c. Selectivity Switch (fig. 33). Selectivity switch S1 is disassembled from the bottom of the chassis as follows:

(1) Remove the top and bottom dust covers.
(2) Disconnect all the leads to the switch gang terminal.
(3) Remove the four screws which hold the terminal board through which the shaft passes.
(4) Remove the nut on the shaft mounting bushing by using a ½-inch open-end wrench.
(5) Remove the screws in the bracket which hold the rear end of the switch to chassis. This is done by unscrewing the two No. 6-32 screws from the top of the chassis. Leave the bracket fastened to the switch.
(6) Slide the switch toward the rear of the chassis and lift it out. Use caution to prevent breakage of other components.
(7) Replace the switch by reversing the above steps. Be careful not to break the leads.

d. Second Mixer and 6.455-MC Oscillator Chassis (fig. 34). All the components of the 2d mixer and 6.455-mc oscillator are mounted on a subchassis located at the rear of the i-f section of the main chassis. A cut-out on the rear makes voltage and resistance measurements possible. Remove the subchassis in the following manner:

(1) Disconnect the 2d mixer plate coaxial cable, relay, and disconnect the lead at the 6-mc transformer (T26) (fig. 31), terminal 7. Also, unsolder the ground connection. Use a small soldering iron, if possible, to prevent melting of the cable dielectric.
(2) Unsolder the three leads to the feed-through capacitors C209, C210, and C211 (fig. 34).
(3) Remove the four No. 8-32 screws from the edge of the subchassis.
(4) Slide the subchassis upward and, at the same time, feed the coaxial cables through the holes.
(5) Replace the subchassis by reversing the above procedure.

e. R-F Turret (fig. 32). The removal of the turret from the chassis is easily accomplished by two men. Take out all the individual coil sections before removing the turret; this will prevent serious damage to these sections. The turret is fastened to a shaft at the front and rear. Remove the turret from the chassis as follows:

Note. By taking off the side panel adjacent to the turret, removal of the turret will be made easier; however, this is not necessary.

(1) Loosen the two setscrews on the dial mask drive gear which is fastened on the extension shaft near the front panel.
(2) Loosen all the setscrews on the nylon shaft coupling.
(3) Pull the knob and extension shaft out from the front panel.
(4) Loosen the end play adjustment nut on the shaft bushing (unscrew toward the front of the chassis).
(5) Rotate the turret by hand until it is possible to loosen the two holding steel screws at each end of the turret shaft. Remove these screws.
(6) While one man holds the turret to prevent the stationary contacts from being bent or broken, the second man should tap the shaft until it protrudes from the back of the chassis. The detent spring will have a tendency to push the turret away from the chassis. The turret should be held in the normal position until the shaft is completely removed from the back of the chassis.
(7) Lift the turret from the chassis, taking care not to bump it against any of the chassis components.

f. R-F Turret Reassembly. Carefully replace the turret as follows:

(1) Hold the turret in its normal position, and insert the shaft. Pressure must be exerted on the forward part to depress the detent spring so that the shaft will pass through the bushing.
(2) Insert and tighten the two steel screws at each end of the turret.
(3) The turret should have very little end-play when the adjustment nut is brought close to the detent plate.
(4) Slip the nylon coupling on the shaft and tighten the two rear setscrews.
(5) Hold the dial mask drive gear in place while the extension shaft is inserted through the front panel into the coupling.
(6) Tighten the setscrews on the dial mask drive gear.
(7) Contact centering is explained in paragraph 80, and adjustment of dial mask is explained in paragraph 81.

79. Refinishing

Instructions for refinishing badly marred panels are given in TM 9–2851. A quick-drying grey lacquer, matching the original finish, is recommended.

80. Mechanical Adjustments

a. Adjustment of Tuning Dial Clutch. The clutch is located inside the TUNING dial knob. Remove the snap-on cap, using a knife or a thin-blade screw driver. Tighten or loosen the self-locking nut to adjust the spring tension. Do not adjust for too much friction, since this clutch protects the dial-drive mechanism by slipping when the gears jam.

Caution: Undue pressure on the dial-drive shaft can distort the shaft or gears.

b. Setting Dial Scale With Tuning Gang. The dial scale must be set to read the correct frequency as the tuning gang tunes the receiver. Turn the TUNING knob counterclockwise until it hits the stop (reference lines on the dial should be under the pointer). In this position, a space of .062 inch should separate the bar on top of the stator plates and the fiber strip across the rotor plates. If the space is not correct, it should be adjusted as follows:

(1) Loosen the setscrews on the front section of the tuning gang shaft coupling.
(2) Place a .062-inch gage between the stator and rotor plate stops, and move the rotor to cause a tight fit for the gage.
(3) Tighten the coupling setscrews.

Caution: Do not use undue force on the dial mechanism or tuning gang shafts; this could cause distortion of the shafts or gears.

c. Centering of Turret Contacts. The turret contacts touch the stationary contacts when the turret is stopped in any one of the six positions. The purpose of the detent is to stop the turret contacts in the center area of the fixed contacts. The detent spring may be slid back or forward to achieve this position of the contacts. Loosen the two screws that hold the spring, and, with the detent roller in a notch, turn the turret until the contacts are in perfect alinement; then tighten the screws. If too much or too little turret shaft end-play is encountered, adjust the shaft bushing nut for more or less clearance between the nut and detent plate.

81. Adjustment of Dial Mask

The band number and mask opening should be centered horizontally when the turret is in a detent position. Ajdustment may be made in the following manner if the mask is not set correctly.

a. Loosen the two Allen-head setscrews on the dial mask drive gear (located on the bottom of the chassis on the front panel and of the turrent extension shaft).

b. Place the turret in a detent position.

c. Turn the dial mask drive gear until the dial mask is positioned correctly.

d. Retighten the drive gear setscrews.

e. A small circular plate located directly under the TUNING knob is the positioning guide for the dial mask idler gear. If the mask binds or does not operate smoothly, the idler gear may need adjustment. Slightly loosen the three screws on the circular plate, and move the plate until satisfactory operation is obtained. Retighten the screws to secure the plate in this position.

Section III. ALINEMENT AND ADJUSTMENT PROCEDURES

82. Test Equipment Required for Alinement

a. Signal Generator. The signal generator required for alinement must cover a frequency range of from 450 kc to 55 mc, unless more than one generator is used. It should be possible to modulate it 30 percent with an af of 400 cps with either an external or internal a-f oscillator. The output must be continuously variable from zero to .5 volt (500,000 uv) with a low impedance connection (50 ohms or less).

b. Output Meter. A visual indication of the receiver output signal is necessary for alinement. A power output meter provides this indication, and also supplies the proper 600-ohm load across the secondary of audio output transformer T35. Power Output Meter TS–585(*)/U is satisfactory for this purpose. Terminals 2 and 4 on E4 should be shorted together, and the meter should be connected to terminals 1 and 5. Set the meter to read approximately 50 mw at ¼ or ½ scale. An alternate method of indicating the output is by the use of an a-c reading output meter, such as Multimeter TS–352(*)/U. For this method, a 600-ohm load resistor must be connected in place of the

power output meter. The a-c output meter is connected across the resistor and the 10-volt scale is used. The signal generator should be turned up to indicate 5 or 6 volts input to the meter. This represents approximately 50 mw output.

c. Headset and Speaker. When alinement of the bfo is made, either a speaker or headset is used to listen to the beat frequencies to determine when a null is approached. The headset may be plugged into the PHONES jack (J–3) provided on the front panel. A speaker can be connected to the AUDIO OUTPUT terminals (E–4) on the rear of the receiver. Short terminals 2 and 4 together and connect the speaker to terminals 1 and 5.

d. Frequency Meter. Very accurate h-f oscillator settings may be made by the use of a frequency meter in conjunction with the signal generator. A frequency meter such as frequency meter set SCR–211 of Frequency Meter TS–174(*)/U, is satisfactory to use as a frequency standard with the signal generator.

e. Alinement Tool. A standard fiber or phenolic alinement tool with a screw-driver end may be used for most of the circuit adjustments. The top of some of the i-f transformer coils have a larger hollow-screw adjustment. These may be adjusted with a screw driver with a suitable size blade. Use a phenolic rod for the bottom slug adjustment when going through top adjusting screw.

83. Alinement Procedures

a. If the instructions contained in this paragraph are followed, complete alinement may be made from the top of the receiver. To accomplish this, the receiver must be removed from its mounting (rack, case, etc.). Remove the top dust cover by sliding it to the rear of the chassis and lifting it off. Refer to figures 38 and 39 for location of the necessary alinement adjustments. Be careful in making these adjustments; damage to the cores of the coils can result if adjustments are forced past their limits. To make some of the adjustments it will be necessary to use a long insulated type screw driver tool. It is recommended that the alinement be made in the order given; otherwise, false readings or unsatisfactory alinement may result. Allow about 15 or 20 minutes for the receiver and test equipment to warm up prior to alinement. In connecting the r-f signal generator to the antenna input terminal E1, the output impedance of the signal generator must be known. This is required because it is imperative that the dummy load, including the series resistance of the signal generator, be exactly 100 ohms (example: signal generator impedance 50 ohms, plus dummy antenna 50 ohms, equal 100 ohms). A very low output impedance of the signal generator, about .75 to 1 ohm, is best suited for alinement of this receiver. Always begin by feeding a signal into the receiver using a small signal to start with and then increasing it after an indication is seen on the output meter. This will prevent either overloading the receiver or damage to the output meter. As the adjustments are peaked, sufficient output may be obtained to move the meter needle off scale. Reduce the output from the signal generator or damage to the meter may result. Normally, a center-scale reading on the meter is preferred for a reference setting. Since the receiver is very sensitive, any electrical interference in the immediate vicinity may cause erratic signal indication when alinement is being made. If this is the case, alinement should be made in a well-shielded grounded room, such as a standard screen room used for radio testing purposes. The construction of the i-f transformers is such that both the top and bottom tuning slugs may be adjusted from the top of the shield can. The top slug adjustments require a wide-blade screw driver. The bottom requires a phenolic rod which is narrow enough to fit through the hole in the top adjustment. The bottom adjustment is the primary on all the transformers, while the secondary is the top adjustment.

b. Set the front panel controls to the following positions before attempting to aline the receiver:

(1) SELECTIVITY (S1)	NORMAL SHARP.
(2) RECEIVE-SEND (S6)	RECEIVE.
(3) CW-MODULATION (S5)	MODULATION.
(4) AGC-MANUAL (S4)	MANUAL.
(5) ANL-OFF (S3)	OFF.
(6) BAND SELECTOR	BAND I.
(7) VFO CRYSTAL (S2)	VFO.
(8) AUDIO GAIN (R94)	Approximately half clockwise rotation.
(9) CRYSTAL PHASING (C161)	0.
(10) BFO PITCH (C183)	0.

(11) TUNING (C1 and C2)..... Lowest frequency indicated on tuning dial.
(12) RF GAIN-AC (R83, S7)..... Full clockwise rotation.
(13) ANT ADJ..... As required.

Note. Any changes in the above settings will be given in the particular procedure requiring those changes.

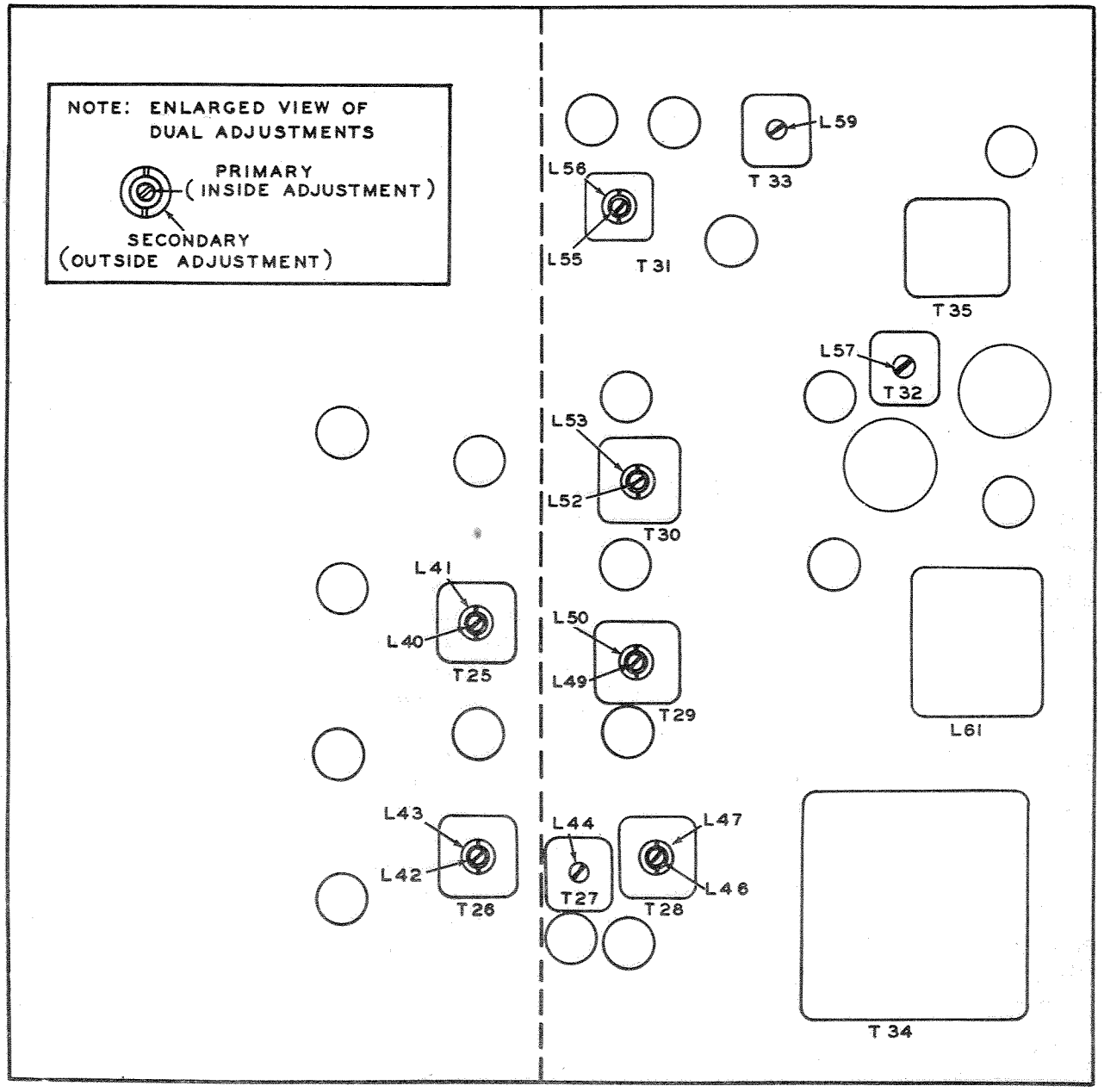

Figure 38. Radio Receiver R–274/FRR, i-f stage alinement diagram.

