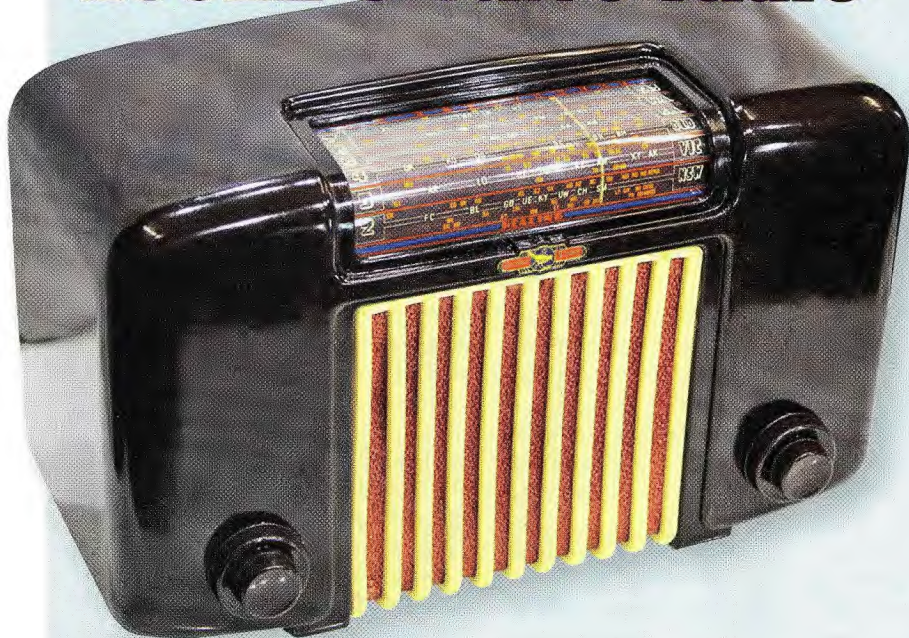


Vintage Radio

By Associate Professor Graham Parslow



The 1948 Healing L502E 5-valve radio



Boasting excellent performance, the Healing L502E was released in 1948 and is a fairly conventional 5-valve superhet receiver. A number of different models share the same cabinet design, with some unusual mechanical linkages used for the on/off switch and tone controls.

AMONG MY COLLECTION of vintage radios are four Healing models which all have the same cabinet style. Two of them are model 502Es (the more common type) and these have a loop antenna coil that also serves as an inductor for the tuned RF front-end. By contrast, one of the remaining two sets, a model L502E, uses a conventional aerial coil in place of the loop antenna.

The fourth set is a battery-powered

model 553A and this set uses a vibrator to generate HT from its 6V battery power supply. Healing consistently used an "A" suffix in their model numbers to designate battery-powered "farm radios" and an "E" suffix for those powered from mains electricity.

In my opinion, many vintage radio collectors progress through several phases that can be roughly summarised as tentative, then manic and fi-



The attractive singing canary emblem on the Healing receivers is made of enamelled brass.

nally mature. My first Healing acquisition, in my manic phase, was the model 553A farm radio, which I obtained from eBay. I confess that I was enamoured with the graceful shape of the case and the charm of the singing canary emblem.

That first radio was advertised with one missing control knob. This was subsequently reproduced using a plastic milk-bottle lid which just happened to have the correct dimensions and a comparable knurled edge. This lid was filled with car body filler and a hole drilled to fit the set's control shaft. The colour was carefully matched to the Bakelite by judiciously daubing the part with black and brown paint.

When that radio originally arrived by post, it was missing the knob as expected but what wasn't expected was that its valves were also missing. This was part of a learning experience to check advertised radios for the common parts that "handymen" remove and put in their junk boxes (badges, knobs and valves). Knobs removed from the sides of cabinets are particularly hard to pick from frontal pictures.

Fortunately, the Golden Voice emblem was still in place. This emblem is made of enamelled brass and cleans up well with Brasso polish.

As an aside, the phrase "Golden Voice" was also used by Motorola in the US for their radios and other equipment but the logo had a different appearance to that used by Healing. I haven't found any links behind that shared usage.

