# Restoration of a Silvertone Model 4766 – SPARC Radio Museum, Coquitlam BC, 2013/2014 – Gerry O'Hara

**Restoration contributors:** Cabinet – Pat Jones; Chassis – Gerry O'Hara, Gerald Taylor, Craig Marston. Special thanks to John Fluevog and Jeffrey Liu of Fluevog Shoes for making the 3D-Printing of the dial escutcheon possible, to Brian Murtsell/Les Mitchell (wooden aircraft builder) for fabricating the speaker grill ribs, and to George Gorczynski for reproducing labels and 'cleaning-up' photos of existing chassis decals.

## Introduction

This radio, a Silvertone Model 4766, was donated to the SPARC Museum in 2011 and sat ignominiously in a dingy corner of the rear (cabinet) workshop for a couple of years. I had tagged it for future restoration, not for the Museum's collection (as there was already one on display), but as a possible personal project as the Museum has a program of de-acquisition for duplicate sets due to lack of space. Of course, there were just too many other projects 'on the go', either for the Museum, for Museum 'customers' (visitors or members that have requested their radios to be restored/repaired in exchange for a donation to the Museum funding), and even for my personal interest/collection (rare these days due to lack of space at *chez O'Hara*).

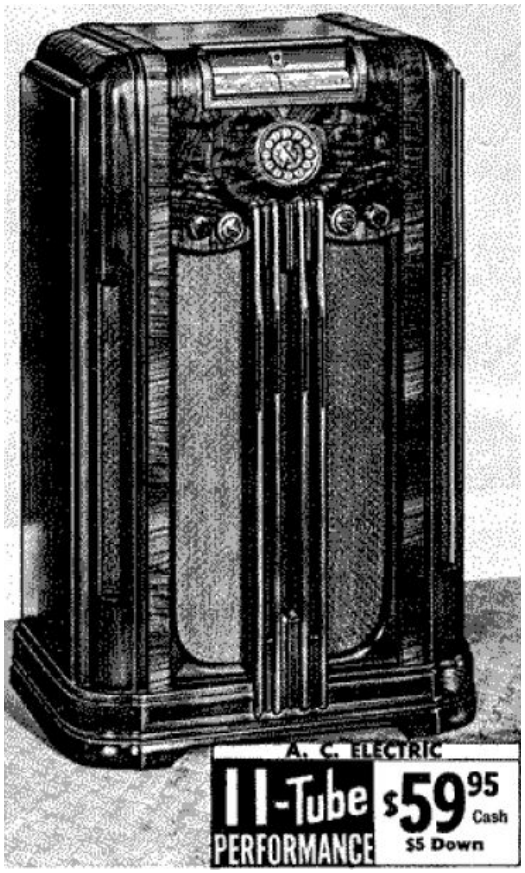
Late in 2012, I was contacted by Daniel Labelle and Serge Hainault of the SQCRA asking if SPARC would like to submit an entry of their 'International Radio Contest' – the Museum volunteers scrambled and managed to prepare a submission based on one of our 'standard' restoration efforts for a Museum customer, a lowly Canadian General Electric Model GE-66 , with a re-cap and alignment of the chassis, plus a re-finish of the console cabinet that the well-meaning owner had ruined with a rotary sander. Altogether, nothing special, and, not

surprisingly, the Museum did not do well in the contest... So, after receiving more notice for the 2013 competition, it was decided by the Museum restoration volunteers that the Silvertone 4766 would make a suitable candidate.

**About the Silvertone Model 4766**

The 'Silvertone' Model 4766 is a large 'top of the range' table-top radio introduced as part of the 1937 model year offerings by Sears Roebuck & Co of Canada. Several similar models were introduced at this time, all based on the same chassis, Type 101.483. This chassis boasts ten tubes (but with a claimed '13-tube performance'), including the 'magic eye' tuning

indicator – a 'must have' gadget for any self-respecting higher-end radio in the years immediately preceding WWII. Other models in the range included the 4666 – a similar-looking table model with only one speaker and no magic eye (illustration, above), a contemporary advert noting its '11-tube performance' for only $49, and two floor model variants of these two set types, the 4687 and 4686 respectively (advert, left), the 4687 fitted with a 'Tone Beautifying Acoustic Stabilizer'. All models sport three

