

**installation
and
operating
instructions
for model S-40 B, BU
radio receiver**



94X586
750

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Figure 1. Radio Receiver Model S-40B, BU, front view.

INSTALLATION AND OPERATING INSTRUCTIONS

FOR

RADIO RECEIVER MODEL S-40B, BU

Your receiver, when properly installed, is capable of outstanding performance. Read the installation and operating instructions carefully as they are provided to insure the maximum satisfaction from your receiver.

GENERAL: - The S-40B & S-40BU receiver are table model superheterodynes capable of receiving standard broadcast and foreign or domestic short wave stations over four frequency ranges with continuous coverage from 540 KC to 44MC. A bandswitch is provided to select among the four ranges of reception which are indicated on the colorful and attractively illuminated main tuning dial scale. The amateur bands as well as foreign station locations are also clearly indicated on the main tuning dial scale for convenient reference. Appearing on the main tuning dial is also a logging scale which is used as a reference in logging radio stations of special interest. Many special features are provided to improve reception including bandspread tuning, automatic noise limiter and automatic volume control. Provision is made for the optional use of a headset. A beat frequency oscillator is provided for code reception. This feature is especially useful to the radio amateur and code enthusiast.

The S40B receiver is designed to operate from a 105 to 125-volt, a-c, 50/60 cycle source and requires 75 watts of power for operation. The S40BU receiver is designed to operate from a 110 to 250 volt a-c, 25 to 125 cycle source and requires 75 watts of power for operation. A switch is located on top of the transformer for adjusting the transformer to the proper voltage source. Connection to the power source is made by the two prong plug which is attached to the six foot line cord extending from the rear of the cabinet.

The complete receiver is 9 inches high by 18-1/2 inches wide by 11 inches deep and weighs 28 pounds.

The maximum output of the receiver at the speaker is one watt with less than ten percent distortion.

MECHANICAL DESCRIPTION: - The model S-40B & S-40BU radio receivers are housed in an attractive well ventilated aerodized sheet metal cabinet to minimize electrical interference and provide mechanical strength. The full length aerodized top cover, mounted on a piano type hinge, provides a means of gaining access to all of the tubes, dial lamps, and primary i-f transformer adjustments. Mixer, oscillator and secondary i-f adjustments may be made from the bottom of the cabinet through the holes provided for this purpose under the notice card. Three small holes on the bottom near the front of the cabinet provide access to the oscillator padlock adjustments. All controls for tuning and operating are located on the front of the receiver. Notice that some of the control markings are in red. This is to aid the novice in operating the receiver.

ELECTRICAL DESCRIPTION: - The block diagram, Figure 2, illustrates the function of the receiver circuits in a simple manner which is described as follows: radio signals are picked up at the antenna and fed to the antenna coil of the r-f stage where the desired station signal is selected by a resonant circuit and fed to the mixer-oscillator tube.

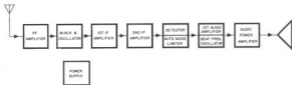


Figure 2. Radio Receiver Model S-40B, BU, block diagram showing receiver circuits.

At the same time the oscillator section of the mixer - oscillator tube generates a local r-f signal which is mixed with the selected incoming station signal. An intermediate frequency signal of 455 kc (kilocycles) is selected by the first i-f transformer and fed through two i-f amplifier stages to the detector automatic noise limiter stage where it is demodulated. The audio component of the i-f signal is amplified by one of the triode sections of the 1st audio-beat frequency oscillator tube and then capacity coupled to the audio power output tube where it is further amplified and fed to the speaker.

The a-v-c circuit is a conventional one which provides a uniform signal level when listening to music or voice (phone) broadcasts.

The beat frequency oscillator stage operates in the CW position of the AM/CW switch and provides an r-f signal at 455 kc (kilocycles) which is fed to the detector stage to beat against the i-f signal, thereby rendering code signals intelligible. The pitch of the code signal can be varied by means of the PITCH CONTROL which permits a variation from 0 to 1,000 cycles.

The automatic noise limiter circuit employs one diode of a duo-diode type tube (5H6), the other diode being used as the detector stage.

A power rectifier stage provides a well filtered source of high voltage to the plate and screen circuits.

INSTALLATION OF THE RECEIVER

1. As soon as the receiver has been unpacked, examine it for any apparent damage which might have occurred in shipment. If any damages are found, file a claim IMMEDIATELY with the transportation company. If purchased packed "over the counter" and any defects or damages are apparent after the receiver has been unpacked, return it IMMEDIATELY to the dealer. If purchased "unpackaged" over the counter, examine carefully and thoroughly for any possible defects, BEFORE ACCEPTANCE.

2. Fill out and immediately mail the record return card which is enclosed with these instructions.

3. This receiver is equipped with rubber mounting feet for mounting on a table or other piece of furniture. Do not mount this radio on a radiator or any area subject to heat or high humidity.

