TECHNICAL MANUAL

DEPOT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

RECEIVING SET, RADIO
AN PRR-9 (XE-9)

HEADQUARTERS, DEPARTMENT OF THE ARMY
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Depot Maintenance Manual
Including Repair Parts and Special Tools List

RECEIVING SET, RADIO AN/PRR-9(XE-9)

CHAPTER 1

FUNCTIONING OF EQUIPMENT

1-1. Scope

a. This manual contains instructions for depot maintenance of Receiving Set, Radio AN/ PRR-9(XE-9) and depot overhaul standards. No direct support (DS) or general support (GS) maintenance is authorized for this equipment. The instructions include functioning of the equipment, troubleshooting, repair, alinement, and testing. The manual also lists tools, materials, and test equipment necessary to accomplish the maintenance.

b. Operation and organizational maintenance for the AN/PRR-9(XE-9) are covered in TM 11-5820-549-12-1.

1-2. Indexes of Equipment Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether these are modification work orders (MWO'S) pertaining to the equipment.

1-3. Reporting of Equipment Manual Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forward direct to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-ME-NMPAD, Fort Monmouth, NJ 07703.

Section II. FUNCTIONING OF RECEIVING SET, RADIO AN/PRR-9(XE-9)

NOTE

Reference designations in this section are abbreviated. See schematic diagram, fig. 4-10, for complete reference designations.

1-4. Block diagram, AN/PRR-9(XE-9) (fig. 1-1)

Receiving Set, Radio AN/PRR-9(XE-9) is capable of receiving a voice-modulated or tone-modulated frequency-modulated (fm) signal within the frequency range of 47 to 57 megahertz (MHz). The specific frequency of operation is crystal-controlled, and a change in the frequency is accomplished by changing the internal oscillator crystal. The set has the capability of either un-squelched or 150 Hz tone squelch operation. The signal path is shown in the block diagram (fig. 1-1) and is discussed in a. through f. below. For complete circuit details, refer to the overall schematic diagram (fig. 4-10).

a. The AN/PRR-9(XE-9) employs integrated circuits and electronic component assemblies for many of its functions. The rf integrated circuit module Z1 includes circuitry which, with associated external discrete components, performs the function of rf amplifier, first mixer and local oscillator. Z2, the i.f. integrated circuit module, with associated external components, performs the functions of 10.7 MHz i.f. amplifier, second mixer, second oscillator, and 455 kHz, i.f. amplifier. The detector integrated circuit module Z5, with other associated components, provides the limiter, squelch and audio amplifier functions. Z3 contains diodes, resistors and capacitors of the discriminator circuitry. Z4 contains the 150 Hz notch filter portion of the squelch circuit. For signals or functions of the integrated circuit connection points, refer to the following descriptions and the summary in paragraph 1-16.

b. A signal received in the antenna of the receiver is increased in amplitude by radio frequency (rf) amplifier. The amplifier signal is applied to the first mixer where it is mixed with the output of the local oscillator, which is crystal-controlled. The first oscillator frequency is 10.7 MHz below the frequency of the incoming signal, and as a result of mixing, a 10.7 MHz intermediate frequency (i.f.) is developed.

c. The output of the first mixer is then applied to a 10.7 MHz i.f. amplifier where the signal is amplified and applied to the input of the second mixer. The output of the second oscillator, which is crystal-controlled by a 10.245 MHz crystal, is also applied to the second mixer. The mixing of the 10.'7 MHz and 10.245 MHz signal results in an output signal of 455 kilohertz (kHz).

d. The output of the second mixer is coupled through a 455 kHz i.f. filter, which establishes the major bandpass characteristics of the receiver. The 455 kHz signal is then amplified by the 455 kHz i.f. amplifier and applied to the limiter.

e. Proper limiting of the fm signal is accomplished by the limiter stage. Limiting action keeps the signal at a predetermined amplitude. The output of the limiter is applied to a modified Foster-Seeley discriminator stage, and the audio information extracted from the fm signal.

f. The audio signal from the discriminator is increased by the audio amplifier and applied either to the horn transducer or headset depending upon which is used. The squelch circuit, when applied, is activated by the presence of 150 Hz tone signal recovered by the discriminator from the incoming signal and disables the audio amplifier to keep the receiver quiet in the absence of a signal.

1-5. Antenna and rf Circuits (fig. 4-10)

a. The AN/PRR-9(XE-9) receiver antenna E1 (Antenna AS-1998/PRR-9) is a whip-type antenna most receptive to any direction of horizontal radiation. A permeability tuned loading coil L1 is used to electrically compensate for the physical shortness of the antenna. The signal from the antenna is coupled through loading coil L1 to a double-tuned circuit by means of a low-impedance tap of transformer T1. The input tuned circuit consists of variable capacitor C1 and the inductance of TI. The rf signal is coupled by capacitor C2 to the other half of the double-tuned circuit, consisting of variable capacitor C3 and the primary winding of transformer T2. The signal is inductive-coupled to T2 secondary and to Z11 the input of the rf amplifier. The output of the rf amplifier is coupled from Zi-4 to a tap on the primary of transformer T3. The primary of T3 and variable capacitor C7 form the third tuned circuit at the rf signal frequency.

b. The primary to secondary turns ratio of T2 and the tap on the primary of T3 provide the proper impedance relationships to maintain stability of the rf amplifier under all voltage and temperature service conditions and, at the same time, provide adequate signal gain.

c. Capacitors C4 and C5 provide signal bypassing of the T2 secondary.

d. Rf choke L2, in conjunction with the capacitors C6 and C9, form a B+ decoupling network providing isolation between the rf amplifier and the first mixer.

1-6. Local Oscillator

The transistor for the local oscillator is contained in integrated circuit Z1. A third overtone (CR-81/U) crystal (Y1) operating in the series-resonant mode de" -mines the frequency of oscillation 10.7 MHz below the incoming rf signal. The oscillator output tuned circuit consists of a piston trimmer, C15, and a fixed shielded inductor, L4. The capacitor divider, C13 and C14, provides the feedback between the transistor collector at Z1-8 and emitter at Z1-10 to sustain oscillation. The injection signal is derived from the oscillator output circuit and is applied to the first mixer circuit at Z1-6 by capacitor C10. Capacitor C12 is the signal bypass for the oscillator output circuit. Rf choke, L3, in conjunction with capacitors C9 and C12, form a B+ decoupling network providing isolation between the local oscillator and the first mixer.

1-7. First Mixer

The transistor for the first mixer is contained in the integrated circuit Z1. The rf signal from the rf amplifier is applied through Z1-6 to the input of the first mixer by means of the secondary winding of T3 and R1. The signal from the local oscillator is applied across the combined impedance of R1 and the secondary of TS. The output of the first mixer at Z1-12 is developed across the tuned circuit consisting of T4 and C16, which is resonant at the first i.f. frequency 10.7 MHz. The 10.7 MHz i.f. signal is coupled from the first mixer at a reduced impedance level by means of the tap on T4 and through capacitor C17 to the input of the 10.7 MHz i.f. amplifier at Z2-3. Capacitors C8, C9 and C11 provide signal bypassing. Rf choke L5, C9 and C22 form a B+ line isolation network between the first mixer and the 10.7 MHz i.f. amplifier.

1-8. I.f. Amplifier, 10.7 MHz

The transistor for the 10.7 MHz i.f. amplifier is contained in the i.f. integrated circuit Z2. The i.f. signal is coupled to the Z2-3 input of the 10.7 MHz i.f. amplifier by C17. The output signal at

Z2- 4 is developed across a capacitively coupled double-tuned circuit consisting of C18, T5, C19, C20 and T6. The signal is then transferred at a reduced impedance from the tap on T6 by means of C21 to the input of the second mixer at Z25. Capacitor C22 functions as the signal bypass for the amplifier.

1-9. Second Oscillator

The transistor for the second oscillator is contained in the .i.f. integrated circuit Z2. The second oscillator operating at 10.245 MHz is a Pierce type with the crystal Y2 operating at its fundamental parallel resonant mode. The leads of crystal (type CR-64U) are soldered to the circuit board. Capacitors C24 and C25 form the phase-reversing voltage divider for the feedback signal from collector, Z2-1, to ground and from base, Z2-2 to ground. Capacitor C23 couples the 10.245 MHz signal to the input of the second mixer at Z2-5. Capacitor C22 is the signal bypass for the circuit.

