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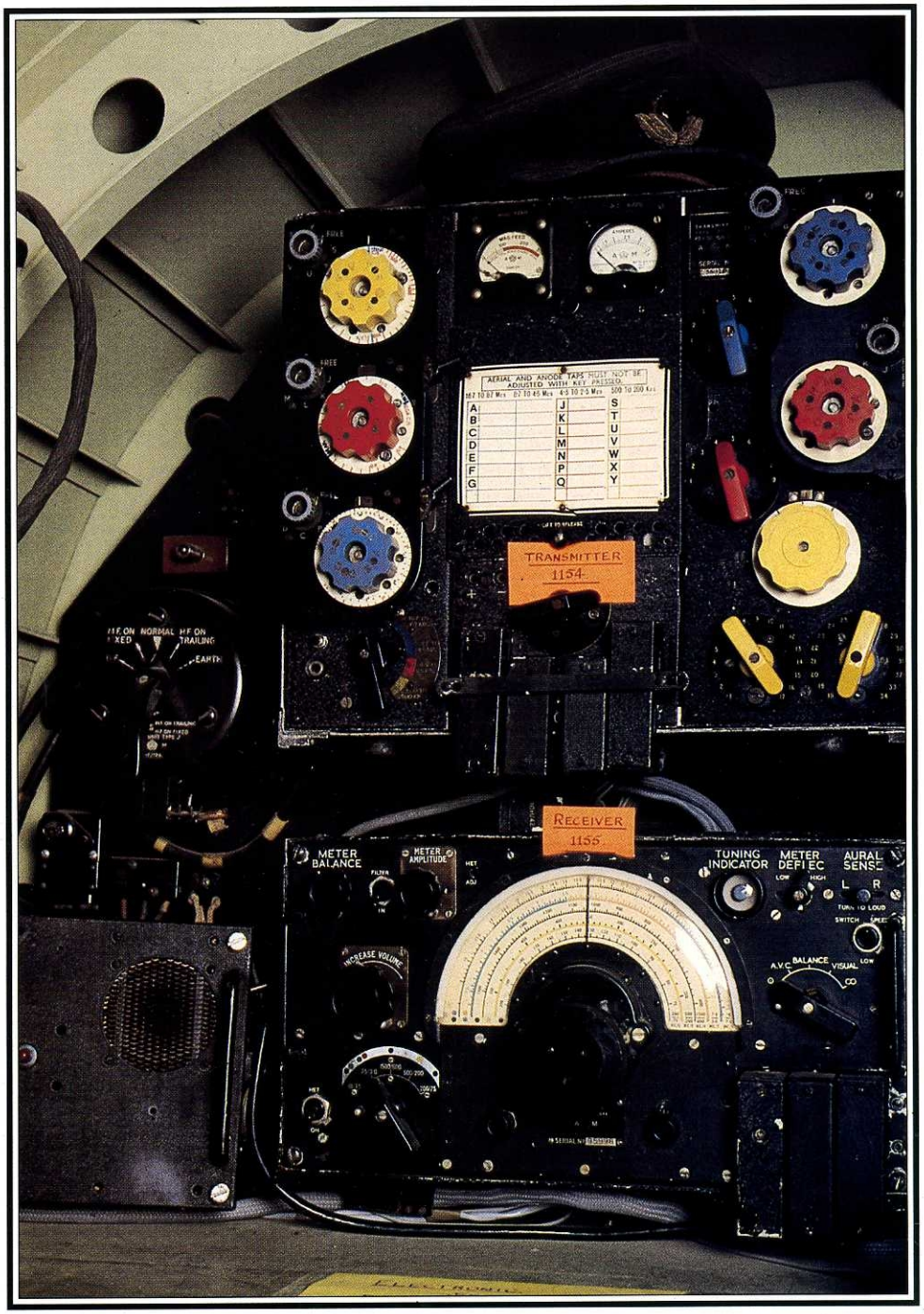
RADIO BYGONES

INCORPORATING THE RADIOPHILE

No. 1 – August/September 1989

RADIO GOES TO WAR



Ten Years at the Chalk Pits Museum

Receiver Profile – The RI 'Airflo'

Alba Radio Circa 1934 - 36

A selection of domestic receivers from the 1930s, including Philips, Pye and HMV

MUSEUM PIECES

This month featuring exhibits from the Chalk Pits Musem, Amberley, West Sussex

World War II 'Clandestine' radio equipment, including the famous B2 suitcase transmitter/receiver

See also Joan Ham's article 'The First Decade' in this issue

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August/September 1989
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Hello!

A VERY WARM WELCOME to all readers of this first issue of *Radio Bygones,* the new magazine for vintage radio enthusiasts.

It is especially appropriate that this magazine should first see the light of day in 1989. Not only is it Museums Year in the UK, but it is also the fiftieth anniversary of the outbreak of World War II, a period of great advances in radio technology.

I am very happy to have persuaded Chas E. Miller to become an Editorial Consultant to *Radio Bygones.* Chas is well known to readers of UK radio and electronics magazines for his articles on vintage topics in general, and valved equipment in particular, but perhaps less well known is the fact that Chas has for several years now published a magazine of his own, formerly entitled *The Radiogram* but more recently renamed *The Radiophile.*

Radio Bygones will incorporate *The Radiophile*, and will retain its regular features on vintage domestic radio and TV, **and** the very special style which Chas has stamped upon his publication. Complementing those features, you will find a broad mix of articles on non-domestic subjects such as amateur radio, air, marine, military and mobile communications, broadcasting, satellites, etc. – covering the era from yesterday backwards, as one of our contributors so neatly put it!

With any new publication, readers may naturally be a little chary about investing their hard-earned money in a year's subscription when its future has yet to be proved. There is, after all, always the risk that the whole project may founder. So, I am sure that you be pleased to know that all subscription cash will be held in a separate bank account, and drawn off as each issue is despatched. That way, should the unthinkable happen, the unfulfilled balance of your subscription can be repaid to you.

I hope that you will enjoy this first issue of *Radio Bygones.* The way the magazine develops in the future will depend very much on what you tell us you would like to see. So please let us know what you think. I look forward to receiving your letters.

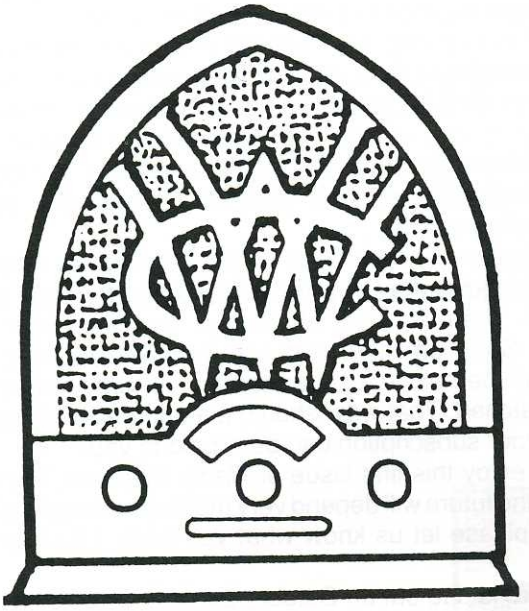
The next issue of *RB* is due out on October 24. Make sure of your copy!

Geoff Arnold

In This Issue

The Vintage Wireless Company Ltd.

Nostalgia & Collecting, 1900-1960s.
Publishers of 'The Antique Wireless Newsheet'
(Sample on Request)



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Radio Goes to War...
and a legend is born.

By Chas E. Miller

'I am speaking to you from the Cabinet Room of No 10, Downing Street...' With these words Prime Minister Chamberlain began his historic broadcast at eleven-fifteen on the morning of 3 September, 1939. His address was recorded and is familiar to people not even thought of at the time, via television and radio documentary programmes. I heard it myself as a very small boy, coming from the new HMV battery set that had recently displaced the home built 3-valver with horn loudspeaker in our house in Ramsgate, Kent.

I must confess that to this day one of the attractions of pre-war radio sets passing through my hands is that it is virtually certain that every one would have brought that message to its owner fifty years ago. Along with everything else that was going to be changed with the outbreak of war, radio in both the domestic and services fields would never be the same again. Indeed, by the time the Prime Minister spoke the BBC had put into effect a literally overnight reorganisation of its National and Regional networks into a single 'Home Service', broadcast on all transmitters sharing but two frequencies, a device to prevent enemy aircraft from using them for radio-navigational purposes. At the same time the Royal Air Force was addressing itself urgently to this question but from the opposite viewpoint of providing its pilots with effective means of direction-finding and of communications between air and ground. The result would be one of the best-known pieces of radio equipment used in British aircraft and subsequently by countless thousands of private short-wave enthusiasts after the war, right up to the present day by some.

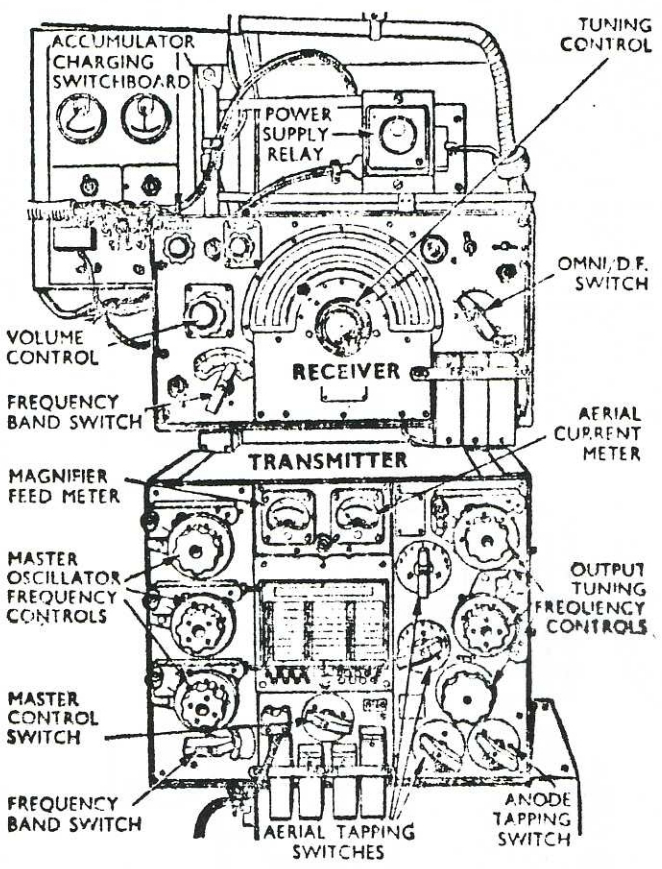


Fig. 1 - Front panel layout of an R1155/T1154 installation

Antiquated

In 1939 some of the radio sets used by the Services were of antiquated design even for that time. For instance, the TR9 transmitter-receiver used elderly valves dating from the late 1920s and required accumulators and HT batteries for its power supplies (yet, almost incredibly, it was still on the Air Publications register as late as 1948). Clearly something much better was required for aircraft that would have to fly very long distances and perform violent manoeuvres in the face of enemy defences. The result was equipment developed by Marconi's Wireless Telegraph Co., and given the title AD.87B/8882B, which will probably mean little or nothing to most people until translated to the RAF designations of transmitter T1154 and receiver R1155. There were numerous marks and modifications over the years but the gear remained essentially the same for two decades (interviews with airmen indicate that it was still in use in the late 1950s and possibly beyond). It would be impossible to cover all the variations in one short article and so the following notes are intended to be of a general nature.

Features

The 1154 set covered from 200kHz to 16.7MHz in four bands, with an ingenious system of 'click-stop' detents on the tuning controls to enable seven spot-frequencies to be selected on each. An eighth position on the controls provided continuous tuning if required. The transmission modes were CW, MCW or radio-telephony, the power outputs on the first being between 50W and 80W and on the second two approximately 12W to 20W.

The associated 1155 set covered (with individual variations) between 75kHz and 18.5MHz and was basically a six-valve superhet with RF amplifier, frequency-changer, two IF amplifiers, detector/output and AGC/BFO stages. When used for communications purposes two different operating modes could be selected; one switched the AF gain to maximum and gave manual control over the RF and IF gain, the other controlled the latter by AGC and provided manual control of the AF gain. The BFO could be switched in with either mode employed but would normally be used with the first. Reception of CW, MCW and RT signals was of course only a part of the 1155's job. Its other purpose was to provide direction-finding facilities whereby aircraft might be steered safely back to base

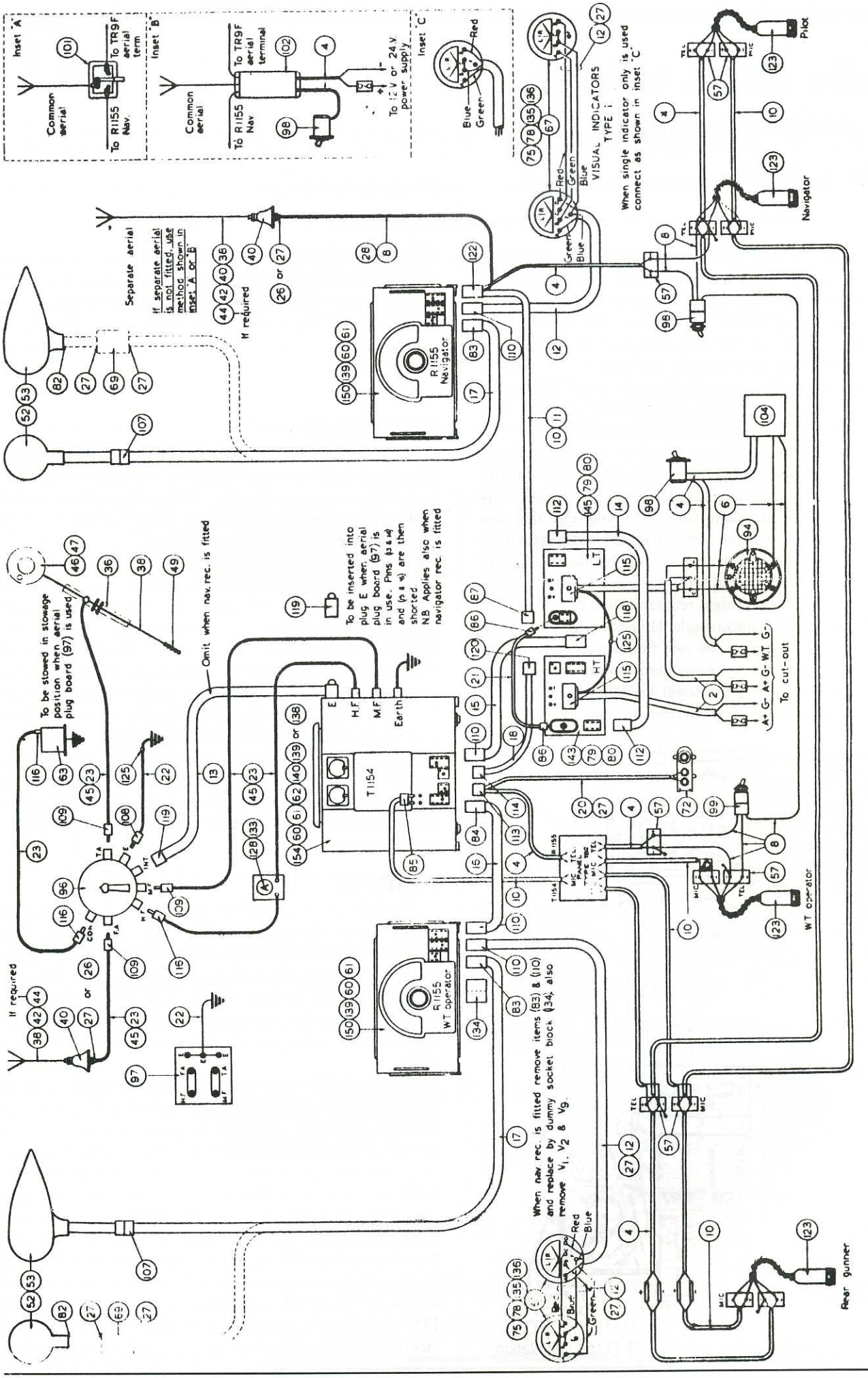


Fig. 2 - Typical installation wiring diagram for an installation comprising T1154 and dual R1155s with crew intercom facilities

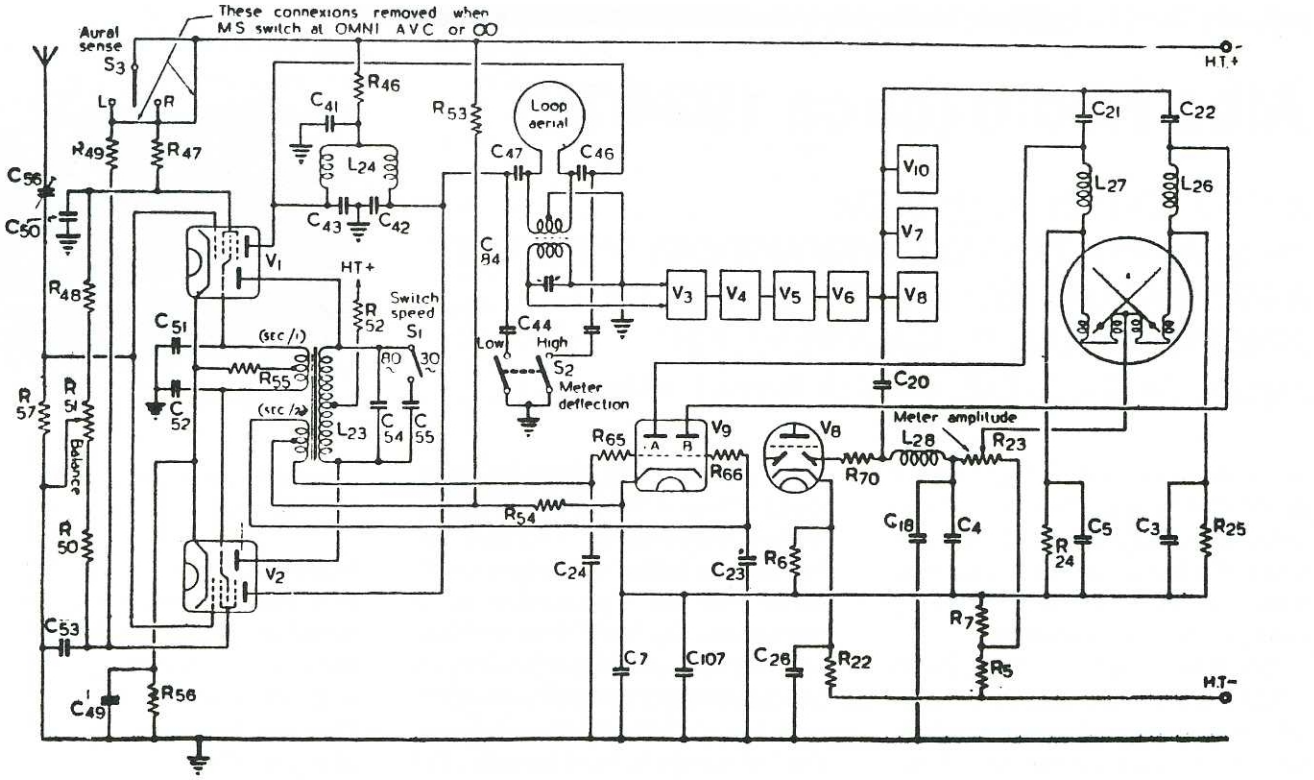


Fig. 3 - Simplified visual DF circuit

through the medium of beacon transmissions. This could be done aurally or visually, the latter being the easiest for the pilot to follow. The way in which this was achieved was ingenious in the extreme and is worth recounting here.