84. I-f Alinement Procedure

The alinement is made with the signal generator connected at the first mixer grid. The adjustments are made, starting from the second detector and working toward the 2d mixer.

Caution: The 455-kc i-f stage alinement is necessary before any other alinement is attempted. If this alinement is not performed correctly, all the alinement thereafter will be in error, and the receiver will have to be completely realined before calibration and operation will be correct

a. 455-KC I-F Alinement Chart.

Band selector is set to	Signal generator frequency	Dummy load	Connect signal generator to	Adjust for maximum (in given order)
BAND I	455 kc (400 csp, modulation 30%).	600-ohm load across terminals 1 and 5 of E4. Also connect 2 and 4 together.	Stator C2A mixer grid circuit V3 (top of chassis).	L56, L55, L53, L52, L50, L49, L47, and L46.

b. I-F Output Alinement. After the 455-kc i-f alinement is complete, the 455-kc i-f output should be alined. Connect a 72-ohm coaxial cable with a connector to jack J2. Place a 72-ohm terminating resistor across the open end of the cable. Connect a sensitive a-c type vtvm (vacuum-tube voltmeter) across the resistor. Apply a 455-kc signal as was used for the 455–kc i-f alinement; do not use modulation. Set the signal generator to give a reading on the meter of from .1 to .2 volt. Tune L57 for a maximum reading on the meter. Do not allow the output to go above .25 volt, since this may overload the i-f system, thereby making the adjustment of L57 sluggish and inaccurate. An alternate method of correctly alining the i-f output without the use of a sensitive a-c vtvm is accomplished as follows:

(1) Place the AGC-MANUAL switch to the AGC position.
(2) Apply a strong 455-kc signal (approximately 10,000 uv) to the first mixer grid.
(3) Adjust L57 for a maximum indication on the CARRIER LEVEL meter.

c. Bfo Alinement.

(1) Connect a speaker or headset to the receiver.
(2) Change CW-MODULATION switch, S5, to the CW position.
(3) Set BFO PITCH control, C183, to 0.
(4) Apply a 455-kc signal as was used for the 455-kc i-f alinement.
(5) If an audio note is heard, tune L59 until a zero beat is obtained.
(6) Check the bfo by turning BFO PITCH control, C183, in either direction. An audio note which changes frequency with rotation should be heard each side of the zero mark if the bfo is correctly alined.
(7) Turn the BFO INJ. control, R82, located on the rear of the chassis, to its normal setting.

d. Adjustment of I-F Bandwidth in Crystal Position. Ordinarily, it should not be necessary to adjust the bandwidth of the 455-kc i-f stages (fig. 41). However, if adjustment is necessary, care must be taken because it is a very tedious operation. The adjustment consists of setting three capacitors (C162, C163, and C164) which are used when the SELECTIVITY switch is in one of the CRYSTAL positions. The correct procedure is as follows:

(1) Set the ANL-OFF switch to ANL.
(2) Connect a d-c vtvm from either terminal on the ANL-OFF switch to ground (on top of chassis).
(3) Apply a 455-kc unmodulated signal. Adjust the amplitude to about +10 volts on the vtvm.
(4) Adjust signal generator frequency to give 5 volts on each side of maximum, and note difference frequency on signal generator. (The signal generator must have a vernier, or a frequency meter must be used to select these points.)
(5) Adjust the proper capacitor and note bandwidth. Repeat until the 6-db down bandwidth is as follows:

CRYSTAL SHARP (C162)—between 170 and 230 cps.
CRYSTAL MED (C163)—between 425 and 575 cps.
CRYSTAL BROAD (C164)—between 1,200 and 1,500 cps.

e. 6-MC I-F Alinement. Place the BAND SELECTOR switch in the BAND IV position. The 6,455-mc oscillator, V8, must be oscillating before the 6-mc i-f alinement can be made. To check this, place a d-c vtvm from ground (chassis) to the junction of R106 and C211 (feedthrough capacitor) (fig. 43). Approximately minus 1 volt should be read on the meter when the stage is oscillating. If no voltage is present, T27 should be tuned. Unscrew the core until the circuit falls out of oscillation. Now screw the core in until the circuit just starts oscillating again, then turn in another one-quarter turn from this position to insure stable oscillation.

f. 6-MC Alinement Chart. In making the 6-mc alinement, you should first determine whether the 455-kc i-f stages are functioning properly. If they do not appear to be operating properly, realine them according to the instructions in the preceding paragraph. Make sure that the BAND SELECTOR is set to BAND IV, which is the

lowest double-superheterodyne band. Tune C140 first, since this is a coaxial cable compensator. Then work from the output end of the 6-mc stages toward the 1st mixer.

BAND SELECTOR is set to	Signal generator frequency (mc)	Dummy load	Connect signal generator to—	Adjust for maximum (in given order)
BAND IV (TUNING switch set to low end of band).	6	600-ohm load across terminals 1 and 5 of E4 with 2 and 4 shorted.	Stator C2A mixer grid circuit V3.	C140, L43, L42, L41, and L40.

85. R-F Alinement

Connect one terminal A of antenna terminal strip E1 to ground. Connect the signal generator through a 100-ohm dummy antenna from ground to the other terminal A of E1. It may be necessary to repeat the alinement adjustments several times.

Note. The 100-ohm dummy antenna should include the generator impedance

86. R-F Turret Alinement Chart

Figure 39 shows the location and layout view of the turret r-f adjustments. In making the r-f alinement, the signal generator and the receiver TUNING dial are set to the desired frequency as indicated in the alinement chart. First, vary the oscillator l-f (low-frequency) adjustment which is a core in the coil. After the adjustment is peaked, continue down the turret (this is down each column on the chart) and adjust all the l-f adjustments in order from the mixer to the antenna. After the l-f end of each band is tuned, the dial and signal generator should be set to the high end of the band and the correct adjustments peaked at that end. It may be necessary to readjust the band at both ends several times before the alinement at either end will not affect the alinement at the opposite end of any band. The h-f ends of BANDS I, II, and III do not have trimmers. Therefore, in order to get a maximum indication, the ANT ADJ control on the front panel must be tuned. Do not disturb any other adjustments on the turret; these are factory-set trimmers and padders to compensate for production tolerances.

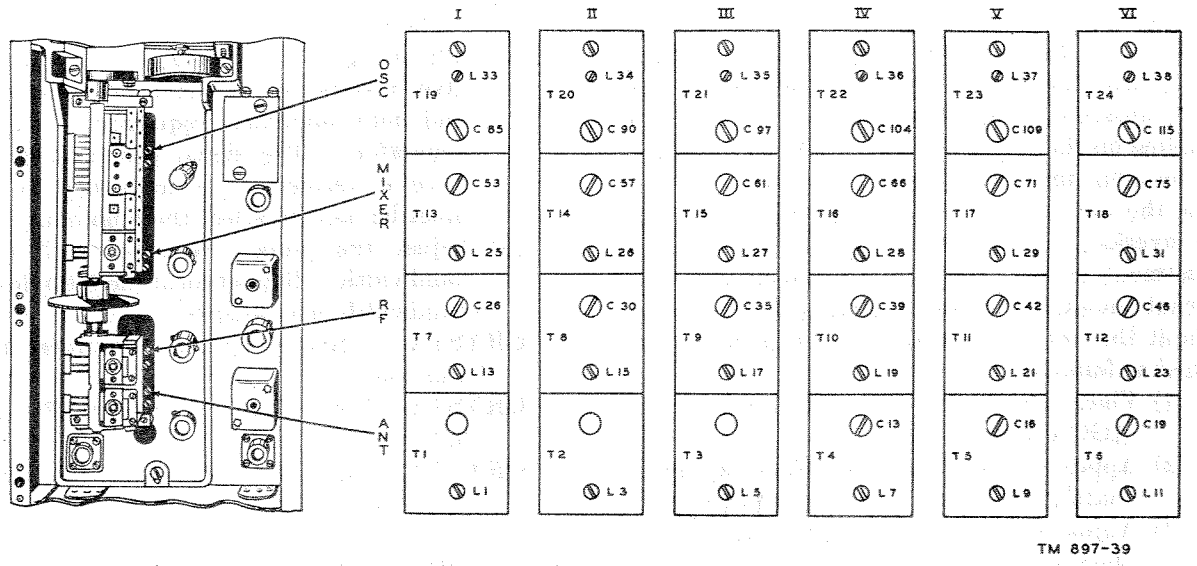

Figure 39. Radio Receiver R–274/FRR, r-f stage alinement diagram.

	End of band						
BAND No.		I	II	III	IV	V	VI
Tuning frequency	Low	570 kc	1.35 mc	3.20 mc	7.30 mc	14.5 mc	29.0 mc
	High	1.24 mc	2.9 mc	6.80 mc	13.3 mc	28.0 mc	54.0 mc
Signal generator frequency	Low	570 kc	1.35 mc	3.2 mc	7.3 mc	14.5 mc	29. mc
	High	1.24 mc	2.9 mc	6.8 mc	13.3 mc	28. mc	54. mc
Oscillator adjustments to be peaked.	Low	L33	L34	L35	L36	L37	L38
	High	C85	C91	C97	C104	C109	C115
1st mixer adjustments to be peaked.	Low	L25	L26	L27	L28	L29	L31
	High	C53	C57	C61	C66	C71	C75
R-f adjustments to be peaked	Low	L13	L15	L17	L19	L21	L23
	High	C26	C30	C35	C39	C42	C46
Antenna adjustments to be peaked	Low	L1	L3	L5	L7	L9	L11
	High*				C13	C16	C19

*On BANDS I, II, and III, no adjustments are to be made.

Note. Oscillator adjustments are peaked above the signal frequency. The second harmonic of the hfo (high-frequency oscillator) is used on BAND VI.

87. CARRIER LEVEL Meter Adjustment

CARRIER LEVEL meter M1 must be adjusted under certain conditions to allow a fairly accurate reading to be obtained as far as measurement of received signal strength is concerned. These are the conditions under which the meter adjustment should be checked:

a. With the set turned off, the meter needle should be at rest on the last dial scale marking on the left end of the scale. A mechanical adjusting screw is provided on the front of the meter to make this condition possible.

b. With the set on and the AGC-MANUAL switch in the AGC position, the RF GAIN-AC control at maximum, the SELECTIVITY switch at the NORMAL MED position, and the receiver tuned to a 50-uv signal (signal generator output injected through 100-ohm resistance at antenna terminals), the needle should indicate 0 db on the meter scale. The METER ZERO control (R87) on the rear of the chassis is used to adjust the meter reading for this condition. The above adjustment should be made on BAND III, 5.0 mc.

Section IV. FINAL TESTING

88. General

This section is intended as a guide to be used in determining the quality of a repaired Radio Receiver R–274/FRR. The minimum test requirements outlined in paragraphs 90 through 100 may be performed by maintenance personnel with adequate test equipment and the necessary skills. The receiver must meet the minimum standards required of Signal Corps Class A equipment. Repaired equipment meeting these requirements will furnish uniformly satisfactory operation.

89. Test Equipment Required for Final Testing

The instruments needed for testing the repaired equipment are listed below:

a. R-F Signal Generator. The r-f signal generator should be capable of covering the same frequencies tuned by the receiver, and also the i-f of 455 kc. A signal generator that covers the range of from 450 kc to 67 mc is recommended. It should have an r-f output of approximately .5 volt (500,000 uv) with a calibrated variable attenuator to control the output from zero to maximum amplitude. If provision is not incorporated for internal audio modulation ranging from 250 to 5,000 cps, an external audio oscillator covering this range must be used in conjunction with the signal generator. Thirty percent modulation with the audio frequencies must be obtainable.

b. Output Meter. Two types of output meters may be used for final testing: an audio power output meter and an a-c voltmeter.

(1) The audio power meter is best suited, since it has a built-in load to match the receiver 600-ohm output. The scales are marked in watts and db. The meter

may be connected directly to the receiver AUDIO OUTPUT terminals 1 and 5 of E4 (connect terminals 2 and 4 together).

