The simple German Volksempfänger radios could also receive it very well, much to the annoyance of German propaganda services.

Once the war was over and domestic radio production had started again the need for my kind of sets had ceased. I found that there was a demand for custom built chassis to fit into furniture or old cabinets.

By 1946 I had started to manufacture amplifiers for staff location and 'Music while you work' systems. I was also involved with television work as soon as it started up after the war.

My business also embraced electrical installations, house and factory wiring and overnight cinema repairs. I still found time to make custom built radios; this has never stopped even though the amplifier side went bust in '73 because I wouldn't adopt stereo, miniature valves or transistors. The TV side packed up when all the British manufacturers closed and very reliable sets were coming in from abroad.

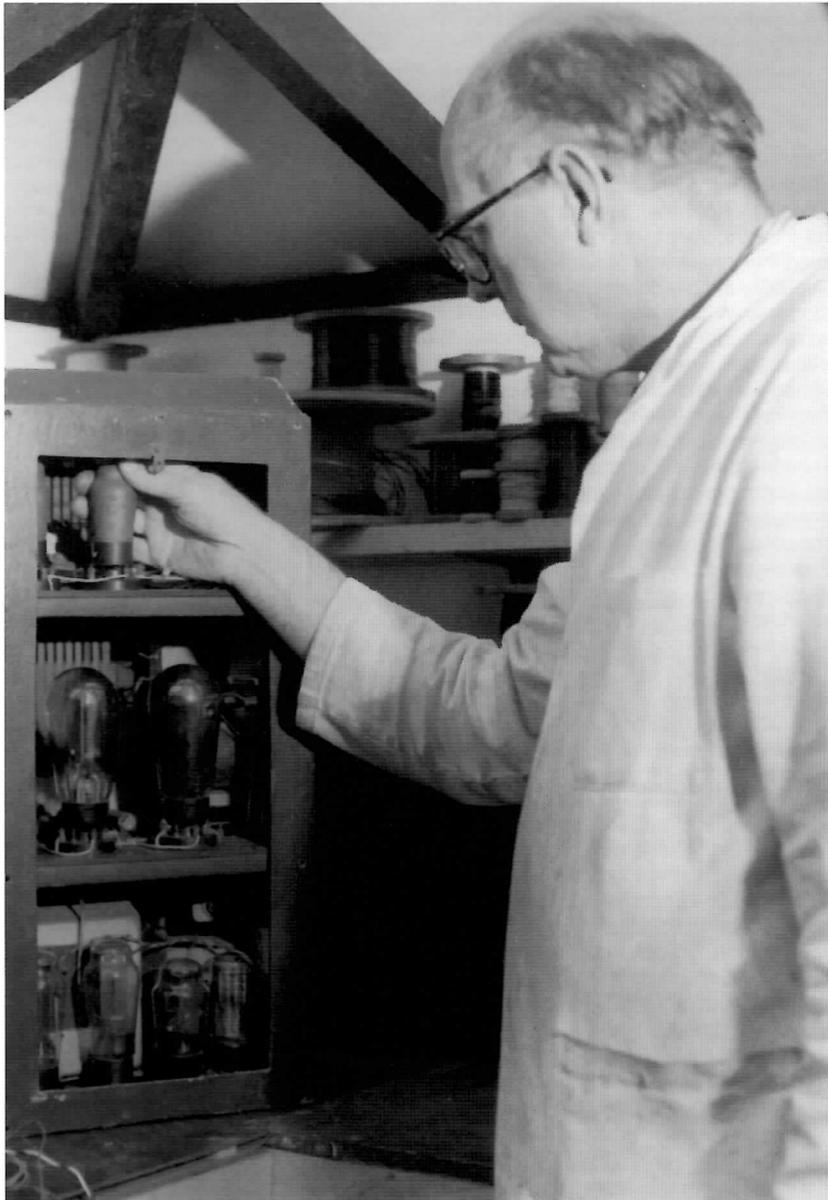
Soon after this the Vintage wireless movement was well under way. I had now gone full circle and I am still making vintage radios the same as I was in 1942. The main difference now is that I have learnt how to use veneers and how to wind our own coils and transformers. However I don't have much trouble with The World Service: it is almost impossible to receive.

Some of our sets do pick up Radio 4 quite well. Radio 5 can be received quite well if you don't mind sport or phone-ins from people who can't express themselves properly (know what I mean?).

Then there is Capital Gold. It comes in quite well: they have nearly sixty different tunes from the sixties.

Sunrise Radio comes in loud and strong, I am sure I can smell the curry. Country and Western on 1035 morning, noon and night. Further up the dial we have a couple of rather dangerous religious stations (complete with 110 volt accents). So here I am writing in the lounge at Warners Lakeside Geriatric Holiday village (Probably waiting for God) trying to tell the world that we are the oldest and only manufacturer of valve radios.

When I get up to that great service department in the sky I will be able to tell St Peter I did it my way.



# The Gilfillan 68F of 1948

By Gary Tempest

This unremarkable looking radio had everything I could ask of a restoration project. It had both historical and technical interest. It set me thinking and reading about the Gilfillan brothers, Alan Hazeltine, Edwin Howard Armstrong and an FM converter circuit called the Fremodyne.

## The Gilfillan Brothers

I read about Sennet and Jay Gilfillan in a small book about the Los Angeles radio manufacturers during the 20's to the 40's (Ref. 1) They were a couple of true American entrepreneurs during those early days when manufacturing was booming. They were quite prepared to try their hand at making a wide range of products and certainly understood the old adage "diversify or die". Starting in 1914 in smelting and refining because of a family connection, they moved through a couple of score other ways of 'turning a dollar', before selling out to the then giant conglomerate International Telegraphs and Telephones (ITT) in 1963. The list includes auto parts, electric drills, grinders and motors, radio parts, radio kits, AC/DC radios, refrigerators, television receivers and radar systems during World War Two. Their interest in radio began in 1924 with kit sets and expanded into producing their own models. During the 1930's they produced over 100 types. A coup was being awarded a royalty licence by David Sarnoff of RCA in 1927. This allowed the brothers to sub-license and enter into a range of deals with manufacturers in 11 Western states. After WW2 the brothers went back into manufacturing for the domestic market, including radios. In 1948 came the model 68F. This radio is a conventional 5 valve superhet, with the addition of a double triode valve, which acts as an FM converter. The circuit used was called the Fremodyne and was invented by the Hazeltine Electronic Corporation.

## Hazeltine

I was unable to ascertain whether the company founder, Alan Hazeltine, had anything to do with the design of the Fremodyne circuit. He made his name and fortune, enabling him to fund his laboratories in 1924, from the invention of the Neutrodyne circuit. As I am sure most of you will know, this circuit neutralised the feedback, due to the anode to grid capacity, of triode valves. It enabled the manufacture of stable, high gain, 'straight' receivers. He licensed the invention to radio manufacturers, unwilling or unable to pay RCA royalties on all the best radio patents including regeneration. In the US regeneration was the dominant technique in radios from 1920 until 1923. But in 1924 the Neutrodyne came to the fore and was very popular until its demise in 1927 with the introduction of the screened grid valve.

## Edwin Howard Armstrong

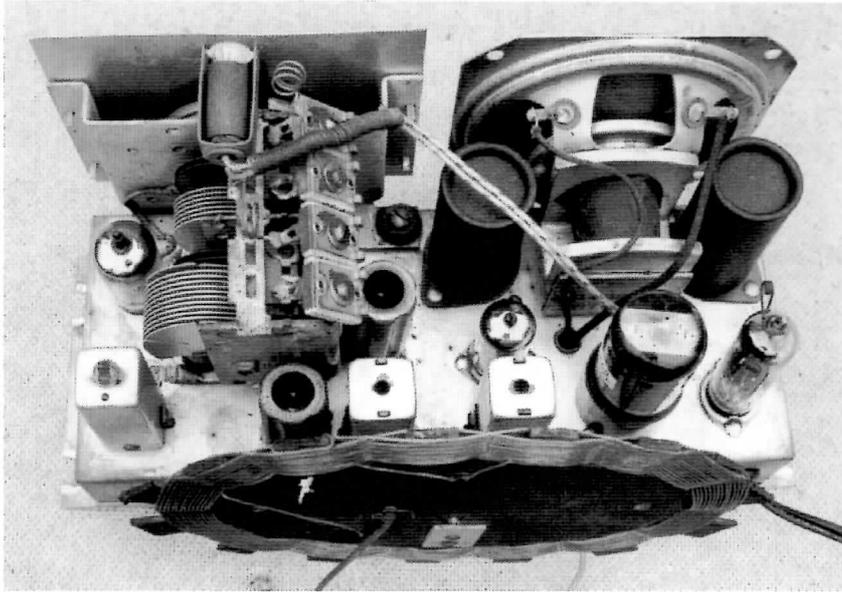
The Fremodyne circuit uses Super Regeneration, invented by Armstrong in 1921. I must confess to knowing little about him except that he had invented the Superheterodyne and had had something to do with FM broadcasting. However, once my interest



was aroused I read an excellent biography by Alan Lessing (Ref.2) who tells how amazed Armstrong was when he discovered, by accident, Super-Regeneration. He thought, after years of studying it, that he knew everything there was to know about regeneration. Suddenly a radio he was working on burst into hither to unknown gain. When he tried to investigate it, it would as quickly drop back to normal. Eventually, with the dogged determination which he was famed, he tamed the effect and patented it as Super-Regeneration. What happens is that regeneration and gain is allowed to build up until the circuit oscillates. Then the presence of oscillations is used to charge a capacitor that changes the circuit bias, or working point, such that the oscillations stop. When the capacitor discharges, then the process starts again. Providing the circuit quenching occurs at supersonic frequencies it is not heard in the audio output. Of all his inventions it had the least commercial success. He of course, invented the superheterodyne technique in 1918 and the use of wide-band FM in 1933. Twenty years later he was still at the cutting edge of developments and demonstrated the use of multiplexing on an FM signal. This eventually led to the transmission of stereo signals. Throughout all these inventions and their patents he fought continuous legal battles with others, including Lee De Forest, over Regeneration, and RCA over FM. Alas, by 1954 he had lost his fortune and his health leading him tragically to commit suicide by jumping from a hotel window. Ironically, his wife then accepted a settlement from RCA over the use of FM, which he himself had rejected.

Armstrong to my mind must rank as one of the greatest engineers, certainly during the development of radio and early electronics. It is sad that a man should be so badly treated when an industry was largely built upon his inventions.

Armstrong to my mind must rank as one of the greatest engineers, certainly during the development of radio and early electronics. It is sad that a man should be so badly treated when an industry was largely built upon his inventions.



### My Gilfillan 68F

Having read these books I wanted to acquire the radio. They seem quite rare, in that in a number of years of looking at Internet auctions, I have only seen the one I bought. The AM only version (68B) turns up more frequently and so perhaps purchasers could not be persuaded to pay for the 'new fangled' FM addition. The condition was very good with a complete and rust free chassis. The same could not be said of the copper plated steel front panel. The plating had broken down and rusting had started. Once I had the panel removed it was cleaned with steel wool and the rust treated with Phosphoric Acid (Jenolite). I could see no economic alternative other than to spray it with copper effect paint. This gave me problems in that it was very difficult to get good adhesion. The slightest knock during re-assembly would cause a flake to fall off. Perhaps paint does not adhere so well to copper? So it was out with the Ferric Chloride, used for etching printed circuit boards. Once I was down to bare steel, I used steel wool to abrade the surface for the best possible key. After priming and re-painting all seems well. One effect I was not able to re-create was the shading that the original panel had. This must have been done

chemically, possibly by exposure to fumes, and resulted in the edges of the panel being dark brown, shading uniformly to bright copper in the centre. I tried experiments on pieces of metal using a cellulose lacquer toner aerosol. 'Toner' is lacquer with an added pigment; walnut in my case. I just could not get a nice uniform fade effect and worse, the paint droplets are seen where the toner is very lightly applied. So, for the time being the radio is finished with just a copper look front panel. The cabinet was sound, with only one piece of veneer missing but it did need completely re-finishing. The cabinet is a strong structure and had little distortion as the chassis goes in from underneath, with a solid but ventilated back panel.

Restoration of the chassis followed normal practice. If you have never worked on US radios then the Sprague electrolytic capacitors are particularly easy to re-cap. They have a black cardboard tube covering the aluminium can. Once you have the item away from the chassis, normally held in place by 'twist lock' tabs on an insulating spacer, it is easy to remove the cardboard tube. Just use a heat gun to soften the pitch, normally along the sides, but it can be at the end as well. It is a good idea to solder thick wire to the tags and then bring them together and secure them in a vice. Now using a cloth, the hot cardboard tube can be persuaded to slide off. Then cut down the can, say three quarters of an inch from the tag end. This is the only part you are going to need now, so chuck the rest in the bin. After cleaning away all remnants of the old capacitor, fit the new caps', bringing the lead-out wires through small holes to the tags, as usual. All that is needed now is to fit the cardboard tube over the stub of the old can. Masking tape can be used to ensure a tight fit.

On this radio, the Solar wax paper capacitors were particularly good, being encased in plastic. Except where this had split along the mould line, insulation was better than 20M ohms at 250v. Once I powered up, the radio worked straight away and I then spent some time on alignment, particularly of the FM band. Fortunately, I had obtained the Sams Photofact folder that gave reasonable information on doing this. I redrew the FM converter to try to understand how it worked. See next page for the circuit.

The plating had broken down and rusting had started. Once I had the panel removed it was cleaned with steel wool and the rust treated with Phosphoric Acid (Jenolite). I could see no economic alternative than to spray paint it with copper effect paint.



## The Fremodyne FM Converter

The single double-triode valve converts the FM band of 88 to 108 Mc/s to give audio output. When switched to FM this output is amplified by the AM pre-amp and the 35L6 output valve.

Wireless World, of March 1948, which included a short article on the circuit, put the functions like this:

One section of the valve works as the local oscillator necessary for superheterodyne conversion, while the other section functions as:

1. A superheterodyne converter to an IF of about 22 Mc/s
2. A super-regenerative IF amplifier of high gain.
3. An FM to AM converter and
4. A detector giving an AF output.

W.W. also said the circuit has been criticised for radiation but the Hazeltine engineers said that it was 30-40 dB better than an ordinary super-regenerator. This would be one without superheterodyne conversion and a separate local oscillator stage. Here, this runs at around 22 Mc/s higher than the tuned frequency and is not near the resonant frequency of the input tuned circuit. Another problem was said to be that stations could be tuned in two places, one on each side of the I.F. transformer response with both being correct.

Now from the schematic of Figure 1, how does this clever piece of circuitry actually work?

Below is an explanation 'worked up' by me. I don't know whether it is totally correct, so if any readers have comments, corrections or even a better explanation, then I would enjoy reading them.

From looking at Refs. 3 and 4, I consider the second triode (12AT7 b) to be a VHF Colpitts oscillator. The anode is at AC earth, due to capacitor C27, and so is connected to one end of the oscillator coil L62, the other end of which is connected to the grid. Now the grid to cathode capacitance and the stray capacitance from cathode to earth forms the tapped capacitors across the coil associated with this type of circuit. The RF choke L67 allows DC to flow in the valve but has a high reactance so as not to affect oscillation. Ideally, the resistor R55 should have a value so as not to load unduly the 'tank' formed by L62, A8 and the tuning capacitor. No doubt by suitable choice of R55 and the capacitor C29 it is possible to control oscillator amplitude, in 'grid leak' fashion.

The first stage (12AT7 a) has to be basically an oscillator that is continually quenched (stopped) at supersonic frequency. Again it looks like a Colpitts with C31 and C32 forming the feedback capacitors.

They are also the IF transformer tuning capacitors, returned via C36. Choke L65b provides a high impedance DC path

Mixing takes place, between the input signal and the injected oscillator waveform, at the non-linear cathode to grid of the stage. R54 and L66 provide a high impedance DC return path for the grid.

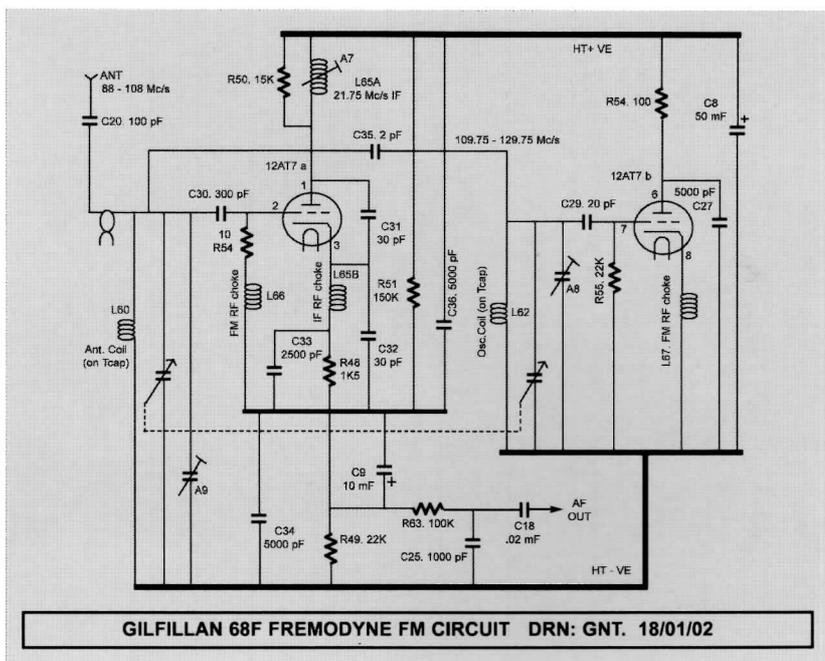
Capacitor C33 and resistors R48 and R49 are the quench components. This capacitor, charging via the grid cathode diode, leads to the valve becoming biased off. If an oscilloscope is connected to C9 negative (or positive), then a sawtooth waveform is seen, of about 25 Kc/s, with audio superimposed upon it. The value of C9 is not critical, it being just an audio coupler with IF shunted away by C34.

As the frequency modulation sweeps across the tuned circuit skirt, the IF current through the valve changes and this is converted to an audio voltage change across R49. R63 and C25 provide de-emphasis.

## Conclusions

This for me was an interesting and nostalgic project.

So what of performance? AM performance is as good



as any small radio of the time and is quite respectable. This can't be said for the FM band. It can only be described as poor and the quality is worse than the cheapest solid state radio. It is possible that I am still not getting the best from the circuit; I was reluctant to start disconnecting and measuring the ceramic capacitors 'birdnests' around this stage. However, these did look as good as new with solid encapsulation. Also, I have 'talked', via the Internet, with US collectors and old radio dealers. They said this performance was about all it was capable of, and some gave a lot of other more disparaging remarks as well! It needs strong signals and careful tuning to minimise distortion and low level background whistles, to which it is prone. It does have reasonable rejection of AM noise, presumably the high gain of the super-regenerator means it acts as a limiter. I have a fluorescent bench light that generates stacks of interference (I must get around to adding some line filters); it is so bad that I cannot have an AM radio in use in the same room. On the FM band of the Gilfillan, although it can be heard when switched on, it is at a very low level and not objectionable. So in 1948, buyers would have had a radio with which they could listen to the new FM stations, with a fair degree of AM noise rejection, for just \$34. It was one of the lowest priced FM receivers.

## References:

1. Los Angeles Radio Manufacturing. The First Twenty Years, by Floyd A. Paul. Available from A.E.S. (Antique Electronic Supply, Arizona, USA)
2. Man Of High Fidelity, Edwin Howard Armstrong by Alan Lessing.
3. Thermionic Valve Circuits by Emrys Williams
4. RSGB Radio Communication Handbook (Fourth Edition)
5. Solid state fremodyne circuits. See [http://www.somerset.net/arm/fm\\_only.html](http://www.somerset.net/arm/fm_only.html)

I have a fluorescent bench light that generates stacks of interference (I must get around to adding some line filters); it is so bad that I cannot have an AM radio in use in the same room.

# Has anyone ever heard of 'Plew television'?

Bernard King admits: "I don't have a Plew!"

