

A novel 63 Volt Battery for Tube Portable Radios

H. Kristian Walter

Portables of the late 40's and early 50's (pre-transistor age) faced the problem of supplying their tubes with sufficiently high plate voltages while trying to be as small and compact as possible. The bottleneck was obviously the size and weight of the "B"-battery. A standard way to build these radios was to use the four tubes 1R5, 1T4, 3S4, and 1U5, and to power their heater strings in parallel with 1.5 Volt from a "D" cell battery and their plates in parallel with a 67.5 Volt battery, produced by many factories (Eveready 467, RCA VS016, Burgess 1734) with the same size. Although these 67.5 Volt batteries may still be available, they certainly are difficult to find and expensive to buy and to replace.

In the following I show how to build an inexpensive 63 Volt battery with the same size as an original 67.5 Volt battery using seven conventional 9 Volt batteries. Since the tubes work well with plate voltages as low as 40 Volt, the missing 4.5 Volt are of no consequence for the performance of the radios to be restored. The new battery can be easily assembled and disassembled without the need of any soldering and can use a wide variety of 9 Volt batteries including rechargeable ones.

The size of a 67.5 Volt battery is 92mm x 69mm x 33mm, the size of a conventional 9 Volt battery is 45mm x 26mm x 16.5mm. Accounting for the necessary interconnections, the outgoing electrodes and the shell thickness it is possible to house seven 9 Volt batteries inside an original battery shell, as shown in figure 1. This results in a 63 Volt battery, compared to the original voltage of 67.5 Volt. The measured voltage is in fact higher, since batteries tend to have higher voltages than specified. Figure 2 shows the seven batteries already connected by clips and arranged in the proper way before being put into the emptied shell of a RCA VS016 battery. The clips are made of the contact pieces taken from seven additional 9 Volt batteries (find them in recycle depots or ask for expired ones in your nearest dollar store), and rearranged and soldered to provide the contacts between the seven batteries connected in series. Two of the contact pieces (Type A) need only their two poles connected, two (Type B) need to be cut before connecting their poles, because their distance is slightly too short, another two (Type C) need to be cut and reconnected by a piece of flexible wire, and one (Type D) has to be cut and each pole connected to the poles of the final new battery.

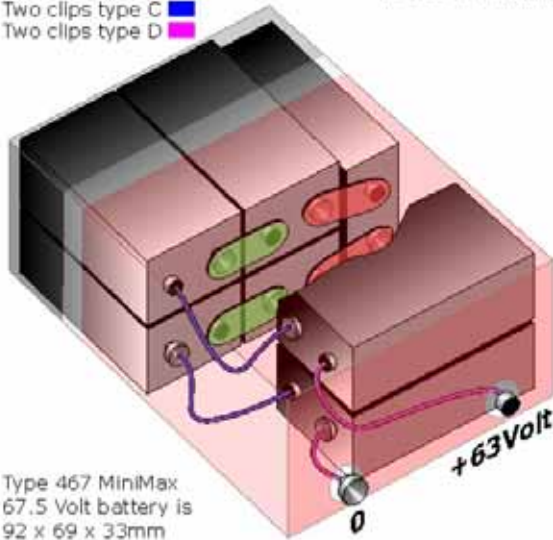
The initial costs for seven 9 Volt batteries (assuming Alkaline batteries and no extra costs for the batteries to be sacrificed for the clips), and the replacement costs for the battery are about 7.50 US. One can also chose to replace the batteries with Li or rechargeable ones. According to the specs of radios using the above set of tubes, the B-battery is discharged with about 7.5 mA, and therefore the Alkaline 9 Volt batteries have to be replaced after about 60 hours uninterrupted listening, Li batteries would last about 160 hours, and rechargeables about 30 hours.

Finally figure 5 shows a full-size template of the shell of a RCA VS016 67.5 Volt battery, which can be printed out, cut and glued to house the seven 9 Volt batteries.

A Self-Contained "63 Volt B Battery" for Portables

Two clips type A ■
 Two clips type B ■
 Two clips type C ■
 Two clips type D ■

A 9 Volt battery is
 45 x 26 x 16.5mm



Type 467 MiniMax
 67.5 Volt battery is
 92 x 69 x 33mm

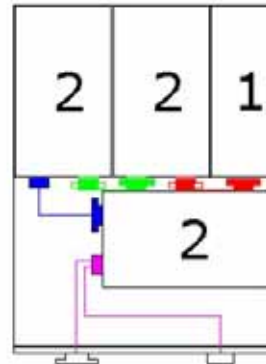


Figure1:

Schematics of
 seven 9 Volt
 batteries
 connected in
 series to make a
 63 Volt battery of
 the size of an
 Eveready 467
 67.5 Volt Battery



Figure 2: The seven 9 Volt batteries connected with clips ready to be put into the emptied shell of an original RCA VS016 67.5 Volt battery.