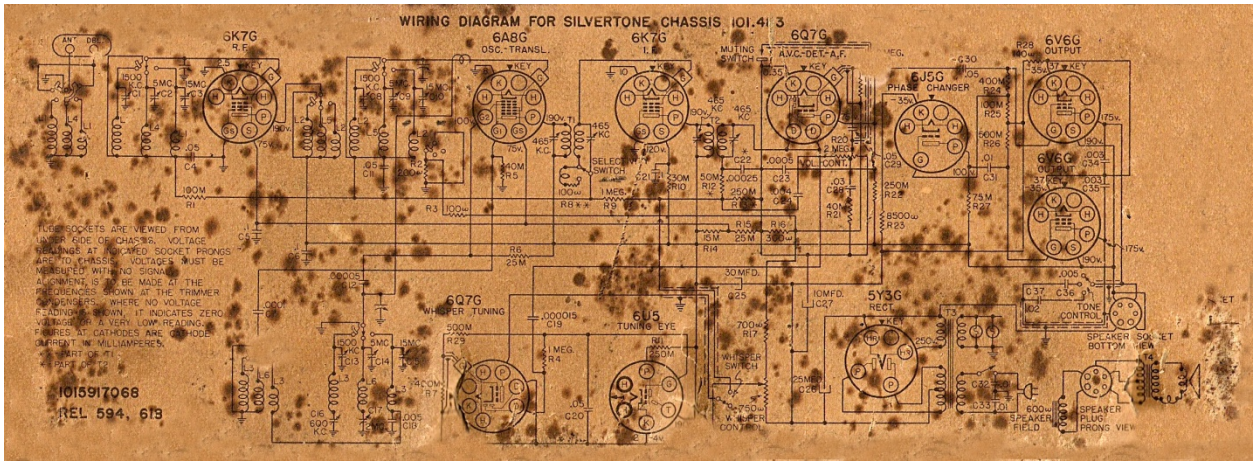


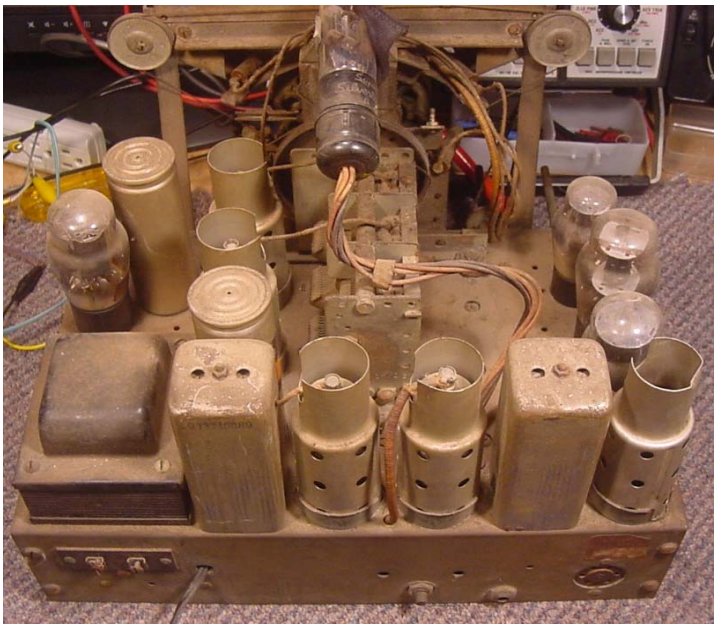

wavebands, each presented on a 'Roll-over Dial' (photo, right), and '100% automatic tuning' via a round push-button dial mechanism – advertised as the 'Newest, Smartest Looking Automatic Tuning Dial', this being described as 'Positive, Instantaneous and

Smooth Acting – requiring only one single twist of the finger to get your favourite station' – a really cool feature in 1937.

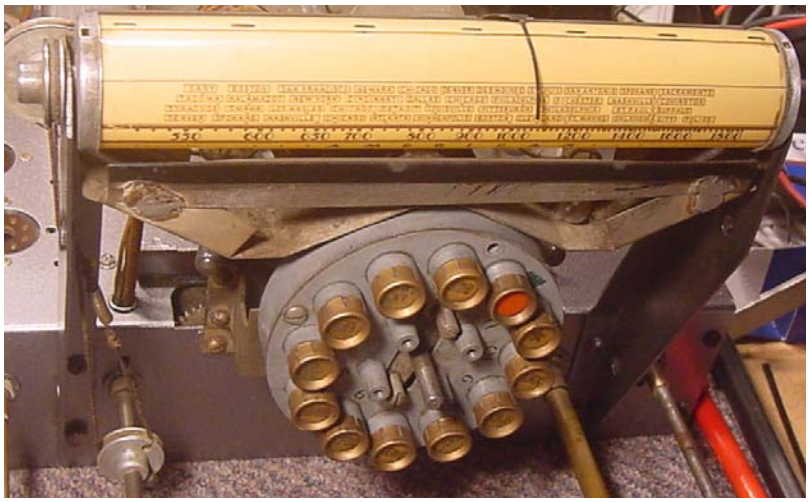
Chassis/Electrical Design

The tube line-up of the Model 4766 is a 6K7G RF amplifier, 6A8G converter, 6K7G IF amplifier, 6Q7G AGC/Detector/1st AF amplifier, 6J5G phase splitter, 2 x 6V6G AF output tubes, 6Q7G 'whisper tuning' (a form of switch-operated squelch coupled to the mechanicals of the tuning mechanism), 6U5 tuning eye and a 5Y3G rectifier. The push-pull 6V6Gs feed a pair of 6" speakers, mounted in the corners of the rather large and imposing table top cabinet. As noted above, a single speaker version was available, the Model 4666, together with two console versions, Models 4686 and 4786, the latter both making use of larger speakers to provide real justice to the beefy push-pull AF output stage of the chassis. The set provides full coverage from around 520kHz through to 18.5MHz in three bands: 'American' (520kHz – 1.7MHz), 'Intermediate' (1.7 – 6MHz) and 'Foreign' (6MHz – 18.5MHz). The IF is a standard 465kHz.



The chassis is quite compact for a ten tube design (chassis label with schematic above), although under the chassis is still quite accessible. The tuned circuits are well-screened and access for alignment is through a metal cover plate with a label attached identifying which trimmer is which. The RF, IF and AF tubes are arranged logically around the coilpack, with the power supply components off to one side. Power supply filtering is by two large above-chassis mounted 500 volt



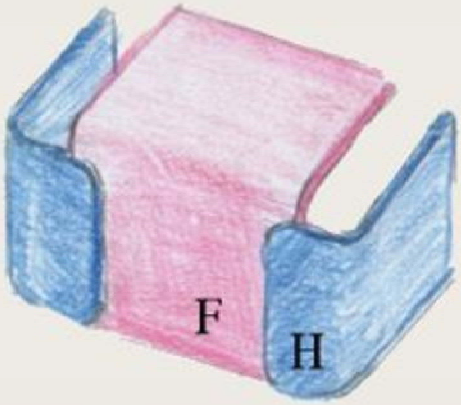
working can-type wet electrolytics, these being 25uF and 30uF – quite large values for this era. Line filtering was provided by a tar-potted dual 0.05uF metal can mounted under the chassis.

The tuning mechanism is fairly complex, having separate dial cords for the wavechange switch and pointer, together with a 'telephone dial' form of station pre-set ('Automatic Tuning Dial') – photo above. The instructions for setting-up, operating and servicing the latter take a full three pages in the available literature, complete with 23 diagrams! – and we thought Video Cassette Recorder (VCR) instruction of the 1970's and 1980's were complicated... (thank Heaven for PVRs, Netflix and YouTube...).

