VINTAGE RADIO

By Fred Lever

1930s "Vogue" radio restomod

Sometimes our contributors simply describe vintage radios. Other times they fix them up or even restore them. This goes way beyond that. It's a "restomod" – taking parts (or in this case, a part) from an old radio and putting newly built electronics inside, either to improve it, or because the original components are long gone. While most of the radio is new, it was built in the style of a 1930s radio.

I had shelves in my workshop made from scrap materials. Some of the timber came from the cabinets of discarded radios and TV sets. One piece was the front panel of an old 1930s style radio. I remember that it had glass bottle valves, a circular tuning dial and a very heavy loudspeaker. The workings of the set went to the tip, and I used the timber parts.

A couple of years ago, I was pulling the shelves down in a workshop rearrangement, when out came the front panel, complete with its brass escutcheon proclaiming it to be a "Vogue"!

It was in remarkably good condition considering how it had been used. But there were still quite a few scratches on it, and the timber on one side was soaked with motor oil.

Some web searches and forum posts gave me information on "Vogue" radios but unfortunately, none of this information matched with what I had. Based on what I remembered of the chassis construction, it was a cut-price radio, unlike the 5-8 valve, 3 or 4 knob Vogue radios I found on the web.

It had only two knobs: tuning and volume. The power switch was in the two-wire power cord which had a bayonet plug, which you connected to a double adaptor in a ceiling lamp. I remember this because we used the radio for a short time but then scrapped it when it failed.

That may seem amazing in this day of vintage preservation, but back in the 1950s and 1960s, millions of radios were scrapped as television came in. I remember one large radio store in town used to burn hundreds of radios at a time as they were traded in for TVs and transistor radios!

History

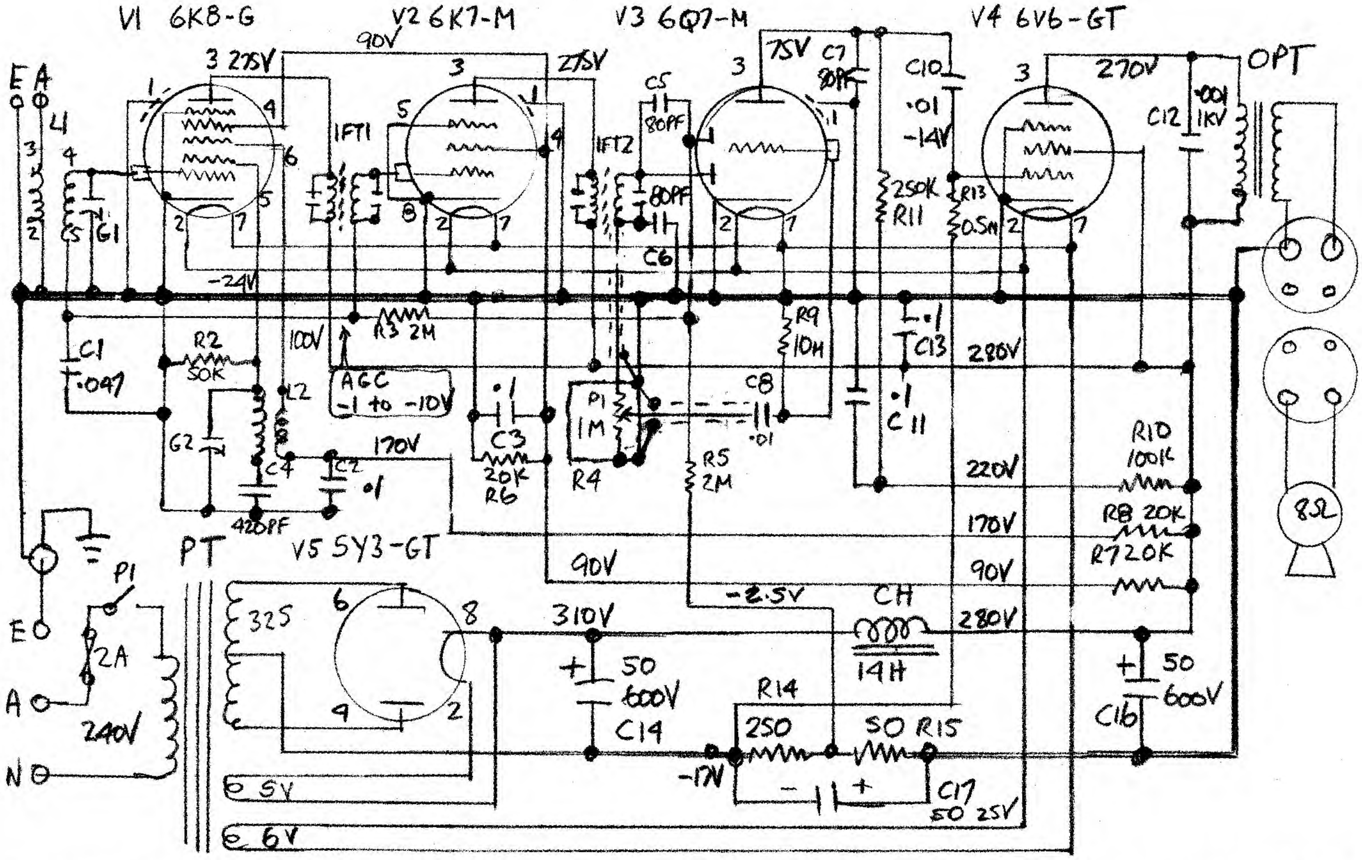
While the restoration detailed below was in progress, I found out a little more about this set from a vintage radio forum member. They identified the escutcheon as part of a type of dial assembly provided by Efco Mfg Co, called the "Lion".