DF Facilities

Three aerial systems were provided on an aircraft carrying the 1154/1155; a fixed-wire type along the top of the fuselage, a trailing wire that was let down in flight, and a directional loop. For aural direction-finding the loop would be rotated for minimum signal in the operator's earphones; since this would occur with the loop at right angles to the transmitting station a correlation of figures would establish the direction in which the aircraft was flying. Visual DF also used the loop, set in the athwarthships position, in conjunction with the fixed aerial. With the receiver tuned to a beacon station on the loop aerial an electronic switch within the receiver connected the signals also received on the fixed aerial either in phase or out of phase with those from the loop. The switch also applied the rectified voltage at the detector in the set to either of two operating coils in a special indicating meter having two pointers, so that one registered the signal from the fixed aerial plus that from the loop, the other the signal from the fixed aerial minus that from the loop.

With the loop set athwartships it would give its minimum output with the aircraft pointing at the station. This would result in both pointers registering the same amount of signal strength. They were arranged in the instrument so that this resulted in their crossing each other on a white central line on the dial. If the aircraft swung off course the signal delivered to one pointer would rise and that to the other would fall. They would continue to cross one another, but off the white line. The pilot would then correct his steering until the point of intersection was once more on the line. By this means he could maintain his course back to base – or, it was discovered, in exactly the opposite direction, since with a strong beacon signal the meters would indicate correctly with the aircraft pointing away from it as well as toward it! The standard procedure for obtaining correct orientation was deliberately to swing the aircraft off course to the left after the pointers were seen to be intersecting on the line. If the original direction had been correct the pointers would fall to the right; if they fell to the left the aircraft must be on a reciprocal course requiring immediate remedial action!

The power supplies for the 1154/1155 were derived from motor-generators giving 6.3V for the valve heaters of both sets, 220V for the receiver and 1200V for the transmitter. Relays were incorporated so that the transmitter HT could not be switched on before its valve heaters were lit. The total power consumption was of the order of 250W on receive and 500W on transmit. In a typical installation two receivers would be provided, one for the wireless operator and one for the navigator, plus two indicators, one for the latter and another for the pilot. In addition, intercom facilities would be provided for all crew-members.

Multi-Service

Later in the war the 1154/1155 were fitted into small vessels, the main equipment being housed in the operator's cabin and given the suffix N to distinguish it from airborne gear. The navigator, however, was furnished with his own receiver suffix A, B or F. Certain 1154s were modified for operation on 200kHz - 500kHz and 1.5MHz - 5.5MHz only and were suffixed L. To complete the hat-trick of the 1154/1155 being used in all spheres of warfare there were the vehicle-mounted gears type 115, 115B, 130 and 131. The first two used

continued on page 27

Alba Radio (circa 1934/36)

RADIO TESTERS REQUIRED. MUST BE CONVERSANT WITH MODERN SUPERHET RADIO RECEIVERS. CIRCUIT TESTING, FAULT FINDING, RF AND IF ALIGNMENT, ETC. (Apply Alba Radio Ltd., Worship Street, London EC)

A smoke-blackened example of the Alba 540 awaiting resoration

So ran the advert in a newspaper in 1934 to which I replied, became a 'radio tester' and remained with Alba Radio to eventually become production foreman until another and more promising engagement took me elsewhere.

The Alba 'factory' was housed in an old four or five storey building, probably late Victorian but by modern standards, somewhat antiquated and unhygienic. For example, little imagination is needed to realise what the atmosphere on the assembly and test floor (third up from the ground) was like on a hot summer day with some two hundred soldering iron gas heaters going. Unless the windows were open there was every possibility of severe brain damage from lack of oxygen, or worse, complete asphyxiation. However, opening the windows also allowed the infiltration of an extremely indelicate aroma from the Whitbread (Brewers) horse stables next door! This created a pervading and combined smell of horse manure and fumes from the resin flux used for soldering.

But open windows were also an invitation for the feathered London wildlife hunting for food, tea-break left-overs for instance. Once in, they would perch on the iron roof-ties and drop their semi-liquid missiles, which all too frequently landed on someone's head below.

Then there were the almost daily occasions when the rats came out, such visitations being immediately discouraged by the assembly and wiring girls, with a bombardment of hot soldering irons and some choice London 'East-enders' invective!

Production Target

At the time, Alba were marketing several different domestic radio models ranging from the large mains radiograms with a 'cruncher' type 78 rpm automatic record turntable and three wavebands, to small battery operated medium and long wave portables. All valved sets of course. The day's production quota depended on which models were 'on the lines', the daily invasions of the aforesaid rats and the temperament of the assembly and wiring girls. During the peak period of a few months before Christmas, and with two production lines going, the day's quota would average 80 to 90 sets per line depending on the models being produced. This did of course include assembly, wiring, test and alignment, boxing (fitting the chassis and loudspeakers into cabinets), final testing and packing. Total 160 to 180 sets per day.

The AC/DC Sets

Mains supplies in the home at that time were either AC or DC (200 to 250 volts) so Alba, like most other manufacturers, produced 'AC/DC' versions of their various models. The valve filaments (usually 13 volts) were connected in series, the total voltage required being supplied via a 'voltage-dropping resistance' connected directly to the positive side of the mains supply. This was for DC operation, so the chassis of the set was connected directly to the negative side of the mains. A half-wave rectifier was incorporated for AC operation. However, the chassis could be live, mains to ground, and the set potentially lethal, depending on which way round the plug was inserted in the mains socket.

A Tester's Work

After a final assembly and wiring check at the end of a production line, each chassis was 'valved up'. A tester would take one, connect it to a loudspeaker in his test cabin, plug in and switch on. If no smoke appeared and providing the dial lamps lit up and all the valve heaters glowed, a preliminary 'is anything working' test could be made. This was *finger on the grid of the LF amplifier*, the expected result being a fairly loud hum from the speaker which indicated that the LF and output stages were operating and the HT volts were present. One could then inject a modulated signal at the intermediate frequency and tune up the IF stages. The next stage was RF alignment, tracking and trimming to comply with the receiver tuning dial calibration for each waveband, and a 'sensitivity' test. Final checks included AGC function (this embraced the magic-eye tuning indicator which was a feature of most radio sets in those days), volume and tone controls, waveband and on/off switches, etc., finishing with a quick tune round the bands. Time taken, if one didn't stop to listen to some interesting BBC programme, about 15 minutes.

Fault Finding

More often than not there were one or two faults which had to be cleared by the tester. Most were simple, like a dry soldered joint, a poor switch contact or an open-circuit resistor, etc. Anything like a faulty IF or RF coil or a mains transformer and the set was returned to the line as a 'reject', which usually invoked an uncomplimentary comment from the girl who had to replace the faulty component.

Production Foreman

This was definitely not a job where one just stood around idly watching the

girls on the lines fitting components on the chassis and soldering in the wires at a speed which had to be seen to be believed. The work was arduous but varied. Ensuring adequate supplies of components and valves, etc., to keep the lines going, allocating the assembly and/or wiring per chassis, per girl, for new models; a task that required extreme patience and diplomacy. Any girl who thought her work allocation was a little greater, or a little more difficult than that given to her colleagues, would immediately down tools. This could involve a complete change of 'allocations' right down the line, not to mention a lot of argument loaded with four-letter words aimed at the production foreman who, by this time, was being referred to as 'that stupid b...'! Except in such moments of crisis the girls, bless 'em, were good-hearted and generous and it was not unusual to find some homemade cakes, an apple or an orange on the bench in my little office, put there whilst I was on the factory floor.

New Models

New models came down from the design department as a more or less working 'lash-up', on an old chassis of approximately the right size, together with a circuit and a few notes on expected performance. It was part of my work as production foreman to construct a fully working prototype, less cabinet, on which production would be based and to ensure it operated according to the given set of specifications. The carpentry department then produced a suitable cabinet based on what the sales department thought would be attractive to customers and envied by competitors. And so the business of starting a new assembly and wiring line would begin all over again.

Auto-tuning

One particular new model (its type number long since forgotten) may be of interest. The set could be used for table models or radiograms but its special feature was automatic tuning, a form of what we now call scanning.

The tuning capacitors were DC motor driven, and the function could be started by pressing a button. The AGC voltage from any reasonably strong station was used (with appropriate circuitry) to immediately stop the motor, and therefore the tuning capacitors, on that station. The system would ignore weak stations, but if the station received was not wanted then pressing a button would allow the scanning to continue. If not stopped by another station, the motor would reverse at the end of the range and tune the band in the opposite direction. One or two other manufacturers had taken up the same idea but it never caught on.

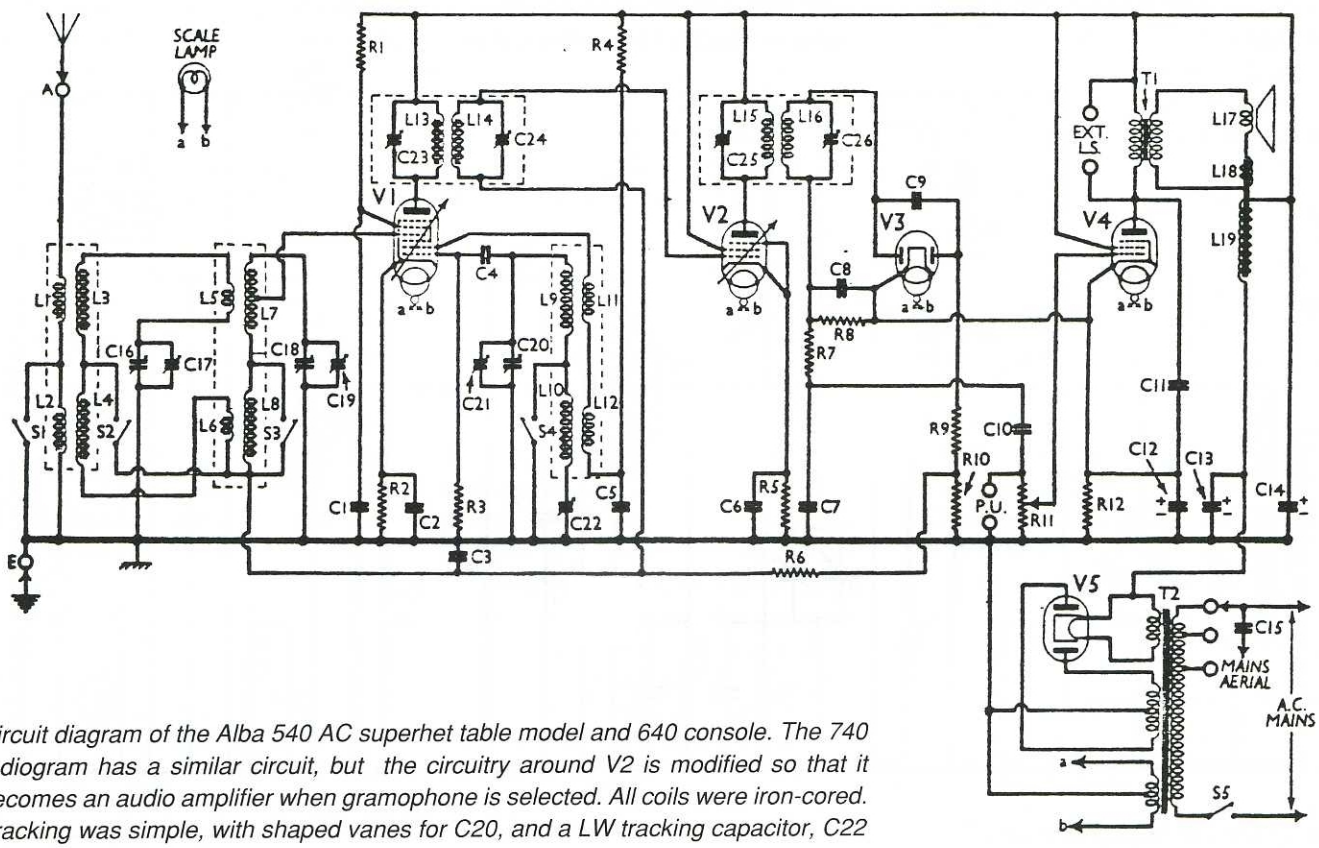
Annual Event

Alba Radio were generous in this one respect, they paid for an annual dinner and dance for all the staff. Everyone from managing director to floor sweeper attended and many took part in the talent contest. If you could 'do a turn', good or otherwise, it won a prize.

They were as good as most other radio manufacturers to work for but in those days the factory workers' wages, including those of the 'technical' types (testers, etc.) hardly permitted affluent living. Assembly and wiring girls 10d (ten pence) to 1/- (one shilling) per hour. Testers 1/9d (one shilling and ninepence) per hour, with extra for overtime.

As a radio tester you gained real expertise at fault finding, and as a production foreman considerable knowledge of how to cut costs in production without spoiling the product.

Yes, sets are still sold under the name 'Alba Radio', but these days they are , made in the Far East, and distributed in the UK by one of the large radio combines. ***RB***



Circuit diagram of the Alba 540 AC superhet table model and 640 console. The 740 radiogram has a similar circuit, but the circuitry around V2 is modified so that it becomes an audio amplifier when gramophone is selected. All coils were iron-cored. Tracking was simple, with shaped vanes for C20, and a LW tracking capacitor, C22

Information Department

by Chas E. Miller

In issue No. 22 of *The Radiophile* we appealed for information on the Premier Radio kit receivers that appeared in the late 1940s. Thanks to The Vintage Wireless Company of Bristol, to Phil Savage, to Dave Porter and to J.P.Vaughan we now have data on both TRF and superhet models.

TRF

The TRF was produced in two versions known as the Mark I and Mark II. Both were conventional in design, using the familiar three-pentodes arrangement, but the valve line-ups differed. They were for operation on AC only but as they derived their HT directly from the mains the chassis could become live if correct polarity was not observed.

The Mark I valve line-up consisted of a 6K7 RF amplifier, VR91 or VR91A (EF50) detector and 6F6 or 6V6 output, all of which were available in vast quantities on the Government surplus market. The HT rectifier was a pair of STC RM1As in series. The mains transformer gave 6.3V for the valve heaters and approximately 5V for the dial lamp.

The RF stage used a simple dual-wave (MW and LW) tuning coil with a common primary winding. The volume control worked on the time-honoured principle of increasing the cathode bias on the 6K7 whilst simultaneously shorting out the aerial to chassis. A similar coil set was used to give tuned-anode coupling between the RF stage and the anode-bend detector. No reaction was used. The AF was resistance-capacitance coupled from the detector anode to the grid of the output valve. Fixed tone correction was applied to the latter by a 0.002µF capacitor from anode to chassis. The HT rectifier was, as mentioned earlier, supplied directly from the mains with a 0.1µF capacitor to bypass RF down to chassis. The anode of the output valve was supplied directly from the cathode of the rectifier whilst its screen grid and the rest of the set was fed via a 10kΩ smoothing resistor. The primary of the mains transformer was untapped, the one winding having to suffice for inputs of between 200V and 250V.

The Mark II set had a very similar circuit but used a different valve line-up consisting also of ex-Government valves and seemingly chosen to find good homes for types that would otherwise have lain idle for ever. The RF amplifier was a CV303, equivalent to the Mullard EF22, an RF pentode used in a very few domestic and car receivers. The detector was a VR116 (Mazda V872) or CV1116 (Mazda 6F32). Both of these were RF pentodes not found in domestic equipment; the latter should not be confused with the later valve of the same type number with a B7G base. The output valve was a VT501/CV1501 (Marconi-Osram TT11) another non-domestic valve comparable to a 6F6 in specification.The mains-derived HT supply remained but an extra smoothing resistor was introduced between the rectifier cathode and the primary of the output transformer.

Superhet

The superhet kit was designed for AC only or AC/DC use and employed four valves and a metal rectifier. It covered three wavebands, long, medium and short and used an IF of 465kHz. The AGC was delayed but applied to the IF amplifier only. The output and HT section was

