FADA ‘KA’ Model 42 – An ‘Ultimate’ TRF… Gerry O’Hara

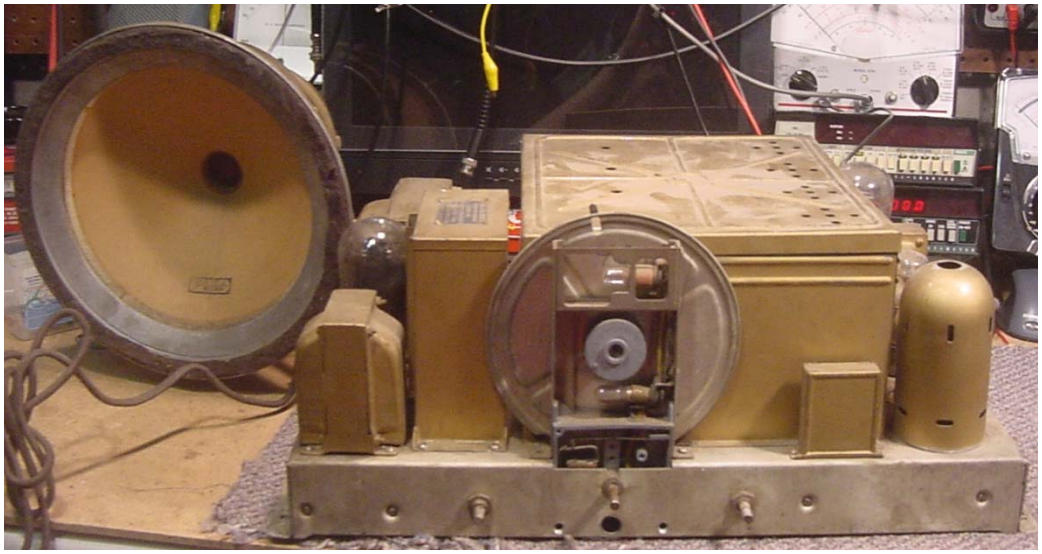
Tuned Radio Frequency (‘TRF’) receiver technology had progressed steadily throughout the 1920’s: in the early part of that decade, the sensitivity of radio sets was limited by the primitive triode tubes available at the time and their tendency towards instability (self-oscillation) if too much gain was attempted in the circuit. Various techniques evolved to promote better stability, including improved screening and decoupling, orientating inductors at angles to each other to avoid interference, and neutralization methods (including the patented ‘Neutrodyne’ technique) to cancel-out the inter-electrode capacitance of the triodes that caused much of the instability problem.

The development of the screen grid valve (tetrode) and its general introduction into the market in the late-1920’s led to much more elegant and stable TRF receiver designs, especially when combined with the screening and stage-decoupling techniques that had been developed previously, and, with a view to ease of operating, ganged-tuning techniques when several radio frequency (RF) stages were deployed. By 1930, TRF techniques were well-advanced and when the first commercial superheterodyne sets appeared in numbers in the early-1930’s, the TRF sets of the day gave then a decent run for their money – at least for Broadcast band reception. However, as the 1930’s wore on, the superheterodyne became the dominant technology as it provided opportunity to apply more advanced techniques, in particular those leading to improved selectivity (needed due to the explosion in the number of stations crowding the band) and also reliable and stable operation at higher frequencies (Short Waves) that were becoming increasingly popular.