The set may have been a low production private factory set or even a kit set from one of the radio type parts shops or retailers re-using the name Vogue. I lean towards the theory of this radio being built from a kit, as I used to see kits advertised in "Radio and Hobbies" using Australian-made parts. So my plan to recycle parts from Aussie radios of the period seemed like a good one.

Beginning the restoration

I cleaned the front panel up with degreaser and water, then prised off the ornaments and unscrewed the precious escutcheon and put them aside. Then followed a few hours of sanding back the veneer finish to remove some of the horrors, giving a better view of what was left. The veneer was badly damaged but I decided to polish it anyway and use it as-is.

I achieved a reasonable state with the front panel and the dimensions of this gave me a starting point to build a suitable chassis. Looking through my junk box, I realised that I had a handful of RCA metal case valves and as they were introduced in 1935, I decided to



The circuit used for this Vogue radio is loosely based off the circuit used in the AWA Radiola Model 84, 193, 194 and 501, all sold from 1939. You can find the Model 84 circuit diagram at www.radiomuseum.org/r/amalgamate_radiola_84.html

make a classic 1930s superhet with five valves and drew up a preliminary circuit.

Circuit description

It's a superhet AM broadcast band receiver. The aerial picks up radio signals and the tuned circuit of coil L1 and tuning capacitor G1 makes it selective for the tuned station frequency. This signal is then fed to the control grid of the 6K8G converter (V1).

V1 amplifies the signal and also mixes it with an oscillator signal which tracks the station frequency with a 455kHz offset, set by inductor L2 and the other half of the tuning gang, G2.

The output of V1 is a mixture of the tuned and oscillator signals, which produces a strong difference product at 455kHz. Coupling transformers IFT1 and IFT2 are resonant at this intermediate frequency, so they pass the signals at this frequency only and rejecting the higher carrier and sum-product frequencies.

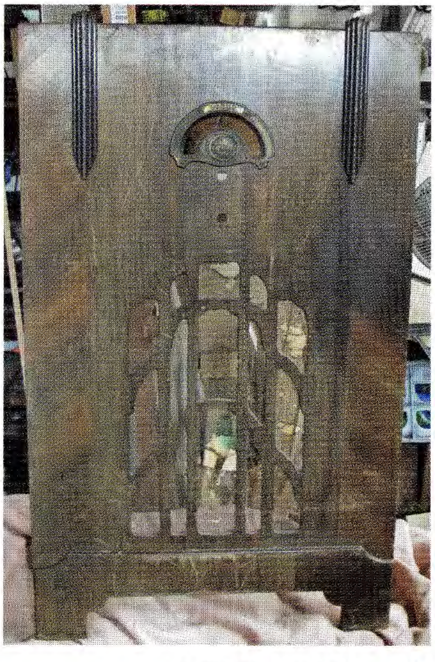
IF amplifier valve V2, a 6K7M, amplifies this IF signal and its output is fed into IFT2 which then couples to a diode in V3, a 6Q7M dual diode/triode. This, in combination with 80pF filter capacitor C6, demodulates the audio and it is then fed to 1MΩ volume control pot P1.

The audio signal is also filtered to remove the AC audio component by 2MΩ resistor R3 and 47nF capacitor C1 and the result used as the AGC control signal, which alters the DC bias of the control grids of both V1 and V2, reducing their gain when tuned to stronger stations.

The audio signal from P1 is then fed to the control grid of the triode in V3, which acts as an audio preamplifier, and the output is coupled from its anode to the control grid of audio amplifier valve V4, a 6V6GT, via a 10nF capacitor (C10). It's configured as a Class-A amplifier and drives the primary of the output transformer, which couples the signal to a modern 8Ω loudspeaker.

V5, a 5Y3GT, is used to rectify the output of the mains transformer PT, to produce a 310V HT rail which then passes through an LC filter to remove ripple, before feeding the anodes of the other valves. Each one receives a different HT voltage as set by various dropping resistors, to best suit that particular valve and the way it is being used.

The mains transformer also has 5V and 6V AC windings to drive the valve



The front panel of the Vogue radio had torn mesh and was the only part remaining of the set. The original radio was likely sold as a kit set or small production run. The emblem on the cabinet depicts a muse (likely Erato) playing a lyre and was manufactured by Efco, based in Arncliffe.

heater filaments. Only V5 needs 5V; the others have 6V heaters.

A trial chassis layout

I took a sheet of 0.7mm galvanised steel I bought from Jaycar and tried various layouts by arranging the parts on a generously sized rectangle. From this I determined that the chassis would need to be about 355 x 230 x 50mm. I made sure to leave plenty of room around the components, as the cabinet would be pretty large anyway.

I planned to mount most of the smaller parts on tag strips and wire the set with coloured wires, with the major components laid out neatly in a rectangular grid. I wanted to use as many period parts as possible.

The next step was to fold up the chassis. I cut out the metal using a jigsaw and shears and folded it up using a small press, plus a hammer and dolly in a vice. I ended up with one large sheet and some smaller plates, which I then pop riveted together.

I made up a box frame to carry the side and top panels from timber flat bars. The dimensions were to suit the existing front panel, with enough depth to accommodate the chassis. I chose a 12in, 8Ω speaker from Jaycar, mounted on a baffle board attached to the main frame, as the front panel is too brittle to take any screws or weight.

