Restoration of BC-312M

In late June, 2012, a derelict military receiver, model BC-312M, was acquired at K9STH. The condition of the receiver was such that even thinking of returning it to its original state was not possible. As such, it was decided to first get the receiver in operation and then to get the receiver into a respectable physical condition even though that condition was far removed from the original design of the receiver.

As received, the BC-312M was equipped with the RA-20 120-VAC power supply and thus was almost a BC-342. Up through the BC-312J series the BC-312 and BC-342 receivers were identical except for the power source. The BC-312 series used 2-dynamotors for the high voltage supply and the BC-342 receivers used the RA-20 120-VAC power supply. Starting with the BC-312K and with later BC-312 series receivers the BC-312 receivers did not have the crystal i.f. filter although this filter was still included in the BC-342 receivers. Therefore, the BC-312M receiver restored at K9STH does not have a crystal filter.

When received, the receiver was missing a good number of the physical parts and assemblies from the front panel and so many modifications to the original circuitry had been tried in the receiver that the receiver was not operational. The heater ("filament") string had been rewired and most of the tubes were not receiving heater voltage. The AVC circuit had been severely modified and that also contributed to the non-functioning of the receiver.

After trying to get the receiver at least partially operating, it was decided to basically rewire the receiver, except for the high frequency oscillator circuitry, and to replace all resistors and capacitors in the radio frequency, intermediate frequency, and audio circuits. Also, several parts in the BFO assembly were replaced. New resistors and capacitors were obtained from Mouser at a cost of just over $20.00. Other parts were already "in stock" which helped keep down the cost of the restoration.

During the rewiring several modifications were made in the i.f. and r.f. stages as recommended in several articles and conversion books from the 1950s. Also, the RA-20 power supply had the electrolytic capacitors and load resistors replaced.

The r.f gain and audio gain controls are joined in the original design. Since this double potentiometer was bad it was decided to go ahead and "split" those controls. The "dimmer" control for the pilot lamps on the main frequency dial had been modified and so it was removed and the hole used for the new r.f. gain control. The existing hole for the combined controls was used for the audio gain control. The pilot lamp circuitry, which originally consisted of a series connection of 2-each #47 bulbs was rewired in parallel and 2-each #53 (14-volt bulbs) bulbs were installed in place of the original #47 bulbs. Since the #53 bulbs are operating almost 20% below rating, the bulb life should be considerably greater than if they were being operated at full specifications. Also, there is still plenty of illumination of the frequency dial with the #53 bulbs operating slightly below 12-volts AC.

After rewiring the receiver, the alignment was so far off that a full alignment had to be done. Basically, the receiver had been badly "detuned" when the various modifications were made and that was why the receiver was completely dead when received. The frequency calibration was "way off" and every band had to be re-calibrated. Also, the mixer tuning was "way off" as well which added to the difficulty of aligning the receiver. During the alignment it was discovered that one of the 6K7 tubes in the i.f. chain was very weak. Fortunately, a replacement 6K7 was "on hand". Also, it was discovered that the audio output transformer had shorted turns and thus was "loading down" the high voltage as well as exhibiting a temperature considerably above normal. This transformer was replaced with an audio output transformer from a "junked out" broadcast receiver ("All American Five") from the late 1940s.

After the receiver was again operational, the "improvement" of the physical looks began!

When acquired, the BC-312M was missing the band switch knob, the escutcheon around the frequency dial, and quite a number of other parts including the accessory connection assembly. The decision was made to make an "overlay" for the front panel and to replace all of the knobs.

Since the "overlay" is primarily cosmetic, aluminum "flashing", available from just about any home improvement center, was used. This relatively thin aluminum is easier to drill and cut as well as being considerably lower in cost than aluminum sheets. The "overlay" was cut from the flashing, holes were drilled for the various controls and mounting screws, and then attached to the existing front panel. A new escutcheon was made for the frequency dial. This was made in 2-pieces because it is much easier to get a good looking cutout for the dial rather than trying to use a single piece of aluminum.