1-10. Second Mixer and 455 KHz Filter

The transistor for the second mixer is contained in the i.f. integrated circuit Z2. Both the 10.7 MHz i.f. signal and the 10.245 MHz oscillator signal are coupled to the input of the second mixer Z2-5, at the junction of C21 and C23. The desired difference frequency signal of 455 kHz is developed across the input of the ceramic ladder filter FL1. The filter has a -6 decibel (db) bandwidth of approximately 40 kHz and a -60 db bandwidth of approximately 70 kHz. Capacitor C22 is the signal bypass for the second mixer.

1-11. I.f. Amplifier, 455 KHz

Three cascaded stages of 455 kHz gain are contained in the i.f. integrated circuit Z2. The input signal for the first stage is taken from the output of the ladder filter FL1 and is introduced at Z1-8 to the amplifier. Capacitor C26 provides coupling between the first and second stages of gain from Z2-9 to Z2-10. Capacitor C28 couples the signal from the second to the third stage of gain from Z2-11 to Z2-12. Capacitor C29 couples the signal from the output of the third stage at Z2-13 to the input of the limiter at Z54. The signal bypass for the B + line is C22.

1-12. Limiter and Discriminator

The transistor for the limiter is contained in the detector integrated circuit Z5. The 455 kHz i.f. signal is applied to the limiter input at Z5-3 by the capacitor C29. The output of the limiter from Z5-1 passing through the isolation resistor R2 drives the discriminator input tuned circuit, C30 and T7, by means of a top on T7. The secondary winding of T7 acts as a tickler for the discriminator secondary T8. The discriminator secondary tuning capacitors, detection diodes and a low-pass filter are contained in electronic component assembly Z3. The low-pass filter has two isolated outputs, one, Z3-2, applying signal to the squelch control R5 and the other, Z3-1, applying signal to the volume control R7. Capacitor C36 is the signal bypass for the limiter. The B+ filter network C22, L6 and C36 provide isolation between the 455 kHz i.f. amplifier and the limiter.

1-13. Audio Circuit

The recovered fm modulation (voice or tone) is applied across the volume control R7. The desired level of the signal is selected by the adjustment of R7 and is coupled to the input of the audio amplifier at Z5-13 by capacitor C40. The audio amplifier is contained in the detector integrated circuit Z5. The output signal is applied from Z5-10 to the horn transducer LS1 or the headset H-302(XE-1)/PRR-9 by means of the earphone jack J5. Both the horn and the headset have an impedance of approximately 220 ohms and a resistance of 80 ohms. Capacitors C40 and C42 are instrumental in determining the low frequency roll-off. Capacitor C43 assures stability of the audio amplifier by minimizing gain at frequencies above the audio spectrum. The signal bypass for the audio amplifier B + line is capacitor C36. Diode CR3, in series with J5, allows the horn transducer LS1 to function in the event J5 short circuits to ground (B-).

1-14. Tone Squelch Circuit

a. Tone squelch (150 Hz) is activated when the receiver control is initially turned on. Squelch switch S1, which is a part of the receiver control, is open in this condition. The audio amplifier is disabled and dissipates no power in the absence of signal. Upon reception of a signal with 250 Hz sidetone modulation, the 150 Hz signal is applied across the squelch adjust potentiometer R5. The proper level of signal is coupled from R5 by capacitor C35 through R3 to the input of the squelch circuit at Z5-4. The. transistor for the squelch circuit is contained in the detector integrated circuit Z5. The squelch circuit responds to the 150 Hz input signal and activates (within Z5) the audio amplifier.

b. Electronic component assembly Z4 and capacitor C34 comprise the 150 Hz notch filter and enable the squelch circuit to respond to the 150 Hz tone signal and reject other signals. Capacitor C37 determines the squelch circuit open and close characteristic. Capacitor C38 is the signal bypass for the squelch circuit.

c. The squelch circuit is disabled when the receiver control is manually rotated fully clockwise b}) the closure of switch S1. In this condition, the audio amplifier is energized regardless of the receiver input signal conditions. To reactivate the squelch circuit, the control must be rotated fully counterclockwise (opening S2) and then rotated clockwise to a setting which will produce the desired listening level upon receipt of a signal.

1-15. Power Source

The receiver is designed to operate from a battery (BA1) type BA-4534/U. The receiver is capable of full performance over the voltage range of 3.6V to 2.6V. Power is applied to the receiver when the control is moved from the fully counterclockwise position which closes switch S2.

1-16. Summary of Integrated Circuit and Electronic Component Connection Points

The following table summarizes the signals or functions of connection points of the integrated circuits and electronic component assemblies.

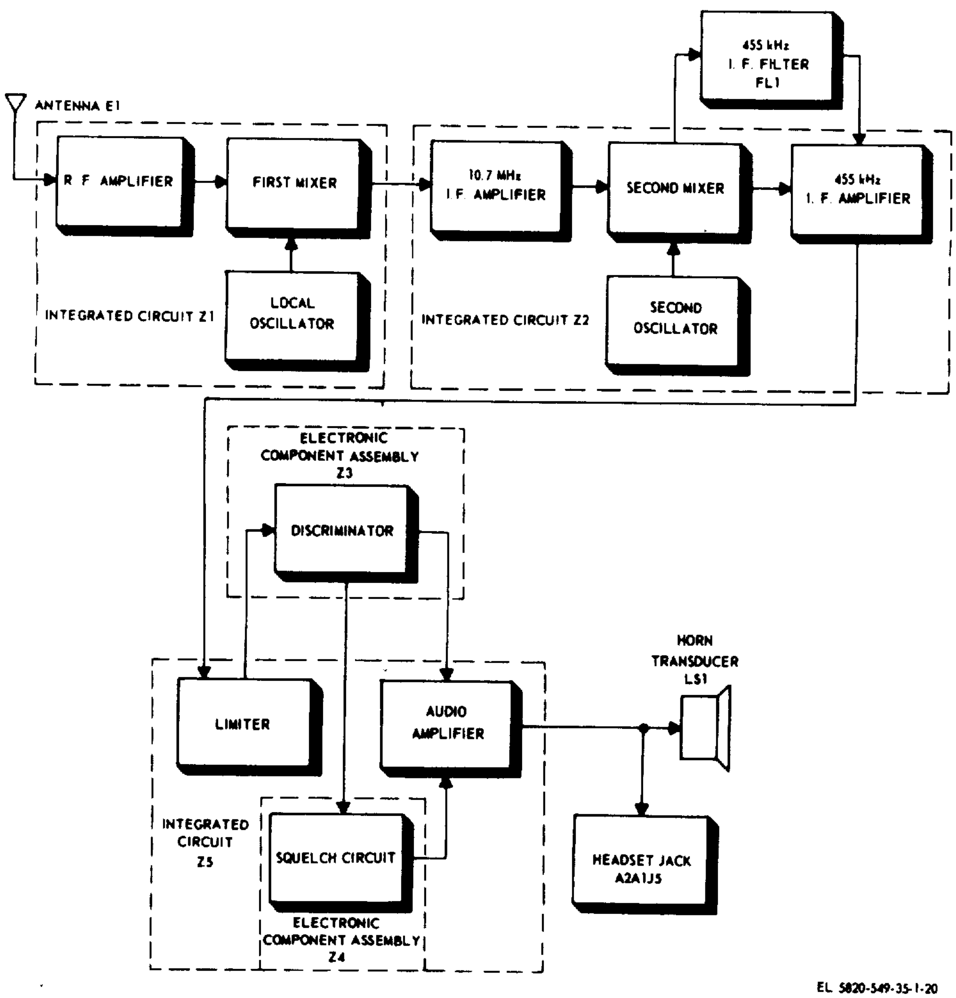

Figure 1-1. AN/PRR-9(XE-9) block diagram.