Figure 3: The seven 9 Volt batteries encased in a second protective oiled paper layer, and spaced by a piece of foam, before being hidden in the original shell



Figure 4: Assembled new 63 Volt battery housed in the original shell of an antique 67.5 Volt RCA VS016 battery

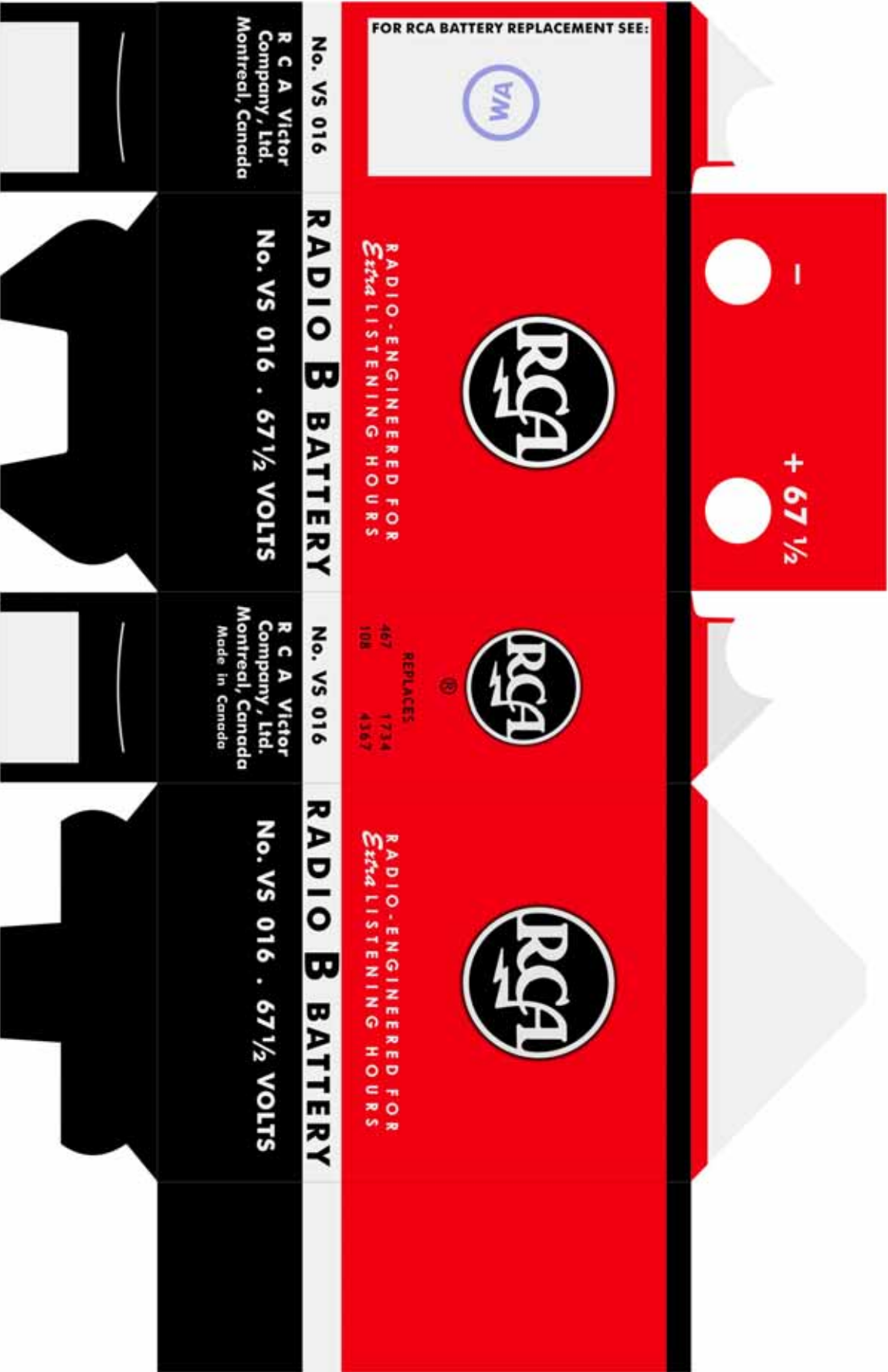


Figure 5: Template of the shell of a RCA VS016 67.5 Volt battery