(2) An a-c voltmeter, such as contained in Test Equipment IE–9C, Test Set I–56–(*), or Multimeter TS–352(*)/U is also satisfactory. The meter should have an input resistance greater than 500 ohms per volt. To use the a-c voltmeter type input meter, a parallel 600-ohm load-resistor is necessary. The parallel combination of resistor and meter is placed across terminals 1 and 5 of E4 (connect terminals 2 and 4 together).

90. Test Conditions

a. To provide a basis for testing the performance of this receiver, it is recommended that the tests be made under standard test condition. This will allow testing to be done at a more rapid rate with a minimum of changing of the front panel controls. In preparing the receiver for final testing, a minimum of 20 minutes for receiver warm-up is necessary for full stability. A one-hour warm-up is preferred.

b. These are the standard test conditions:

(1) A-f output is 10 mw (milliwatt).

(2) Signal-plus-noise to noise ratio is 10 to 1 (10 db).

(3) Output a-f load is 600-ohm resistive.

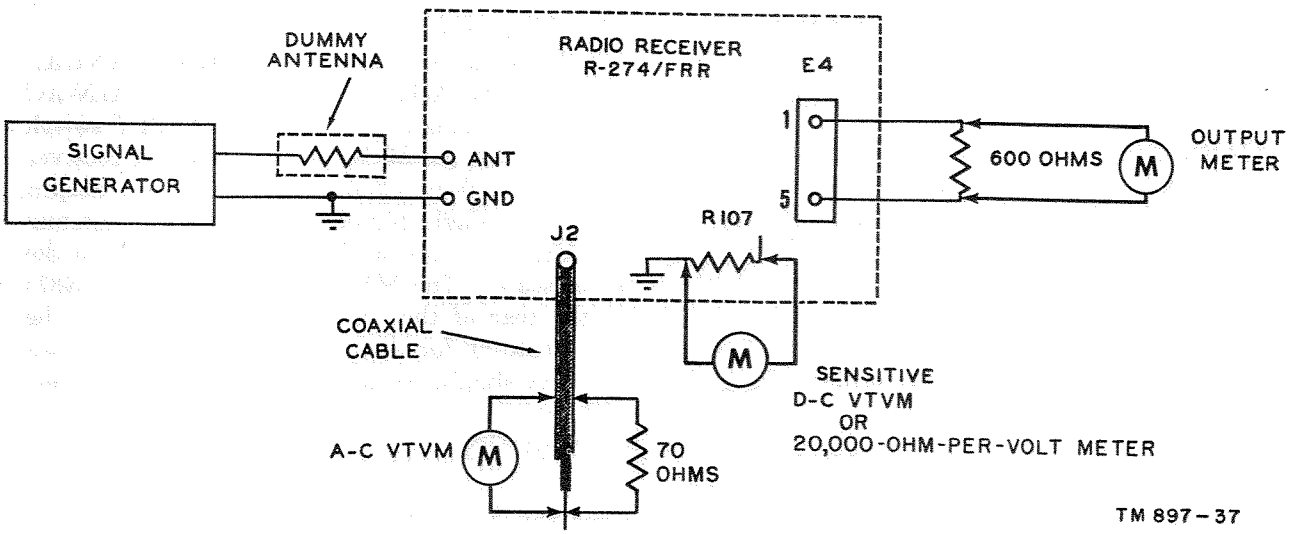

Figure 40. Over-all test set-up.

c. A-C Electronic Voltmeter. When measuring the voltage output of the i-f output stage, a sensitive a-c voltmeter is necessary. Since the i-f output is approximately 200 mv (millivolts), a meter sensitivity of at least 1,500 mv is required. An electronic type meter, such as the Ballantine model No. 300 or Electronic Multimeter TS–505(*)/U, is satisfactory for measuring output. In using the meter, a short length of Radio Frequency Cable RG–58/U with a coaxial connector to fit the i-f output connector, J2, is required. This coaxial cable must be terminated in a 70-ohm resistor at the meter end.

(4) Dummy antenna (including signal generator impedance) is 100-ohm resistive.

(5) I-f output dummy load is 70-ohm resistive.

(6) R-f test signals modulated 30 percent at 400 cps.

(7) Line voltage 117 volts a-c $\pm$ volt.

(8) The bandwidth must be set for 8 kc in a-m tests, and 3 kc in c-w tests.

(9) The above conditions may be modified by the specific test to be used.

c. Place the controls in the following positions unless otherwise specified.

Control	Setting
TUNING	As specified.
BAND SELECTOR	As specified.
RF GAIN-AC	Fully clockwise (maximum).
AUDIO GAIN	As required.
BFO PITCH	0.
CRYSTAL PHASING	0 (center position).
RECEIVE-SEND	RECEIVE.
AGC–MANUAL	MANUAL.
CW-MODULATION	MODULATION.
ANL–OFF	OFF.
VFO-CRYSTAL	VFO.
CRYSTAL VERNIER	0.
SELECTIVITY	NORMAL-MED.

91. Beat-frequency Oscillator

a. Inject an unmodulated r-f signal through the dummy antenna to the receiver antenna terminals.

b. Set the CW-MODULATION switch to CW and tune in the r-f signal.

c. When the receiver is tuned to the incoming signal, there should be a zero beat.

d. Vary the BFO PITCH in either direction to obtain beat frequencies up to at least 3,000 cps but less than 4,000 cps.

e. If the two foregoing steps do not give the proper indications, the bfo internal adjustment (L59) may need correction (par. 84*c*).

92. Dial Calibration Accuracy

a. This test checks the accuracy of the dial scale reading of the incoming tuned signal.

b. The controls are set to standard test positions with these exceptions:

Control	Position
RF GAIN-AC	As required.
AUDIO GAIN	As required.
AGC-MANUAL	AGC.
GW-MODULATION	CW.
BFO PITCH	0.

c. Apply at least a 100-uv signal through a dummy antenna to the antenna terminals. Use an oscilloscope with an a-f signal generator and an a-f counter at the audio output to determine the accuracy of the tuning dial calibration. When the signal generator and receiver are both set to exactly the same frequency, check the calibration at 100-kc intervals on BANDS I, II, and III and at 500-kc intervals on BANDS IV, V, and VI. Adjust the RF GAIN-AC control and the AUDIO GAIN control to supply the necessary audio output.

d. The accuracy in the entire range of 540 kc to 54 mc should be within .2 percent of the correct settings.

93. Sensitivity

a. The sensitivity of the receiver is measured at three frequencies (both ends and center) of each band. Sensitivity is defined as the amount of input signal (number of microvolts) necessary to produce a certain output with at least a 10 to 1 (10 db) signal-plus-noise to noise ratio.

b. In the sensitivity measurement of Radio Receiver R–274/FRR, the receiver must be able to supply 2 watts a-f output as determined by the tests in paragraph 98.

c. After the minimum requirements have been satisfied, reduce the setting of the AUDIO GAIN control, R94, to a position which will give an output power value of 50 mw as read on the output meter, with a 30 percent modulated 2-uv signal fed into the antenna input terminals.

d. Measure the sensitivity of a receiver (known to be in good operating condition) at three frequency points in each of the six frequency bands. The nominal sensitivity is the number of microvolts of input required to produce an audio output of 50 mw. Prepare a chart giving the readings on this typical receiver. The chart will be useful in determining the relative sensitivity of the receivers under test.

94. I-F Output Voltage

a. The i-f output voltage is measured at the coaxial connector, J2, on the rear of the chassis. A short piece of coaxial cable is soldered to a coaxial connector to deliver the output voltage to a meter. An a-c vtvm with a sensitivity of at least 1,500 mv should be used for the measurement.

b. Connect a 70-ohm terminating resistor across the open end of the output cable. Place the meter across this terminating resistor. Apply an unmodulated signal under standard test conditions to the antenna terminals and read the i-f output on the meter.

c. With a 2-uv signal input, the i-f output must be at least 200 mv (.2 volt).

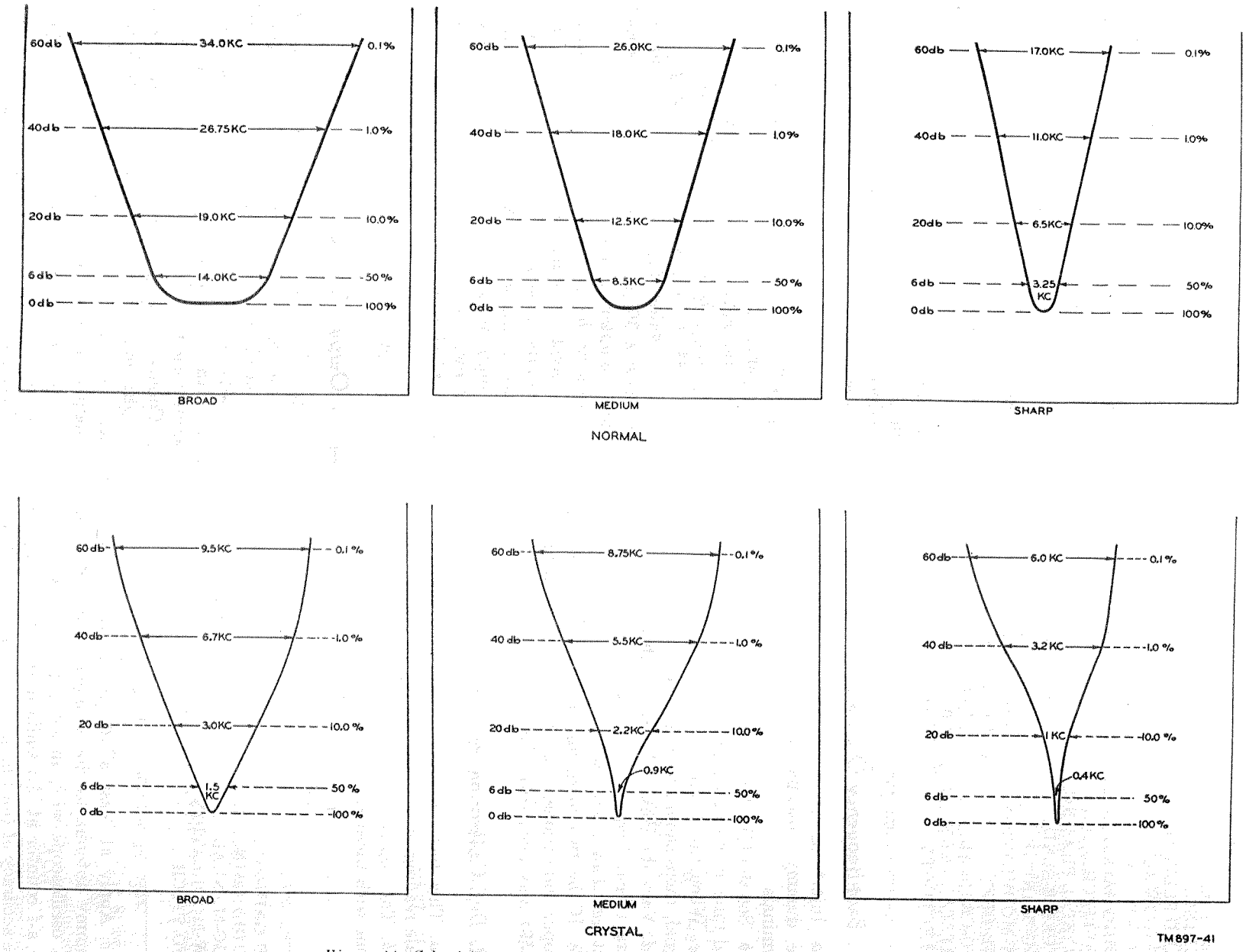

Figure 41. Selectivity curves for different positions of SELECTIVITY control.

95. Over-all Selectivity

The over-all selectivity of the receiver is a measure of the band-pass characteristics from the antenna terminals through the receiver to the output terminals. Since the audio stages have a fixed response, measurements are taken at the detector load resistor, R107. Figure 41 shows the over-all curves for all six positions of the SELECTIVITY switch, S1. These curves are representative of the curves to be expected in making the over-all selectivity test.

a. Procedure.

(1) Insert a 10-uv unmodulated test frequency signal at the antenna terminals. Connect a sensitive d-c type meter across detector load resistor R107. The test is made under standard test conditions for control settings. Note the voltage indication on the meter; if it is over 10 volts, turn the RF GAIN-AC control counterclockwise until a 10-volt level is reached. This will prevent overloading the i-f stages. Accurately adjust the TUNING knob until the signal is peaked on the meter. Readjust the RF GAIN-AC control, if necessary, to bring the reading back to 10 volts on the meter.

(2) Tune the signal generator to one side of the test frequency setting and increase the generator output. A 10-volt reading on the meter should be maintained throughout the test. Continue to deviate from the test frequency until it is necessary to supply 10,000 uv to the receiver for a 10-volt meter reading. Duplicate the same procedure for the other side of the test frequency setting. The frequency diœerence between these two settings on each side of the test frequency is the bandwidth.

(3) The procedure in (1) and (2) above may be used for testing all positions of the SELECTIVITY switch; however, for these tests, it is necessary to use only the noncrystal positions.

b. Minimum Requirements.

Selectivity control setting	Test frequency (mc)	Bandwidth (kc)
NORMAL SHARP	.54	3
NORMAL MED	1.5	8
NORMAL BROAD	3.45	14

96. Image Rejection Ratio

a. Besides receiving a signal to which it is tuned, the receiver will also receive a greatly attenuated signal at a frequency which is equal to the tuned frequency plus two times the i-f. The additional frequency that is picked up is called the image frequency. This receiver is designed to attenuate the image frequency to a great extent. In Radio Receiver R–274/FRR, double superheterodyne action is needed to reduce the image frequency response on frequencies above 7 mc. Therefore, in computing the image frequencies, two different intermediate frequencies will have to be taken into consideration. On BANDS I, II, and III, the image frequency will be equal to the test frequency plus two times 455 kc (i-f). (Example: 1,000 kc plus (2×455 kc)=1,910 kc.) For the frequencies above 7 mc, that is, BANDS IV, V, and VI, the image frequency is the test frequency plus 2 times 6 mc (i-f). (Example: 30 mc plus (2×6 mc)=42 mc.)

b. The following table lists the minimum image rejection ratio requirements.