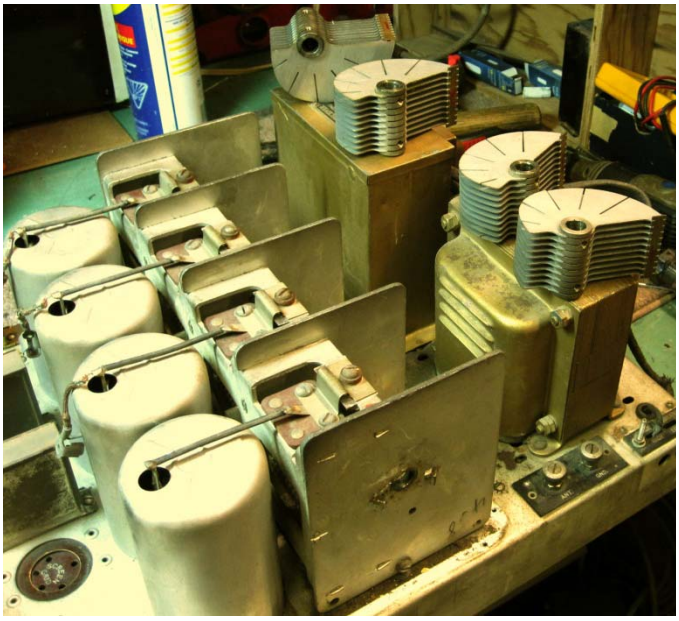
One of these advanced-design TRF’s was the FADA ‘KA’ Model 42 (image, left), which shared the same chassis as FADA Models 41, 44, 46 and 47, the primary difference between the models being the cabinet – except Model 47, which included a turntable (‘phonograph’). The ‘KA’ chassis was introduced in 1930 and boasted three stages of screen-grid RF amplification using #24 tubes, with a total of four tuned-circuits at RF, ganged to a single tuning control. The last of these stages was coupled to an infinite impedance detector, (a #27 tube) by an aperiodic coupling transformer, this feeding the first audio amplifier (another #27 tube), audio driver (also a #27 tube) and push-pull audio output (2 x #45 tubes) giving plenty of audio to drive a substantial 12” electro-dynamic loudspeaker. A #80 rectifier tube was

used in a conventional power supply circuit.

A local/long-distance switch was fitted to the antenna circuit to avoid overloading of the set on strong local signals, and the audio circuit included a noise filter switch. The chassis also featured a crude visual tuning indicator – called a 'Flash-o-Graph', that lights a bulb located behind the upper part of the dial when a desired station is tuned in (the bulb is simply switched on by a notch cut in the tuning dial) – station names being written on this section of the scale in front of the light. In addition, the phonograph input is switched-in automatically be a cam located on the tuning friction drive plate, this operating a switch located under the chassis when the tuning dial is at one end of its travel – quite ingenious.

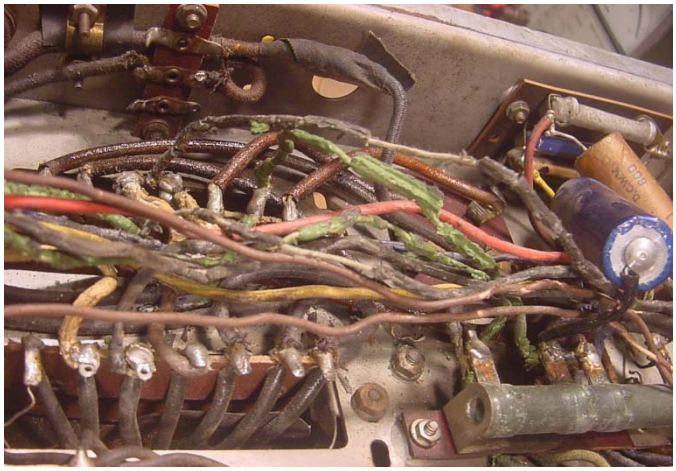


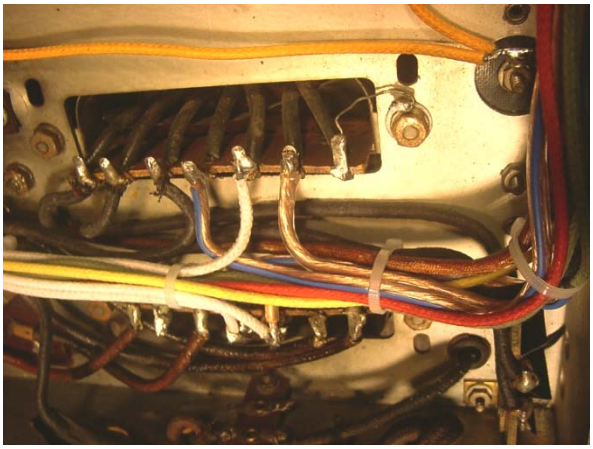
A FADA 'KA' Model 42 chassis was brought into the SPARC museum for repair (photo, left), the owner having restored the cabinet himself. The chassis was in a poor state of repair and the 4-section tuning gang – a very heavy-duty affair – was completely seized. On investigation, it was found that the end bearings were house in 'pot metal' castings that had distorted - this is a common problem with pot metal (a low-cost, low-melting point alloy), which was often used in the 1920's and 1930's for castings where strength was not a primary concern. In this case, the tuning gang had to be dismantled to allow the tuning shaft to be removed and the bearings reamed-out and lubricated. That done, another pot metal casting used to support the friction drive and 'Flash-o-Graph' mechanism was found