The set described here is a 1948 model 502E, made not long after World War 2. When the war ended, Healing proudly declared that "Australia's

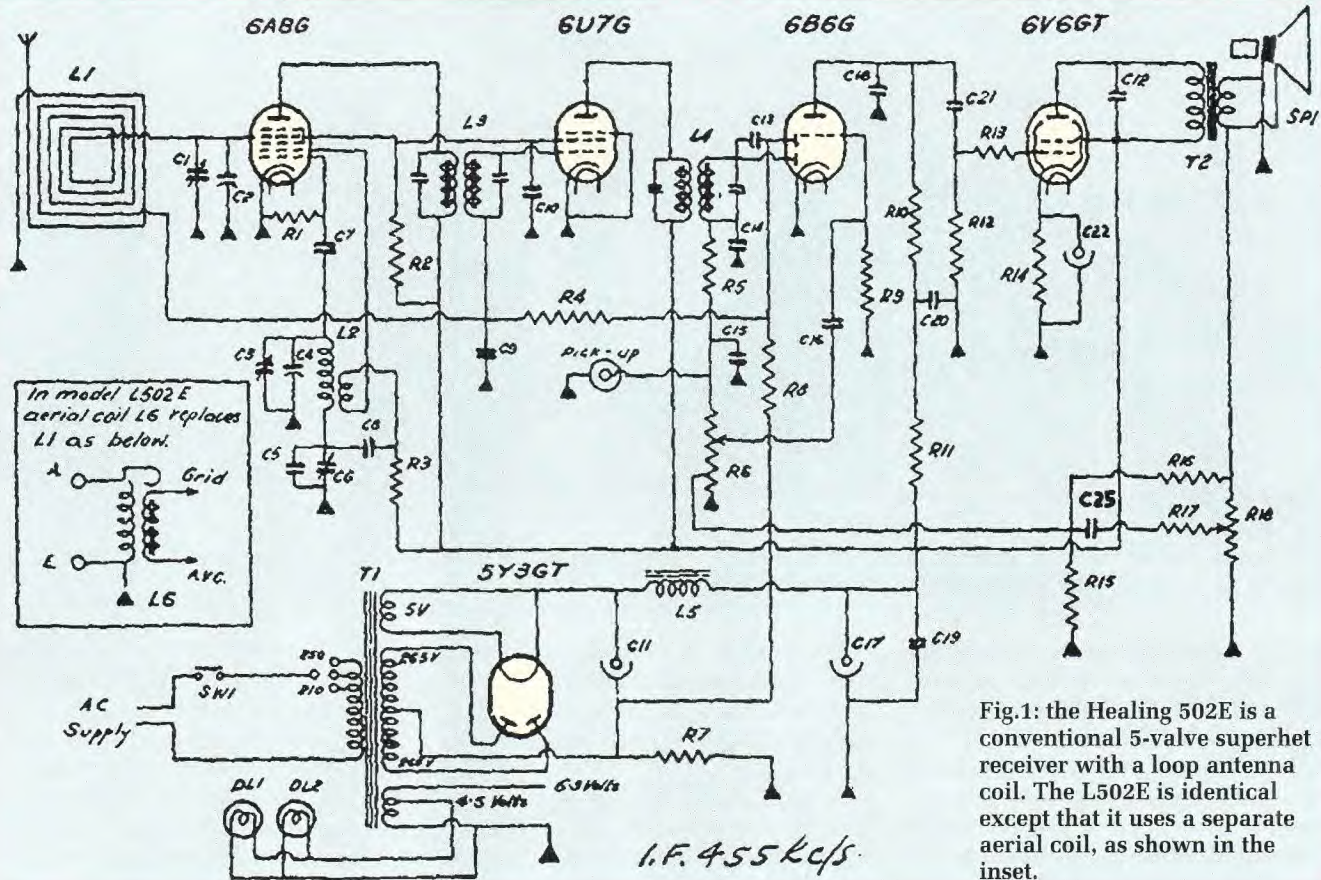


Fig.1: the Healing 502E is a conventional 5-valve superhet receiver with a loop antenna coil. The L502E is identical except that it uses a separate aerial coil, as shown in the inset.

largest manufacturer of radar receivers" was now "devoted to producing radio receivers for every Australian home. And Golden Voice is right 'Back On its Perch' at your Healing Dealer, waiting to show you just how good the much-promised post-war radios really are. In vacuum-pressed veneer consoles and rich plastic mantel cabinets, each Golden Voice Radio is a thing of beauty and, of course, unsurpassed for quality and tone".