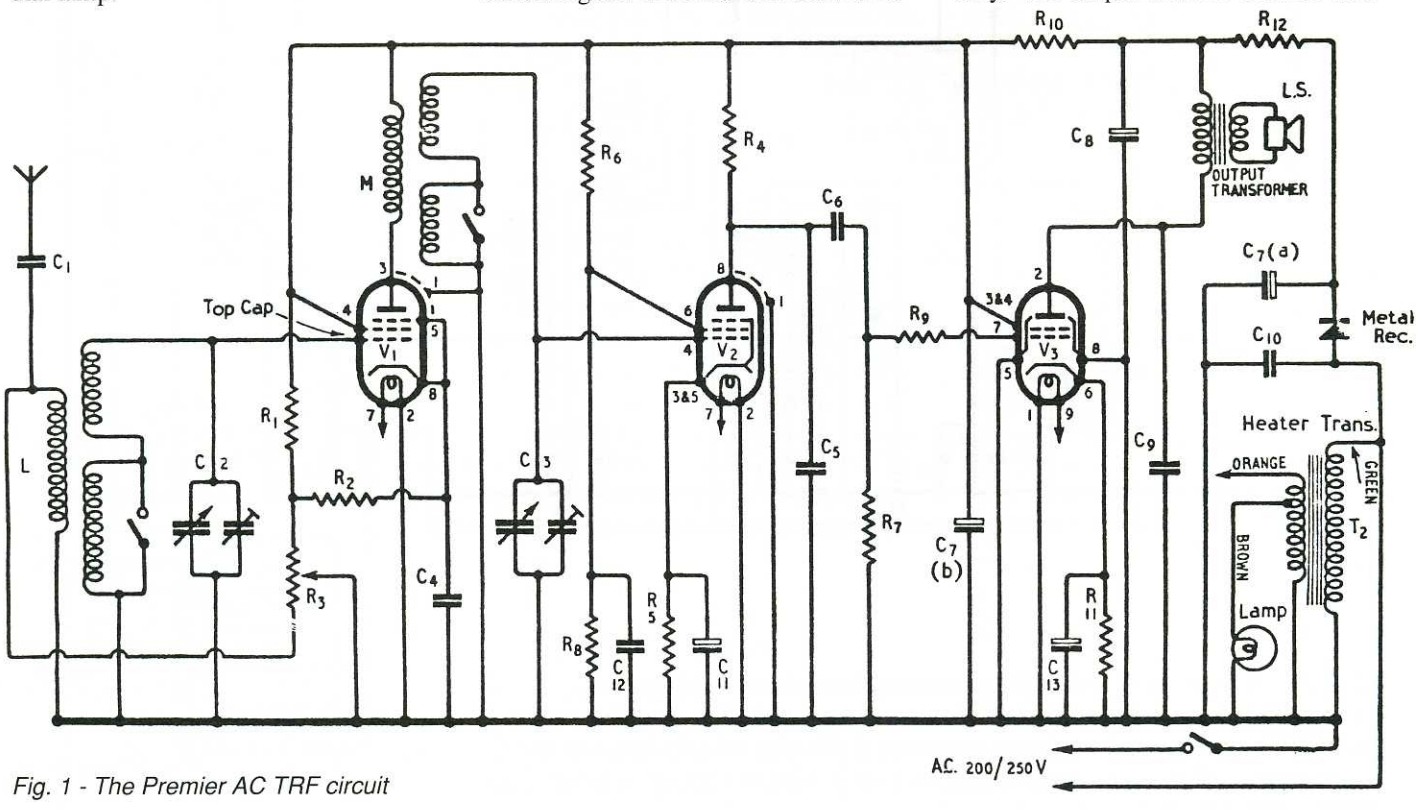


Fig. 1 - The Premier AC TRF circuit

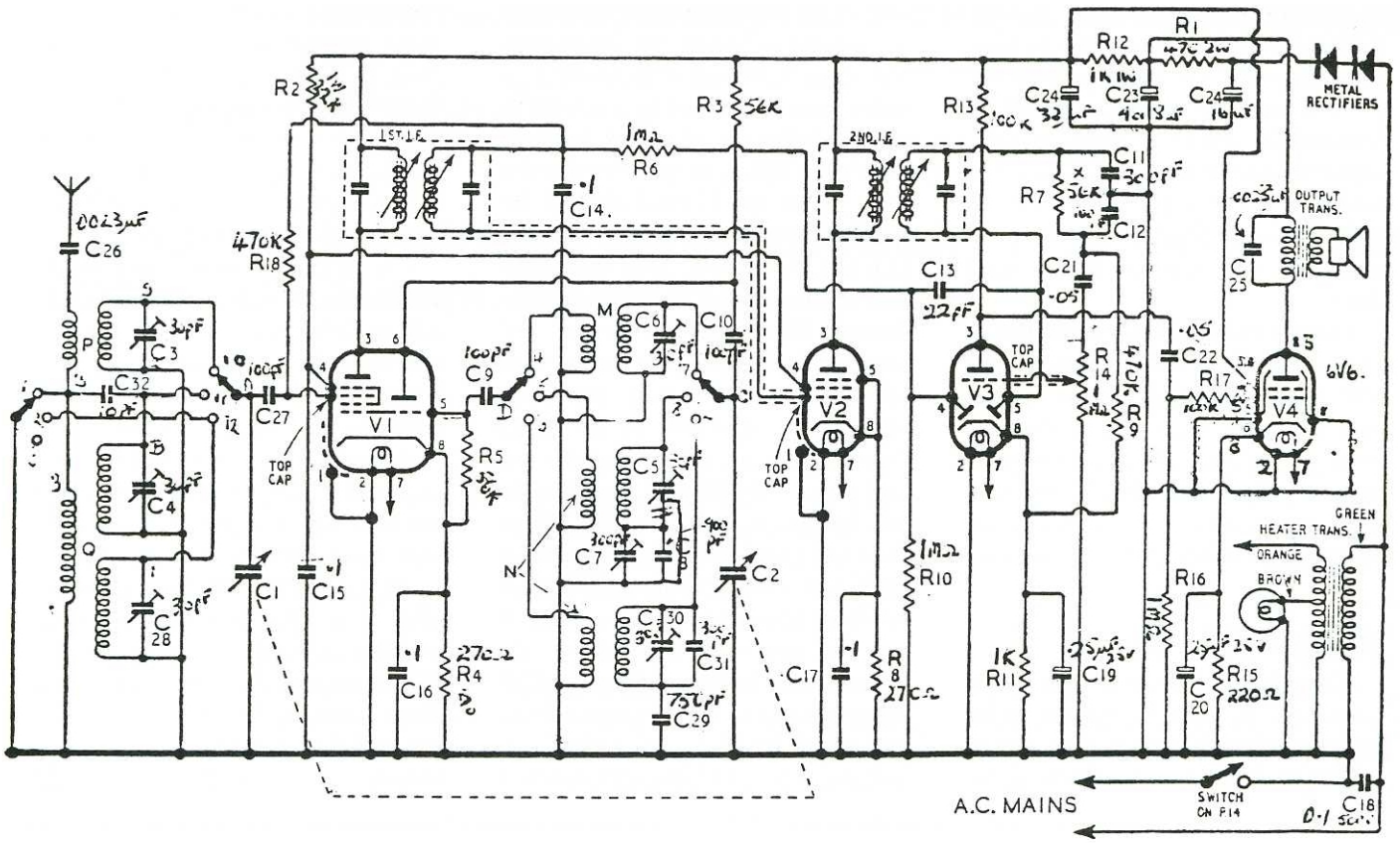


Fig. 2 - The AC version of the Premier Superhet Kit

very similar to that of the Mark II TRF receiver. The AC-only version valve line-up was 6K8 frequency-changer, 6K7 IF amplifier, 6Q7 detector/AGC/AF amplifier and CV1510 output. This last is a B9G-based power pentode equivalent to the Marconi-Osram E1242, an industrial valve with curious characteristics. The AC/DC line up was similar except that a 12A6 was used in the output stage. This has a 0.15A heater, shunted in this set to pass the same 0.3A as the rest of the valves (Some constructors used all 0.15A valves with perhaps a higher heater voltage output valve, e.g., 12K8, 12K7, 12Q7, 35L6). The heaters were supplied via a resistive line cord.

Very comprehensive instructions, including actual-size lay-out diagrams were supplied with all kits and given reasonable ability almost anyone should have been able to build a satisfactory receiver. One cannot help feeling though that the question of the mains-connected chassis was not explained sufficiently since the set by definition was likely to be handled by inexperienced persons. There should have been a full explanation of the dangers involved and of how a simple test could have been made to check if the chassis were in fact 'live' with a low-wattage lamp connected to earth, and suitable safety precautions described. The superhet manual had a good section on aligning the set with a signal generator but failed to warn against the danger of the possible potential difference of mains voltage between receiver and generator.

AC/DC versions of both models were very similar, except for having series heaters and line-cord dropping resistors.

The cabinet used to house the kits could be purchased separately, and I took advantage of this at the time. My own design of superhet was used for the chassis which covered MW and LW, using Wearite 'P' coils and Weymouth IF transformers. It had a 6K8 frequency-changer, a 6K7 IF amplifier and a 6B8 detector/AGC/output. The pentode section of the 6B8 was really only intended for RF or IF applications but if the screen-grid voltage was raised to that of the anode and the grid bias reduced it was possible to get sufficient AF output from it for bedroom listening (c.f. the Z77 in EMI TV receivers). The gain of the valve proved insufficient for it to be driven directly from the detector, however, and a 955 triode was wired in under chassis to act as an AF amplifier. The set then provided a great deal of good listening, much of it from AFN Munich, when Ralph Moffat was the star disc jockey. Now I have dated myself!

The mention made above of shunting the heater of a 12A6 to render it compatible with a 0.3A heater chain makes this an appropriate time to answer questions received on this subject.

The Basics

A shunt resistor is one that is placed in parallel with another component which is carrying current, with the object of diverting some of the latter. The single most popular use of shunts occurs in multi-meters where they are used to extend the current ranges. There are various ways of calculating the values of shunts but the following adapts well to the use of electronic calculators. It is based on first discovering the potential difference across the meter at full scale deflection (fsd). Most meters have their internal resistance marked on the scale, a typical value for a 1mA fsd type being 100 ohms. Ohm's law tells us that the pd needed to produce fsd is 100(ohms) x 0.001(amps) = 0.1V. Thus, if we wanted to extend the fsd of the meter to 100mA the shunt would have to drop 0.1V at 99mA or 0.099A. Ohm's law is again invoked to give the result as 1Ω, give or take a very little. A resistor of this value would not be difficult to find; the fun really starts when very heavy current readings are required. Extending the fsd

to 1A means having 0.999A passing through the shunt, which needs to have a resistance of 0.1Ω. Pushing up the fsd to 10A calls for a shunt of 0.01Ω, obtained by bolting a chunk of solid copper across the meter terminals. Little wonder that a friend of mine observed many years ago when seeing a meter so modified, 'Cor! It's less than a dead short!'.

Placing a shunt across a meter that is exactly the equal of the internal resistance will double the fsd of all the voltage scales at the expense of reducing the sensitivity by one half (e.g., 1000 ohms per volt down to 500 ohms/V. This sort of scale doubling is to be found on certain multi-meters, both old and new.

Heater Shunts

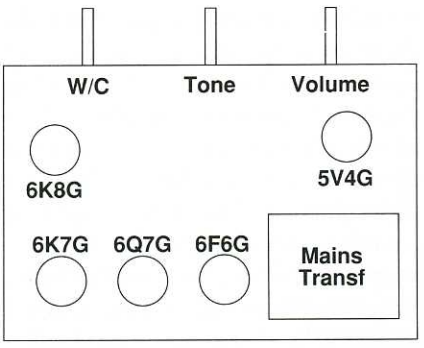
Shunts are used in series heater chains where one or more valves are to be introduced that have lower heater current ratings than the majority. Thus in the case of the Premier kit set mentioned above, using a 12A6 (0.15A) in company with three 0.3A valves means that its heater must be shunted by a resistor to pass the difference, i.e. 0.15A. Jolly old Ohm's law comes in again to give the shunt value as 12.6(V) divided by 0.15(A) = 84Ω. The wattage rating is 12.6 x 0.15 = 1.89W. Note that in the case of the Premier set the use of the shunted 12A6 was by design and therefore the heater supply voltage was calculated to suit that particular combination of valves (I am being charitable here since the value of the line cord resistor, 660Ω, was exactly right only for a mains voltage of 231.5V, so there must have been discrepancies at other inputs). When we are using shunted valves as non-standard replacements it may be necessary to look at the differences in heater voltage as well. If we were to use a 12A6 as a replacement for a CL33 (which heaven forfend!) in addition to the 0.05A disparity in heater current there would be a difference in heater voltage of 22.4V. This is too much to be absorbed in the chain as a whole so in addition to a 250Ω heater shunt a series resistor of 110Ω should be fitted as well (if you check these figures for yourself you will find that I have rounded them off suitably).

Car radio receivers (and professional mobile communications equipment) for 12V or 24V operation frequently used series/parallel arrangements of 6.3V heater valves, sometimes with shunts to balance the current flow. Attention must be paid to this when non-standard valves are fitted to such sets to ensure that one chain of valves is not over-run at the same time as another is under-run.

AC/DC/Battery receivers produced since World War II usually have shunt resistors across the valve filaments to take account of HT current which also flows through them. These resistors are very lightly stressed and unlikely to give trouble. ***RB***

Information Wanted!

Martin Loach has a Philco set which he believes to be from around 1945 as it has the 'General Forces Programme' marked on its dial. The chassis carries no model number but it is vaguely similar, Martin says, to the A535 of about 1946. The cabinets are alike, too, but that of Martin's set has a dial with circular markings and centrally pivoted pointer. The layout of the valves, etc., is shown below. If you can help, please contact Martin at 96, Lashford Lane, Dry Sandford, Abingdon OX13 6EB.

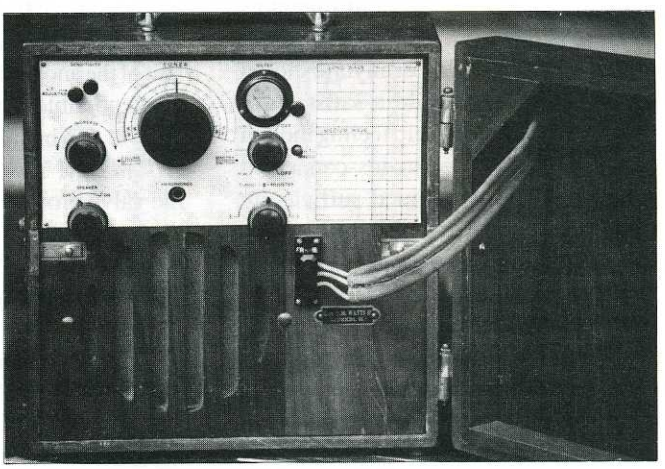


Does anyone have information on the EMI Component Bridge type QD211? This unit measures about 12in by 9in and has a balance meter with two ranges on the front panel. If you can help, please contact Alec Loveday on 0270 68306. Alec is also seeking information on an ex-Government 'Oscillator Beat Frequency No.8', manufactured by a firm with the initials F.H.L.

Following the successful outcome of our appeal for Premier kit set information, I wonder if we can repeat the trick with a contemporary home-built set, the 'Peter Pan'? As far as is known this was another simple TRF using 6K7G, 6J7G, 25A6G and 25Z4G. Replies direct to Larkhill, please, if you can assist.

We have the *Trader* service sheet for the Emor Globe receiver but one of our readers is seeking information on the manufacturer, whose premises appear to have been situated near to where he now lives. If you know anything about the Emor concern please get in touch with us here at Larkhill.

Finally for this issue, does anyone recognise the receiver shown below, photographed in the boatbuilder's display at the Chalk Pits Museum. It appears to be a direction finding set intended for use in a yacht, and carries the maker's name 'Capt O M Watts, London W'. Information on this one to the Wimborne editorial offices, please.



Please continue to send queries intended for this column to: The Radiophile, Larkhill, Newport Road, Woodseaves, Stafford ST20 0NP

The First Decade

The story of the Wireless & Communications Exhibition at the Chalk Pits Museum, Amberley

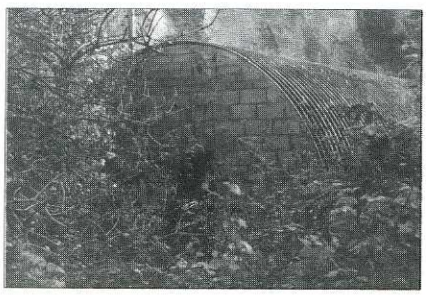
by Joan Ham

Ron Ham's collection and interest in wireless goes back nearly as long as he does, and is a story in itself. Suffice it to say that back in 1977, following Ron's appearance in a television science programme, a large part of his wireless collection spent the summer months in Helston at the Cornwall Aircraft Park. During its absence, the space which it had occupied at home had naturally filled with more wireless collectanea and the return of the exhibits from Cornwall was anticipated with some apprehension!

At that time, a local architect responsible for some of the planning that went into the successful Weald & Downland Open Air Museum at Singleton, together with several friends, had become alarmed at the loss of some industrial exhibits which this museum could not house, and for which there was no logical home. The idea of an industrial museum to take such items followed naturally, and when the abandoned Amberley Chalk Pits became a possible site the wheels began to turn. This is yet another story, but one of the wheels was contact between John Warren (the architect) and Ron Ham, resulting in Ron offering his collection as part of the new museum if it could be housed. Another friend, David Rudram, a telephone engineer and lifelong wireless collector added his treasures to Ron's and joined the museum enthusiasts. We visited the site, then a glorious 25 year old wildlife jungle, with John Warren who showed us (after pushing our way through a tangle of young trees that hid it) a wet doorless, windowless Nissen hut. There were puddles and moss on the floor, and in one corner behind a propped up piece of wood a pallet which had apparently been a tramp's doss. The building, however, was one of the few still standing on the site, and if we were prepared to do some work to make it serve, it would be our first (temporary) wireless exhibition. Gifted with a powerful imagination, we could see its possibilities, and so our weekends, spare time and energies were mortgaged for the foreseeable future.

Open Day

Meanwhile, local interest and a certain amount of uninformed gossip made the activities behind the grey gates a source of fascination. It was decided to recruit latent goodwill for the project and possibly acquire some more volunteers to help prepare the site for a projected opening in 1979 by holding one special Open Day, with the volunteers showing the site to members of the public, trustees explaining the plans and aspirations and answering questions, and small temporary exhibitions of whatever items could be assembled. There was a 1929 Leyland bus brought in for the day, a working stationary engine, refreshments with the aid of some portable burners, a sales table of donated items which were not museum material, and there was a van-load of vintage wireless home from Cornwall – the first real exhibitable collection. It needed a one-day display area under cover, so an erstwhile cart-shed under the main building was allocated. We began by sweeping the fallen ceiling off the floor! Then we needed to construct some exhibition benches or shelves with no money or resources. One advantage of an abandoned quarry site is the usable rubbish that gets dumped there! We found wood, bricks, cable drums and other unconsidered trifles, with which we managed to 'bench' all round the walls. It was serviceable but looked the rubbish that it undoubtedly was. Local connections are valuable at such times, and the chairman of the Storrington Horticultural Society (yours truly) commandeered yards of green baize used at the annual flower show to cover the sins.



Unpromising beginnings. The Nissen hut as we first saw it, hidden by shrubs

NOW we could unpack, polish, label and arrange our collection, which we did, burning midnight oil to have everything ready for the next day. Alas, we had overlooked the presence of certain other keen volunteers! Some of our friends who did a great deal of hard site clearing and building repairs in those days were army squads and the young sailors from the stone frigates of HMS Daedalus, Mercury and Collingwood. One such party was camping overnight in the rooms above, and the thunder of service boots on the bare floorboards had showered our public-ready exhibition with a thick layer of ceiling debris. Despite this set-back, we were ready when the gates opened, and that first Open Day was an outstanding success. Eight hundred people paid 50p each to come in and inspect the site and talk to us. The day showed a profit which went towards buying essential materials for repairs. We have celebrated that day every year since, as the last Special Event of the season, with a great many visiting exhibits coming in for the day, 'everything from a Dinky toy to a Rolls Royce'.

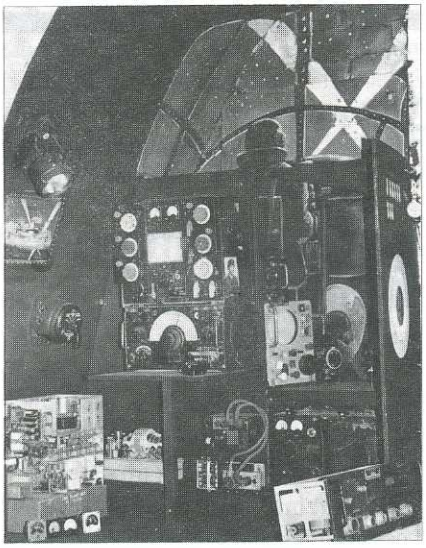
We worked on during all our spare time. We cleaned out the Nissen hut, scrounged timber and built display stands, painted 'scenery' on the asbestos

walls to complement the particular exhibits in front of it, and established our first permanent Wireless and Communications Exhibition. David climbed the chalk cliff behind the building with a roll of cable which he then threw down, having fixed the end. The other end was attached to a ceramic 'lightning arrester' switch on the door-frame. To this, we could attach a crystal set and allow visitors to hear genuine cat's-whisker reception. Watching the faces of children hearing it for the first time, was to see magic returning to a generation reared on fingertip technology. Our first 'Lancaster wireless cabin' was a most realistic painting on the wall, with the R1155/T1154 mounted *in situ*. Yards of camouflage netting draped the hideous damp breeze blocks of the end wall behind a display of military sets, and a contemporary domestic setting housed the obligatory 'wireless for the nine o'clock news'. Fluorescent lighting was supplied with some strictly 'temporary' wiring (which remained its source of supply for years!) We were ready for visitors, and remained the flagship exhibition of the new museum as other interests were gradually installed around the site.

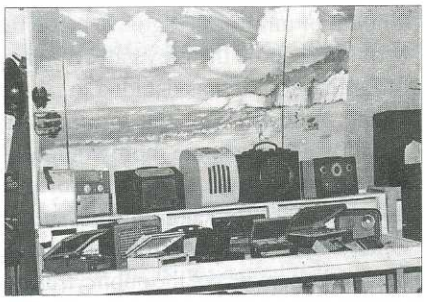
Up and Running

Visitors loved it, both the technically and nostalgically minded. Some very interesting and rare items were donated to us, including a WWI Marconi spark trench set given by a well-known local surplus store, a No 1 RAF spark transmitter and a Doulton china parrot which concealed a loudspeaker unit, together with various ephemera to complement the displays. We were innocent in those days, and believed that people only came to look at things. We learned, after 60 items went missing, some of no possible use or value to anyone else, that security was sadly a vital part of the display. This was discouraging, as one feature appreciated by many was that an item of especial interest or recollection to a visitor was often lifted out for closer inspection or photography, and this freedom also meant that we could show blind visitors some of the exhibits in a way that they could appreciate. This can no longer be done with every item secured, but is a price that must be paid by the many, for the misdeeds of a few.

