Vintage Radio

By Associate Professor Graham Parslow

Rescued from a farm: a rare 1948 model 766 Breville radio

Sixty-five years of abuse and abject neglect made restoring this 1948 Breville 766 radio a real challenge. It's an interesting 6-valve battery-powered set designed specifically for use in rural areas.

The old Breville 766 was in quite poor condition when purchased, having spent most of its life in a chicken coop.

HOW DID A 1948 6-valve Breville 766 radio get to spend most of its 65 years in a farm chicken coop, accumulating muck? I can only speculate that the farmer wanted to listen to the radio while feeding the chooks. But speculation aside, this is an interesting radio with interesting historical connections to the Australian radio industry.

These days, the Breville brand-name is one that most people only associate with electrical gadgets and kitchenware but it was not always so. The Breville company dates back to 1932 when its two founders, Bill O'Brien and Harry Norville, created the brand-name by combining their names. The company started off making valve radios as its main product and the Australian Official Radio Service Manuals (AORSM) list numerous Breville models between 1937 and 1955.

The advertisement reproduced later in this article is from the 1938 AORSM and shows that at the time, Breville specialised in high-performance radios for farms. World War 2 subsequently stopped all domestic radio manufacture and so Breville diversified into manufacturing mine detectors for the military during the war years.

After the war, Breville resumed making radios and also began manufacturing small appliances (hence the brand that we know today). Radios were discontinued under the Breville name after 1955 and were instead made under the Precedent brand-name, along with stereograms and TV sets. The Precedent business was subsequently sold in 1968, leaving Breville to concentrate on appliance manufacture.

The reason that Breville remains well known is due to the development of its novel sandwich toaster in 1974, a product that became a global marketing success. Another success from 1977 was Australia's first food processor, the Breville "Kitchen Wizz".

32V systems

Following European settlement, Australia made its original fortune from sheep and wheat, helped by the occasional gold rush. As a result, the Australian population was highly rural until World War 2 when many new manufacturing jobs resulted in a drift in the population to urban centres. Even so, during the 1950s, a large part of the population remained in rural centres, many of which lacked mains electricity.

By coincidence the Breville model

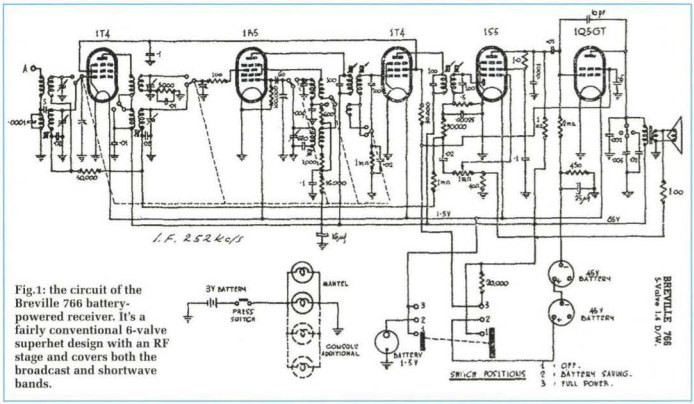


Fig.1: the circuit of the Breville 766 battery-powered receiver. It's a fairly conventional 6-valve superhet design with an RF stage and covers both the broadcast and shortwave bands.

766 featured here shares the author's birth year of 1948. The author grew up 220km from Adelaide in a community where the farms largely ran on "freelight", a standard 32V system using lead-acid batteries charged by wind-powered generators.

The small town that I lived in was better off, with a diesel generator that provided 240VAC between 6am and midnight. This ended in 1956 when mains power was brought to the area.

In fact, 32V systems were common in rural Australia and many farms were quite some distance from radio transmitters. As a result, many specialised farm radios were made and they had to be quite sensitive in order to receive weak signals. They also had to be frugal when it came to power consumption, so they could be powered using (expensive) single-use batteries or by batteries and mechanical vibrator circuitry to produce the necessary HT rail.