Integrated Circuit and Electronic Component Assembly Terminal Identification

Symbol	Pin number	Circuit board pad number (fig. 2-1)	Signal or function
Z1	1	36	Channel frequency input
	2	37	Rf amplifier bypass (emitter)
	3	38	Rf amplifier B+
	4	39	Channel frequency output to tuned circuit
	5	40	First mixer bypass
	6	24	Channel frequency and local oscillator injection to mixer
	7	23	Local oscillator B+
	8	25	Local oscillator frequency output
	9	26	Local oscillator crystal frequency
	10	27	Local oscillator emitter bypass
	11	28	First mixer emitter bypass
	12	29	10.7 MHz i.f. output to tuned circuit
	13	32	First mixer B+
	14	GRD	Ground (B-)
Z2	1	21	10.245 MHz crystal frequency
	2	22	10.245 MHz oscillator output
	3	20	10.7 MHz i.f. input
	4	46	10.7 MHz i.f. to tuned circuit
	5	49	10.7 MHz plus 10.245 MHz injection to second mixer
	6	50	455 kHz i.f. to filter FL1
	7	47	B+
	8	14	455 kHz amplifier input to first amplifier
	9	15	455 kHz i.f. output to C26
	10	16	455 kHz amplifier input to second amplifier
	11	17	455 kHz i.f. output to C28
	12	19	455 kHz amplifier input to third amplifier
	13	18	455 kHz i.f. output to C29
	14	GRD	Ground (B-)
Z3	1	53	Audio frequency
	2	1, 52	150 Hz signal
	3	57	455 kHz i.f.
	4	58	455 kHz i.f.
	5	GRD	Ground (B-)
	6	12	455 kHz i.f.
	7	13	455 kHz i.f.
Z4	1	5	150 Hz notch filter output
	2	GRD	Ground (B-)
	3	2	1l50 Hz notch filter input
Z5	1	60	455 kHz i.f. to discriminator
	2	54	Limiter B+
	3	3	455 kHz i.f. input
	4	2	150 Hz squelch tone input
	5	54	Squelch B+
	6	5	150 Hz squelch tone
	7	6	Squelch bypass
	8	8	Rectified 150 Hz squelch tone
	9	GRD	Ground (B-)
	10	10	Audio frequency output
	11	54	Audio amplifier (B+)
	12	56	Audio. amplifier bypass
	13	9	Audio frequency input
	14	59	Ground (B-)

CHAPTER 2

DEPOT TROUBLESHOOTING

2-1. Scope of Depot Troubleshooting

This chapter covers the troubleshooting procedures assigned to the depot category of maintenance for Receiving Set, Radio AN/PRR-9(XE9). These procedures supplement those described in the operation and organization maintenance manual TM 11-5820-549-12-1.

2-2. Organization of Troubleshooting

a. General. The first step in troubleshooting is to determine which functions are not operating correctly. The AN/PRR-9(XE-9) may receive signals satisfactorily, but the squelch may be inoperative. Complaints may also include weak reception, or completely inoperative equipment.

b. Operational Tests. Operational tests may indicate the general location of trouble. In many instances, the tests will help determine the exact nature of the fault. The operational test (TM 11-5820-549-12-1) may be used to determine general performance. The use of Indicator, Channel Alignment ID-1189(XE-2)/PR may also help to locate trouble. Some troubles may be due to poor alinement.

c. Visual Inspection. Obvious faults such as broken battery connector pin, and a loose or broken antenna housing assembly can easily be determined from visual inspection.

d. Intermittent Troubles. In all troubleshooting, the possibility of intermittent troubles should not be overlooked. If present, this type of trouble often may be made to appear by tapping or gently jarring the AN/PRR-9(XE-9) while operating the receiver control. The use of higher than normal input voltages for the purpose of locating intermittent faults should be avoided since damage to the integrated circuits could result.

e. Voltage and Resistance Readings. The best technique for locating trouble is the measurement of dc voltages and resistances. The most significant measurements on the integrated circuits are the collector terminal voltages. Detailed instructions for voltages and resistance measurements are provided in paragraph 2-6.

2-3. Test Equipment Required for Troubleshooting

The following chart lists test equipment required for troubleshooting the AN/PRR-9(XE-9). The associated technical manuals are also listed.

Item	*Technical manual*
Indicator, Channel Alignment ID-1189(XE-2)/PR	TM 11-6625-937-12
Multimeter TS-352B/U	TM 11-6625-366-15
Power Supply PP-3514/U	TM 11-6625-617-12

2-4. Troubleshooting Test Setup

a. Bench tests of the AN/PRR-9(XE-9) require connection to a power source. The power source must be connected to the AN/PRR-9(XE9) for all dc voltage measurements. The power supply should be set for 3.2 vdc. TS-352B/U connections are made to pads of the printed circuit board in the electronic unit assembly, or to other points designated in the voltage and resistance chart, paragraph 2-6.d. In making measurements on the printed circuit pads, always observe the polarity of the test equipment as specified for the particular tests.

CAUTION

This equipment contains integrated circuits. If any test equipment item does not have an isolation transformer in its power supply circuit, connect one in the power input circuit. A suitable transformer is identified by FSN 5950-3561779.

(1) Never connect test equipment (other than multimeters and vtvm's) outputs directly to an integrated circuit; use a coupling capacitor.

(2) Make test equipment connections with care so that shorts will not be caused by exposed test equipment connectors. Tape or sleeve (spaghetti) test prods or clips as necessary to leave as little exposed as needed to make contact to the circuit under test.

(3) When a power supply is used in place of the battery normally used with the equipment,

it must have good voltage regulation and low ac ripple. Good regulation is important because the output voltage of the battery eliminator (which has poor regulation) may exceed the maximum voltage rating of the integrated circuits in the equipment being tested. A battery eliminator that has poor ac filtering will create a false indication of poor filtering in the equipment being tested.

b. Test harness for connecting the power supply to the AN/PRR-9(XE-9) can be made by using the connector from a discarded Battery, Dry BA-4534/U, or a similar connector such as Switchcraft Micro-Jack type TR2A. Either of these connectors will fit the battery connector of the AN/PRR-9(XE-9). The tip of the battery connector is B + and the sleeve is B-.

2-5. Troubleshooting Chart

a. Use of Chart. The more common troubles are listed in the troubleshooting chart below. If the operational symptom is known, locate the symptom in the Indication column.

b. Conditions for Tests. All voltage checks in the chart are to be made with the PP-3514/U connected to the receiver (para 2-4). All resistance measurements and continuity checks are to be made without power to the receiver and the ohmmeter on a higher than X1 range.

c. Troubleshooting Chart

Indication	*Probable trouble*	*Procedure*
1 No audio	a. Defective J5	a. Examine J5 for open switch element. Replace J5 if required (pars 3-2).
	b. Defective Z3	b. Measure voltages and resistances at Z3 (para 2-6).
2 Audio received with headset, but not with horn transducer.	a. Defective LS1	a. Replace LS1.
	b. Defective J5	b. Examine J5 for proper action of switching element. Replace J5 if required (para 24).
3 No squelch	a. Misalinement	a. Realine (para 3-3 through 3-8).
	b. Defective Z4	b. Measure voltages and resistances at Z4 (para 2-6).
	c. Defective S1	c. Make continuity test of S1. Replace control assembly, if S1 is faulty (fig. 2-4).
4 Weak reception	a, Misalinement	a. Realine (para 3-3 through 3-8).
	b. Defective antenna connector J2	b. Mechanically adjust or replace J2.
	c. Defective Z1	c. Measure voltages and resistances at Z1 (para 2-6).
	d. Defective Z2	d. Measure voltages and resistances at Z2 (para 2-6).
5 No reception	a. Misalinement	a. Realine (para 3-3 through 3-8).
	b. Defective Y1	b. Replace Y1 (fig. 2-2).
	c. Defective Z1	c. Measure voltages and resistances at Z1 (para 2-6).
	d. Defective Z2	d. Measure voltages and resistances at Z2 (para 2-6).

2-6. Voltage and Resistance Measurements

a. General. All measurements are made with the electronic unit assembly removed from the case (TM 11-5820-549-12-1). Voltage and resistance measurements are given for all significant circuit points. Identification of integrated circuit elements is given in the schematic diagram, figure 4-10 and in the table in paragraph 1-16. For identification of printed circuit board pads refer to figure 2-1.

b. DC Voltage Measurements. All voltage measurements are made with the negative side of the TS-352B/U connected to ground of the printed circuit board. Positive connection is made to the indicated pad. All voltages shown on the chart are positive unless marked with a negative sign (-). Set the PP-3514/U for 3.2 volts. All voltage readings within 10 percent of those shown should be considered normal.

c. Resistance Measurements. All resistance measurements are made with the negative side of the multimeter connected to ground of the printed circuit board. Resistance measurements in circuits where integrated circuit elements are located may be expected to vary considerably from the typical values shown.

