Receive Short Wave On Your Home Radio

By Len Buckwalter

Here is the most inexpensive route to short-wave listening—the conversion of a table model radio.

JUST above the broadcast band exists the bustling activity of various communications services. A sweep across the dial from 1.7 to 5.5 mc will tune ship-to-shore stations, commercial telephone, weather, WWV time signals, and the 80 meter ham band.

With little expense or special skill a table model AC-DC radio can easily be converted for use on these frequencies. The cost may be kept below $4.50 even if all the parts are purchased new.

Here's how it works. The tuning range of the home receiver is altered by replacing the antenna and oscillator coils and tuning condenser. The parts are readily available from local distributors or mail order houses. Alignment, described later, is accomplished with signals received off-the-air.

The converted receiver *may* be used with its original speaker. However, headphone reception, valuable for receiving weak stations, is provided for.

actually select your desired signal and hear it on what becomes effectively a clear channel, free from interference from other CW or phone signals.

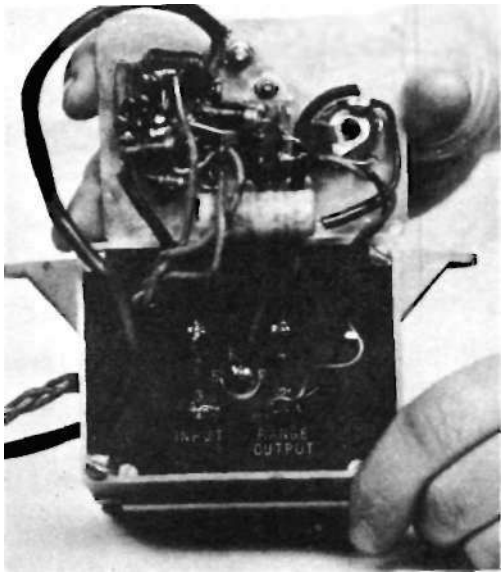
The surplus filter designated FL-5-F, has long been used for separating code signals. In its original state the filter introduces a loss in signal level which may be serious enough to cause the signal to become inaudible during deep fades. The incorporation of the amplifier, however, places the picture in a different light, and instead of encountering losses, we have a gain of up to -(-4 db at 1020 cps only, with an extremely sharp peak in the "sharp" position. In the BROAD position, used for 'phone reception, the overall gain is as much as -f 19 db.

The filter, which is the heart of the Signal Splitter, is housed in a metal case measuring 3%" wide by 2%" deep by 4" high. The top cover is taken off easily when four screws are removed, one from each corner.

1) Drill %" hole to accommodate 12AU7 socket, approximately %" in from left side.
2) Drill %" hole, %" in from right side for 'phone jack J1.
3) At approximate center, drill hole to accommodate function switch SI, 5/16" for toggle switch, or *Vz"* by *Yi"* for slide switch, whichever is preferred.

Another hole must be drilled to allow entry of power supply leads and the input audio lead from the receiver. This audio lead must, of course, be shielded to prevent hum pickup. The size of the hole is dictated by the combined wire sizes, and it should be drilled on the left side at a point about 1" irom the top.

To operate the Signal Splitter, after the power supply has been connected and turned on, first turn the function switch to the BROAD position, connect the audio input lead to the headphone jack on your receiver, then plug your headset into the output jack on the top of the signal splitter. You should be able to hear all the signals you would normally hear, but at greatly increased sound level due to the amplification within the unit. Reduce your receiver audio to a comfortable listening level.



Various interconnections should have enough slack so cover of filter case may be removed.

