

Vintage Radio

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Vintage radio parts: the art of cannibalism & making do

Obtaining suitable parts is one of the real challenges when it comes to restoring vintage radio receivers. And the best source for these parts? Answer: other old vintage radio receivers that aren't worth restoring!

At first glance, the title of this article would seem to be completely foreign to vintage radio. However, as you'll quickly see, it's now becoming increasingly difficult to source many

vintage radio parts. Genuine spares are rare and are becoming rarer. Certainly, it's not unusual to hear someone ask where they can get parts for an XYZ radio, "to get it looking and working

like it did in 1925" or some other similar question.

A bonanza of parts?

Rarely is this heading true, except where someone has been a real "magpie" and hoarded every old radio and spare part that came their way over the last 40 years or so. Indeed, such a collector would have a garage larger than the home that he or she lives in.

The average collector has not been involved in vintage radio for a long period and certainly hasn't got a huge space to store equipment in – or even an area to effectively display the collection, for that matter.

Scrounging from wrecks

Fortunately, the average collector can obtain virtually all the parts that are required for a restoration project by using a little imagination. Often, it's possible to substitute a similar part from another set or, in some cases, have a damaged part repaired.

One of the best sources of vintage radio parts are the wrecks – the sets that are not worth even trying to restore. Their parts can be "cannibalised" and used to "re-birth" a set that is in better condition.

In fact, I've done this a number of times and a favourite approach is to make one good set out of two. Even then, there are often many parts left over that can be used in another receiver.

For example, I bought six HMV "Little Nippers" circa 1955-60 at an auction. They were a real bargain and I have been able to faithfully restore some and use the left-over parts from the wrecks in other projects.

One project involved converting a

Salvaged parts can really look like junk until they are cleaned and sorted. Unfortunately, both the dial-scale and the loudspeaker in this box have seen better days.



240VAC Little Nipper set to operate on 32V DC, with the HT also operating at 32V. After conversion, the modified set was compared with another restored 240VAC "Little Nipper" and this proved to be an interesting experiment.

In particular, I wanted to be able to judge the effectiveness of the conversion. Externally, the modified receiver appears quite normal and its performance is comparable to the original unmodified radio. So why did I do this? The answer is so that I could do some research into a future article for SILICON CHIP.

Another project I have in mind is to build a power supply for battery-operated radios, based on a wrecked mantel receiver. The power supply in a typical 1950s mantel radio has almost ideal secondary power transformer windings to suit such a project, so it's not necessary to purchase an expensive new transformer. In fact, some of the information on this has already been published – see the article on vibrator power supplies in the December 2003 issue.

The point is that wrecks can be very useful for parts when it comes to restoring other sets, so don't spurn a wreck just because it is a wreck! It just might have the very part you will need to complete a future project. However, don't pay much for such a unit and if you can scrounge it for nothing, then so much the better.

Dial glass & mechanisms

A wreck can often be worth a lot just because it has an intact dial-scale, so look at the dial-scale carefully. In fact, the value of a set drops dramatically if its dial-scale is broken or missing. A few members of the HRSA (Historical Radio Society of Australia) make dial scales but because of the work involved, they usually cost around \$30. And that's if they have a scale for the model you are interested in!

The dial mechanism itself usually remains in a repairable condition – but not always. A mechanism can sometimes be taken off a wreck and used in another receiver, often one that's a different model or even comes from a different manufacturer. However, be aware that the mechanism, tuning capacitor and dial scale are all matched together in particular receivers. For example, a mechanism with a large-diameter dial cord drum will have a



Tuning gangs used a wide range of different plate shapes, so it's important to substitute a unit with the same shape, capacitance range and tuning characteristics if you have to replace a tuning gang during restoration.

long scale, while a small-diameter dial drum will match a shorter dial-scale.

The dial-scale and the tuning capacitor also need to be matched together, otherwise the tuned stations will not match their locations on the dial. There are three basic tuning capacitor plate shapes as shown in an accompanying picture. These are: straight line capacitance, straight line frequency, and a shape that is a combination of straight line frequency and capacitance, the latter being the most common shape used in later receivers.

