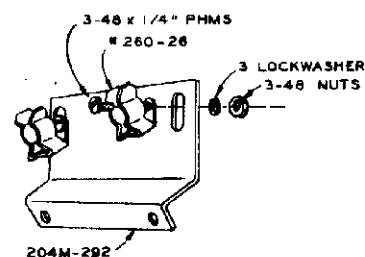
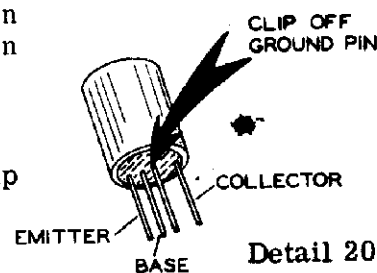


Figure 26

- () See Detail 19 and assemble the heat sink bracket (#204-14292). Using 3-48 x 1/4" PHMS, mount the two transistor clips to the bracket.
- () See Figure 26 and place a 2N407 transistor in sockets X8 and X9 (audio output). Install the heat sink assembly by sliding the transistor clips over these two transistors. Pinch the transistor clips slightly to insure a snug fit. It may be necessary to loosen the nuts holding the clips so that the clips will align with the transistors and the heat sink mounting holes will align with the holes in the circuit board. Fasten the heat sink assembly to the circuit board and main frame with 3-48 x 1/4" PHMS, #3 lockwashers and 3-48 nuts. Tighten the transistor clip mounting nuts if alignment was required.
- () Install a 2N407 transistor at location X7.
- () See Detail 20 and carefully, so as not to destroy the transistor, clip the ground pin off the three 2N373 transistors as shown.
- () Install a 2N373 transistor in sockets X4, X5 and X6.
- () Install a 2N409 transistor at location X10.



Detail 19



Detail 20

RECEIVER ALIGNMENT

It has been found that a large number of the kits returned for service are accurately constructed but badly misaligned. The necessity of accurately following the alignment instructions cannot be overemphasized.

ELIMINARY TESTS

- () Rotate the VOLUME control counterclockwise to the OFF position.
- () Place the AVC switch in the ON position.
- () Place the ANL switch in the OFF position.
- () Rotate the RF GAIN control fully clockwise.
- () Connect one end of a 1 1/2" length of bare wire to the screw 1 of the muting terminal strip EE. Connect the other end to screw 2 of terminal strip EE. This may be removed later as explained in the OPERATION section.
- () Plug the power plug BH into the power outlet socket on either the battery box or the 110 volt AC Power Supply, Model XP-2
- () Turn the VOLUME control clockwise until a click is heard. If the 110 volt supply is used, the dial lights should light to full brilliance when the receiver is turned ON. If the battery supply is used, it will be necessary to slide the spring loaded pilot light switch to the ON position and check to make sure that the pilot lights light to full brilliance. If the pilot lights fail to light or appear dim, turn the power OFF immediately and refer to the IN CASE OF DIFFICULTY section before proceeding with the alignment instructions.

NOTE: If the 110 volt power supply is used, disconnect the line cord from the wall receptacle before proceeding with any further checks on the receiver as 110 volts AC appear at the switch on the rear of the VOLUME control.

- () If everything appears normal and no heating, due to incorrect or shorted wiring, is evident, proceed with the alignment instructions.

ALIGNMENT OF THE IF AMPLIFIER

NOTE: The transfilters set the width of the top portion of the IF passband and the IF input and output transformers need only be peaked for maximum gain and skirt selectivity.

Equipment Required: An RF signal generator, such as the HEATHKIT RF Signal Generator, capable of tuning to 455 kc and having some means of modulating the RF signal.

A multimeter or vacuum tube voltmeter, such as the HEATHKIT Multi-meter or VTVM.

- () Turn the VOLUME control counterclockwise to the OFF position.
- () Connect the hot lead of the RF signal generator through a .05 μ fd capacitor to the IF input pin. An extra capacitor is supplied with the kit for this purpose. Connect the ground lead to the chassis.
- () Connect the multimeter or vacuum tube voltmeter across the speaker terminals. Switch the meter to the AC 1.5 volt range.