to be badly distorted and fell apart during dismantling (photo, below-right) – this casting had to be re-built using 'JB-Weld' and epoxy adhesive.

Once these mechanical repairs were completed and the chassis given a thorough cleaning, a preliminary electrical check was undertaken. The wiring was found to be predominantly rubber-insulated and unfortunately this had perished to the point that several wires in the main loom had amalgamated and the insulation was crumbling off much of the remainder (photo, below). The first job was therefore to re-wire the majority of the chassis. Care is needed here as the tubes used in this set all have 2.5v filaments and the current draw is substantial (many amps). Thus the loom wiring for the filament circuits had to be heavy-gauge. Period cloth-covered wiring was used for the remainder of the wiring (photo, below) and the heavy-gauge (plastic-covered) filament wiring was hidden within the loom. The 'Flash-o-Graph' mechanism was investigated and it appeared that a part might be missing, so the two dial bulbs were wired in parallel, rendering the mechanism inoperative, but fully illuminating the dial – besides, cutting notches in the rather fragile 81 year-old dial would not be a good idea!

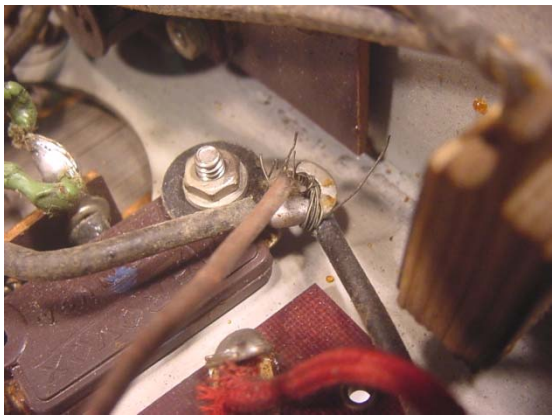




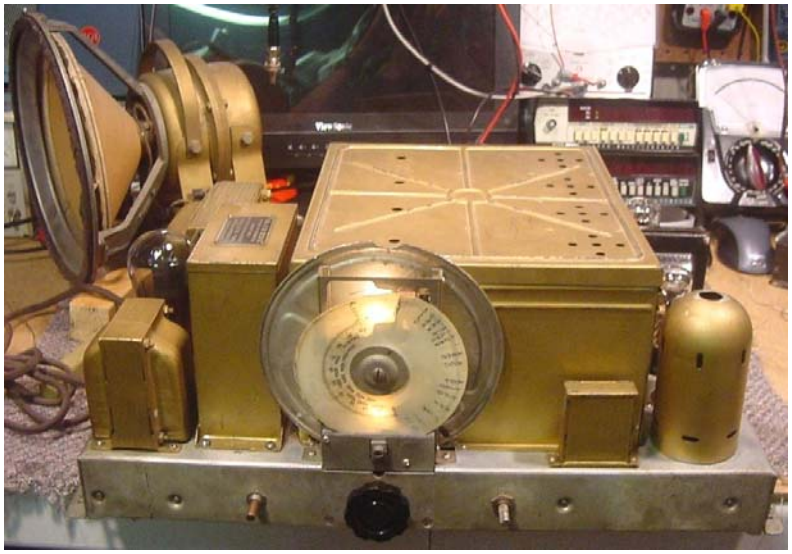
With the wiring completed, the transformers were tested. The power transformer tested ok, as

did the RF and audio output transformers, the power supply filter choke and the loudspeaker field coil. However, the audio driver transformer primary was found to be open-circuit. A suitable part was sourced from the SPARC museum stock (a late-1920's Ferranti unit) and this was fitted – a bonus of using a 'period' part was that it did not look out of place on the chassis (photo, left).