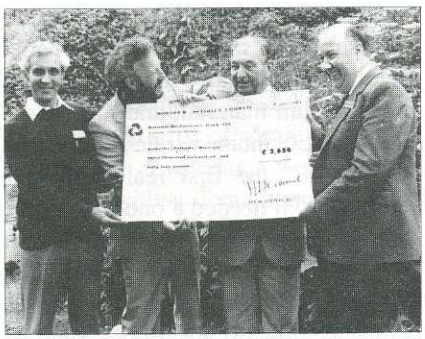
The White Pit, a self-contained area of the museum where the exhibition



Our first simulation of the Lancaster wireless cabin, with background scene painted on the breeze block wall



Another painted backdrop, this time for a collection of portable receivers



On our way to a new building. Cllr. Shepherd presents Ron Ham (R), John Warren (Museum Chairman) and David Rudram (L) with a cheque for £3654 from the Horsham Lottery

building stood, was a natural amphitheatre, and in following seasons, an annual Vintage Wireless Day was organised as a special event, when outside exhibitors brought in their field stations, vintage exhibits, military vehicles equipped with radio and various associated private collections to add to the permanent display.

One day the Brownlow family, active members of the Mid-Sussex Amateur Radio Society, visited the museum and asked if it would be possible to bring a portable station to operate on Sundays from the site. They did so, using the family callsigns to provide visitors with a working display of amateur radio, and proved a great attraction. The Sunday station gradually extended from a caravanette to a tent, which was erected and dismantled every time, and portable aerials. Then a railway sleeper was dug into the solid chalk, to provide a firm base for an aerial mast, and the idea took shape of asking for a special callsign, and eventually GB2CPM came into being. It has been operated almost entirely by Margaret and Gerry Brownlow, sometimes with the addition of their sons, and eventually with other operators who come in on weekdays to help keep the station on the air. Contacts range from the Arctic to the Antipodes and from Japan and Russia to the American continent.

A New Home

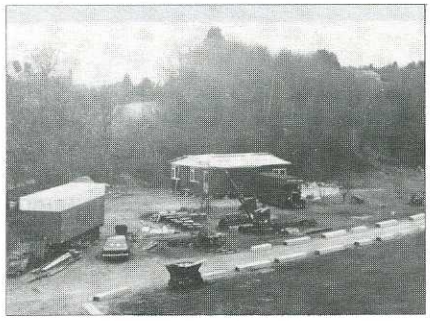
It was never intended that the Wireless & Communications Exhibition should remain in that damp unsuitable building for longer than it took to raise the money for a new building. In June 1982, our new building was opened by Geoff Arnold, who was then Editor of *Practical Wireless*. The date coincided with the 50th anniversary of the magazine, and the new display proudly included a set of graphics boards displaying for each decade, samples of the output of *PW*. The exhibits were rehoused in displays of each era to tell the communications story starting with a Boer War telegraph set, working through WWI to the era of crystal sets, blueprints and home constructing, early manufactured products, WWII clandestine and military radio, German WWII sets, post-war and amateur history. It was possible in the 1700 square feet of exhibition space to establish a permanent GB2CPM station, and with a generous donation, to equip it with the latest state-of-the-art transceiver, sparing the Brownlow rig its weekly transit, installation and dismantling. Opposite GB2CPM, we built a display in the form of a vintage radio shack commemorating the early trailblazers, Barbara Dunn G6YL the

first licensed lady radio amateur, Nell Corry G2YL and Gerald Marcuse – pioneer of Empire Broadcasting in 1927. Their stories have been told elsewhere, but they now have a permanent tribute where their present-day successors demonstrate today's technology.

Lancaster

The Lancaster's famous Marconi twins, the R1155 and T1154 are installed in a life-size replica of the war-time bomber, which shows from radio cabin, through navigator's desk to pilot's deck and instrument panel exactly how those young men of Bomber Command were installed with their equipment in cramped cold situations for what might well have been hours at a time to operate the finest that the factories at home could turn out.

The final display is a large room full of polished, beautiful woodwork and engineering in the shape of the radio industry's output of television, wireless and speakers during a fascinating 60 years of development. It is memory lane for engineers, listeners and viewers alike, and living history in a lifetime for the many parties of schoolchildren who



The new wireless building takes shape. The first stage is a redundant school classroom, taken down and re-erected in the museum by volunteers

cannot resist giggling at the tiny TV screens or the massive radiograms.

Ten years at the Chalk Pits have seen our collection and ambitions grow. This brief 'walk-round' the exhibition as it is today leaves out many fascinating details that the visitor will see, such as the working vintage telephone exchange in a glass case, where uniselectors can be seen finding the number dialled on a demonstration telephone, and which handles about 30 internal telephone lines saving miles of staff leg-work, or the large display of 60 years of valve history and the very latest addition – a tribute to Capt. Peter Eckersley, first chief engineer of the BBC, generously contributed by his family.

The Future

The radio building is still a temporary home. It is made up of two redundant classrooms, taken down by volunteer labour and re-erected at the museum. There are plans for a permanent building when funds and circumstances permit. There are areas of the communications story which we have not been able to explore owing to pressure of space – naval radio, recording and broadcasting; we would like to build an early wireless shop where the many small packets of components, instruments and tools can be put in context. The archives and library are being rehoused this year, but there will still be a shortage of space, because our archives have kept pace with the growing collection. Looking back on the first decade, the achievements have been outstanding, and there is no reason to suppose that we shall not continue to improve our display and the wonderful story that it tells. ***RB***

See our covers this month for photographs of a selection of other exhibits at the Chalk Pits.

The Amberley Chalk Pits Museum is 3 miles north of Arundel, West Sussex, on the B2139, immediately beside Amberley Station (BR). Follow road signs marked 'Industrial Museum'. There is a car and coach park adjacent, and all exhibits and the toilets are accessible by wheelchair.

Other exhibits within the 36 acre open air site include a narrow gauge railway, blacksmith's, ironmonger's, printer's, boatbuilder's, woodturner's and potter's workshops, a village garage and cycle shop, a bus garage, a domestic display, stationary engines, water pumps, steam road vehicles, brickmaking, roadmaking, lime kilns and a tanyard building. A nature trail and refreshment facilities complete the attractions for a family day out.

Admission prices for 1989 are £3.00 for adults, £2.00 for OAPs and £1.00 for children, or there is a £7.50 family ticket covering two adults and two children.

The Museum is open daily from 10am to 6pm until the end of the school summer holidays, then from Wednesday to Sunday each week until 29 October 1989. It is then closed until Easter 1990.

Amplifier for 78 rpm Records Part 2

by Chas E. Miller

In the last issue of *The Radiophile* we discussed the general requirements of an amplifier capable of reproducing 78 rpm records correctly and, to this end, the characteristics needed in the tone control circuits. We shall now examine the circuitry of a suitable pre-amplifier which will incorporate these controls, but before commencing the writer would like to thank Pat Leggatt for helpful suggestions that have been put into effect in this article.

It was initially envisaged that the amplifier would be used with either crystal pick-ups of fairly high output (>200mV) or moving-coil types providing from approximately 15mV upwards, but to cater for inputs lower than this, provision has been made for an extra amplifying stage to be fitted if required. The moving coil pick-ups that were considered to be very suitable for the reproduction of 78 rpm records were the Decca types A, B, C and D and the EMI type 14. The first two are of very low impedance (30Ω and 170Ω respectively) and produce output voltages of 13mV and 36mV. They are normally used in conjunction with matching transformers of 1:40 ratio, raising the output to the amplifier to approximately 500mV and 1.4V. Type C has an impedance of 850Ω and gives an output of 70mV, whilst the figures for type D are 4.2kΩ and 180mV. These two do not need matching transformers. The EMI type 14 has a very low impedance of 2Ω and gives only 6mV but it is invariably used with a transformer of 1:110, raising the output to around 650mV. The load resistors required for the above pick-ups are 47kΩ for the A and B, 10kΩ for the C and D and 100kΩ for the 14. There are of course many other moving-coil pick-ups and details of these may be discovered in such reference books as *Points on Pick-ups*.

Crystal pick-ups are generally less critical as to loading and one simple input circuit will suffice for all.

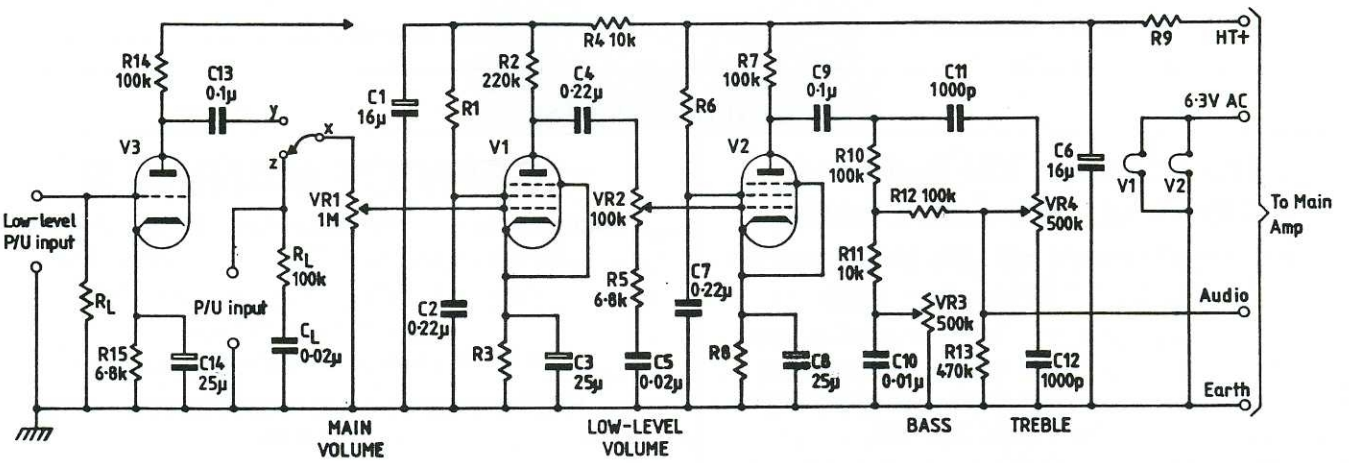
Rather than complicate the design of the pre-amp. by fitting a switch to select different input loads it will be assumed that the constructor will use that suited to his particular pick-up.

The Circuit

The first stage in the pre-amp.includes provision for increasing the bass response at low levels of output from the loudspeaker to compensate for the characteristics of the human ear (see *The Radiophile* Issue No 22). The circuit is arranged so that frequencies below 1kHz are boosted as the volume is reduced. The second stage is a straightforward amplifier with the bass and treble controls in its output to the main amplifier. As explained in the first article, the choice of valves is quite wide and it is most unlikely that the constructor will not have suitable types already to hand. Broadly speaking, any 'straight' RF pentode should be suitable, with those designed especially to be non-microphonic slightly preferable. 6SJ7s were chosen for the prototype because their metal envelopes give good screening and the single-ended design cuts out the need for screened leads to top-cap grids. Apart from this the writer likes octals!

Construction

The pre-amp. may be constructed on its own small chassis or it may of course be incorporated into the main amplifier. Keep all leads short and run the heater wiring well away from other valve pins and components to prevent induction of hum voltages. If miniature all-glass or other non-metallised valves are use suitable screens should be provided. The values for the components as given in the table are appropriate for 6SJ7s; alternatives for other valves are shown in brackets. The values for R_L and C_L are for crystal pick-up inputs; for moving-coil types see above. None of the resistors needs to be rated above 0.5W and in fact



Circuit diagram of the pre-amplifier. The optional extra amplifier for very low output pick-ups (V3) is brought into circuit by transferring link connection x–z to x–y. The values of the unmarked resistors depend upon the valve types used (see Components list)

Components

R_L	100kΩ
R1	1MΩ (EF37: 390kΩ; SP61: 1.2MΩ)
R2	220kΩ
R3	2.2kΩ (EF37, Z61, most miniatures: 3.3kΩ)
R4	10kΩ
R5	6.8kΩ
R6	1MΩ (EF37: 270kΩ; SP61, Z61, most miniatures: 470kΩ)
R7	100kΩ
R8	2.2kΩ (EF37, Z61, most miniatures: 1.5kΩ)
R9	Chosen to reduce the main HT line down to approximately 250V; typical value 47kΩ
R10	100kΩ
R11	10kΩ
R12	100kΩ
R13	470kΩ
R14*	100kΩ
R15*	6.8kΩ

**Required for Extra Pre-amp only*

VR1	1MΩ
VR2	100kΩ
VR3	500kΩ
VR4	500kΩ
C_L	0.02µF
C1	16µF
C2	0.22µF
C3	25µF
C4	0.22µF
C5	0.02µF
C6	16µF
C7	0.22µF
C8	25µF
C9	0.1µF
C10	0.01µF
C11	1000pF
C12	1000pF
C13*	0.1µF
C14*	25µF

0.25W types would be sufficient with the possible exception of R9. Coupling capacitors which are subject to HT voltage and the various HT decoupling capacitors should be rated at a minimum working voltage of 400V. The two cathode by-pass capacitors need be rated at no more than 12V.

Operating the Pre-amp.

This is perfectly straightforward once the low-level listening arrangement has been set up, which is done as follows.

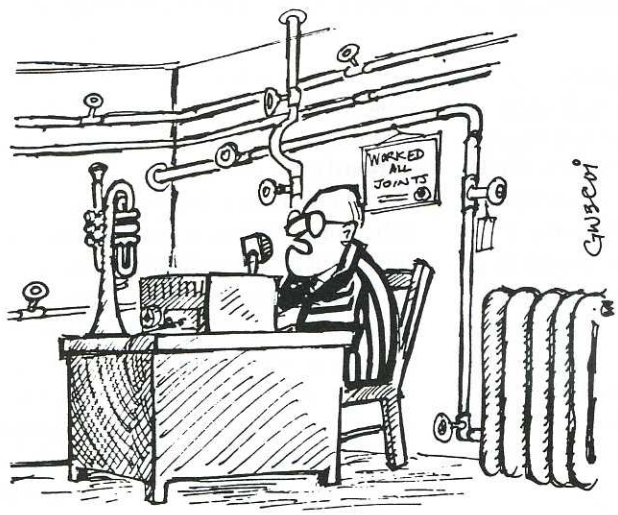
Set VR2 to its centre position and adjust VR1 to give the sort of volume that would be used for normal listening. The tone controls should then be set as required. When it is desired to reduce the volume to a background level VR2 should be employed; this will automatically bring up the bass without the settings of the tone controls having to be disturbed.

Extra Pre-amp.

This is a very simple addition employing a low-mu triode giving a voltage gain of approximately 12 to give additional amplification for very low output pick-ups. The valve used may be a 6C5GT/G (USA) or an L77(Marconi-Osram). There are only five other components, including a repositioned R_L.

The extra stage takes up very little room and there should be ample space for it close to the volume control VR1 so that the connecting lead (x–y in the circuit diagram) may be as short as possible. Likewise, the lead to the grid of V3 from the input sockets should also be short.

NEXT TIME – THE MAIN AMPLIFIER



"... I'M STILL VERY MUCH A VALVE MAN...."

News & Events

Due to delays in assembling the new full catalogue, **The Vintage Wireless Company Ltd** has issued an Abbreviated Component Catalogue dated July 1989. Further details on Bristol (0272) 565472.

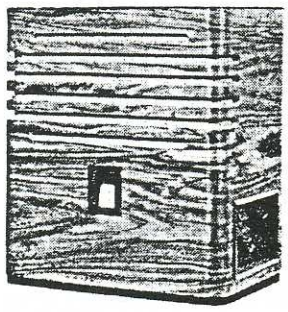
More **News & Events** on page 27...

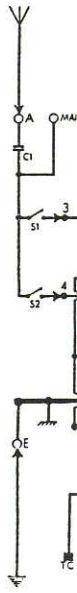
If you offer a service or are staging an event of interest to vintage radio enthusiasts, send full details to Radio Bygones, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ, and we'll give it a mention.

Items for inclusion in our next issue, due out on 24 October 1989, must reach us by October 5.

The RI 'Airflo'

by Eddie Phillips





The old-established firm of Radio Instruments Limited entered the domestic receiver field briefly just after World War II and produced a few models of somewhat unusual design. The 'Airflo', which is the subject of this issue's Profile, was certainly unlike any other set on the market when it appeared in 1946 for it had a small, edgewise-on, drum tuning dial of the type employed last, notably by EMI, some 15 years earlier. Apart from a rather severe loudspeaker grill the dial alone occupied the front of the large, plain wood cabinet, the controls being recessed into the bottom right hand side. The circuit was that of a 4-valve, 2-waveband (medium and long) superhet for AC mains operation; except for the use of reasonably up-to-date Mazda octal valves it reflected the old-fashioned cabinet design.

Input Circuits

The aerial input is to either primary winding of two RF transformers (MW and LW) making up the first section of a capacitance-coupled band-pass tuner. The second section has single coils for MW and LW, that selected by the wave-change switch being directly coupled to the control grid of the frequency-changer (V1, TH41). The local oscillator also has separate sets of coils for the two wavebands with comprehensive trimming and padding arrangements employing iron dust cores and fixed and variable capacitors. All the tuning coils, RF and local oscillator, together with the gang capacitor, are contained in a screening can mounted beneath the chassis. It seems rather a pity that RI did not go the whole way and have the wave-change switch in there as well.

IF/Detector/AGC

The IF signals at 450kHz are coupled by a transformer having air-cored coils with trimming capacitors to the IF amplifier (V2, VP41). This valve is operated without the standing bias of –4V specified by the makers, but on the other hand its screen voltage is reduced to 90V instead of the recommended 250V so there is probably no danger of its being over-run. Its screen grid shares a common decoupling resistor with that of V1.

The second IF transformer has a tapped secondary feeding the detector diode (part V3, HL42DD). The AF signals are taken from the bottom of the secondary winding via a filter network consisting of a 47kΩ resistor flanked by two 100pF capacitors and thence to the volume control, which acts as the diode load resistor. Following usual practice this returns to the cathode of the double-diode-triode to prevent the detector from being biased. The second diode of V3 acts as AGC rectifier with a delay voltage of approximately 1.5V furnished by the cathode bias of the triode section. It is this latter which provides one of the most unusual features of the Airflo. It is, almost uniquely, a variable-mu valve and has AGC applied to it as well as to the frequency-changer and IF amplifier stages. Two levels of AGC voltage are used, that for V1 being significantly higher than that for V2 and V3. The AGC is shorted out when the pick-up sockets are used; at the same time the control grid of V1 is shorted to earth to mute the RF input.

AF and PSU

The amplified AF signals at the anode of V3 are resistance-capacitance coupled to the grid of the output valve (V4, PEN45); included in the circuit is a variable tone control of the top-cut type consisting of a 250kΩ potentiometer and a 0.02μF capacitor. There is also fixed tone correction by a 6.8kΩ resistor in series with another 0.02μF shunted across the primary of the output transformer.

