

Vintage Radio

By Kevin Poulter & Stan Snyders



**Rescued from the junk pile
& fully restored . . .**

A 1925 Freed-Eisemann Neutrodyne Radio

Salvaged from an old storage shed in outback Queensland, this rare 1925 Freed-Eisemann neutrodyne set was in poor condition, with a dilapidated, water-damaged cabinet and missing parts. Restoring it to as-new condition proved quite a challenge.

FREED-EISEMANN RADIOS were so popular in 1924 that they sold around \$US4.5 million worth – more than all the other 12 neutrodyne-licensed brands combined. This type of radio was licensed for manufacturing under the Hazeltine patents owned by Independent Radio Manufacturers Inc.

The Freed-Eisemann company was run by Joseph Freed, Alexander Eisemann and Arthur Freed. They stated in their advertising that they felt “personally responsible” for the performance of their radio sets. These sets were craftsman-built and you can see the high quality right throughout their radios – from the cabinet to the chassis and the overall design.

In 2008, HRSA member Stan Snyders was travelling from Queensland back to his home in Victoria. Stopping

for a short break and fuel in the remote outback Queensland town of Surat, he looked for a junk shop. An old wooden storage shed with a concrete and dirt floor and lots of junk looked promising. It was run by a woman supplementing her farmer husband’s income during tough drought times.

Scanning the junk, it didn’t take long for Stan to spot a real gem. Sitting on the dirt floor with half a petrol-engined water pump on top, was what looked like the back of a 1920s coffin-style radio. When the dust was wiped away, the front panel indicated that it was a Freed-Eisemann Model NR-7.

Unfortunately, it was badly damaged, with the top lid bowed and split along its length, due mainly to the heavy petrol engine that had been placed on top. The inside had also been stripped of some parts and the

wooden cabinet was clearly water-damaged. However, the three large RF coils were still in place and so were the three tuning capacitors with their very large black Bakelite knobs.

Sitting next to each RF coil was a UX-base valve socket. Incredibly, each of these sockets was fitted with an 80 rectifier valve, so someone in the past clearly didn’t have a clue about what they were doing. The rest of the circuitry was missing.

Only the holes left on the front panel gave a clue as to what may have been there. It was obvious from the layout that the radio had been designed and constructed in two halves. An RF (radio-frequency) section which was largely still present and an AF (audio-frequency) section which was the part that was missing. All the internal wiring still present used solid round

copper wires covered with black cloth spaghetti.

The only cotton-covered wire was a section of the battery cable. The rats had eaten the rest of it. And every cable exit hole had been gnawed around the edges, leaving deep grooves.

The \$50 asking price for the set seemed reasonable so Stan asked the proprietress about its history. She told him that it had been found at a local cattle station clearance-sale two years before and was part of an auction lot. Unfortunately, she couldn't remember the name of the cattle station but it was obvious that the original owner had purchased this upmarket set to pick up distant stations like Brisbane.

She also said that since the dirt floor of the old shed often flooded when it rained, the more valuable petrol engine had been placed on top to protect it from the water! No matter – this set was too good to pass up, so Stan paid the \$50 and took the set with him.

Restoration

"Old Freed" subsequently sat on the workshop bench for two months, then Stan took digital photos to later serve as a guide when it came to putting it back together again later on. Taking a few photos can be a real time-saver when it comes to radio restoration.

Having taken the photos, Stan began the disassembly. The poor state of the cabinet and other parts meant that it had to be completely stripped down before restoration could begin.

First, the front panel and the attached RF section were removed and put to one side. The rationale at this stage was that if the cabinet could be made to look like new, it would provide suffi-

October, 1925



"—by the judgment of this great tribunal of American people"—LINCOLN



It was Lincoln's faith that the judgment of this tribunal is right. And so through the years it has proved to be—not only in the great matters of State, but in the thousand decisions of daily life. Out of the multitude of things offered to them, the American people have given their marked preference to but a few—and to those few only because they *durst* it.