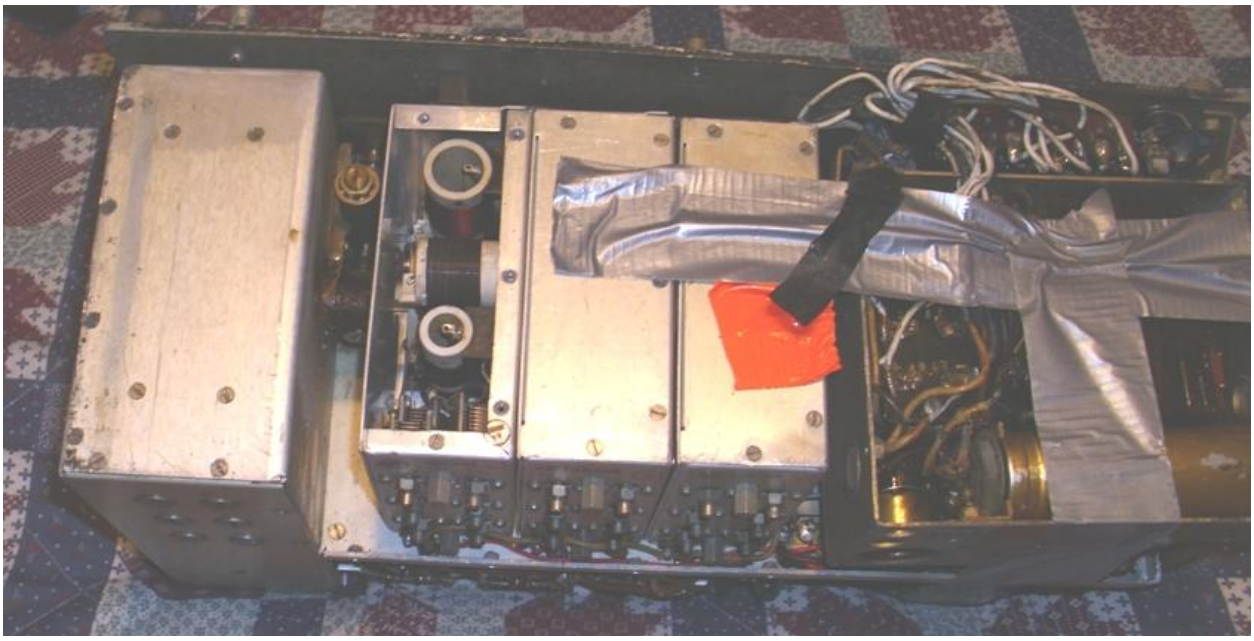
The band switch mechanism requires a very "stout" attachment for the knob. After a couple of tries, a suitable attachment was manufactured.

Originally, the intention was to use "modern" knobs for the controls. However, after trying some, it was decided that "Daka-Ware" knobs, which were very common in the 1940s and well into the 1950s, "looked" much better on the receiver. In addition, the original aluminum surface was just too reflective and it was decided to paint the "overlay" with a blue-gray paint. Also, the original control labels were cut from paper and applied to the "overlay". Frankly, this was not very attractive! Therefore, decal material, which can be used with ink jet printers, was obtained from a company called Micro Mark. After printing, the decals were applied to the "overlay".

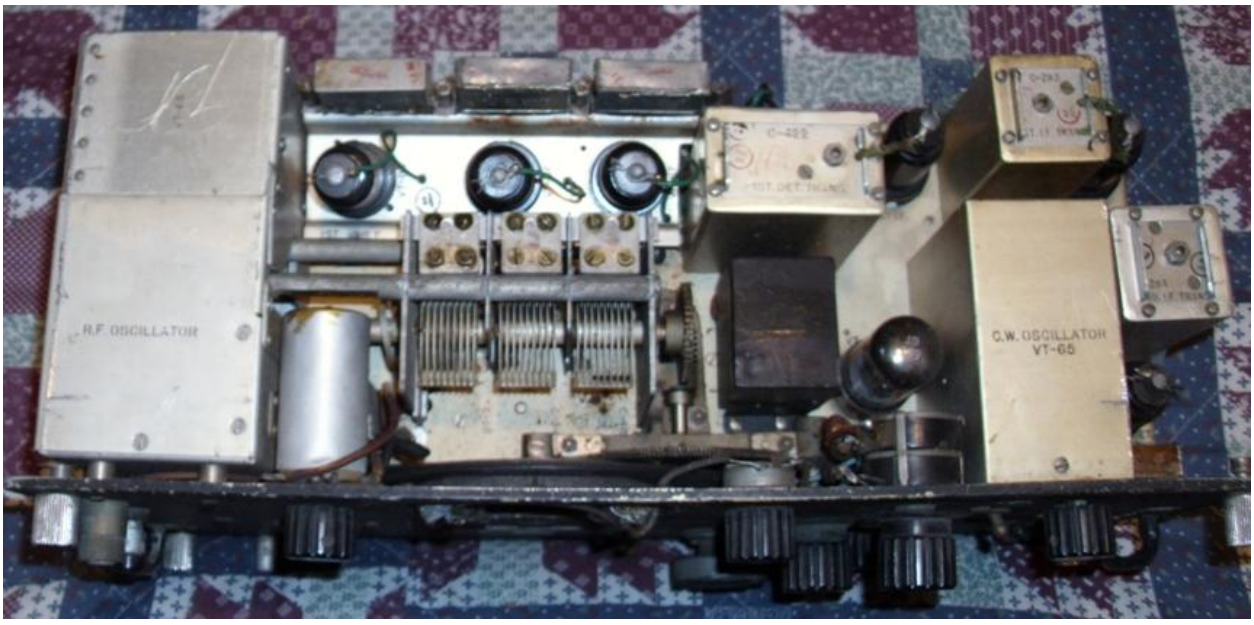
The end result is a well working receiver which also is fairly attractive!