Unfortunately, vibrators were noisy in operation and their constant buzz was rarely welcome.

The 6-series valves (indicating 6.3V filaments) of the 1930s onwards had a power consumption of 40-60W in a radio designed to produce an audio output of around 1W. By contrast, the Breville 766 uses compact 1-series valves (nominal 1.4V filaments) and consumes less than 2W for around 300mW of audio.

In the restored Breville radio featured here, the 90V (battery-powered) HT rail draws 15mA, while the 1.5V filament supply draws 320mA. Selecting the "economy" position using the Battery Switch on the front panel reduces the HT consumption to 12mA by inserting a series resistor but this has no affect on the filament current drawn from the 1.5V battery.

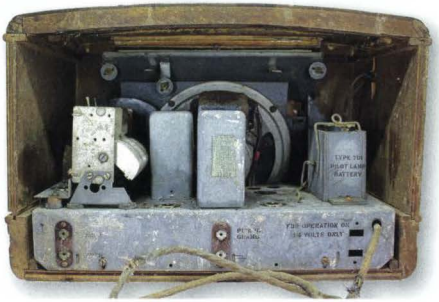
Circuit details

The circuit of the 766 is a fairly standard 6-valve superheterodyne design with an RF amplifier stage – a configuration easily determined due to the use of a 3-section tuning gang. Fig.1 shows the details.

This view shows the fully-restored receiver. Repairing the cabinet was a major part of the restoration.

Above & below: these two photos show the poor condition of the set prior to restoration. Note the amount of chicken droppings that had found their way under the chassis and that's after the loose material had fallen away! The view below shows the set after blowing away the gunk with compressed air.

The chassis was cleaned using a paint brush, mineral turpentine and WD-40.



The RF amplifier stage is based on a 1T4 valve, with a 1R5 as the mixer-oscillator and another 1T4 as an IF (intermediate frequency) amplifier. Interestingly, the IF for this model is 252kHz, not the more common 455kHz. This makes the set more sensitive and selective when it comes to receiving longer wavelength stations in the broadcast band.

A 1S5 diode-pentode serves as the detector and as an audio preamplifier. This in turn drives a 1Q5 audio output stage. The 1Q5 valve is somewhat odd in appearance, being housed in a GT glass envelope that's sized somewhere between the "new" compact size of the other valves used in the set and the older-style "full-size" valves.

An interesting feature is that the dial lights are only illuminated when a side-mounted pushbutton switch connects a 3V bicycle battery into circuit with the globes. This was obviously a power-saving measure to conserve the battery. Fortunately, this radio came with an original Eveready battery still mounted in its "clip-down" battery box on the top of the chassis.

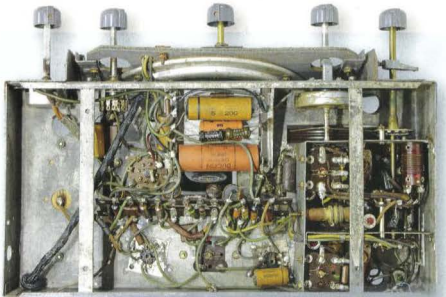
No chickening out

The model 766 includes a number of high-quality features, such as a sturdy chassis, rugged IF coils, a shortwave band and a Magnavox 8-inch speaker. The restored radio has excellent sound quality, a remarkable outcome considering the state the set was in when I purchased it.

Regular SILICON CHIP readers may recall the Vintage Radio article in September 2012 which described how the author acquired a collection of poorly-preserved radios from rural Victoria. As stated in that article, "the radios were in appalling condition and, after a quiet moment of reflection on the value of my purchase, some of the despondency was relieved by simply getting a hose and washing the chicken droppings off the Breville".

In practice, there are a number of reasons why hosing down a plywood radio from the 1940s is a bad idea, including possible delamination of the ply and staining. However, given the condition of the set, there really seemed to be no other option at the time. As it turned out, I was luckier than I deserved to be and the old Breville's cabinet remained reasonably intact.