Healing's claim of high quality and clarity of tone has some validity. Both of my model 502s give excellent reproduction from their 8-inch Rola speakers.

Circuit details

Fig.1 shows the circuit details of the Healing Model 502E. There are no radical surprises here and no corners were cut for the sake of economy. However, it's worth noting that, at the time, Healing also made a smaller 4-valve economy model designated the 401E. This "kitchen radio" did omit as many parts as possible to drive the cost down.

As shown in Fig.1, the Healing 502E is a fairly conventional 5-valve super-



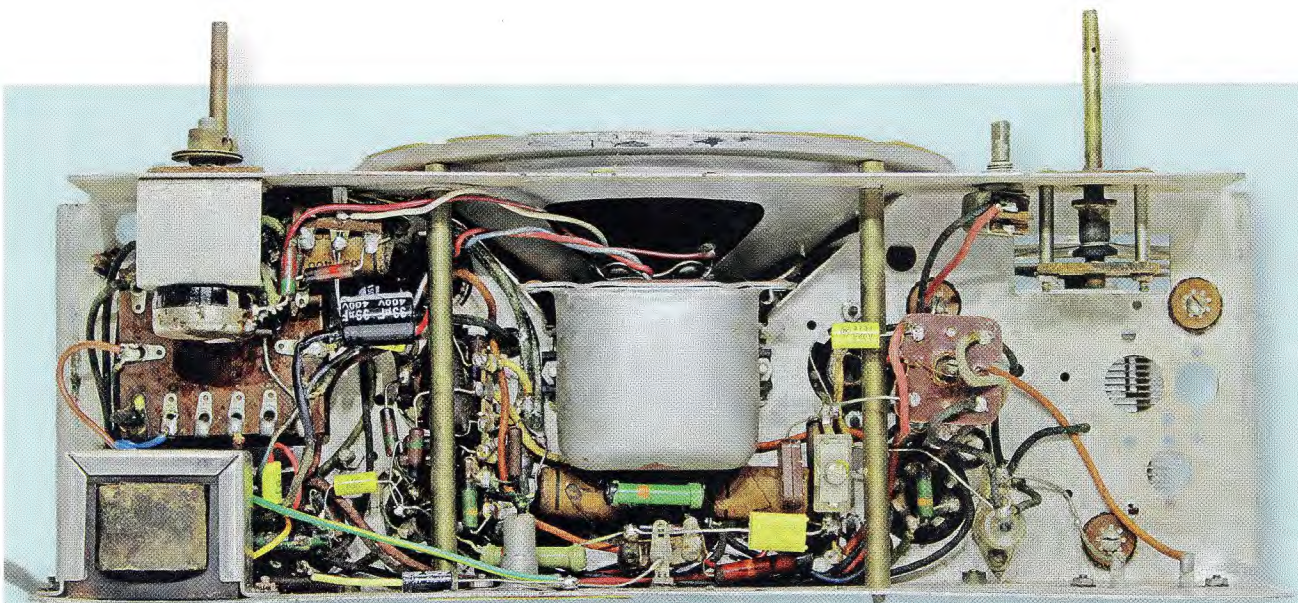
The author's L502E receiver prior to restoration. It was covered in dust, had missing knobs and valves, and came with spider webs and a wasp nest.

het design employing a 6A8 mixer oscillator, a 6U7 IF amplifier, a 6B6 detector/AGC/audio preamplifier, 6V6 pentode output and a 5Y3 rectifier. The tone control circuit is somewhat more complicated than usual, with feedback from the output transformer via bass control pot R18 to a tap on the volume control to provide bass boost.

An unusual feature is a 4.5VAC tap

on the 6.3V transformer secondary winding to power the two 6.3V dial lamps. This presumably extended the life of the dial lamps which are mounted behind the rear edge of the plastic dial face. The lighting is rather dull as a result of this arrangement but still perfectly OK in a dark room.

Running the lamps at less than their rated voltage may have extended their



This view shows the 502E after the under-chassis restoration work had been completed. Some parts are difficult to access as they are buried under other components.

life but it certainly wasn't indefinite. The two sets in my collection both came with darkened open-circuit lamps.