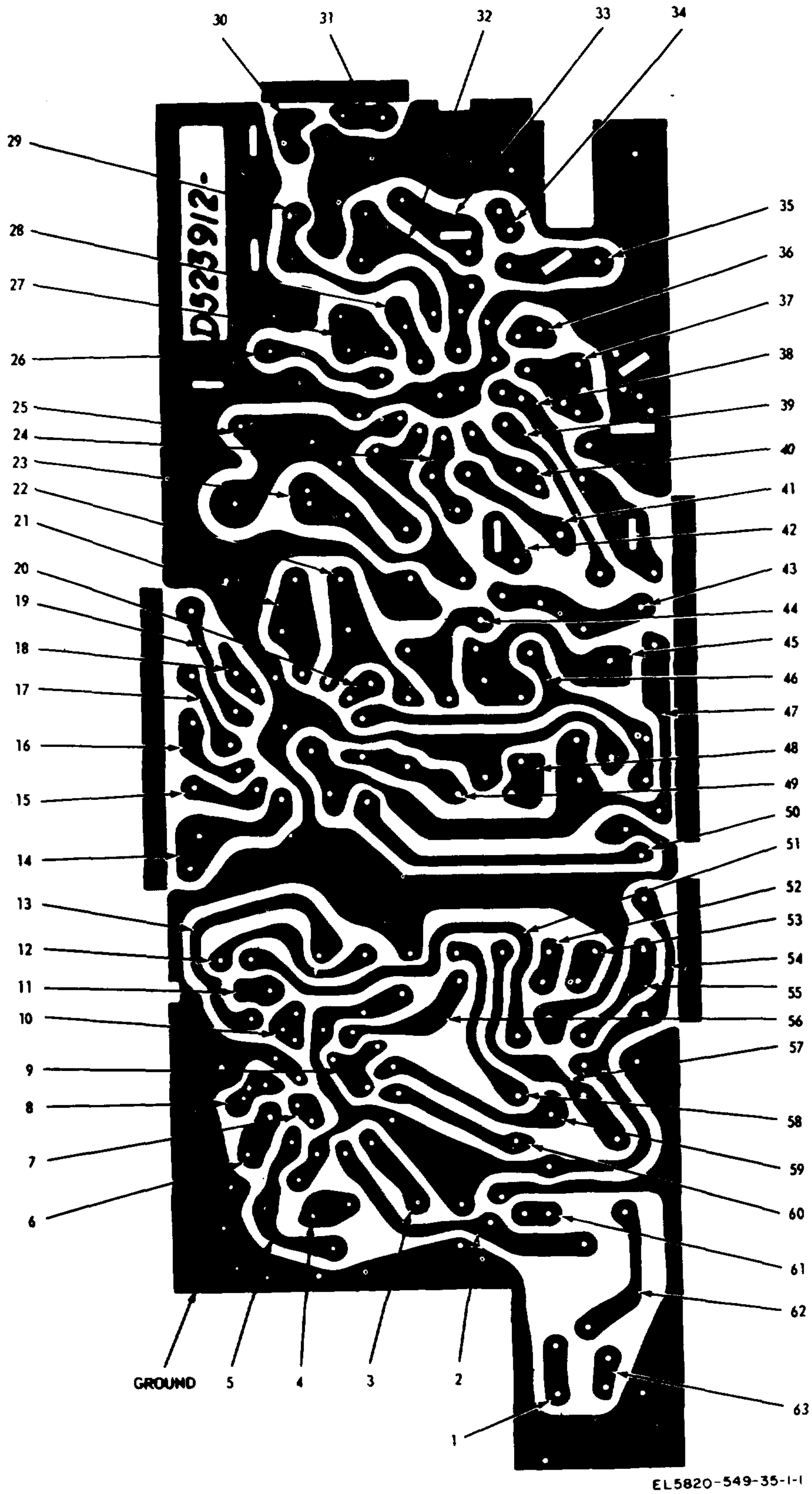

Figure 2-1. AN/PRR-9(XE-9) printed circuit board, voltage and resistance pad locations.

d. Voltage and Resistance Measurements (fig. 2-1).

NOTE

Unless otherwise indicated, setting of squelch control does not affect values shown.

Pad no. (fig. 2-1)	Circuit point	Typical resistance ohms (OHMS -DC±AC on TS-352B/U connected to circuit board ground)	DC Voltage ±10% (3.2 VDC Input to AN/PRR9(XE-9) Battery -Connector)
1	Z3-2, R5-high aide	45.0 K	0
2	Z4-3	28.0 K[a], 11.0 K[b]	1.25[a], 1.25[b]
8	Z5-3	8.0 K	0
4	C29, Z2-13	22.0 K	1.2
6	Z4-1, Z5-6	12.0 K[a], 9.7K[b]	1.2[a], 1.25[b]
6	Z5-7	3.0 K[a], 3.0 K[b]	.25[a], 0[b]
7	R7-high side	12.0 K	0
8	Z5-8	26.0 K[a], 0[b]	2.5[a], 0[b]
9	Z5-13	8.0 K[a], 7.7 K[b]	0[a], .65[b]
10	Z-10	28.0 K[a], 26.0 K[b]	2.8[a], 2..35[b]
11	T8-shield	0	0
12	Z3-6	4.6 K	-2.05
13	Z3-7	4.6 K	-2.15
14	Z2-8	7.7 K	.6
15	Z2-9	20.0 K	1.9
16	Z2-10	7.6 K	.6
17	Z2-11	21.0 K	2.0
18	Z2-13	21.0 K	1.2
19	Z2-12	7.7 K	.5
20	Z2-3	7.7 K	.6
21-	Z2-1	23.0 K	1.15
22	Z2-7	7.7K	.4
23	Z1-7	7.5 K	3.1
24	Z1-6	8.5 K	.8
25	Z1-8	7.5 K	3.1
26	Z1-9	8.6 K	.7
27	Z1-10	300.0	.3
28	Z1-11	250.0	.2
29	Z1-12	7.4 K	3.1
30	T4-tap, C17	7.4 K	3.1
31	C17, Z2-3	930.0	.6
32	Z1-13	7.4K	3.1
33	C1, T1	0	0
34	J2, T1-tap	0	0
35	C3, T2	0	0
36	Z1-1	220.0	.7
37	Z1-2	220.0	.7
38	Z1-3	7.5 K	3.1
39	Z1-4	7.5 K	3.1
40	Z1-5	8.5 K	.9
41	R1, T3-secondary	8.5 K	.9
42	C7, T3-primary	7.5 K	3.1
43	L2, L5, L3	7.5 K	3.1
44	C19, C20 T6-shield	0	0
45	T5-shield	0	0
46	Z2-4	7.5 K	3.1
47	Z2-7	7.5 K	3.1
48	C21, T6-tap	0	0
49	Z2-5	7.5K	.5
50	Z2-6	9.5K	2.6
51	T7-primary, T8	4.6 K	-2.1
52	Z3-2	45.0 K	0
53	Z3-1	57.0 K	0
54	Z5-2, 5, 11	7.5 K	3.2
55	T7-primary, C30	7.5 K	3.2
56	Z5-12	30.0 K[a], 27.0 K[b]	2.6[a], 2.3[b]
57	Z3-3	7.5 K	3.2

See footnotes at end of table.

Pad no. (fig. 2-1)	Circuit point	Typical resistance ohms (OHMS -DC±AC on TS-82B/U connected to circuit board ground)	DC Voltage ±10% (3.2 VDC Input to AN/PRR9(XE-9) Battery -Connector)
58	Z3-4	4.6 K	-2.1
59	Z5-14, T7-shield	0	0
60	Z5-1	21.0 K	3.1
61	C35, R3	500.0	1.2
62	C35, R5-wiper	30.0 K	0
63	R5-low side	0	0

[a] Receiver set for squelched operation.
[b] Receiver set for unsquelched operation.