That hasty hosing meant that there are no photographs to show what the set was initially like on the outside. However, the chicken and rodent droppings that remained trapped under the chassis give an idea of the conditions that the radio had endured (see photo). The only way for chicken droppings to find their way under the chassis was via a gap behind the speaker but even so, the underside was fairly



These two photos show the underside of the chassis and the rear inside view after restoration. The chassis scrubbed up well and despite the years of neglect, very few parts needed to be replaced.

solidly packed. Because the amount of trapped debris was unexpected, the accompanying photograph only shows what remained attached to the chassis after the loose material had fallen away.

Restoration

Step 1 in the restoration was to use a compressor to blow away most of the contamination. This was followed by contact cleaning using a paint brush and liberal amounts of turpentine. Turpentine is a non-conductive solvent that evaporates completely, a process that was sped up with a few blasts from an air compressor.

Once the chassis was clean, a few judicious squirts of WD-40 were applied to lubricate the volume pot, the tuning-gang bearings and the Oak rotary switches. A few squirts of WD-40 were also applied to give hard-surface components a final clean and to add lustre to their appearance.

In fact, I discovered WD-40's excellent cleaning/shining properties by accident on a previous restoration. I would have discovered it sooner if I had read the blurb on side of the can. It lists this as being among the many virtues of the fish-oil extract in this product.

After cleaning, the chassis of the old Breville 766 looked like it had been miraculously transformed. What's more, it was in such good condition that it looked like the radio could even be quickly made to work.

The chassis was missing its 1R5 mixer-oscillator valve so I cannibalised one from another radio. The next job was to restore the dial-tuning mechanism to working order. It was missing some parts, so I scrounged a replacement dial-pointer plus a tensioning spring from the junk box and installed a new dial cord. It all worked quite well, with the smooth feel that comes when a flywheel is part of the system.

After replacing the five missing knobs (also scrounged from my junk box) and an antenna, it was time to power the old valve radio up and see if it worked. First, a bench power supply set to deliver 1.5V was connected to the valve filaments and the five valves quickly settled down to draw 320mA. A separate bench supply was then connected to the HT rail and slowly ramped up 90V.

During this process, the HT current was monitored to ensure that it didn't rise unduly and perhaps cause a faulty part to explode (it has only happened to me once but once is enough). In this case, there were no explosions and the current appeared to be normal. However, there was no response from the radio, so I twiddled the tuning.

Initially, nothing happened and thoughts of "where do I begin" began forming. But then, after a few minutes, the radio suddenly started "crackling". This is a useful sign when it comes to troubleshooting because it means

Another view of the fully-restored radio. The missing cabinet veneer was repaired using car epoxy filler.

that the loudspeaker and output transformer are probably working.

Further adjustment of the tuning then brought in stations. This was another case of the HT electrolytics reforming under voltage and resuming their normal function. In the end, no further parts needed replacing and the tuning was good, without any need for adjustment (or alignment).

Having established that it worked OK, the radio was then fitted with batteries and now runs exclusively on battery power. This gives it an almost instantaneous output after switch on, unlike most valve radios that need warm-up time (mainly due to the fact that the rectifier valve has to warm up and bring up the HT rail).

Restoring the cabinet

Getting the radio working now gave me the motivation to continue restoring the cabinet. The first step here was to use paint stripper to remove all vestiges of the original lacquer finish. The case was in two pieces (top and bottom) and all joints were in poor condition due to the failure of the animal glue originally used in 1948.

In those days, carpentry shops had a continuous hot-glue pot that was used as needed. By contrast, for this restoration, modern PVA glue was used for all joints and lots of clamps were applied to keep it together while the glue dried.

Re-gluing the top veneer proved to be quite a challenge. Some of the top veneer was simply missing and I have learnt by experience that simply splicing in another piece of veneer always produces a result that looks wrong, regardless of the technical excellence of the job.