Cabinet Design

I have heard the cabinet described as 'Gothic' – that it may well be (I am no expert on things Gothic), but if nothing else it is very long and wide for a table top radio!

I found a very interesting article on the SF Hobbies website (Father and Son Hobbies - http://sfhobbies.com/) that discussed the finer details of the cabinet design of one of this radio family's console-style derivatives, the 4787, entitled 'The Perfect Cabinet Design'. Unfortunately this was later found to be a dead link. This defunct article, was somewhat full of industrial design gobbledegook, however, I do agree with the author of that vanished article that the cabinet of this model has a certain appeal in its *symmetrical form*, and I would also note that "*...the design comprises three sections: the central, rather bold and imposing control section, flanked on either side by a sensually-curved loudspeaker housing, with bold curved ribs across the speaker apertures, topped with formidably strong curved and colour-contrasting shoulders. At rest, the control layout exhibits a pleasing balance, with the eye drawn to the splendid telephone dial and then naturally dropping to the remaining controls. However, in use, the eye tends to be drawn upwards by the hypnotising 'magic eye', and then to the magnificent period rotating sliderule dial. The dial itself is a work of 'deco' art, declaring the 'American', 'Intermediate' and 'Foreign' wavebands in a very bold font, with scores of stations listed by the city or country in a veritable plethora of exhibitionism of illustrative icons....*" (I could go on, but will refrain - oh dear, there I go – sheer poetry). Pity that particular link is dead, however, the good news is that more design notes on the 'overlapping layer-style' Silvertone cabinets, including the Model 4766 and its relatives, can still be found on the SF Hobbies website at http://sfhobbies.com/sfhobbies/radio/OLStyle/index.jsp - see extract below on Model 4677:




**This cabinet inherited features from models #4666 and #4769. I don't know from which model it got more "genes", but this baby is very handsome. The front layer (F) is similar to that of model #4666, but with a minor change, the bottom being curved inward. The horizontal layer (H) is like that of the #4769, but symmetric. The fantastic elements on the left and right corner of the top of the radio are similar to model #4666, but with more of a concave surface.**

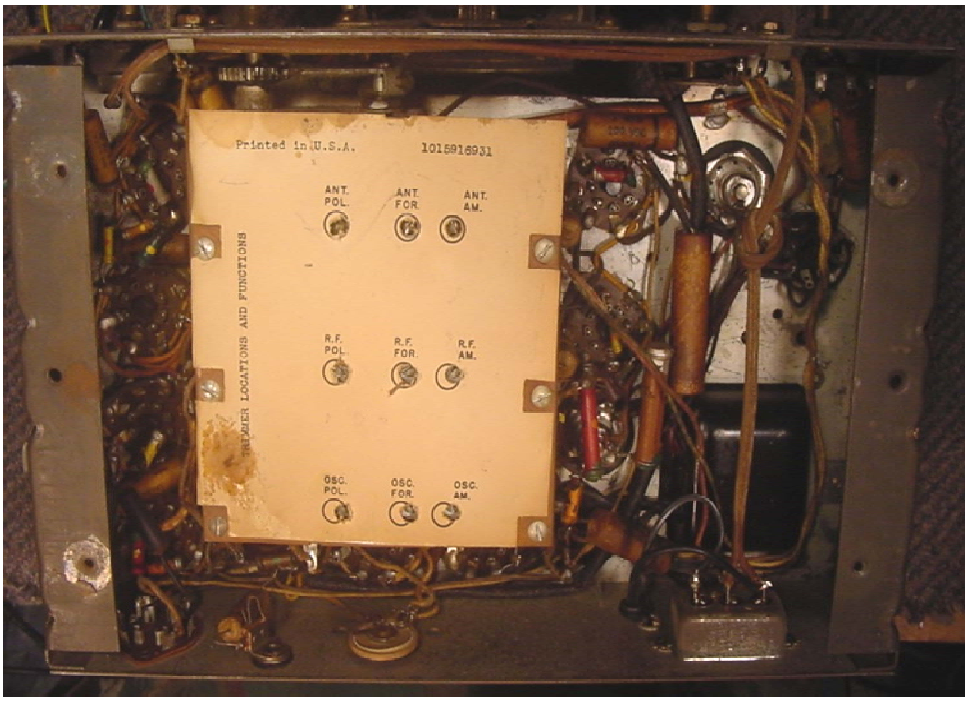
***From Sears AD.***

***"Cabinet has been conceived to harmonize with European and American periods of furniture-art, as well as the contemporary modern mode. "***

**As Found...**

The as-found condition of the set would not really do the above 'flannel' justice – in short, it was a wreck: the seams were literally falling apart, most of the speaker aperture ribs were broken, speaker cloth ripped and the finish in a very poor condition. The plastic tuning dial escutcheon was warped and broken into several pieces. The rear plywood cover was missing, and inside was filthy, the chassis rusted and the dial cord wrapped around everything it should

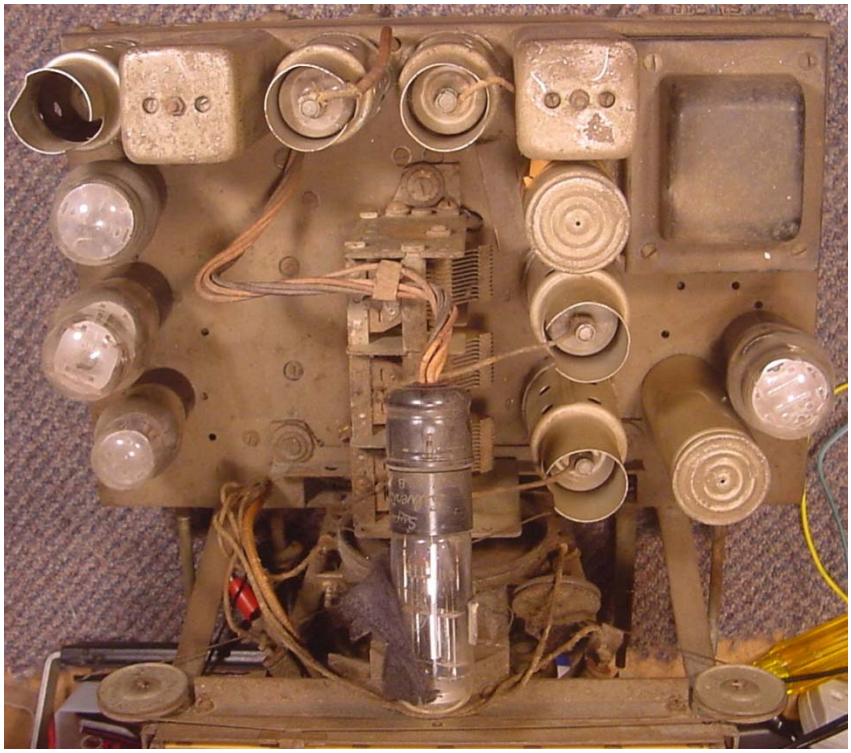
not be (due to a missing pulley – luckily recovered from under the chassis. On the positive side, all tubes were present, as were the tube shields and few, if any, repairs had ever been done over the years as all under-chassis components looked original (photo, right).