I made up the frame and did a trial fit of the chassis, to locate the control spindles and to make sure nothing would be fouled. I made a board for the speaker and clamped it in position, to make sure that it would fit as well. There were no major snags, so I was then able to firm up a lot of details.

My woodworking skills are very limited, so I assembled the cabinet using butt joints with plenty of glue. Once the frame was squared up, I clamped the front panel to the frame and glued it in place. It was warped like a banana and I had to clamp it every 150mm or so, to make it sit straight and pull it onto the frame.

The case was made from plywood, while the frame and speaker baffle was made from timber. The chassis had the components loosely placed on top to help align the location of the tuning gang and dial.

With that tacked on, I then put in some more flat bars for the chassis to sit on and glued them in place. Finally, I had a mounting place for the chassis.

After mounting the speaker and its frame, I taped some gold coloured cloth on the frame with the back side of the cloth at the front, to give a matte finish through the fretwork.

The side panels had to be bevelled to mate with the front panel before they could be fitted to the cabinet. Not having the skill to produce a bevelled edge, I did the next best thing and inserted a section of triangular timber strip up against the front panel on each side, thus presenting a taper for the front panel and a flat face side panels to butt up against.

I made a lid for the cabinet from 7mm plywood and added a centre brace underneath, in case heavy items were placed on top. I did not want the plywood to buckle inward.

With that glued firmly in place, I then cut the side sheets from 9mm plywood with my trusty jig saw. I made them a few millimetres larger than necessary and glued them into position. Then I profiled the edges with an angle grinder, to match the frame, and smoothed the whole lot using 120 grit, ready for finishing and staining.

The chassis was made from pieces of galvanised steel, folded with a forming press and held together with rivets. It is about 355 x 230 x 50mm.

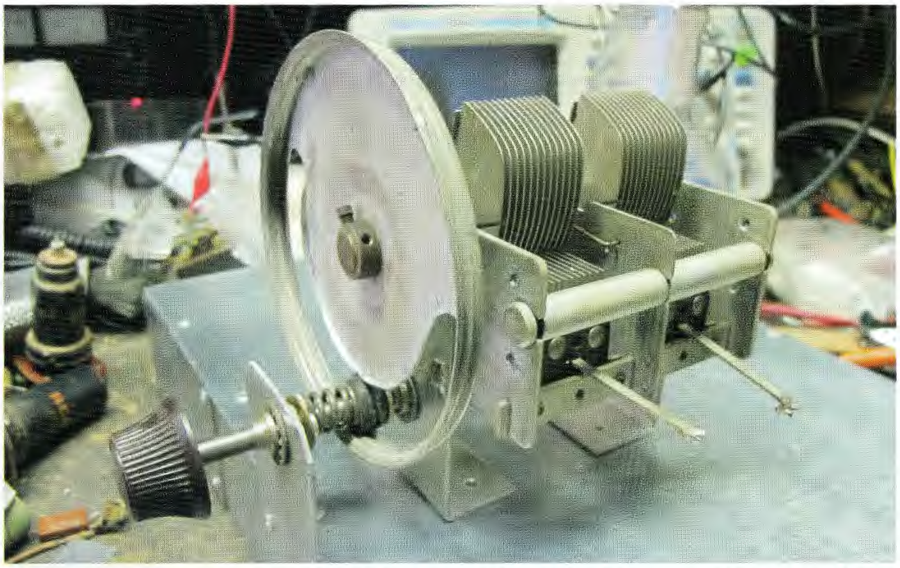
I then decided to test the gluing of the frame and gave some of the rectangular bar sections a whack with a hammer. The bottom crossbar fell out, so apparently, glue was not good enough by itself! I added screws at each corner to peg the joints. I threw a few more screws in at the other main joints as well, not wanting the cabinet to fall apart later.

The next step was to paint the interior surfaces flat black. Once that dried, I sanded the other faces (apart from the front panel) using 400 grit sandpaper and applied coats of cedar stain to pull the shade of the white timber towards the front panel shade.

I gave it several coats, sanding again with 400 grit in between, until I achieved the shade I was looking for and the ply flatted off without too much wood fibre standing up. The stain went darker upon drying so in the end, I overshot a bit.

I then buffed the wood with oil and then buffed a coat of silicone-based

The sides and top were attached to the case, with coats of cedar stain applied to the outside.



The tuning gang was refurbished from an AWA radio. The drum it came with was then drilled to form a circular hole that the spindle could travel across. The spindle was cut from a metal rod.

car polish on top, giving an "antique" look with a low-gloss finish showing all the scratches, bumps and fake "wear" marks.

Tuning mechanism

I now needed to think about the tuning gang drive mechanism. The front controls from the chassis have to match the holes in the front panel, so there were fixed centres to work from. The proximity of the spindles indicated that the original dial drive was probably a friction drive, direct onto the tuning gang drum, so I decided to mock up a drive and make sure that it was possible.

I pop-riveted a temporary plate to the front of the chassis, and after some fiddling, I worked out what was possible and how to fit this into the space available. I fitted a bush to the temporary plate and I then cut a short piece of quarter-inch rod to form a spindle. I cross-drilled the spindle for split pins and slid a tension spring and two washers onto the spindle so they would grip a disc.

The tuning gang I used was from a junked AWA chassis; the drum on the gang was a nice size to make the friction plate. I drilled the drum and cut out a semicircular section for the spindle washers to grip and drive the gang through half a turn.