4. An external antenna should be connected to the receiver as follows:

On the rear apron of the receiver chassis is located the antenna connector strip, marked A1, A2 and G. Select one of the antenna systems described below and connect it to the strip as directed.

An external ground connection is not essential to this receiver, but in some locations will help to improve reception especially on the higher frequencies. If it is desired to use an external ground, always connect it to the terminal marked "G" on the antenna terminal strip.

A. Single Wire Antenna: When using a single wire antenna installation, connect a jumper between the antenna terminal A2 and G. Then connect a single wire of about 50 to 75 feet (including lead-in) to terminal A1. Use #14 gauge copper wire or heavier for best results. Erect the antenna as high and free from surrounding objects as possible. This type of antenna works well where the signal to noise ratio is relatively high and a more elaborate installation is not practical. Refer to Fig. 3.

B. Doublet Antenna: This type of antenna is recommended where the receiving conditions are poor or where maximum sensitivity is required over a relatively narrow range of frequencies. The lead-in wires should be connected to terminals A1 and A2. If a concentric line with grounded outer conductor is used, connect the inner conductor to terminal A1, the outer conductor to terminal A2 and connect a jumper between terminal A2 and G.

(1) To determine the proper length of the doublet antenna in feet:

(a) Determine the frequency range to which you wish to listen.

(b) Divide 468 by the frequency (in megacycles) of the high frequency end of the range you selected. This will give you the length in feet. Refer to Fig. 4.

(2) To prepare the antenna for installation:

(a) Measure and cut the wire to the length determined in step (b) above. Cut this length in half.

(b) Wrap and solder the two wires of the lead-in to each of the quarter-wave sections at the insulator as shown in Fig. 4.

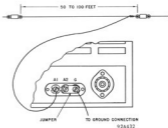


Figure 3. Single Wire Antenna Installation.

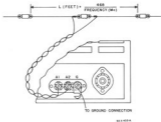


Figure 4. Doublet Antenna Installation.

Keep in mind that this type of antenna is directional broadside to its length and should be so orientated if maximum pick-up from a given direction is desired.

For reference to other types of antenna refer to the latest edition of the Radio Amateur's A.R.R.L. Handbook, section on antennas. This book can be procured from your Hallicrafter dealer.

PRE-OPERATIONAL CHECK - The following checkup on a newly installed receiver is recommended before turning on the power for the first time.

- (1) See that the tubes are securely seated in their sockets. Refer to Figure 7 for the proper location of each tube.
- (2) Check the pilot lamps located behind the dial escutcheons and see that they are securely in place.
- (3) Check all external connections. See that they are secure and make positive contact. Remember that an improvised installation gives improvised results.

OPERATION OF THE RECEIVER

EXPLANATION OF THE CONTROLS. - Scanning across the front of the receiver from left to right, the control markings and an explanation of each is as follows:

NOTE: Some of the control markings are in RED. This is an added feature incorporated for the convenience of the listener who is not familiar with radio terminology as an aid in setting the controls most used for the reception of standard broadcast stations.

Reference to Figure 6 will help the listener in becoming familiar with the use of the controls.

1. **SENSITIVITY control.** - This control regulates the sensitivity of the receiver. Turning the control clockwise increases the sensitivity of the receiver.
2. **BAND SELECTOR switch.** - This switch selects the desired band or frequency range for the listener. The frequencies covered by each band switch position are read directly from the main tuning dial. Position #1 (in red) is the standard broadcast band. Each range has sufficient overlap to provide continuous coverage over the overall tuning range of the receiver.
3. **VOLUME control.** - This control sets the audio level at the speaker and is to be set for the level of volume most pleasing to the listener.
4. **A. V. C. switch.** - This switch, when set at "ON", provides a constant audio output level over reasonable variations in signal strength at the antenna, i.e. it automatically controls the sensitivity of the receiver when this circuit is in operation.
5. **Main TUNING control.** - This control tunes the receiver to the desired frequency of reception which is read on the main tuning dial located to the left of the control. The outer scale on the dial may be used for logging purposes which is described later on in these instructions.

6. **AM/CW switch.** - This switch turns on a local oscillator used to produce the beat frequency necessary for making code signals intelligible. For ordinary reception it is set in the AM position.

7. **BAND SPREAD tuning.** - This control is used in conjunction with the main TUNING control for fine tuning of short wave stations, the use of which is explained later in these instructions.

8. **NOISE LIMITER switch.** - This switch cuts in a circuit which clips the noise voltage peaks generated by electrical disturbances, thereby providing intelligible reception in cases where reception would normally be impossible. This feature will not totally remove the noise but will do a good job of limiting it to a reasonable level.

9. **TONE control.** - This control adjusts the tone qualities of the audible signal for either speaker or headset and also includes a switch which turns the A-C power ON or OFF. The types of response available are - LOW, MED, and HIGH. In the A-C OFF position the power to the receiver is disconnected.

(a) **LOW** - The bass and high frequencies are attenuated to provide a response for voice frequencies only.