You'll have to go back a long, long way. My story starts around 1934 or 1935. In fact, almost certainly before the Crystal Palace fire of November 1936. I was about 11 or 12 years of age at that time and it was a regular pastime of my twin brother Reg, a certain 'Ginger' Jenkins and myself to make a local 'safari'. This included trips to Tooting Bec Common, Figgs Marsh, Mitcham and other exotic resorts within walking distance of the area (Derinton Road). One afternoon, we were returning from one of our rather pointless meanders. After yet again sampling the delights of the Tooting area, we were all three 'agog' with indifference. We had got as far as the Mitcham Road junction with Bickersteth Road when we peered into a Wireless shop window. You may wonder why three scruffy schoolboys would be attracted to a radio dealer's window display?

Peering through the glass, the name of 'Plew Television' claimed our attention; however this did not surprise us. Although it cannot be said that Ginger Jenkins was enthralled with what Reg and I had spotted (Ginger was a good mate and we liked him except for his constant slight whiff of fried chips). But Reg and I had, even at that age, been conditioned to television over a long period. In spite of the relative crudeness of the Baird technology, the adverse criticism of his methods etc, we of the 'King family' were stalwart supporters of the Baird faction. We had good reason to be.

My sister had recently left employment with Baird to settle down to married life after seven years service with the company. During that time she was occasionally involved as a soubrette in various test experiments, including the 1929 demonstrations to the press. My elder brother Eric was at that time working at Bairds (at the Crystal Palace). Of course, the fire ended all that. A few years later my oldest brother Horace, an Inner Magic Circle member, took part in the Baird colour experiments during the Second World War.

So, at that tender age of 11 or 12, we were well 'conditioned' to television and it was that awareness that enabled us to spot this particular item in the radio dealer's window. The showcase adjacent to a television set declared the exhibit to be a 'Plew'! Regarding Baird, in our biased way, to be the only legitimate name in TV, we passed on the information to Brother Eric who in turn, reported the find to the Baird Company at Sydenham. They were keenly interested!

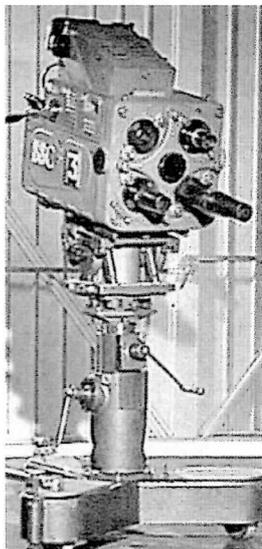
Shortly after, my Dad was asked to act the part of an affluent 'punter' wishing to venture into the new

world of television viewing. Dad was well equipped to 'play' that role as he had been running a semi-pro concert party throughout the twenties and early thirties. He even worked some comedy pattern for Baird tests in the late twenties. The price of the set had been ascertained, so Dad, armed with the requisite cash supplied by Bairds, went to the shop and made the purchase. Very soon after the set was delivered to 327 Derinton Road a car arrived from Sydenham to take the set back for close scrutiny.

As kids, we did not play any further part in this commercial drama but as we were innocent of such grown-up subjects as copyright law and technical infringements', it all got a bit over our heads. To us, it did have a slight touch of a Biggles adventure (to be found in our Modern Boy magazine). We discovered much later there had been genuine infringements of Baird patents. I never, ever heard of Plew television again. They probably went bust. How a company could be so venturesome as to put a television set into production in the early thirties I cannot imagine. Especially it seems, without regard to the laws governing patent protection.

There we have it, folks. Could there be any Plew television sets out there waiting for discovery and even restoration? I doubt it. Therefore, I won't be 'waiting up' for a positive response! But it would be interesting to hear more of that venture. With a bit of luck, a keen '405 Alive' reader, with access to Wireless magazines of that period, might come across a display advertisement. And come to think of it, I wonder whatever happened to Ginger Jenkins!

Could there be any Plew television sets out there waiting for discovery and even restoration? I doubt it.



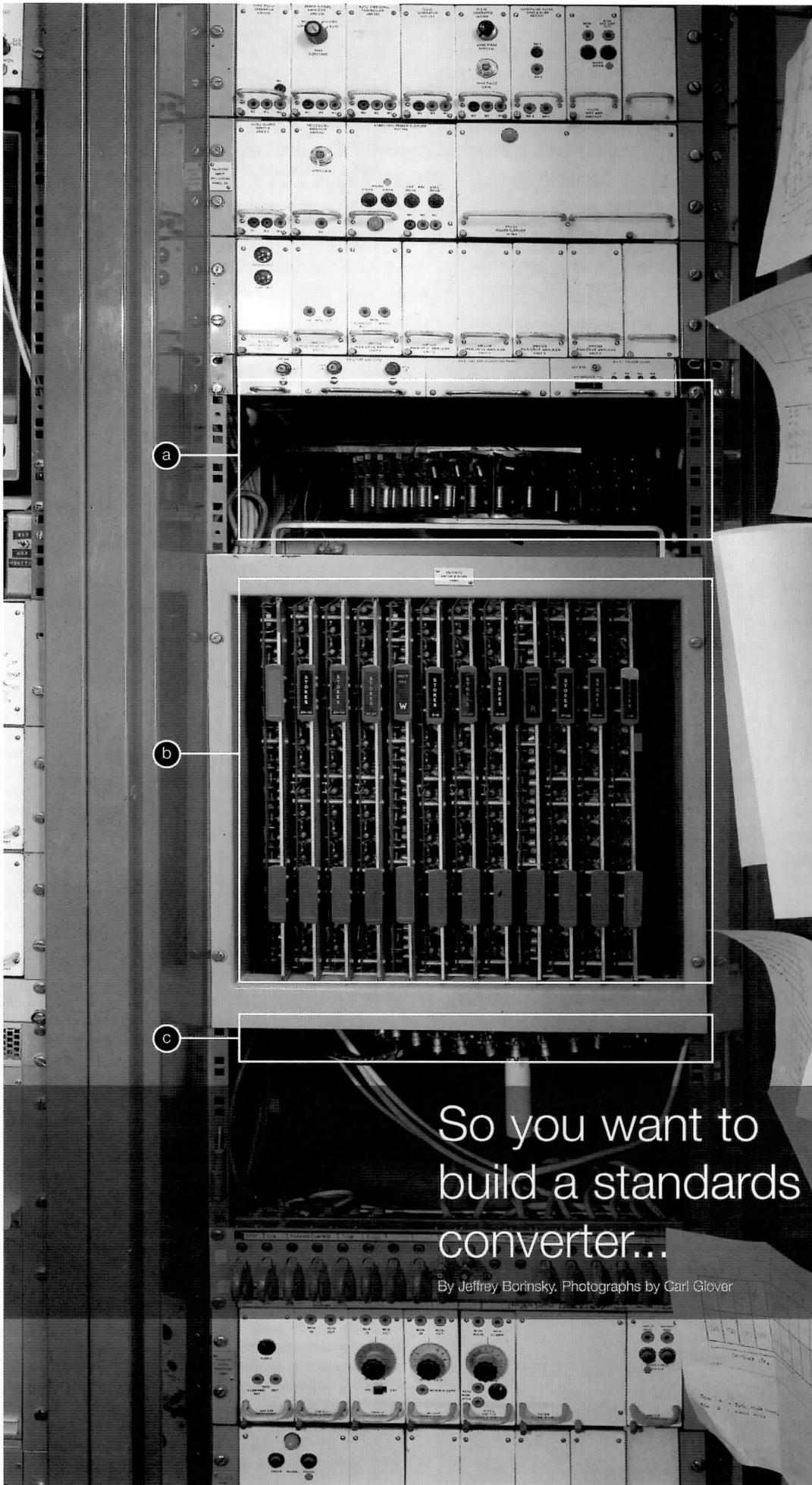
## Where is it now?

Dicky Howett asks, "The 'Top Town' trophy (a Northern television precursor of Its a Knockout) seen here in 1956 with BBC producer Barney Colehan, was one of several beautifully crafted hand-built models (no doubt at great expense in the BBC's mechanical workshops) But who now 'holds' this trophy, which is an exquisite scale-model of a Marconi Mk 3 sitting on an Eclair 'Crab' pedestal. The pictured full-scale item is my own ex-BBC Manchester Marconi Mk 3 on an ex-BBC Manchester OB's Eclair 'Crab' dolly. As can be seen, it's the exact combination of the model. Recently, another different model- again ex-BBC- was discovered in a Kent junk shop. So these things certainly turn up. Any information as to the trophy please contact me".

Dicky Howett+44 (0)1371 820155email  
dicky.howett@btinternet.com

Less than half of a  
C06/501 Converter

a: 625 'Commutator'  
b: Analogue line store  
and interpolator  
c: 405 'Commutator'



## So you want to build a standards converter...

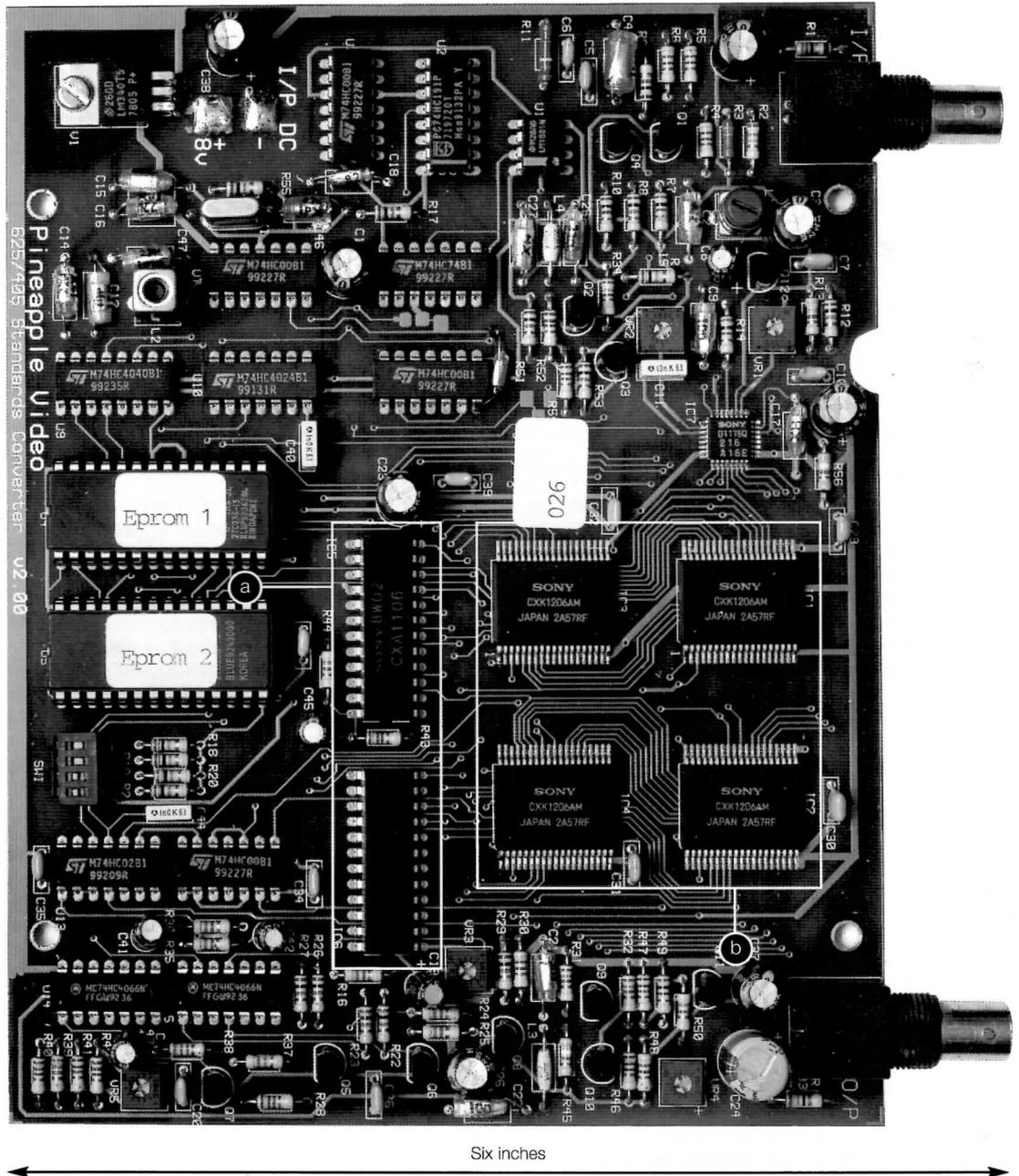
By Jeffrey Borinsky, Photographs by Carl Glever

Some thoughts  
and reflections  
on generating  
405 line signals.

No-one who ever  
tried it said that  
making a  
625 to 405  
converter was  
easy. That  
privilege is  
reserved for  
armchair  
designers.

The Pineapple converter - complete PCB

a: Twin DACs  
b: Framestore



### Hall of fame

Several people have climbed the hill and built converters. It all started with the professionals.

### BBC

When BBC2 started on 625 lines in 1964 there was an obvious and pressing need to convert TV signals from 625 to 405. The only method available before then was optical conversion. This is just a rather grand way of saying that you point a 405 camera at a 625 monitor. It does work, and remarkably well if you use good equipment. It was used in early international exchanges, starting with a pioneering 1952 relay from Paris to London. After BBC2 started, the BBC planned to originate all programmes on 625. Initially 625 to 405 conversion was done at Television Centre but later all distribution was done at 625 leaving conversion to 405 to be done at each transmitter. This needed a reliable all-electronic solution that could run unattended for long periods.

The first BBC analogue design was demonstrated in 1963 and was developed into the rather prosaically

named CO6/501. It was a daring and complex design, dividing each line into 576 elements, each of which was stored in a separate inductor/capacitor network. A pair of electronic commutators scanned round these storage elements. An updated version, the CO6/501A, was also built by Pye for the ITV network. By the way, these converters are huge, each occupying a pair of 6ft high rack cabinets. The same BBC teams also designed the incredibly complex 525 to 625 analogue converters in the late 1960s. The extra complexity is due to the different field rates needed to store a whole field rather just a single line. The whole converter occupied seven rack cabinets.

By 1970 it looked as if the 405 service would outlive the original analogue converters. Digital video techniques were then becoming feasible and the BBC Research Department demonstrated an experimental model in 1971. This was the basis for the CO6/509 which was less than a quarter of the size of the CO6/501 and much more reliable. Modern digital chips at that time included 4 bit TTL adders and in particular some fast shift register chips that could be used to

store whole lines of video. The design was still very complex, particularly the analogue to digital converter (ADC) which was a large board full of very hairy circuits.

These converters were employed at BBC transmitters until the end of the 405 service in 1985. ITV somehow soldiered on with the analogue converters and I suspect that the 405 pictures were getting pretty bad towards the end due to lack of maintenance.

#### IBA

The IBA developed an experimental digital 625 to 405 converter at about the same time as the BBC. The design was conceptually very similar too. It was used temporarily to feed the channel 9 transmitter at Croydon. Its real purpose was to prove the technologies for the famous DICE - Digital Intercontinental Conversion Equipment. DICE was the first digital converter between 50Hz and 60Hz TV systems.

Then there was a long gap. Nobody really needed to design a new converter until enthusiasts wanted to run their 405 sets after the shutdown of transmissions in 1985. By this time a converter would be relatively simple for professional designers and would become increasingly so into the 1990s. Unfortunately the potential market for such converters would not really justify the attention of a commercial company so the field was wide open to enthusiasts to have a go. Unfortunately, even highly competent enthusiasts rarely have access to the skills, techniques and components that are often taken for granted in the professional world. In compensation they do have plenty of dedication, initiative, ingenuity and patience.

#### David Boynes

His was the first amateur design. Sheer hard graft and innumerable hours of work went into this converter. When he started, the vital video analogue to digital converter (ADC) was available as a single chip but they were scarce and expensive. His converter has evolved over several years. All done with hand built boards full of TTL. I take my hat off to him.

#### David Looser

He started his converter after David Boynes and probably had more experience of design techniques but his several boards full of hand wired TTL would not be fun for anyone to copy. I remember documenting this design for publication, fully realising that nobody was likely to replicate it! This design still stands as the only amateur built converter with a 4 line interpolator.

#### Jim Daniels and the Pineapple

The Pineapple converter arrived at about the same time as the Dinosaur. I would not claim to know which really came first. This was a deceptively simple design with several cunning features. Uniquely it stored a full frame of video which allowed tricks such as freeze frame. The interpolator was a brilliant concept. The main complexity of an interpolator is in the multipliers. These used to be either complex or expensive to do digitally. This design used a pair of digital to analogue converters (DACs) and did the interpolation very simply in the analogue path.

#### Dave Grant, Mike Izycky and the Dinosaur

The Dinosaur converter became the one to have. As with the Pineapple, the designers of the Dinosaur had the benefit of modern components. They made and sold a compact and thoroughly engineered package that could be used reliably by any enthusiast. Alas no longer available and secondhand units are sought after.

Some people had the affront to complain about the price of the Dinosaur converter. The only reason why

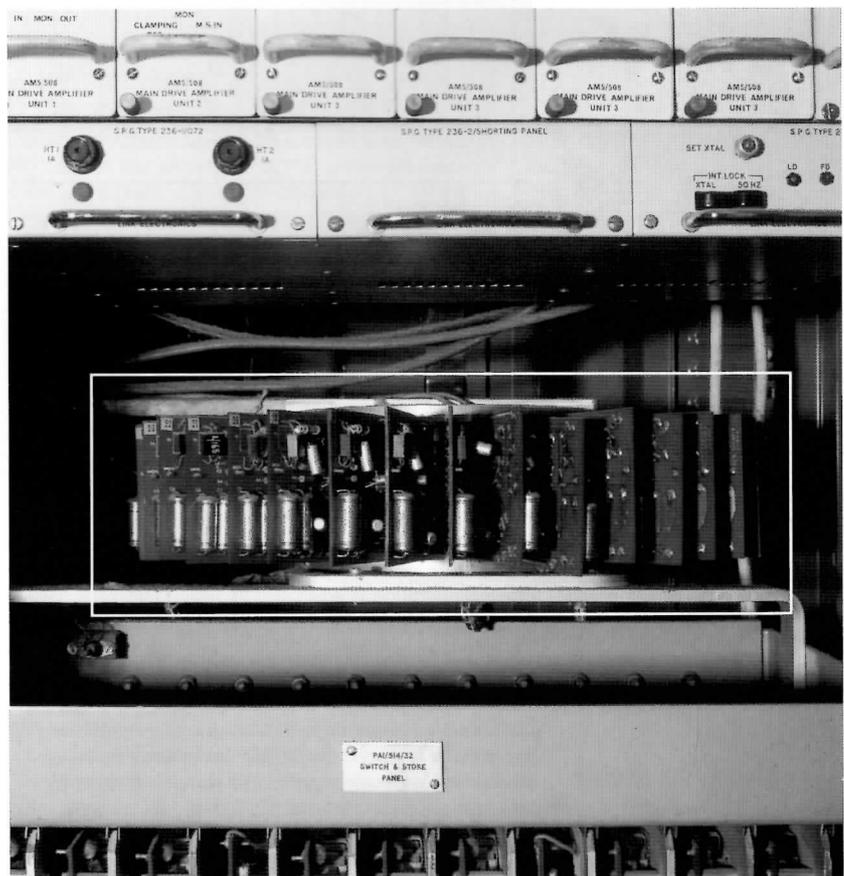
complex consumer electronic equipment is cheap is because it is made by the million. When you are doing total production runs of 10 or even 100 the one-off costs of PCB layout loom large. And components are much more expensive in dozens than in thousands, let alone millions. Add in the hand assembly and test and I can assure you that the Dinosaur converter was a bargain. Dave and Mike would have done better financially by keeping their money in the bank.

#### Malcolm Everiss and Domino

Since the extinction of the Dinosaur there were several years when it was not possible to buy a converter. Several people have talked about doing designs for sale but only one has emerged as a product. At the time of writing this (July 2002) I have the first production unit on my bench for review. (see page 43) It includes a channel 1 modulator as standard. Like the Pineapple it uses framestores. This means that the output syncs will always be clean and continuous regardless of any corruption of the input signal. Malcolm has devised some good techniques for simplifying the design including the use of low cost PIC microprocessors for timing generation. **What's the difference?** Now we know *who* has done it let's find out *how*. Let's look at how 625 and 405 signals differ. I'm only going to look at the baseband video; I'm assuming that you have 625 video available and can make or scrounge a System A modulator.