Here is where I made a stupid mistake. I set the whole thing up and fabricated brackets to hold the gang at the height so that the spring-loaded washers tightly gripped the flat face of the drum cut-out and it drove the gang nicely. But I chose the inner circle to drive; thus, when I turned the spindle clockwise the gang turned anti-clockwise!

I had to rework the brackets to raise the gang for the spindle, to work on the outside circle of the cut-out. But I had removed most of the front face on the outside so now the washers would not grip reliably. I had to fit a rubber grommet to the spindle as a tyre, which drove against the inner surface of the drum. It worked well and rotated the drum in the same direction as the knob.

With the drive mechanism sorted, I mounted the gang onto the chassis and checked it in the cabinet and found I had a space of about 20mm in front of the drum to fit a dial. I would tackle that later but at this stage, envisaged a stationary card lit from behind with a pointer mounted on the drum.

At this point, it would have been easy to cut and re-drill the gang supports to get the dial drum outside diameter precisely in line with the escutcheon opening, but this point evaded me at the time.

Chassis layout

I then turned my attention to assembling the chassis. I needed four tuned coils. I had a junked model 84 AWA set with the oscillator and IF coils and after searching through my odd coil box, I found an aerial coil that looked promising. I needed the aerial coil to cover 600-1700kHz, the oscillator coil to about 950-2150kHz and the IF coils would then be tuned to around 450-455kHz.

I tested all the coils using a signal generator and a CRO, looking for a resonant peak when applying a varying frequency signal. As I did this, I kept in mind that the frequencies would be somewhat reduced when built into the set due to stray capacitances.

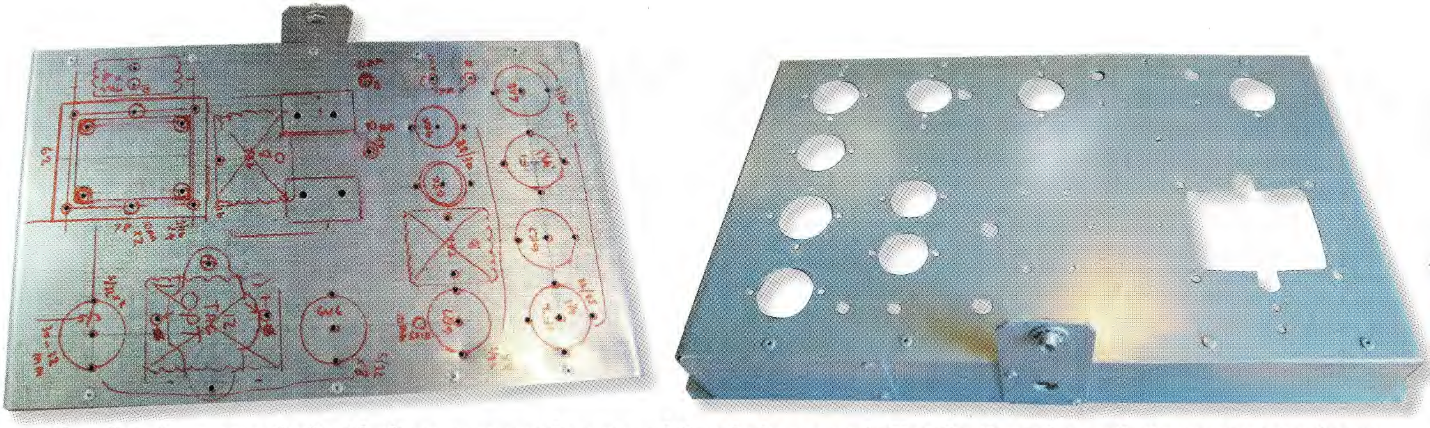
I added a 420pF padder to the oscillator coil and found that it would then resonate from 960-2130kHz. The aerial coil resonated from 475-1550kHz, again in the ballpark.

While IFT1 gave identical 400kHz peaks on both windings, IFT2 was a problem. One adjusting screw was wound all the way out and jammed – with the screwdriver slot broken off! The good winding resonated at 405kHz but the broken side was at 350kHz. Freeing the adjusting screw just moved the resonance down to 300kHz.

At some stage, the screw had been wound right out in an effort to get near the correct setting; the exposed thread had a dab of red paint showing this was a factory setting! The set probably still worked but must have been down on sensitivity.

I pulled the coil apart and removed the peaking capacitor; it measured 120pF. Without this capacitor, the coil resonated at 650kHz, so I judged the coil was still usable. I fitted a 56pF capacitor instead, and the coil then resonated at 405kHz with its slug at mid position, the same as the others.

The oscillator coil from the AWA set was unshielded, but I wanted it in a



The chassis was marked with the component layout and then holes were drilled for the valve sockets, power transformer and IF transformers. After this, the chassis was coated with primer and painted blue.

can, like the others. I fitted and tested it in a scrap square can to match the aerial coil, which came from an unknown receiver. I planned to connect the tuning gang fixed plates and the converter grid cap above the chassis, so drilled the cans for the coil grid winding to come out the top.

The tuning gang already being located, I then marked up positions for the coils, the valves and IF coils in the front end of the set. I kept these parts as a compact group on the left and placed the detector and audio output parts along the rear of the chassis. That left the right side of the chassis for the power supply parts.

I used the circuit diagram as a guide and visualised the required layout. The aerial and oscillator coils fit right beside the tuning gang, to get the shortest connecting wires.