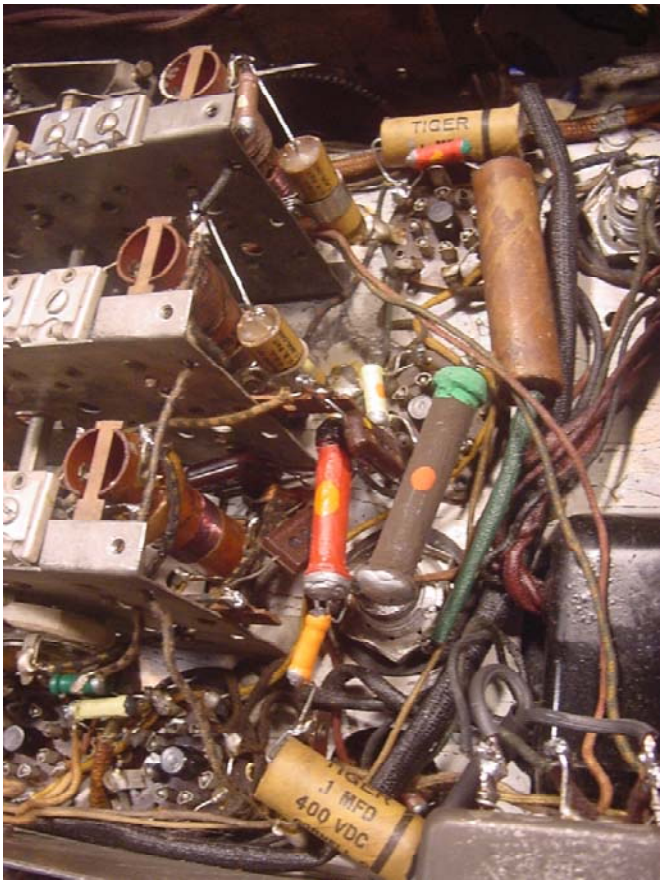

**Restoration**

Chassis

The tubes and tube shields were removed, and the chassis was cleaned fastidiously. However, given the dull-rusty appearance of the chassis (photos, right), even when cleaned and buffed-up with 'Scotchbrite' pads, it was given a coat of metal-finish paint after removing the two large can electrolytics and masking all other parts. Large components, eg. the power transformer, were masked using tape, with the tuning mechanism placed inside a plastic bag. Small items and labels on the chassis were coated with grease as a masking agent. The finished result was a transformation to something close to its original appearance. The tuning gang was carefully cleaned, re-lubricated and new rubber mounts installed (combination of tap washers and grommets). All paper capacitors were removed one at a time, the cases cleaned and re-stuffed







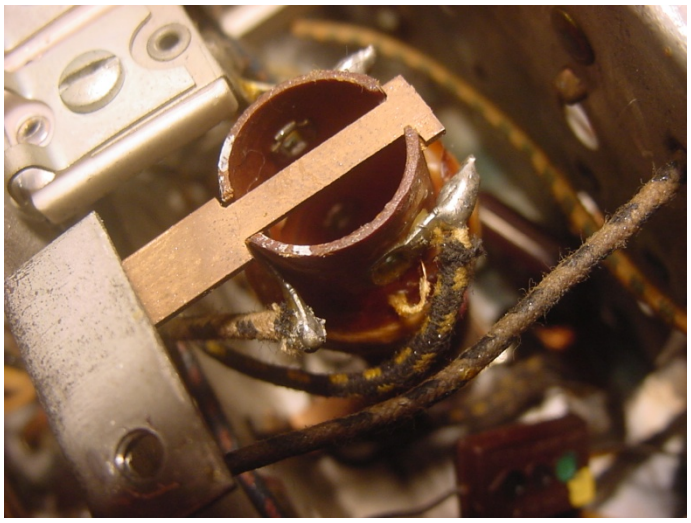

with modern parts (photo, above), as was the single tubular electrolytic located beneath the chassis (large tube at upper right of photo, right). The two large above-chassis mounted can electrolytics were also re-stuffed (photos, page 8) and reproduction labels fitted. The majority of the dogbone-style resistors had drifted significantly out of tolerance, so all were removed and reproductions were made by using a fibre glass fishing rod as a housing with wire-wrap/epoxy built-up ends (larger styles – photo, below, left), or using two-watt metal film resistors with their ends beefed-up with dental super-glue or epoxy before painting in the original colours (photo, below, right). A reproduction label was also made for the coilpack screening lid, and the two labels on the chassis sides were re-made using cleaned-up photos of the same labels on the Museum's Model 4766 as these were discoloured to the point of illegibility.

The tubes were cleaned and tested. The 6U5 eye tube was working, but very weak, so was replaced with a NOS tube, along with a 6K7G, the 6A8G and a 6Q7G, the latter found to have a heater to cathode short.

