

Electronic Restoration of Radio Receivers

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INTRODUCTION

- **What is the most magical thing about a radio receiver?**

REPAIR vs. RESTORATION

- **Repair: Location and resolution of a few localized faults. We might repair a 10 year old radio.**
- **Restoration: Sweeping obviation of global problems. 60 year old set are candidates for restoration.**

GOLDEN ERA PROBLEMS

- **Greatly increased component count**
- **Early state of the art: Poor long term reliability.**
- **Resulting in:**
 - Dead electrolytic caps
 - Leaky paper caps
 - Changed resistor values
 - Decay

PHILOSOPHY

- **Let's make it work like it did when it was new.**
- **Let's make the set stay fixed on into the next century.**
- **Some sets may be too significant to touch.**

PHILOSOPHY (2)

- **"Shotgun" replacement of any suspect components.**
- **Substitute with modern parts.**
- **Preservation of craftsmanship.**
- **Modern components hidden below-deck are acceptable.**

VISUAL INSPECTION

- **Before you buy:**
 - Gross damage
 - Missing parts
 - Major modifications
 - Irreparable cosmetic problems

VISUAL INSPECTION (2)

- **After it's too late:**
 - Burned components
 - Leaking capacitors
 - Beware the broken band switch!

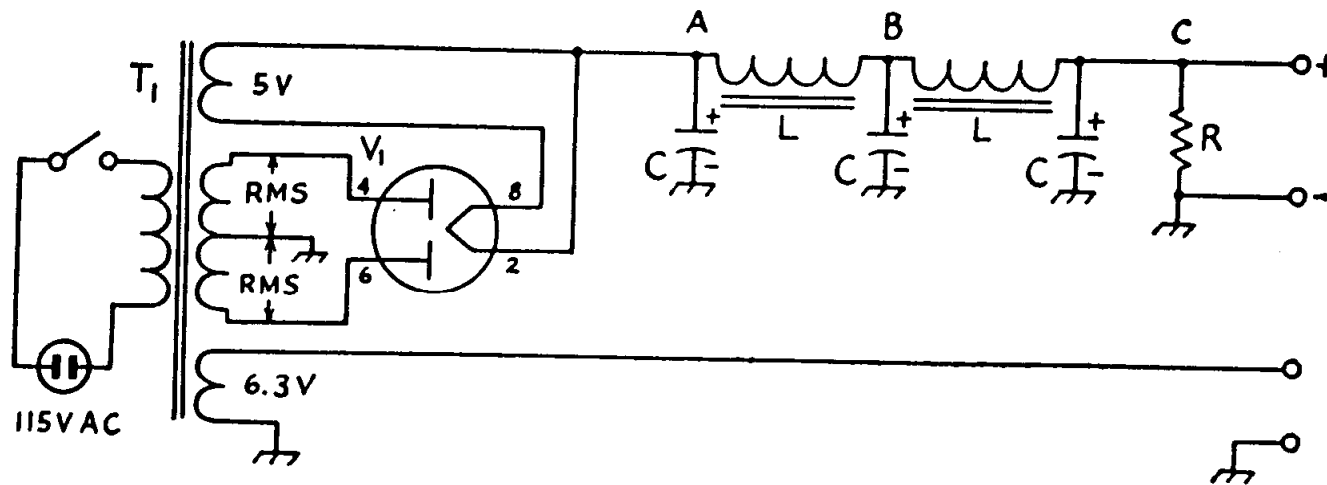
POWER TRANSFORMER

- **This is probably the most expensive component.**
- **Don't just plug 'er in and turn 'er on. A shorted component could burn out the transformer.**
- **But, check the transformer before expending a lot of effort on the set.**

TRANSFORMER TEST

- **Remove rectifier tube.**
- **Turn set on.**
- **Tubes and pilot lights should light.**
- **Check HV and filament voltages at rectifier socket.**

TYPICAL POWER SUPPLY



INSTALL A FUSE

- **Install clip-type fuse holder, under the chassis, in the power transformer primary circuit.**
- **Use a reasonable value fuse.**
 - The rated power consumption, times 120%, divided by the line voltage, equals the necessary fuse value.
 - This is probably in the neighborhood of 1 amp.