(b) **MED.** - The bass and high frequencies are attenuated somewhat less than for the LOW position providing a response for more than the ordinary voice frequencies. This position is preferred for voice communications when the signal to noise ratio will permit.

(c) **HIGH** - The bass and medium frequencies are attenuated in favor of the high audio frequencies providing good response for high audio frequency response.

10. **PITCH control.** - This control is used to vary the pitch of the code signal when listening to amateur or commercial code stations.

11. **STANDBY-RECEIVE switch.** - This switch disconnects the d-c voltage within the receiver while leaving the tube heaters at operating temperature, thus leaving the receiver in condition for instant use. This switch is used by the radio amateur "ham" to put the receiver in a standby condition when transmitting. For the general listener it provides a means of putting the receiver in an inoperative condition ready for instant use.

A special plug is provided on the rear of the chassis for making connections to a remote standby switch. Connection is made with a standard A.C. plug. This feature is especially useful when the receiver is used in conjunction with a transmitter, as it provides a convenient method of incorporating the receiver standby switch with the transmitter switching system.

BAND SPREAD TUNING

FOR THE "HAM". - To use the band spread dial, set the dial pointer at "Q", set main tuning dial pointer at the high frequency end of the range to be covered and tune in the stations with the BAND SPREAD tuning control. Example: Assume you wish to listen in on the 10 meter band. Set the BAND SELECTOR at position 4 (15.7 to 43 mc), set main TUNING dial pointer at 30 mc (megacycles), the high end of the 10 meter band, and then set the band spread dial pointer at "Q". You can now listen in on the 10 meter band by tuning with the BAND SPREAD tuning control. The preceding example holds true for any of the frequency ranges, although

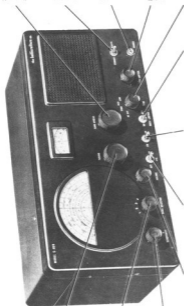
Set at "0" for normal tuning. Use for fine tuning or "band spread" tuning.

Normally set at RECEIVE. Set at STANDBY for short standby periods.

Use standard type headset for more reception.

Use for code reception and tune for desired pitch of signal.

Set at position most pleasing to listener.



For normal use, tune to desired frequency of reception. When using bandspread dial - for amateur bands, set at high frequency end of band; for short wave listening set slightly counter-clockwise past desired station frequency.

Set at desired frequency range.

Set at maximum clockwise when using an external tuning meter and for weak stations. Adjust as desired for local and general listening conditions.

Set to desired level of volume. Set at OFF when listening to code stations, otherwise set at 0K.

Set at 0K if static or noise is excessive otherwise at OFF.

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Figure 6. Radio Receiver Model S-40B, BU, view showing use of controls.

the higher in frequency is the range of tuning, the broader will be the range of tuning on the band spread tuning dial scale. Band spread tuning is not necessary on the broadcast band.

FOR THE SHORT WAVE LISTENER. - To tune in short wave broadcast radio stations with the band spread tuning control, set the band spread dial pointer at "0", set the main tuning dial pointer counterclockwise slightly past the frequency of the station you wish to tune in and then tune in the station with the BAND SPREAD control.

IMPORTANT. - The calibrations on the main tuning dial scale are only correct when the BAND SPREAD dial pointer is set at "0".

OWNER'S MAINTENANCE

PREVENTIVE MAINTENANCE. - Keep the various parts of the receiver clean, especially the tuning capacitors. Dust and dirt should be blown out with dry air or brushed out carefully without bending the capacitor plates in the slightest. Noisy reception may be also caused by dirty condenser wipers, faulty volume controls, switches and tubes, etc. in the receiver. Check the switch contacts and controls and make sure that all tubes are always in their sockets.

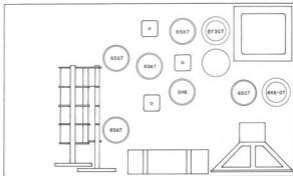


Figure 7. Radio Receiver Model S-40B, BU, view showing tube locations.

REPLACING TUBES AND DIAL LAMPS. - When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top of the receiver chassis, Fig. 7, to determine the location of each tube. The receiver employs two dial lamps with bayonet type sockets to illuminate the two dial scales. Replace these with similar types, 6/8 volt, 250 ma., "blue bead" G.E. #44 or equivalent. The color code referred to is the color of the glass bead above the glass stem inside the envelope of the lamp.

PERIODIC ADJUSTMENTS. - This receiver has been carefully aligned at the factory and should not require realignment until it needs new tubes in the r-f and mixer-oscillator stages or shows signs of loss in sensitivity, off frequency calibration or requires service work on these stages. Alignment should not be attempted by inexperienced persons as maximum performance is obtained only by intelligent alignment.

A complete service bulletin is available for use in servicing this receiver and can be obtained from any one of our distributors or dealers or by contacting the factory direct.

"The Hallicrafters Co. reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate these revisions in earlier models."