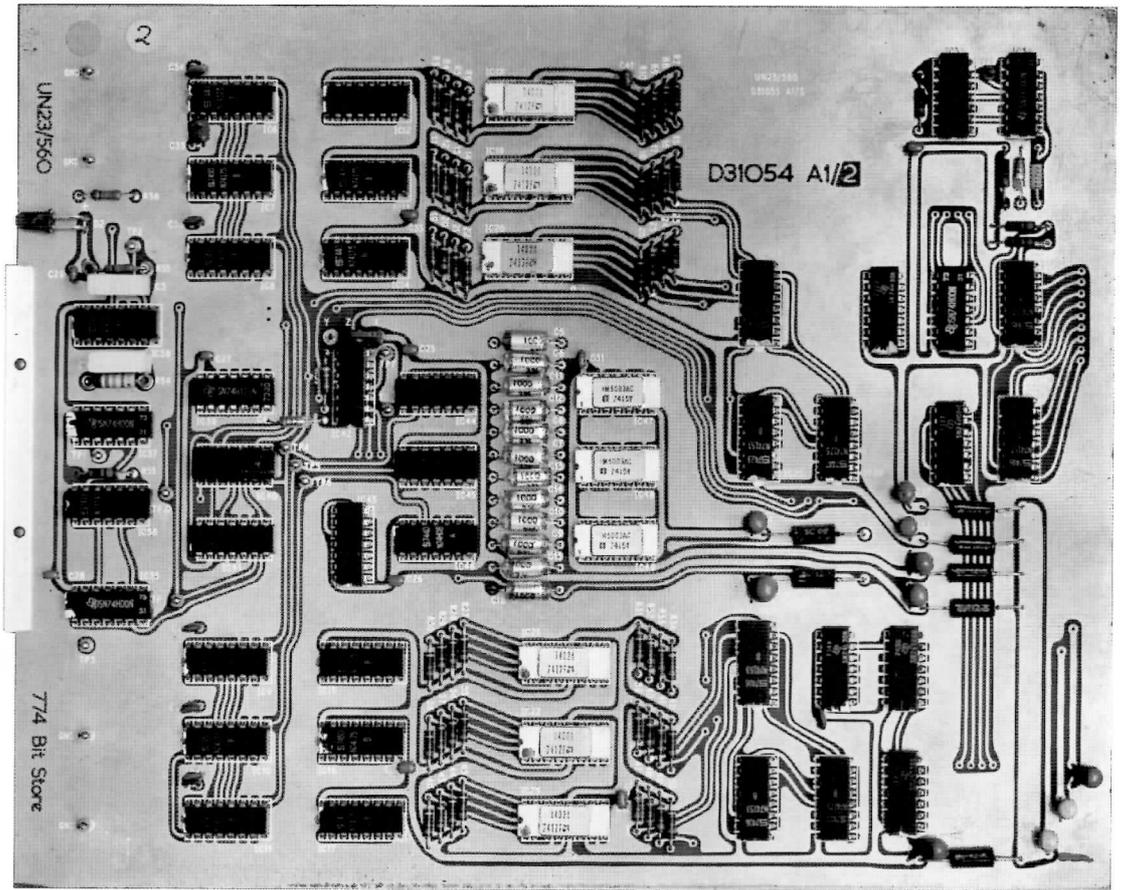
The Pineapple converter arrived at about the same time as the Dinosaur. I would not claim to know which really came first. This was a deceptively simple design with several cunning features.

C06/501 - 625 'Commutator'

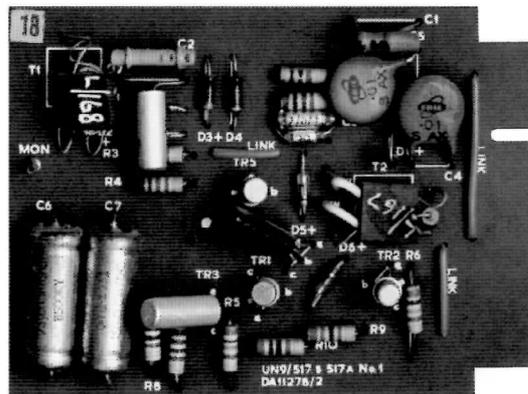


Right: Line store from C06/509 converter

Below: C06/501 - part of 'Commutator'



It is almost essential to divide each line into a number of separate elements, now commonly known as pixels. At least 500 are needed to preserve picture detail and modern digital TV equipment uses 720.



make the sync separator's life much easier. It would not hurt and could easily help if equalising pulses were added to the 405 signal. Maybe 5+5+5 as in the 625 system though it is just possible that some sets would fail to lock with only 5 broad pulses. 8+8+8 would not fit in the field blanking interval. The pre-equalising pulses are much more important than those after the broad pulses. Some versions of the 405 standard include a setup or pedestal which raises black level above blanking level. The NTSC 525 system includes setup even today. Its purpose is to help receivers blank the video during flyback. This is not a problem with modern sets but many older ones suffered from visible flyback lines. It would not be difficult to include setup on the 405 line output of a converter.

The good news is that the field rates and interlace are the same for both systems. If they were different then a converter would be *much* more difficult. The main difference is the number of lines and if you try to put fewer lines into the same field length, then those lines will inevitably be longer. This leads us to the first main problem. We must redistribute 625 lines, each 64µs long into 405, each 99µs long. With the benefit of hindsight this time redistribution is conceptually simple to do.

#### Time redistribution

It is almost essential to divide each line into a number of separate elements, now commonly known as pixels. At least 500 are needed to preserve picture detail and modern digital TV equipment uses 720. Roughly one in every 3 lines from the 625 line input will not be written into the store.

Analogue storage was used in the early BBC converters and it might be possible to build a modern equivalent with charge coupled delay lines if they are still available. Not a practical option.

SYSTEM	A	I
Lines per picture	405	625
Fields per second	50	50
Interlace	2:1	2:1
Line frequency	10125Hz	15625Hz
Line length	≈98.8µs	64µs
Line blanking	17.5 to 19µs	12µs
Front porch	1.5 to 2µs	1.6µs
Line sync width	8 to 10µs	4.7µs
Field blanking	13 to 15.5 lines	25 lines
Number of broad pulses	8	5
Number of equalising pulses	None	5 + 5
Broad pulse width	38 to 42µs	27.3µs
Black level	0V nominal	0V nominal
Sync tip below black	300mV	300mV
White above black	700mV	700mV

Before we plunge into the details it's worth a quick look at two items that could enhance the pictures on your 405 line receivers, namely equalising pulses, and setup. Bad interlace was a perennial problem on many 405 receivers and equalising pulses were invented to

The BBC digital converter used 3 separate line stores. Think of them as 3 buckets, one being filled, another being emptied and a 3rd one to ensure that you never have to read and write the same store at the same time. This approach was the only practical one in 1970 but now we have dual port memory. This can be written and read simultaneously and is a thoroughly practical and low cost method. A good example is the NEC UPD485505. I would not recommend the standard FIFO memories made by many companies. Their control requirements are a nuisance in this application.

A frame store seems like overkill but allows the output sync to be steady at all times even when the input is disrupted. Also allows freeze frame, the possibility of a simple test card generator and few other tricks. With modern parts such as the Averlogic AL422B this is no more expensive than using line stores and would be my favoured approach.

### Interpolation

This is the other main problem. To smooth out those jagged edges we need that dreaded word. Interpolation. The concept is a bit harder than time redistribution but let's have a go at the theory of a simple 2 line interpolator. If you want to generate a new output line that is half way between two input lines then you need a 50:50 average of the input lines. The proportions are varied according to the position of the output line.

The BBC did theoretical studies backed up by practical trials to show that 2 line interpolation is vastly better than none at all. 3 or 4 lines are better than 2 though you will be hard pressed to see this, except by direct comparison on carefully chosen test signals. More than 4 lines is just not worth doing. I would choose a 2 line interpolator for a simple and practical design.

### Theory into practice

Now we know what has to be done let's see how to actually do it.

### Input and output

Curiously enough, the difficult bit is no longer the time redistribution and interpolation. When all that had to be done with boards full of TTL and small slow memories it was hard. Modern programmable logic and memories have reduced it all to 2 or 3 chips of which more later. What we need to do first is convert the 625 input to a digital signal and reverse this at the 405 line output.

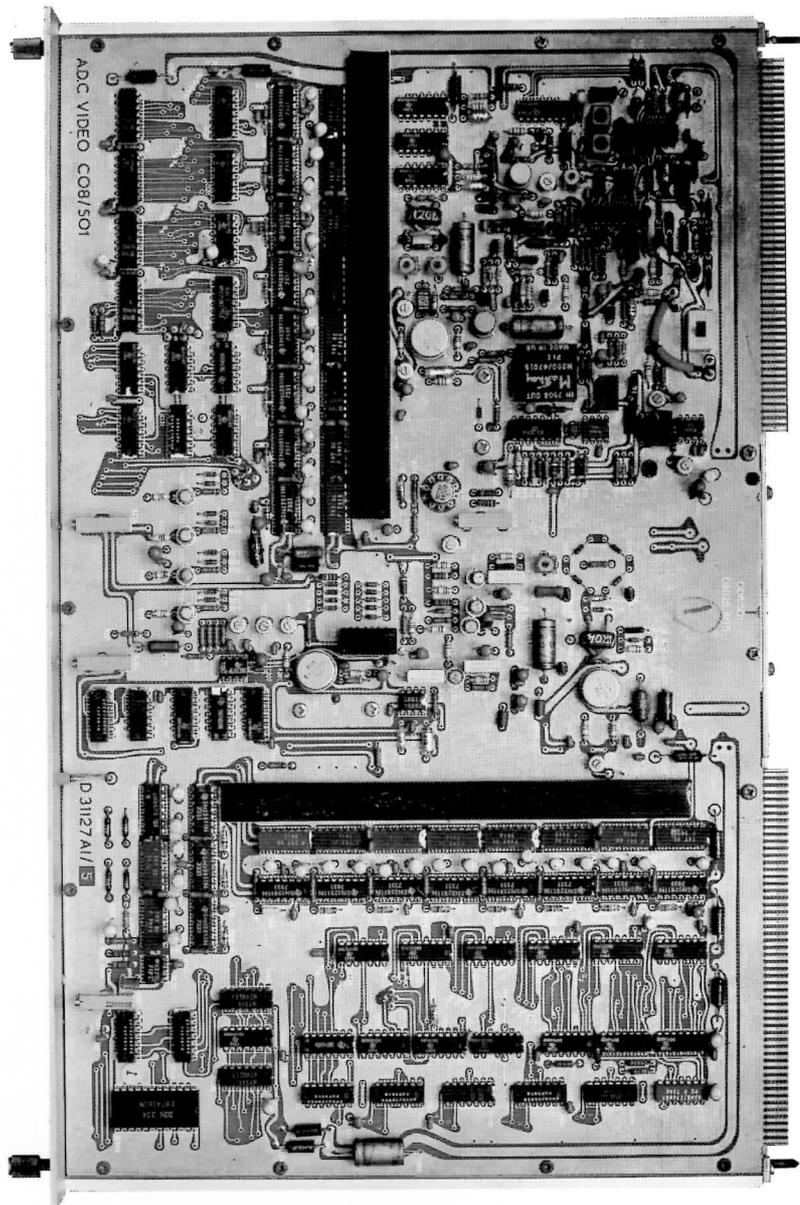
### Discrete ADC

The BBC design in the CO6/509 is a scary piece of design. Thank goodness we don't have to do it that way any more.

### Single chip ADC

The first 8 bit video ADC, the TRW TDC1007, was introduced in about 1978, cost about £200 per chip and was welcomed with open arms by the professionals in companies such as Ampex and Quantel. Its modern counterpart is a small low cost, low power device. The generic 1075 device was first made by Raytheon and does a good job for under £5. There are plenty of other parts too such as the Philips TDA8708 which includes video clamping and gain control ahead of the ADC itself.

Along with the ADC we also need to amplify and clamp the video, extract H and V timing and derive a sampling clock with a phase locked loop (PLL). If we cannot be bothered to do this then we can buy an....



### Integrated decoder

Several manufacturers produce multistandard decoders on a single chip. They take in analogue video on any colour standard and deliver decoded digital signals. They were originally designed for "stunt" modes in TV sets, video on computers and suchlike. I'll talk about the Philips SAA7111A as I know it well but Analogue devices, Brooktree, Harris and others have all made some.

All you need to do is connect the analogue input via a capacitor, add a small handful of external parts and hey presto you have 8 bit video and a 27MHz clock. The main snag is that you really need a microprocessor in the system to program all the registers in the decoder via an I<sup>2</sup>C port.

If you are one of that very small band who want to explore 405 NTSC colour then a decoder chip is definitely the right approach.

### Discrete DAC

Nothing like as scary as a discrete ADC but I'm still glad we don't have to do it that way now.

### Single chip DAC

Curiously the problem here is that single 8 bit video DACs are really rather old fashioned. They have been largely superseded by triple DACs and ultra fast single

Above: ADC from CO6/509

Right: CO6/509 complete

- a: Power supplies
- b: Open door showing part of interpolator.
- c: ADC partly withdrawn

Designing converters is only for the knowledgeable or the brave. Building them commercially is probably a certifiable activity. I salute all those who have tried and succeeded.

DACs. The Philips TDA8702 is a simple device that is probably still available. Then we need to filter the output and insert syncs. Sync generation is quite a few TTL chips or an easy bit of logic inside a suitable programmable logic device.

I hope that most of you are still with me. I know that this sort of thing is second nature to design professionals but it is definitely not easy. But you weren't seriously contemplating designing a converter. Or were you?

**The digital bits**

We need to choose the sample clock speed. On the 625 side I would go for 13.5MHz without much thought since that's what the whole TV industry uses. It is possible to run the 405 side at the same clock speed but this would involve a complex interpolator to change the number of samples per line. It is much easier to follow the route of all previous converters and keep the same number of samples per line. The 405 output clock is then  $13.5\text{MHz} \div (625/405) = 8.748\text{MHz}$ . In a linestore based converter this will be a voltage

controlled oscillator phaselocked to the input clock via a funny bit of logic. In a framestore design it will be a free running crystal. Before you go to get a crystal cut, note that twice this frequency is 17.496MHz which is tantalisingly close to 17.734475MHz, the standard PAL 4fsc, which is readily available off the shelf. If you cheat a little and make the 405 horizontal blanking 12 pixels or about 1.3µs too long it will work out just nicely and I doubt if anyone will notice. The BBC used 12.65625MHz for the 625 clock which is OK but I would not recommend going any lower. The only other frequency you might use is 14.75MHz which gives square pixels and is standard for some decoder chips.

Once you have decided on line or frame storage the basic design decisions almost take themselves. If you have access to modern programmable logic devices (FPGAs) made by companies such as Xilinx and Altera then there is no contest. A single device costing under £20 can easily contain all the logic including the line stores. The Xilinx XC2S100 is an example. It will also interface to an external framestore. Besides the low component count, the other great merit of this approach is that you develop and change your design ad infinitum without physically rewiring anything. If you are not able to access this sort of technology, and the manufacturers do not exactly encourage amateur users, it is amazing what can be done with EPROMs, PIC processors and standard logic, chips. What you will be doing is using ingenuity and dedication instead of a fairly complex and possibly expensive design environment. If you want a taster of what's possible with modern programmable logic download the Xilinx Webpack software free of charge from [www.xilinx.com](http://www.xilinx.com) and give it a try. You could then buy or make the programming probe and have a go with a small cheap device such as the XC95144XL. You will be amazed at how many '161 counters, '138 decoders, '283 adders and '374 registers can be absorbed into one part. The main disadvantage is the multi-legged surface mount packages.

**Actually building a converter**

Right. We've designed our converter. Well I have anyway. Now let's build it. There are 2 routes and both can be unpleasant. The pioneers favoured hand made boards full of standard logic. These are wretched things to build and debug. A PCB would be feasible but expensive.

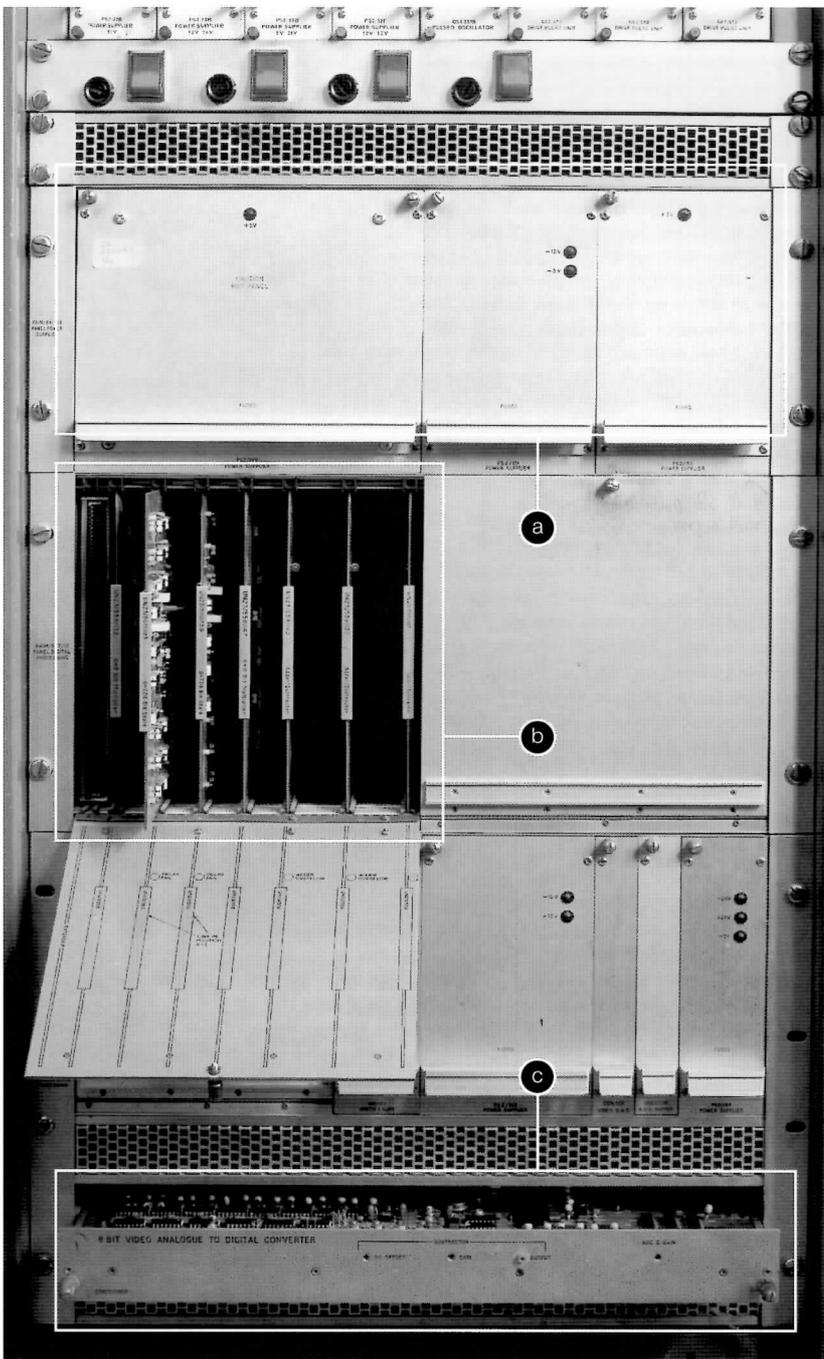
For a modern converter design a PCB is essential. All those surface mount chips need very fine connections and that PCB is likely to be a precision multilayer job. These are commonplace in professional circles but not something you can make yourself. If you climb the learning curve you can design the PCB with one of the low cost PCB CAD packages and have it made by a specialist manufacturer. You will find it expensive in small quantities. Unless you are good at watch repairs you will also need a surface mount workstation to assemble it.

Now do the costings. Add up all the parts, including a box and power supply. Amortise the costs of PCB layout and manufacture and see what it comes to. If you do this honestly, for the likely (small) quantities, you will be alarmed by the answer.

The author once adapted a design that he did for a client to do 625 to 405 conversion. It worked quite well but like so many projects it never got finished. It was not suitable for production or sale since it was based on a fairly expensive piece of professional equipment.

**Alternative approaches**

So far I have only written about conventional methods of converting 625 to 405. Now let's look at the alternatives. I mentioned optical conversion. I have tried this venerable method and it can be remarkably good. I



have even used it to convert 405 to 625. It does need careful setting up and is prone to moiré patterning from the interaction between the different line structures. The simplest way to avoid this is to defocus the camera very slightly. Better ways include spot wobble on the monitor or reducing the height so that the line structure disappears. And doing the same on the camera. All this is well within the scope of an enthusiast.