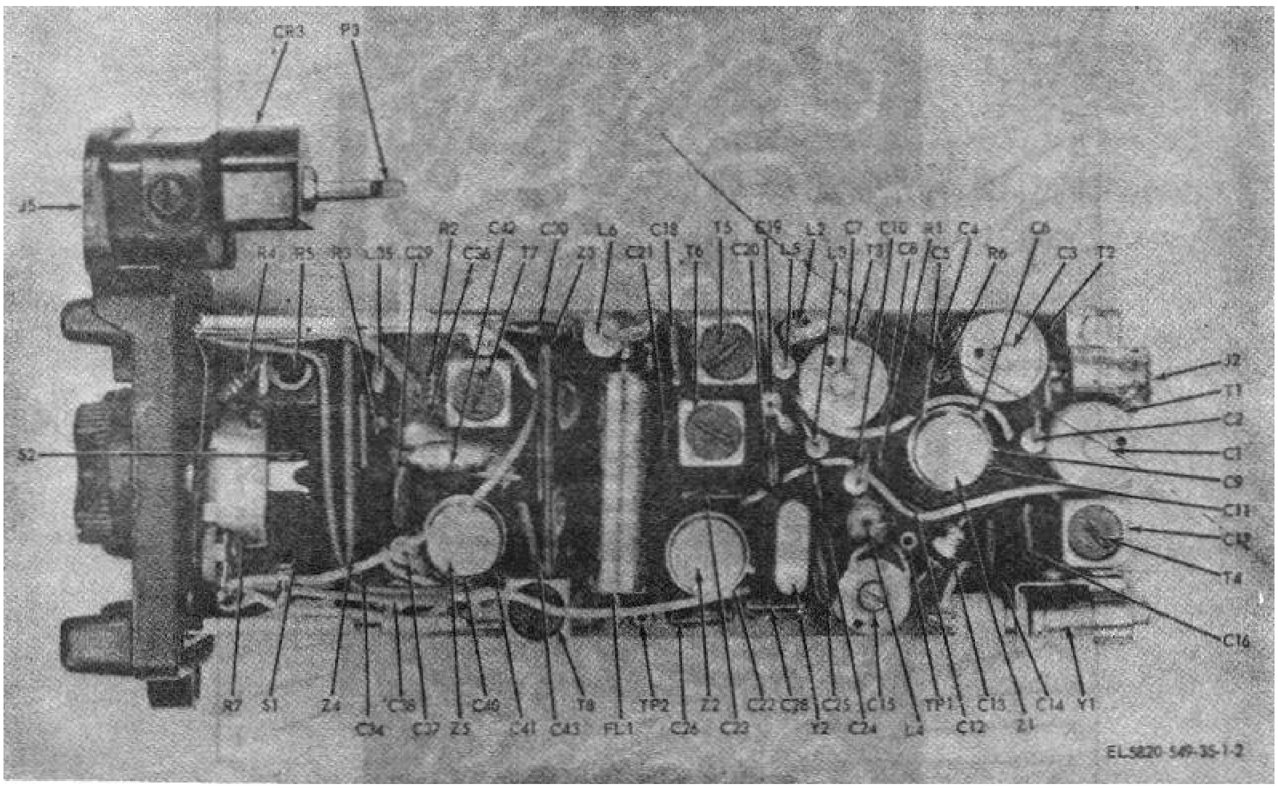

Figure 2-2. AN/PPR-R(XE-9) printed circuit board parts location.

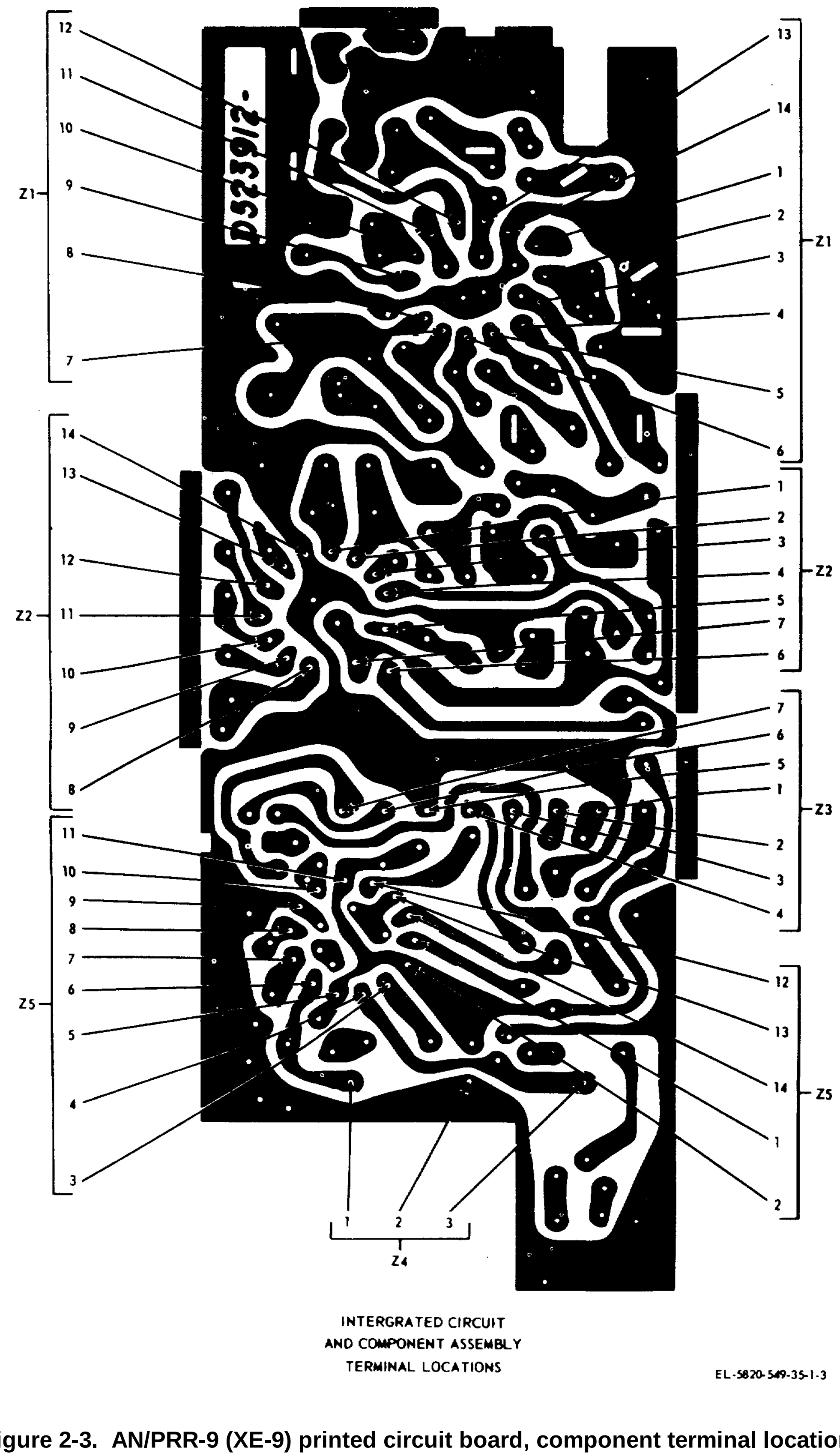

Figure 2-3. AN/PRR-9 (XE-9) printed circuit board, component terminal locations.

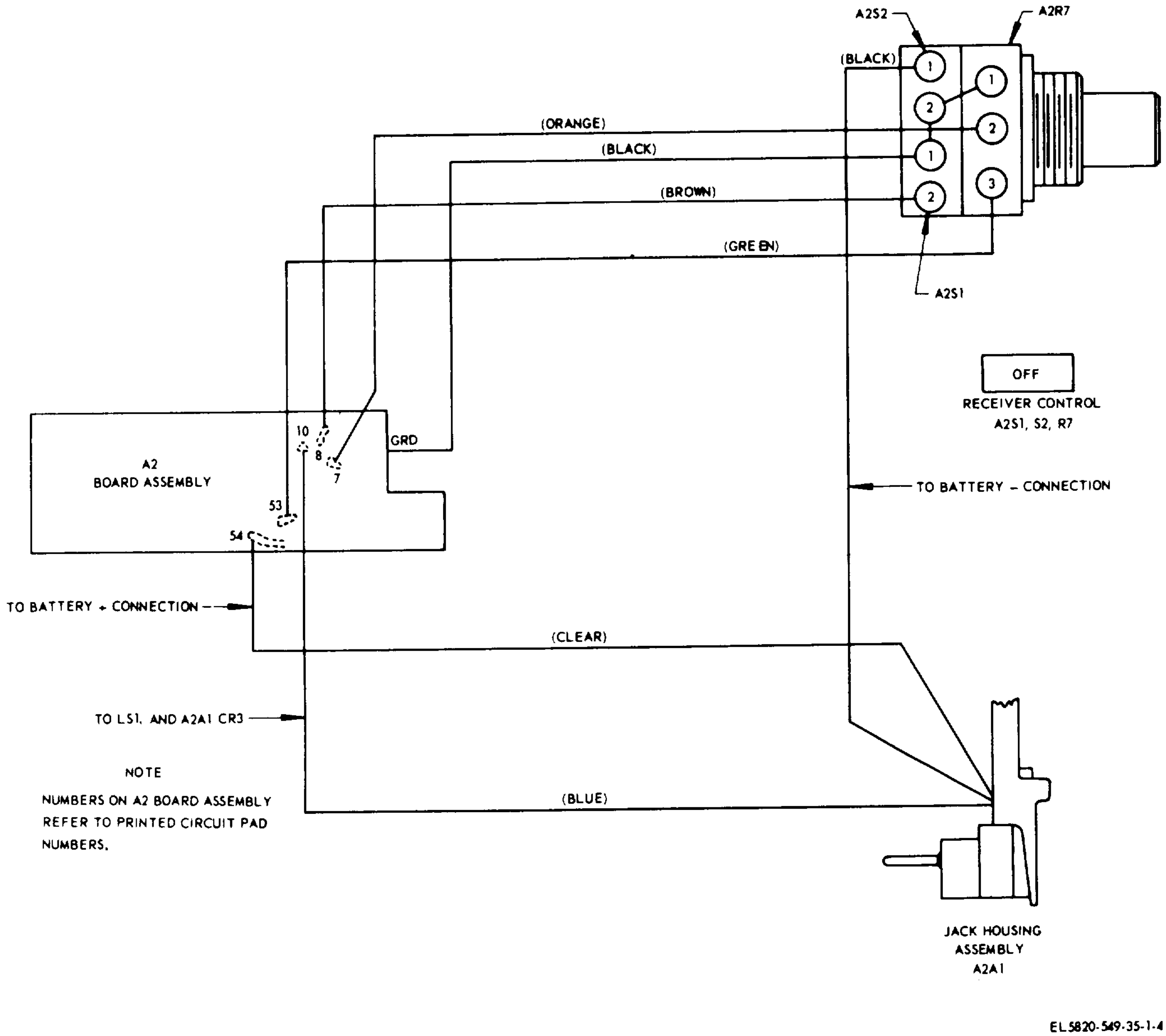

Figure 2-4. AN/PRR-9(XE-9) switch wiring diagram.