Having re-capped the chassis and whilst awaiting the dogbone resistors to be fabricated, the most out of tolerance



resistors were temporarily replaced with modern parts so the chassis could be powered-up for testing. The power transformer had previously been tested for continuity, so the rectifier tube (5Y3G) was installed (all other tubes removed) and the line voltage wound up on a Variac, monitoring the HT voltage line. All was found to be well, so the remaining tubes were installed and the set powered-up again on full line voltage. The two short wave bands came up immediately, but the 'American' (Standard Broadcast) band was dead. Checks revealed that the local oscillator was not working on this band. I suspected the wavechange switch, but after copious careful contact cleaning with Q-Tips and Deoxit and more checks, the fault was traced to an



open-circuit local oscillator feedback coil (photos, left). This had to be removed from the set for repair – luckily the feedback coil secondary winding is not tuned, and tapping into the coil to a point where continuity was found worked like a charm – up came the 'American' band. By this time the reproduction dog-bone resistors were available and installed. The set was then re-aligned and found to be working very well across its entire tuning range, with very good sensitivity, though with some scratchiness in operating the controls.

Deoxit was used to clean a noisy volume control and to clean-up the various switch contacts on the front panel controls, including the 'whisper tuning' control, which also worked well. Replacement of two dial bulbs completed restoration of the chassis.

Cabinet

Following cleaning, the old finish (shellac) was scrapped off the cabinet and the cabinet re-glued together in a number of stages. The broken speaker aperture ribs were reproduced by forming/gluing several thin wood laminates into a plywood using a jig made from one of the 'good' ribs. Once fabricated, these were each fitted into the cabinet sides. Following fitting of the ribs, the entire sides were re-veneered and the cut-outs between the ribs made with a sharp knife.

The plastic escutcheon on the Museum's Model 4766 was removed and scanned in a 3-D scanner (although also warped and damaged, it was in better

shape than the one on the set being restored). After some (software) manipulation to remove warping and other defects in the scanned image, the escutcheon was reproduced in plastic on a 3-D printer. The printed escutcheon (bottom in photo, left) was then finished using high-build primer, carefully sanded, and spray painted to reproduce the original escutcheon colouring.

The re-built cabinet was sanded down with 600-grit 'wet and dry' emery paper lubricated with lemon oil, grain-filled, and then finished in tinted lacquers, starting with the darker trim, the remainder of the cabinet being masked-off in stages until the desired contrasting tones were achieved. The entire cabinet was then given several coats of clear semi-gloss lacquer. The knobs were cleaned and polished with Novus #2 and #1 and re-fitted, and new brass locator pins fabricated and installed in the cabinet front above them. Rather than install new speaker cloth, a suitable fabric was re-cycled from a scrap radio (courtesy of Gerry Taylor) and this was duly installed behind the wooden ribs.

This model is fitted with a plywood rear panel with a complex arrangement of cut-outs, as evidenced by the museums example. This was missing from the set being restored, so the rear panel off the museum's set was used as a template to fabricate a replacement, complete with reproduction label.

Finally the rotating pre-set dial was cleaned, sanded, primed and re-finished in satin-finish enamel paint to match the dial escutcheon.

**Re-assembly and Finishing-up**

The speakers were cleaned and re-fitted into the cabinet along with the chassis, the knobs re-fitted, eye-tube aligned, rear panel fitted and the completed receiver tested. The sound produced by the two small speakers is remarkably good and the set now looks a 'feels' like a quality piece of 1930's engineering and aesthetics.