Test frequency (mc)	Rejection ratio
1.27 (high end BAND I)	100,000 to 1.
3.0 (high end BAND II)	10,000 to 1.
7.0 (high end BAND III)	10,000 to 1.
13.8 (high end BAND IV)	100,000 to 1.
29.7 (high end BAND V)	100,000 to 1.
54.0 (high end BAND VI)	10,000 to 1.

c. Follow the standard test condition (par. 90) with the following exception: AUDIO GAIN adjusted as needed to set the output level.

d. Insert an r-f test signal of 5 uv to the receiver antenna terminals (through dummy an-

tenna). Adjust the receiver TUNING control to this test frequency. Set the AUDIO GAIN to obtain a 50-mw reading on the output meter. Without changing any of the receiver controls, insert an r-f signal of the image frequency instead of the test frequency. Increase the signal generator output until the same 50-mw reading is indicated on the output meter. The ratio between the input needed at the image frequency and the 5-uv input is the image rejection ratio. To find the image rejection ratio, divide the number of microvolts input needed at the image frequency by 5 uv.

Note. At frequencies above 20 mc, many signal generators exhibit strong frequency modulation of the r-f carrier; it is recommended, therefore, that tests be conducted on a c-w basis with the carrier unmodulated and the BFO PITCH control adjusted for a 1,000-cps reference beat note. This method will result in more reliable measurements.

97. I-F Rejection Ratio

Any signals developing voltages in the antenna at 455 kc or 6 mc, which are the intermediate frequencies in use in Radio Receiver R–274/FRR, may have a tendency to force through the receiver as interference to normal reception. The two stages of r-f amplification, V1 and V2, included in this receiver are intended to provide a high rejection ratio of the signal frequencies at 455 kc and 6 mc with respect to the frequency to which the receiver is tuned. A ratio between the number of microvolts of input at the i. f. (output of the signal generator modulated 30 percent with 400 cps) required to produce 10 volts dc across diode load resistor R107 and the number of microvolts of input at the tuned frequency required to produce 10 volts dc across resistor R107 is known as the i-f rejection ratio.

a. Use standard test conditions (par. 90) when measuring the i-f rejection ratio.

b. Eighteen test frequencies constitute one set of tests; three tests are made in each of the six bands. The three frequencies in each band are at the low end, center, and high end, respectively, of the tuning range of the band.

c. Adjust the signal generator to produce the frequency tuned by the receiver. Apply a 5-uv signal, modulated 30 percent with 400 cps, to the antenna terminals (A and A on terminal board E1) through the dummy antenna.

d. Adjust the RF GAIN-AC control, R83, until the voltmeter, connected across resistor R107, reads 10 volts dc.

e. Without changing the receiver controls of the signal generator connections, set the signal generator to produce the i. f. modulated 30 percent with 400 cps. The i-f is 455 kc for BANDS I, II, and III or 6. mc for BANDS IV, V, and VI. Increase the output of the signal generator until the voltmeter across resistor R107 again reads 10 volts.

f. Calculate the i-f rejection ratio by dividing the number of microvolts of signal generator output required in *e* above by 5 (the number of microvolts required in *c*).

g. Use a shielded screen room if any i-f interference is expected.

h. The minimum requirements are listed below:

Test frequency (mc)	Rejection ratio (db)
.54 to 54	100

98. Agc Characteristics

a. The agc voltage that is developed by the incoming signal automatically adjusts the bias on certain tubes to provide a substantially constant audio output with variations of signal strength. The purpose of this test is to see whether the above condition is met by the repaired receiver.

b. Standard test conditions will prevail with the exception that the AGC-MANUAL switch will be in the AGC position. A test frequency in BAND I and BAND V will be used for the test. Apply a 2-uv modulated signal to the antenna terminals and adjust the AUDIO GAIN control for an output of 10 mw. The input is then increased to .2 volt (200,000 uv) with spot checks at 10, 100, 100, 10,000, and 100,000 uv. After the .2-volt point is reached, the output should *not decrease* when the input signal is increased to .5 volt.

c. The minimum requirements are as follows:

Signal input	Test frequency 2.2 mc (BAND II)	Test frequency 22 mc (BAND V)
2 uv to .2 volt.	Not more than a 13-db increase in ouput (from 10 mw to 200 mw).	Not more than a 13-db increase in output (from 10 mw to 200 mw).
.2 volt to 1 volt.	Power output shall not decrease.	Power output shall not decrease.

99. Power Output to Speaker

a. The power output to speaker test is used to determine the power output capabilities of the receiver.

b. Use standard test conditions with the AUDIO GAIN control turned fully clockwise (maximum gain). Select a test frequency in the center of each band. Apply a 2-uv signal modulated 30 percent with a 1,000 cps audio signal to the antenna terminals.

c. The power output must be at least 2 watts across 600 ohms with a 2-uv input signal.

100. Frequency Response

The over-all frequency response of the receiver favors voice communication. The h-f response is limited by the position of the selectivity control. Two settings of this control are used to provide test measurements of the response. One is NORMAL MED and the other is NORMAL BROAD.

a. Apply a 50-mv input, r-f signal of 10 mc modulated 30 percent to the antenna terminals. The signal generator must be externally modulated at a depth of 30 percent with an audio oscillator. Place the AGC-MANUAL switch in the AGC position.

b. Adjust the agc to give a 0-db indication on the output meter when the signal generator is modulated with 1,000 cps. Keep the percent of modulation of the signal generator constant at all other modulation frequencies. Apply different audio modulation frequencies at these points: 200 cps, 300 cps, and at 200 cps intervals to 4,000 cps to obtain an audio frequency response which conforms closely to the curves shown in figure 42.

c. The minimum requirements are listed in the following table:

Audio frequency (cps)	Change in output measured in db	
	NORMAL MED	NORMAL BROAD
300	Less than 1 db down.	Less than 1 db down.
1,000	0	0.
3,500	Less than 3 db down.	Less than 1 db down.

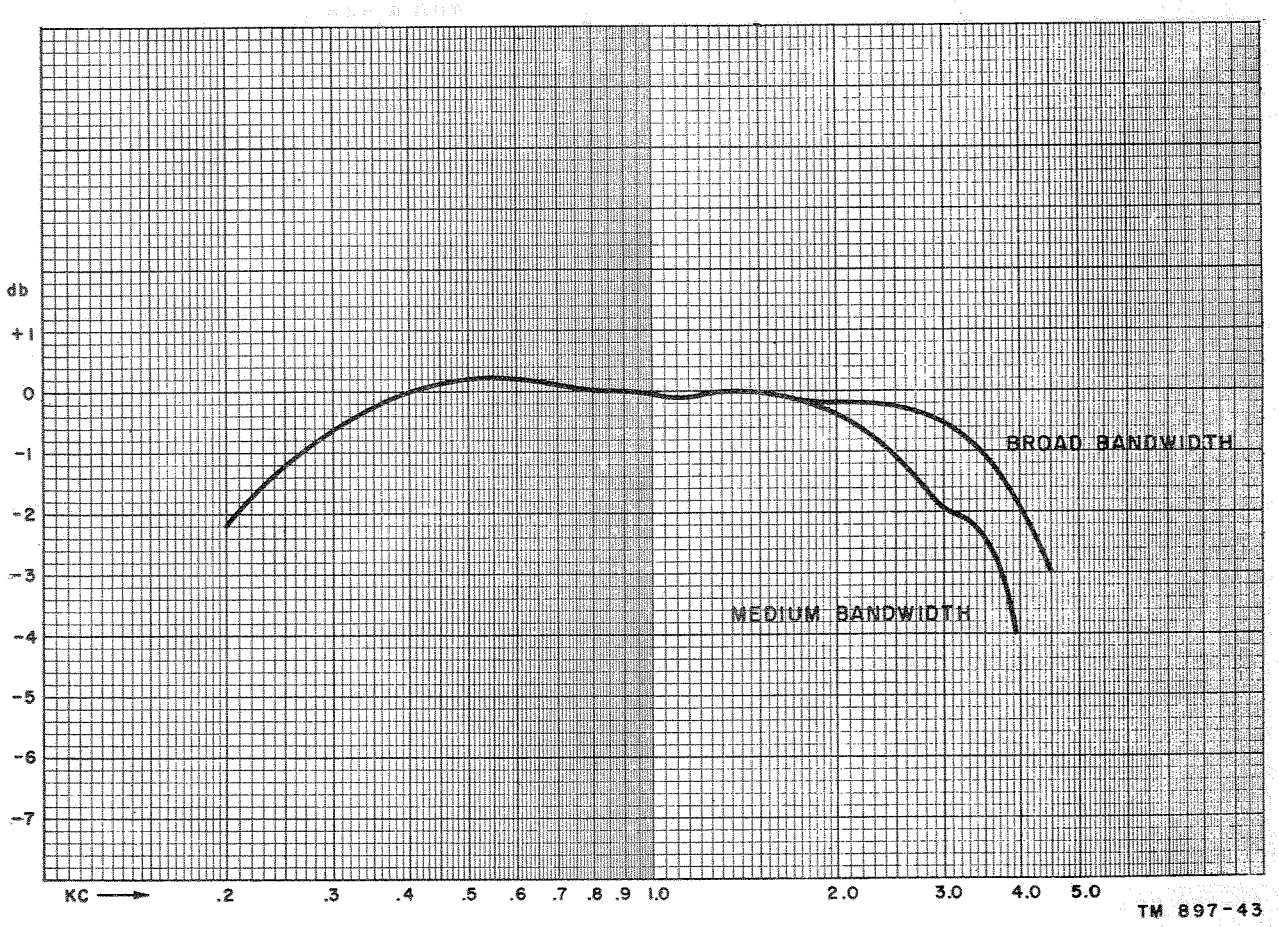

Figure 42. Typical a-f response curve.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

101. Disassembly

The circumstances involved in shipment and storage vary, therefore no definite procedure for repacking can be given. The following instructions are recommended as a guide for preparing the radio receiver for transportation and storage.

a. Turn the RF GAIN AC switch to OFF.

b. Remove power plug.

c. Disconnect antenna and ground from the receiver. Remove the headset plug from the receiver PHONES jack.

d. Remove receiver from rack.

102. Repacking for Shipment or Limited Storage

a. The exact procedure used in repacking for shipment or limited storage depends on the material available and the conditions under which the equipment is to be shipped or stored. Refer to paragraph 12 and reverse the unpacking instructions as far as practicable.

b. Whenever practicable, place a dehydrating agent, such as silica gel, inside the chests. Protect the chests with a waterproof paper barrier. Seal the seams of the paper barrier with waterproof sealing compound or tape. Pack the protected chests in a padded wooden case, providing at least 3 inches of excelsior padding between the paper barrier and the packing case.

Section II. Demolition of Materiel to Prevent Enemy Use

103. General

The demolition procedures outlined in paragraph 104 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only on order of the commander.

104. Destruction of Equipment

a. Smash. Smash the crystals, controls, tubes, coils, switches, capacitors, and transformers, using sledges, axes, handaxes, hammers, crowbars, or other heavy tools.

b. Cut. Cut cords and wiring, using axes, handaxes, or machetes.

c. Burn. Burn cords, resistors, capacitors, coils, wiring, and technical manuals, using gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panels, cabinet, and chassis.

e. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

f. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes, or other holes, or throw them into streams.

g. Destroy everything.

APPENDIX I

REFERENCES

Note. For availability of items listed, check SR 310–20–3 and SR 310–20–4. Check Department of the Army Supply Catalog SIG 1 for Signal Corps supply catalog pamphlets.

1. Army Regulations

AR 380–5	Safeguarding Military Information.
AR 750–5	Maintenance of Supplies and Equipment (Maintenance Responsibilities and Shop Operation).

2. Supply Publications

SIG 1	Introduction and Index.
SIG 3	List of Items for Troop Issue.
SIG 5	Stock List of All Items.
SIG 6	Sets of Equipment.
SIG 7 & 8	Organizational Maintenance Allowances and Field and Depot Maintenance Stockage Guide.
SB 11–76	Signal Corps Kit and Materials for Moisture-and-Fungi-Resistant Treatment.

3. Publications on Auxiliary Equipment and Test Equipment

TM 11–300	Frequency Meter Sets SCR–211–(*).
TM 11–303	Test Sets I–56–C, I–56–D, I–56–H, and I-56–J.
NAVSHIPS 91379.	Signal Generator AN/URM–25.
TM 11–307	Signal Generators I–72–G, H, J, K, and L.
TM 11–5030	Signal Generator TS–497A/URR.
TM 11–321	Test Set I–56–E.
TM 11–472	Repair and Calibration of Electrical Measuring Instruments.
TM 11–2524	Oscillators I–151–A and I–151–E.
TO 16–35TS382–2	Audio Oscillator TS–382A/U.
TM 11–2613	Voltohmmeter I–166.
TM 11–2624B	Voltohmmeters TS–294/U, TS–294B/U, TS–294 C/U.
TM 11–2626	Test Units I–176, I–176–A, and I–176–B.
TM 11–5017	Output Meter TS–585A/U.
TM 11–2627	Tube Testers I–177 and I–177–A.
TM 11–5044	Frequency Meter TS–174B/U.
TM 11–5527	Multimeter TS–352/U.
TM 11–5511	Electronic Multimeter TS–505/U.