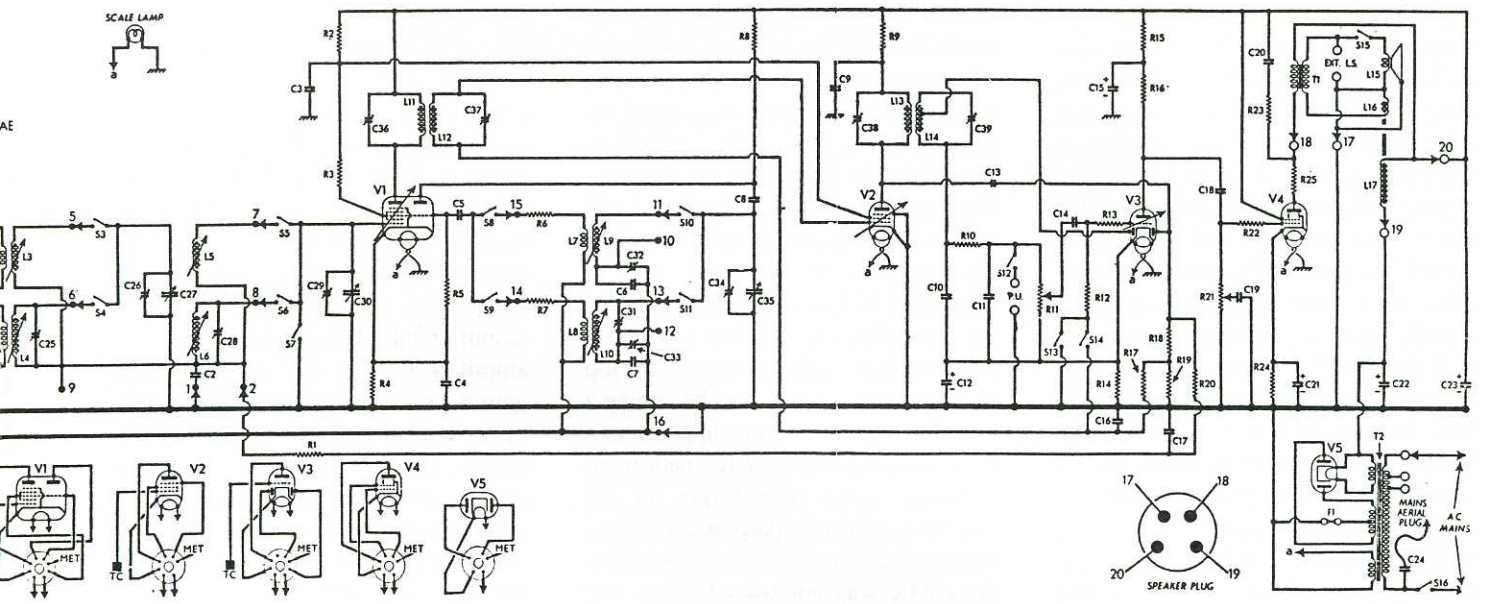
The loudspeaker is of the energised type with a hum-bucking winding in series with the voice coil. The field coil acts as the smoothing choke, dropping approximately 100V. The HT is provided by a conventional double-wound mains transformer and an indirectly-heated rectifier (V5, UU6). An all-too-rare safety device is the fitting of a fuse between the centre-tap of the HT winding and chassis. Another old practice was recalled by the fitting of a 'mains aerial' facility, in other words a small capacitor connected to one side of the mains input.

VFM?

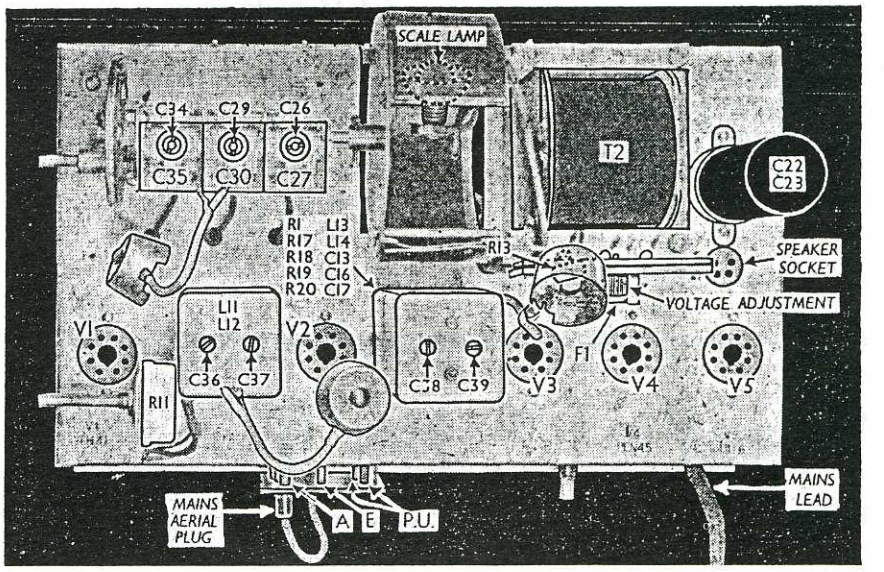
The privilege of owning a set that would have been sensational at the Radio Show of fifteen years earlier but was decidedly *déjà vu* in 1946 did not come cheaply; the Airflo cost no less than £19 10s. plus £4 3s. 11d. purchase tax, representing three or four weeks wages for many prospective buyers. One could have had two DAC90s, and change for the same amount! ***RB***

CHAS E. MILLER COMMENTS...

I remember the RI Airflo well, as it was sold by the shop where I worked during 1948/49. As Eddie remarks, it was curiously old-fashioned in design and to the young service engineer it appeared ridiculously dated. It would seem that the customers thought so as well and it was not a great seller. The performance, however, was good, both sensitivity and selectivity being rather better than the average at that time for a four-valve superhet. This was undoubtedly aided by the Mazda valves used; although the non-standard octal base was an irritant their electrical efficiency could not be faulted. I wonder why, though, Mazda made the triode section of the HL42DD



▲ *Circuit diagram of the RI 451B Airflo AC superhet*



Plan view of the chassis. The HT circuit fuse F1, which is mounted on the voltage adjustment panel, is almost completely hidden by the top cap connector of V3

variable-mu? Was this in anticipation of the widespread use of AGC on the AF stages? If so, it did not materialise.

AF AGC

Writing the above caused me to consider what exactly happens with AF AGC. Suppose the set is receiving a station that is subject to fading and at best is just on the borderline as regards having sufficient signal strength to overcome the delay voltage and to start the AGC working. When the triode receives its dose of negative bias its anode current will fall and with it the cathode voltage. This in turn will reduce the delay voltage so that AGC will still be generated even should the signal strength fall below the level necessary to maintain the output from the loudspeaker. Ah, but at that point the bias on the triode also will fall and by increasing its anode current raise the delay voltage again. It sounds as though the time constants in the circuitry would have to be very carefully chosen. I think if I were using AF AGC I should have the delay voltage fixed by using a negative bias derived from a resistor in the HT– lead. It might be worth trying some time as an experiment, although the general lack of enthusiasm for AF AGC would suggest that the results do not justify the complication.

Other RI Models

The only other RI models that I can recall were the 'Aria' and the 491 which were contemporary with the Airflo. The Aria was a smallish AC/DC set with a plain wooden cabinet having a 'speaker grill similar to that of the Airflo. It had a conventional dial, however, and three wavebands. The valves used were again by Mazda, this time the TH233, VP133, PEN453DD and the U403. The odd thing about this range was that the numbers did not indicate the true heater current as was the normal practice for Mazda. For

instance, the PEN3520 had a heater voltage of 35V and a current of 0.2A; the PEN1340 figures were 13V and 0.4A respectively and those for the PENDD1360 were 13V and 0.6A. This long established Mazda custom was abandoned for some reason or other in the octal AC/DC range and whilst the figures still indicated the heater voltage the current was 0.2A and not 0.3A as would be expected. The dial lamps in the Aria were wired in parallel with the rectifier anode surge limiter which meant that they were at mains voltage with respect to chassis. The designers must have had a good deal more faith in the insulation of the lampholders than I would have had! This practice, combined with the use of only a single-pole mains switch, boded ill for anyone changing a dud bulb with the set switched off but not unplugged from the mains.

The Aria was not too bad a performer but it suffered like the Airflo from its dated appearance which presumably inspired the firm's stylists to try something different for the model 491. This had a semi rounded-off dark wood cabinet with twin 'speaker grills (but only one LS!) angled at either end and a central dial. A table radiogram version was produced as well; inside both was another 'short' superhet using 4V Mazda octals. The usual problem arose of getting adequate output from the output valve on 'gram' in the absence of a normal AF amplifying stage and RI resorted to converting the IF stage for this purpose. The pick-up was switched into the grid circuit of the IF valve and the AGC line disconnected. At the same time a capacitor which normally decoupled the HT feed to the anode had its lower end removed from earth and taken to the top of the volume control, thus becoming a coupling capacitor. One supposes that these shenanigans must have made more economic sense than fitting an AF amplifier in the first place but it is not a solution that appeals to me. In the event the public was not wooed either and Radio Instruments Limited sets soon faded from the scene.

Burrell

By coincidence whilst planning these notes I happened on the service sheet for a Burrell receiver. The name is more familiar to most people, I suspect as that of a well-known make of steam traction engine. Perhaps it was the same concern; if a motor-cycle firm (AJS) could make radio sets, why not they? At first glance the circuit looks like that of a typical three-pentode TRF, but closer examination reveals that it is in fact a superhet, the first pentode being a self-oscillating mixer, the second an IF amplifier and the third, as expected, the output. The detector is a 'Westector', which also provides AGC to the IF amplifier only. This set also lacks an AF amplifier and the way in which extra gain is provided for gramophone pick-up use is novel and possibly unique. The output from the pick-up is used to modulate the IF which is then amplified and detected as for radio. I cannot remember ever having seen a Burrell set; does any reader have any more information on the marque? By the way, the receiver mentioned is the subject of Trader sheet No 9. You will look in vain for it in the later indices published in the 1970s, which reminds me that I must somehow con Ray into looking through all the old pre-war indices to see if there are any other later omissions.

RB

COMPETITION

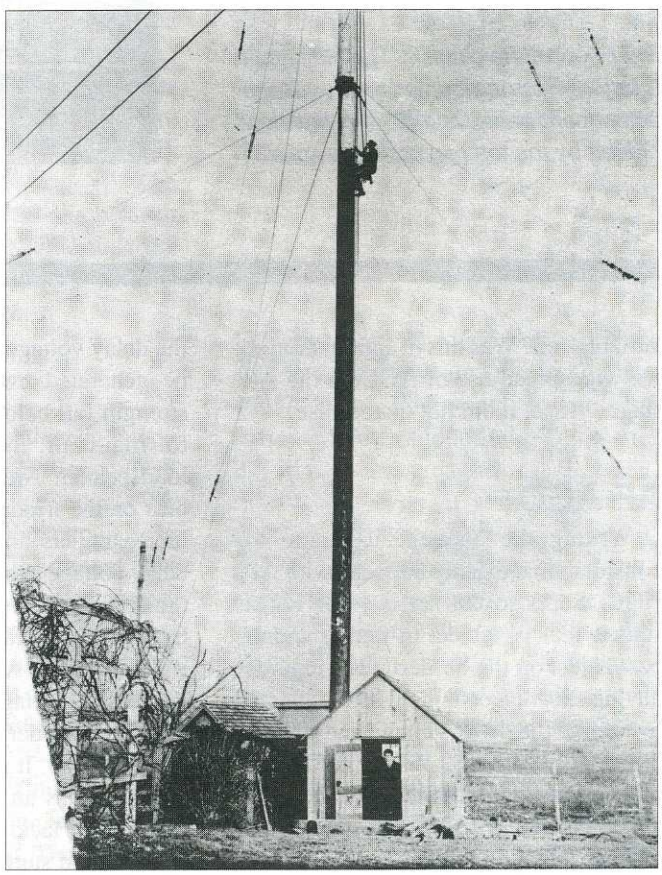
Where is it? - No. 1

Each issue in *Radio Bygones*, we'll feature for your puzzlement and delight a photograph of a radio installation of days gone by, drawn from the archives of GEC-Marconi Ltd. And we'll be asking the question, where and when was it taken?

We kick off with what could be described as a real toughie. No doubt some knowledgeable person out there will prove us wrong by placing it instantly, but just in case you don't, we'll accept the station name plus a date correct within five years. We did think of giving you a clue, but decided it would probably just lead you up the garden path. After this, they can surely only get easier!

Send your entry, on a postcard or the back of a sealed-down envelope please, addressed to Radio Bygones, 8A Corfe View Road, Corfe Mullen, Wimborne, Dorset BH21 3LZ. The first correct answer drawn from the editorial biscuit tin on Friday, October 6 will win for its sender the prize of a year's subscription to *Radio Bygones*! The answer, and another 'Where is it?', will appear in our next issue, due out on October 24.

Don't forget, the closing date for receipt of your entries is Friday, 6 October 1989. The Editor's decision is final.



Photograph by kind permission of GEC – Marconi Ltd

A Gas-mask Box Receiver

You can't keep a good editor down and even in the throes of a World War, with death and destruction from the air threatening the population of the United Kingdom, one of the well-known radio magazines contrived to exploit that ancient British trait of, whenever possible, making use of materials to hand. In this case it was a home-built, 2-valve midget portable to be housed in the cardboard box in which your gas-mask was supplied by the ARP authorities. The circuit was very simple – just a triode grid-leak detector, transformer-coupled to a low-power triode output driving a single earphone. The batteries fitted into the box with the receiver, thus making it self-contained. The 'HT' of 27V tapped at 19V was supplied by three 9V grid bias batteries in series and the LT by a 3V No 800 cycle-lamp battery. Prospective present-day constructors might care to note that a filament rheostat adjusted to 5Ω was fitted to reduce the voltage to 2V for the valve filaments and that specific directions were given as to which types of triode (they're all designed for different jobs) were to be used in each position in keeping with the valve manufacturer's recommendations.

Space was saved by mounting the tuning coil around the detector valve. The tuning and reaction capacitors were of the solid-dielectric type and thus needed very little room. The only other control besides these was a simple single-pole on/off switch breaking the filament supply. The aerial was a length of rubber-covered flex fitted in the place of the original string by which the gas-mask box could be carried or slung over a shoulder. For radio reception the latter was the better mode as the aerial was fully extended but the reader was warned that a certain amount of directivity would be noted. Thus anyone seen to be repeatedly spinning around on his heels in the street whilst holding an earphone in one hand and a gas-mask in the other could be assumed to be a DXer striving to capture an elusive station.

When the earphone was stored within the box it then assumed the appearance of an ordinary gas-mask. With hindsight the use of such a receiver seems to have been fraught with problems. For instance, was the constructor supposed to leave his real gas-mask at home when wandering about listening in the streets? If so, what would happen if he were stopped by an air-raid warden or caught up in one of the periodic gas-mask tests in which tear gas was let loose in city streets? Or did he draw attention to himself by carrying his real mask as well and thus give the appearance of toting two of them around? Suppose he made a mistake in the heat of the moment when tear gas was encountered and ended up with a No 800 battery jammed up his nostrils?

The other and more serious danger would be that he was likely to be accused of being a fifth-columnist or Nazi spy, carrying an illegal radio set with which he was directing bombers, and this could well have led to his being lynched by an angry mob. On the whole it would appear to have been prudent to eschew this piece of ingenious design and stick to stamp-collecting or some other less dangerous pursuit. Fifty years on, however, the gas-mask set might be ready to make a more felicitous second début and should anyone wish to acquire a genuine cardboard box for the same the Editor would be pleased to pass on all enquiries. He doesn't know to whom, yet, just that he'd be very glad to pass them on! ***RB***

ASSUMED TO BE A DX-ER ....

IN OUR NEXT ISSUE

The History of Magnetic Recording

Vintage Years of Amateur Wireless

Receiver Profile – The KB FG50

plus all the usual features

Contents subject to last-minute revision

CLANG!

Following publication of the article 'The Early Days of *Radio & Television Servicing*' in Issue No 22 of *The Radiophile*, Pat Hawker has pointed out that he was in fact in charge of the London office of the IBA's Engineering Information Service, not Head of Engineering.

He also spotted a small slip of the word processor which rechristened Roy Wilkins as Ray. Apologies to all concerned.

Wireless Takes to the Road

Part 1

by Tim Wander

At the Earls Court Radio Show in October 1988, the BBC launched a new radio service –the Radio Data System – or as it is more generally known, RDS.

The quote the literature, RDS 'warrants an official launch as it marks the most significant development in radio technology and radio services since the introduction of the transistor thirty years ago which bred a new generation of portable radios'.

Simply, RDS is a data signal added to the audio on VHF FM broadcasts carried by all major broadcast stations throughout Europe. The data is used primarily for either display or control purposes at the listeners' radio sets.

The system has been developed jointly by the BBC and members of the European Broadcasting Union, and apart from increased equipment costs it is a free service. RDS will enable the radio to display what station the set is tuned to, such as 'BBC R4' instead of '93.5MHz'. It can also tune the set to the best signal automatically if the station is available on more than one frequency, and provide an accurate clock which even keeps track of Winter/Summer Time variations, and adjusts automatically when travelling across Time Zones.

An RDS radio will stay tuned to a choice of programme wherever you go. So, for example, if you are motoring from London to Glasgow, an RDS radio will automatically tune to the strongest signal, whether you're listening to Radio 1, 2, 3 or 4. And if you're listening to BBC Local Radio, the RDS set will automatically hand you to the next local station as you pass from area to area.

With multiple pre-programmed stations and automatically updating news/road reports, RDS abandons the traditional head-under-the-dashboard search for tuning knobs and represents a major step in in-car entertainment.

But what has RDS got to do with a magazine such as *Radio Bygones*, devoted to the history of radio? While looking at the RDS sets two questions occurred to me: Where did car radio begin, and who was the first to put radio on four wheels for entertainment? Not surprisingly the story begins with a young Italian and the company that still bears his name – Marconi.

Steam Omnibus

In early 1902, while Marconi was still basking in the public acclaim of his transatlantic success, his new Marconi Wireless Telegraph Company was investigating installing wireless aboard motorised vehicles.

The Marconi Company had experienced severe vibration problems with its mobile army sets mounted on horse-drawn wagons that were used during the Boer War [1]. However, Marconi recognised that a mobile wireless station could greatly aid radio experimentation. The working environment around Chelmsford was somewhat better than the South African plains, and a mobile station would also form an ideal publicity platform for his rapidly growing company.

At Marconi's request, the Thornycroft Steam Omnibus Company modified one of their steam 'motor-cars' by fitting a covered body, a very strong roof, windows all round and steps at the back.

The new Marconi 'wireless' omnibus used coal or coke and could carry enough for a 40 mile journey, provided that the boiler water could be replenished every eight or ten miles. The bus had two forward gears, 'fast' and 'slow', but the driver had to get down from his seat to change from one to the other.

The on-board wireless spark transmitter had a power of 110 watts input and a range of seven miles. The noise of its spark when transmitting could be heard over 150 yards away. The vehicle's boiler system was initially used as an earth, but it was found more effective to drag some 15ft of wire-netting behind the car coupled by chains.

As to the success of the vehicle, I'll leave that to the reader.

Report on Motor Car as Applied to Wireless Telegraphy. 23rd March 1902

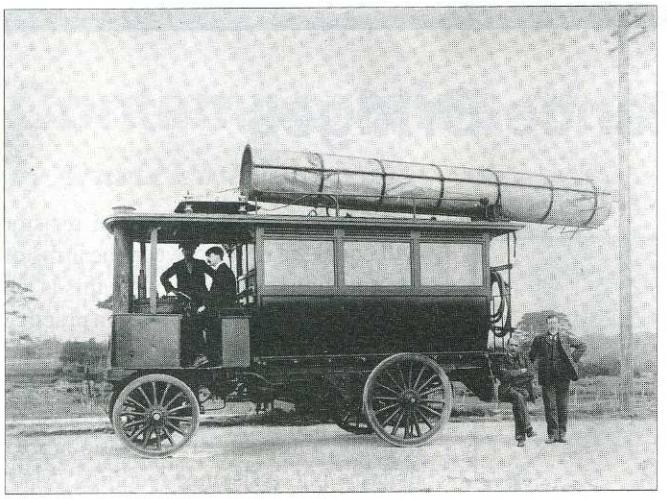
'In making the following report, I do not wish to do more than draw attention to various points in the existing and future motor cars which may affect the progress of the application, and to suggest improvements that have so far occurred to me. Further, as the existing car has not yet been actually tried in connection with wireless telegraphy, but only run in the ordinary course, it may transpire that certain of such suggestions may prove worthless or unnecessary, though at present they seem to have some value.