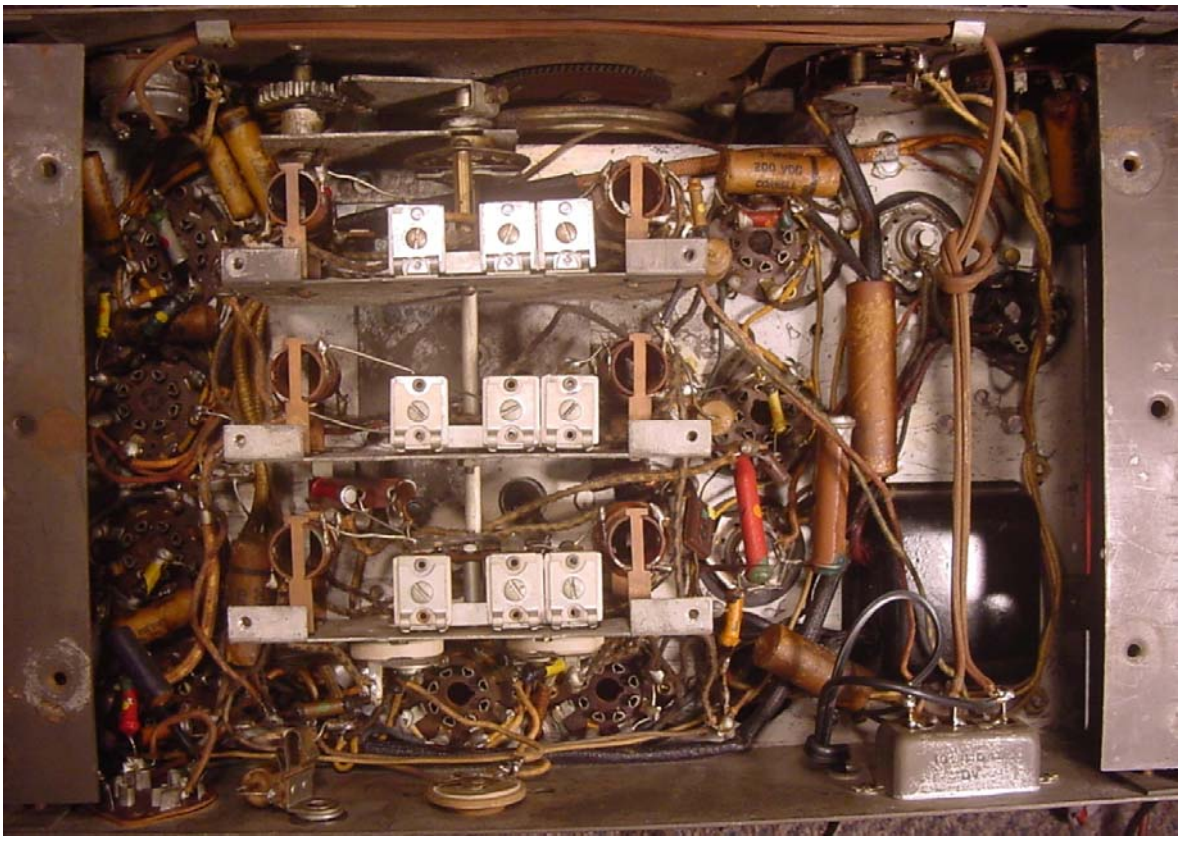
**Conclusion**

The Silvertone Model 4766 restoration project was a true team effort, with involvement by many SPARC Museum volunteers and their network of talented friends. The cabinet restoration was primarily the result of Pat Jones exceptional talent with wood cabinets, with the chassis work being attributable to myself. Special thanks goes to Gerry Taylor who painstakingly reproduced all the small dog-bone resistors, to Craig Marston, who's talents in converting fishing rods into 2 Watt resistors is second to none (he is also an ace at reproducing dials and knobs), John Fluevog/Jeffrey Liu for 3D printing the dial escutcheon, Brian Murtsell/Les Mitchell for fabricating the speaker aperture ribs, and George Gorczynski for reproducing capacitor labels and cleaning-up photos of chassis decals.

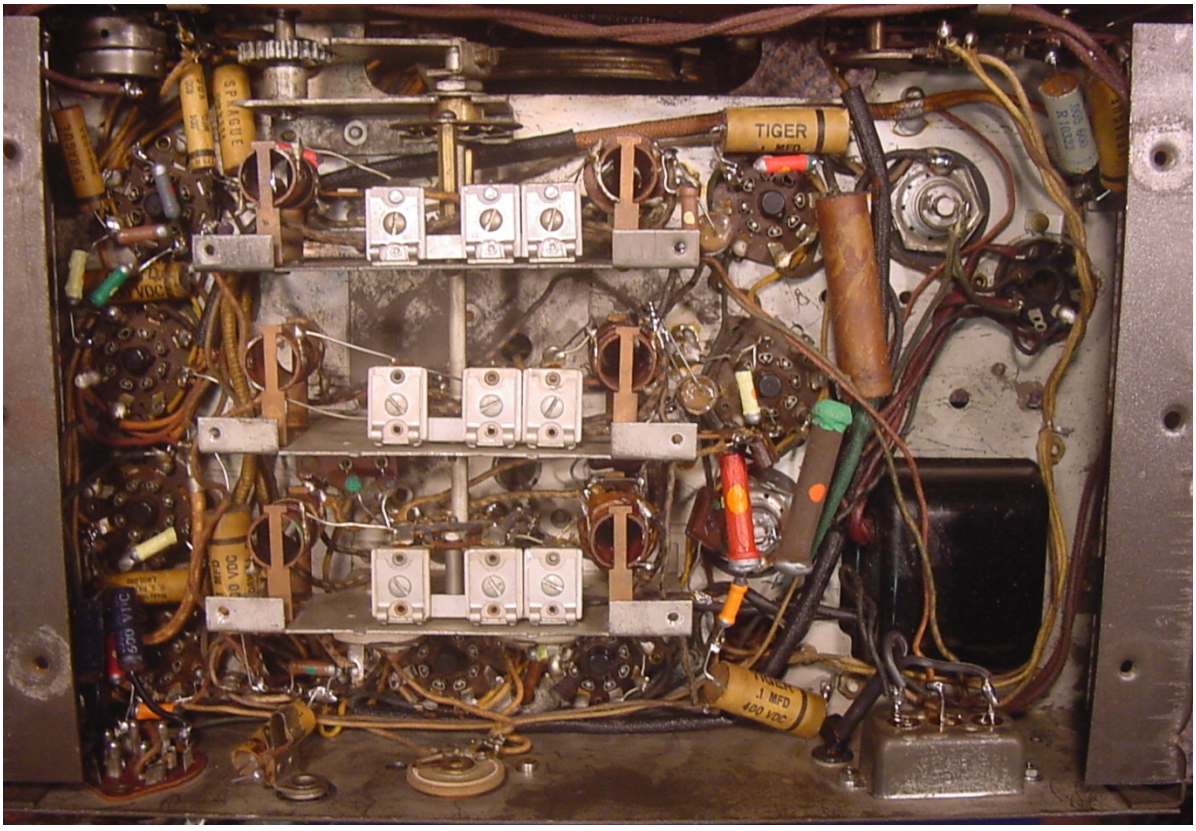
Gerry O'Hara for SPARC Museum

Coquitlam, March, 2014

Above: Reproduction rear panel (prototype from the SPARC museum top, reproduction panel below). Below: reproduction panel fitted to the set



Above: Under chassis before restoration Below: Under chassis after restoration



Above: Fitting the restored chassis back into the cabinet Below: Completed restoration