Some have suggested using computers or digital signal processors (DSP). Conceptually there is no problem. I'm a pretty lousy programmer and I could write you the conversion algorithms in a few lines of a high level language such as BASIC. These would take a 625 line image, already in the computer, and convert it to a 405 line image, also within the computer. And there's the snag. You still need to get the picture in and out and you have to ensure that the computer can keep up with the data. Video comes at you continuously so real time means exactly that - you cannot put your hand up, take time out and catch up later. So when you say you have built a converter with a cast-off 486 PC I won't believe you. Modern DSP (digital signal processor - a sort of specialised microprocessor) chips are entirely capable of doing the digital parts of the processing though you will still need to get the signals in and out. Maybe I'm prejudiced but I would rather use programmable logic than DSP for this job.

### Final thoughts

I have not really mentioned modulators. There are at least 2 published designs which are feasible for the enthusiast. One was (optionally) built into the Dinosaur converter and the Domino converter includes one as standard

405 NTSC colour is an interesting subject. A few experimental receivers were built for the BBC trials in the 1950s and some of these survive. If you use a decoder chip as the input system the digital complexity is not much greater than for monochrome. There is also no conceptual problem about designing the colour output. Annoyingly, standard colour encoder chips could easily do the strange subcarrier frequency needed but not the 405 syncs. I would probably use a largely discrete component design which needs a lot of parts but is not too hard to do. A clever approach would be to do the whole NTSC encoder digitally in programmable logic. I reckon this will need rather more programmable logic resource than the whole of the rest of the converter.

Designing converters is only for the knowledgeable or the brave. Building them commercially is probably a certifiable activity. I salute all those who have tried and succeeded.

### References and further reading

Many of these references are certainly not light bedtime reading.

*Television Engineering, Principles and Practice* Vols 1 - 4. S W Amos and D C Birkinshaw. A useful if dated general reference. Available from many libraries and secondhand.

*Television Standards Converter using a line store*. P Rainger and E R Rout. Proc IEE Vol 113 No 9, September 1966. An excellent detailed paper on the BBC analogue converter.

*Television Standards Conversion*. S M Edwardson and C K P Clarke. Electronics and Wireless World, January 1987. A review of standards conversion over the past 30 years.

Fifty years of high-definition TV transmission. R C Hills.

IEE Journal Vol 56 No. 1, January 1987. A historical review, mainly about transmitters.

*Digital TV line standard converters*. Wireless World, May 1987. A brief introduction.

*Digital line store standards conversion: Determination of the Optimum Interpolation Aperture Function*. G M Le Couteur. BBC Research Dept Report 1973/23. Rigorous and authoritative mathematical and experimental treatment.

*Digital Line Store Standards Conversion: Preliminary Interpolation Study*. J O Drewery, J R Chew, G M Le Couteur. BBC Research Dept Report 1972/28. Theoretical study of interpolation.

*Digital Standards Conversion: Interpolation Theory and Aperture Synthesis*. C K P Clarke and N E Tanton. BBC Research Dept Report 1984/20. Another rigorous treatment of interpolation including field rate conversion.

NB: None of these last three papers is for the faint hearted. They are quite mathematical, involving Fourier analysis and other university level subjects.

*IBA Technical Review, Vol 3. Digital Television*. Ed. Pat Hawker. Excellent description of the IBA experimental 625/405 converter.

*IBA Technical Review, Vol 8. Digital Video Processing - DICE*. Ed. Pat Hawker. Although this deals with 525/625 conversion much is relevant to 625/405 problems.

CQ-TV is the bulletin of the British Amateur Television Club. It is available only to members. There have been many useful designs for SPGs, test pattern generators etc. A full index is available from the Club.

TELEVISION (Previously Practical Television) has published many relevant articles. Here are a few:

*System A Modulator*. David Looser. October 1984.

*A Vintage Tube Renovation*. Jeffrey Borin. September 1987.

*Recording 405-line signals*. Gareth Foster. October 1983.

*Goodbye to 405 Lines*. Pat Hawker. January 1985.

*Channel 1 modulator*. Jeffrey Borin. March 1989

*405 MAC, a new approach to HDTV*. Jeffrey Borin. April 1988.

*Practical 405 - How To Run Your Historic Receivers*. Jeffrey Borin. November/December 1988

### Appendix

#### Comparison of RF standards

SYSTEM	A	I
Nominal channel width	5MHz	8MHz
Sound carrier frequency relative to vision		
	-3.5MHz	+6MHz
Vision modulation polarity	Positive	Negative
Sync tip carrier	Zero	100%
Black level carrier	30%	76%
White level carrier	100%	20%
Sound modulation	AM	FM
Ratio of peak vision carrier voltage to unmodulated sound carrier	2:1	3.3:1

#### Band I carrier frequencies

Channel	Vision MHz	Sound MHz
1	45.0	41.5
2	51.75	48.25
3	56.75	53.25
4	61.75	58.25
5	66.75	63.25

# The Early Television Museum

by Steve McVoy

In November of 2001 the first museum in the United States dedicated entirely to early television equipment opened in Columbus, Ohio. It is operated by the Early Television Foundation, a non-profit organization dedicated to the restoration and preservation of receivers and camera equipment from the 1920s through the 1950s. Our collection includes mechanical sets from 1928-32, prewar British and American electronic sets, early postwar British, American, Dutch and French sets, and early Color receivers. In addition, we have a small but growing collection of early postwar camera equipment.



As I became more familiar with the history of television, I learned of the development of mechanical TV in the United States and in Britain, and of the BBC's broadcasting of electronic television three years before the TRK-12 was introduced.

## History of the Museum

In 1998 I sold my cable television business, and, wanting to try something new, decided to collect early television receivers. As a teenager I had worked in a television repair shop, and often worked on early postwar sets such as the RCA 630. I began searching Ebay for sets, and within a few days a RCA TRK-12 prewar set came up. At that time I knew very little about the history of television, and assumed that the first commercial sets were made after World War Two.

The TRK-12 was in pieces. In fact, there were two partial badly damaged cabinets. The CRT was missing, as was the radio dial frame. In the process of bidding on the set, I was emailed by a number of U.S. television collectors. As time went on, I got to know them, and slowly learned something about prewar technology and history.

I located a company that does historically accurate cabinet restoration, and they began the process of making one good cabinet out of the pieces I had. I began the electronic restoration, and discovered that the technology was not too different from what I remembered of the early postwar sets I had repaired as a teenager. I began a search for the missing parts, and finally found a CRT (from another collector) and the dial frame (from an RCA radio of the same era). The set now sits in the lobby of the museum.

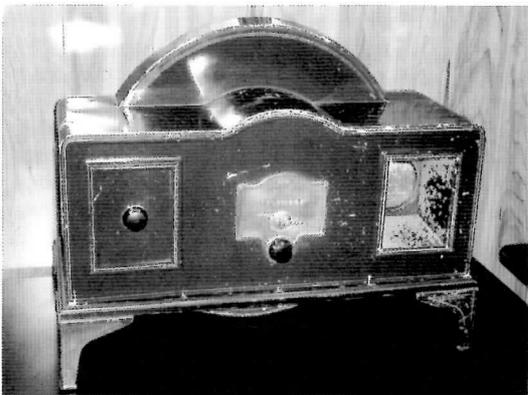
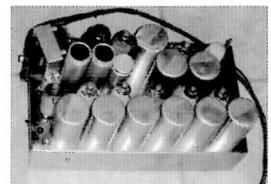
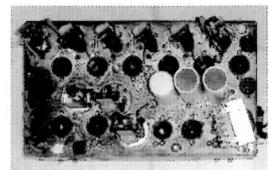
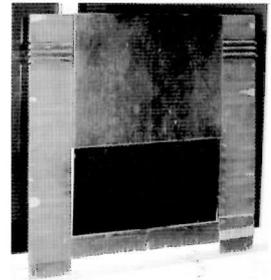
As I became more familiar with the history of television, I learned of the development of mechanical TV in the United States and in Britain, and of the BBC's broadcasting of electronic television three years before the TRK-12 was introduced. And, I learned of an RGD 382-RG for sale in England. This set was my

introduction to British electronic receivers. It was also missing a number of parts, but the cabinet was in better condition than the TRK-12. In the process of restoring the RGD, I had to find a way to supply a 405 line signal for it. Collectors I met in England supplied me with a VCR, which could play back 405 line tapes, and I modified an American modulator to supply the RF. The RGD is now complete, and is prominently displayed in the museum's Prewar British room

I acquired a number of early postwar sets on Ebay, from local auctions, and from radio swap meets. By 2000 I had almost 100 sets, and was running out of places to put them. While looking for sets to purchase I visited many of the collectors in the U.S., and, though they were very cooperative in showing me their collection, their sets were generally hidden away in their basements or attics. The major science museums, such as the Smithsonian Institution and the Henry Ford Museum, have a few early television sets on display, but nowhere can the general public see a comprehensive collection of receivers.

## The Construction of the Museum

I then started formulating plans for a museum, and began searching for a suitable building. After considering a number of sites, I decided on an 11,000 square foot warehouse building in a suburb of Columbus. After getting the required governmental approval, renovation of a 2,000 square foot section of the building began in the summer of 2001. In late November the museum opened to the public.



Our British prewar collection includes Cossor models 54 and 137T; HMV models 904, 905, 907 and 1800; Marconi 705; Pye 817; Ekco TA-201; Baird T18C; and the RGD 382-RG. The Cossor, Pye, Ekco and RGD are in working condition.

**The Collection**

We presently have several mechanical sets, including a Baird Televisor, Jenkins Model 100, Hollis Baird C-5, RCA 60 line, and two sets made in 1929 by a Columbus resident and his father. The Baird and RCA are working, with the video supplied by a personal computer, which converts the American 525 line video to 30 and 60 line. We also have a working 60 line flying spot scanner camera, using a photocell cabinet originally used by RCA in their 1932 field trials in New York. Visitors can watch their friends on the RCA receiver.

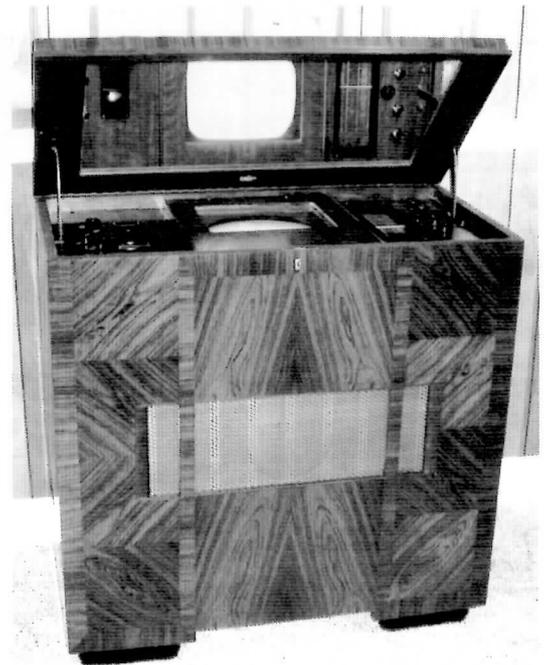
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Our American prewar sets include the four RCA sets introduced at the 1939 World's Fair: the TT-5 vision

only set and the TRK-5, 9, and 12 TV/Radio receivers. We also have the Westinghouse WRT-700 and 703, made by RCA and electrically identical to the TT-5 and TRK-12. In addition, we have four of the Andrea sets made in 1939: the 1-F-5 table top 5 inch model; the KTE-5 kit version of the same set; the 2-F-5 console model; and the 8-F-12 TV/Radio/Phonograph.

Also on display are two Dumont sets, a model 180 from 1938 (the earliest production set in the U.S), and a model 183. There is a striking resemblance between these sets and the Cossor 137T, with similar CRTs and sweep circuits. Apparently Allen Dumont visited England in 1937, brought back a Cossor, and copied the design without any licensing agreement.

We have two General Electric sets, a HM-171 5 inch vision only model, and a HM-225 9 inch. Another kit set in our collection is the Meissner 10-1153. Finally, we have a prototype Bell and Howell projection set made



around 1944. It uses a 5 inch developmental CRT.

At present, the TT-5, TRK-5, TRK-12, 1-F-5, 2-F-5, HM-171, HM-225, and the Bell and Howell prototype are in working condition.

Our postwar collection includes about 50 sets from the U.S, Britain, France and Holland. We have a number of rare late 40s sets, including the Temple TV-1176, a 7 inch set with built-in magnifier; the Telejuke, a 15 inch Emerson TV set and Seeburg 78 rpm jukebox in a glass cabinet; a Telecon projection set; and a Crosley "Swing a View", with a ten inch picture tube that can be rotated toward the viewer.

Our early color collection includes the first production color set in the U.S., the Westinghouse H840CK15, made in early 1954. We also have a RCA CT-100 15 inch set and two early Motorola sets, one with a 19 inch tube and one with a 21 inch CRT; all made in 1954. Finally, we have Philco and RCA 21 inch sets made in 1955 and a Col-R-Tel attachment that converts small screen black and white sets to color using a rotating disc.

Our collection of early camera equipment is small but growing. At present we have late 40s image orthicon studio cameras from RCA and General Electric; iconoscope film chain cameras; a World War Two iconoscope camera used to direct a glide bomb

to its target; and an early Dage 15 inch color monitor.

#### **Our Future Plans**

We hope to renovate another 3000 square feet of display space this year to house a collection of early CRTs that has been loaned to the museum, and to allow us to build a replica of an early television studio. In addition, our collection keeps growing, and we need space to display the new items. Eventually we hope to have the entire building renovated. Another display in the planning stage is a re-creation of an early TV repair shop, with test equipment and tools from the late 40s.

#### **Visit us**

The museum is open Saturday from 10 to 6, Sunday from 12 to 5, and by appointment. You can learn more about the museum and the collection at our website: [www.earlytelevision.org](http://www.earlytelevision.org), by writing to us at 5396 Franklin Street, Hilliard, OH 43221, USA, or by phone at 614-771-0510.

# Safety on the bench

by Graham W. Palmer I. Eng., F.I.I.E. (Electronics)

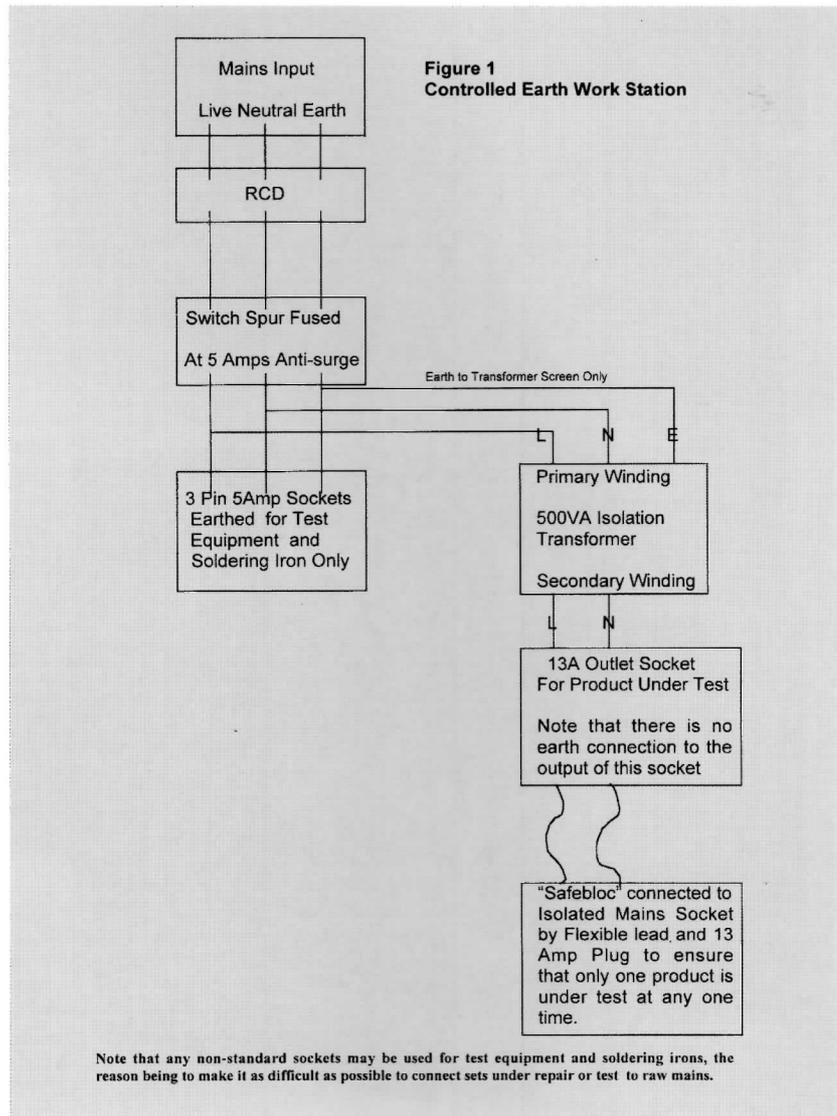
During the last few years as a member of the BVWS, I have been meaning to write something on the subject of safety testing for a long time, having been prompted by letters and articles I have read in the Bulletin month after month about repairing valve radio receivers (Wirelesses for the older members). I have been a member of BVWS for a number of years and I never fail to be amazed at the lack of basic electrical safety practices by the people who write such letters and articles. It is a further source of amazement to me that nobody has been killed or seriously injured by such practices relating to repairs. Perhaps we never hear of them!

What finally made me put keyboard to paper was a purchase I made at Harpenden recently of a Philco Model 444 "Peoples Set". This was sold to me (by a "bona fide" dealer no less) without any warning whatsoever that it was totally unsafe to connect to the mains. Had I been one of the many non-technical individuals we have in our Society who are members not only for the intrinsic value of vintage radios but also to perpetuate the British love of their heritage, I would probably have been dead at worst or have a blown fuse at best. Cosmetically, the product looked quite good apart from a non-Philco back cover, but as a qualified radio engineer I did not rely on cosmetics as a reason to connect it to the mains without going through a series of tests. These revealed one mains short circuit, four serious HT short circuits, badly degraded HT leads to the mains energised loudspeaker which were just twisted together and poked into what was left of the loudspeaker cone, LT short circuit on the dial lamp holder and so on. I could go on, but what concerns me is how we, as essentially a technical society, can allow Members, whose only interest in vintage radio is to make a bob or two, to risk other people's health and lives without a care. Should we not have simple rules like requiring Members to label products that are potentially unsafe before selling them?

It only requires statements like "Working - OK to plug in" or "Untested - DO NOT connect to mains until checked thoroughly", or "Sold for display only" etc. More accurately sellers should get buyers to sign disclaimers before releasing the product for sale.

The Royal Society for the Prevention of Accidents define an accident as "an unplanned, unpremeditated occurrence which MAY result in injury and/or damage". By definition this statement means that unsafe practices do not always injure BUT they do increase the risk quite dramatically.

You may ask what qualifications I have for the effrontery to write this - well, I initially qualified in the nineteen-fifties starting as an apprentice and working



solely on pre and post war valve radio and television products. In addition I worked under a Service Manager who was an ex-RAF Sergeant Wireless Mechanic and who was paranoid about safety. Following this I gained further qualifications and more senior positions, at one time responsible for a number of service departments throughout the UK. It was in this position that I was constantly in contact with Factory Inspectors (before the days of the Health and Safety Executive) who had to be consulted about any electrical or electronic testing station and who had the authority not to award a safety certificate, which meant that the company or individual in question could not practice their trade.

I remember reading one article in the BVWS Bulletin written by a fine gentleman, who he states near the beginning that the two items essential for simple repairs are a multi-meter and a collection of books - this is OK for battery sets but completely wrong for mains sets. The first essential item for mains powered sets is a good quality isolation transformer (at least 500VA) and if possible an earth free environment. I was horrified at a recent BVWS meeting where it was suggested that a Variac fulfils the isolation task - IT DOES NOT! Most, if not all Variacs are essentially an auto-transformer where the variable output voltage is

Figure 1

I was horrified at a recent BVWS meeting where it was suggested that a Variac fulfils the isolation task - IT DOES NOT!

One may argue that there is a cost involved - so what! - how much is a life worth? I suggest that not one member of the BVWS has enough money to pay for a human life.

not isolated from the mains. As an earth free environment is very difficult to achieve a controlled earth environment is the next best thing. All mains feeding the test area should be through a Residual Current Device (RCD) which will safeguard the operative in the case of earth leakage either direct or through the body!