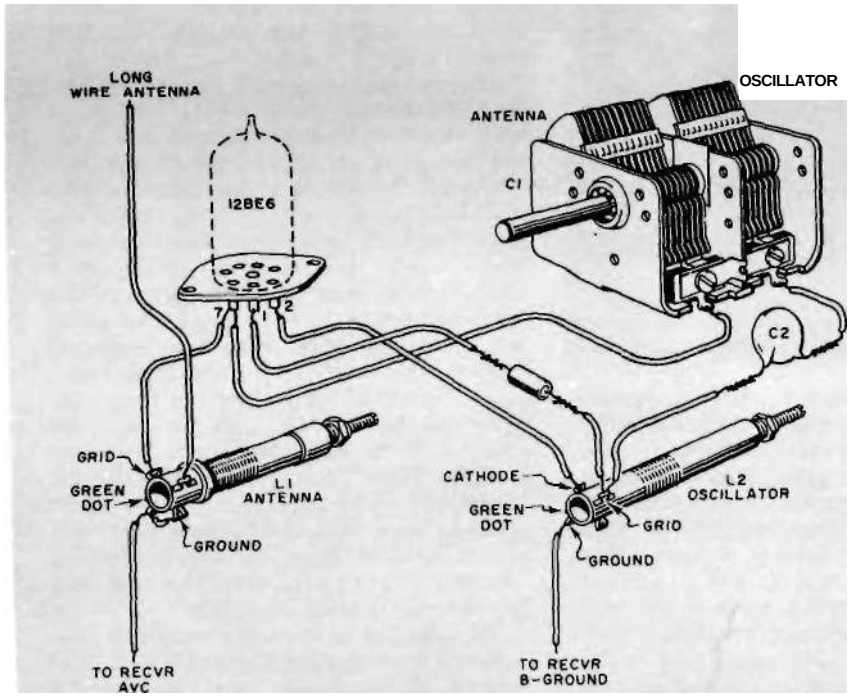
Now, turn the function switch to SHARP and operate your receiver BFO in the normal manner. You will notice immediately that the signals will not be as loud as when in BROAD position and that 'phone signals will no longer be intelligible. This is normal, due to the extremely sharp tuning characteristics of the filters. However, you will also notice that as you tune across your receiver dial with the BFO on, that one particular note (1020 cycles) will appear to be particularly loud, and that almost invariably you will hear only one signal at a time. •

PARTS LIST

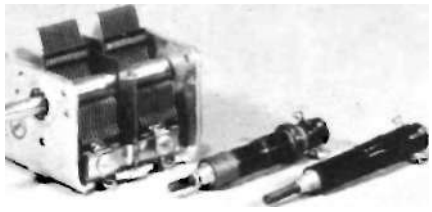
RI.R4—580,000 ohm <//» resistor
R2—1000 ohm '/j w
R3.R6—33,000 ohm 1/2 w
R5—3300 ohm >/2 w
CI,C2,C3,C5—.03 mfd 400 volt Aerovox Aerolite capacitors
C4—25 mfd electrolytic 25 volt
J—phone jack
PLI—phone plug
SI A,SIB—DPDT slide switch
FIA.FIB—Filter FL-5-F (available at most surplus dealers or Concord-Niagara, 47 Warren St., New York City)
VIA.B—I2AU7 tube and socket

Power Supply Parts

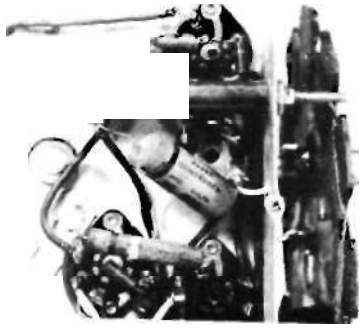
R7—120 ohm '/, w
R8—920 ohm '/j w
R9—33,000 ohm
C4.C7—20 mfd ISO v
DI—Silicon diode rectifier (Sarkes-Tarzian M-ISO)
T—Power transformer (Stancor PS8415 or Triad RS4X)
S02—Chassis socket (Cinch-Jones S-304-AB)
PL2—Power Plug (Cinch-Jones P-304-AB)
Case—Aluminum box 4"x2'/t"xI-VI»"



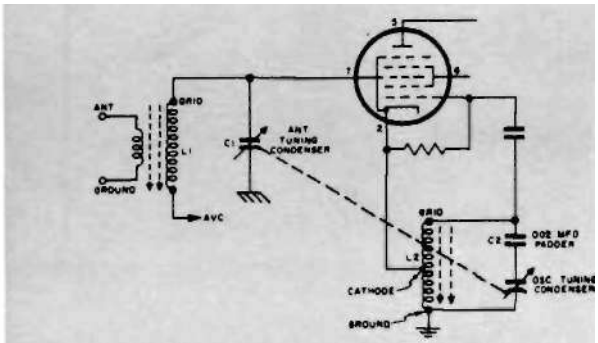
The new parts are wired into receiver as above. They are LI, L2, CI, and C2. Note points in circuit to which they are connected (12BE6, AVC, B-).



Main tuning condenser CI and the two coils. At the right Is the tapped oscillator coil L2. Antenna coil LI above it has two separate windings.



Underside of chassis showing mounting detail of ofcillator coil L2 at the upper right hand corner. Immediately above it is the 12BE6 converter tube.

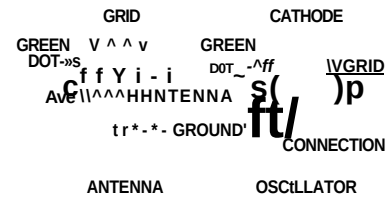


Partial schematic of receiver after conversion coinciding with the wiring guide.