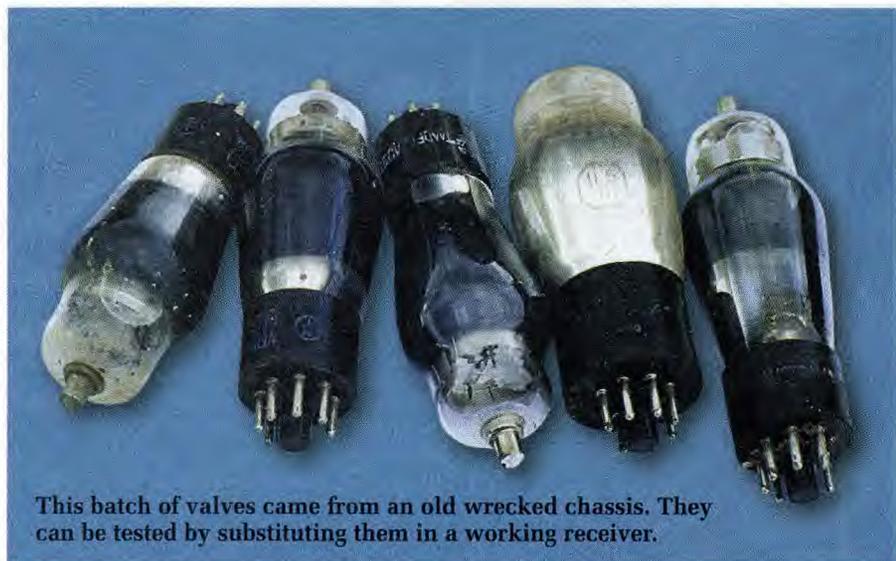
As well as the dial-scale mechanism, it's also worth collecting the pulleys.

The wooden ones often get broken, so it's good to stock up on these.

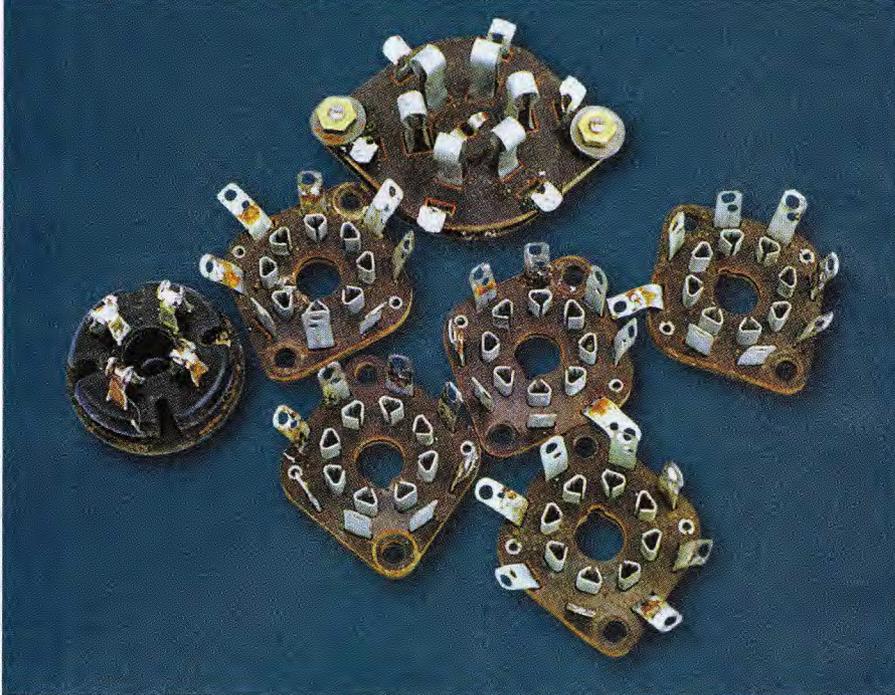
Plugs and sockets

Many of the original plug and socket types are no longer available, so these should be stripped from any wrecks you come across and put aside. You can quickly remove them from a chassis by cutting all the wires off the terminals and then either undoing their mounting screws or removing the mounting circlip. The socket should then be cleared and all the soldered wire ends removed.