As with many similar sets, the 502E has a gramophone "pick-up", with the signal fed in via an RCA-type socket in the middle-rear of the chassis to the top of the volume control pot. There is no provision to mute the radio section when it is used with a gramophone pick-up though, so presumably it was just a matter of the user tuning off-station, to a quiet part of the dial.

The four control knobs have a twin concentric configuration and are used for power on-off switching, volume control, tone control and tuning. Switch pots weren't common at the time and so the 502 uses an articu-

lated linkage to connect the rotary outer righthand control shaft to a rotary switch for the mains power. The righthand central control shaft is used for tuning.

A mechanical linkage is also present on the lefthand side, with the outer control shaft fitted with a friction wheel. This in turn drives a wheel on the shaft of the separate tone control pot. The lefthand central shaft controls the volume pot. Basically, the engineering techniques used for these controls were driven by the aesthetics of the case design.

Restoration

The Healing L502E in the photos is the most recently acquired of my four Healings and came from a deceased

estate. It's fair to say that its previous owner was more a hoarder than a collector. Many sets in his collection had been tinkered with and then sent to ignominious storage on dusty shelves.

When I acquired it, the L502E was missing all its knobs but came complete with spider webs and a rock-like mud-wasp nest between the tuning gang and the chassis. This wasp's nest had penetrated between the vanes of the tuning gang but I was able to remove it using a stiff wire brush.

Unfortunately, the set's exposed steel surfaces all showed significant rust, including on the tuning gang, the dial light enclosure and the mains transformer casing. These rusted surfaces were all abrasively cleaned and painted to match the original finish.

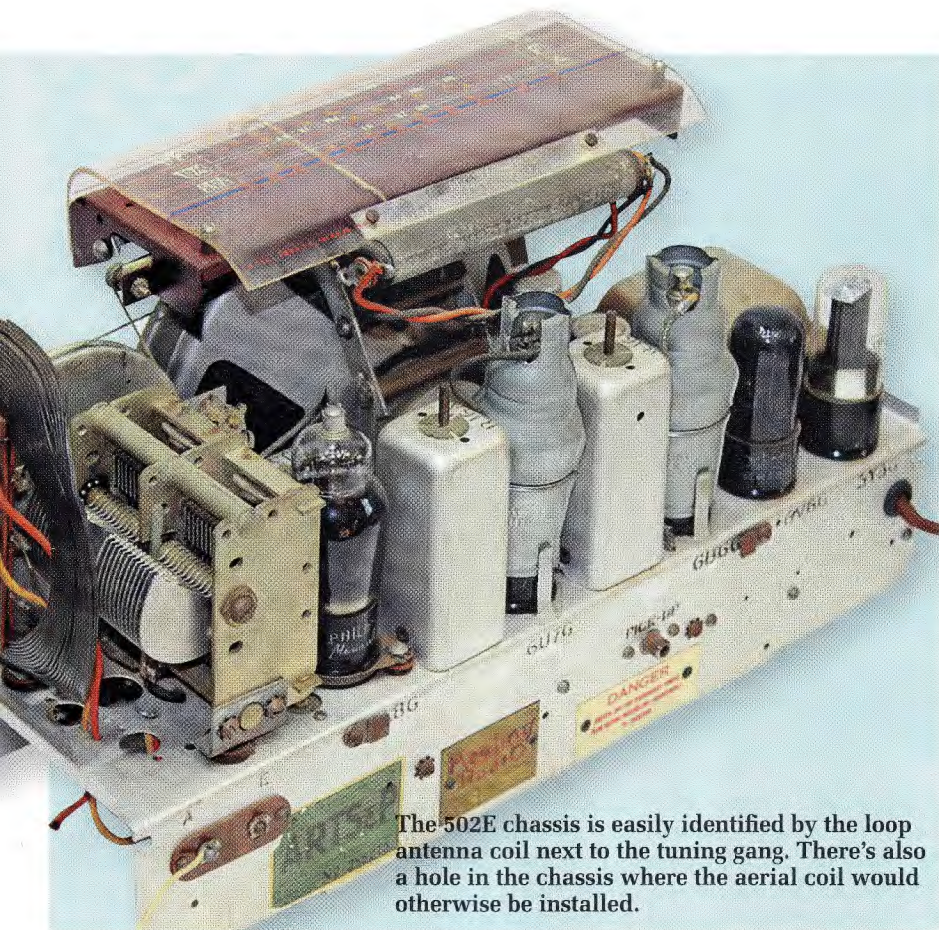
The folded metal chassis didn't have any rust because it is made of aluminium. However, the aluminium had degraded in many places to either an oxide or salts of aluminium. A good clean-up using scrapers and steel wool restored a gleam to most of this metalwork.