Several repairs had previously been undertaken (a long time ago) on the chassis – this included replacing the multiple (paper) filter capacitor block with a single 8uF electrolytic (a bit of a 'kludge') and replacement of several sections of each of the multiple 0.1uF bypass capacitors in the RF section. In addition, someone had jury-rigged a tone control in place of the local/distance switch – the wires for this were not even soldered, but simply wrapped around the grid connections of the output tubes (photo, right) - this was all removed and the local/distance switch reinstated.

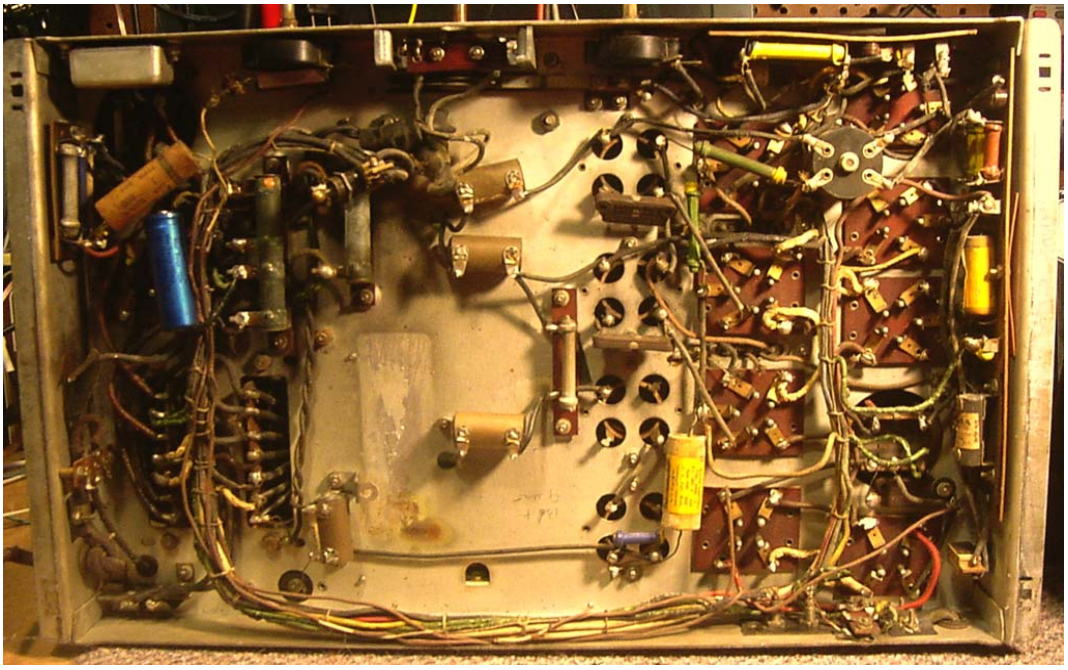


All paper capacitors were replaced (the one across the filter choke was a dead-short and all others were leaky/low capacitance), and new electrolytics fitted into the power supply: those on either side of the filter choke were replaced with two pairs of series-connected 450wv units as the voltage at switch-on approaches 550v and the standard 450wv replacements may not have lasted too long. All resistors except a high-wattage one in the power supply (providing bias to the output tubes) were found to be within tolerance – the failed resistor was replaced with a



new ceramic 10W part.

All tubes tested as serviceable, except one of the #45 tubes had been replaced by a #26 tube (not even a close match – apart from sharing the same base). A replacement #45 tube was fitted from SPARC stock and the chassis powered-up. In came some strong local stations an, after aligning the four RF tuned circuits,, many weaker stations were also coming in loud and clear on a 20 foot wire antenna.



Above: below-chassis on before work started. Below: following capacitor replacement (note, several original capacitors were left in place – bridged-over - to support the new components)