I positioned the aerial and Earth connectors at the front, to avoid having the aerial wire near the IF stages. I later realised that I could have put the terminals on the back of the chassis and routed the wires around to the front.

The valve sockets and the coils were orientated for logical lead placement. I drilled four holes for the two-bolt IFTs, to give me several options later. You have to think in three dimensions and make sure that all securing bolts are accessible and nothing hits anything else. There are a few holes required for wires to come from under the chassis to above, eg, grid cap leads, dial lighting and gang connections.

It's a bit like laying out a PCB. Some of the resistors and capacitors will connect direct, point to point, but I placed small pieces of tag board in strategic locations to hold parts where the lead length was not critical. I also added a socket to the rear of the chassis for the speaker leads.

The choke and power cord needed holes too, as did the separate Earth screw on the right-hand side. I used a Jaycar cord-grip gland to secure the power cord. I drew the component outlines with a Sharpie pen first, then drilled all the holes once the pilot marks were squared up.

Having drilled all the required holes, I cleaned up the chassis, sprayed it with etch primer and then blue Galmet hammer paint.

Speaker transformer

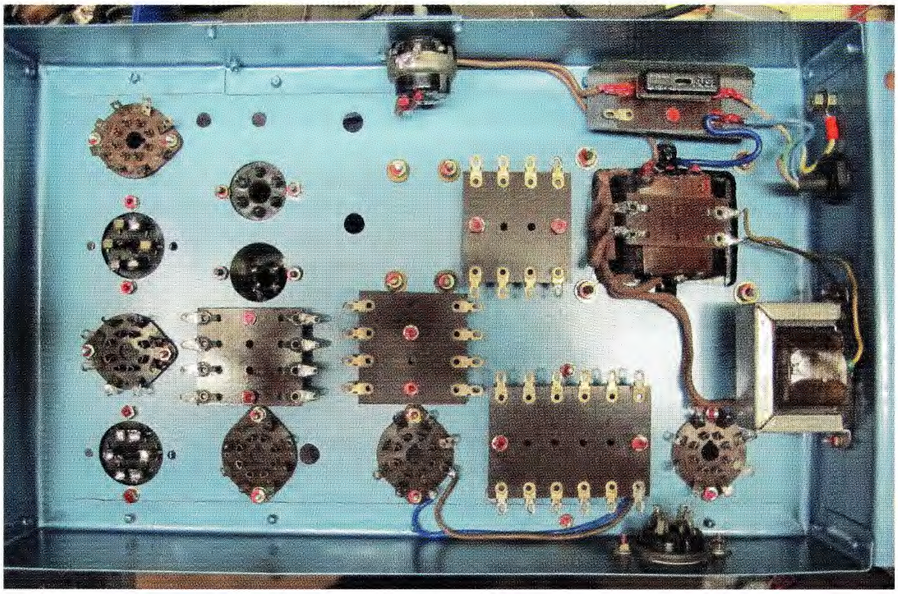
As the 6V6 audio output valve does not have earth-shattering output power, I selected a Jaycar MM2002 (type 2215) 15W multi-tap power transformer to match it to the 8Ω speaker. With a 230V AC primary and 15V AC secondary, that gives a turns ratio of 15.3:1 (230 ÷ 15).

As the speaker is an 8Ω unit, the impedance seen by the valve will therefore be 1.88kΩ ($8\Omega \times 15.3^2$), which is a bit low. If I used the 9V tap, the impedance would be 5.2kΩ which is a bit more like it. A 6V6 in class A with 250V at the plate is specified for driving a minimum load of 5kΩ.