Last year, the American public made known its preference in Radio. The most striking feature of its choice is the *continued* preference given to one set—the FREED-EISEMANN. Although competing with thirteen other manufacturers of Neutrodyne Receivers, the volume of FREED-EISEMANN sales was more than half of all the others combined. Today, FREED-EISEMANN is by far the largest manufacturer of Neutrodyne sets in the world.

Why FREED-EISEMANN on PERSONAL Responsibility

Mr. Joseph D. R. Freed, Mr. Alexander Eisemann and Mr. Arthur Freed, the executives of the Company, feel personally responsible to you for the performance of their radio set. They have inspired every man in their great plant with the same uncompromising vigilance; the same devotion to an ideal. You will know at the first turn of the dial, that your FREED-EISEMANN has been built by clever, trained, unburdened hands to give you pleasure—now and for years to come.

You can have a home demonstration without cost or obligation.

Telephone your FREED-EISEMANN dealer today!

Freed-Eisemann Radio Corporation
MANHATTAN BRIDGE PLAZA, BROOKLYN, N.Y.

A personal message from JOSEPH D. R. FREED

"Buy your radio as you buy a car—not because of some vented 'sales' in connection but because of its maker's reputation. From my experience as a radio engineer, I can assure you that the importance and basically sound improvements made in the radio receiving set up to date have been embodied in our new models which we are now offering."

Write for Mr. Freed's booklet, "Practical Advice on How to Buy a Radio."

The Diamond N.B. 20. A deluxe Neutrodyne Receiver in a handsome mahogany cabinet. \$175.00

NB-25—A six-tube Neutrodyne Receiver. \$110.00

Approved by Independent Radio Dealers Association, Inc. 123046, 124022, 124024



FE-15—A new five-tube storage battery Receiver. \$75

FE-18—A new five-tube 20 cell battery spare for batteries in cabinet. \$95

Look for the Freed-Eisemann logo—a group of Central points.



NB-20, \$175



NEW! FE-15, \$75



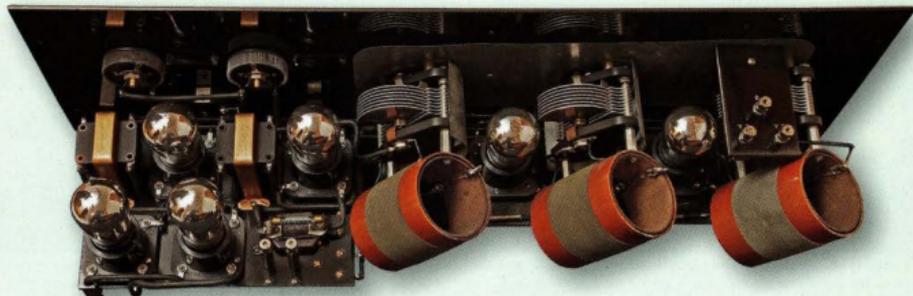
NEW! NB-25, \$110

FREED-EISEMANN
Mastery in Radio

This 1925 advert for Freed-Eisemann radios boasted that the company had outsold all the other 12 neutrodyne receiver manufacturers combined.



This is the view inside the cabinet of the fully restored receiver. The RF section is at the left, while the detector plus audio stages are at the righthand end. Note the two gold-finished interstage transformers in the audio section.



Rear view showing the large coils and the two wirewound rheostats. The entire detector/audioboard on the left was missing from the salvaged unit and had to be rebuilt from scratch, using photos obtained via the internet as a guide.

cure for another three days. The panels were then again rubbed back using 600 grade wet & dry paper and warm soapy water, as previously described.

Once dry, a final coat of polyurethane was applied using a soft long-haired brush and allowed to cure. This was then gently rubbed back with 0000 steel wool and linseed oil.

The accompanying photos show the end result, with the timbers brought back to life. In fact, the cabinet now looked so good that it inspired Stan to tackle stage two – the electronics.

Parts-gathering

Having restored the cabinet, it then took Stan a further 18 months to collect sufficient original parts to begin restoring the circuit. There were some good finds along the way, with most of the parts, including the missing knobs, coming through eBay and contact with fellow collectors.