- () Turn the VOLUME control clockwise until it stops.
- () Turn the signal generator on and apply approximately 30% modulation. Set the signal generator at 455 KC.
- () Adjust the top slug in the IF input transformer, with the plastic alignment tool provided, until the output meter reads maximum. Now adjust the bottom slug in the IF input transformer, until the output meter reads maximum. Repeat these adjustments until all interaction is eliminated. These adjustments should be made with the minimum amount of input signal required to indicate on the output meter to prevent overloading.
- () Adjust the top slug in the IF output transformer until the peak reading is obtained on the output meter. Now adjust the bottom slug in the IF output transformer until the peak reading is obtained on the output meter. Repeat these adjustments until all interaction is eliminated.
- () Turn the receiver OFF.

NOTE: This completes the preliminary alignment of the IF amplifier. The final alignment of the IF input transformer will be completed after alignment of band A. Disconnect the signal generator. Leave the output meter connected for alignment of the rest of the receiver. (See NOTE under FRONT END ALIGNMENT.)

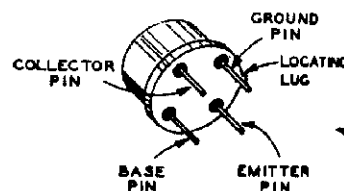
FRONT END ALIGNMENT

Equipment Required: An RF signal generator capable of delivering a modulated signal within a frequency range of 500 kc to 30 mc.

A vacuum tube voltmeter or a multimeter.

NOTE: The built in signal indicating meter can be used equally well to align the front end assembly. If the built in meter is used, align the following stages with enough signal to indicate about 5 on the meter.

- () Install a 2N1396 in the RF amplifier transistor socket X1 as shown on the label previously installed in the RF SECTION of the tuner assembly.
- () Install a 2N1225 in the mixer socket X2, and the oscillator socket X3. Orient as shown.
- () Connect the hot lead of the RF signal generator to the low impedance input terminal #3 on the rear of the chassis. Connect the ground lead to terminal #2 on the same strip.
- () If an output meter is used it should be set on the AC range and connected across the speaker terminals.
- () Loosen the setscrew in the dial string pulley on the main tuning capacitor. Carefully set the dial pointer to the high end of the band until it is aligned with the vertical line, this is at the extreme right end of the calibrated bands A, B, C, D and E. Rotate the shaft on the main tuning capacitor until it is fully open. Now tighten the setscrew. Check to make certain that this alignment is correct or the receiver's calibration will be incorrect.
- () Loosen the setscrew in the bandspread dial string pulley. Rotate the bandspread knob until the dial pointer is aligned with the vertical line on the left end of the calibrated bandspread portion of the dial. Now rotate the bandspread capacitor shaft until it is at full mesh. Now tighten the setscrew.



- () Loosen the nut on the rear bushing of the bandspread tuning shaft, until the stop will rotate freely. Rotate the bandspread knob clockwise until the dial pointer aligns with the "SET" mark. Now adjust the 335° rotational stop so it rests against the pin, in the shaft, thereby providing a positive stop at the high end of the bandspread scale. Now tighten the nut.
- () Check that the bandspread capacitor is fully open and the dial pointer is aligned with the "SET" position on the bandspread portion of the dial. This setting will remain in this position for the remainder of the alignment instructions.
- () Set the antenna tuning capacitor to one-half mesh.
- () Rotate the RF GAIN control fully clockwise.
- () Set the band switch to band A (550 kc to 1600 kc).
- () Make certain that the BFO knob is in its OFF position. The knob should be all the way in, on this push-pull switch.
- () Place the ANL switch in OFF position.
- () Place the AVC switch in the ON position.
- () Now turn the receiver ON and the VOLUME control clockwise about one-half turn.

BAND A ALIGNMENT

- () Tune the signal generator to 1500 kc. Apply 30% modulation to the RF signal.
- () Rotate the MAIN TUNING knob until the dial pointer indicates 1500 kc.

NOTE: In all alignment steps, as the adjustments peak, reduce the signal generator's output to the lowest possible level so as not to overload the receiver. If aligning with the built in signal indicating meter, the input signal should be decreased, as the slugs and trimmers peak, to mid-scale reading, about "5" on the meter.