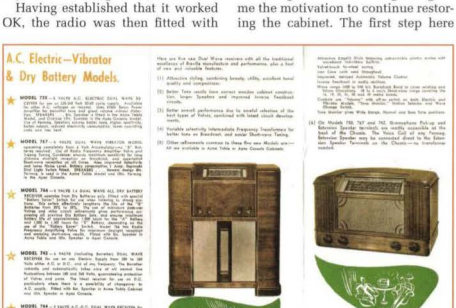
Although the process is not intuitive, the best way to go is to apply 2-part epoxy filler (ie, car bog) and then sand this back to a smooth finish. After applying one coat of polyurethane to the entire case, the pink filler is then painted over with three shades of brown and black to blend into the wood-grain of the cabinet.

The accompanying photographs show just how successful this process proved to be. It's certainly one of those times when you get a good feeling when a job is finished.

Apart from the woodwork, a significant amount of work was also required to restore various peripheral fixtures, including the dial plastic, the metal trim and the speaker cloth. Unfortunately, the five knobs scrounged from my junk box to get the set going didn't match and finding suitable knobs proved to be a real challenge. In the end, a set of knobs was purchased to match the cabinet styling.

It was with pride that I took the completed radio to a recent meeting of The Historical Radio Society of Australia. Powered by batteries, it stood proudly independent and functioned just as it did back in 1948. One member who specialised in collecting farm radios was particularly impressed with it. He had never seen a Breville 766 before and he told me that it was now a very rare radio.

This was a project that repaid my efforts many times over. Despite being rather underwhelmed by it when I first purchased it, it's one that I am now more than happy to have in my collection. SC



A.C. Electric—Vibrator & Dry Battery Models.

Here are five new Short Wave receivers with all the traditional excellence of Breville manufacture and performance, plus a host of new and valuable features.

(1) Attractive styling, combining beauty, utility, excellent tonal quality and composition.

(2) Better Tone results from correct wireless cabinet construction, larger Speakers and improved Inverse Feedback circuits.

(3) Better overall performance due to careful selection of the best types of Valves, combined with latest circuit developments.

(4) Variable adversity Intermediate Frequency Transformers for further Tone on Broadcast and similar Short-wave Tuning.

(5) Other refinements continue to Deep Sea new Models are—All are available in Acme Table or Apex Console Cabinets.

Attractive Artistic Dials features adversitable plastic, matted with excellent "Invisible" Lettering.

Improved Tone Control.

Tone Gain with ease throughout.

Improved, detailed Automatic Volume Control.

Inverse Feedback in audio stations.

Improved Tone Control, Tone Gain, Tone Control system and Tone Compensation on Long Wave Stations comes controlling the Tone Control on Short Wave Stations.

Complete with "Stations" with off-on switch on Amp. Electric and Vibrator Models "Tone Monitor," Medium Selector and Wave Selector Switch.

Tone Monitor gives Wide Range, Mid-range and Bass Tone positions.

(6) On Models 750, 767 and 762, Gramophone Pick-up and Reference Speaker Sockets are readily available at the back of the Chassis. The Voice Coil of any Pentong Reference Speaker may be connected direct to the Reference Speaker Terminals on the Chassis—no transformer needed.

APEX CONSOLE

And here's the new and graceful Apex Console, designed lower and wider to delightfully express the new diminished "look." Not exaggerated, but in artist grand trends. Made from selected Australian Timbers, Walnut and Blackwood, finished in Lacquer finish. Generous baffle area ensures Tonal tone from the different high notes to the resonant bass.

ACME TABLE MODEL

This charming Table Model is just small enough to fit handily on the occasional table, at the bed-side, or on the mantel, yet large enough to give "big set" performance with full-throated tone and volume from its 8in. speaker. Strongly constructed and executed in choice walnut veneers, hand polished to a beautiful piano finish.

ALL SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

BREVILLE RADIOS are manufactured and guaranteed by BREVILLE RADIO Pty. Limited

Breville Radio manufactured a range of AC, vibrator and battery-powered radios, including the Apex Console and the Acme Table Model pictured here.