Photos of various stages follow:

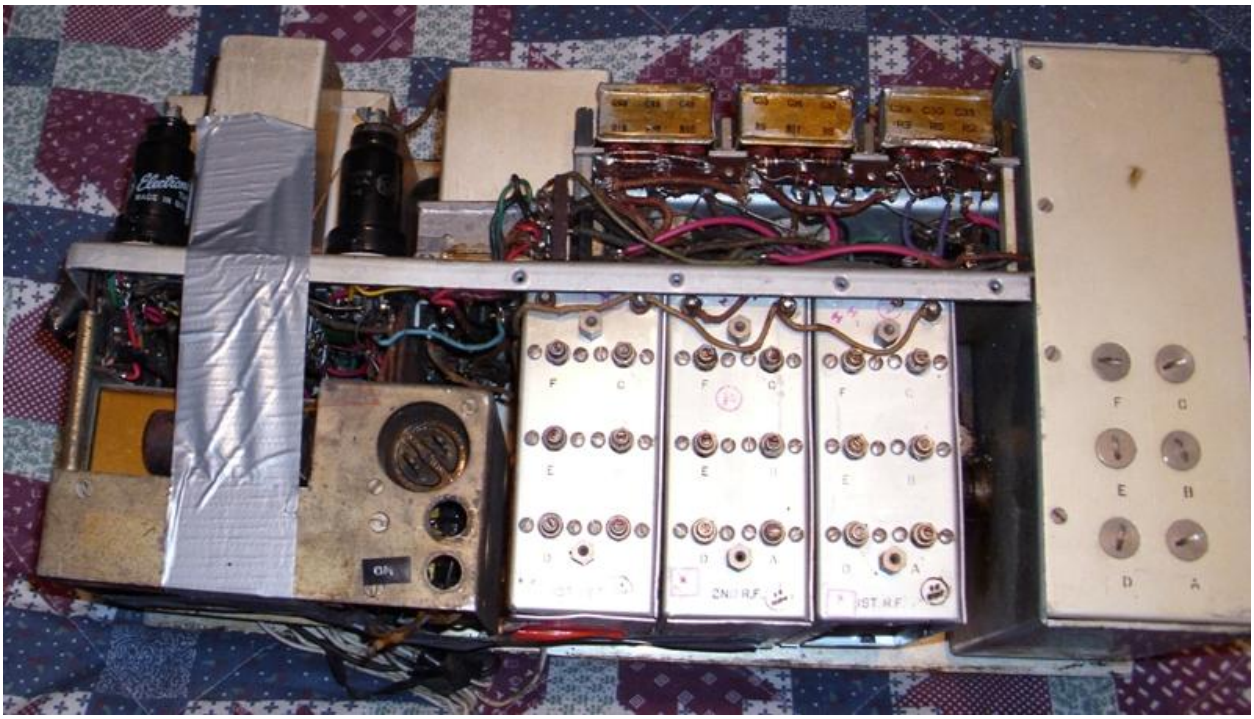
Front panel of BC-312M when acquired



Underside of receiver as acquired



Top of receiver as acquired



Back of receiver as acquired

First try with “modern” knobs

Receiver with “Daka-Ware” knobs and paper labels

Final receiver