ING

- () Refer to Figure 26 on Page 55 for the location of the alignment adjustments. Notice that the chassis top plate has been screened in vertical rows showing the band letter and in horizontal rows showing the RF mixer and oscillator sections and the associated coil slug and trimmer adjustments.
- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 1500 kc. If the signal heard was lower in frequency than 1500 kc, rotate the band A oscillator trimmer screw counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 1500 kc, rotate the band A oscillator trimmer screw clockwise until the signal is heard and peaked on the meter.
- () With the receiver and signal generator still set at 1500 kc, adjust the band A mixer trimmer until the peak meter reading is indicated.
- () Once again, with the receiver and signal generator set at 1500 kc, adjust the band A RF amplifier trimmer until the peak meter reading is indicated.
- () Tune the receiver to 600 kc.

- () Set the signal generator to 600 kc.

NOTE: The RF amplifier, mixer and oscillator coils are supplied preset to the normal required inductances, so only a very slight amount of adjustment should be required to correctly align the bottom end of each band. If a large number of turns is required to bring the coil into resonance, recheck the circuit wiring.

- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 600 kc. If the signal heard was lower in frequency than 600 kc, turn the band A oscillator coil slug counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 600 kc turn the band A oscillator coil slug clockwise until the signal is heard and peaked on the meter.
- () With the receiver and signal generator still set at 600 kc, adjust the band B mixer coil slug until the peak meter reading is indicated.
- () Once again, with the receiver and signal generator set at 600 kc, adjust the band B RF amplifier coil slug until the peak meter reading is indicated.
- () Due to the interaction between the coil and the trimmers, repeat the preceding 8 steps several times in sequence until the signal is correctly aligned to the calibration points. Be sure to accurately reset the signal generator each time to the proper frequencies during this sequence of operations.
- () Temporarily place a small piece of tape on the 6 alignment screws for band A to eliminate the possibility of turning one of these adjustments during the completion of the alignment.
- () Set the receiver and signal generator to 600 kc. Now adjust both the upper and lower slugs in the IF input transformer for peak output. These adjustments should be repeated several times until the interaction between the top and the bottom slug is eliminated. The IF input transformer was roughly aligned during the IF amplifier alignment.

This completes the band A and IF amplifier alignment.

BAND B ALIGNMENT

- () Tune the signal generator to 4.0 mc. Apply 30% modulation to the RF signal.
- () Set the band switch to band B.
- () Rotate the main tuning knob until the dial pointer indicates 4.0 mc.
- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 4.0 mc. If the signal generator was lower in frequency than 4.0 mc rotate the band B oscillator trimmer screw counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 4.0 mc, rotate the band B oscillator trimmer screw clockwise until the signal is heard and peaked on the meter.
- () Leave the receiver set at 4.0 mc. Tune the signal generator to 4.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 3.09 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the trimmer capacity by turning the band B oscillator trimmer counterclockwise until the second signal is heard and peaked on the meter.

- () With the receiver and signal generator set at 4.0 mc, adjust the band B mixer trimmer until the peak meter reading is indicated.
- () Once again with the receiver and signal generator set at 4.0 mc, adjust the band B RF amplifier trimmer until the peak meter reading is indicated.
- () Tune the receiver to 1700 kc.
- () Set the signal generator to 1700 kc.
- () Tune the signal generator back and forth until the modulated alignment signal is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 1700 kc. If the signal heard was lower in frequency than 1700 kc, turn the band B oscillator slug counterclockwise until the signal peaks on the meter. If the signal heard was higher in frequency than 1700 kc, turn the band B oscillator slug clockwise until the signal peaks on the meter.
- () With the receiver and signal generator still set at 1700 kc, adjust the band B mixer slug until the peak meter reading is indicated.
- () Once again with the receiver and signal generator set at 1700 kc, adjust the band B RF amplifier slug until the peak meter reading is indicated.
- () The coils and trimmers are interacting and the preceding steps should be repeated until the peak output falls on the two alignment points.
- () Temporarily place a piece of tape on the 6 alignment screws on band B.

This completes the band B alignment.