Thornycroft's Steam 'Bus

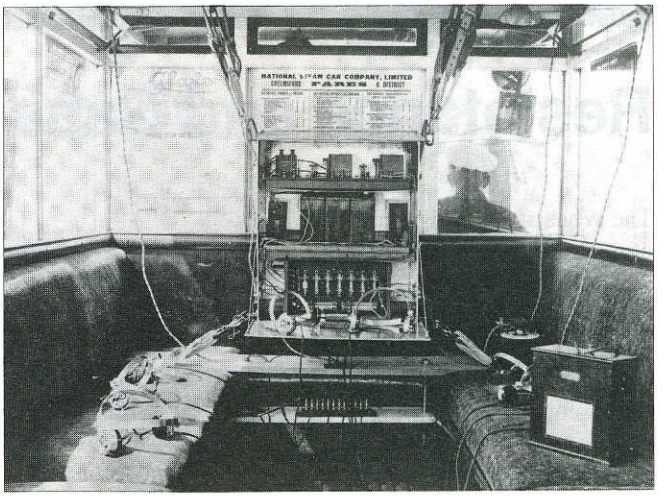
This car having been obtained as the only one at all suitable for the purpose and able to be delivered in the required time, it can hardly be expected that it should entirely meet with the full requirements. There are however various matters which should be considered therewith.

Motive Power

Contrary to the opinion of the makers, I do not think coal or coke a suitable form of motive power producer, owing to the great bulk to be carried and the amount of dust created in the handling; further it cannot be bought "anywhere" as, owing to the peculiarity of the boiler and firegrate, it is by no means advisable to alter the nature of the coal often, and there are also but very few coals suitable for the work, and these only obtainable in large towns or seaports. The use of any sort of coal must be condemned, as it would necessitate frequent stoppages when unsuitable fuel was being used. The reasons being that



The Marconi Steam Omnibus equipped with wireless



Inside the Marconi Steam Omnibus

Photographs by kind permission of GEC – Marconi Ltd

most coals leave a quantity of ash which chokes up the flues and stops a good draught, or clinkers the grate, or both; also a coal giving off much smoke renders the owners liable to penalty under the "Locomotives on Highways" Act, since it would emit "visible vapour".

Handiness

The car is not a handy one to drive as it is more than one man can manage for a long period, for instance he has: steering, steam to engine, pump, water gauge, firing, water lifting, blast, water tanks, cylinder lubricator, all requiring more or less constant attention, while two of which can never be long left out of hand on an average road.

Further the method of firing is crude and primitive in the extreme, cleanliness being left out of the question. Should too much steam be made when standing or up a long gradual incline the firehole lid has to be left open, a source of great danger to the boiler, and unless the road is well known this is a danger impossible to avoid.

Lubrication

So far as this has been tried the result has been good, but it is my firm opinion that a careless driver would soon ruin the bearings, since each has a separate lubricator requiring attention and in no instance is it automatic or sight feeding, and among the number of lubricators that require filling, it would be very easy to miss at least one, if not more.

Power

The power of the engine is all that is required in fact even more, for on more than one occasion the wheels skidded round without moving the car, showing that there was insufficient grip on the wheels, for the power required or developed.

The change of speed from fast to slow, or vice versa, or throwing the engine entirely out of gear, is also very primitive, and necessitates the driver or his assistant getting down from his seat to make alteration.

Gearing

The whole of the gearing is strong and well made, but should be much better covered to keep out sand and grit, which now have free access to these parts and greatly increase wear and tear, and as before observed the lubrication is proportional to the care of the driver. The method by which the drive is transferred to the wheel rim is excellent and should be adopted wherever possible.

Springs

The springs from the wheels to underframe are certainly sufficient for the purpose and well designed but it would be advisable to fix the body on a further set of lighter springs independent of the frame so as to avoid the excessive vibration now felt.

Wheels

For ordinary roads the wheels are excellent, but for extraordinary purposes they are too narrow and give insufficient grip.

Coal Provision

This is insufficient for general purposes and will not take the car more than 40 miles unless coal is carried loose in bags or boxes, which creates excessive dirt and dust.

Water Provision

This is also quite inadequate for the purpose especially in a dry country, eight to ten miles being the maximum distance that can be covered without a fresh supply.

General Remarks

In spite of the above criticisms the present car is sufficient to prove to the firm the utility and adaptability or otherwise of motor cars and numerous useful and reliable experiments can be carried out, but I would recommend that a special car be built and equipped, should a demonstration be proposed before the authorities, rather than risk condemnation owing to the unsuitability of the car. Further the route selected for experiments should if possible have a good water supply and be within easy access of coaling depots.'

How long the Company had its steam omnibus and what happened to it eventually is not on record, nor is there any trace of the registration number it may have had. If any reader could fill in any of its history, the author would be pleased to hear via *Radio Bygones*. **RB**

Reference

[1] 'Wireless Goes to War - the First Time', *Practical Wireless*, May 1989.

Resistance and Capacitance Bridges

The Wheatstone bridge that is the basis of measuring instruments for resistance and capacitance takes its name from Sir Charles Wheatstone (1802 - 1875) who invented among other things the concertina musical instrument and the stereoscope before turning to electrical devices and, with W F Cooke, taking out the first patent in England for an electric telegraph. He did not actually invent the bridge, which was the brain-child of a chap called Samuel Hunter Christie, but it was he who demonstrated its usefulness.

Principles

In the basic bridge circuit four resistors are arranged as shown in Fig. 1. 'M' is a centre-zero milliameter. If the values of the resistors are such that the voltage at 'A' is equal to the voltage at 'B' there will be no potential difference across the meter and it will not give any reading, at which stage the bridge is said to be balanced. Very accurate commercial bridges are made to measure resistances to fine tolerances and these are of immense assistance in telegraph or telephone use for determining the exact position of faults on lines. The specific resistance per yard of the cables used is known and from this the correct resistance of a certain length of line may be calculated. If the actual line resistance as measured on a bridge is below the norm a reverse calculation will locate a fault as being x yards down the cable.

Practice

For radio servicing work a modified form of Wheatstone bridge is employed. In Fig. 2 the places of R3 and R4 have been taken by a potentiometer with its wiper taken to one side of the meter. This means that the pot. can be adjusted so that the voltage at 'B' can be made to equal that at 'A', whatever the values of R1 and R2. Let's look at this more closely.

Supposing that the value of R1 is 100Ω and that of R2 is 25Ω, the voltage across the latter will be one quarter of that across the former. We have seen that the resistances of R3 and R4 must be

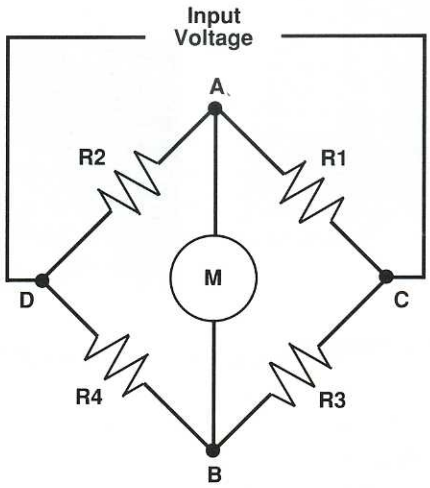


Fig. 1 - The basic Wheatstone Bridge

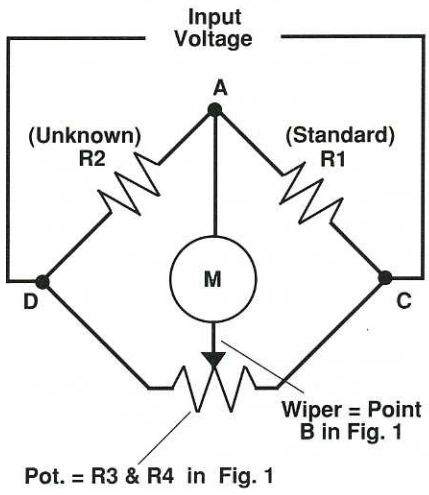


Fig. 2 - A practical application of the bridge

chosen to make the voltage at 'B' equal to that at 'A' for the bridge to be balanced, but note that this does not mean that R3 and R4 must have the exactly same values as R1 and R2. The requirement is that they should have the same ratio of difference. For instance, R3 could be 250Ω and R4 1000Ω. Thus R3 and R4 could actually consist of (say) a 5000Ω pot. This could be adjusted to provide a range of ratios from 1:1 to virtually 5000:1, making it possible to balance the bridge with a considerable variation in the values of R1 and R2.

Following on from this, if R1 is made fixed at, say 1000Ω and R2 consists of a resistor of unknown value, when the pot. is adjusted to balance the bridge the ratio between R1 and the unknown resistor will equal the ratio between the arms of the pot., and if we know what this is we can calculate the value of R2. In practice we don't have to resort to pencil and paper because the pot. will have some kind of dial attached to its spindle to translate automatically the ratio across its arms into resistance readings. Also, provision will be made to switch in different values of R1 to enable a wide range of values for R2 to be measured, 1000Ω and 100 000Ω being typical choices.

Capacitance

The same bridge principle may be used to measure the capacitance of unknown capacitors by comparison with known standard values. It is not necessary to employ a variable capacitor as the one half of the bridge, a resistive pot. still being suitable to establish the ratio difference, but the voltage source has to be AC. This can in fact be 50Hz drawn from the mains via a low voltage transformer. The meter too must be replaced by something capable of measuring small changes in AC voltage, which may be nothing more complicated than a pair of earphones, the pot. being adjusted for minimum hum. A rather more picturesque method is to use a 'magic eye' to give visual indication; when the pot. is adjusted accurately the shadow will be at minimum. A conventional mains transformer can be used both to give 6.3V for the heater of the magic eye and as the source of the bridge voltage. Around 200V HT will be needed for the anode and target of the eye and this voltage can be used to carry out leakage tests on capacitors. The usual method is to place the HT and a small neon lamp in series across the capacitor to be checked; any leakage will be shown up by flashing of the neon with the frequency of the flashes providing an indication of the amount of leakage. Anyone seeking more information on constructing a resistance/capacitance bridge is referred to the *Practical Handbook of Valve Radio Repair* by Chas. E. Miller, which gives a full circuit and a pattern for a dial. ***RB***

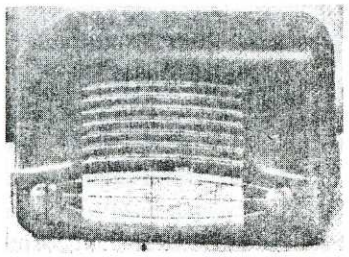
Contemporaries of the DAC90

by Arnold Costain

Whilst not disputing that the Bush DAC90, featured in the last issue of *The Radiophile*, was a very good set, I can't help wondering why no one ever seems to mention its competitors. Virtually every well-known manufacturer and some not so well-known had a stab at making a compact set (as opposed to an out-and-out 'midget') but many of them are now almost forgotten.

Cossor

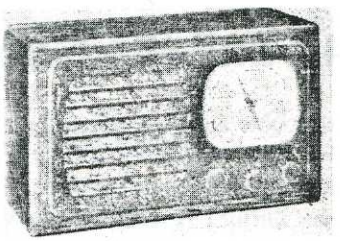
For instance, when do you ever hear of the Cossor 464, even though it was technically far superior to the DAC90? The 464 was designed on the same lines as the 90 in that it was a full-size chassis in a small cabinet but it had three wavebands instead of two, with the option of internal or external aerials and a genuine AC-only power supply with double-wound mains transformer. Octal valves were used, the line-up being OM10 (ECH35), OM6 (EF39), OM4 (EBC33), 6V6G and 6X5G. Most sets using the latter as rectifier powered its



heaters from the same winding as that used for the other valves, but in the 464 the 6X5 had its own filament winding on the mains transformer to obviate the danger of heater/cathode shorts. It was released at the same time as the 90 – April, 1946 – and cost only 15s. 7d. more at £14 16s. 3d. as against £14 0s. 8d., a small extra price for the improved specification.

Rees Mace

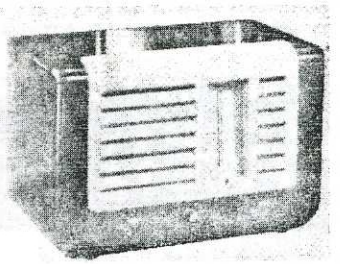
Then there was the RM Electric 'Cameo' U54A, released in June, 1946. It was a compact 4-valve, 3-band superhet for AC/DC mains with the option of internal or external aerials. It used Mazda valves (TH233, VP133,



HL133DD, Pen383, U403) and was housed in a very handsome bakelite cabinet with an 'aeroplane' dial which I find vastly preferable to that of the DAC90. It cost £15 plus purchase tax.

Ekco

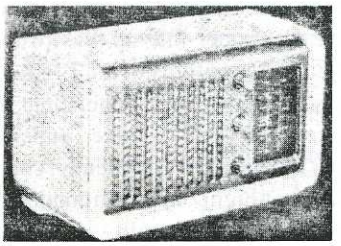
In the same month Ekco released the U29, an attractive compact set for AC/DC mains and covering medium and long waves. It had an internal frame aerial with provision for connecting an



outside type and its line-up was CCH35, EF39, Pen453DD and CY31. Both poles of the mains input were switched and the dial lamp was shunted so that the set would continue to work even if the bulb failed, making it again technically superior to the DAC90. Its price was 13gns. plus purchase tax.

Ferranti

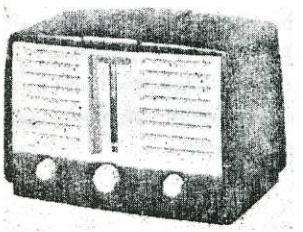
Ferranti entered the market with their model 547, a 2-band AC/DC superhet using American type valves (12K8GT, 12K7GT, 12Q7GT, 50L6G/GT, 35Z4GT) again having the choice of



internal or external aerials. Its loudspeaker was large for the class of set and was of the energised type, the field winding being used for HT smoothing. The cabinet was well-designed and the price was 14gns. plus p.t.

GEC

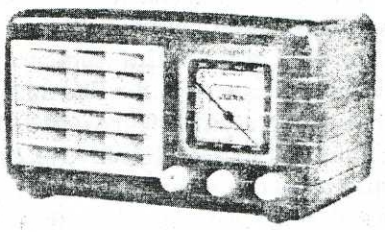
GEC's 'Compact' (its actual name) was a 5-valve, 3-band superhet for AC/DC mains, using Marconi/Osram 0.16A heater valves (X76M, W76, DH76,



KT76, U76) and a barretter (161). There were actually two versions, released simultaneously, one of which had an energised 'speaker and negative bias for the valves obtained by a resistor in the HT- line, and the other a p.m 'speaker with an early example of a section of the output transformer being employed for HT smoothing. Conventional cathode bias was used for all valves. Both sets had a permanently attached 'throw-out' aerial and each cost 14gns. plus p.t.

Ultra

Ultra Electric's U405 actually pre-dated the DAC90 by nearly six months, being one of the very first post-war receivers and appearing in November of



1945. It was an AC/DC 5-valve, 2-band superhet in a good-looking, two-tone bakelite cabinet

continued on page 29

The Marconiphone T14A and the Goblin Time Spot

Although it is generally held that the best days of EMI as far as domestic radio receivers are concerned were behind the firm by the end of World War II, it did in fact produce some very good sets which demonstrate that it was still one of the leading manufacturers. An example was the Marconiphone T14A, a 4 + 1 superhet having five wavebands, long, medium and three semi-bandspread short-wave ranges giving continuous coverage between 13.3m and 52m. One of these sets came our way recently with a note to the effect that it produced not a sound in its loudspeaker but that the latter was running red hot!

Dead Short!

There could be only one explanation of the latter phenomenon, of course, that being a dead short on the HT line causing the field coil to pass an enormous excess of current. This diagnosis was confirmed quickly by a resistance test, after which came the job of locating the cause of the short. The usual service engineers' technique was used in which the common HT+ point carrying the most feed cables is found and the latter disconnected one by one with the resistance of each to chassis being checked at the same time. Once the cable which registers a short to chassis is identified further investigation along its length soon pin-points the cause of the trouble.The use of a low ohms range enables a fault to be located as being on one side or other of a low resistance component such as the primary winding of an IF transformer.

In the T14A a 0.02µF capacitor is shunted directly from the HT+ line to chassis to act as an RF by-pass and it was this that had gone dead short. Replacing this was, of course, only the start of the actual repair job. All EMI sets of a certain age, as 40-plus used delicately to be termed, will inevitably be suffering from a surfeit of leaky capacitors and it is folly not to replace all the paper types in one go. This is especially true of those coupling the volume control to the grid of the double-diode-triode and the anode of the latter to the output valve grid, also those used to decouple the AGC line to chassis. On the other hand the low-value capacitors used in tuned circuits appear almost to be indestructible and it is seldom indeed that any needs be changed.

In this particular case, before the full capacitor-changing operation was carried out, the shorted 0.02µF was simply cut out and the set was given a test run to discover if the mains transformer, rectifier and field coil had survived their ill-treatment, which if not would have made it difficult to carry out an economic repair. In the event they appeared almost incredibly to have suffered no harm, but certain other discrepancies were noticed.

Valve Changes

The output valve was a 6V6G in place of the correct KT61 and the IF amplifier was a 6K7G instead of a KTW61. In the case of the output stage the bias requirement of the KT61 is much lower than that of the 6V6 at –4.4V as against –12.5V and the cathode resistor fitted, which is only 100Ω, just cannot provide anything like this latter amount. This means that the 6V6 would be drawing far too much HT current with consequent overloading of the output transformer and the rest of the HT supply items – as if they hadn't been overtaxed enough already! In addition the sensitivity of the 6V6 is well below that of the KT61. This last also applies to the 6K7 as compared with the KTW61, which has a much higher slope. Having both incorrect valves installed at the same time robbed the set of a great deal of its potential performance, as was demonstrated by the dramatic increase when the proper line-up was restored. Indeed, the sensitivity of the T14A on all bands is a good deal better than most contemporary four-valve superhets, aided by the X81 frequency changer which has a high conversion conductance factor. The sound quality is extremely good and this is a set which should give someone much pleasure in the future.

Life Begins...

Next, a report on a virtually unique phenomenon, a receiver well over 40 years of age that did not need a single component replacing and, dragged out of long retirement, produced excellent sound quality and performed generally to a much higher standard than the EMI set whose virtues have just been extolled. What, we hear you ask, is the make of this paragon amongst vintage sets? Surely it must be from the very top drawer of makers? Actually, no. It is a Goblin 'Time Spot', and not the familiar model with the sloping-front cabinet and twin circular dials. This set, the gift of the widow of an old friend, has a reasonably compact rectangular cabinet measuring 17in wide by 12in high by 9in back to front, with about 1in at top and bottom of the front chamfered off at approximately 45°. A single dial on the right-hand side carries both the wavelength scales and the clock face, the rest of the front being taken up by an expanded metal grill, behind which sits an 8in Plessey energised loudspeaker. The two-piece back panel is secured by four screws which are of such good quality that one feels at once that here is a set which has been well designed down to the last detail.

The circuit is a perfectly straightforward 4-valve plus rectifier superhet using a 6K8G frequency-changer, 6K7G IF amplifier, 6Q7G detector/AGC/AF amplifier, 6V6G output valve and 5V4G rectifier. Although the last two mentioned bear US Army VT- numbers it appears that they are originals and would have been bought in by the makers from an ex-Government source. Indeed, all components seem to have been selected eclectically. The mains transformer is also by Plessey and the smoothing capacitors (an 8 + 16µF unit dated June, 1947) is by BEC, the coil pack by Wearite

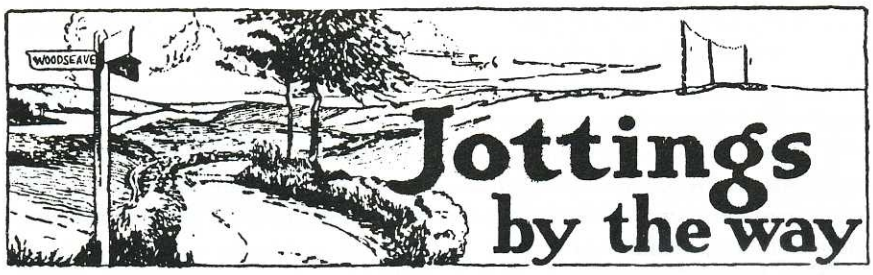
and most of the coupling and decoupling capacitors by Sprague (the few others are two very high quality Dubilier flat mica types and a single cardboard tubular from the same firm). The resistors are by a number of different firms, including some unmistakably Philips'. The IF transformers have not yet been identified positively but they are of singularly robust and efficient design. The tuning capacitor is again a Plessey component. Further pleasing small design details are the use of an adjustable metal strut to hold the dial assembly rigidly upright and of a wooden retaining strip for the loudspeaker baffle board so that it can be released completely from the cabinet by loosening two screws.