CLEANING

- **Clean as you go.**
- **Scribe tube numbers on the bases.**
- **Does everyone know about GOJO?**
- **Don't use water based cleaners on bakelite.**
- **Be really careful with dials etc.**

LUBRICATION

- **Lithium grease on capacitor bearings.**
- **Light oil on shafts etc.**
- **TV tuner cleaner on switch contact, volume controls, and tuning-cap shaft ground connections.**

ELECTROLYTICS

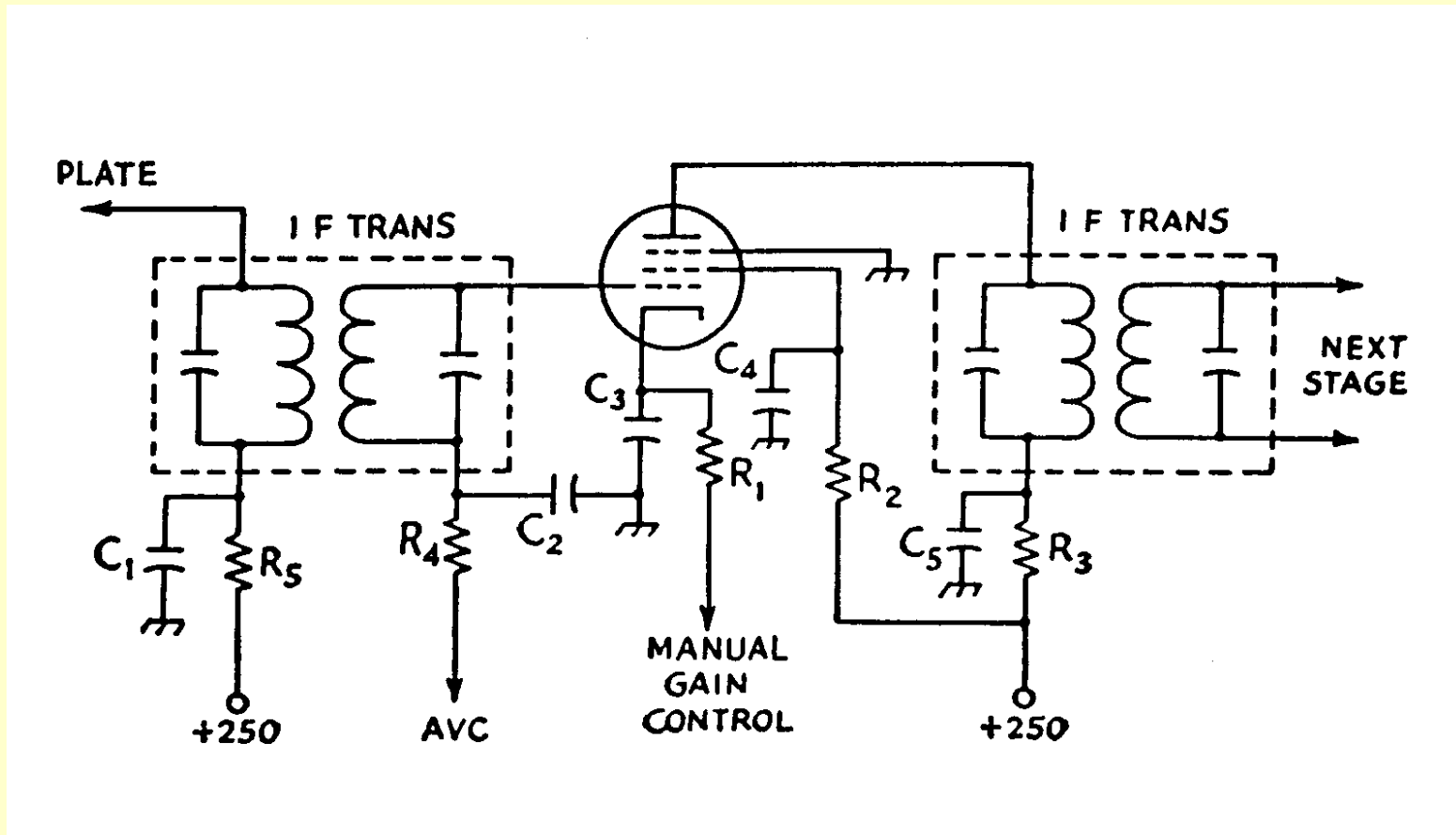
- **Replace them all!**
 - Power supply filters
 - Cathode bypasses
- **Leave exposed cans in place**
 - Disconnect
 - Install terminal strips to hold new caps below deck. They'll generally be much smaller than the originals.
 - Don't use drastically over-value replacements, particularly for the PS input filter. Higher than normal system voltage could occur.