BAND C ALIGNMENT

- () Tune the signal generator to 8.5 mc.
- () Set the bandswitch to band C.
- () Rotate the MAIN TUNING knob until the dial pointer indicates 8.5 mc.
- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 8.5 mc. If the signal generator was lower in frequency than 8.5 mc, rotate the band C oscillator trimmer screw counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 8.5 mc, rotate the band C oscillator trimmer screw clockwise until the signal is heard and peaked on the meter.
- () Leave the receiver set at 8.5 mc. Tune the signal generator to 9.41 mc. A second signal should be audible. This is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 7.59 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the trimmer capacity by turning the band C oscillator trimmer counterclockwise until the second signal is heard and peaked on the meter.
- () With the receiver and signal generator set at 8.5 mc, adjust the band C mixer trimmer until the peak meter reading is indicated.

- () With the receiver and signal generator still set at 8.5 mc, adjust the band C RF amplifier trimmer until the peak meter reading is indicated.
- () Tune the receiver to 5.0 mc.
- () Set the signal generator to 5.0 mc.
- () Tune the signal generator back and forth until the modulated alignment signal is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 5.0 mc. If the signal heard was lower in frequency than 5.0 mc, turn the band C oscillator slug counterclockwise until the signal peaks on the meter. If the signal heard was higher in frequency than 5.0 mc, turn the band C oscillator slug clockwise until the signal peaks on the meter.
- () Leave the receiver set at 5.0 mc. Tune the signal generator to 5.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 4.09 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the oscillator inductance by turning the band C oscillator slug counterclockwise until the alignment signal is heard.
- () With the receiver and signal generator set at 5.0 mc, adjust the band C mixer slug until the peak meter reading is indicated.
- () With the receiver and the signal generator still set at 5.0 mc, adjust the band C RF amplifier slug until the peak meter reading is indicated.
- () The coils and trimmers are interacting and the preceding steps should be repeated until the peak output falls on the two alignment points.
- () Temporarily place a piece of tape on the 6 alignment screws on band C.

This completes band C alignment.

BAND D ALIGNMENT

- () Tune the signal generator to 19.0 mc.
- () Set the bandswitch to band D.
- () Rotate the MAIN TUNING knob until the dial pointer indicates 19.0 mc.
- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 19.0 mc. If the signal generator was lower in frequency than 19.0 mc, rotate the band D oscillator trimmer screw counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 19.0 mc, rotate the band D oscillator trimmer screw clockwise until the signal is heard and peaked on the meter.
- () Leave the receiver set at 19.0 mc. Tune the signal generator to 19.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 18.09 mc if the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the trimmer capacity by turning the band D oscillator trimmer counterclockwise until the second signal is heard and peaked on the meter.

- () With the receiver and signal generator set at 19.0 mc, adjust the band D mixer trimmer until the peak meter reading is indicated.
- () With the receiver and signal generator still set at 19.0 mc, adjust the band D RF amplifier trimmer until the peak meter reading is indicated.
- () Tune the receiver to 9.0 mc.
- () Set the signal generator to 9.0 mc.
- () Tune the signal generator back and forth until the modulated alignment signal is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 9.0 mc. If the signal heard was lower in frequency than 19.0 mc, turn the band D oscillator slug counterclockwise until the signal peaks on the meter. If the signal heard was higher in frequency than 9.0 mc, turn the band D oscillator slug clockwise until the signal peaks on the meter.
- () Leave the receiver set at 9.0 mc. Tune the signal generator to 9.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 8.09 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the oscillator inductance by turning the band D oscillator slug counterclockwise until the alignment signal is heard.
- () With the receiver and signal generator set at 9.0 mc, adjust the band D mixer slug until the peak meter reading is indicated.
- () With the receiver and the signal generator still set at 9.0 mc, adjust the band D RF amplifier slug until the peak meter reading is indicated.
- () The coils and trimmers are interacting and the preceding steps should be repeated until the peak output falls on the two alignment points.
- () Temporarily place a piece of tape on the 6 alignment screws on band D.

This completes band D alignment.

BAND E ALIGNMENT

- () Tune the signal generator to 30.0 mc.
- () Set the band switch to band E.
- () Rotate the main tuning knob until the dial pointer indicates 30.0 mc.
- () Slowly tune the signal generator back and forth until the audio note is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 30.0 mc. If the signal generator was lower in frequency than 30.0 mc, rotate the band E oscillator trimmer screw counterclockwise until the signal is heard and peaked on the meter. If the signal heard was higher in frequency than 30.0 mc, rotate the band E oscillator trimmer screw clockwise until the signal is heard and peaked on the meter.
- () Leave the receiver set at 30.0 mc. Tune the signal generator to 30.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the receiver is correctly aligned. Tune the signal generator to 29.09 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the trimmer capacity by turning the band E oscillator trimmer counterclockwise until the second signal is heard and peaked on the meter.