Unfortunately, this isn't always an easy task as some manufacturers fed



This batch of valves came from an old wrecked chassis. They can be tested by substituting them in a working receiver.



These valve sockets were salvaged from a wrecked set and have been cleaned to make them ready for use again. Valve sockets are always worth salvaging, since many are no longer easy to obtain.

the wires through the terminal lugs and then bent them over so that the wires couldn't come away – even if they were never soldered! And with up to four (or more) wires attached to each lug, it can take quite some time to remove them.

The best approach is to first remove as much solder as possible from the joint, either using desoldering wick (they go under various trade names) or a solder sucker. It will then usually be possible to use a pair of sidecutters to cut the wires where they sit proud of the terminal, after which you can

remove the wire pieces using a hot soldering iron.

Plugs are a bit different to deal with. If there is a small amount of wire lead still attached to the plug, simply heat the tip with a soldering iron and pull the lead out using a pair of pliers once the solder is molten (the plug can be held in a vice while this is being done).

As before, the excess solder can be removed using a solder sucker.

Dud octal and pre-octal valves have bases that are ideal for plug-in coils. Valves with loose bases are eas-

ily pulled apart – just heat each pin in turn using a soldering iron, while pulling the plug away from the glass envelope. Lightly clamping the valve base into a vice can make this job just a bit easier.

If the adhesive between the base and the valve envelope is still intact, try a few different solvents around the joint until one works.

Valve sockets are hard to come by, although some types are available at a price. However, by salvaging them, you'll save several dollars per socket. Valve sockets occasionally give trouble, though – either due to broken contacts or insufficient tension in the contacts.

IF transformers (IFTs)

Old wrecks are a good source of replacement IFTs of various shapes, sizes and frequencies. However, when removing them from old receivers, be sure to check where each lead comes from and label them accordingly. This can be done by attaching tags, identifying the “plate”, “grid”, “AGC” and “HT” leads.

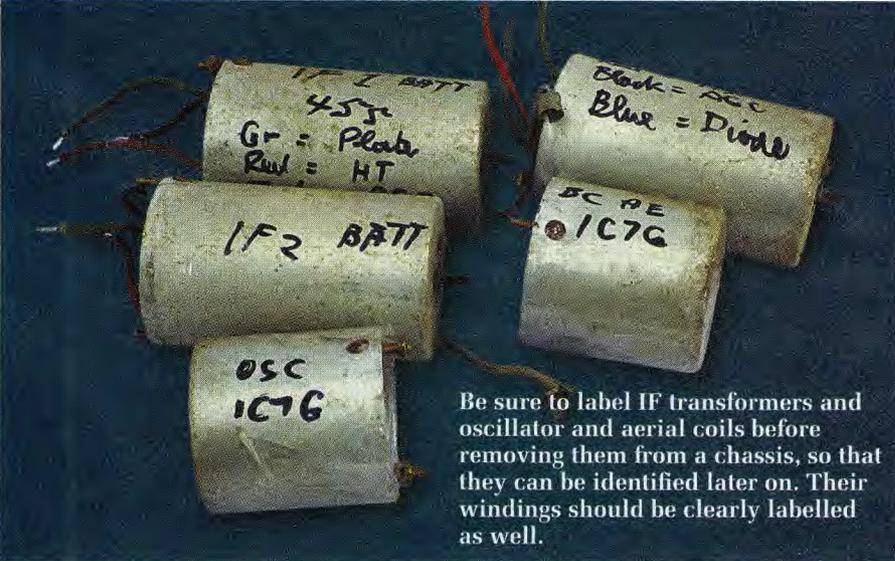
If you don't do this, you may find that the transformer performs poorly (or not at all) when used in another set. That's because its primary and secondary winding connections may be different to the original coil. Remember – the coupling between the windings is optimised when their connections are wired to the correct points in the circuit.

The position of an IFT in the set is important too. A “first” IFT should always be used immediately following the converter valve. Similarly, the second and (possibly) third IFTs should be marked and used in their correct relative positions.

If possible, make a note of the make and model of the receiver the IFTs have been taken from and note the IF (intermediate frequency) that was used as well. This will make it much easier when it comes to selecting suitable IFTs for use in another receiver later on.