PAPER CAPS

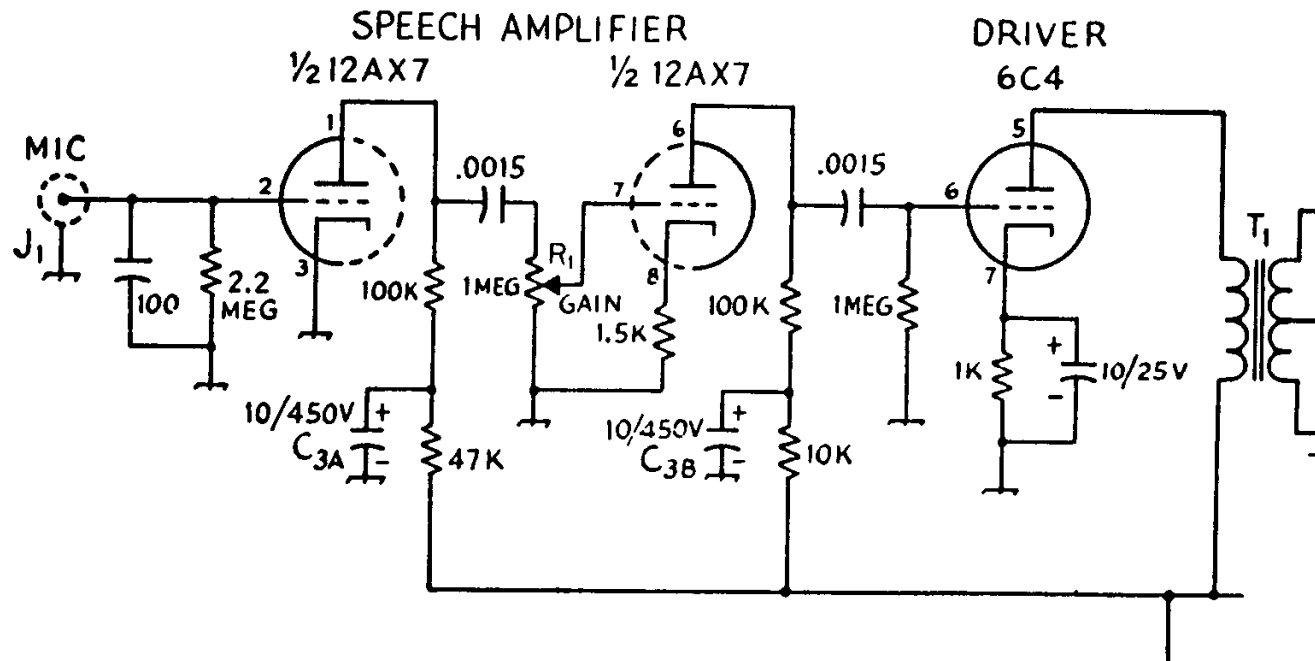
- **Paper caps are all suspect!**
- **Wax coated units are almost surely leaky.**
- **Replace with ceramic or plastic caps.**
- **Mica caps are generally OK.**
- **Try not to mess with frequency determining components.**

**Replace just one
component at a
time!**

CAPS IN RF AND IF AMPS



CAPS IN RESISTANCE COUPLED STAGES



THE OLD "DON'T BE VAGUE ASK FOR SPRAGUE " TRICK

- **When replacing components, avoid digging into the solder joint on terminal strips and tube sockets.**
- **The Sprague capacitor people used to ship "QUIG" connectors with their replacement caps.**
- **These are small solder-coated coils of wire used to sleeve the new cap leads to the cut-off leads of the old component.**