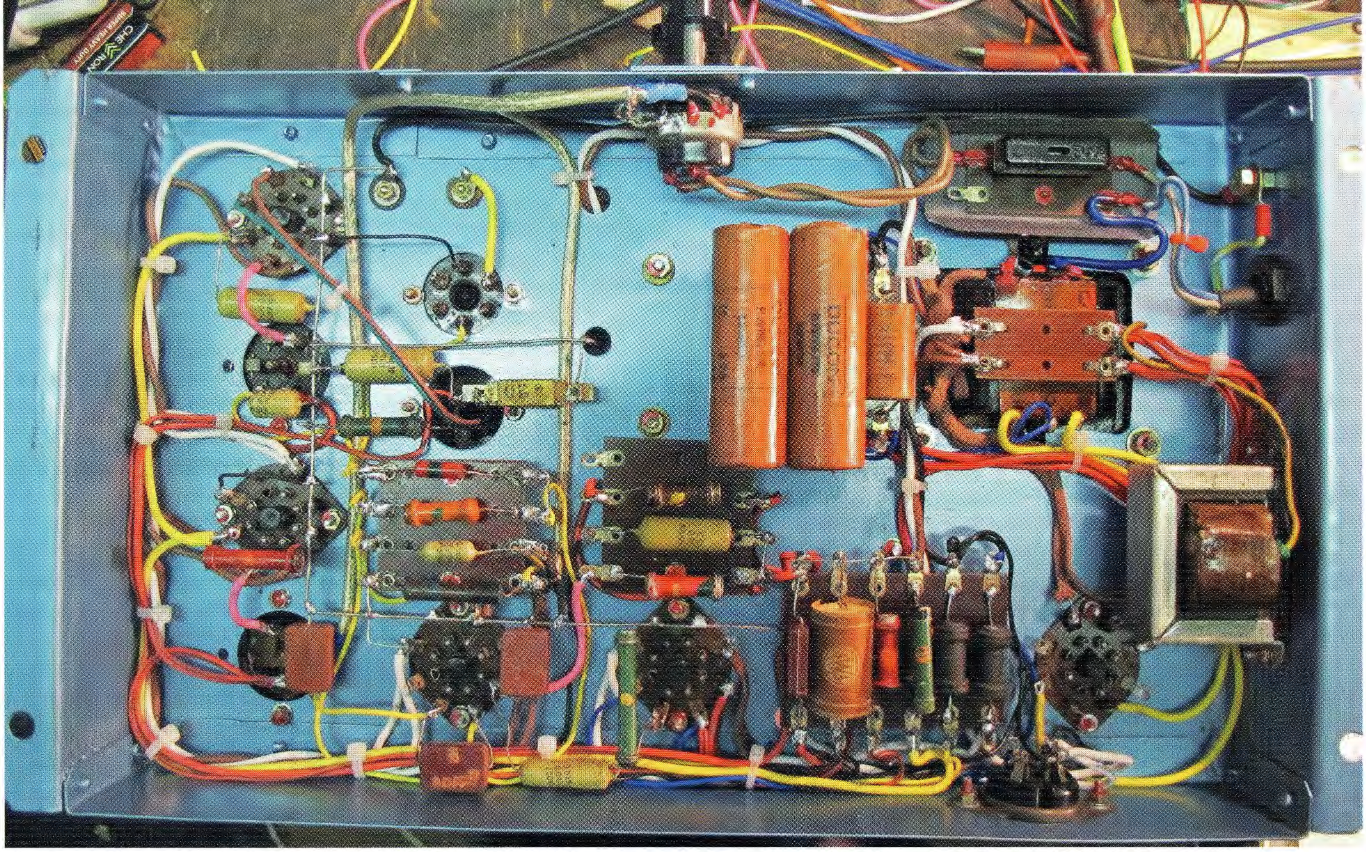
I wired a 6V6 and a 6Q7 together on the bench to drive the transformer and to test for the best of my valves to use in the audio section. This lash-up was powered from my trusty variable power supply, which has 6V AC and 0-350V DC outputs.

The result was that the 6V6 gave about 4W output with 250V DC at the plate and the Jaycar transformer gave identical results either interleaved or air-gapped, which indicated there was a surplus of iron and no DC offset saturation with either stacking.

I left the transformer air-gapped, and on the final test, it was good for a frequency response of 80Hz-5kHz at 4W using the 9V tap. The impedance curve was fairly flat with a useful output from 2-16Ω, peaking at 6Ω. So it would suit the 8Ω speaker nicely. The



The chassis at an early stage of assembly, with various sockets mounted, some wiring done, and a fuse connected to the volume pot's on/off switch.



The complete chassis is shown above. Note the stiff wire used as an Earth bar from the external Earth terminal at upper left, terminating at the tag strip at lower right.

output transformer started ringing at higher frequencies and at the clipping power level. A capacitor across the primary reduced this tendency.

I did not employ any negative feedback in the circuit, to keep it simple and keep the gain as high as possible.

I used 1930s parts in my tests and found the only critical component was the 6Q7 plate decoupling capacitor. Any leakage here would drive the 6V6 to maximum plate current (about 90mA) and choke off the audio. So a low leakage capacitor is a must.

Chassis assembly

It was time to attach the basic bolt-on components such as sockets and tag strips. RF components aside, I wanted to mount them on tag strips. I drew up a rough wiring diagram from the circuit diagram and pencilled in where the parts could go.

From that, I arrived at the number of tag strips needed and squeezed them into the chassis as required, around the valve sockets. These were washed in methylated spirits and given a buff up, then bolted to the chassis. Then the transformers were given a black or lacquer finish and also fitted.

I mounted the tuning gang and fitted the tuning coil and oscillator cans in an orientation that gave the shortest grid and plate leads. That did not work so well for the oscillator plate and grid leads, which can be seen running diagonally from the valve socket straight to the coil.

The grid lead for the converter was picked off the top of the tuning gang fixed plate connection, and the oscillator coil was connected through the can to the top of the gang. The IF cans were mounted for shortest signal lead length. I then fitted in the Earth bar which runs from the external Earth spring terminal, past the signal valve sockets and terminates on a tag strip with the HT divider components.

On its way, it picks up the shield and cathode points of pins 1 and 8 for each valve and provides a convenient bar to wire bypass capacitors and signal ground points to.

I didn't use the chassis itself for any ground or B- connections; I prefer to run two wires to all points on the circuit, keeping the signal B+ and filament feeds separate. That is how I make guitar amps, so I took the same approach with this radio.

Mains cable and power-up

I fitted the mains cable and fuse and completed the transformer primary wiring. I used a bulkhead gland to grip the power cord and attached the Earth to a brass screw. That screw is then wired to the single ground point of the circuit, where the tuning gang capacitors terminate.

I fitted a 2A mains fuse, then double-checked the power plug Earth pin continuity to all chassis panels. Then I powered up the transformer and checked all the secondary voltages and connections.

With all that satisfactory, I completed the filament wiring and plugged in a set of dummy glass valves, and checked that all the heaters lit up.

That also gave me the opportunity to check the 5Y3 rectifier valve insulation and confirm B+ output at the filament, with the plates at about 450V DC. With no smoke or flames, I then proceeded to wire in the power supply components and the 6Q7 and 6V6 circuits, to test the audio section for correct function and the smoothing DC component's suitability.

The volume control required shielded cable as the signal passes from the rear of the chassis to the front and back again. I probably should have mounted the control on a bracket at the rear and fitted a long extension shaft through a front power switch.