CHAPTER 3

DEPOT REPAIRS AND AUNEMENT

Section I. DEPOT REPAIRS

3-1. General Parts Replacement Techniques

The AN/PRR-9(XE-9) is a transistorized unit, constructed compactly. Be extremely careful when replacing parts and assemblies.

a. Whenever wires are removed, replace with the same lead dress and length as the wires which were removed. Always examine replaced wires to be sure insulation is in good condition so that accidental grounding of the conductor will not take place.

b. Use a pencil-type soldering iron with a 25watt maximum capacity. This equipment is transistorized. If only ac-operated irons are available, use an isolating transformer. Do not use a soldering gun; damaging voltages can be induced in components.

c. Check any soldering iron, before use, for shorts to the tip. If a short is found, do not use the iron on this equipment.

d. When soldering or unsoldering integrated circuit leads, work quickly; excessive heat may cause permanent damage to the integrated circuit or circuit board.

e. To remove solder from printed circuit board pads and connectors, use a piece of untinned copper braid, approximately 1/8-inch in width. Put a small amount of flux on copper braid. Place end of braid on top of the joint. Place soldering iron tip on top of the braid. Solder then should start to flow from the joint into the braid. Place fresh braid over the joint as it becomes saturated with solder. Use this procedure to remove as much of the solder as possible. Use small scalpel blade to free the lead from the copper circuit and straighten it, using small longnose pliers.

3-2. Removal of AN/PRR-9(XE-9) Jack Housing Assembly (fig. 3-1)

Remove the jack housing assembly for repair of the headset jack A2A1J5 or battery connector A2A1P3 as follows:

a. Remove the electronic unit assembly A2 from the receiver case.

b. Remove the hexagonal nut A2A1H1 and protective cover A2A1MP1 from the headset jack.

c. Remove the two flathead screws A2A1H2 that attach the jack housing assembly to the front plate assembly.

d. Remove hexagonal nut A2A1H2 from the battery plug connector A2A1P3.

e. Work the assembly loose to reach parts, as required.

f. When replacing the jack housing assembly, be sure insulation is not damaged where wires go through front plate assembly.

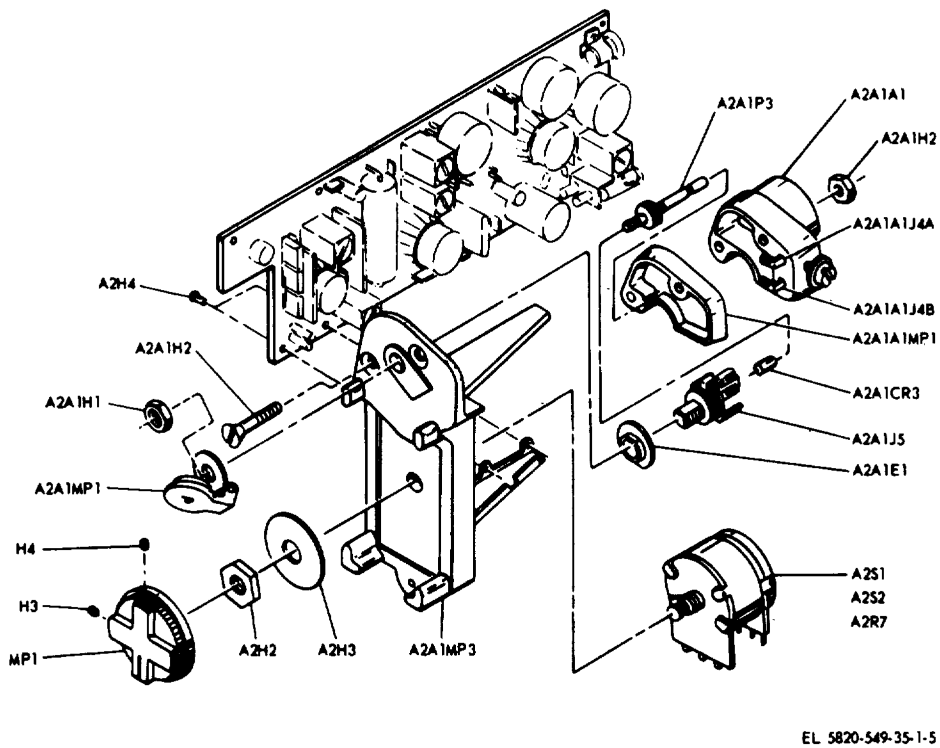

Figure 3-1. AN/PRR-9(XE-9) electronic unit assembly, partially exploded.

Section II. DEPOT ALINEMENT

3-3. Test Equipment and Special Tools Required for Alinement

The following test equipment, special tools and materials are required for depot alinement of Receiving Set, Radio AN/PRR-9(XE-9).

Item	*Technical manual*
Indicator, Channel Alignment ID-1189 (XE-2)/PRR	TM 11-666-937-12
Signal Generator AN/GRM-50	TM 11-6625-573-15
Signal Generator AN/URM-108	TM 11-6625-586-12
Multimeter TS-352B/U	TM 11-6625-366-16
Voltmeter, Meter ME-30A/U	TM 11-6620-320-12
Digital Readout, Electronic Counter AN/USM-207	TM 11-6625-700-10
Output Meter TS-685 A/U	TM 11-5017
Analyzer, Spectrum TS-723A/U	TM 11-5097
Power Supply PP-3514/U	TM 11-6625-617-12
Oscillator, Audio TS-421A/U	TM 11-6625-355-12
Voltmeter, Electronic AN/URM-145	TM 11-624-14
Materials: Capacitor 1000 pf, ±10%, 200 wvdc Resistor, 75 ohm ±5%, 1/2 watt	

3-4. Use of Indicator, Channel Alinement ID-1189(XE-2)/PR

The channel alinement indicator can be used in making battery tests, or for alinement when the channel frequency of the AN/PRR-9(XE-9) is changed.

3-5. 10.7 MHz i.f. Alinement

If misalinement is indicated during troubleshooting (para 2-6), the 10.7 MHz i.f. stages should be alined as follows:

a. Connect the equipment as shown in figure 3-2.

b. Set the PP-8514/U for 3.2 volts.

c. At pin 5 of Z1, through a 0.001 uf capacitor, inject an unmodulated 10.7 MHz signal of sufficient strength to produce a 15 millivolt ac signal at TP2.

d. Adjust T4, T6 and T6, in sequence, for maximum voltage at TP2. Repeat the adjustments until no further improvement is obtained.

3-6. Discriminator Alinement

If misalinement is indicated during troubleshooting (para 2-5), the discriminator should be alined as follows:

a. Connect the equipment as shown in figure 3-3.

b. Set the PP-3514/U for 3.2 volts.

c. Adjust the TS-585A/U for an impedance of 150 ohms

d. Adjust unmodulated frequency of AN/ URM-103 to channel frequency of AN/PRR-9 (XE-9) at 50 microvolts and fine-tune AN/ URM-103 frequency to produce an indication of 455 kHz ±500 Hz on AN/USM-207.

e. Tune T8 for 0 volts on TS-352B/U.

f. Without changing frequency of AN/URM103, set modulation at 1 kHz at 8 kHz deviation.

g. Adjust receiver control R7 for 3.5 milliwatt indication on TS-585A/U.

h. Adjust T7 for minimum distortion indication on TS-723A/U.

3-7. Local Oscillator Alinement

The local oscillator of the AN/PRR-9(XE-9) is normally alined on the ID-1189(XE-2)/PR. An alternate procedure using test equipment is described below.

a. Connect the equipment as shown in figure 3-4.