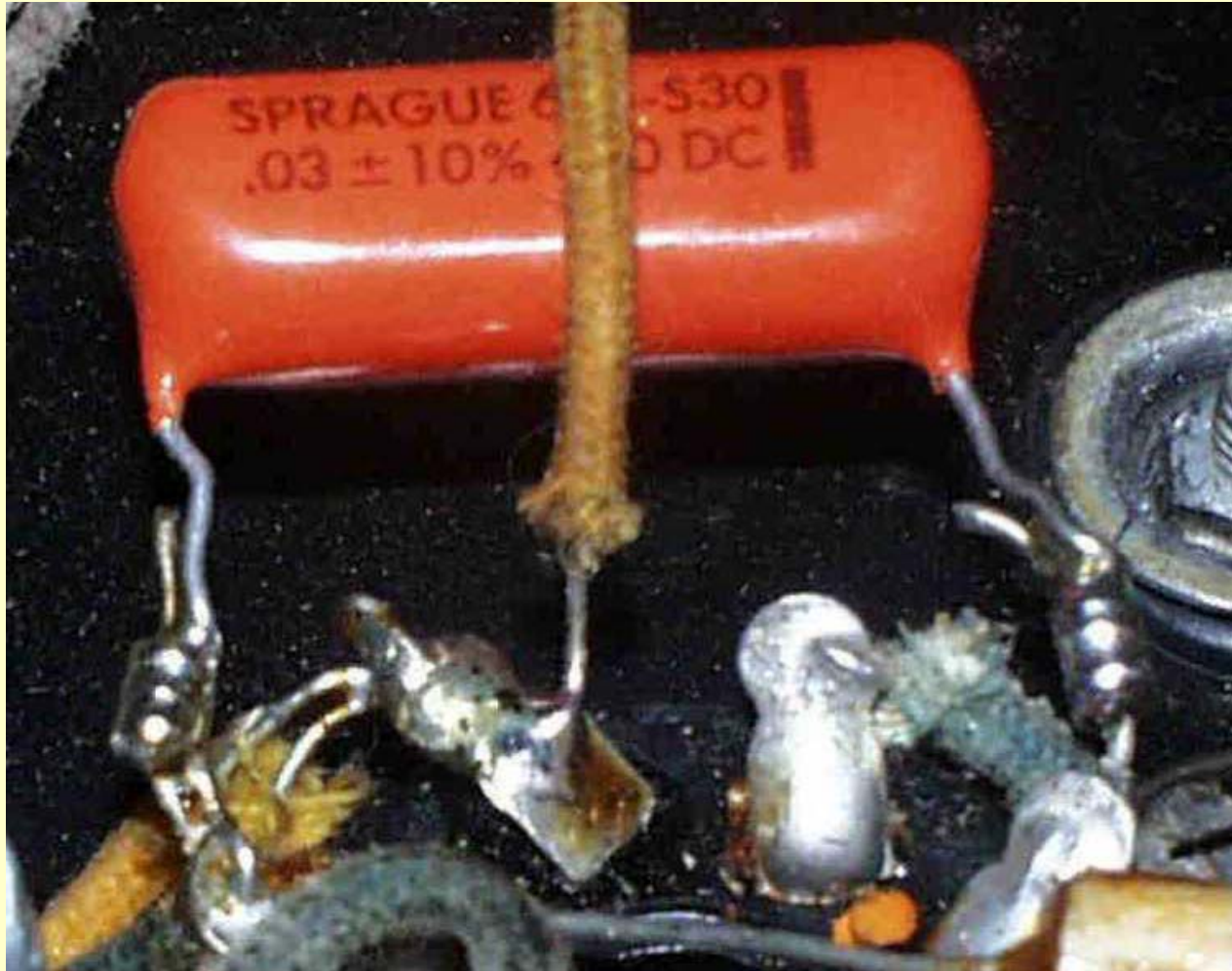
SPRAGUE (continued)

- **Use the shank of a small drill bit held in a pin vise to form a coil on the new part.**
- **Slip these over the old leads and solder.**
- **This preserves the craftsmanship of the original wiring job.**
- **Not only that, its quick!**

Pig-tail Tool



Replacement



RESISTORS

- **Watch for resistors that have changed in value.**
- **Resistance usually increases.**
- **High values, greater than 100K, are more effected.**
- **This is not as universal a problem as the leaky cap syndrome.**
- **Spot check a few units in each set.**
- **Remember these are usually $\pm 20\%$ units. Look for drastic changes.**

OTHER DETAILS

- **Test the tubes.**
- **Replace suspect line cords.**
- **Restrung the dial cord if frayed.**

CONCLUSION

- **If you follow this procedure, the set will usually "come up" easily with minimal trouble shooting and repair.**
- **Resist the urge to align a poorly performing set until after it's restored. As an old race car mechanic told me: "Don't even try to tune junk!"**