- () With the receiver and signal generator set at 30.0 mc, adjust the band E mixer trimmer until the peak meter reading is indicated.
- () With the receiver and signal generator still set at 30.0 mc, adjust the band E RF amplifier trimmer until the peak meter reading is indicated.
- () Tune the receiver to 20.0 mc.
- () Set the signal generator to 20.0 mc.
- () Tune the signal generator back and forth until the modulated alignment signal is heard. Check the frequency of this signal as indicated on the signal generator. Return the signal generator to 20.0 mc. If the signal heard was lower in frequency than 20.0 mc, turn the band E oscillator slug counterclockwise until the signal peaks on the meter. If the signal heard was higher in frequency than 20.0 mc, turn the band E oscillator slug clockwise until the signal peaks on the meter.
- () Leave the receiver set at 20.0 mc. Tune the signal generator to 20.91 mc. A second signal should be audible; this is the image frequency. This signal should be down in magnitude when the tuner assembly is correctly aligned. Tune the signal generator to 19.09 mc. If the alignment signal is heard at this frequency, the oscillator is incorrectly set 455 kc below the incoming signal. If this should occur, decrease the oscillator inductance by turning the band E oscillator slug counterclockwise until the alignment signal is heard.
- () With the receiver and signal generator set at 20.0 mc, adjust the band E mixer slug until the peak meter reading is indicated.
- () With the receiver and the signal generator still set at 20.0 mc, adjust the band E RF amplifier slug until the peak meter reading is indicated.
- () The coils and trimmers are interacting and the preceding steps should be repeated until the peak output falls on the two alignment points.
- () Remove the tape that was temporarily placed on the band A, B, C and D adjustment screws.

This completes alignment of the tuner assembly.

BFO ALIGNMENT

- () Set the BFO control to its center position.
- () Pull the knob out (this turns the BFO on).
- () Turn the adjustment screw in the BFO coil until the peak meter reading is obtained.

This completes the alignment of the receiver. Disconnect the signal generator and audio output meter. See Figure 29 on Page 60 and place the receiver in the cabinet. Install the antenna. Place four #6 sheet metal screws in the rear of the cabinet. Tighten securely.

OPERATION

- VOLUME.....** Advancing the control marked **VOLUME** from counterclockwise position turns on the power and controls the audio output of the receiver.
- RF GAIN.....** Controls the sensitivity of the RF amplifier. In general this control should be on (clockwise). However, by backing off the control, blocking of the receiver by extremely strong signals can be prevented.
- BAND SWITCH..** Changes bands as indicated on the front panel.
- ANT. TUNING..** This control peaks the RF amplifier and should be readjusted for each band.
- ANL.....** The ANL switch provides audio clipping of high noise pulses to provide reduced noise in the audio output.
- AVC.....** The AVC switch serves a dual purpose of shutting off the S-meter and removing AVC from the RF amplifier and 1st IF stage. With AVC OFF, the RF gain control provides excellent control over receiver sensitivity.
- BFO.....** The BFO control turns on and adjusts the frequency of an oscillator whose center frequency is 455 kc. This signal is injected into the emitter of the 2nd IF amplifier. This produces an audible beat note in the speaker, allowing reception of CW and teletype signals.
- PHONE JACK...** This jack provides a convenient method of connecting a set of earphones. The speaker is automatically cut out when an earphone jack is inserted in the receptacle.
- ANT. SWITCH..** Located on the rear of the receiver is a switch for switching either high or low impedance antenna inputs. When using the whip antenna, or a long wire antenna, this switch should be in the high impedance position. When using coaxial fed antennas, this switch should be in the low impedance position.
- MAIN TUNING..** The MAIN TUNING knob is used to tune the five bands on the top half of the dial. The main tuning is calibrated accurately only when the bandspread tuning knob is full clockwise.
- BANDSPREAD..** BANDSPREAD is used to tune the calibrated ham bands or to be used with the logging scale on the bottom half of the dial. With the bandspread tuning knob set full clockwise, set the main tuning pointer over the circle on the main dial containing the wavelength number (80 M, 40 M, 10 M, etc.), corresponding to the bandspread dial desired. Now, tuning the receiver with the bandspread tuning knob, gives an expanded frequency scale for the amateur frequency band being used.