Components and wiring for the audio and power supply were installed but without the 6V6 and 6Q7 to start with; just the 5Y3 rectifier. I powered the set up via a Variac and monitored the back-bias resistor voltage to give me an idea of the current drawn. I watched the surge and forming current of the electrolytics, which was around 100mA at first but dropped as the capacitors formed.

After a minute or so, the current dropped to a negligible level, so I slowly advanced the supply voltage to 230V AC. The HT peaked at 450V DC with little current flow, and nothing was getting hot, so the forming action was finished. The filament voltages were normal, so I shut it down and plugged in the 6Q7 and 6V6 valves.

The amplifier stages worked first up, drawing a total of about 50mA, resulting in a back-bias voltage of -15V. I injected an audio signal into the volume control and power tested with a sinewave and a dummy load. The 6V6 gave an identical power output as it did during my bench test, with a similar frequency response.

Front-end testing

Working backwards, I continued by wiring the detector and converter sections but only plugged in the 6K7. To see how the IF transformers would react, I injected a 455kHz signal into the plate pin of the 6K8 socket.

The signal got through to the 6K7, and was then amplified, but IFT2 did not seem right; there was no peaking with slug adjustment, just a change in amplitude.

This did not bode well, but I pressed on, leaving the slugs set for an overall peak at 455kHz. When the 6K8 was plugged in, a stable oscillator signal appeared at the 6K8 plate and this could be adjusted over a range of 1000-2500kHz via the tuning knob. I checked the DC voltages and they were more or less as expected. There was -17V back-bias with -2.5V at the tapping point for the RF system. The HT was 280V DC and 70V for the screen supply.

I injected a modulated RF signal into the aerial circuit and was rewarded with a signal at the 6K8 plate that included a strong 455kHz component, giving me a tuning range about 500-2000kHz which more than covered the AM broadcast band. So it seemed that the basic tuning coil set was suitable.

Substituting an external aerial for the RF generator allowed me to tune across the AM band and pick up the spectrum of local Sydney stations from 2FC way past 2SM, and it was great to hear actual radio stations!

Troubleshooting

However, all was not well. The signal at the diodes of the 6Q7 was way below expectations, and the volume control needed to be at maximum to get a reasonable output for the speaker – plus there was no AGC voltage.

There was indeed a problem with IFT2. The only thing to do was to pull it out and substitute another coil. I found a Kingsley coil in my junk box which was of a similar age and frequency range. I checked it for resonance and wired it in. Immediately, I could peak the IF and had about a volt of audio signal available at the volume control.

Better still, I found I could slide the Kingsley IFT can inside the faulty AWA coil can, so from the outside, both IFTs look the same.

But I still did not have any AGC voltage, and the set was out of control, with nasty distortion coming from the detector and IF sections. I checked the resistance of the AGC line to ground and instead of megohms I found it to be a varying low resistance of about 2kΩ. This was shunting the AGC voltage to ground.

This was caused by 2MΩ carbon resistor R5 which had a resistance which varied if I wiggled it! With that replaced, I could get up to 20V off the unloaded diode and once connected back to the grid system, I saw between 1-10V depending on signal strength.

Interestingly, with the coil set working well, I could dispense with the trimmers on the gang. The tracking of the gang sections finished up giving good enough matching so that trimming did not increase the signal level, even at the top end of the scale; removing the trimmers simplified the build.

The signal was now as clean as you could expect and with the IFTs all peaked, the set was 'lively' with plenty of background chatter off station with low AGC, and an almost silent background when tuned in to a strong station. However, there was a level of hum and buzz that was not nice and needed investigating.

The hum was mostly 50Hz, with some buzz mixed in. I realised that I had forgotten to Earth one side of the heaters. Earthing pin 7 of V1-4 gave better results than pin 2, and that reduced the 50Hz level right down, leaving the buzz to deal with. I noted that the buzz varied with the volume control setting, being almost non-existent at full volume and worse at half volume.

This was because I had used a switch pot to switch both mains and millivolt-level audio signals. Placing mains wiring anywhere near a high-impedance grid circuit is not a good idea. The obvious thing to do would be to get the mains wiring right away from the audio wiring or shift the control function to a less sensitive part of the circuit, such as the output valve grid.

However, I persisted and found that by re-dressing the mains wire around the volume control and changing the grounding point for the shielded cable, I reduced the buzz to a minimum and left it at that. In normal listening conditions, no hum or buzz can be heard.

DC voltage checks

I then decided to check the DC operating conditions of the valves. The 6V6 output valve was biased at -14V and with 280V on the plate, was within specs. The 6Q7 generates its own grid bias and amplified cleanly with a gain around 15 times, with a plate voltage of 80V.

The 6K7 and 6K8 were working OK but with screen voltages a bit low, at around 60V. I changed the divider circuit to push the screen voltages to 90V, and the IF signal level increased noticeably.

The set draws about 60mA with the output valve accounting for most of that, and after a couple of hours, nothing was overheating and the voltages

The faulty AWA IFT2 was replaced with a Kingsley coil which fit perfectly inside the AWA can. However, this did not fix the lack of AGC voltage.

and currents were unchanged.

Tweaking the valve lineup

The valve lineup shown in the circuit diagram wasn't finalised until this stage, as I became a bit of a "valve jockey", substituting various compatible types to find the best combination.

I found that a particular metal 6Q7 had a bit more gain than the others. The 6K7s all worked about the same, so I picked the nicest-looking one.