All people working on and repairing mains driven electrical and electronic equipment should contact their local Health and Safety Executive and obtain the latest update of a booklet called "Electrical Testing". It may have been re-titled but the HSE will know what you want.

One may argue that there is a cost involved - so what! - how much is a life worth? I suggest that not one member of BVWS has enough money to pay for a human life. A basic drawing for a controlled earth work station is shown in Figure 1. Even though this is much safer than working from raw mains it is still important to ensure that all safety procedures are still practiced.

The next item I would agree is a reasonable multimeter, it does not matter if this is digital or analogue, however I would advise analogue as it is much more useful for the cursory checking of electrolytics and in the more advanced stages of repairs, the tuning and alignment of RF and IF circuits as peaks and troughs are more easily discernible. However, the idea of plugging in a radio and waiting to see the smoke is perhaps the most common mistake made by amateurs. Therefore the next step in the safety process is NOT to plug it in but to make cold tests using the multimeter set to a suitable ohms range. These do not need to be complicated but are important as follows:

A mains loop test on the end of the mains lead to ensure there are no short circuits - remember when doing this test that a mains transformer has much less resistance than a series heater chain with mains dropper.

A mains to earth/chassis test where the unit has full isolation (mains transformer). Leakage often occurs where the set has been in damp conditions and may be OK if dried out slowly, otherwise find the fault before testing.

Next check is for HT shorts, first on the rectifier output or reservoir capacitor. Then test on the other side of the smoothing resistor, choke or mains energised speaker magnet coil, whatever the smoothing arrangements are in that particular set.

Follow this with short circuit checks on the anodes and screen grids of all the valves as a short here will not necessarily show on the main HT line due to the value of anode load and screen feed resistors. Often a short circuit decoupling capacitor can be found like this than in later stages of diagnosis.

Finally, before connecting to the mains carry out a thorough visual check - in particular of electrolytic capacitors to see if they are bulging or wet; if they are in this condition replace them. Also check the wiring as many pre-WW2 radios used rubber covered leads which are prone to becoming hard and flaking off the conductor. This can be particularly dangerous in floating leads to loudspeakers and dial lights.

**Note** that in order to give the radio the appearance of authenticity, most canned smoothing capacitors can be dismantled using great care to remove the material within the can and replace it with modern capacitors (**Don't forget to choose capacitors which will handle the ripple current**). The original can may then be re-sealed and fitted. You can now plug in, using your isolation transformer, or if you are foolhardy, direct into the mains (don't forget if you are using raw mains to make sure that a live chassis set is connected the right way round **before** connecting).

The other essential piece of workshop equipment is a good soldering iron of a suitable wattage, to unsolder chassis connections. When soldering

components in old radios, the practice is to make the joint mechanically sound before soldering if at all possible; this was the method specified in those early days unlike PCB soldering in modern equipment.

Other items of equipment include a Signal Generator (to save twiddling trimming, tracking and IF tuning). A good selection of hand tools and if you are rich enough, a valve tester. The latter is not essential as the best valve tester is the set you are working on. A small box to put the screws and knobs in when dismantling; many bits have been lost when putting them on the workbench instead of in a container.

So much for basic safety and equipment, but what other advice can I give will aid fault finding and testing in safety and without damaging the radio set? A list of simple Do's are below (Note they are not in any particular order). I have not shown Don'ts as they are a negative way of getting points across. The list is not exhaustive and I suggest that we see additions to these from other members of BVWS from time to time:

#### The Do's

- Do go through all the cold checks shown above.
- Do use a proper electrically safe working area.
- Do keep all non-technical people away from the workbench when repairing or testing a set.
- Do get a circuit diagram - the recent issue of BVWS CD's of Trader Sheets is excellent.
- Do use an accurate test meter.
- Do use a good quality soldering iron, preferably low voltage with temperature control.
- Do ensure that your test equipment is working to specification e.g you can test a signal generator with a frequency counter.
- Do use clean rubber mats or similar on the bench to avoid cabinet damage.
- Do replace any frayed, hardened rubber or heat damaged cable and sleeving.
- Do wear shoes with insulated soles and heels, trainers are fine but old fashioned "beetle-crushers" are better - JUST IN CASE.
- Do disconnect any unit from the mains supply when changing components or wiring.
- Do ensure that, when replacing a wired component, that a good mechanical joint is made before soldering (this was the recommended practice before PCB's)
- Do ensure plenty of ventilation especially when using proprietary fluid cleaners e.g. Servisol.
- Do follow alignment instructions accurately - remember it worked once when aligned as instructed - if it does not work after the correct alignment procedure there is a fault and no amount of twiddling will put it right.
- Do clean dials with great care - most dirt can be removed with clean water. Remember that using detergents and solvent cleaners may remove transfers and you will be left with clear glass.
- Do handle loudspeakers with care. Most cones can be removed and repaired, then re-fitted and centred using simple card feeler gauges or jigs. Re-glue cone suspension with contact adhesive.

Best wishes and a safe and long life in the new/old radio industry.

# Interactive Television is a Novelty for the 21st Century. Or is it?

Harry Greene takes a leisurely and lightweight look at the age of the 'TV Gimmick'.

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With the 'Panorama' direct vision picture tube it's freedom road all the way.

Freedom from multiple reflections, dust or condensed vapour; absolutely nothing gets between you and the picture because the 'Panorama' makes protective panels redundant. You're in touch with direct vision.

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**And it's on.**

In fact, in various forms, it has been around for most of the last century. When I say 'it', I mean the ever present desire to break the barrier between the viewer and the impassive glass of a television screen. Ever since the birth of monochrome high definition television, a great deal of effort has centred on making the experience of television more 'real'. Many readers will recall the all too real, early apprehension felt by viewers who believed that television could 'see' into their home. I recall one extremely religious relation who grew up in the 50s. She had a stern mother who forbade anyone to undress in front of the screen as she considered it an immoral act. Later, after much deliberation, this ban was lifted, but with certain exceptions, such as 50s boxing broadcasts, the rule still applied! However, we are digressing from our target. Over the years various inventions have crept into view, some of these destined to be ephemeral gadgets and the rest evolving into durable features. The predominance of gadgets mostly began after television itself ceased to be a novelty. It is not for your humble narrator to say when this was, but it is equally unimportant to our story! Fashion (the most virulent disease of the masses) dictates what is 'in' and what is 'out', and many of these interactive gadgets were marketed to give you something that hadn't been seen (or in the case of stereo sound – heard) before. Of course you might not have wished for something new; in fact as we will see, the public often voted against some promising hopefuls. A small note should be reserved for 'CEEFAX' and 'TELETEXT'. These are certainly not gimmicks and a whole article could be devoted to them. However, for the purposes of this meander through the byways of television history we must attack the ephemeral and the unusual. By nature, a true gimmick is never instantly commonplace, and rarely achieves permanence.

The most obvious early attempt to provide interaction is also the most durable; in fact it might hardly be termed a gimmick, though it surely started as one, perhaps being the 'genesis of the couch potato'. I am, or course, speaking of the humble remote control. These first appeared in America during the early 1950s. They variously were clunky, cord wired devices. Similar to the early hearing devices, these were often more cumbersome than desirable. Although a few expensive British projection receivers carried a remote control for simple on/off operation, it was the American market which fully embraced the idea. Unlike the British single channel BBC service, for obvious reasons, the American market was already saturated with a multitude of channels and therefore a good reason to have a quick way of selecting and switching. One of the earliest, popular commercial attempts was the 1952 Zenith 'Lazy Bones' remote. This device used motorised tuning to channel shift. Zenith effectively stole the lead in the concept of a remote channel-switching device. However, what was really desired was a true, cordless remote. This breakthrough dream became commercial reality in 1955 with the introduction of the 'Flash-O-Matic', using selective light as a communication channel. These were ordinary torch (or 'flashlight') bulbs. Unfortunately, reflected daylight caused problems with the detector and could inadvertently switch channels without the viewer's intervention. After a number of complaints, Zenith abandoned the flashlight idea and replaced this with ultrasonic waves. The remote control was introduced as their new 'Space Command' model. The impact of this clunky battery operated remote would last into the age of colour television. For almost twenty years a large number of televisions were controlled by a device which often caused havoc with family pets!

Top left: the virtues of 'direct Vision' TV!

Top: It didn't catch on....!

Next page: Magic Kits from the popular US children's show

Fashion (the most virulent disease of the masses) dictates what is 'in' and what is 'out', and many of these interactive gadgets were marketed to give 'you' something that hadn't been seen (or in the case of Stereo sound – heard) before.

(cats and dogs were able to hear the high pitched frequencies used). Inflicting 'room 101' style epileptic fits on 'Thomas' wasn't very popular. Therefore, the evolution of the remote has finally settled on the infrared control. This doesn't annoy pets (though they can see the signals!) and draws less battery power. A modern sideline on the Infrared remote is a tiny box



currently available from novelty or joke shops. This device can be placed in a room and emits a wide beam of infrared, effectively paralysing all attempts to use a normal remote control!

Today, of course, you can buy a remote control for any television set. In early days, this wasn't so and there was no free market for such devices. Part of the reason was complexity and part was due to compatibility. Ignoring the actual control of the set itself, manufacturers invariably turned to devices to improve the viewing picture. Since most of the early commercial Television sets had a small screen (compared with today), an obvious idea would be to promote extra entertainment value with the addition of a 'magnifier'. There was a DIY craze in the 1950s of almost epidemic proportions and it suited a good many self-taught handymen to try their hand at building such a device. Most of the projection devices were advertised as 'blueprints' in the weekend newspapers. The DIY craze ensured that a good many people attempted (using a magnifying lens and black cardboard) to project their 405 lines up to home cinema proportions. Unfortunately, the results were too dim to be viewed without eyestrain.

The only commercial success in this field was the 'bubble magnifier', which could be bought as an add-on to an existing set. This was basically a split convex lens made of plastic (or a plastic outer shell with fluid inside). The rather ugly magnifier could be bolted on the front of the television set (even uglier) or held up on a special metal stand (rather like a music stand). So many houses were dominated by this great Cyclops eye, peering out to hypnotize the unwary viewers. It is perhaps surprising that people were prepared to endure these devices as they often greatly distorted the television picture. An added problem was that the field of viewing was reduced. Most of the magnifiers were added to table-top sets, typically enlarging an 8-inch picture to a more respectable 12-inch. Those with the fluid filled variety could expect an increasingly opaque picture as the fluid clouded over. By the late 1950s these bug-eyed devices were largely a thing of the past. New sets invariably had larger screens.

For those who had a 'de-luxe' 12 inch picture, there was still the problem of extraneous light. The reflections of the standard lamp and coal fire could be distracting. Even the purchase of a special 'Television Lamp' might not cure reflection. The solution touted to the public was the addition of a 'filter' screen. These were much cheaper than magnifiers and were far more of a

gimmick. They also had the inherent ability to be manufactured at very low cost. Surviving examples show that more attention was paid to the packaging than the 'valuable' contents inside. Most 'filters' were simply sheets of grey acetate which gave the vague impression of being an expensive sheet of the then relatively new Polaroid filter material. Gaudy, but compelling outside packaging reassured a gullible customer that the product was 'Di-Optic' or some other such pseudo-scientific nonsense. The same customer invariably found that when the filter was applied, the picture became simply darker than before. If the sheet had been made of Polaroid it would have worked! (And would also have been prohibitively costly). Given the rather dim C.R.T. of those days, why anyone would want a 'glare' filter is beyond my comprehension!

A more sophisticated version of the 'glare filter' came in a form which added 'colour' to your Television image. If the glare filter stretched the truth to breaking point, this type of gimmick broke truth in half and more. This tri-banded filter was usually a gelatine effort made in hues of blue (for sky), red (for faces) and green (for grass). It is almost certain that many of these were sold at local markets to gullible customers. Possibly all but a few brave vendors would dare to unwrap the packaging and reveal the crude colours inside. One can only imagine the people who bought one of these and returned home to be severely disappointed with the result. Despite all this, these filters sold by the thousand. Why was this so? To a certain extent, people of the 50s were geared (through a great deal of contemporary scientific progress) to believe that the impossible was truly possible. Even when the filters were well known as a 'con' many were still sold as a cheap novelty. Even further down the line of dubious merchandise were the rather despicable 'colour viewers'. This was a hand-held viewer with a horizontal rainbow spectrum made of gelatine. Very cheap to produce and packaged carefully so as to conceal the true nature of the colour viewer. These could be sold for a few shillings, wrapped in concealing brown envelopes. Trade could be brisk for an experienced 'barker' at local fetes and fairs (or even corners of busy London streets!). To add to the deception, envelopes were usually printed with 'testimonials' from happy customers. The only really happy people were the hawkers, who could not even be arrested for fraud. In truth, they did provide a way of viewing colour television. The fact that none of the colours were true is neither here nor there.

These television 'add on' filters and magnifiers were rather passive devices, though they qualified as vaguely interactive. In contrast, undoubtedly the most unique and spectacular example of early interactive Television was achieved by an American children's programme called 'Winky Dink and You'. This was first broadcast by the CBS network on October 10, 1953. For the following four years, host Jack Barry presented this Saturday morning mixture of fantasy and learning to an eager audience of child artists. The actual character 'Winky Dink' was animated (voiced by Mae Questal of 'Olive Oyl') fame. During the course of the animated adventures, Winky Dink would often require help from the viewing children. At this point, host Jack Barry would ask them to use their 50 cents 'Winky Dink' kit, by bringing the supplied green plastic sheet into contact with their television screen and use the special 'wipe off' crayon to draw the required image. The plastic sheet stuck to the screen as if by magic (although static electricity surely played a part). The sheet also had an embossed Winky Dink "logo" on the bottom that now resembles the transparent logos that identify digital Television channels. Each kit contained 5 coloured crayons for this purpose. An attempt was made to revive the programme in 1969; however because of worries over the harmful effects of radiation, the kits were withdrawn. Other parents

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had a more worrying and direct problem. It was difficult to control children from actually drawing directly on to the screen. A few evenings were ruined by the application of permanent waxy hues to 'I Love Lucy' and 'Sgt. Bilko'. Merchandising reached huge proportions, thanks to the addition of a luxury kit which cost six times as much, but included more crayons and a 'magic' erasing cloth. Many an American of a particular age recalls having added a rainbow burst of colour to the real Television screen and ended up with an inability to sit down for a few days! (Presumably their 'Davy Crockett' hat (real skin) might have been confiscated too!)

The possibility of nationwide colour television was never far away. To some extent, the people who would benefit most would not be the general public, but the commercial advertisers. Some products were difficult to sell in monochrome. However, just before the dawn of true colour television, a technique based on the successive contrast principle tried to simulate colour using a monochrome picture. The interaction required here was simply to force the television viewer to 'see' colour images created entirely by means of carefully calculated successive high contrast monochrome patterns. This method was famously reviewed in a Tomorrow's World 60s broadcast. However the concept first surfaced in the early days of ITV. This early experiment is best explained by a contemporary account:

"Many readers saw a new kind of 'colour TV' last month when Associated Television, the ITA weekend programme contractor in the London area, transmitted an experimental commercial using what was termed "subjective colour". Colour, it was claimed, might be seen on the ordinary standard black-and-white receiver and, in fact, colour was seen by many thousands of viewers, according to the response obtained by ATV. The commercial consisted of a specially prepared film in which the brand name was static against a background of flickering lines and bars. Using the principle of the well-known Benham's top, the intermittent pattern was designed to produce an illusion in the eye of colour. Tests made previously by ATV suggested that eight out of ten people should see colour, the odds favouring women rather than men, and younger people rather than older. My own reaction? For the first two or three seconds – nothing, then colour began to creep in, in a fugitive, almost furtive manner. Some of the bars appeared blue, some green, and there was a hint of purple. No reds or yellows (though many viewers wrote to ATV claiming to have seen these two colours). Summing up – an interesting optical illusion, tiring to watch. Throughout the test, of course, there was no colour on the screen other than black-and-white. The colour is in the mind, and varies from one individual to another. Practical possibilities? Nil – except, perhaps, for a few short commercials as a kind of 'gimmick'. The system could not be applied in any way to programme production. It is important for dealers to stress to their customers that this test was not colour TV in any commercial way, and does not indicate that colour is just round the corner. Real colour Television is still many years away."

W.J. Clarke BSc, writing in  
British Radio & Television Retailing, October 1956

The reviewer doesn't mention the product, but it was 'OXO'. There is a fascinating follow up to this story. In the early 1990s 405 Alive founder Andy Emmerson spoke to Eric Ainley, a retired member of the team responsible for this 1956 colour experiment.

"Mr Ainley recalled that it was a bit of a gimmick really but it managed to get a lot of publicity for ITV and, to a lesser extent, the advertised product (OXO). It was

made on film and projected on an EMI telecine machine in the basement of ATV's studios at Britalian House, London (17/19 Foley Street, corner of Ogle Street). The commercial was made in black and white but the precise arrangement of the frames caused a kind of flicker effect, which with the persistence of vision, led some viewers to think they saw 'real' colours. If you squint and blink at a very bright white incandescent lamp bulb, you can simulate the same effect."

The promotion of 'OXO' was an inspired choice as the colour red was the easiest to simulate. A rather sinister side effect of this process was that it had some highly probable disadvantages. In practise, high contrast flickering can induce epileptic attacks. This problem actually increased as a general result of the introduction of monochrome television and decreased with the introduction of colour television.

Aside from the 50s dream of creating cheap colour television, there was also the 50s craze for three-dimensional films. They were christened '3D' films by the British expert Raymond Spottiswode and the name seems to have stuck. At the height of the craze in cinemas, a few attempts were made to broadcast '3D Television'. The person who made this possible was American entrepreneur James Butterfield who designed a pair of prism glasses which could be worn to combine two parallel images. On the camera side, there was a rig comparable to that used on Hollywood 3D films, namely, two cameras facing right-angled mirrors. The output from each camera was inlayed to create two side by side images on one Television picture. By careful head positioning, the 'bug-eyed' prism eyeglasses could easily merge the two pictures to create a single, high quality stereoscopic image. Evidently the major U.S. networks were unimpressed as the experiments only got as far as a special Mexican Television demonstration and a live broadcast of the popular 'Space Patrol' series. The only British attempt was a rather feeble attempt by PYE to show pictures at Radiolympia. The novelty of the PYE system was that a special receiver combined two polarised images. This meant that a good number of people could view 'live' Television at Olympia using the same glasses then in use for 3D films in the commercial cinema. Undoubtedly the demise of the idea was largely due to the fact that the double imaged pictures could not be enjoyed without the somewhat costly glasses. The idea didn't disappear, but was used in good many medical and scientific applications (in fact, is still in use today).

The idea of 3D was resurrected in the early 1980s. In a long forgotten edition of Tomorrow's World, presenter Michael Rodd asked viewers to collect two essential items for a mystery feature the following week. These items were a pair of red and green cellophane sweet wrappers. As he held both in his hand to demonstrate, a good few people must have assumed this was some sort of joke, however the next week, all was revealed. The sweet papers were used to demonstrate anaglyphic stereoscopic monochrome images, which had recently been developed in America. This was the beginning of a short international interest in the production of electronic, broadcast quality stereoscopic pictures. Cable Television in many American states had already been broadcasting (with considerable success) a series of converted versions of 1950's '3-D' films. The first official 3D television broadcast was on December 19th, 1980 and was aired over 'Select TV', a Los Angeles pay TV system. The program was a Columbia 3D feature film from 1953, 'Miss Sadie Thompson', and a 3D monochrome 3 Stooges short (Spooks, 1953). This broadcast was made possible by a breakthrough from '3D Video Corporation'. This process allowed for the conversion of existing commercial 3D films to the anaglyph format. The first broadcast on Select TV was black and white. Sadie Thomson was originally shown

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Most Television controls required a great deal of adjustment before even acceptable results were achieved. Looking at a VHS recording from the time, I am struck by the crudity of the encoded signal. At times the red and blue images are improperly converged. The strange colours bleed through and destroy the depth effect. If TVS had chosen a monochrome 50s film, perhaps the experiment would have been hailed a success.

theatrically in the Polaroid process with the addition of colour by Technicolor. The colour of the original film was removed prior to conversion. The 3D colour encoding could be seen as colour fringes on the Television screen.