Missing valves

Having completed the chassis clean-up, it was time to restore the circuit to working order. Both the 6V6 and 5Y3 valves had been removed from the radio. At first, I thought that they might have been removed for use in another radio. However, the collection this radio came from included a number of valve testers, so it was more than likely that these valves had been removed for testing and had failed.



This front view of a 502E chassis shows the unusual curved dial-face and the mechanical linkages used for the on/off switch (right) and the tone control (left).



The 502E chassis is easily identified by the loop antenna coil next to the tuning gang. There's also a hole in the chassis where the aerial coil would otherwise be installed.

A look under the chassis soon reinforced this latter theory. The under-chassis layout is crowded and this makes it difficult to replace certain parts. In particular, the HT filter choke (L5) blocks access to components

around the 6V6 and 5Y3 valves, so I removed it for the duration of the restoration. That choke was clearly stamped with the date "22 OCT 1948".

Once it was out, the cause of the two valve failures could be readily ex-

plained by the state of paper capacitors C12 ($0.01\mu\text{F}$) and C21 ($0.02\mu\text{F}$). C12, in particular, had been deformed by heat into an almost unrecognisable blob with fly leads extending from it.

This capacitor is paralleled across the output transformer's primary, its role being to bypass high frequencies beyond the normal audible range. Because C12 and T2 form an LC circuit, I suspect that, as the capacitor deteriorated, it caused the 6V6 audio output stage to oscillate, resulting in high power dissipation. However, C21 was probably the main reason the two valves failed.

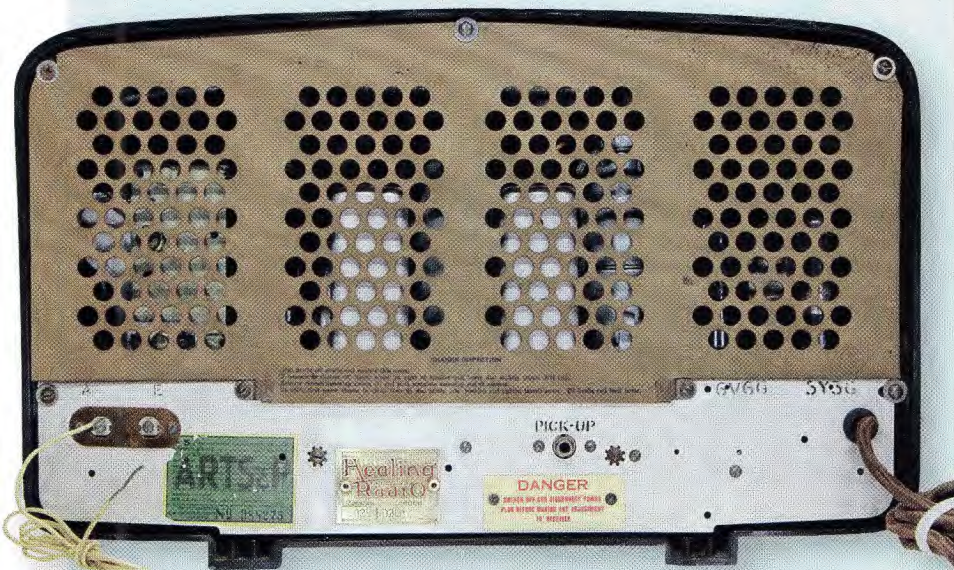
C21's failure is unremarkable, since it's used as a coupling capacitor between the 6B6 preamplifier and the 6V6 output stage and is subjected to a high DC voltage. In fact, any paper capacitor used in this role should be routinely replaced due to the high probability of DC leakage.

The evident failure of C21 in this Healing set would have resulted in a high positive grid bias on the 6V6. This in turn led to the destruction of both the 6V6 and the 5Y3 rectifier which supplies the current. Fortunately, when the 6V6 failed, the output transformer remained intact.