The converter choice was interesting as I had many metal, glass GT and G types to pick from. After a lot of to and fro, I settled on a particular new-old-stock 6K8G that worked quietly with high gain and no sign of instability, as it is a shielded construction.

Not knowing a great deal about converter design, I took the easy approach and merely selected the best-sounding valve.

Most of the capacitors I used are the 1960s mud-brown types. Low-value capacitors are all original "Simplex" mica moulded types. I didn't use any 1930s or 40s wax or moulded paper capacitors as they are all quite leaky now.

The resistors are mostly carbon wire end types plus a few wirewound. The electrolytics are 1960s 600V TV plastic types, hidden in some older "Ducon" cardboard tubes.

Dial lighting and scale

The chassis was offered up to the cabinet again and lined up, to check the spindle length was correct to fit knobs and to see what room there was to fit the dial scale. It was then that I discovered the gang spindle was not in the centre of the dial escutcheon. I missed by about 15mm vertically for one reason or another, thus making a direct 1:1 dial impossible.

The other choice I had to make was between a fixed scale and moving pointer, or fixed pointer and moving scale. What then followed was a series of trials, making up cardboard dial scales. The best solution I came up with was a porthole escutcheon with a fixed pointer at top centre and a simple moving circular dial behind that, bolted directly to the gang drum, with the stations and frequencies marked on it. In the end, I blanked off most of the curve in the escutcheon with a plate, leaving a wedge-shaped port with a fixed centre pointer.

I then mounted a simple dial plate off the gang drum. The dial plate was then marked with stations and covered with a plastic disc to keep it clean. Working on the smaller radius of the lower escutcheon opening reduces the usable circumference and crowds the station markers together, but that's what I am stuck with.

Next time, I will know better and position the escutcheon to use a larger diameter for greatest scale length.

The remaining work concerned mounting a dial light above the pointer position, making up a speaker connecting lead, finalising the exact position of the chassis in the frame, drilling the chassis securing holes in the frame and fitting a set of temporary knobs to operate the set. I will find a more suitable pair at some stage.

It's the old story; I have plenty of knobs that look the part by themselves but not two that look completely right together.

Conclusion

The set is sensitive enough to pick up local stations with a short lead on the aerial terminal, but works much better with a 10m outdoor aerial. The 6V6 gives adequate listening level for room use. The tone of the finished radio is slanted toward the bass end, mostly due to the big speaker I used.

I did an audio frequency response check from the RF modulated signal generator and found it to be flat from 200Hz to 3kHz, with -3dB points at 110Hz and 6kHz. But the 15in speaker skews that towards the bass end. The cabinet could do with a tweeter, but enough is enough; this is 1935, after all!

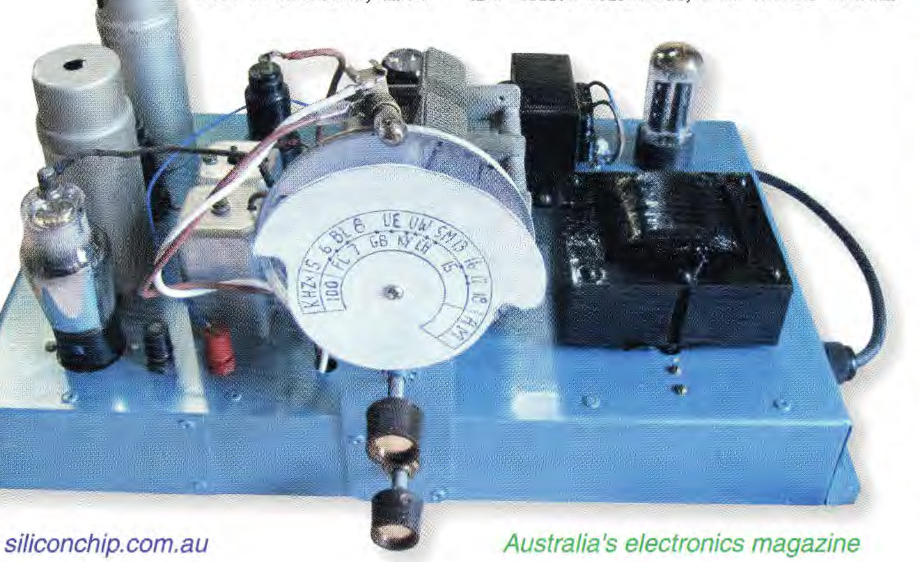
One of the last jobs was to level the legs of the cabinet and drill the frame for the hold-down chassis bolts. The cabinet had warped over the couple of weeks it took me to finish the chassis and rocked diagonally by about 3mm. I shortened the longer leg by about 2mm, then fitted some stick-on felt feet – the cabinet finally stood square.

With the chassis pushed into final position and the dial lined up, I pencilled through the chassis holes and drilled the timber out double oversize, then bolted the chassis in place with 3/16-in bolts.

The set now has the external appearance of a well-worn and faded 70-year-old cabinet, but it has a spick and spiffy chassis inside with RCA octal type valves, which were just plausible in 1935. It's as if some were later replaced with glass types and the capacitors were later replaced with 1960s models and re-wired with modern plastic cable.

The set sits in my little collection as representing a 1930s radio and it was fun to build, and learn a little more about RF circuits and valves.

Extra details on this set can be read in the forum post Fred Lever made at: siliconchip.com.au/link/aapw **SC**



The finished dial was drawn by hand onto a piece of stiff paper.