RF, oscillator and aerial coils

RF and oscillator coils rarely give much trouble but are always worth taking off a wreck. Once again, mark where each terminal goes in the set. Oscillator coils may have three or four active terminals, depending on the type of converter used.



Be sure to label IF transformers and oscillator and aerial coils before removing them from a chassis, so that they can be identified later on. Their windings should be clearly labelled as well.

These are the unusable parts from the box shown at the start of this article. The casualties include the dial-scale, the loudspeaker, the paper capacitors and the chassis itself.



Aerial coils are the most likely to suffer damage in a radio, particularly in rural areas where substantial outside antennas were used. Nearby lightning activity can and often does burn out these coils, so intact units are well worth salvaging.

Broadcast band aerial coils for sets made after about 1935 have many different forms. The coil may be designed for use with a long antenna, a relatively short antenna, a very short antenna or a loop antenna of some sort. For this reason, it is important to make a note of the make and model of the receiver when removing an aerial coil. That way, you can later replace a faulty coil in a vintage radio receiver with one that has similar characteristics.

Earlier broadcast coils were wound onto large diameter coil formers and, as such, are easy to repair – either by joining a broken wire or by completely rewinding the coil. Likewise short-wave coils can often be rewind, as there are not many turns on them.

Power transformers

Occasionally, a power transformer burns out in a receiver and a replacement is required. There are two ways

of replacing it – either have it rewind (at considerable cost) or substitute an equivalent unit. It is always nice to have the set look original but sometimes a replacement can be made to look similar to the original.

Before stripping a transformer from a chassis, it would be wise to check for any insulation breakdown between the windings and the core. This should be done using a high-voltage tester if possible, otherwise an ohmmeter can be used to check for more obvious shorts.

If that test is satisfactory, run the transformer for some time with no load. If it gets more than slightly warm or it starts to have a burnt smell, it is probably faulty and will not be worth salvaging (unless you can rewind it or have it rewind).

During this procedure, measure all the AC output voltages from the transformer. Under no-load conditions, the voltages should read slightly high; eg, a 6.3V filament winding will probably read about 7.0V. If it does, it is fairly safe to assume that the on-load voltages will be about 10% lower.

Before removing the transformer from the chassis, be sure to label all

Photo Gallery: 1940 Ultimate Model FJ 5-Band Radio



Boasting five bands and five valves, the Ultimate Model FJ is a New Zealand-made radio that shows clear English styling influences. It features wooden knobs and an attractive cabinet that has inlaid bands separating the various wood veneers that were used. The valve line-up is as follows: ECH35, 6K7-G, 6Q7-G, 6F6-G and 6U5 ("magic eye"). An unusual feature is the stainless steel valve shield fitted to the 6K7-G, while the IF transformers are encased to zinc cans. (Set restored by Maxwell L. Johnson; photo by Ross Johnson)

the windings with their voltages. In particular, make a note of any primary tappings so that you know how to connect the mains supply (some transformers have tappings to suit different mains voltages).

The current ratings of the windings can be estimated by looking at the valve line-up and the number of dial lamps used. A typical 5-valve radio using a rectifier with a 6.3V heater will have a 6.3V heater winding rated at 3A, while the HT load will be around 50mA. Similarly, a 5-valve set with an 80 or 5Y3GT rectifier will have a 5V 2A transformer winding, as well as a 2-3A 6.3V heater winding.

Older sets will have 2.5V windings and these will be rated for around 6A or more in total.

Sets with more than five valves will have one or more 6.3V heater windings (usually more than one) that may have a total rating of 6A, while the high tension drain may be 80-100mA. If it is known what valves were used, it is easy to calculate the total current drain by looking up valve data books.

Older sets used electrodynamic loudspeakers, which have their field coils in series with the HT supply line. In these sets, the output voltage of the HT winding on the transformer will be noticeably higher than in those sets which have permanent magnet loudspeakers.

Chokes

Many vintage radio receivers used HT filter chokes and these are well worth retrieving. The inductance in Henries and the design current is generally stamped on the choke.

As with power transformers, their winding should be checked for shorts to frame.