Despite the clear evidence that this set had been stored for some time in damp surroundings the wound components, including the mains transformer, showed not the slightest sign of having deteriorated. The wisdom of using the best available capacitors is demonstrated by the fact that none of them needs to be replaced. The main electrolytic, by the way, is rated at 450V although the maximum from the rectifier is approximately 325V. Clearly, Goblin worked on the old Victorian principle of make it strong enough and it will last rather than the modern philosophy of cutting down safety margins to the bone. We did, rather wistfully, try to find an excuse to change the tubular cardboard capacitor mentioned above but finding that its insulation resistance was beyond reproach we left it *in situ*.

Time Machine

So was there anything at all wrong with the Time Spot? Well, the wave-change switch had to receive a dose of cleaner before all three bands (long, medium, short) were operative, the set appearing to have been left switched to MW for countless years. When all sound faded away intermittently the cause was a bad heater pin connection on the 6K7G valve holder, which responded at once to a snifter of cleaner. Also, let it be whispered, the clock that gave the set its very *raison d'être* had developed some very strange habits. At first it steadfastly refused to work at all, but after an hour or so started to go backwards. Later on it was seen to have changed its mind and was now registering correctly, but only for a short time before going into reverse again. After a night's rest it consented to run properly but for how long is anyone's guess.

These minus points aside, it can truly be said that few other sets have given such satisfaction on test as the Time Spot. The sensitivity and selectivity on all bands, and the sound quality are all excellent. By good fortune there were a couple of local radio stations putting out jazz and popular dance music of the 1940s at the time and the reproduction of these was first rate, with ample bass response without the loss of the treble to produce the 'mellow bellow' of so many contemporary sets. A check of the circuitry around the output stage showed that negative feedback is introduced to the AF amplifier from the output transformer by a potential divider in its cathode and that the output valve cathode resistor is not by-passed. These two comparatively simple devices are highly successful in the Time Spot. Whether or not the clock will resume normal working procedures only time will tell (sorry!) but here is a receiver that anyone would be happy to use – certainly we will. Full marks, Goblin! ***RB***



by Chas E. Miller

First of all, I would like to thank everyone who has taken the trouble to write or telephone to wish *The Radiophile* well in its new guise. All were insistent that the special 'flavour' of the magazine should not be changed and I have been happy to assure them that neither Geoff nor I has the slightest intention of doing this, as you will find when you read through this issue. You will notice too that The Radiophile Booklist is still delivered with your magazine and that there is a lot of good reading matter on offer. The Friends of The Radiophile Get-Togethers will continue to be held every six months at Shifnal and the next of these will take place on Sunday, September 17 next. I look forward to having the opportunity of chatting to a lot of readers, old and new. Meanwhile, I am going to be extremely busily engaged in getting out the first issue of *Stories and Souvenirs*, a new magazine of fiction and nostalgia. You can read full details of this in the book list.

Tales of the Unexpected

Talking of nostalgia, I have had two rude shocks recently when assuming that some familiar-sounding names were in fact those well-known to me. The first occurred when I was on holiday and spotted, in a garage, a newish looking poster with the acronym ITMA largely displayed. When I inspected it more closely I found to my chagrin that it represented the Imported Tyre Manufacturers' Association. This, however, was as nothing to the shock I received only last night. In the television schedule printed in my daily paper (which I invariably con for vintage films) there was a one-word title for something to be shown at 11.05 p.m. It was simply called 'Geraldo' and in my innocence I thought it might be a profile of the well-known bandleader. Thus I sat expectantly through the usual interminable dreary advertisements and trailers until nearly ten past eleven, when the programme actually started. It turned out to be an American chat show devoted to customers of a male brothel talking about their experiences, which might be great for viewers in search of vicarious titillation but hardly appealing to someone hoping to hear some good music. Can I set the Trades Descriptions people on to our local TV station, do you think?

Changing Times

The time switch here at Larkhill for the off-peak electricity was changed recently. I was rather sorry to see the old one go for it had a measured tick-tock just like that of a long-case clock. The new one is utterly silent and is, so I am told, radio controlled with pulses radiated by the Droitwich Radio 4 transmitter at midnight and 7 a.m. (GMT) activating the switches. Certainly the changeover is very precisely timed, with two audible clicks from the mechanism with a two second interval instead of one as with the old timer. I presume that there is a make-before-break action so that there will be no sparking when the one switch opens, to preclude 'spike' damage to the radio unit. All very clever, but from my point of view there is another drawback apart from losing the friendly sound of the old clock. Because this was set to switch the cheap-rate off at 7.45 GMT and it was too much trouble for the Electricity Board to change it over when the clocks were put forward for Summer Time, half-price electricity was available until a quarter to nine, making it possible to do quite a lot of morning chores at low cost. Doubtless the loss of revenue to the Board prompted the development of the new timers but for the consumer, improvement once again means making worse!

Speaking of time brings to mind the proposed changes that will result in the UK being one hour ahead of GMT during the winter and two hours ahead in the summer. I for one welcome the idea because long light evenings will be of much more use than long light mornings. Inevitably there will be objections from some quarters but overall the system worked well during World War II and during the three-year experiment in the 1970s. In any case, anyone really antagonistic to DBST cannot be forced to keep to it; while it may be convenient for many people to keep to national time there is nothing to prevent individualists from setting their clocks to any time that suits them (before the coming of the railways and the telegraph in the 19th century every community had its own time of day). Thus, here at Larkhill I refuse to put back the clocks at the official end of Summer Time. By this I gain not only an extra hour of daylight but I can nip down to the local town at 5 p.m. WST (Woodseaves Sensible Time) and find all the shops still open for at least another hour and without meeting the tea-time traffic jams. WST is also invaluable in saving working time. Callers tend to gaze at my clock with a mixture of puzzlement and alarm, and convinced that they are an hour late for their next appointments they cut short their visits. If you consider WST somewhat eccentric, remember that we should not have Summer Time at all were it not for the efforts of an 'eccentric' schoolmaster during the first World War!

Reith's Centenary

The 100th anniversary of the birth of J C W (Lord) Reith falls on July 20 this year. Remembered still as the 'father of the BBC' he actually spent only sixteen years of his long life (he died in 1971 at the age of 82) with the Company/Corporation, joining it in 1922 and leaving in 1936. It is said that he retired voluntarily but just why is puzzling, since he never again found work that would fully extend his undoubted talents. In later life he was to write that it was 'monumental folly' for him to give up the BBC, so why did he? Certainly he received as much, if not more, criticism as he did praise during his tenure from the public at large, the press, both popular and technical and in parliament; did this wound him more than he admitted? With hindsight, though, it was probably as well that he did go when he did and not have to agonise over the changes that had to be made to the BBC's policies in World War II. Would he for instance willingly have countenanced the broadcasting of entertainment on Sundays on the 'Forces' network? Yet

this was regarded as so essential in maintaining morale that had he refused it would probably have been imposed on him by Government decree. This in turn must have provoked a clash which might well have resulted in direct Government control of the BBC, which would not have been relinquished lightly. All highly speculative, of course, but is this another case of all things working together eventually for good?

Mankind Diminished

A sad week in which I write this that has seen the passing of three famous octogenarians, each a leader of his particular field in the entertainment business. It would be presumptuous of me to do other than mention Laurence Olivier, but low-brow that I am I think I can pay my own tribute to the other two, Tommy Trinder and Mel Blanc.

Tommy was one of the comics who helped to keep Britain smiling during the war years in a series of stage shows and the occasional film. If you were in London about the time when the war ended you may remember the famous advertisments - 'If it's Laughter you're after, Trinder's the Name!'. No need for action by the Trades Description people there! If that was a bit before your time you may recall Tommy's long stint in the radio programme *Does the Team Think?* in which he vied with Ted Ray and Jimmy Edwards, under the chairmanship of MacDonald Hobley – all, alas no longer with us – to provide hilarious off-the-cuff answers to listeners' questions. That cheerful cockney voice is going to be missed and cannot be replaced for, trite but true, they don't make them like Tommy Trinder any more.

Mel Blanc was known to countless millions of people who had never seen him, for his was the voice of all those characters in the Warner Brothers' Merrie Melodies and Looney Tunes cartoon films, such as Tweetie Pie, Pepe le Pew, Woody Woodpecker and perhaps most famous of all, Bugs Bunny. One thing is for certain, his voice is going to continue to become known to new generations so long as cartoons continue to be shown on television. We are told, though, that to make sure that his voices may be heard in new films he trained his son to do them as well. ***RB***

News & Events

If you get this issue of Radio Bygones promptly, you should just have time to get along to the Town & Country Festival at **Stoneleigh Abbey, Warks, on August 26 - 28.** There, among many other attractions, you'll find Chris Price with his vintage radio stand, in the rural museum section, 'under the clock'.

The latest 26-page catalogue from **Kenzen** lists a large range of valves (over 1500 types in stock, including many rare and 'vintage' types); valve holders; resistors including droppers, wire-wound and 'vintage' types and potentiometers, plus a variety of modern bits and pieces. You can get a copy by sending a cheque or postal order for £1.00, together with a large stamped addressed envelope with 28p stamp, to **Kenzen, Unit 9, 16-20 George Street, Balsall Heath, Birmingham B12 9RG.**

RADIO GOES TO WAR - continued from page 5

conventional transmitter and receiver units and the second two had four preset channels.

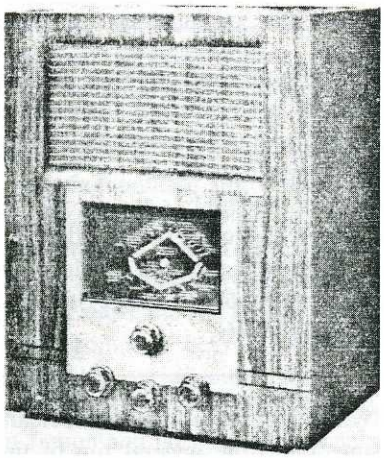
The 1154 and 1155 were probably unique in being used on air, sea and land, as most military radio equipment was designed and built for one specific role. Naval sets in particular would have imposed far too much of a weight penalty to be used in aircraft; the well-known CR100 (B28) receiver was equivalent to three 1155s! The equally well-known No.19 'Tank set' was perhaps not so ponderous as that but its coverage and sensitivity were greatly inferior to those of the 1155.

This was not all; the 1155 was arguably the most handsome of all receivers of World War II with its semi-circular, clearly marked dial, so much superior to the general run of tiny windows or ugly metal discs. The performance of the 1155 was excellent and even today, despite the rival claims of some very glamorous receivers produced both in the the UK and USA, there are plenty of people who rate the 1155 the best of all the ex-Government receivers. Good examples change hands at high prices and when, about two years ago, a large consignment was discovered in unopened original packing in a warehouse they were sold at £80 each untested, although during the 40 years they had lain forgotten it is virtually certain that all the numerous decoupling capacitors would have become low-value resistors! ***RB***

The Pye Story

by Dictron **(continued)**

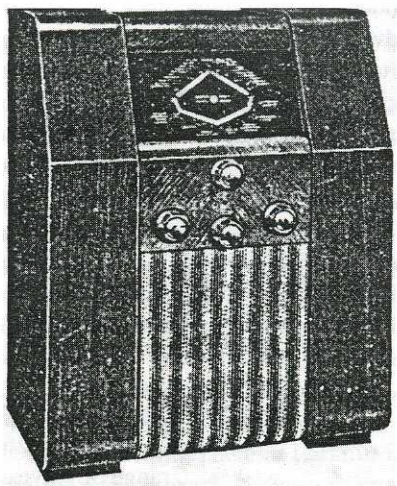
For 1939/40 Pye dropped numbers (with one exception) for their models and brought back their old favourite combinations of Ms, Ps and Qs. The earliest release of '39 (January) was the MP, an utterly predictable short superhet using an ECH2 (or -3), an EF9, an EBL1 and an AZ1. Console and radiogram versions appeared in the following May and in 1940 came a re-vamped edition, the MP/40 with octals in place



The MP and MPU Series

of the P-based valves. The MPU series which came shortly afterwards looked as though they were simply AC/DC versions of the MPs in the accustomed Pye manner, but they had an extra waveband covering the 'trawler' band. The power supply section was just about as badly designed as could be, with non-shunted dial-lamps, single pole on/off switch and fuses in both poles of the mains input (if the neutral one should blow, beware!). The smoothing was very odd, with a choke in the negative HT line and a loudspeaker field winding connected across HT+ and mains neutral (or negative on DC). The valve line-up was ECH33, EF39, CBL31 and CY31 for the table model and for some strange reason TH30C, VP13C, Pen40DD and UR3C in the console. In the latter the smoothing changed from negative to conventional positive with a few other more minor modifications.

The MP finally appeared with the four-band coverage of the MPUs but under a different name – the RS4, which

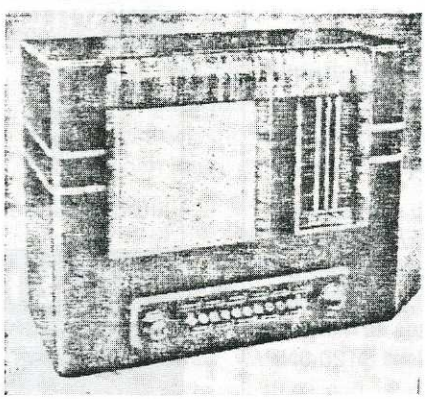


The RS4

sounds more like an Ekco – and with the cabinet virtually inverted so that the 'speaker was below the dial and controls. It was a considerably more handsome set than its predecessor.

The PP/AC

Another early release of '39 (March) was the PP/AC, an AC mains transportable with lots of push-buttons and a 4-valve superhet circuit using the by-now somewhat *passé* 4V valves TH4B, VP4B, TDD4, PenA4 and DW4/350. Five pre-set stations were available on the buttons, the other six of which were used for wave-band switching, tone control and on/off. The tone buttons gave a choice of fidelity, less top or less bass and there was negative feedback as well. The circuitry of this something-old, something-new

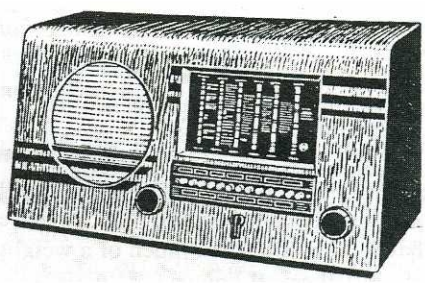


The PP/AC. The PP/B is similar

model was to reappear with very few alterations in the allegedly super-dooper 'International' a few months later, of which more in a moment. There was a battery version of the PP/AC in April '39, known as the PP/B (what else?) employing 2V British 7-pin valves and a QPP output stage.

The International

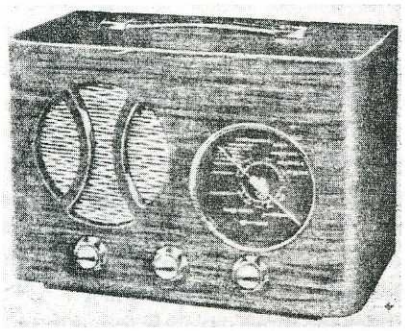
July 1939 saw the release of the International, Pye's entry into what was becoming a fast-growing market for short-wave receivers. The reason for the upsurge of interest in SW was the international situation and the public's desire to learn what other countries (notably the United States) had to say about the prospects of war or peace. The International was very nearly a very good set, spoilt by what would appear to have been a cast-iron limit on the



purchase price. Most of the cost of the set must have gone into furnishing the band-spread tuning and the push buttons that selected its ranges, with nothing left over to provide a really good receiver specification. Behind all the razzmatazz of the polychromatic dial was an indifferent 4-valve plus rectifier superhet which was basically just the same as the PP/AC referred to above. Had the International been equipped with the RF amplifier and two IF stages of the earlier 'Empire' model it would have been sensational; as it was it was like one of the sports cars of the period whose long lean bonnet concealed just a 7 hp engine. It was not the first time that Pye had made this mistake and it would not be the last. The line-up, by the way, was ECH3, EF9, EBC3, EL6 and AZ1.

The Mite

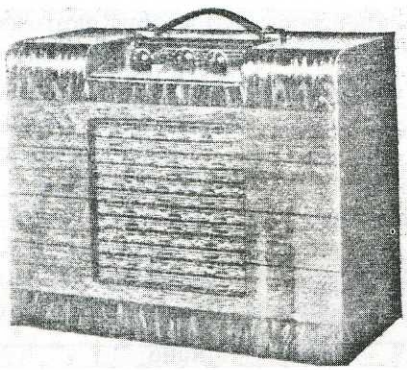
The Pye 'Mite', also of 1939, was at the opposite end of the scale from the International, being virtually an Anglicised Yankee midget. It was of the conventional 3-pentode type and even used American valves, albeit of Mullard manufacture in that firm's 'Amerty' series. The line-up was 6K7G, 6J7G, 25A6G and either 25Z4G or 25Z5G, with a line-cord mains dropper. Thus



Pye achieved what must have been the unequalled feat of using almost every range of valves on the market – British 4-pin and 7-pin, P-base, British and US octals – at the same time in their various models for that year.

The QU

The first entry for 1940 was the QU, an AC/DC superhet transportable covering MW and LW only and every bit as interesting as a contemporary Ministry of Food recipe for ersatz rissoles. The single-pole mains on/off switch was supplemented by a two-pole safety switch actuated by the set back; when it was removed the mains were completely

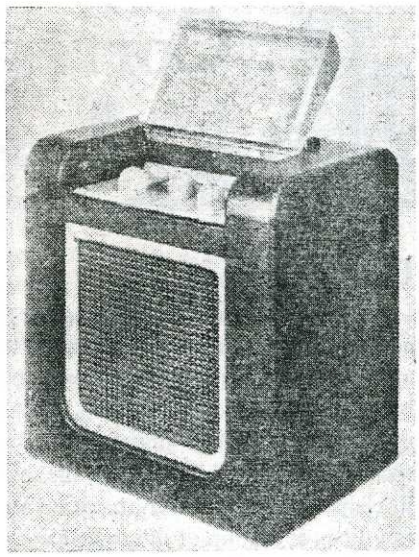


disconnected. As is usual with such worthy devices its chief practical use was to frustrate service engineers who soon learned that it could be de-activated by the use of an ordinary pencil.

Baby Qs

We have all heard about those wartime queues and Pye added to them with their 'Baby Q Senior' and 'New Baby Q' all-dry portable superhets. The Senior used Mullard/American valves (1A7G, 1N5G, 1H5G and 1C5G whilst the New had Mullard P-base types DK1, DF1, DAC1 and DL2. A thoughtful feature was the provision of an adaptor to permit the use of a 2V accumulator in place of the 1.5V LT cell.

So, as the requirements of the war machine brought about a long hiatus in the production of domestic radio equipment, we conclude the Pye story for the time being, but this is not quite the end of the tale. Between 1935 and 1939 the firm produced sets sold under



The Baby Q Senior. The New Baby Q is of similar shape but in a single tone finish

the names of Ever Ready, Lissen and Invicta. In the next issue we shall take a look at these models and the Ever Ready code for the valves used in them.