To begin, the main tuning condenser is removed since the broadcast type does not offer a favorable tuning ratio. Clip the two wires going to the condenser lugs plus any ground strap attached to the frame. Remember which wire goes to the *smaller* group of plates. For future reference, this is the *oscillator* lead, the other is in the *antenna* section. Installing the new condenser shouldn't present too much of a mounting problem as these units are well standardized. The Miller #2112, used in the illustrated model, fit perfectly over the old mounting holes. Its outside dimensions were identical to the original part. Be sure to change the dial cord drum.

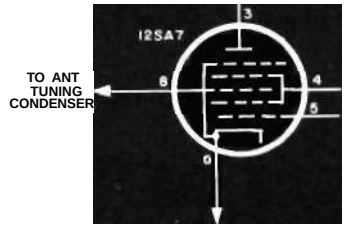
The new antenna coil, another Miller part, will replace the original broadcast loop. A convenient mounting spot is directly on the cardboard where the loop is wound. Referring to the diagram wire it as follows. Locate the lead that runs from the loop to the converter tube. In many cases this will be pin 7 on a 12BE6. This lead will continue to the *antenna* section of the variable condenser. Clip this wire from the loop and solder it to the "Grid" lug of the new coil. The other lead from the loop connects to the "AVC" lug. Be sure the other end of this lead runs into the chassis. Now jump the "AVC" and "Ground" lugs together with a short piece of bare wire. Add a length of lead, about 30 feet long, to the remaining "Antenna" lug of the coil. The new tuning circuit is now complete.

The second half of the receiver conversion is in the oscillator section. The procedure outlined here assumes a 12BE6 tube and a tapped-coil type oscil-

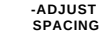


Use these base diagrams to identify the lugs on coils. Green dot must be in position shown

Follow 'Sis guide for adding a headphone jack. The JOCK and 10 ohm resistor are new part*.



If your receiver uses a 1 2SA7 converter tube Instead of the 1 26E6. use these pin numbers.



[2BA6 SOCKET (IF STAGE) PINS I AND 5

Adding the two "gimmick" wires for receiving code. The length should be about a half inch

lator, quite commonly used in these receivers. In any event, the circuit may be wired to conform with the winding on this coil.

Remove the old oscillator coil (the small one below the chassis and close to the tuning condenser) carefully clipping the connections.

The diagrams should provide enough information. However, here are some points to be aware of. Include the .002 mfd. padder condenser. One side is soldered to the "Grid" lug of the coil, the other to the section of the tuning condenser previously identified as *oscillator.* The "Cathode" connection is the lead going directly to pin 2 of the 12BE6. The remaining wire (s) comprise the "Ground."

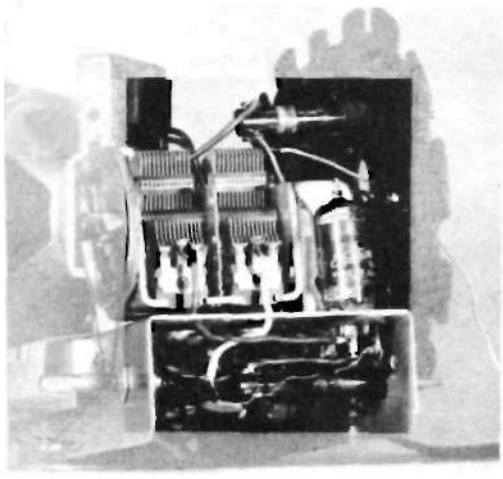
Turn the receiver on for about 15 minutes to permit it to stabilize itself for alignment. Since this will be done with off-the-air signals, it will be helpful to connect the outside antenna at this time. It was found that by clipping a short wire to the fingerstop of a telephone, strong signals were pulled in.

Set the tuning condenser in the fully meshed position and turn the oscillator tuning slug, starting from the maximum clockwise position (all the way in). The idea is to receive the upper end of the broadcast band and approximate a rough adjustment of the coil. Keep turning until the broadcast station of the highest frequency is heard. Tune the antenna slug for maximum volume. Now fully unmesh the tuning condenser. Slowly turn the oscillator slug counterclockwise until WWV is heard. This powerful station emits a ticking signal at 1-second intervals with time announcements in code and voice each minute. The frequency range is now 5 mc on the high end of the dial and just above the broadcast band on the low side. •

PARTS LIST

C1--10-365 mTifd. variabN 2-iect on capac tor [J. W. Mil er 2112)
C2--.002 mfd molded micd
L1- Antenna coil (J. W. filler 1-M95-A)
L2- OicilUto coil (J. W, Miller B-W96-C)

Antenna coil LI is seen above the main tuning condenser. Below chassis is oscillator coll L2.



Old antenna loop on rear of receiver is no longer used. White lead is new antenna wire.