Although the BBC managed to gain an exclusive preview of this technique, it was in 1982 that the newly formed ITV company TVS made history by broadcasting the first three-dimensional programmes. A preview programme was made as part of the programme, 'The Real World' (an imitation of the Tomorrow's World format). By this time, experiments had evolved to allow an amount of colour into the 3D television image. This 25 minute colour programme showcased a variety of film clips, old and new, plus genuine stereoscopic video footage produced from a pair of studio cameras. It isn't well known that this programme was broadcast twice (the first was a local broadcast a week earlier and was only in monochrome). The 'official' broadcast was simply a build up to the screening of a complete film, the 1953 Columbia Western 'Fort Ti'. This film had originally been shown in the far superior Polaroid system, however in the new television version, the results left a lot to be desired. Obviously, sweet wrappers would be no use 'en masse' and therefore a tiny pair of hand held glasses were provided free with each copy of the 'TV Times'. More gullible viewers could purchase an expensive 60p pair from their local newsagent. Sadly they would prove useless as TVS freely admitted that their experimental broadcasts were a failure. There were many reasons for this; one of the most obvious was the inherent difficulty in producing an acceptable stereoscopic image via the anaglyphic red/blue process. Most Television controls required a great deal of adjustment before even acceptable results were achieved. Looking at a VHS recording from the time, I am struck by the crudity of the encoded signal. At times the red and blue images are improperly converged. The strange colours bleed through and destroy the depth effect. If TVS had chosen a monochrome 50s film, perhaps the experiment would have been hailed a success.

Oddly enough, the same programme was back a year later with another try at something new. This time, another free gift in the TV Times provided viewers with a 'scratch and sniff' card. This was tied in with a Saturday morning childrens' show called 'No. 73' and with another special 'Real World' programme. In this case the viewer was told to scratch a panel and guess the smell. Little more than a simple game, the experiment had no lasting appeal. This was possibly because at that time, High Street shops were filled with a great variety of similar 'scratch and sniff' stickers.

This short lived 3D craze (accompanied by a dozen, or so new films for the cinema) was swiftly eclipsed by the growing interest in computers. A rather special first was achieved by the fledging Channel Four. A weekly programme called '4 Computer Buffs' attempted to broadcast computer software via the Television screen. Presenter Tony Bastable encouraged keen buffs to either purchase a special kit, or build a

home made effort. This kit involved attaching a rubber sucker to the bottom right of the television screen to pick up an inlaid pattern which was converted by a photocell into interpretable computer code. The initial system didn't work very well and a second series featured an improved version.

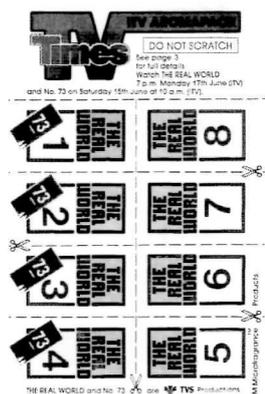
Around the early 90s, there was a revived interest in a cheap way of simulating 3D pictures. A number of Japanese cartoon shows had made use of what is known as the Pulfrich illusion. This was discovered and analysed in 1922. It involves using delaying vision information by placing a filter over only one eye. If movement in the television picture is kept going as a series of constant pans, the brain actually interprets true depth. The effect is as subjective as the earlier 'OXO' commercials, yet it carried a great deal of appeal for broadcasters, as aside from a pair of glasses, an ordinary but fast motion television picture could be used. The glasses were used in the U.K. to promote the annual 'Children in Need' event. In retrospect, this experiment must have disappointed viewers as the glasses did look much like the old red/blue anaglyphic versions; however, they were incapable of creating true stereoscopic depth.

In 1958, the BBC began a series of experimental broadcasts in a new medium - Stereophonic sound. The Crystal Palace television sound transmitter broadcast the right hand channel (and later this was extended throughout the UK) on 41.5 MHz for the television loudspeaker (a caption would be shown on the TV screen "stereophonic test transmission"). The accompanying left hand channel was broadcast nationwide through the VHF channels. This was a build up to true stereo sound broadcasts. As this was a free service, many people joined enthusiastically after following preview instructions in the Radio Times. The tests were transmitted on Saturday mornings on alternate weeks, and ran from 10am. to around 12noon. Many of these programmes relied on music broadcast from tape; however a few used sound effects of aircraft, trains and marching bands... Most of the material derived from an EMI demonstration LP, though later, some childrens' programmes such as 'Norman and Henry Bones - boy detectives' were broadcast in the new format. Eventually these early efforts would flower into what was known as NICAM stereo. It was a grand leap of over thirty years before the BBC officially began broadcasts in the new digital stereo system called 'NICAM'. This took place in August 1991. In fact, the NICAM broadcasts of stereo sound had begun in the mid 1980s (in the London area from Crystal Palace) with a large and wide ranging series of tests. A typical week's BBC programmes in the late 1980s had a high proportion of experimental NICAM broadcasts. These were a mixture of film, videotape and outside broadcasts (the latter being technically more difficult as the other sources relied on pre-mixed soundtracks). It was possible to receive these broadcasts by buying a NICAM VHS video recorder and feeding the audio channels to a suitable amplifier. Often the sound mix was crude and in many early broadcasts the speech remained stubbornly mono, with only incidental music in true stereo. NICAM is also a doomed format. Digital television encoded Dolby Surround sound is destined to replace the BBC's brainchild.

And so ends my tour of gimmicks and their history. Some were destined to last and others have been forgotten. Who knows what the future might bring. Whatever it does, the old days of cardboard and cellophane are unlikely to re-appear. Happy viewing!

Below: Quickly following on from the 3-D, experiment came smell-o-vision. Free cards in the TV Times promoted the gimmick.

Below right: Promotional anaglyphic red/blue glasses were issued for the TVS 3-D TV experiments in 1982.



# Vintage Valve Boxes for Free – well almost

by Peter Kyne

This is not the type of article that usually appears in the Bulletin but it may be of practical interest to those who collect and keep a small stock of valves to maintain their own sets.

All of the valve boxes in figure 1 were made by myself. Those on the left, which might be described as the “utility model”, cost about 10 pence each to make. Each one of the boxes on the right costs around the same to produce as the whole pile of boxes on the left. So you pay your money and you take your choice.

When I first joined the BVWS, not surprisingly, valve boxes did not figure largely in my thoughts. I was introduced to the Society by Colin Mansfield a neighbour of my brother-in-law Ian, who keeps free-range chickens and grows vegetables on his family farm in Sussex. Colin took me to meet Ron Simpson, curator at the Bognor Regis Wireless Museum. During my visit to the museum Ron and Colin were excellent and informative hosts. It was most enjoyable and needless to say this trip was the catalyst I needed to seal my membership of the BVWS.

At the time my priority was to collect the parts needed to complete a replica of the “Cosmic III” (a home construction battery set featured in a 1932 issue of Popular Wireless).

Having made the set it seemed a mere formality to order the correct valves from Ken Bailey at KenZen, who promptly met my requirements. As this was my first battery set I then had to focus my attentions on designing and building an eliminator to make the set work. The “Cosmic”, by the way, works quite well on a good aerial. It was used regularly to pick up Radio 4 until replaced by another home-built receiver.

## What has this to do with Valve Boxes?

Well that’s rather the point. Unless you have a special interest in them, valve boxes do tend to get overlooked. However they have a number of worthwhile features. From a commercial point of view they present the valve manufacturer’s name and product in the most visible and attractive way possible and if you are a collector of such things, then this is the aspect which is most important. If you are researching valve manufacturers and sellers or their products, then the boxes contain useful information to aid such research. On a more practical level, valve boxes protect valves during transit and storage.

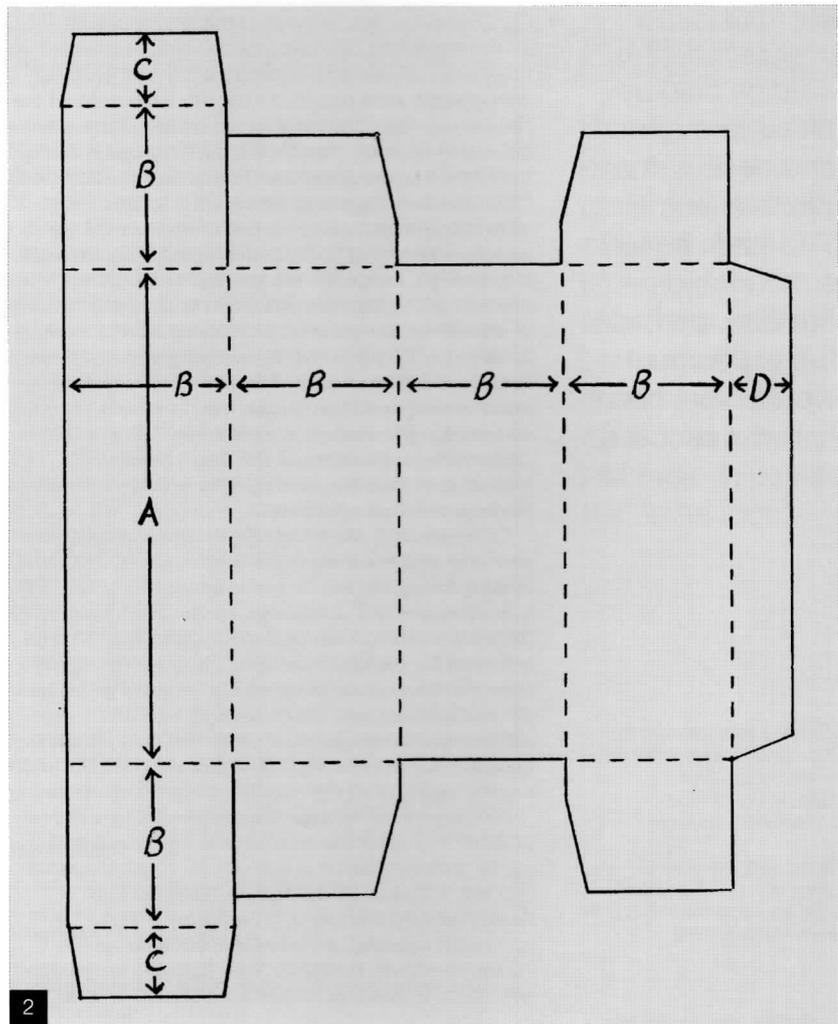
In relation to this last point it’s rather ironic that the valves themselves seem to have survived the ravages of the last 70 years somewhat better than the things designed to protect them, with the result that original vintage valve boxes in good condition are now rare enough to be collectable items in their own right.

For someone like myself the consequence is that the valves I’m interested in (late 20s & early 30s battery valves) almost always turn up without boxes. However, this may be due, in part at least, to my necessarily frugal approach to this hobby. Most of the valves I have were found rattling around in the bottom of trays or boxes at Harpenden and such like.

This lack of valve boxes gives rise to practical problems which were brought home to me a few years ago when I realised that I had an old archive box filled with balls of rolled up newspaper. Each one contained a valve, safe and protected but anonymous. Whenever



1



2

I wanted a valve I had to unwrap each one in turn until I found what I wanted.

Of course I could have labelled them but that’s not the answer. This is not the way to treat these delicate wonders of vintage technology. I needed to get organised and the only way to do this was with proper valve boxes.

## So get some Valve Boxes

That sounds simple enough. The trouble is that most valve boxes are rather on the small side for my purposes. You can usually cram the valve in but there’s no room for packing or data.

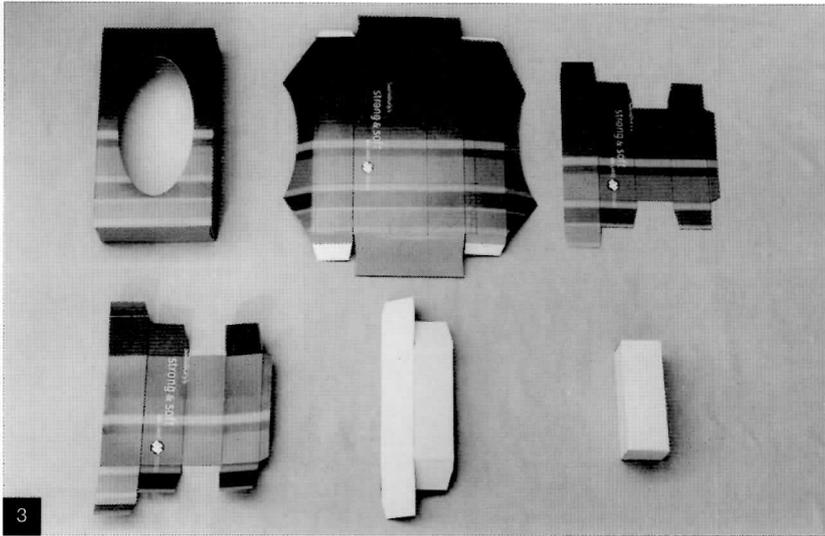


Figure 1 – On the left; boxes for vintage valves, on the right; “vintage boxes” for valves. Available in unlimited supply, provided you are prepared to make them yourself.

Figure 2 – This is the design for the basic valve box, solid lines are cuts, dotted lines are folds. A = length of box. B = width and depth of box.

Figure 3 – The stages of making the “utility model” valve box: a; an empty scrap box, b; opened up and marked out, c; cut out, d; folded, e; glued, f; completed valve box trimmed and made up.

Figure 4 – A template will speed up the marking out. This one is made from hardboard.

If you want a job doing, the best result usually comes by doing it yourself. The straightforward way to get a consistent supply of boxes of the right size is to make them.

### Size matters

Ideally for storage and organisation they should all be the same size. I could have just measured an existing vintage valve box but there’s no reason to suppose it would be the right size for my needs. Too small, and some valves won’t fit, too big and it wastes storage space. By measuring a selection of valves I established their maximum dimensions. Allowing for packing etc the optimum size of box is about 6 inches long and between 2 & 2 1/4 inches square.

### Materials

Plain card of course is what is needed, to look tidy and so you can add the appropriate details to the outside i.e. brand name, type number, state of emission etc. Examining a modern valve box shows how they are made and it’s simple to work out the size of card required. So the next thing is to identify an inexpensive supply of suitable card. Printers or stationers are ready sources but these can hardly be described as inexpensive.

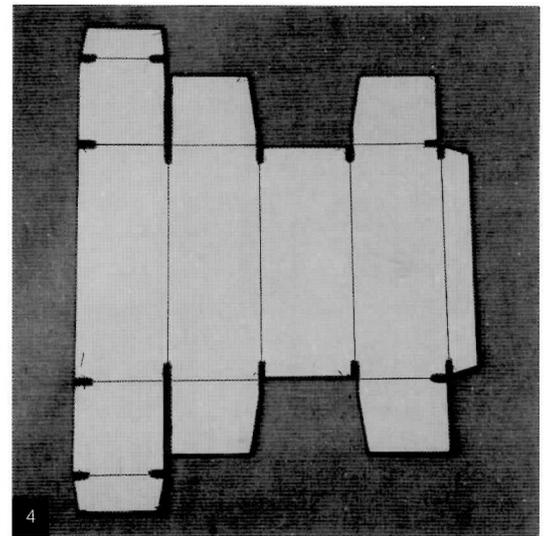
With a little thought one quickly realises that a lot of packaging materials come into the average household every week. They then promptly get thrown away a short time later. The way forward clearly lies in recycling. The sort of card that’s wanted arrives in the home in various guises e.g. cereal packets, tissue boxes, etc. It’s simply a matter of being vigilant and grabbing the empty packets before the tidier members of the family crunch them up for disposal.

### Problems and Solutions

Of course these packets aren’t plain card, anything but. The manufacturers splash them with logos, brand names and headache inducing colours. However most of them are plain on the inside - so use them inside out.

The second challenge is that normally they do not have an area of uncreased card large enough to make a good-sized valve box. The answer is to use one or more of the existing folds as folds in the finished valve box. Using this approach enables a large tissue box, for example, to yield a valve box just over 2 inches square and up to 6 1/2 inches long.

The simplest type of valve box has a single long joint running down one of the back corners. Manufacturers make this joint with hot-melt glue and I used the same method assisted by a cheap domestic glue gun. In



fact the glue-sticks and elastic bands are the only two things which I have had to buy.

For packing I use ordinary bubble-wrap (small bubbles) cut into pieces about 14 inches by 6 inches and secured around the valve with a small elastic band. I’ve never had to buy any bubble-wrap, it just seems to turn up.

### Making boxes

As some readers may wish to try this out for themselves I will describe the process as a list of instructions. The basic design of a simple valve box is shown in figure 2, the solid lines are cuts and the dashed lines indicate the folds. Dimension A gives the length of the box and B is the width and depth (I used 6 inches and 2 1/4 inches respectively). The length of the tongue (C) should be about 7/8 inch and 3/4 inch is ok for the width of the glue tab (D).

Figure 3 shows the key stages of making a valve box, in this case using a king-size tissue box to illustrate the points.

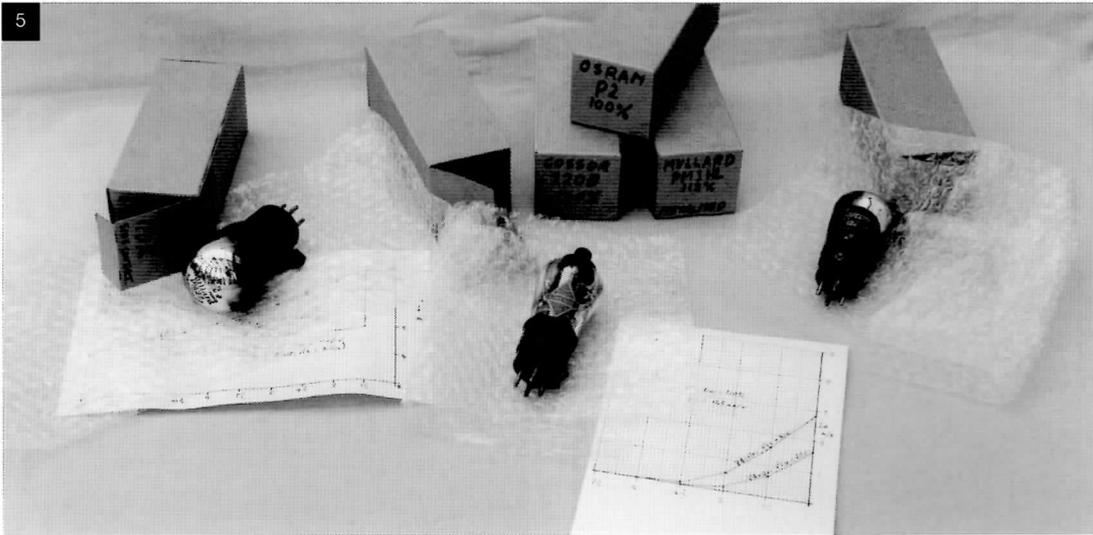
a – Start with a box/packet made of a suitable card, plain on the inside.

b – Open out and place with the printed side up. With a rule and black ballpoint pen mark out a grid of solid lines indicating the cut and fold lines.

c – Cut out, being careful not to remove pieces of card that are wanted. If you scribble on the sections that are not needed it helps to avoid mistakes. Use a sharp knife, straight steel edge and suitable flat surface for long and internal cuts. The rest of the cuts and final trimming are best done with a good pair of scissors.

d – Make all the folds by placing the rule close to each fold line and pulling the card upwards, then fold over and flatten to make the crease sharp.

e – When it comes to gluing it’s best to have a small batch of boxes ready. Use a hobby type hot-melt glue gun and ensure it’s at operating temperature before starting. Fold the left and right box sides inwards so that the side without the glue tab can overlap the glue tab attached to the remaining side. Run a line of hot glue along the glue tab and press the other box side down onto it. If you hold it down with the flat face of a steel rule this will absorb the heat of the cooling glue and ensure the joint is flat. Allow about 10 seconds for it to solidify.



f – Push the box into shape and trim the flaps and tongues for a good fit. If you overdo it the fit will be too loose and the flaps won't stay shut.

### Speeding things up

If you intend to produce these things on an ongoing basis then you can save time by making a marking out template, such as that shown in figure 4. This one was made from a piece of hardboard salvaged from the back of a redundant item of self-assembly furniture. Using the template gives solid lines for the cuts and "pips" for the fold lines, which need to be marked in before folding. A ballpoint pen is used as it dents the card and makes the folding easier.