Meanwhile, here is the complete list of Pye sets for 1939/40: (The 'T' No. is, as always, the *Trader* sheet number).

Model	Remarks	'T' No	Price
906(International)	6 band-spread SW ranges	430	£17 6s. 6d.
New Baby Q	S'het portable with lid		£8 18s. 6d.
Nipper	AC/DC midget		£6 10s. 0d.
MP	3-V superhet	495	£11 0s. 0d.
MPC	Console version of above		13 gns.
MPRG	Radiogram version of above		£21 0s. 0d.
MPB/40	4-V battery		£11 0s. 6d.
MPU/40	AC/DC, 4-band	737	11 gns.
MP/UC	Console version of above		£14 3s. 6d.
P	3-V; push buttons		£11 0s. 6d.
PP/AC	4-V AC transportable	409	14 gns.
PP/B	Battery version of above	470	14 gns.
PS	4-V; push buttons		£13 2s. 6d.
PS/C	Console version of above		17 gns.
PS/RG	Auto-gram version of above		£34 13s. 0d.
PS/B	Battery version of PS; QPP		£13 2s. 6d.
QT	3-V battery TRF		£6 10s. 0d.
QU (**Not** Baby QU!)	AC/DC s'het transportable	496	£11 0s. 6d.
RS4	4-band version of MP		£11 15s. 0d.
Mite	AC/DC TRF midget	602	

DAC90 CONTEMPORARIES
continued from page 23

with squared-off 'aeroplane' dial. It used a slightly different range of Marconi/Osram valves (X71M, KTW74M, DL74M, KT74, U74) and had a conventional mains dropper. The dial lamp was at the low end of the heater chain and was shunted. The only possible detraction was that an outside aerial had to be used with this set but otherwise I rate it much better than the DAC90. It cost £12 17s. 6d. plus p.t.

The above and other sets of the period which came into the 'compact' class certainly performed as well as the DAC90, if not better. It seems unfair that they seldom get their proper due and I hope that this piece has redressed the balance a little. ***RB***

Decibels

I admired your courage in setting out the basics of logarithms and decibels, a very difficult subject to get across to the non-mathematical, particularly when it comes to distinguishing between power and voltage gain. I thought you did very well on the logs and the ATT units but I rather doubt whether some readers would be able to follow the section on decibels. In fact it seems to me that even you have got a little confused in the first few lines at the top of the right-hand column of page 20. An amplifier with a gain of 60dB will have a voltage ratio of 1000 and a power ratio of 1 000 000. I can't see where 30dB comes into it. You know I can't resist having a go at things so I enclose a few paragraphs showing the way in which I would have dealt with decibels. I imagined it taking the place of your script after 'but never achieved the popularity of the decibel' about the middle of the left-hand column on page 20 to '30dB' near the top of the right-hand column. I don't think my piece is of any use to you but I enclose it just out of interest.

One other point relates to the last paragraph of your article. More familiar to domestic listeners might be the fact that at low volume levels music appears to be lacking in bass. For this reason, quite a number of amplifiers and car radios have a 'loudness' button for use at low listening levels and which inserts a bass boost of about 10dB at 50Hz.

Finally turning to the excellent article on a 78 rpm record amplifier, I have one small doubt. Many magnetic pick-ups give a specified output of only a few millivolts, so will a pre-amp. sensitivity of 15mV be sufficient? A typical present-day amplifier has a magnetic pick-up sensitivity of 2.5mV. Or is it the case that 78 rpm records push more energy into the pick-up so that the output will be greater?

Pat Leggatt, Surrey

PS - I've just thought of one more comment. Barnaby Hyndsyte says that his safety officer Bevis is writing a monograph on the effects of senna pods on the ozone layer, and I suppose you think that this is a joke.

But no! In *The Times* a few weeks ago (not on April 1) appeared a report of a serious scientific study into the deleterious effect of cows on the ozone layer. It appears that throughout the world cows breaking wind and eructating produce umpteen tons of methane every day to the extent that the occasional squirt from an aerosol pales into insignificance. This news must have given the Greens a nasty turn!

PL

I welcome your corrections and suggestions re. the decibel article. Of course they are of use -- anything that helps to explain what is a difficult subject must always be welcome.

The magnetic pick-ups we had in mind for the 78 rpm amplifier were not quite the same as the modern type, but now that you have raised the point it shall be attended to.

We asked Barnaby Hyndsyte to comment on your remarks re *methane gas and he stumped off to his office with a bottle of vitriol in one hand and a tin of baked beans in the other to carry out what he calls intensive research. A report on his findings appears in the issue's 'Late News'* *CEM*

Pat Leggatt wrote as follows:

The bel is just the logarithm of the ratio of output power to input power. If we call this ratio R_p, then we have the simple formula:

Gain in bels = log R_p.

And using the more conveniently small decibel, the formula becomes:

Gain in decibels (dB) = 10.log R_p.

So, for example, the gain of an amplifier whose output power is 100 times the input power is found by:

Gain = 10.log 100 = 10 x 2 = 20dB.

While we may be interested in the power **output** of, say, a hi-fi amplifier, we are not usually concerned with power **gain**. It is the voltage gain (output signal voltage divided by input signal voltage) which is usually the important point, and here we have to be careful. If an amplifier increases the voltage at its output by a factor of 10, then the output current will also increase by a factor of 10. Power of course equals voltage times current, so the output **power** will have increased by 10 x 10 = 100. Putting it the other way round, our amplifier with a power gain of 100 (20dB) will have a voltage gain of only 10. So if we used the output/input voltage ratio R_v in the formula for decibels we would write:

Gain = 10.log R_v = 10.log 10 = 10 x 1 = 10dB

which is the wrong answer.

In fact if we want to use the voltage ratio to calculate the gain, we must use a different formula:

Gain = 20.log R_v dB, which gives for our amplifier:

Gain = 20.log 10 = 20 x 1 = 20dB which is the right answer.

To sum up,

Gain = 10.log R_p (output/input **power** ratio)
or 20.log R_v (output/input **voltage** ratio).

Provided that the input and output resistances are the same, the power gain ratio is the square of the voltage ratio. A few useful spot figures are as follows:

Gain	Voltage Gain Ratio	Power Gain Ratio
3dB	1.4	2
6dB	2	4
10dB	3.2	10
20dB	10	100
40dB	100	10 000
60dB	1000	1 000 000

RX Profile

May I add my 2 penn'orth re the DAC90A? Whilst I appreciate the hint for changing the UL41 output valve to a 10P13, would it not be easier to use the Mazda guide of UL84 as the substitute? The heaters are dead on and so are the characteristics. The base has to be changed to B9A of course but provided that pins 4 and 5 are located where 1 and 8 were on the B8A the wires fit well. Also the UL84 is rather cheaper than a 10P13, even for a genuine Mullard and cheaper still for an East European import. There is also no need to decrease the negative feedback on the cathode as the UL84 g_m = 8.4mA/V.

Incidentally, if no UF41 is to hand the UAF42 is a plug-in replacement as pin 3 on the Bush is left unconnected (it's A_d on the UAF41/42 and internally connected on the UF41).

Some more thoughts on the DAC90: I like the nice touch on the mains dropper with a knurled nut on the adjustment strap – not a soldered link as on many sets. Quite a de luxe job!

These days, with AM transmissions being limited to a maximum of 6.3kHz, it's worth halving (say) the 'tone correction' capacitor across the output transformer.

Regarding the frame aerial, it's age that seems to make the turns come loose on the MW section (the LW is waxed) and it's worth a couple of coats of Humbrol enamel to lock it all up before the original enamel drops off!

Dave Porter, Ludlow

I cannot really agree about the UL84, Dave. Apart from other considerations few enthusiasts would wish to make a DAC90A non-standard by changing a valve holder. Also, once this has been done it prevents a quick reversion to the correct UL41 when one of these comes to hand. I did not know that Mazda recommended using the UL84 as a substitute for the UL41; if so it seems a little forward of them! The characteristics of the two valves do in fact differ quite sharply. For instance, at V_a = V_{g2} = 200V the anode current of the UL84 is 65mA against the 45mA of the UL41 and the recommended anode load only 2.4kΩ as against 4.3kΩ. I realise that the UL84 figures will be altered if the V_{g2} is lowered but I feel that the result will not be anywhere as near a match as the 10P13. On top of all this the UL84 has if anything a greater tendency to go heater/cathode than the UL41! The UAF42 is acceptable as a replacement for the UF41 but the characteristics are again different and it would be wise to check that the $-V_{g1}$ does not exceed 2V to avoid reduction of gain. Since the DAC90A was designed for transmissions carrying higher frequencies than 6.4kHz, would not the tone corrector have been chosen with this in mind and the response be quite adequate at the lower frequency without its being lowered in value? Apart from that, Dave, I loved your letter. Keep on taking the tablets!

CEM

TIPS & HINTS

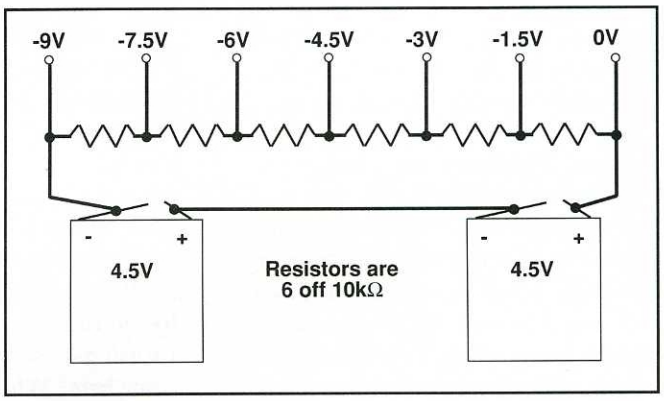
A Substitute Grid Bias Battery

by Ray Holmes

When using non-mains receivers I like to feed them from the specified batteries as much as possible. However, since it is virtually impossible to obtain the correct types nowadays a means to overcome this problem becomes part of the general interest of those involved in restoration.

Regarding grid-bias batteries, I use two 4.5V 'flat' batteries (e.g., Ever Ready 1289) in series to provide 9V and connect resistors across them to give the necessary intermediate tappings. This arrangement may conveniently be housed in a container made from hardboard and wooden strips to the same size as the original GB battery and carrying 'banana' sockets for the receiver's battery plugs. It then has the advantage of fitting in the space or the retaining clips provided in the set. The total cost should not exceed £3.

The diagram shows how the resistors are wired up. With the nominal 9V overall the current passing through the chain is 15μA, giving a drop of 1.5V across each 10kΩ resistor and thus providing tappings of 1.5V, 3V, 4.5V, 6V, and 7.5V. I prefer to use 0.5W resistors for ease of wiring but of course 0.25W or



even smaller types would be perfectly adequate in view of the negligible current involved. For the same reason I omit a switch to break the flow when the set is not in use, but one could be incorporated if desired.

This new 'battery' can be given a 'period' appearance by pasting on to it labels steamed off an old, worn out original. ***RB***

LATE NEWS...

A trenchant look at recent events, not all of which were successful in making the headlines elsewhere!

A recent article in the *Daily Telegraph* was devoted to imploring the BBC to discontinue the use of four-letter words and blasphemous langauage from Radio Four programmes. The very fact that such an article has had to be written demonstrates just how low this once proud organisation has sunk, thanks to successive managements who have been either too dim or too spineless to stand up and tell the trendy, foul-mouthed writers and producers to mend their ways. Surely there must be someone somewhere who is not afraid of being labelled old-fashioned and is prepared to clean up the BBC so that it can once again inspire respect? Or is this another case of those whom the gods wish to destroy they first make mad?

News from the Sales

Boggis and Hoskins report brisk bidding and both high and low prices in their recent auction of radio and musical artefacts and memorabilia. A Wickersneed 'Super Seven' in mint condition, complete with brass-bound coils and leather loudspeaker fetched well above reserve at £1450. On the other hand, a home-made 3-valve receiver built in a 19th century sentry box and in poor condition was knocked down for just £42. A representative of a well-known radio club, also in poor condition and who had been asleep inside the sentry box was knocked down for £4.50 to an elderly maiden lady. Lord Malfunction saw his fabled only existing example of a square round Ekco sold to an American collector for £22 000 and the same buyer paid £4000 for a part-used grid bias battery. A Hectorphone horn gramophone, circa 1920, with stained-glass accoutrements fetched £10 000. A large photograph of Lord Gort with circuit diagrams and other drawings attributed to B. Hyndsyte was withdrawn just prior to the sale on the advice of the Director of Public Prosecutions. A Spam sandwich supposed to have been half-eaten by Heinrich Hertz (provenance unsure) failed to reached its reserve of £1 000 000, the best bid being 4p from a passing bum. The same bidder was more successful when he obtained 193 copies of a now-defunct radio magazine for just 25p. Your reporter asked him what it was he liked best about that publication and he replied, 'The texture, mate.'

Tell Me, Daddy...

Little FitzHyndsyte may be only twelve but he has a veritable thirst for knowledge and I am ever ready to assuage it. For instance, the other day the lad asked me what it means when someone is said to be 'green'.

'That is easy, my son,' I replied. 'Referring to my dictionary I see that it means that he is immature, undeveloped, inexperienced, naive and gullible.'

The dear boy's face lit up. 'That's exactly what I thought, Dad.' said he...

Passing all understanding... His next question was not so easily answered. 'Daddy, is it true that in 1992, 300 million foreigners from Europe will be free to come and live in England if they want to?' Restraining my natural instinct to tell him not to end a sentence with a preposition, I nodded. 'As Shakespeare says, 'tis true; 'tis true, 'tis pity; and pity 'tis, 'tis true.'

'But the three million people who live in Hong Kong and who have British passports won't be allowed to come here? Why is that, Dad?'

'Alas my son,' I replied. 'There are some things that no one can explain...'

The Answer Off Pat

We are in receipt of a communication from a Mr. Pat Leggatt who concurs with the great Bevis, safety officer to Hyndsyte House and Cycliste Extraordinaire, on the subject of the deleterious effects of senna pods on the ozone layer. This is because, Mr. Leggatt asserts, anything causing living creatures to evacuate their bowels produces the dreaded CH_4. I am reminded of certain experiments that used to take place in the Services to ascertain the exit velocity and flash point of this gas and would agree with Mr. Leggatt that on the face of it the situation is fraught with peril. However, the scientists who are responsible for warning the world of its imminent doom are for ever changing their minds and by the time this piece is printed the currently fashionable menace may be something completely different, such as coconuts producing phosgene or white mice chewing their way inexorably through that layer.

Healthy Cynicism

What the public at large is lacking nowadays is that scepticism practised by the citizens of Missouri and expressed in the simple but telling phrase 'show me'. Why are people so ready to believe the most arrant nonsense if it is said loudly enough by someone with apparent authority? *(You should know, you've been getting away with it for years! – Ed).* We at Hyndsyte House have been greatly heartened to hear that the CO_2 threat to mankind (via the 'greenhouse' effect) is now discounted because the gas is absorbed safely by plankton in the oceans. It is immensely comforting to know that one of the Creator's smallest and seemingly most insignificant works is able to do more for humanity than any given number of highly-trained scientists. (Next Week: *How unleaded petrol is poisoning the Universe*, by Dr. Esteban Burke, Emeritus Professor of Hydrocarbonic Studies and part-time caretaker, University of Bude).

Barnaby Hyndsyte

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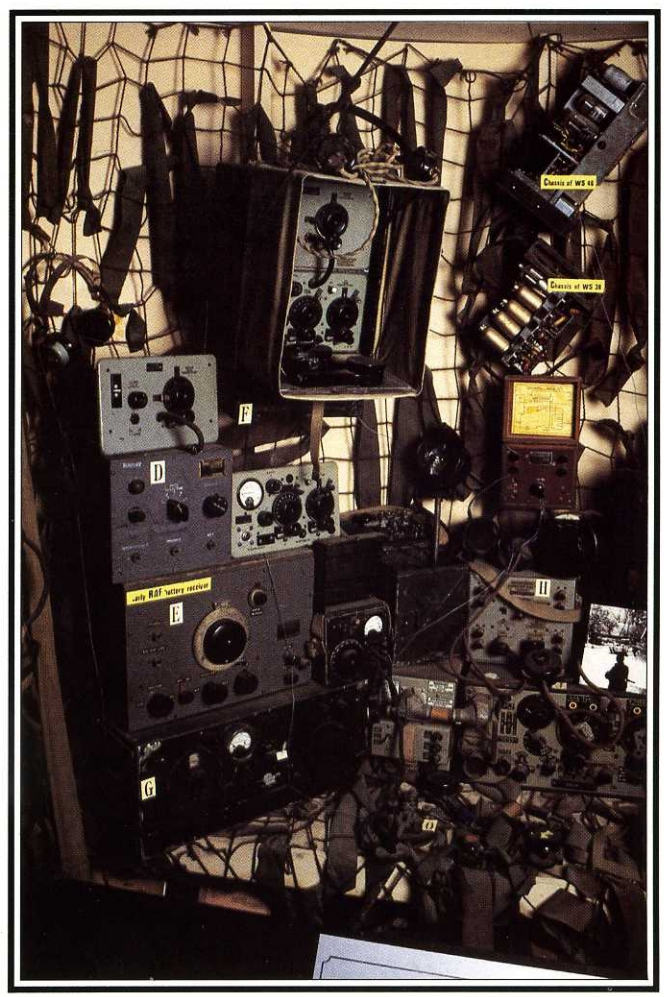
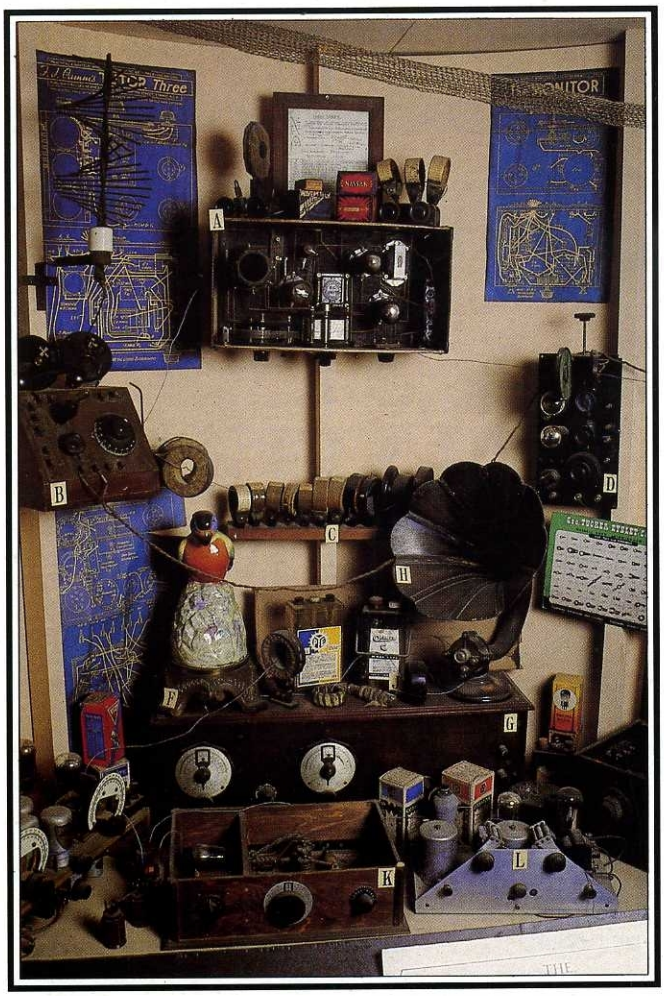
A selection of wireless equipment from World War I

MUSEUM PIECES



Military wireless equipment from World War II



A selection of early home-constructed equipment

MUSEUM PIECES

The first IC? The 3NF valve with built-in, glass-encapsulated components