4. Painting, Preserving, and Lubrication

TB SIG 13	Moistureproofing and Fungiproofing Signal Corps Equipment.
TB SIG 69	Lubrication of Ground Signal Equipment.
TB SIG 212	Low Temperature Lubricants for Meteorological Equipment.
TM 9–2851	Painting Instructions for Field Use.

5. Camouflage

FM 5–20	Camouflage, Basic Principles.

6. Decontamination

TM 3–220	Decontamination.

7. Demolition

FM 5–25	Explosives and Demolitions.

8. Other Publications

FM 24–18_____ Field Radio Techniques.
FM 72–20_____ Jungle Warfare.
SR 310–20–3____ Index of Training Publications (Field Manuals, Training Circulars, Firing Tables and Charts, Army Training Programs, Mobilization Training Programs, Army Training Tests, Graphic Training Aids, Joint Army-Navy-Air Force Publications, Combined Communications Board Publications, and Army Communications Publications).
SR 310–20–4____ Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, Modification Work Orders, Tables of Organization and Equipment, Reduction Tables, Tables of Allowances, Tables of Organization, and Tables of Equipment.
SR 700–45–5____ Unsatisfactory Equipment Report (Reports Control Symbol CSGLD–247).
SR 745–45–5____ Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD–66 (Army).
TB SIG 4_____ Methods for Improving the Effectiveness of Jungle Radio Communication.
TB SIG 25_____ Preventive Maintenance of Power Cords.
TB SIG 66_____ Winter Maintenance of Signal Equipment.
TB SIG 72_____ Tropical Maintenance of Ground Signal Equipment.
TB SIG 75_____ Desert Maintenance of Ground Signal Equipment.
TB SIG 123_____ Preventive Maintenance Practices for Ground Signal Equipment.
TB SIG 178_____ Preventive Maintenance Guide for Radio Communication Equipment.
TB SIG 219_____ Operation of Signal Equipment at Low Temperatures.
TB SIG 223_____ Field Expedients for Wire and Radio.
TB 11–499–( )*_ Basic Radio Propagation Predictions.
TM 9–2857_____ Storage Batteries Lead-Acid Type.
TM 11–314_____ Antennas and Antenna Systems.
TM 11–453_____ Shop Work.
TM 11–455_____ Radio Fundamentals.
TM 11–466_____ Radar Electronic Fundamentals.
TM 11–476_____ Radio Direction Finding.
TM 11–483_____ Suppression of Radio Noises.
TM 11–486_____ Electrical Communication Systems Engineering.
TM 11–681_____ Electrical Fundamentals (Alternating Current).
TM 11–496_____ Training Text and Applicatory Exercises for Amplitude-Modulated Radio Sets.
TM 11–499_____ (Preliminary) Radio Propagation Handbook.
TM 11–660_____ Introduction to Electronics.
TM 11–661_____ Electrical Fundamentals (Direct Current).
TM 11–4000_____ Trouble Shooting and Repair of Radio Equipment.

*A new TB in this series is issued monthly which gives propagation predictions 3 months in advance.

9. Abbreviations

a-c_____ alternating-current.
a-f_____ audio-frequency.
agc_____ automatic gain control.
a-m_____ amplitude-modulated.
anl_____ automatic noise limiter.
bfo_____ beat-frequency oscillator.
cps_____ cycles per second.
c-w_____ continuous-wave.
db_____ decibel.
dbm_____ decibels relative to 1 milliwatt.
d-c_____ direct-current.
hfo_____ high-frequency oscillator.
h-v_____ high-voltage.
icw_____ interrupted continuous wave.
i-f_____ intermediate-frequency.
kc_____ kilocycle.
l-f_____ low-frequency.
mc_____ megacycle.
mcw_____ modulated continuous waves.
mv_____ millivolt.
mw_____ milliwatt.
r-f_____ radio-frequency.
SPST_____ single-pole, single-throw.
μf_____ microfarad.
$\mu\mu$f_____ micromicrofarad.
uv_____ microvolt.
vtvm_____ vacuum-tube voltmeter.
vfo_____ variable-frequency oscillator.

APPENDIX II

IDENTIFICATION TABLE OF PARTS

1. Requisitioning Parts

The fact that a part is listed in this table is not sufficient basis for requisitioning the item. Requisitions must cite an authorized basis, such as a specific T/O & E, T/A, SIG 7 & 8, list of allowances of expendable material, or another authorized supply basis. The Department of the Army Supply Catalog applicable to the equipment covered in this manual is SIG 7 & 8 R–274/FRR. For an index of available supply catalogs in the Signal portion of the Department of the Army Supply Catalog, see the latest issue of SIG 1.

2. Identification Table of Parts for Radio Receiver R–274/FRR

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
	RADIO RECEIVER R–274/FRR: A-M, C-W and mcw signals; for comm; .54–54 mc continuous in 6 bands; input 95–260 v, 50/60 cyc, single ph, 130 w; w/std 19″ rack panel; 19″ lg x $10\frac{15}{32}$″ h x 18⅛″.		2C4180–274
	RADIO RECEIVER R–274A/FRR: A1, A2, and A3 reception; for comm; 540 kc to 54 mc freq range in 6 bands; 95–260 v ac (8 taps), 50/60 cyc, single ph, 130 w; table mtg; $21\frac{3}{8}$″ lg x $12\frac{3}{4}$″ h x $17\frac{1}{8}$″ d; 20 tubes superheterodyne ckt; turret mtd coils; built-in xtal filter; beat freq osc; dual conversion above 7.4 mc; 6 xtal positions available for fixed freq operation.		2C4180–274A
	TECHNICAL MANUAL TM 11–897		Order through AGO.
O13	BEARING, roller: single row radial; .063″ shaft dia, .250″ OD, .328″ wd.	Roller bearing for detent	3H321–95
O18	BEARING, sleeve: for dial mask idler gear; .375″ lg, head slotted .031″ wd x .031″ d x .312″ dia x .046″ lg, body .2495″ dia x .265″ lg, end shoulder .187″ dia x .062″ lg, undercuts, next to head and shoulder .015″ wd x .010″ d, end tapped 4–40 x 3/16″ d.	Bearing for dial mask idler gear	2Z581–34
O15, O16	BEARING, sleeve: for phasing capacitor shaft; 7/16″ lg, ½″ hex. head, 1/16″ thk, .252″ ID, threaded ⅜″–32 SAE extra fine std thd x $2\frac{1}{64}$″ lg; ctb .261″ dia, 5/16″ d from threaded end.	O15: Bearing for SELECTIVITY switch shaft. O16: Bearing for VFO CRYSTAL switch shaft.	2Z581–36
O14, O26	BEARING, sleeve: for phasing capacitor shaft; .437″ lg, ½″ hex. head, 1/16″ thk, .252″ ID, threaded ⅜″–32 NEF–2 thd x $2\frac{1}{64}$″ lg, ctb .261″ dia, 5/16″ d from threaded end.	O14: Bearing for phasing capacitor shaft. O26: Bearing for antenna adjustment shaft.	2Z581–37

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
O19	BEARING, sleeve: turret shaft brg; ⅝″ lg, ⅞″ hex. head .078″ thk, 1/32″ from 1 end, .3755″ ID, threaded ½″–28 EF x ¼″ lg, body sect. ½″ OD, undercut next to head 1/32″ wd x 1/64″ d.	Rear bearing for BAND SELECTOR turret shaft.	2Z581–35
O17	BEARING, sleeve: turret shaft brg; .812″ lg, ¾″ hex. head .062″ thk, .3449″ ID, threaded ½″–28 EF–2 x .266″ lg and 9/16″–24 EF–2 x .171″ lg, .4995″ dia x ¼″ lg body sect. between thd; undercut next to head 3/64″ wd x 1/32″ d.	Front bearing for BAND SELECTOR turret shaft.	2Z581–33
W2	CABLE, RF: Radio Frequency Cable RG–58/U; coax; 53.5 ohms nom impedance, 28.5μμf per ft.	455-kc and 6-mc transmission line.	1F425–58
W1	CABLE ASSEMBLY, power: Electric Power Cable CX–1855/U; two #16 AWG stranded cond; 6′ lg excluding term.	Power input	3E7350.1–72.28
C32, C36, C43, C47, C67, C76	CAPACITOR, fixed: ceramic dielectric; 2.2μμf ±20%; 500 vdcw.	C32: Couples V1 to V2, T8 C36: Couples V1 to V2, T9 C43: Couples V1 to V2, T11. C47: Couples V1 to V2, T12. C67: Couples V2 to V3, T16. C76: Couples V2 to V3, T18.	3D9002E2–1
C28, C55, C59, C63	CAPACITOR, fixed: ceramic dielectric; 3.3μμf ±20%; 500 vdcw.	C28: Couples V1 to V2, T7 C55: Couples V2 to V3, T13. C59: Couples V2 to V3, T14 C63: Couples V2 to V3, T15.	3D9003E3
C181	CAPACITOR, fixed: ceramic dielectric; 5μμf ±.5μμf; 500 vdcw; JAN type CC20UJ–050D.	Couples BFO to V12	3D9005–111
C34, C48, C62	CAPACITOR, fixed: ceramic dielectric; 5μμf ±1μμf; 500 vdcw; JAN type CC20UJ050F.	C34: H-f padder, T9 C48: Gain equalizer, T12. C62: H-f padder, T15.	3D9005–124
C166	CAPACITOR, fixed: ceramic dielectric; 6 μμf ±.5μμf; 500 vdcw; JAN type CC20UJ–060D.	C166: Couples switch S1, section 6, to GRID of V11.	3D9006–26
C91, C98	CAPACITOR, fixed: ceramic dielectric; 10μμf ±.25μμf; 500 vdcw; JAN type CC20TJ–100D.	C91: Temperature compensator, T20. C98: Temperature compensator, T21.	3D9010–200
C44, C73, C165	CAPACITOR, fixed: ceramic dielectric; 10μμf ±.5μμf; 500 vdcw; JAN type CC20UJ100F.	C44: H-f padder, T11 C73: H-f padder, T17. C165: Balance capacitor normal positions of switch S1, section 5.	3D9010–118
C72	CAPACITOR, fixed: ceramic dielectric; 12μμf ±10%; JAN type CC20UJ120K.	C72: ANTENNA PADDER, T5	3D9012–49
C3, C9, C12, C41, C70	CAPACITOR, fixed: ceramic dielectric; 15μμf ±10%; 500 vdcw; JAN type CC20UJ150K.	C3: Antenna balance, T1 C9: Antenna balance, T3. C12: Antenna balance, T4. C41: H-f padder, T11. C70: H-f padder, T17.	3D9015–69
C86	CAPACITOR, fixed: ceramic dielectric; 18μμf ±5%; 500 vdcw; JAN type CC20SH180J.	H-f padder, T19	3D9018–31
C6	CAPACITOR, fixed: ceramic dielectric; 18μμf ±10%; 500 vdcw; JAN type CC20UJ180K.	Gain equalizer, T2	3D9018–10

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C110	CAPACITOR, fixed: ceramic dielectric; 22$\mu\mu$f ±2%; 500 vdcw; JAN type CC30LH220G. *Note.* Capacitor JAN type CC30PH270G, 27μ, should be requisitioned and connected in parallel with this item for maximum efficiency.	Temperature compensator, T23	3D9022–59
C103	CAPACITOR, fixed: ceramic dielectric; 22$\mu\mu$f ±2%; 500 vdcw; JAN type CC30PH220G. *Note.* Capacitor JAN type CC30LH330G, 33μ, should be requisitioned and connected in parallel with this item for maximum efficiency.	Temperature compensator, T22	3D9022–58
C81, C87, C93, C99	CAPACITOR, fixed: ceramic dielectric; 22$\mu\mu$f ±5%; 500 vdcw.	C81: R-f bypass, grid V4, T19 C87: R-f bypass, grid V4, T20 C93: R-f bypass, grid V4, T21. C99: R-f bypass, grid V4, T22.	3D9022–55
C38, C65	CAPACITOR, fixed: ceramic dielectric: 22$\mu\mu$f ±10%; 500 vdcw; JAN type CC20UJ220K.	C38: H-f padder, T10 C65: H-f padder, T16.	3D9022–19
C18, C141	CAPACITOR, fixed: ceramic dielectric; 27$\mu\mu$f ±10%; 500 vdcw; JAN type CC20UJ270K.	C18: H-F padder, T6 C141: 6.455-mc crystal load capacitor.	3D9027–22
C100	CAPACITOR, fixed: ceramic dielectric; 33$\mu\mu$f ±5%; 500 vdcw; JAN type CC20TH330J.	Tracking capacitor for T22	3D9033–39
C21, C40, C49, C80, C144, C171	CAPACITOR, fixed: ceramic dielectric; 33$\mu\mu$f ±10%; 500 vdcw; JAN type CC20UJ330K.	C21: Coupling to V1 C40: Gain equalizer, T10. C49: Coupling to V2. C80: Coupling to V3, T19. C144: Coupling from V8 to V7. C171: 455-kc coupling to AGC tube V13.	3D9033–19
C189	CAPACITOR, fixed: ceramic dielectric; 39$\mu\mu$f ±10%; 500 vdcw; JAN type CC20UJ390K.	BFO plate circuit network	3D9039–18
C177	CAPACITOR, fixed: ceramic dielectric; 47$\mu\mu$f ±5%; 500 vdcw; JAN type CC20UJ470J.	BFO temperature compensator on tuned circuit, T33.	3D9047–58
C105, C111	CAPACITOR, fixed: ceramic dielectric; 47$\mu\mu$f ±5%; 500 vdcw; JAN type CC30CH470J.	C105: R-f bypass, grid V4, T23 C111: R-f bypass, grid V4, T24.	3D9047–43
C82	CAPACITOR, fixed: ceramic dielectric; 47$\mu\mu$f ±5%; 500 vdcw; JAN type CC30RH470J.	Temperature compensator, part of tracking capacitor of T19.	3D9047–65
C54	CAPACITOR, fixed: ceramic dielectric; 47$\mu\mu$f ±10%; 500 vdcw; JAN type CC20UJ470K.	Part of 6-mc trap, T17	3D9047–29
C45, C74	CAPACITOR, fixed: ceramic dielectric; 56$\mu\mu$f ±10%; 500 vdcw .400″ lg x .200″ dia; Centralab #CC20UJ560K.	C45: H-f padder, T12 C74: H-f padder, T18.	3D9056–46
C122	CAPACITOR, fixed: ceramic dielectric; 56$\mu\mu$f ±10%; 500 vdcw; JAN type CC25UJ560K.	Screen bypass, V5	3D9056–44
C68, C69	CAPACITOR, fixed: ceramic dielectric; 56$\mu\mu$f ±10%; 500 vdcw; JAN type CC30UJ560K.	C68: Part of 6-mc trap of T16 C69: H-f padder, T16.	3D9056–39
C106	CAPACITOR, fixed: ceramic dielectric; 100$\mu\mu$f ±5%; 500 vdcw; JAN type CC30UJ101J.	Temperature compensator, part of tracking capacitor of T23.	3D9100–230
C4	CAPACITOR, fixed: ceramic dielectric; 100$\mu\mu$f $\mu\mu$f ±10%; 500 vdcw; JAN type CC25UJ-101K.	H-f bypass, V17	3D9100–185