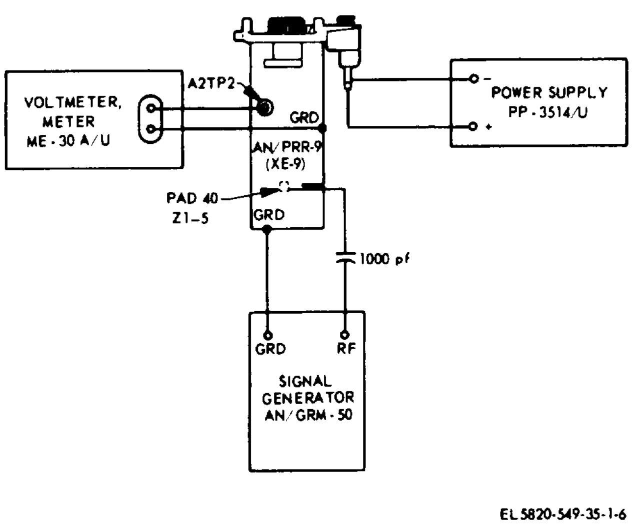

Figure 3-2. AN/PRR-9(XE-9) 10.7 MHz i.f. alinement, test setup.

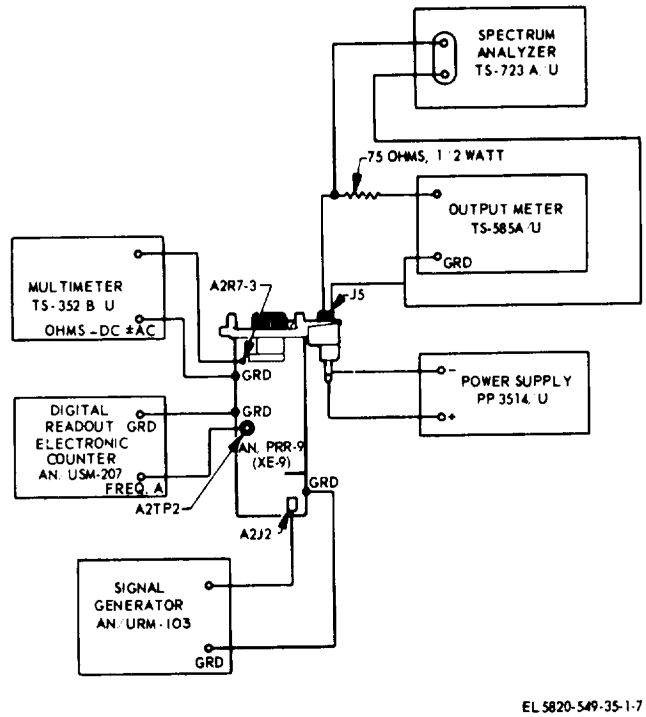

Figure 3-3. AN/PRR-9(XE-9) discriminator alinement, test setup.

b. Set the PP-3514/U for 2.6 volts. The lower-than-normal voltage will assure satisfactory oscillator operation under field conditions.

c. Install the desired crystal Y1 in the receiver and set the receiver for squelched operation.

d. Adjust C15 fully clockwise.

e. Slowly adjust C15 counterclockwise until an upward indication on the AN/URM-145 meter 100 mv scale is observed. Continue to adjust C15 counterclockwise until maximum indication is observed on the AN/URM-145. The maximum indication should be about one-quarter turn counterclockwise from the point of initial upward deflection of the meter. A final meter reading of 40 to 50 millivolts is typical.

3-8. Squelch Sensitivity Adjustment

The squelch sensitivity is normally adjusted with the ID-1189(XE-2)/PR. An alternate procedure using test equipment is described below.

a. Connect the equipment as shown in figure 3-5.

b. Set the AN/URM-103 to the receiver channel frequency with 50 microvolt output, and external modulation.

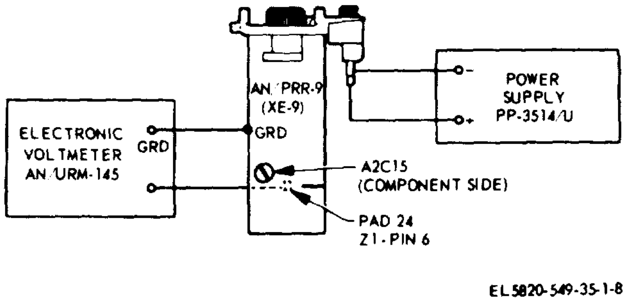

Figure 3-4. AN/PRR-9(XE-9) local oscillator alinement, test setup.

c. Adjust the TS-585A/U for an impedance of 150 ohms.

d. Set the TS421A/U for 150 Hz and adjust deviation of AN/URM-103 for 2 kHz.

e. Set the PP-3514/U for 3.2 volts.

f. Set the AN/PRR-9(XE-9) receiver control for squelch "on" operation.

g. Adjust the squelch potentiometer, R5, fully counterclockwise. Then slowly adjust R5 clockwise to the setting where the current suddenly increases 10 to 12 milliamperes.

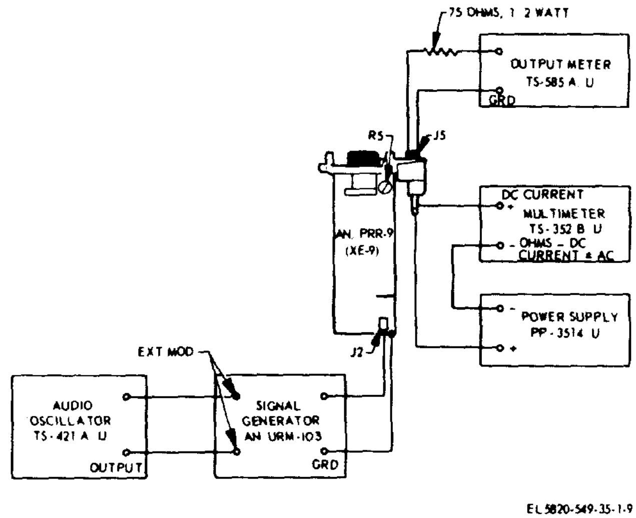

Figure 3-5. AN/PRR-9(XE-9) squelch sensitivity adjustment, test setup.

CHAPTER 4

DEPOT OVERHAUL STANDARDS

Section I. GENERAL

4-1. Purpose of Final Testing

The tests outlined in this section are designed to measure the performance capability of repaired equipment. Equipment that is to be returned to stock should meet the standards given in these tests.

4-2. Technical Publications

This manual together with TM 11-5820-549-12-1 covers the equipment to be tested.

4-3. Test Facilities Required

The following equipments, or suitable equivalents will be employed in determining compliance with the requirements of this Specific Standard.

a. Test Equipment

Nomenclature	Federal stock no.	Quantity required	Technical Manual
Power Supply PP-3514/U	6625-445-6933	1	TM 11-6625-617-12
Digital Readout Electronic Counter AN/USM-207	6625-911-6368	1	TM 11-6625-700-10
Oscillator, Audio TS421A/U	6625-669-0228	1	TM 11-6625-355-12
Voltmeter, Electronic ME-30A/U	6625-643-1670	1	TM 11-6625-320-12
Indicator, Channel Alignment ID-1189(XE-2)/PR	6625-181-1884	1	TM 11-6625-937-12
Multimeter ME-26/U	6625-360-2493	1	TM 11-6625-200-15
Multimeter TS-352B/U	6625-242-5023	1	TM 11-6625-366-15
Output Meter TS-585A/U	6625-244-0501	1	TM 11-5017
Signal Generator AN/URM-103	6625-720-8352	1	TM 11-1275
Signal Generator AN/GRM-60	6625-868-8353	1	TM 11-6625-573-15
Analyzer, Spectrum TS-723A/U	6625-668-9418	1	TM 11-5097

b. Materials

Material	Federal stock no.	Quantity Required
Capacitor, 5.0 pf ±0.5 pf		1
Capacitor, 2.2 pf ± 10%		1
Resistor, 39 ohms ±1%, 1/2 w.		1
Resistor, 50 ohms ±1%, 1/2 w.		1
Resistor, 75 ohms ±5%, 1/2 w.		1

c. Rf Pad. An rf pad for testing the AN/ PRR-9(XE-9) is required and is illustrated in figure 4-1. Materials for the rf pad are included in b. above.

4-4. Test Harnesses

The equipment can be tested with conventional rf, audio, and dc test cables. Use a subminiature phone plug for connection to headset jack.