C22 had deteriorated so badly that it had lost its outer wrapping and so its value was no longer visible. This capacitor functions as a cathode bypass on the 6V6 and so a new $22\mu\text{F}$

The model L502E uses a conventional aerial coil instead of the loop antenna coil used in the 502E. It's shown here nestled between the first IF coil and the loudspeaker (ie, immediately behind the tuning condenser and the 6A8 mixer-oscillator valve).





The Healing 502E & L502E sets carried a "Pick-Up" socket on the rear of the chassis so that a turntable could be plugged in. There was no provision to mute the radio section when this was done though.

40V electrolytic was installed in this location. The two HT filter electrolytics were also replaced with new capacitors.

Paper capacitors C20, C8 and C19 all showed signs of failure at their pitch-filled ends and so these too were replaced. The remaining capacitors were buried under wiring and other components and were left in place for the time being. The idea was to replace individual capacitors later only if that proved necessary.

Apart from the difficulty of doing so, there is a good argument for not replacing all of the original capacitors. Component failure is most likely in the initial operating period if there is a defect and any parts that pass soak-testing can be left in place.

It's worth noting here that the debacle of failing electrolytics in the early 2000s has now passed into history. Those failures were attributable to inappropriate aqueous electrolyte mixtures that are no longer used.

The replacement capacitors used for this restoration were sourced from the component bank of the Historical Radio Society of Australia (HRSA), a service which is only available to members. However, 630V polyester capacitors are readily available from Jaycar. Replacement 6V6 and 5Y3 valves for this radio were also obtained from the HRSA.

The broken dial cord was replaced with some difficulty, due to three separate turns being required around the dial drum. In addition, the mains on-

off toggle switch of this radio did not switch off, so it was bypassed.

The last bit of preparatory wiring, prior to switch-on, was to replace the dilapidated twin-core (figure-8) mains lead a 3-core flex so that the chassis could be securely earthed. The original figure-8 was retained by a knot inside the chassis which is now illegal. As a result, the replacement mains cable was firmly secured to the chassis with an approved clamp.

Applying power

Next, the valves were all removed and the power applied. The dial lights glowed encouragingly, the set's power consumption was around the expected 10W and the transformer stayed cool. The rewired chassis looked like it had a fair chance of working at switch on once the valves had been reinstalled and an antenna connected.

For once, my optimism proved to be well-founded. I applied power and was rewarded a short time later with some low-level hum and then a slightly off-station signal. I corrected the tuning and then tuned right across the dial. Everything worked fine, the radio sounded great and the power consumption settled at a steady 55W.

Cabinet restoration

The cabinet looked exactly as you would expect it to look after languishing on a dusty shelf for many years. A quick clean up with some warm soapy water and a silicone car polish soon brought out the hidden beauty, after which the torn grille fabric was replaced with new material.

The plastic speaker grille at the front of the cabinet was straightened with the aid of carefully applied heat from a heat-gun. This wasn't completely successful but the end result was quite passable and it certainly looked a lot better than it did before. Unfortunately, a distorted speaker grille is a near-universal feature on the cabinets of these old Healing radios.

Another problem was that the sleeve and friction drive for the tone control was absent. As a result, the tone control was simply set to an agreeable setting and left at that setting. Two large knobs that covered the case holes were then installed for volume and tuning. Perhaps a genuine knob set will turn up for this radio in the future, although I have yet to see any of these unique knobs for sale.

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A Brief History Of A. G. Healing & Co

A. G. Healing was founded by Alfred George Healing who was born in 1868 in Richmond, Victoria. In 1898, at the age of 30, Healing obtained the Victorian agency for the English Haddon bicycle and operated as A. G. Healing & Company in a small factory and shop in Bridge Road, Richmond.

In 1921 the factory was relocated to the corner of Queensbury and Elizabeth Streets, Melbourne. The staff grew to about 50 and 25,000 bicycles were made per year at the peak of production, with sales to all states.

In 1925, Healing diversified into radio manufacture. They also simultaneously imported Atwater-Kent radios from the US but tariffs and limits on imports eventually saw the company discontinue this brand.

The most highly-valued radio in the Healing line-up is the 403E "Scales" model (SILICON CHIP, March 2006), a 4-valve set which sold from the late 1940s to the early 1950s. The company survived into the TV era and in 1959, the electronics division became part of Rank Industries. It ceased manufacturing in 1975.