Using the logging scale, it is possible to return to any particular frequency within the tuning range of the receiver by noting the main tuning point and the logging scale reading.

TUNING AM SIGNALS

The receiver controls should be set as follows:

VOLUME ON one-half turn (clockwise).
BFO OFF (pushed in).
BAND SWITCH.. Desired band.
RF GAIN..... Full ON (clockwise).
ANT. TUNING . Peaked after tuning in signal.
ANL..... OFF (unless excess noise is present).
AVC..... ON (unless copying a weak signal).

Tune signal to peak reading on S-meter, adjust VOLUME control for desired output level. Peak the antenna tuning. If signal is extremely strong, turn the RF GAIN control counterclockwise to reduce possible distortion.

TUNING SSB OR CW SIGNALS

The receiver controls should be set as follows:

VOLUME..... ON one-half turn (clockwise).
BFO ON. Set with the red pointer to the left index mark (pulled out) for lower sideband and to the right mark for upper sideband.
BAND SWITCH.. Desired band.
RF GAIN Reduce (counterclockwise) to eliminate RF amplifier gain after tuning in CW or SSB signal.
ANT. TUNING.. Peaked after tuning in signal.
ANL OFF (unless excessive noise is present).
AVC OFF.

Tune signal to peak reading on the S-meter, turn the VOLUME control full ON and control the audio output with the RF GAIN control. A slight amount of readjustment of the BFO will probably be required to accurately tune an SSB station to the desired pitch.

FIXED STATION RECEIVER

When using this receiver with a transmitter, the muting terminals on the rear of the chassis should be used. These terminals are in the -12 volt supply lead and protect the receiver from overload and possible damage when being used in the proximity of a transmitter.

Using an external switch or a relay, the terminals 1 and 2 of the muting terminal should be open (disconnected) during the transmit period and closed (connected) during the receive period. The jumper wire used in normal operation must be removed for this type of operation.