One of the most spectacular finds was the unique on-off-volume switch – it was new in its box (1925 stock) and cost just \$8! The missing high-shoulder UV sockets (for the short-pin 201 valves) were located, while the 6Ω and 10Ω rheostats came from the HRSA's Valve Bank.

A Google search soon located the circuit, along with photographs of the chassis. This information was invaluable, especially for the missing audio stages. Stan wanted the set to look like it had just left the factory, so authenticity was paramount.

First, the RF stage was disassembled from the black face escutcheon and given a clean with warm, soapy water. The two rheostats and the rotary

switch for on/off/medium/loud were missing and someone had badly drilled a jagged 20mm-hole where the switch had been. This hole was repaired using 2-pack cast 306 epoxy resin with a black primary pigment (available at fibreglass stores and craft shops), to match the original colour. The entire hole was filled, then cut with 600 wet and dry and polished, to give an invisible repair.

Cast 306 epoxy is easy to work with and machines really well. It's produced by a company called Solid Solutions in Moorabbin, Victoria. This epoxy is also suitable for making knobs and doing other repairs. Any colour can be made, using primary pigments.

The next step involved restoring all the border lines and lettering on the faceplate and knobs (they had faded to almost grey). All the Freed-Eisemann set's graphics were originally gold, so a 'Power Plus' Contessa Gold (PJ6160) automotive spray can was used (avail-

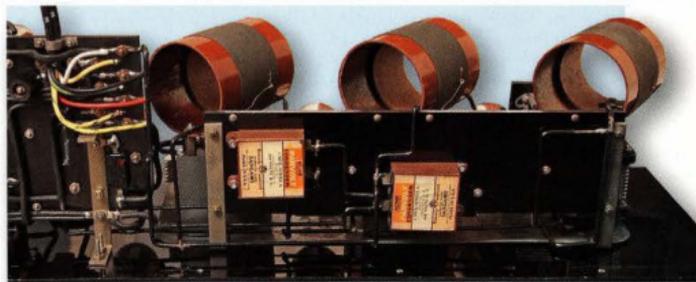
able from Supercheap Auto or Auto-Barn) for the job.

After shaking the can vigorously, Stan sprayed a small amount into the cap. Then, using a very fine touch-up brush, the paint was smeared into the grooves of the letters and edging and left to dry. A second layer was then applied, as required. Once dry, the excess was rubbed off using a fine cotton cloth dipped in a small amount of acrylic thinners.

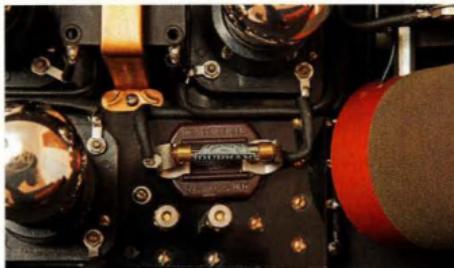
Valves & audio stage

The Freed-Eisemann Model NR-7 used UX-201A triode valves throughout (six in all) but the CX-301A can also be used, as can power triode valves such as the UX171A and UX112. The required valves (UX-201A) were all obtained through various enthusiasts and via the internet.

The missing audio section was made by following photographs of complete NR-7 radios. Two brass brackets need-



The two 1µF capacitors mounted under the RF stage were still operational, while the new multi-way battery cable was obtained from stock especially made for the HRSA valve bank.



The only fixed resistor in the circuit is the 2M Ω grid leak resistor for the detector valve. It's mounted between two clips above a 0.00025 μ F (250pF) mica capacitor.

ed manufacturing, so brass stock with the same profile as the brackets in the RF area was obtained from a company in Clayton, Victoria that specialises in brass profiles. This brass stock was then cut and bent to shape.

The most difficult items to acquire were the two interstage transformers. Only originals could be used, as Freed-Eisemann wound their own. They were autograph embossed on the metal band around the transformer and finished in gold plating, so they really looked the part! Once again, the internet came to the rescue.