Output transformers

An open circuit loudspeaker transformer (usually in the primary winding) is a common fault in vintage radios. However, they can be rewound and sometimes complete windings are available for use with the existing iron core. In addition, Dick Smith Electronics has a small line transformer

(Cat. M1100) which has a 5k Ω tapped primary winding and a multi-tapped secondary loudspeaker winding. Although not designed to have DC through its primary, it still makes quite an effective loudspeaker transformer if a replacement is unavailable.

If you are scrounging parts from a wreck, check the windings on the loudspeaker transformer using an ohmmeter. If they are OK (ie, not open circuit and no shorts to frame), then it is well worth salvaging. As before, tag the transformer leads and note both the speaker impedance and the output impedance or the valve if the necessary information isn't already marked on the transformer itself.

Loudspeakers

Any loudspeaker is well worth keeping, provided its cone is not damaged beyond repair. Check also that the voice coil is not open circuit and that the voice coil is not rubbing in its annular gap (sometimes this can be adjusted). If it's not marked, the voice coil impedance is not greatly different to its DC resistance and you can quickly check this using an ohmmeter.

Small components

There's lots that can be salvaged here. For example, tag strips can be removed in much the same way as valve sockets and some capacitors (mainly mica types and occasionally electrolytics) are worth removing.

Try to keep the lead lengths as long as possible. However, this isn't always easy when a component lead has been wound around and through a tag strip terminal.

Paper capacitors are usually too leaky to be usable. However, some restorers like a set to look completely authentic and remove the innards from paper capacitors and replace them with more modern polyester units. It's a trick worth remembering with other components.

Resistors are also worth salvaging, provided they haven't gone high in value. Even some of the large ones that are faulty could be removed, cut in half with a very fine saw and glued back together again but with the sections not actually touching each other. More modern resistors can then be mounted underneath them and hidden from view if absolute authenticity is desired.

The large hardware items, includ-



As well as the valves, lots of other parts are worth salvaging from wrecked radio receivers. These include the tuning gang, valve sockets, transformers, valve shields and the aerial, oscillator and IF coils.

ing switches and volume controls, are particularly worth keeping. However, some switches are "specials" for a particular set and may not suit anything else. Unfortunately, volume controls are often noisy but sometimes can be cleaned with a contact cleaner spray.

Tuning gangs

Unless they've been damaged, the tuning gangs used in the later sets rarely need replacement. By contrast, some of the very old ones corrode and in some cases fall to pieces. These can be replaced with a more modern tuning gang that has the same (or similar) characteristics, so tuning gangs are always worth saving.

Always store tuning gangs with the vanes fully meshed, to prevent accidental damage.

Chassis and cabinet

By itself, a chassis is generally not worth keeping. However, it's a different story if it is in good condition, with all or most of the components still in place. In that case, it's worthwhile keeping it until a suitable cabinet can be obtained (or you can obtain a similar set with a good cabinet but a poor chassis).

The same applies to cabinets and some restorers will even adapt a nice cabinet, if necessary, to suit a chassis that has no cabinet. Although the resulting set will not represent any particular model, it will in most cases be typical of sets of that particular era.

Cabinets in very poor condition

can be restored if necessary, although that is more a task that a skilled woodworker would take on.

Knobs & logos

Never throw a radio out with any of its knobs. Even if broken, many knobs can be repaired and it will be cheaper than getting some made or having to buy them new. In most cases, you can use an epoxy adhesive (eg, Araldite) to repair broken knobs.

Occasionally, manufacturer's logos are also worth salvaging from a set, especially the metal ones.

Valves & transistors

It's a good idea to carefully remove any valves in the set, clean them and put them aside until they can be tested in a working receiver that uses the same valves. Note that the markings on some valves can be very faint or can easily be rubbed off, so use a marker pen or similar to mark the valve type on the glass envelope.

Germanium transistors are becoming rarer than valves, so any wrecked transistor sets should have their transistors salvaged and tested for possible later use.

Summary

Old wrecked radios are a wonderful source of parts. Don't throw them out until anything that could possibly be used in the future has been scavenged. Alternatively, you may decide to leave the chassis as it is and cannibalise it for parts as required.