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C64	CAPACITOR, fixed: ceramic dielectric; 100μμf ±10%; 500 vdcw; JAN type CC30UJ-101K.	Part of plate load, V2	3D9100–246
C89	CAPACITOR, fixed: ceramic dielectric; 120μμf ±5%; 500 vdcw; JAN type CC32TH-121J.	Temperature compensator, T20	3D9120–39
C182	CAPACITOR, fixed: mica dielectric; 180μμf ±5%; 500 vdcw; JAN type CM20C181J.	BFO frequency deviation network capacitor.	3K2018132
C33, C37, C60	CAPACITOR, fixed: ceramic dielectric; 180μμf ±5%; 500 vdcw; JAN type CC32UJ-181J.	C33: Gain equalizer of T8 C37: Gain equalizer of T9. C60: Gain equalizer of T14.	3D9180–31
C84	CAPACITOR, fixed: mica dielectric; 220μμf ±2%; 500 vdcw; JAN type CM20D221G.	Tracking capacitor, T19	3K2022143
C56	CAPACITOR, fixed: ceramic dielectric; 220μμf ±5%; 500 vdcw; JAN type CC32UJ221J.	Gain equalizer of T13	3D9220–38
C102	CAPACITOR, fixed: mica dielectric; 270μμf ±2%; 500 vdcw; JAN type CM20D271G.	Tracking capacitor, T22	3D9270–22
C96	CAPACITOR, fixed: ceramic dielectric; 270μμf ±5%; 500 vdcw; JAN type CC32UJ271J.	Temperature compensator, T21	3D9270–21
C108	CAPACITOR, fixed: mica dielectric; 390μμf ±5%; 500 vdcw; JAN type CM20D391J.	Tracking capacitor, T23	3K2039142
C119	CAPACITOR, fixed: ceramic dielectric; 390μμf ±10%; 500 vdcw; JAN type CC35UJ391K.	Coupling between V5 and V3	3D9390–25
C88	CAPACITOR, fixed: mica dielectric; 560μμf ±2%; 500 vdcw; JAN type CM25D561G.	Tracking capacitor, T20	3D9560–16
C29	CAPACITOR, fixed: mica dielectric; 820μμf ±10%; 500 vdcw; JAN type CM25D821K.	Gain equalizer, T7	3K2582141
C94	CAPACITOR, fixed: mica dielectric; 1200μμf ±2%; 500 vdcw; JAN type CM30D122G.	Tracking capacitor, T21	3K3012243
C123	CAPACITOR, fixed: mica dielectric; 2200μμf ±10%; 500 vdcw; JAN type CM30B222K.	D-c blocking capacitor, VFO crystal.	3K3022221
C209, C210, C211	CAPACITOR, fixed, ceramic dielectric; 2300μμf −20% +50%; 500 vdcw.	C209: Feedthrough bypass, filament of V7. C210: Feedthrough bypass, for B+ of V7 and V8. C211: Feedthrough bypass, grid of V8.	3DA2.300–1
C120	CAPACITOR, fixed: mica dielectric; 3300μμf ±10%; 500 vdcw; JAN type CM30B332K.	H-f audio bypass, V17	3K3033221
C176, C190, C191, C200, C201., C203	CAPACITOR, fixed: paper dielectric; 10,000μμf ±20%; 600 vdcw; JAN type CN35E103M.	C176: ANL network V12 C190: A-c input filter, P1. C191: A-c input filter, P1. C200: Audio coupling, grid V16. C201: Audio coupling, jack E3. C203: Audio coupling, V17.	3DA10–435

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C23, C24, C25, C50, C51, C52, C58, C78, C79, C117, C118, C124, C127, C131, C132, C136, C138, C139, C142, C143, C146, C150, C152, C156, C157, C158, C167, C168, C174, C178, C179, C187, C188, C205, C206, C212, C213	CAPACITOR, fixed: ceramic dielectric; 10,000$\mu\mu$f +80% −20%; 450 vdcw.	C23: AGC bypass, V1 C24: Screen bypass, V1. C25: Plate return bypass, V1. C50: Cathode bypass, V2. C51: Screen bypass, V2. C52: Plate return bypass, V2. C58: AGC filter. C78: Cathode bypass, V3. C79: Screen bypass, V3. C117: R-f filter, AGC. C118: Part of plate tank, V4. C124: Plate circuit decoupling, V5. C127: Plate circuit decoupling, V3, 6-megacycle position. C131: Cathode bypass, V6. C132: Screen bypass, V6. C136: Cathode bypass, V7. C138: Filament bypass, V7. C139: Screen bypass, V7. C142: Grid return bypass, V8. C143: Plate circuit decoupling, V8. C146: Plate circuit decoupling, V7. Reference T28. C150: Screen bypass, V9. C152: Plate circuit decoupling, V9. C156: Cathode bypass, V10. C157: Screen bypass, V10. C158: Plate circuit decoupling, V10. C167: Cathode bypass, V11. C168: Screen bypass, V11. C174: Plate circuit decoupling, V11. C178: Cathode bypass, V15. C179: Screen bypass, V15. C187: Screen bypass, V14. C188: Plate circuit decoupling, V14. C205: Screen bypass, V17. C206: Filament bypass, V4. C212: Plate circuit decoupling, V6. C213: Suppressor bypass, V14.	3DA10–514
C197	CAPACITOR, fixed: paper dielectric; 50,000$\mu\mu$f ± 10%; 300 vdcw; JAN type CN42 E-503K.	AGC time constant capacitor	3DA50–365
C175	CAPACITOR, fixed: paper dielectric; 100,000$\mu\mu$f ± 20%; 400 vdcw; JAN type CN43 E-104M.	Noise filter, V12	3DA100–838
C202	CAPACITOR, fixed: paper dielectric; 500,000$\mu\mu$f ± 10%; 600 vdcw; JAN type CP53 B1F-F504K.	Cathode bypass, V16	3DA500–468

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C186A, C186B, C194A, C194B	CAPACITOR, fixed: paper dielectric; 2 sect.; 100,000 μμf ±15% ea sect.; 600 vdcw; JAN type CP53B4DF104L.	C186A: Suppressor bypass, V14 C186B: R-f gain control, R83, bypass. C194A: B+r-f filter, V16. C194B: Plate circuit decoupling, V16.	3DA100–760
C198, C199	CAPACITOR, fixed: paper dielectric; 1μf +20% −10%; 600 vdcw; JAN type CP53-B1FB105V.	C198: AGC time constant C199: AGC time constant.	3DB1–355
C204	CAPACITOR, fixed: electrolytic; 25μf; 25 vdcw; JAN type CE63C250F.	Cathode bypass, V17	3DB25–79
C195	CAPACITOR, fixed: electrolytic; 50μf; 50 vdcw; JAN type CE63C500G.	B− filter	3DB50–78
C192A, C192B, C193A, C193B	CAPACITOR, fixed: electrolytic; 2 sect.; 40μf ea sect.; 350 vdcw; JAN type CE42-C400P.	C192A: B+input filter C192B: B+output filter. C193A: B+filter. C193B: B+filter.	3DB10–81
C8, C11, C14, C17	CAPACITOR, variable: ceramic dielectric; 1.5–9μμf.	C8: Antenna balance adjustment, T2. C11: Antenna balance adjustment, T3. C14: Antenna balance adjustment, T4. C17: Antenna balance adjustment, T5.	3D9009V–22
C85, C92, C97, C104, C109, C115	CAPACITOR, variable: air dielectric; plate meshing type, 1 sect.; 2.2–14.5μμf.	C85: Trimmer adjustment, T19 C92: Trimmer adjustment, T20. C97: Trimmer adjustment, T21. C104: Trimmer adjustment, T22. C109: Trimmer adjustment, T23. C115: Trimmer adjustment, T24.	3D9014VE58
C26, C30, C35, C53, C57, C61	CAPACITOR, variable: ceramic dielectric; 2.5–13μμf; 500 vdcw; JAN type CV11B130.	C26: Trimmer adjustment, T7 C30: Trimmer adjustment, T8. C35: Trimmer adjustment, T9. C53: Trimmer adjustment, T13. C57: Trimmer adjustment, T14. C61: Trimmer adjustment, T15.	3D9013V–4
C183	CAPACITOR, variable: air dielectric; single sect. plate meshing type; 3.5μμf min to 25μμf max cap.; 1 3/32″ lg x 15/16″ wd x 1 7/32″ h excluding shaft; nonlocking shaft .250″ dia extends 1 13/32″ beyond mtg bushings.	BFO pitch control	3D9023V–13
C161, C22	CAPACITOR, variable: air dielectric; single sect. plate meshing type; 3.5μμf min to 25μμf max cap.	CRYSTAL PHASING control	3D9023V–14
C13, C16	CAPACITOR, variable: ceramic dielectric; 4.5 −25μμf; 500 vdcw; JAN type CV11A250.	C13: Trimmer adjustment, T4 C16: Trimmer adjustment, T5.	3D9025V–82
C125	CAPACITOR, variable: air dielectric; single sect. plate meshing type; 7μμf min to 100μμf max cap.	CRYSTAL VERNIER control	3D9100V–84
C19	CAPACITOR, variable: ceramic dielectric; 7–45μμf; 500 vdcw; JAN type CV11C150.	Trimmer adjustment, T6	3D9045V–15

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
C39, C42, C46, C66, C71, C75, C83, C90, C95, C101, C107, C140, C162, C163, C164	CAPACITOR, variable: ceramic dielectric; 7–45$\mu\mu$f; 500 vdcw; JAN type CV11D450.	C39: Trimmer adjustment, T10 C42: Trimmer adjustment, T11. C46: Trimmer adjustment, T12. C66: Trimmer adjustment, T16. C71: Trimmer adjustment, T17. C75: Trimmer adjustment, T18. C83: Tracking adjustment, T19. C90: Tracking adjustment, T20. C95: Tracking adjustment, T21. C101: Tracking adjustment, T22. C107: Tracking adjustment T23. C140: Compensating on 455-kc i-f 6-mc position V7. C162: CRYSTAL SHARP bandwidth adjustment. C163: CRYSTAL MED bandwidth adjustment. C164: CRYSTAL BROAD bandwidth adjustment.	3D9045V–22
C1A, C1B	CAPACITOR, variable: air dielectric; plate meshing type 2 sect.; ea sect. 10–201$\mu\mu$f.	C1A: TUNING C1B: TUNING.	3D9218V
C2A, C2B	CAPACITOR, variable: air dielectric; plate meshing type 2 sect.; mixer sect. 10–211 $\mu\mu$f, osc sect. 15–222.5$\mu\mu$f.	C2A: TUNING C2B: TUNING.	3D9223V
C116	CAPACITOR ASSEMBLY: 2 capacitors, JAN type CC20PH180G and CC30LH-470G in parallel.	Temperature compensator, T24	3DE47
C112	CAPACITOR ASSEMBLY: c/o 2 capacitors, 1 Hallicrafters #47B239, 350$\mu\mu$f ±5%; 500 vdcw, 1 Hallicrafters #47B238, 1670$\mu\mu$f ± 2%, 500 vdcw, connected in parallel.	Temperature compensator, T24	3DEA1.670
H8 through H11	CLAMP: cable; holds 3/16″ OD rigid tube		8P1–101–2
H2 through H5	CLAMP: cable; holds 1/4″ OD rigid tube		8P1–101–1
H1	CLAMP: cable; holds 3/8″ OD rigid tube		2Z2642.366
H35	CLAMP: electron tube; accom 3/4″ dia tube	For V4	2Z2642.397
H37	CLAMP: electron tube; accom ST-12 envelopes.	For V17	2Z2642.398
H36	CLAMP: electron tube; accom ST–14 and ST–16 envelopes.	For V18	2Z2643.138
O11, O12	CLIP: Fahnestock; 3/32″ max jaw opening	Allen-head wrench holders	3Z1371–1.1
L62, L66	COIL, RF: choke; unsheilded	6-mc i-f rejection trap	3C375–56
L64, L65	COIL, RF: choke; unshielded; 2.7 uh ±10%, 280 ma, 2.2 ohms ±10%.	Crystal oscillator plate impedances	3C323–212B
L63, L67	COIL, RF: choke; unshielded; 42 turns #28 E single celanese covered copper wire, distributed cap. 1.0$\mu\mu$f ±20%.	Filament chokes, V7 and V8	3C375–55
L39	COIL, RF: choke; unshielded; 75 uh at 2.5 mc.	Crystal oscillator plate impedance	3C375–54
O20, O21, O27 through O30.	COLLAR, spacing: capacitor mtg spacer		2Z2935–102
P3	CONNECTOR, plug: 2 parallel blade male cont; straight.		6Z1727
P2	CONNECTOR, plug: Radio Frequency Plug UG–102/U; 2 rd male cont; straight.	Antenna input	2Z7390–102