PARTS LIST

PART No.	PARTS Per Kit	DESCRIPTION	PART No.	PARTS Per Kit	DESCRIPTION	PART No.
Resistors			Capacitors (cont'd.)			Sockets
1-3	7	100 Ω 1/2 watt (brown-black-brown)	20-107	2	680 μmf silver mica	431-2
1-4	2	330 Ω 1/2 watt (orange-orange-brown)	20-109	2	62 μmf silver mica	431-6
1-6	4	470 Ω 1/2 watt (yellow-violet-brown)	20-110	1	75 μmf silver mica	431-8
1-9	5	1 K Ω 1/2 watt (brown-black-red)	20-111	3	230 μmf silver mica	431-15
1-10	1	1.2 K Ω 1/2 watt (brown-red-red)	20-112	1	310 μmf silver mica	431-38
1-14	3	3.3 K Ω 1/2 watt (orange-orange-red)	20-114	1	270 μmf silver mica	432-19
1-16	2	4.7 K Ω 1/2 watt (yellow-violet-red)	21-14	2	.001 μfd disc ceramic	434-16
1-20	2	10 K Ω 1/2 watt (brown-black-orange)	21-36	1	.002 μfd disc ceramic	434-83
1-22	2	22 K Ω 1/2 watt (red-red-orange)	21-48	10	.05 μfd disc ceramic	434-103
1-24	1	33 K Ω 1/2 watt (orange-orange-orange)	21-53	2	.001 μfd ceramic feed-through	434-104
1-25	1	47 K Ω 1/2 watt (yellow-violet-orange)	21-64	1	1 μmf tubular	436-4
1-29	2	220 K Ω 1/2 watt (red-red-yellow)	21-81	2	.1 μfd disc ceramic	462-59
1-44	3	2.2 K Ω 1/2 watt (red-red-red)	21-82	1	.02 μfd disc ceramic	462-60
1-48	1	390 Ω 1/2 watt (orange-white-brown)	25-95	1	10 μfd 25 V electrolytic	462-61
1-67	1	39 K Ω 1/2 watt (orange-white-orange)	25-96	1	25 μfd 6 V electrolytic	Hardwa
1-95	3	560 Ω 1/2 watt (green-blue-brown)	25-97	1	100 μfd , 100 μfd , 100 μfd	73-1
1-111	1	150 Ω 1/2 watt (brown-green-brown)	25-98	3	15 V electrolytic	73-4
1-113	3	5.6 K Ω 1/2 watt (green-blue-red)	25-99	1	50 μfd 15 V electrolytic	73-22
1-118	2	82 Ω 1/2 watt (gray-red-black)	26-24	2	150 μfd 15 V electrolytic	207-4
1-128	1	62 K Ω 1/2 watt (blue-red-yellow)	26-62	1	20 μmf variable	250-7
1-129	2	4.7 Ω 1/2 watt (yellow-violet-red)	26-64	1	Tuning capacitor (3 section)	250-8
Capacitors			31-23	3	21 μmf variable	250-9
20-99	2	22 μmf silver mica	31-24	3	Dual 6-80 μmf trimmer	250-28
20-100	1	30 μmf silver mica	Coil-Transformers			250-29
20-101	2	47 μmf silver mica	141-3	1	Coil set	250-33
20-102	1	100 μmf silver mica	Consisting of:			250-34
20-103	1	150 μmf silver mica	40-274	1	Band A oscillator coil (OA)	250-49
20-104	2	130 μmf silver mica	40-275	1	Band B oscillator coil (OB)	250-56
20-105	1	180 μmf silver mica	40-276	1	Band C oscillator coil (OC)	250-89
20-106	2	390 μmf silver mica	40-277	1	Band D oscillator coil (OD)	250-93
			40-278	1	Band E oscillator coil (OE)	250-10
			40-279	1	Band A mixer coil (MA)	250-10
			40-280	1	Band B mixer coil (MB)	250-17
			40-281	1	Band C mixer coil (MC)	251-1
			40-282	1	Band D mixer coil (MD)	252-1
			40-283	1	Band E mixer coil (ME)	252-2
			40-284	1	Band A antenna coil (RA)	252-3
			40-285	1	Band B antenna coil (RB)	252-7
			40-286	1	Band C antenna coil (RC)	253-11
			40-287	1	Band D antenna coil (RD)	253-27
			40-288	1	Band E antenna coil (RE)	253-27
						253-35
						253-36
						253-40
						254-1
						254-3
						254-4
						254-7

PART No.	PARTS Per Kit	DESCRIPTION
-------------	------------------	-------------

Sockets-Terminal Strips-Knobs-Connectors		
131-2	1	2-lug terminal strip
131-6	1	2-lug screw terminal strip
131-8	1	3-lug screw terminal strip
131-15	1	1-lug terminal strip
131-38	2	3-lug terminal strip
132-19	1	9-pin molded connector
134-16	1	9-pin miniature wafer socket
134-83	2	Pilot lamp socket
134-103	7	Transistor socket
134-104	3	Transistor socket
136-4	1	Phone jack
162-59	2	1 3/4" aluminum knob
162-60	1	1 1/4" aluminum knob
162-61	4	11/16" aluminum knob

Hardware

73-1	1	3/8" rubber grommet
73-4	5	5/16" rubber grommet
73-22	1	5/8" x 1 1/4" rubber grommet
207-4	2	1/4" cable clamp
250-7	7	6-32 x 3/16" RHMS
250-8	5	#6 sheet metal screw
250-9	2	6-32 x 1/2" RHMS
250-28	6	6-32 x 1/4" slotted head setscrew
250-29	1	6-32 x 3/4" RHMS
250-33	4	6-32 x 1/8" slotted head setscrew
250-34	1	4-40 x 1/2" RHMS
250-49	49	3-48 x 1/4" PHMS
250-56	36	6-32 x 1/4" BHMS
250-89	10	6-32 x 3/8" BHMS
250-93	7	8-32 x 1/4" Allen head setscrew
250-105	4	8-32 x 1/8" Allen head setscrew
250-107	2	10-24 x 1/4" PHMS
250-172	1	3-48 x 1/2" PHMS
251-1	1	Spade bolt
252-1	48	3-48 nut
252-2	2	4-40 nut
252-3	56	6-32 nut
252-7	15	3/8" control nut
253-11	2	"E" ring
253-27	1	Flat washer, 3/8" ID
253-27	9	Flat washer, 5/32" ID
253-35	8	Fiber washer
253-36	2	Dished spring washer
253-40	1	Spring steel washer
254-1	76	#6 lockwasher
254-3	2	#10 lockwasher
254-4	10	3/8" ID control lockwasher
254-7	45	#3 lockwasher

PART No.	PARTS Per Kit	DESCRIPTION
-------------	------------------	-------------

Hardware (cont'd.)