KDB
KNX
KHJ
KEHE
KFI


INTERMEDIATE-AMERICAN
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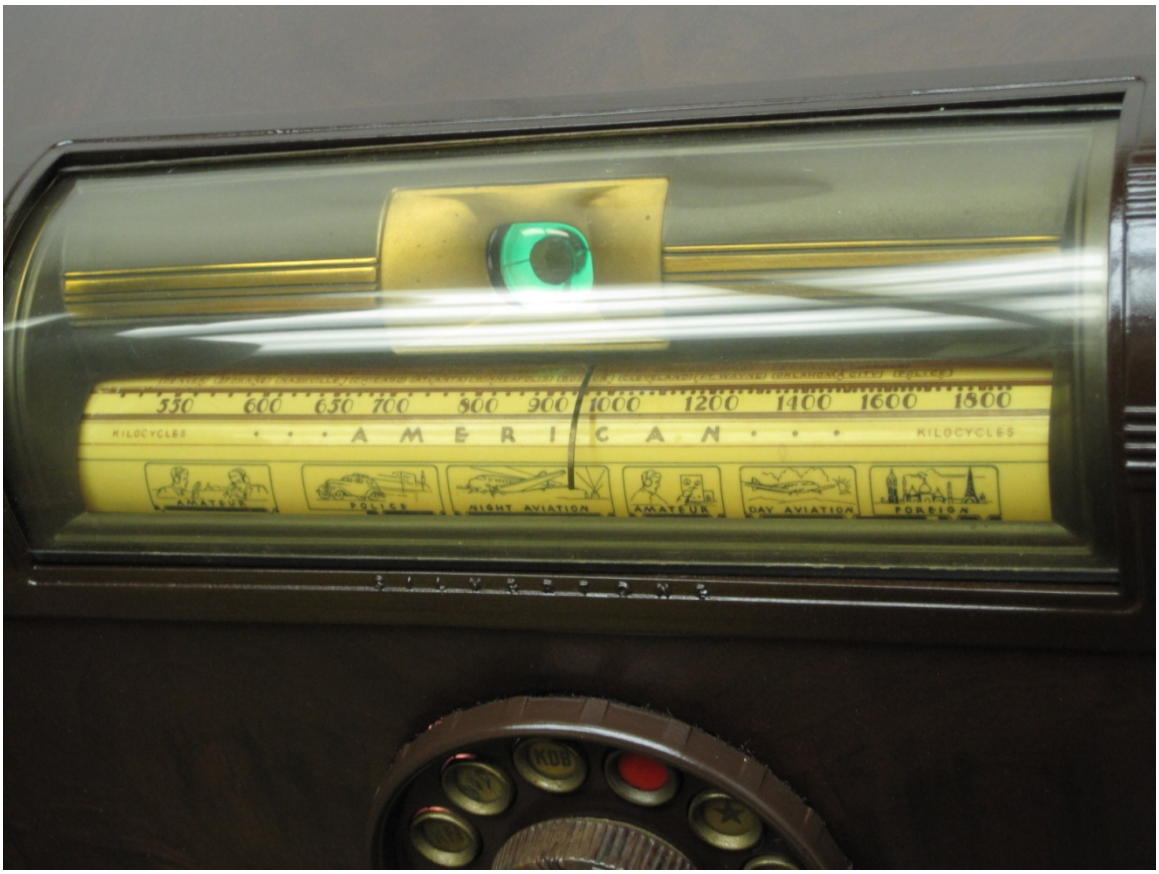
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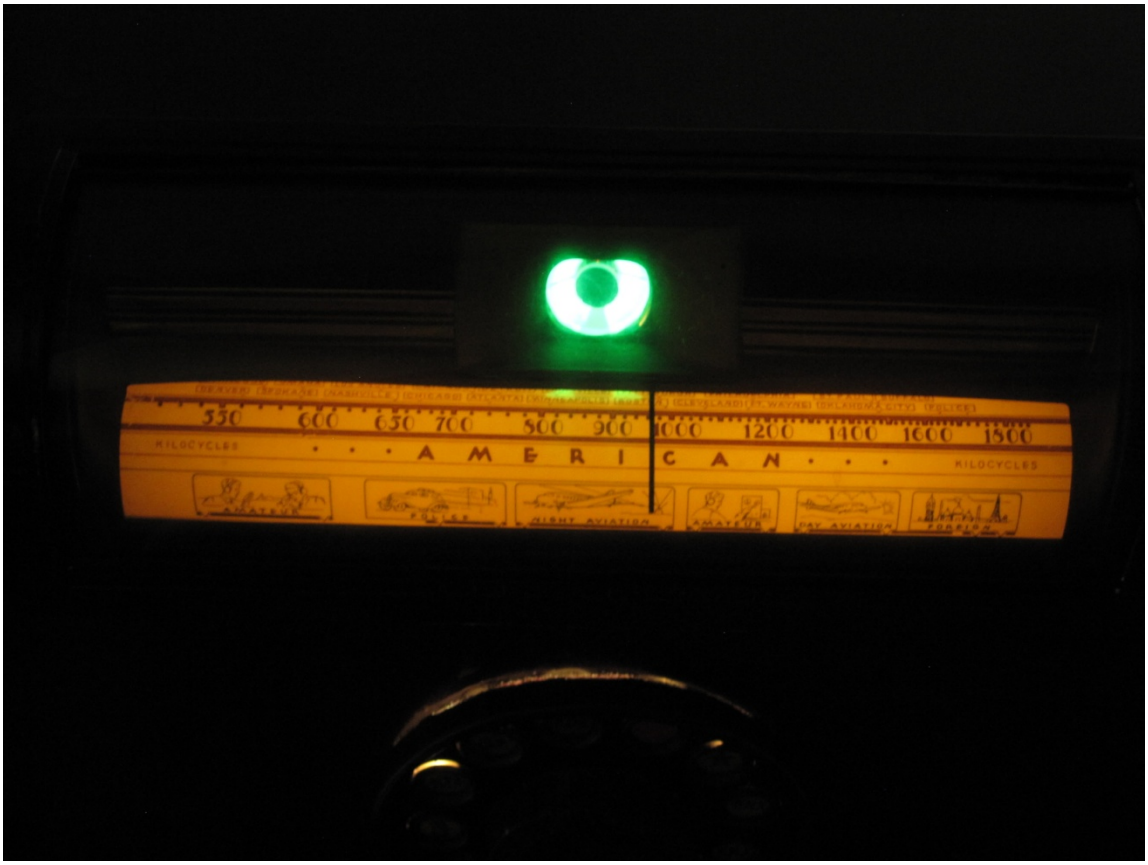
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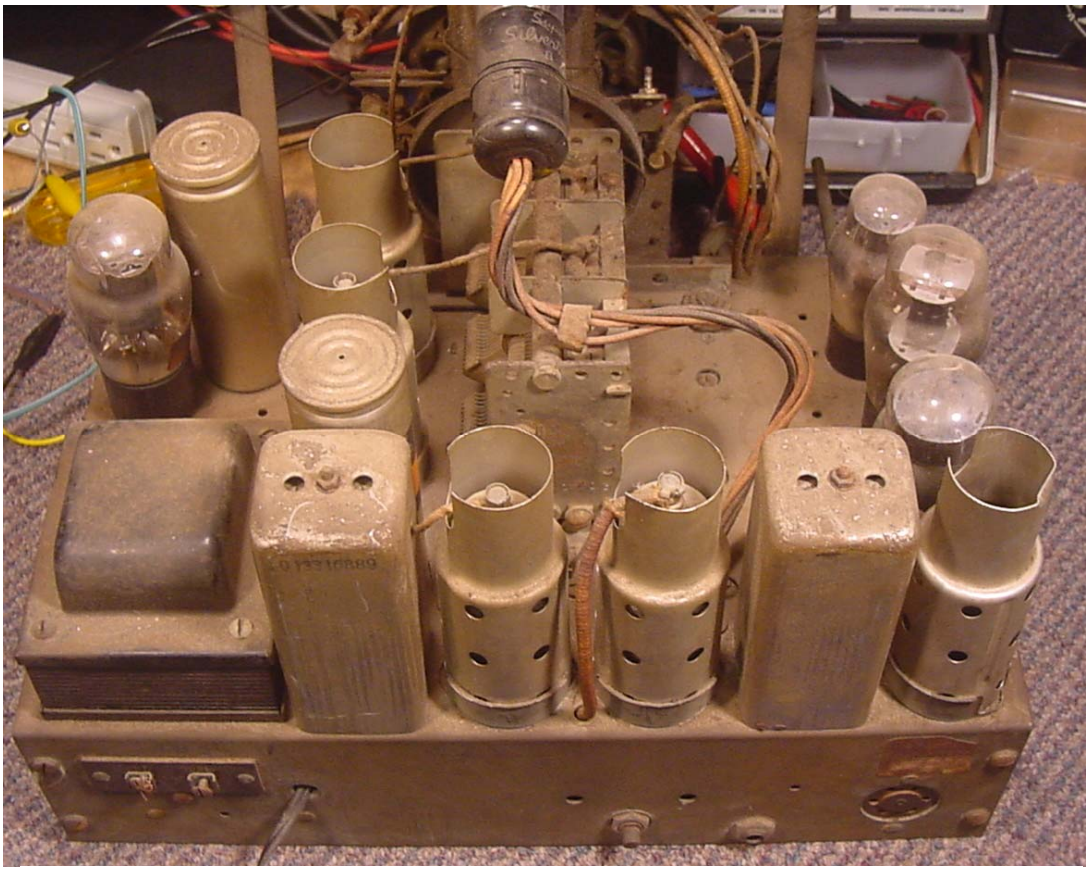