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
J2	CONNECTOR, receptacle: Socket SO–239; rd female phosphor bronze cont, silver pl; straight; 1″ sq x 1 1/16″ lg o/a; Amphenol 83–1R.	455–kc, i-f output	2Z8799–239
J1	CONNECTOR, receptacle: Radio Frequency Receptacle UG–103/U; 2 rd female cont; straight.	Antenna input	2Z7390–103
J9	CONNECTOR, receptacle: 2 flat parallel female cont; straight; 1 3/16″ OD x 1¼″ lg.		2Z3083–15
P1	CONNECTOR, receptacle: 2 flat parallel blades male cont; straight.	A-c power input	6Z8364
J4	CONNECTOR, receptacle: 2 rectangular female cont; straight.	A-c convenience outlet	6Z7784–4
E16	CONTACT ASSEMBLY, turret coil: ant sect., active ckt, fixed cont.	Contact assembly, antenna section.	2Z3197A–57
E20	CONTACT ASSEMBLY, turret coil: ant sect., fixed shorting cont.	Contact assembly, antenna shorting.	2Z3197A–55
E21, E22	CONTACT ASSEMBLY, turret coil: mixer and r-f sect., fixed shorting cont.	E21: Contact assembly, r-f shorting. E22: Contact assembly, mixer.	2Z3197A–54
E23	CONTACT ASSEMBLY, turret coil: osc sect., fixed shorting cont.	Contact assembly, oscillator shorting.	2Z3197A–53
E17, E18, E19	CONTACT ASSEMBLY, turret coil: osc, mixer, and r-f sect. active ckt, fixed cont.	E17: Contact assembly, r-f section. E18: Contact assembly, mixer section. E19: Contact assembly, oscillator section.	2Z3197A–56
O8, O35, O36	COUPLING, flexible: ant adj shaft	Connects extension shaft to CRYSTAL PHASING control capacitor.	2ZK3290–11
O7	COUPLING, flexible: coupling main tuning capacitor sect.	Connects tuning capacitors	2Z3295–149
O34	COUPLING, rigid: coupling, ins		2Z3273–237
Y7	CRYSTAL UNIT CR–18/U: single quartz plate in Crystal Holder HC–6/U; nom xtal freq 6455 kc.	Double conversion oscillator crystal	2X209–6455
Y8	CRYSTAL UNIT, quartz: in Crystal Holder HC–6/U; nom freq 455 kc.	455-kc filter crystal	2X222.2–455
I1	DIAL: BFO pitch control	BFO PITCH control	2Z3723–235
I5	DIAL: R-f gain control	RF GAIN-AC control	2Z3723–239
I7	DIAL: selectivity control	SELECTIVITY control	2Z3723–241
I3	DIAL: very fine osc xtal sw	VFO CRYSTAL switch	2Z3723–237
I2	DIAL: xtal phasing control	CRYSTAL PHASING control	2Z3723–236
I4	DIAL: xtal vernier control	CRYSTAL VERNIER control	2Z3723–238
I6	DIAL: audio gain control	AUDIO GAIN control	2Z3723–240
O22	DRIVE, dial: main tuning drive		2Z3876.133
V18	ELECTRON TUBE: JAN type 5U4G	Rectifier	2J5U4G
V1, V5	ELECTRON TUBE: JAN type 6AG5	V1: 1st radio frequency V5: Crystal oscillator.	2J6AG5
V12, V13	ELECTRON TUBE: JAN type 6AL5	V12: DET and ANL V13: AGC.	2J6AL5
V16	ELECTRON TUBE: JAN type 6AT6	1st A-f amplifier	2J6AT6

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
V2, V6, V8 through V11, V14, V15	ELECTRON TUBE: JAN type 6BA6	V2: 2d radio frequency V6: 6-mc intermediate frequency. V8: 6.455-mc oscillator. V9: 1st 455-kc intermediate frequency. V10: 2d 455-kc intermediate frequency. V11: 3d 455-kc intermediate frequency. V14: BFO. V15: I-f output.	2J6BA6
V3, V7	ELECTRON TUBE: JAN type 6BE6	V3: 1st mixer V7: 2d mixer.	2J6BE6
V4	ELECTRON TUBE: JAN type 6C4	V4: VFO	2J6C1
V17	ELECTRON TUBE: JAN type 6Y6G	Audio output	2J6Y6G
V19	ELECTRON TUBE: JAN type OC3W	Voltage regulator	2J0C3W
F1	FUSE FU-27: 2 amp	A-c line	3Z1927
	GEAR: spur type; dial mask mtg gear; 80 teeth; 2.5624″ OD, .6875″ bore, .125″ thk.		2Z1872–212
	GEAR: spur type; idler gear for driving dial mask; 64 teeth; 2.0624″ OD, .250″ bore, .065″ thk, ctb $2\frac{1}{32}$″ dia x .031″ d.		2Z1872–210
	GEAR: spur type; dial mask drive gear; straight teeth.		2Z4872–211
H15, H16	HANDLE: rec lifting; steel nickel pl		2Z4928–85
E26	INSULATOR, bushing: rd; plastic per JAN–P–79; .100″ lg x ⅜″ OD o/a.	In coupling to main TUNING capacitor shaft.	3G100–75
E50, E51	INSULATOR, plate: rectangular; $\frac{13}{16}$″ lg x ½″ wd x .062″ thk; 2 mtg holes .221″ dia, .375″ c to c, ea hole $\frac{3}{32}$″ from edge and ¼″ from top.		3G320–269
J3	JACK JJ–034: tp; for 2 cond ¼″ dia plug; 1¼″ lg x 1″ wd x ¾″ h; Sig dwg SC–D–2339.	PHONES jack	2Z5534
	KNOB: rd; black plastic; for ¼″ dia shaft; w/integral pointer.		2Z5821–4.1
	KNOB: rd; molded black plastic, incl flat .032″ thk 2″ dia SS locking plate attached to brass hub; for ¼″ dia shaft.		2Z5822–494
	KNOB: rd; black bakelite; for $\frac{3}{32}$″ dia shaft; line marking.		2Z5822–578
	KNOB: rd fluted; black molded plastic; for ⅜″ dia shaft.		2Z5822–495
E5, E6	LAMP LM–27: 6–8 v, ¼ amp; miniature bayonet base.	Dial illumination	2Z5927
R101, R102	LAMP, incandescent: 120 v, 7 w; candelabra screw base.	Series resistors, V19	6Z6825. 1
J7, J8	LAMPHOLDER: candelabra screw base	J7: Socket for R101 J8: Socket for R102.	6Z8336–2
J5, J6	LAMPHOLDER: miniature bayonet	J5: Socket for E5 J6: Socket for E6.	2Z5883–350
H18	LOCK: radio dial lock		2Z6195. 20
H17	MASK, dial: band and freq indicator mask		2Z6505–15
M1	METER, ammeter: dc; range 0–50 ua	CARRIER LEVEL indicator	3F865–25
H19 through H34	NUT, anchor: strap nut; #4–40	For X1 through X16	6L2714–40C–3

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
N1	PLATE, identification: channel freq inscribed "CHANNEL" and "FREQUENCY", under "CHANNEL" inscribed "1", "2", "3", "4", "5", "6", and "VFO".		2Z7091–371
H38	POINTER, indicator	Indicates frequency	2Z7258. 104
L61	REACTOR, filter choke: 5 hy, 150 ma; 65 ohms d-c resistance; HS metal case.	B+ filter choke	3C317–75
K1	RELAY, armature: single wnd coil, 24 v dc, .125 amp, 300 ohms, inductive, coil ins.	I-f selector for single or double conversion.	2Z7599A–274
R49, R58, R64	RESISTOR, fixed: comp; 3.3 ohms ±10%; ½ w.	R49: Overcoupling prevention for T28 in medium position. R58: Overcoupling prevention for T29 in medium position. R64: Overcoupling prevention for T30 in medium position	3Z5993C3–2
R50, R59, R65	RESISTOR, fixed: comp; 8.2 ohms ±10%; ½ w.	R50: Overcoupling prevention for T28 in broad position. R59: Overcoupling prevention for T29 in broad position. R65: Overcoupling prevention for T30 in broad position.	3Z5998B2–1
R109	RESISTOR, fixed: comp; 39 ohms ±10%; 1 w; JAN type RC30BF390K.	Filament stabilizer for R80 ballast tube.	3RC30BF390K
R4, R10, R39, R61	RESISTOR, fixed: comp; 68 ohms ±10%; ½ w; JAN type RC20BF680K.	R4: Cathode bias, V1 R10: Cathode bias, V2. R39: Cathode bias, V6. R61: Cathode bias, V10.	3RC20BF680K
R115	RESISTOR, fixed: comp; 100 ohms ±10%; ½ w; JAN type RC20BF101K.	Gain equalizer antenna circuit BAND 1.	3RC20BF101K
R18, R21, R43, R67, R74	RESISTOR, fixed: comp; 150 ohms ±10%; ½ w; JAN type RC20BF151K.	R18: Cathode bias, V3 R21: Injection voltage equalizer, V3. R43: Cathode bias, V7. R67: Cathode bias, V11. R74: Cathode bias, V15.	3RC20BF151K
R99	RESISTOR, fixed: comp; 220 ohms ±10%; 2 w; JAN type RC42BE221K.	Cathode bias, V17	3RC42BE221K
R1, R8, R17, R28	RESISTOR, fixed: comp; 470 ohms ±10%; ½ w; JAN type RC20BF471K.	R1: Shorting resistor to prevent suck-outs in antenna stage. R8: Shorting resistor to prevent suck-outs in r-f stage. R17: Shorting resistor to prevent suck-outs in mixer stage. R28: Shorting resistor to prevent suck-outs in oscillator stage.	3RC20BF471K
R55	RESISTOR, fixed: comp; 560 ohms ±10%; ½ w; JAN type RC20BF561K.	Cathode bias, V9, NORMAL BROAD position.	3RC20BF561K
R52	RESISTOR, fixed: comp; 680 ohms ±10%; ½ w; JAN type RC20BF681K.	Cathode bias, V9, all 3 crystal positions.	3RC20BF681K
R7, R34, R53	RESISTOR, fixed: comp; 1000 ohms ±10%; ½ w; JAN type RC20BF102K.	R7: Plate load, V1 R34: Plate circuit filter, V5. R53: Cathode bias, V9, NORMAL SHARP position.	3RC20BF102K
R54, R111	RESISTOR, fixed: comp; 1500 ohms ±10%; ½ w; JAN type RC20BF152K.	R54: Cathode bias, V9, NORMAL MED position. R111: Hum filter, RF GAIN circuit.	3RC20BF152K