In practice it's quicker to make boxes in batches of say six or eight, any more than this and it gets rather boring. It's the sort of thing you can progress when you have the odd half hour to spare or if you want to do something which is not too mentally demanding.

With practice the process does get quicker; however this activity is still labour intensive and could never form the basis for a profitable cottage industry. None the less it is a useful way to provide yourself with suitable valve boxes and when required, tailor made boxes for special valves.

### Things are more organised now

Now when I get a "new" vintage valve it goes into a box marked "needs testing". When there's time I test it and record information such as test voltages, mutual conductance and anode resistance. I usually plot out the  $I_a/V_g$  curve as well and all of this is stored with the valve in a new box. Appropriate details are recorded on the end of the box for identification purposes, see figure 5.

### Replica vintage valve boxes

These simple techniques can be adapted to creating replicas of original vintage boxes, examples of which can be seen in figure 1 at the beginning of this article. It is of course more expensive than the 10p per box for the utility model but if you only have one original box and want to store some valves in something resembling the real thing, then this is one way of doing it.

The process is as follows:

1 – Get an intact original valve box with its printing still in reasonably good condition.

2 – Carefully open the long glued joint. Often this is easy and with some boxes the joint may have already separated.

3 – Get access to a colour photocopier that will copy A3 size sheets, my local stationers is very helpful with my slightly potty requests. Use the opened out original box as a master and copy as many as you need. I can get them for about £1 each if I have 5 or more copies.

4 – Now here comes the tricky bit. Photocopiers will not normally handle card, that is thick enough to make a strong box. So the copies are produced on normal copying paper which is then glued onto suitable card. Having paid £1 per copy I was disinclined to use recycled material and invested in some new A3 sheets of card. Anyone who has tried to glue a large sheet of paper onto thin card will know that this can be problematic. The main pitfalls are wrinkling, glue going off too quickly, bubbles and getting glue onto the face-side of the paper.

Your stationer will no doubt be willing to sell you some spray Photomount at £15 per can. Personally I resisted this offer and proceeded as follows.

5 – Mix up some PVA glue (white wood glue) with about an equal amount of plain tap water. The consistency is critical and it's best to experiment with plain paper first. Perversely if it's too thin it dries too fast and if it's too thick you can't spread it thinly enough.

6 – Use a 1 inch paintbrush to spread the thinned glue onto the card (if you spread it on the paper it will wrinkle and that will be the end of that). This needs to be done quickly as it loses its tack rapidly.

7 – Lay the paper on and ease the air out from the middle to avoid bubbles. Place a sheet of plain paper on top to do this as the printed surface will not stand a lot of rubbing whilst it is damp.

8 – When you are satisfied that all the air is out from under the printed areas (it doesn't matter if there are bubbles under the bits you are going to cut off) place a clean sheet of paper on the top and sandwich between several sheets of newspaper.

9 – Place on a smooth flat surface with a flat board on top and hold down with weights. You can stack up several of these sandwiches under the same weighted board.

10 – Wait 24 hours.

11 – Remove from the damp newspaper and lay out somewhere to dry for a few hours.



Figure 5 – The completed boxes are large enough to accommodate packing plus any technical information and curves. Key information such as manufacturer, type no. and state of emission can be added to the box end flap.

Figure 6 – The original box on the left was used as the photocopy master to produce those on the right.

Figure 7 – These poor wrecks shown on the left were copied to create the complete replicas shown centre and right.

12 – Now cut out and use similar techniques as for making plain valve boxes. The only difference is that as you are using the printed surface as the guide to folding then folds will have to be made downwards. This is most easily done by placing a sheet of material with a hard straight edge so that it just overhangs the bench and folding down against this.

Figure 6 shows the results of this process with a Mullard valve box.

#### Restoration by reproduction

Having got to this stage, one can now start to get a bit more ambitious.

The card which vintage valve boxes are made from becomes brittle with age and depending on storage conditions can be positively fragile. If badly treated these often very attractive items can quickly start to disintegrate. It is common for valve boxes from the 1920s to be quite badly damaged or even incomplete. As can be seen, this was the case with the two boxes shown on the left of figure 7. Those on the right of the picture were recreated from these originals by the reprographic equivalent of cloning.

In this situation the first step is to create a complete master from which to photocopy. Take the damaged valve box and carefully open out as in step 2 above.

Place all the pieces on the photocopier glass platen and produce at least two full size, good quality copies with the best colour match that you can achieve.

Use one of the copies as the basis for a new master, then cut and stick pieces of the other copy/copies to it to recreate the missing parts.

If there are tears, blemishes or missing print you will have to bring your artistic abilities to bear to remedy this as best you can. Coloured felt tip pens are helpful and things that look too bright can be toned down by careful shading with a soft pencil.

Now go to step 3 using this new master in place of the original valve box and complete the sequence.

Figure 7 shows what I was able to achieve using this approach; all of the boxes on the right were “cloned” from the two wrecks on the left.

#### Some Points

In the case of the Mullard PM1LF box all of the internal card parts were recreated so that the box can be used as originally intended.

The  $\frac{3}{4}$  inch holes were cut using a punch made from a short length of 19 mm wardrobe hanging rail. To get a clean cut for these holes the tube was sharpened on the inside edge using a  $\frac{3}{8}$  inch round file. The card is laid on the end grain of a large block of wood and the punch struck with a medium weight hammer.

Larger holes were carefully cut out using a sharp pair of nail scissors with curved blades.

The top of the Neutron valve box was completely missing and as I did not know what it should look like I had to use a certain amount of artistic licence in its recreation. I probably got it wrong but it looks ok; no doubt somebody will let me know.

The replica valve boxes are of course too expensive, at over £1.00 each, for general use but could be used sparingly. Also they make quite attractive “ornaments” when dotted about in the workshop or den.

#### So what happened to Ron and Colin?

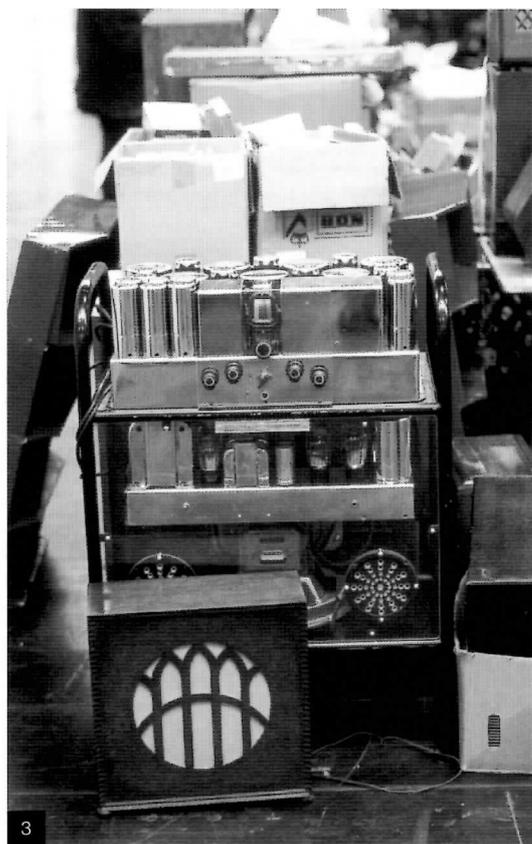
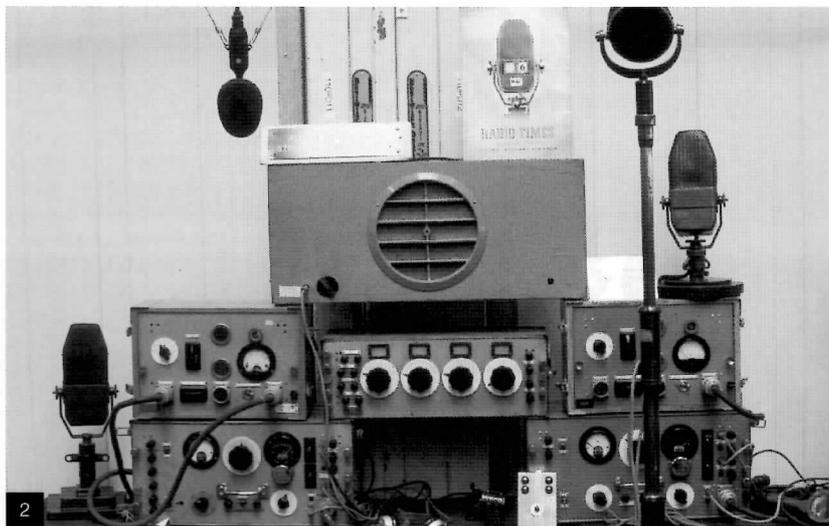
Well Colin still pursues his various vintage interests which include cars and wireless. We usually meet up for a chin wag when I and my better half are visiting the in-laws. Colin is currently doing a regular stint at the Amberley Vintage Wireless, Communication and Television Museum, which is on the site of the Chalk Pits Museum.

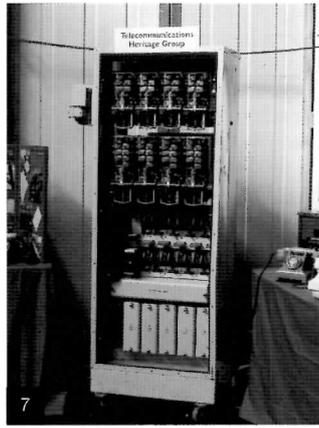
Ron continues his role as curator of the Bognor Regis Wireless Museum and we usually get together at the Southborough Swapmeet. The museum is based at the Bognor Regis Local History Society; it is not large but is well worth a visit if you are in the locality.

# Images from Spring NVCF

Photography by Carl Glover

- 1 & 2 A marvellous display of vintage BBC equipment
- 3: An old Scott awaiting a new owner
- 4: The Radio Amateur Old Timers Association stall
- 5: Ivo Lemmens' mainly European items for sale.
- 6, 7 & 9: A fine display by the Telecommunications Heritage Group.
- 8: Gramophones growing out of the junk.
- 10: Rupert Loftus-Brigham with his wares.
- 11: Bush televisions aplenty!
- 12: Ian Sanders, author of 'Ticking the Crystal' at rest.
- 13 & 14: Simon Wade's wireleses from around the world.





# Letters

## Dear Editor,

This is not a personal swipe at anyone but I do feel the article 'Lash-up TV saved wartime Leningrad' should have included either an authenticated source for these amazing statements or else some words of qualification.

As it stands, it is typical of Soviet publicity stunts and indeed one of their slicker pieces of propaganda but accurate it is not. Included among other totally factual articles, many readers might not realise it was a flight of fancy.

During two decades of fairly assiduous research I have never come across anything to support this tale-but I have seen other equally ludicrous claims. For instance, if you believed all you saw in print this following piece from 'Practical Wireless' (19th September 1936) would sound pretty impressive but it's just wishful thinking.

"A novel method of utilising television to control the entry of ships into canals has been reported from Russia, where the canal between Moscow and Volga is under construction. The locks will be controlled from a central point, and the official on duty will be able to observe the entry of the ships into the lock by looking at a television screen".

To dissect each minor idiocy of this confabulation would bore most readers stiff so I'll not bother to contest the feasibility of the claims but confine my comment to two issues of fact.

The piece states that "electronic television had been developing fast in the USSR before the war." This is true, but using imported technology in the main. The Leningrad television centre imported film scanners and receivers from Scophony (Great Britain) in August 1938, whilst the Moscow studio used American RCA equipment. In any case, all printed accounts state that plans for developing television transmission ceased at the outbreak of the 'Great Patriotic War'.

The incident of picking up film transmissions from an experimental transmitter in wartime London is totally fatuous. Either that or else these transmissions were so utterly secret that no television historian from Prof. Burns downwards has ever been privy to their existence!

In short, I'm not surprised no source reference was published for this article. Finding facts to support it would be very difficult, I feel.

Yours sincerely,  
Andrew Emmerson.

## Dear Editor,

That rather doubtful 'history' by Eric Westman 'Lash-Up TV Saved Wartime Leningrad' BVWS Vol 27 No 2) lashed and crashed further when he asserted that wartime London had an experimental TV transmitter broadcasting newsreels to London hospitals. Rubbish, is my gentle response to that load of cobblers! To start with, no TV transmitter would have been

operating in Britain. Alexandra Palace closed so that it couldn't be used as a beam. I thought we all knew that. So they opened another transmitter just to show Movietone? I think not. Easier to wheel in a 35mm projector and put a sheet up. What is more likely is that the Russians picked up (if indeed they did) the German TV transmissions from either Berlin or Paris.

Yours sincerely  
Dicky Howett

## Dear Editor,

re SG Brown Ltd.

In response to Martin Reed's request for information on the firm of SG Brown, what remains of the business now belongs to Thales Acoustics, who are based in Harrow. Nowadays they supply telephones, headphones and handsets to military and professional users, with many products incorporating active noise reduction techniques for additional hearing protection in noisy environments.

SG Brown were acquired in 1972 by Racal who at the time specialised in radio communications and were presumably interested in SG Brown's range of audio ancillaries. Racal also owned Amplivox who had a complementary range of audio products and in 1978 they merged SG Brown with Amplivox to form Racal Acoustics. The two businesses moved from their old premises at Watford and Wembley to a new site at Harrow in 1990.

In 2000, Racal merged with the French defence contractor Thomson-CSF and shortly afterwards the new group re-branded itself as Thales. The Thales Acoustics website provides an insight into the company's present activities, plus a little more on the history.

<http://www.thales-acoustics.com/>

I have worked at Thales Acoustics for the past year and have to report that the only real evidence of its past is a beautiful horn loudspeaker bearing the name SG Brown which resides in a corner of the boardroom and makes a good conversation piece with visitors.

Regards  
Len Smyth

## Dear Editor,

Can any reader provide me with any information about this crystal set I recently bought at an antique fair. I would like to know the year of manufacture and whether many were made, also was it ever advertised.

It was made by Electradix in a four inch electric meter case. The front, glass, scale and movement were removed and a 22 mm diameter coil was fitted inside, along with a small variable capacitor. The detector crystal is mounted in the end of the wand and is held under pressure by a small spring. The set measures 110 mm wide by 120 mm high. If you can help, my evening telephone number is 01964 622734.

Regards  
John Clappison



## Dear Editor,

In with my modest collection of Vintage Wireless I have a certain wireless of the early days that I cannot recall having seen mentioned anywhere. It is a simple two valve set with the name ERC and P.O. Reg'd No.2029 engraved on the front panel, together with a BBC 'Type Approved By Postmaster General' round transfer. Aerial and Anode tuning coupled with three external plug in coils, one fixed and two variable. Nothing special about the circuit with the usual variable tuning condensers, variable valve filament resistances and so on. But each tuning scale, about three and a half inches in diameter, has what appears to be a Proved Patent Station Indicator with the name Ensign Radio Co., Duke St. W.C.2. Each scale has two circular scale markings from 0 to 180 for short and long waves respectively, while an outer ring has adjustable tags for fixing tuned station positions.

The set is in remarkable condition with a nice polished mahogany cabinet, measuring approximately 11" x 9" x 6". The three external two pin plug-in coils are of basket weave design and named Diamond Sunflower, the respective sizes appear to be 200, 50 and 75 and all three plug in a standard type of coil holder with extended knobs for adjustment.

They say pictures speak louder than words so I have endeavoured to attach some simple quality ones which hopefully will give a clearer picture compared with my description above. By the way, I cannot identify the valves at present in the set but on the back of an early picture the types HL2 and LP2 are pencilled.

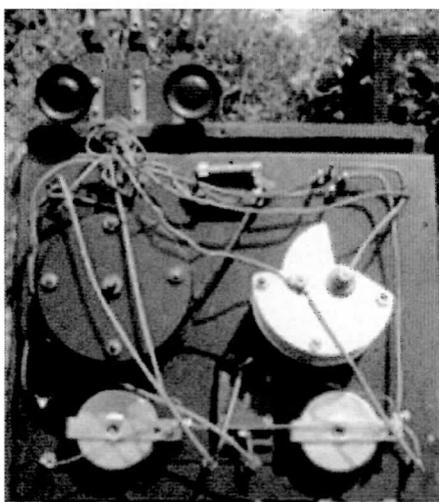
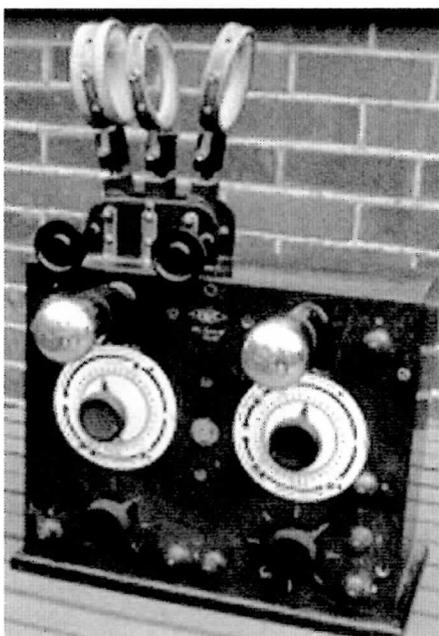
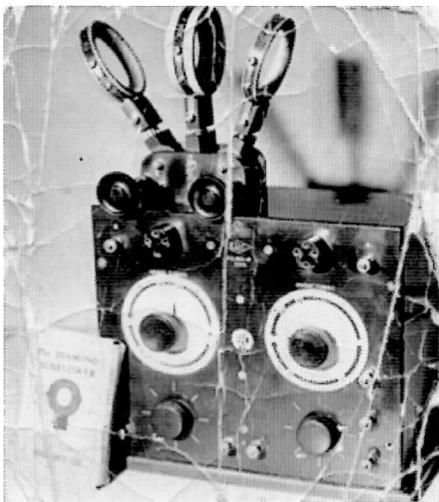
With many years enjoying membership of the BVWS and in possession of every Bulletin issued since day one I haven't spotted the ERC set described here - but then it is sometimes only too easy to overlook these things.

With best wishes,  
Stanley G Casperd,  
C,Eng. M.I.E.E., G3XON

**Dear Editor,**

Whilst writing, I note in the Spring 2002 edition of the Bulletin a welcome increase in the copy devoted to television and in particular the piece by Malcolm Baird about the start of black and white television from Kirk o' Shotts in 1952.

It was in 1963 that I gave what I believe to have been the first ever public demonstration of 405 line colour television in Scotland. This



early CPS Emitrons, but how they could knock the picture from the RCA Image Orthicon into a cocked hat! Now for the "Dear Editor" - please note my mixed use of 'colour' and 'color' which is correct.

and...

In the excellent article "An early colour receiver for UK transmissions" by Graham Dawson (BVWS Bulletin, vol 27 no1), he attributes the 'invention' of PAL to the Germans. Not so.

It was back in late 1952 and early 1953 that the NTSC pioneers had become concerned about the deleterious effects of phase distortion when the chrominance channel was asymmetric in bandwidth. In response, B.D. Loughlin at the Hazeltine Corporation proposed a system of periodic phase reversals of the colour components first known as 'Oscillating Color Sequence' and later as 'Color Phase Alternation'. The field trials focused on a frame rate switching. However, early trials were in fact done at the Hazeltine Laboratories (where I later worked) at line rate. This was discarded in favour of frame rate because of an unfortunate 'line crawl' which could appear when colour switching was done at line rate if the phase of the injected subcarrier at the receiver was not correct - subjectively more annoying than the colour error if CPA was not present.

It was some 10 years later that Dr. W. Bruch of Telefunken GmbH picked up the idea again and introduced a line period delay line applied directly to the Loughlin CPA signal specification. Hence the birth of 'Phase Alternation Line'. He did this work in response to the problems experienced in mountainous Europe where multipath reception gave intolerable distortions.

Internal notes at Hazeltine, that regrettably may never have been published, did show that such a delay line was indeed forecast, but the technology of the time did not allow its easy development. However their US Patent 2943142 & (UK Patent) 702182 make claims for a line rate switching.

This was explained in my lecture 'A Short Account of the Birth of the NTSC Color Television System' to the Royal Television Society, London, in January 1964.

I very much want to keep the record straight on this and to give proper credit to its inventor B.D. Loughlin of Hazeltine. 'Barney' was also responsible for the mathematical analysis of the original RCA dot sequential colour signal specification and which resulted in a reformulation to meet receiver design needs - giving rise to the Constant Luminance principle.