254-9	1	#4 lockwasher
255-39	2	Phenolic spacer
258-1	2	Dial cord spring
258-30	4	Battery contact spring
258-33	2	Battery holder spring
259-1	13	#6 solder lug
259-6	3	#6 small solder lug
259-10	3	Control solder lug
260-11	2	Spring catch Tinnerman
260-26	2	Transistor heat sink clip
261-13	4	Plastic feet
262-4	2	Spring catch pin
262-8	20	Terminal pin
266-38	1	335° rotational stop
453-32	4	1 1/4" spacer

Controls-Switches

10-10	1	20 KΩ control
19-50	1	2 KΩ control w/push-pull SPST switch
19-51	1	5 KΩ control w/DPST switch
60-2	1	DPDT slide switch (tapped holes)
60-5	1	DPST slide switch (spring return)
60-6	1	SPST slide switch (N. O. spring return)
60-13	1	DPDT slide switch (untapped holes)
63-228	1	Band switch

Diodes-Meter-Lamps-Transistors

56-4	3	Crystal diode
407-68	1	Meter 0-1 ma edge reading
412-1	2	#47 pilot lamp
417-14	3	2N373 transistor
417-25	1	2N1396 transistor
417-26	2	2N1225 transistor
417-27	1	2N409 transistor
417-28	3	2N407 transistor

Sheet Metal Parts

100-M250	1	Chassis base
100-M251F309-310	1	Front panel
100-M252	2	3" diameter dial pulley
100-M253F	1	Supply mounting plate
204-M292	1	Heat sink mounting bracket
204-M293	1	Bandsread mounting bracket
204-M294	1	Power outlet mounting bracket
205-M198F	1	Top plate
205-M199F	1	Dial back plate
206-M122	1	Shield plate (osc-mix)
206-M123	1	Shield plate (mix-RF)
214-M7	1	Battery housing

<u>PART</u> <u>No.</u>	<u>PARTS</u> <u>Per Kit</u>	<u>DESCRIPTION</u>
Gears-Shafts-Bushings-Couplings		
451-15	1	Gear tuning drive
451-16	1	Gear tuning drive antibacklash
452-4	1	Roll pin 1/16" x 3/4"
453-82	1	Shaft, phenolic 1/4" x 5 3/4"
453-89	2	Shaft, dial drive 1/4" x 3"
453-90	1	Shaft, 1/4" x 1 7/8"
453-91	1	Shaft, bandsread extension 1/4" x 3 1/2"
455-9	3	Bushing, 3/8" x 1/4"
455-10	1	Bushing, 17/64" x 7/8"
455-11	1	Shaft adapter
455-13	3	Bushing 1/4" x 1/4"
455-18	1	Bushing 9/16" x 1/4"
456-7	2	Shaft coupling
Miscellaneous		
75-34	2	Phenolic punched board (battery box)
75-38	1	Phenolic antenna mounting plate
85-26F308	1	Circuit board
89-16	1	Length line cord
90-120	1	Cabinet
142-12	1	Collapsible whip antenna
209-28	1	Grille (speaker)
211-14	1	Handle
340-2	1	Length #20 bare wire
343-4	1	Length shielded wire
344-1	10	Lengths hookup wire: 1-orange, 1-blue, 1-black, 1-white, 1-gray, 1-green, 1-violet, 1-brown, 1-yellow, 1-red.
346-1	1	Length small sleeving
346-5	1	Length 5/16" sleeving
349-3	1	Length dial cord
390-96	1	Adhesive label
401-33	1	Speaker 4" x 6" 35 Ω
404-40	2	TO-O1 transfilter
404-41	2	TF-O1 transfilter
440-4	1	9-pin molded connector cap
454-12	2	Flywheel
463-18	2	Dial pointer
464-14F311	1	Plastic dial plate
466-7	1	Plastic pulley
595-	1	Manual