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R13 through R16, R88, R100	RESISTOR, fixed: comp; 2200 ohms ±10%; ½ w; JAN type RC20BF222K.	R13: Plate load, V2, T13 R14: Plate load, V2, T14. R15: Plate load, V2, T15. R16: Plate load, V2, T16. R88: Part of meter network. R100: Audio dropping for PHONES jack.	3RC20BF222K
R5, R6, R12, R36, R48, R57, R63, R69, R75, R79, R103	RESISTOR, fixed: comp; 2700 ohms ±10%; ½ w; JAN type RC20BF272K.	R5: Screen dropping, V1 R6: Plate isolation, V1. R12: Plate isolation, V2. R36: Plate isolation, V3. R48: Plate isolation, V7 or V8. R57: Plate isolation, V9. R63: Plate isolation, V10. R69: Plate isolation, V11. R75: Plate isolation, V15. R79: Plate isolation, V14. R103: Plate isolation, V6.	3RC20BF272K
R26, R27	RESISTOR, fixed: comp; 4700 ohms ±10%; ½ w; JAN type RC20BF472K.	R26: Grid leak, V4, T23 R27: Grid leak, V4, T24.	3RC20BF472K
R110	RESISTOR, fixed: comp; 5600 ohms ±10%; 1 w; JAN type RC30BF562K.	B+ hum filter	3RC30BF562K
R86	RESISTOR, fixed: comp; 8200 ohms ±10%; ½ w; JAN type RC20BF822K.	Meter network	3RC20BF822K
R11, R20, R24, R25, R95, R106, R113	RESISTOR, fixed: comp; 10,000 ohms ±10%; ½ w; JAN type RC20BF103K.	R11: Screen dropping, V2 R20: Screen dropping, V3. R24: Grid leak, V4, T21. R25: Grid leak, V4, T22. R95: Cathode bias, V16. R106: Grid return, V8. R113: Meter shunt.	3RC20BF103K
R19, R62, R68, R104	RESISTOR, fixed: comp; 22,000 ohms ±10%; ½ w; JAN type RC20BF223K.	R19: Grid resistor, V3 R62: Screen dropping, V10. R68: Screen dropping, V11. R104: Grid #1 bias, V7.	3RC20BF223K
R33, R56	RESISTOR, fixed: comp; 27,000 ohms ±10%; ½ w; JAN type RC20BF273K.	R33: Screen dropping, V5 R56: Screen dropping, V9.	3RC20BF273K
R44, R47	RESISTOR, fixed: comp; 33,000 ohms ±10%; ½ w; JAN type RC20BF333K.	R44: Screen dropping, V7 R47: Plate dropping, V8.	3RC20BF333K
R22, R23	RESISTOR, fixed: comp; 39,000 ohms ±10%; ½ w; JAN type RC20BF393K.	R22: Grid leak, V4, T19 R23: Grid leak, V4, T20.	3RC20BF393K
R32, R45, R46, R97	RESISTOR, fixed: comp; 47,000 ohms ±10%; ½ w; JAN type RC20BF473K.	R32: Grid resistor, V5 R45: Grid isolation, V8. R46: Grid isolation, V8. R97: Plate decoupling, V16.	3RC20BF473K
R84	RESISTOR, fixed: comp; 82,000 ohms ±10%; 1 w; JAN type RC30BF823K.	AGC voltage divider, V13	3RC30BF823K
R3, R51, R60, R66, R78	RESISTOR, fixed: comp; 100,000 ohms ±10%; ½ w; JAN type RC20BF104K.	R3: AGC isolation, V1 R51: Grid bias, V9. R60: Grid return, V10. R66: Grid return, V11. R78: Screen dropping, V14.	3RC20BF104K
R96	RESISTOR, fixed: comp; 150,000 ohms ±10%; ½ w; JAN type RC20BF154K.	Plate dropping, V16	3RC20BF154K

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
R89, R107, R112	RESISTOR, fixed: comp; 220,000 ohms ±10%; ½ w; JAN type RC20BF224K.	R89: Diode load, V13 R107: Diode load, V12. R112: Carrier level equalizer.	3RC20BF224K
R117	RESISTOR, fixed: comp; 330,000 ohms ±10%; ½ w; JAN type RC20BF334K.	Plate dropping, V16	3RC20BF334K
R73, R77, R98	RESISTOR, fixed: comp; 470,000 ohms ±10%; ½ w; JAN type RC20BF474K.	R73: ANL time constant, V12 R77: Suppressor grid isolation, V14. R98: Grid return, V17.	3RC20BF474K
R40	RESISTOR, fixed: comp; 680,000 ohms ±10%; ½ w; JAN type RC20BF684K.	Screen dropping, V6	3RC20BF684K
R2, R9, R91, R114	RESISTOR, fixed: comp; 1 meg ±10%; ½ w; JAN type RC20BF105K.	R2: Grid return, V1 R9: Grid return, V2. R91: Diode load, V13. R114: Grid return, V6.	3RC20BF105K
R108	RESISTOR, fixed: comp; 2.2 megs ±10%; ½ w; JAN type RC20BF225K.	ANL time constant, V12	3RC20BF225K
R81	RESISTOR, fixed: WW; 400 ohms ±5%; 4 w; JAN type RW20E401.	B— Voltage divider	3RW21910
R35	RESISTOR, fixed: WW; 280 ohms ±5%; 4 w; JAN type RW 20E281.	Current limiting, K1	3RW21010
R105	RESISTOR, fixed: WW; 3.5 ohms ±5%; 2 w; JAN type RW 55E3R5.	Filament dropping for V12 and V16.	3RW9604
R80	RESISTOR, thermal: maintains cur between .58 and .625 amp over the voltage range of 4.3–9.7 v; designed for dc; T–9 bulb 2⅞" lg o/a.	Current regulator, V3 and V4	3Z6925–3.19
R87	RESISTOR, variable: WW; 1500 ohms ±10%; 2 w; JAN type RA20A1SA152AK.	METER ZERO adjustment	3RA6004
S7, R83	RESISTOR, variable: comp; 5000 ohms ±20%; 2.25 w; 3 solder lug term.; SPST sw; enclosed metal case; 1 1/16" dia x 5/16" lg; Hallicrafters #25B886.	RF GAIN-AC control	3Z7350–137
R82	RESISTOR, variable: comp; 5000 ohms ±20%; 2.25 w; enclosed metal case, 1 1/16" dia x 5/16" lg; Hallicrafters #25B884.	BFO INJ control	3Z7350–125
R94	RESISTOR, variable: comp; 2 meg ±20%; 2.25 w; enclosed metal case, 1 1/16 "dia x 5/16" lg; Hallicrafters #25B883.	AUDIO GAIN control	3Z7499–2.50
O3, O4	RETAINER, crystal holder	For crystals Y7 and Y8, respectively.	2Z7780–124
O23, O24	RING, retainer: shaft retaining ring	For CRYSTAL PHASING shaft	2Z7858–156
	SCALE: freq indicator		2Z8076–163
	SCALE: vernier dial		2Z8076–162
O32	SHAFT: ant, adj		2Z8203–596
O33	SHAFT: extension shaft		2Z8203–597
O25	SHAFT: extension shaft	For C161	2Z8203–520
O31	SHAFT: turret shaft		2Z8203–595
O39	SHELL, connector: Radio Frequency Hood UG–106/U; coax socket shielding hood, provides convenient method of connecting cable shielding to receptacle.		2Z7390–106
E48, E44	SHIELD, electron tube: bayonet type mtg; .810" ID x 1.375" h; JAN type TS102U01.	E44: For V13 E48: For V12.	2Z8304.57

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
E33, E34, E35, E37 through E43, E45, E46, E47	SHIELD, electron tube: bayonet type mtg; .810″ ID x 1¾″ lg; JAN type TS102U02.	E33: For V1. E34: For V2. E35: For V3. E37: For V5. E38: For V6. E39: For V7. E40: For V8. E41: For V9. E42: For V10. E43: For V11. E45: For V14. E46: For V15. E47: For V16.	2Z8304.154
O37, O38	SHIELD, light: ea		2Z8301–36
X21 through X28	SOCKET, crystal: 55/64″ lg x ⅜″ wd x 43/64″ h; Eby #9006.	For crystals Y1 through Y8, respectively.	2Z8761–60
X6 through X16	SOCKET, electron tube: 7 cont miniature; 1 piece saddle mtg; JAN type TS102P01.	X6 through X16: for V6 through V16, respectively.	2Z8677.94
X1, X2, X3, X5	SOCKET, electron tube: 7 cont miniature; 1 piece saddle mtg; JAN type TS102C01.	For V1, V2, V3, and V5, respectively.	2Z8677.99
X4	SOCKET, tube: 7 cont miniature; 1 piece saddle mtg.	For V4	2Z8677.166
X17 through X20	SOCKET, tube: octal; saddle mtg	For V17, V18, V19, and R80, respectively.	2Z8678.46
O9, O10	SPRING: helical extension type; for use in conjunction w/coupling main tuning capacitor gear drive; ¾″ lg x 3/16″ OD o/a; 11 complete turns close wnd.	Part of coupling between gear drive and main TUNING capacitor.	2Z8877.428
H38, H40, H41	STUD: ⅞″ lg o/a x 3/16″ dia body, 1/16″ dia term. and #4–40 threaded stud; #4–40 threaded stud at 1 end, 3/16″ lg.		3Z12101–28
S1A through S1F	SWITCH, rotary: 6 positions; 6 sect	SELECTIVITY switch	3Z9825–36.5
S2A, S2B, S2C	SWITCH, rotary: 7 positions; 3 sect	VFO-CRYSTAL selector	3Z9825–62.544
S3, S6	SWITCH, toggle: SPST; JAN type ST42A	S3: ANL-OFF S6: RECEIVE-SEND.	3Z9863–42A
S5	SWITCH, toggle: DPST; JAN type ST52K	CW-MODULATION	3Z9863–52K
S4	SWITCH, toggle: DPDT; JAN type ST52N	AGC-MANUAL	3Z9863–52N
E28, E29	TERMINAL BOARD: general purpose: 1 brass solder lug term.; ¾″ lg x ½″ wd x 11/16″ h o/a.	Binding post strips	3Z770–1.18
E49	TERMINAL BOARD: general purpose: 1 brass solder lug term.; ¾″ lg x ½″ wd x 23/32″ h o/a.		3Z770–1.21
E2, E3	TERMINAL BOARD: general purpose; 2 brass nickel pl screw type term. w/lugs for below chassis feedthru; 1⅝″ lg x 1⅛″ wd x ½″ h, w/lugs 15/16″ h.	E2: RECEIVE-SEND E3: AUDIO IN.	3Z770–2.81
E30	TERMINAL BOARD: general purpose; 2 brass solder lug term.; 1 integral w/mtg lug: ¾″ lg x ½″ wd x ¾″ h o/a.	Binding post strip	3Z770–2.82
E31, E32	TERMINAL BOARD: general purpose; 2 brass solder lug term.; 1⅛″ lg x ½″ wd x 11/16″ h o/a.	Binding post strips	3Z770–2.83
E52	TERMINAL BOARD: r-f gain isolation: 2 brass turret type term.; 2½″ lg x 1″ wd x 3/32″ thk, w/term. ⅝″ thk.		3Z770–2.100

2. Identification Table of Parts for Radio Receiver R–274/FRR—Continued

Ref symbol	Name of part and description	Function of part	Signal Corps stock No.
E1	TERMINAL BOARD: ant. and gnd binding post strip; three #6–32 NC-2 x ¼″ lg; nickel pl brass knurled thumbscrew term. on top and 3 lug term. on bottom; 2 1/16″ x 1/16″ wd x ⅞″ h o/a.		3Z770–3.50
E4	TERMINAL BOARD: general purpose; 5 brass nickel pl screw type term. w/lugs for below chassis feedthru; 2 5/16″ lg x 1⅛″ wd x ½″ h; w/lugs 5/16″ h.	AUDIO OUTPUT	3Z770–5.28
E7	TERMINAL BOARD: resistor mtg; 6 brass silver pl turret type term.; 1⅞″ lg x 1⅛″ wd x 3/32″ thk, w/term. and insert ⅝″ thk.	455-kc output	3Z770–6.84
E9	TERMINAL BOARD: general purpose binding strip post; 8 brass silver pl turret type term.; 2¾″ lg x 13/16″ wd x 3/32″ thk, w/term. and inserts ⅝″ thk.	Resistor, choke, and capacitor mounting (6.445-mc crystal oscillator).	3Z770–11.18
E8	TERMINAL BOARD: resistor and choke mtg; 10 brass silver pl turret type term.; 1⅞″ sq x 3/32″ thk, w/term, and inserts ⅝″ thk.	For BFO	3Z770–10.54
E10	TERMINAL BOARD: resistor and capacitor mtg; 12 brass silver pl turret type term.; 2 rows of 6 term., 1½″ between rows, ea row of ctr 4 term. has term. spaced ⅜″ apart and two opposite end term. spaced 1″ from nearest term.; 3½″ lg x 1⅞″ wd x 3/32″ thk, w/term. and inserts ⅝″ thk.	For ANL	3Z770–12.83
E11	TERMINAL BOARD: resistor and capacitor mtg; 12 brass silver pl turret type term.; 3½″ lg x 1⅞″ wd x 3/32″ thk, w/term. and inserts ⅝″ thk.	For 2d detector	3Z770–12.84
E13	TERMINAL BOARD: resistor mtg; 14 brass silver pl turret type term.; board 6⅝″ lg x 2¼″ wd x 3/32″ thk, w/term. 7/16″ thk.	For r-f and oscillator chassis	3Z770–18.53
E12	TERMINAL BOARD: resistor and capacitor mtg; 14 brass silver pl turret type term.; 2⅝″ lg x 1⅞″ wd x 3/32″ thk, w/term. and inserts ⅝″ thk.	For 1st audio	3Z770–14.57
E14	TERMINAL BOARD: resistor, choke and capacitor mtg; 30 brass silver pl turret type term.; 8⅞″ lg x 1⅞″ wd x 3/32″ thk, w/term. 7/16″ thk.	For 6-mc intermediate frequency	3Z770–30.15
E15	TERMINAL BOARD: resistor mtg; 38 brass silver pl turret type term.; 7⅛″ lg x 1⅝″ wd x 3/32″ thk, w/term. and inserts ⅝″ thk.	For 455-kc i-f chassis	3Z770–38.10
T35	TRANSFORMER, AF: plate coupling type; pri 2000 ohms impedance; secd #1, 50 ohms impedance; secd #2, 150 ohms impedance; secd #3, 150 ohms impedance; max d-c cur rating .075 amp, 500 v test; HS metal case.	Audio output	2Z9635.38
T33	TRANSFORMER, IF: 455 kc; bfo	Bfo	2Z9644.32
T32	TRANSFORMER, IF: output 455 kc	455-kc output	2Z9642.137
T31	TRANSFORMER, IF: 455 kc; output 455 kc IF.	4th 455-kc intermediate frequency	2Z9642.136
T28	TRANSFORMER, IF: 455 kc; input 455 kc, 1st IF.	1st 455-kc intermediate frequency	2Z9642.133
T29	TRANSFORMER, IF: 455 kc; interstage 2d IF.	2nd 455-kc intermediate frequency	2Z9642.134