Yours sincerely,  
Ian Macwhirter  
cc: Mrs B.D. Loughlin, USA

**Dear Editor,**

Grundig TK 17L Open-reel tape recorder

My articles 'The Amateur Repairer' and 'The Reel Thing' illustrate both my lack of technical knowledge and my interest in tape recorders, so here is a cry for help!

My TK 17L developed a fault whereby the erase function ceased to work properly and recording was heavily distorted. This indicated to me an oscillator circuit fault, so I

changed the ECC 83 valve. Normal operation resumed - the Amateur Repairer strikes again! Not so. After a couple of hours the fault returned. I decided to risk another valve - with the same result - temporary recovery followed by return of the fault.

I cannot perceive how a replacement valve can produce a temporary cure, rather than fail straight away. The valve heaters seem to remain intact with a resistance reading of 6-7 ohms.

I realise that any replies would be of little interest on the letters page so request that letters be sent to me directly for which I would be most grateful.

Yours sincerely  
Tony Voysey

7 Orchard Leaze  
Dursley  
Glos  
GL11 6HY

**Dear Editor**

As yourself and a number of other members are aware I have raised this issue informally on a number of occasions.

Over the last couple of years I have become increasingly concerned about something which, I believe, is damaging to the interests of fellow members and is affecting their access to material that is important for our education in key aspects of vintage wireless history.

I have asked for the views of a number of committee members and the consensus is that this is an ethical issue, which should be opened up in a democratic forum to the views of BVWS members. Therefore I am laying out my concerns to fellow members in this open letter.

The objectives of our Society are based on three principles:

- The conservation, preservation and restoration of vintage wireless apparatus and those things related to it
- The education of members and others through meetings, discussion and various educational initiatives and the sharing of knowledge, experience and literature both vintage and modern
- The fellowship of members who give mutual support, advice, guidance and practical help to each other.

These things occur of course through informal friendships and networks as well as at our meetings.

Apart from AGM meetings most of the activity within our members meetings centres around the exchange of vintage materials and equipment. This is vital to enable vintage items and artefacts to be circulated amongst members, through this process they are passed on to others for continued safekeeping.

However, most importantly it enables the experience, knowledge and skills of a broad range of members to be brought to bear in activities such as research, restoration and the sharing of knowledge and understanding about the items which come into their possession.

Various people and activities facilitate these transactions including:

- Exchanges between ordinary members
- Members who have stalls

- Dealers, who play a valued role in this ongoing process
- The Society's own auctions.

My concern relates to the last of these activities and particularly to one type of auction lot, that of vintage periodicals and magazines. This type of vintage literature performs an important role both directly and indirectly in the educational process. It is special for a number of reasons:

- It is of the era and is therefore important as original source material
- It shows what the current practices were
- It directly illustrates both the technical perceptions and misperceptions of the time
- Unlike technical books these publications allow us to deduce much more about the level of knowledge and understanding of wireless communication among the "non-professional" population
- Being written in a popular style for the lay person they are unique documents showing us the interplay between everyday social and economic factors and the rapidly developing broadcast medium.

All of these points refer of course to genuine vintage literature and not post - World War II magazines, which have their own value but fall into a different category and are not part of this issue.

Because of the importance of these vintage publications as educational and source material they need to be available widely enough within our membership for those who will make use of them to do so.

So what is the problem?

The problem is that increasingly over the last two years a limited number of individuals have used financial muscle to secure these lots, with the result that ordinary members are finding it almost impossible to buy this material at the Society's auctions.

It is apparent that this important educational material, rather than being spread among the Society's members is becoming pooled in the hands of a limited number.

This open letter is not a criticism of specific individuals but of a particular behaviour, which has been described by at least one senior member of the Society as "financial bullying".

It is important to bear in mind that our auctions do not have as their prime and only objective the maximisation of financial profit. Their prime purpose is to disseminate vintage artefacts amongst those who will respect, restore and understand them.

I do not believe that the behaviour to which we refer is intended to be to the detriment of other members but rather it is a loss of self-control in the heat of the moment. However the effect is the same.

From time to time the BVWS updates its Constitution and Bylaws to address issues that concern members and others. I believe that a few simple amendments would help bidders to moderate any excessive enthusiasm and ensure that members feel arrangements are fair and reasonable.

My suggestions are:

- No large lots of "vintage literature" i.e. pre-1940 magazines or periodicals (however sets should not be split)
- Where there is "vintage literature" in an auction there should be a minimum number of lots, say ten (If necessary the auctioneer will have large lots sensibly divided at their

discretion)

- Only members can bid for "vintage literature"
- No bidder may secure more than 20% of the "vintage literature" in any one auction irrespective of their status within the Society (the exception to this being if they are bidding on behalf of the BVWS archive library)
- If the auctioneer believes or suspects there is a bidding cartel or partnership they will suspend bidding on lots or withhold lots at their discretion
- If there are unsold lots of "vintage literature" i.e. no other bidders or the reserve price cannot be reached, the auctioneer may allow bidders to exceed their 20% limit to secure a sale
- The auctioneer does not have to explain their actions, except to the BVWS Committee if requested and the Committee will treat this information as strictly confidential.

Such additions to auction rules will I believe:

- Allow members to feel there is a level playing field
- Help the Society to more effectively achieve its aims
- Distribute "vintage literature" more widely within the membership
- Enable sellers to achieve a higher total selling price for these lots.

I apologise for the length of this letter but I feel it would have been unfair of me to make these suggestions without outlining the background factors. If members have a view on this issue please don't tell me directly. It's far more important that you should tell the wider membership or if you prefer give your views directly to the Committee.

Regards  
Peter Kyne

**Dear Editor,**  
**COST REDUCED KB TOASTER?**

I was recently given a KB FB10FM toaster to repair with a serial number of 01265, so presumably an early unit. The first surprise was that it did not tally with the trader sheet and only had 4 valves, not 5; 12AT7, 6BJ5, EABC80, EL84, all old and maybe original. The chassis was punched for 5 valves and looked as though it had been like this since factory production. Needless to say the performance was poor. Can anyone shed light on this set, was it perhaps an attempt at cost reduction or simply a one off trial.

Ed Dinning.  
01207 270122  
eddinning@cwcom.net

**Dear Editor,**  
**Good day,**

We have in our possession an amazing work of art. This object of art, is a vase, inside it we found a few very old radio pieces, with the name Hammond / London engraved on them.

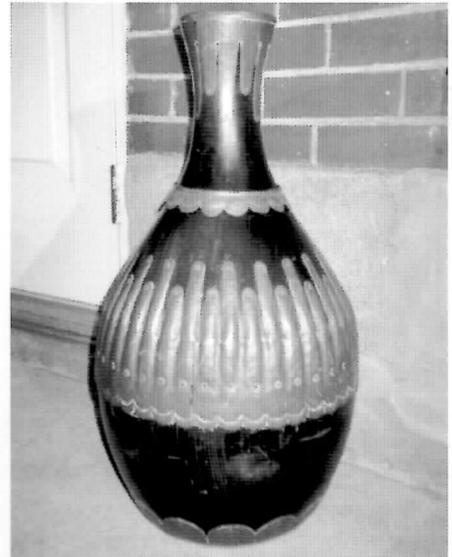
It also has a antique 'C' battery mentioning "'Patented 1917' from the Company 'Burgess', this company still exists in 2002. This leads us to believe that this radio was created around 1920-1940.

It is a wooden vase and has 4 rows of copper ornaments on it. The most fascinating thing about this vase, is the fact

that it was created with the intention of bringing no attention to himself and it was also constructed to be of diverse uses (see pictures attached).

We are trying to find more information about this vase and the history around it.

If you are interested in this object or if you care to share your knowledge with us please feel free to contact me at ninab@echotape.com



# Domino 625 to 405 standards converter

A review by Jeffrey Borinsky MIEE C. Eng.

Several years ago 405 enthusiasts had a choice between two high quality 625 to 405 line converters. I reviewed the Dinosaur and Pineapple units in 405 Alive when they first appeared. Unfortunately neither have been available for some time. There have been rumours of several new designs but nothing has appeared until now.

Domino is a compact unit which takes 625 video and audio inputs. The outputs are 405 line video and channel 1 VHF so no external modulator is needed. It is supplied fully built and tested. Power is supplied from an external adaptor, included with the unit.

## A note about prices

Prospective purchasers may think that the price of £400 is rather high. The only reason why your TV sets and videos are cheap is because they are made by the million. When you are doing total production runs of 10 or even 100 the one-off costs of PCB manufacture loom large. And components are much more expensive in dozens than in thousands, let alone millions. Add in the hand assembly and test and I can assure you that the Domino converter is a bargain. Add in all the time spent in development it is clear that there is very little profit to be made and that it was largely a labour of love. The designer would probably do better financially by keeping his money in the bank.

## First thoughts

Operation could not possibly be simpler. There are no external controls apart from a preset control for audio level. The construction quality is good. Inside the metal case are two PCBs, one for the main converter and a further one for the modulator. There are no user serviceable parts inside the case and I would not recommend users to open the case. Everything runs cool so reliability should be good. An external "wall wart" mains power unit, included with Domino, guarantees electrical safety and is an appropriate choice.

## Interpolation

Domino interpolates 2 lines from the same field. This gives the same excellent interpolation quality as the Dinosaur converter which is difficult to distinguish from the BBC CO6/509 which uses four lines.

## Sound

On the review sample there was no external adjustment for sound level. I understand that all production units will have an externally accessible preset control which allows the user to cope with the wide variety of outputs from VCRs etc.

## Radio interference

The converter contains high speed digital circuitry which is a potent source of RF interference. I cannot be sure that it complies fully with the European standards but judging by the all-metal case it is unlikely to cause any significant problems.

## Poor quality inputs

The framestore architecture ensures that the output sync's will always be steady and continuous regardless of the input. In this respect it is similar to the Pineapple converter and better than the Dinosaur. Very occasionally you may see a whole frame dropped or repeated. This is an inherent property of framestore based converters. In many years of working with different framestore based systems I have never actually noticed this happening and it is not a problem. The picture content may be garbage but the 405 syncs will always be good. This is reassuring with some 405 line sets whose timebases react badly to any sync problems.

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 about -5dB. 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 designer of Domino has decided that it is acceptable in consumer equipment for the black level to sit at +1V. This is unlikely to cause any trouble (I have seen worse elsewhere) but is something that could be improved. 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.

## High frequency response

This is the only aspect that caused me any real concern. Here is the engineering background. The 625 line system has a nominal bandwidth of 5.5MHz. Mr Nyquist's famous sampling theory says that in a digital system you must sample at at least twice the highest analogue frequency. Hence 11MHz would be the absolute minimum and modern professional TV equipment uses 13.5MHz. You must prevent all inputs above half sampling frequency from reaching the analogue to digital converter. If you sample a 6MHz signal at 10MHz you will get a very

nasty 1MHz pattern on your pictures reminiscent of 1.57MHz intercarrier/subcarrier beat. This effect is called aliasing and is prevented by a low pass filter at the input. Ideally this has no attenuation up to half sampling frequency and infinite attenuation above it. This is not actually possible and the practical filters used in professional equipment are very complex and expensive.

The Domino samples at 10MHz which made it easier to design but is definitely on the low side. Hence the theoretical maximum bandwidth is 5MHz with 4MHz as a practical maximum. Many inputs will be colour so the band around 4.43MHz must be well filtered to stop dot crawl patterns and aliasing. The unfortunate result of this is that the pictures are a bit soft. On test card C the two finest sets of HF gratings are not resolved. This will only be noticed on a really good receiver but is immediately apparent on the professional monitor that I used during this review.

Note that a 5.5MHz input at 625 will result in a 3.5MHz output at 405. This is due to the same number of cycles being stretched over a longer line.

I must re-iterate that although I am concerned about the HF response it is rare that you will have a vintage TV that can actually resolve these high frequencies anyway and the subjective effect is not disturbing.

## Modulator

The modulator uses crystal control to give 45MHz vision and 41.5MHz sound carriers. On the review sample these were accurate to better than 0.01% which is more than adequate. Sync level was correctly set just a few percent above zero carrier and the sound carrier was approximately 6dB below the vision carrier which is correct. There are no significant harmonics. Black level clamping was excellent with no noticeable shift or bounce as the picture was switched from full black screen to full white screen. There was no noticeable sound on vision or vision on sound. I am not able to measure the distortion in the sound modulator but looking at the design I have no doubt it will be much lower than in any likely receiver. A warning that the output is very powerful, useful for distribution or dealing with a very deaf set, but enough to overload many sets. An 18dB attenuator is supplied and should be used in most cases.

## Conclusions

Despite some minor reservations I can strongly recommend the Domino as an invaluable product for all 405 line enthusiasts.

The Domino is only available directly from its designer:  
Malcolm Everiss  
26 Castleton Road  
Swindon  
SN5 5GD  
01793 886062  
email: malcolmeveriss@claramail.com

Price £400 including delivery. £10 discount if collected from a BVWS meeting. Cheque with order. Please allow 28 days for delivery.

# Minutes

**Minutes of BVWS Committee meeting held on Tuesday 26th March 2002 at the Vintage Wireless Museum, Dulwich, starting at 7.30 pm.**

Present: Mike Barker (chair), Jeffrey Borinsky, Ian Higginbottom, Guy Peskett, Terry Martini, Carl Glover, Steve Sidaway, Robert Chesters (on conference phone).

1. Apologies for absence: Steve Pendlebury,
2. The minutes of the meeting held on Sunday 17th February 2002 at Tonbridge were accepted as a true record.
3. MB tabled a letter from Steve Pendlebury saying, that due to failing health he was forced to resign from the post of Membership Secretary. Since receiving the letter the Chairman had established that Steve would be willing to take on the less onerous task of website developer working with Peter Foden who is the current webmaster. It was agreed that this should happen and that Steve be thanked for his efforts.
4. MB proposed the co-option of Graham Terry to the Committee to assist the Chairman with the continuing processing of renewals with a view to Graham taking over as Membership Secretary. This was agreed.
5. A confidential item was discussed and a majority decision taken.
6. MB reported that in the current renewal exercise the number of forms received did not match the

number of flagged renewals on the Membership database. This was thought to be due to some forms being sent to Bolton and others to members of the Committee, or subscriptions being paid at meetings without accompanying forms. The discrepancies were being investigated.

7 AOB

- (i) IH said that following the AGM a member had offered to take over the task of producing the members' advertisements sheet. IH agreed to see if the offer still stood and if so to invite the member to meet the Committee at the next opportunity.
- (ii) TM reminded the Committee that it was vital that a new Harpenden Organiser was ready to begin by the June swapmeet.
- (iii) Steve Sidaway announced that a promotion had resulted in an unexpected increase in workload and that reluctantly he would have to resign from the Committee. The Chairman thanked him for his work and forthright contributions in discussions.
- (iv) MB announced that Simon Vaughan of the APTS had approached the Society and suggested issuing their archive of Campbell film and photography on a CD in a joint venture. JB said that he had seen the material and thought it was excellent and that BATC might also be interested in any joint venture. It was agreed to pursue this and the question arose of whether the archive might be put onto the CD of the past issues of 405-Alive which was already planned for this year. It was decided to keep them separate. The follow-up work for this item will be co-ordinated by JB. TM remarked that he was having difficulty finding a full set of back numbers of 405-Alive for scanning.

(vi) Following prompting by Alan Carter IH agreed to approach Tony Constable about the possibility of hosting visiting members of the AWA at the garden party and June Harpenden meeting this year. It was suggested that any AWA members who happened to be in England then might be invited to drop in, this being publicised by the AWA website.

(vii) The costs of the credit card facility were discussed and JB agreed to investigate an alternative provision.

(viii) Some suggestions for streamlining the membership renewal software were discussed.

(ix) MB tabled two publications he had been sent by members: two chapters and a synopsis of a history of the Tannoy company by Julian Alderton, and a complete text "From Crystal sets to 405 line television, How it Works and how it is Mended" by Chris Garnett.

(x) TM offered to take on the duties of Events Coordinator following the resignation of SS. TM was thanked for his offer which was accepted. The meeting closed at 11.05 pm. The next meeting will be on 2nd May and will be hosted by JB.

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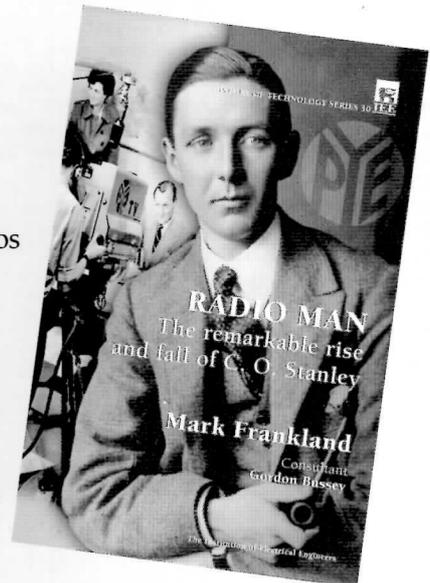
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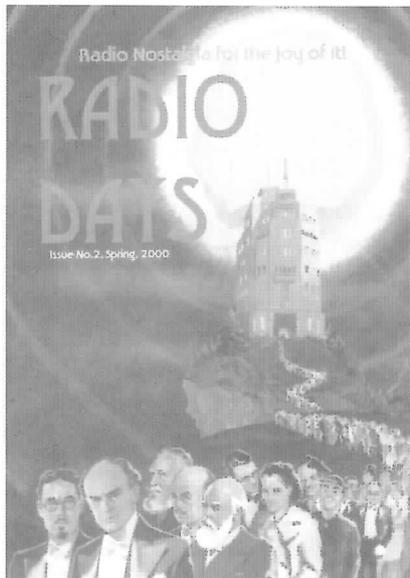
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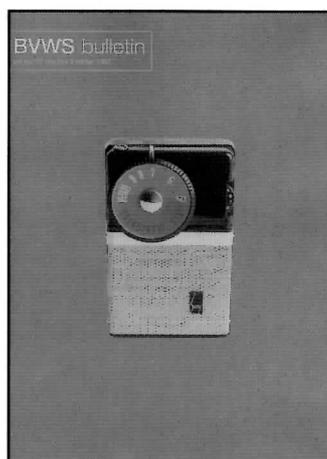
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# News and Meetings

## The keeper of the list

Martyn Bennett still has the role of custodian of the BVWS list of G.P.O. 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.



## Contact address:

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



## SEPTEMBER:

1st Harpenden  
15th NVCF  
22nd Easton in Gordano, Bristol meeting

## OCTOBER:

6th Shifnal (Radiophile)  
13th Workshop at Gerry's  
20th Cowbit (Radiophile)  
27th October BVWS Southborough Regional Swapmeet. Victoria hall.  
Bookings/enquiries 01892 540022

## NOVEMBER:

24th Harpenden

## DECEMBER:

1st Wootton Bassett

## FEBRUARY 2003

16th Audiojumble Angel Centre, Tonbridge. Enquiries 01892 540022

## New Articles

If you have anything interesting to say concerning Wireless, Television, Broadcasting, Collecting etc. please send it to the Editor for future publication in the BVWS Bulletin. Your article can be just a few paragraphs long if you think it conveys its message to your fellow members. Also if you have any photographic material that would look good in the Bulletin, don't hesitate to post it to the Editor. The chances are that I will definitely use it!

Please send to: Carl Glover, 33 Rangers Square, London SE10 8HR.  
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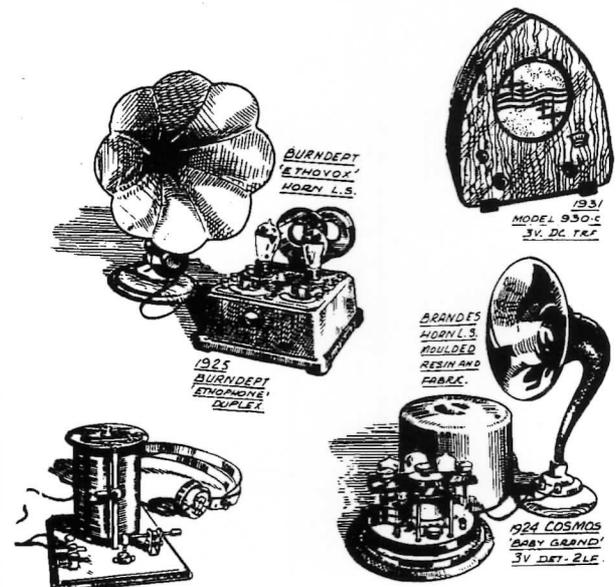
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