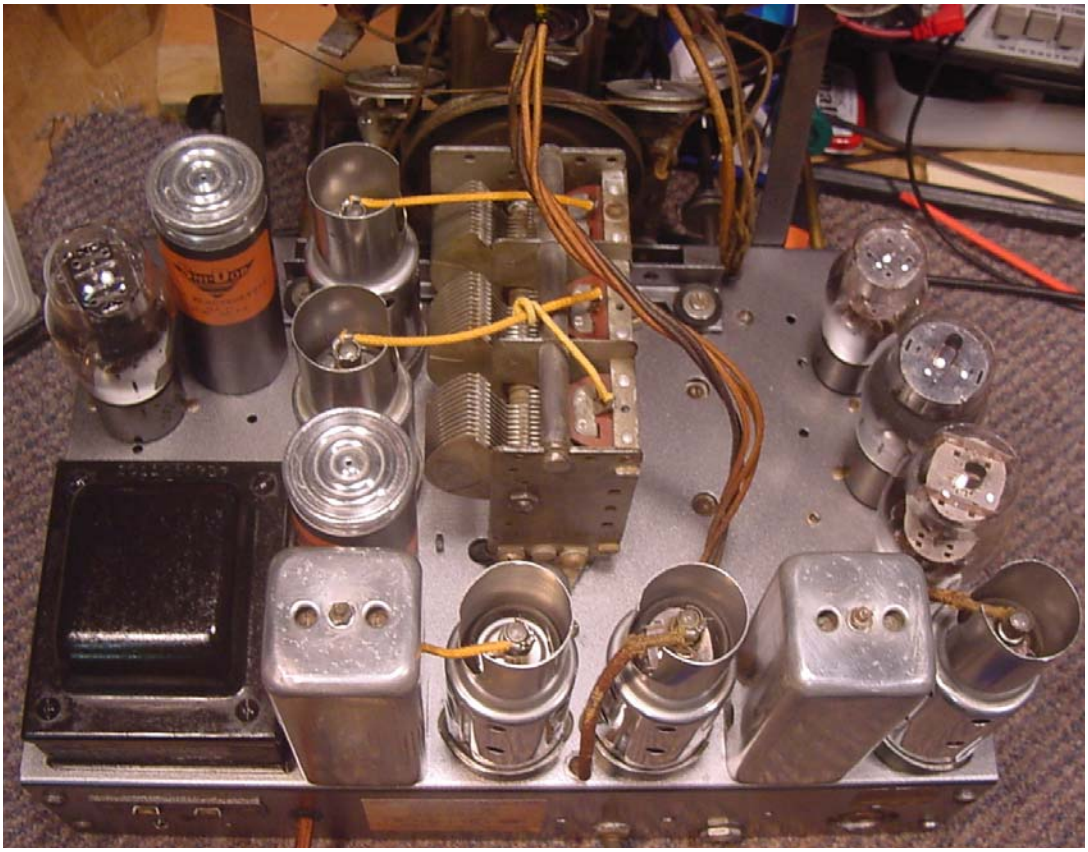


Above: Above chassis before restoration Below: Above chassis after restoration



Above: Cabinet before restoration Below: Cabinet after restoration


KILOCYCLES
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