Grid resistor

The only fixed resistor in the entire circuit is the 2M Ω grid resistor for the detector valve. This clips into two brackets mounted at either end of a 0.00025 μ F (250pF) mica capacitor (see photo). These parts also had to be replaced.

RF stages

After initially cleaning the RF parts, all three variable tuning capacitors were disassembled and placed in an ultrasonic cleaner. Their aluminium vanes and frames were then finished off by scrubbing them with a toothbrush, after which the bearings were oiled and the parts reassembled. They came up looking like new.

The RF coils are rather large and have khaki windings. However, the coils were very discoloured, so they were removed from the chassis and painted with artist's acrylic paint mixed with water to a runny slurry. This was virtually a dye which the double cotton-covered coils absorbed perfectly. After three coats, the result was exactly as envisaged.

As previously stated, all the wiring

in the RF stage used round copper wires covered with heavy black sleeving. This wiring was in poor condition, so it was replaced and covered in heavy black spaghetti insulation.

A new cloth-covered, multi-core DC power cable, obtained from the HRSA Valve Bank, was also installed.

Alignment

The first and second RF stages in Freed-Eisemann Model NR7 need to be aligned (or "neutralised"), with no heater voltage applied to the valve in the section currently being neutralised.

One way of removing the heater voltage would be to unsolder the supply lead to the relevant section each time it's neutralised, then re-connect on completion. However, that's messy and time-consuming, so Stan made an adapter socket, comprising a spare socket mounted on top of the pin assembly from a dud valve. This assembly has the grid and plate connected but not the heater pins.

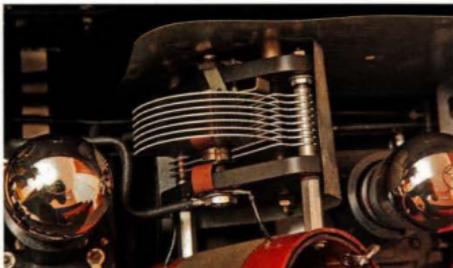
This simple adapter enables the valve to be 'in circuit' but effectively disconnects the heater voltage.

The alignment procedure is as follows: first, with all valves in place, a radio station at the top end of the band is tuned. That done, one RF valve is removed, placed in the special adapter and the assembly fitted back in place. The relevant neutralising capacitor is then adjusted until no sound is heard.

As an aside, it's also possible to discard the adaptor and simply use a valve with an open-circuit heater. However, it's still better to neutralise the grid and plate of the valve that will actually be used in the set.

Audio levels

When set to its mid-position, the



This close-up view shows one of the variable capacitors after it had been ultrasonically cleaned, scrubbed with a toothbrush and re-assembled. It now looks like new.

rotary switch applies voltage to the heater of the first stage audio valve. This gives a volume that's more than adequate for everyday listening and can be adjusted by a rheostat, which changes the heater voltage.

Switching to the 'loud' position engages the heaters of a further two 201A's wired in parallel (ie, the second audio stage). If the local stations are too loud, then one of the 201A valves can be removed! Note also that if a power triode valve like a UX171A or UX112 is used in the second stage audio, just one is needed – in either valve socket.

The weakest 201A is used for the detector, as it doesn't need a high μ (voltage gain). The highest μ valve is fitted to the first audio stage, as that's where the most amplification takes place.

The audio output is fed via a phono jack under the 3-position switch. Stan tried horn speakers and headphones but the frequency range of a horn speaker is pretty awful for music. In the end, a PA speaker with an 8-inch (200mm) loudspeaker was used and is connected via an audio transformer with a 7k Ω primary. This improved the listening quality no end.

Performance

In operation, the NR-7 is very sensitive and selective and is one of the best performing sets in Stan's collection. By using a 30m-long wire aerial, stations from NSW, SA and Tasmania are received just like local Melbourne stations.

Stan believes that this excellent performance is largely due to the huge coils that this set uses in the RF stages. They are certainly much bigger than those used by most of the set's other competitors. **SC**