4-5. Organization of Tests

Tests for Receiving Set, Radio AN/PRR-9(XE9) are given in section II of this chapter. The tests are organized in the most logical manner for rapid testing, and to utilize the same or similar test setups for successive tests. Whenever a change in frequency is required, the AN/PRR9 (XE-9) or AN/PRT-4 should first be alined on the ID-1189(XE-2)/PR.

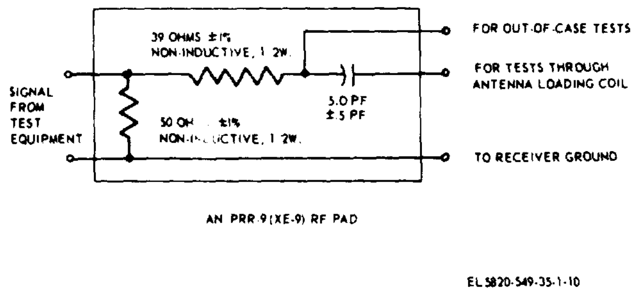

Figure 4-1. Rf pad, construction details.

Section II. TESTS

4-6. AN/PRR-9(XE-9) Sensitivity Test

Remove the antenna from the receiver. Make overall sensitivity test as follows:

a. Place a 51 MHz channel frequency crystal (crystal frequency 40.3 MHz) in the receiver and aline with ID-1189(XE-2)/PR.

b. Connect the, test equipment as shown in figure 4-2.

c. Set the PP-3514/U for 3.2 ±0.1 volts input to the receiver.

d. Set the TS-585A/U for 150 ohms.

e. Set the AN/URM-103 for 0.8 microvolts at channel frequency, and ±8 kHz deviation at 1 kHz. Leave the TS-421A/U off for this test.

f. Adjust the receiver volume control, squelch off, for an audio output power reading of 2.4 milliwatts on the TS-585A/U.

g. Note and record the db indication on the TS-723A/U in the SET LEVEL position.

h. Change the TS-723A/U from the SET LEVEL position to the DISTORTION position and note and record the db indication.

i. Value obtained in step g shall be at least 10 db higher than the value obtained in step h.

j. Change the receiver channel frequency to 47 MHz (crystal frequency 36.3 MHz) and aline on ID-1189(XE-2)/PR. Repeat steps b. through i.

k. Change the receiver channel frequency to 57 MHz (crystal frequency 46.3 MHz) and aline on ID-1189(XE-2)/PR. Repeat steps b. through i.

4-7. AN/PRR-9(XE-9) Squelch Sensitivity Test

This test should be run after the sensitivity test in paragraph 4-6. The receiver may be operated on any normal channel frequency.

a. Connect the test equipment as shown in figure 4-3.

b. Set the PP-3514/U for 32 ±0.1 volts input to the receiver.

c. Set the TS-585A/U for 150 ohms.

d. Set the AN/URM-48 for the receiver channel frequency and ±3.0 kc deviation using 150

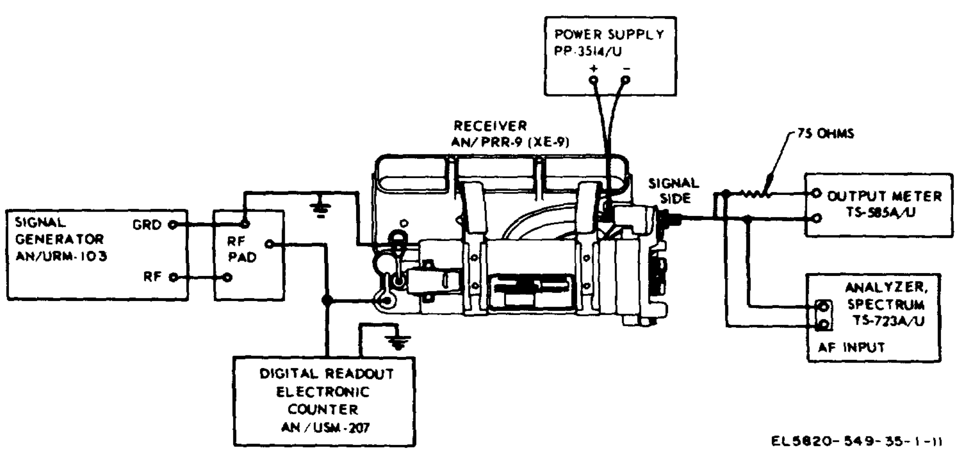

Figure 4-2. AN/PRR-9(XE-9) sensitivity test.

Kz external modulation from the TS-421A/U. The AN/URM-103 output should be zero at this point.

e. Set the receiver volume control for maximum, squelched operation. Remove plug from headset jack and listen to horn transducer to be sure receiver is squelched. Then replace plug in headset jack.

f. Increase the AN/URM-103 output until current on TS-352B/U increases approximately 10 to 12 milliamperes.

g. Note and record indication of AN/URM103 RF ATTENUATOR MICROVOLTS dial.

h. AN/URM-103 output shall not exceed 0.4 microvolts.

4-8. AN/PRR-9(XE-9) Limiting Test

With the exception of the TS-723A/U, this test uses the same test setup as figure 4-2. The receiver is operated on any normal channel frequency.

a. Connect the test equipment, with the exception cited, as shown in figure 4-2.

b. Set the PP-3514/U for 3.2 ±0.1 volts input to the receiver.

c. Set the TS-585A/U for 150 ohms.

d. Set the AN/URM-103 to receiver channel frequency and ±8.0 kc deviation at 1,000 cps. Set the generator output at 100,000 microvolts.

e. Adjust the receiver volume control for 8.5 milliwatts output as indicated on the TS-585A/U. This output is the reference level.

f. Adjust the AN/URM-48 output successively to 10,000, 1,000, 500, 100, 10, and 1.0 microvolt levels, noting the change from the 3.5 milliwatt (mw) reference level as indicated on the TS-585A/U at each of these steps. Output level shall not vary more than ±1.75 mw at any of the settings of the AN/URM-103.

4-9. AN/PRR-9(XE-9) Audio Frequency Response Test

a. Connect the test equipment as shown in figure 4-4.

b. Set the PP-3514/U for 3.2 ±0.1 volts input to the receiver.

c. Set the TS-585A/U for 150 ohms.

d. Set the AN/URM-48 to the receiver channel frequency at 5,000 microvolts output level.

e. Set the TS-421A/U for 1,000 cps and adjust output for an indication on the AN/URM48 of ±8.0 kc deviation.

f. Set the receiver volume control to squelch "off" and adjust for a 3.5 milliwatt indication on the TS-585A/U.

g. Note the db indication on the ME-30A/U. This is the reference level for subsequent measurements.

h. Change the TS-421A/U modulating frequence successively, to the frequencies indicated below. Output changes as indicated on the ME30A/U shall be within the range shown in the "Response" column below.

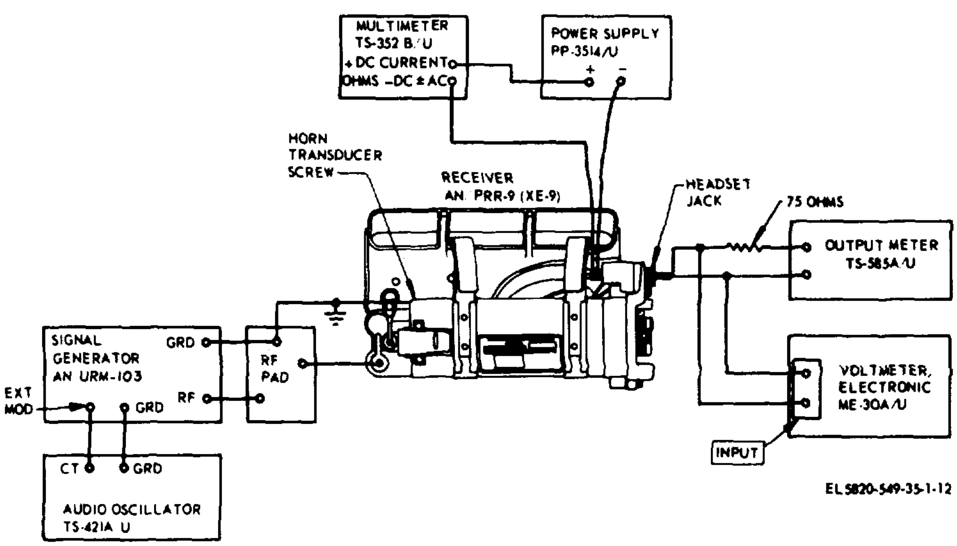

Figure 4-3. AN/PRR-9 (XE-9) squelch sensitivity test.

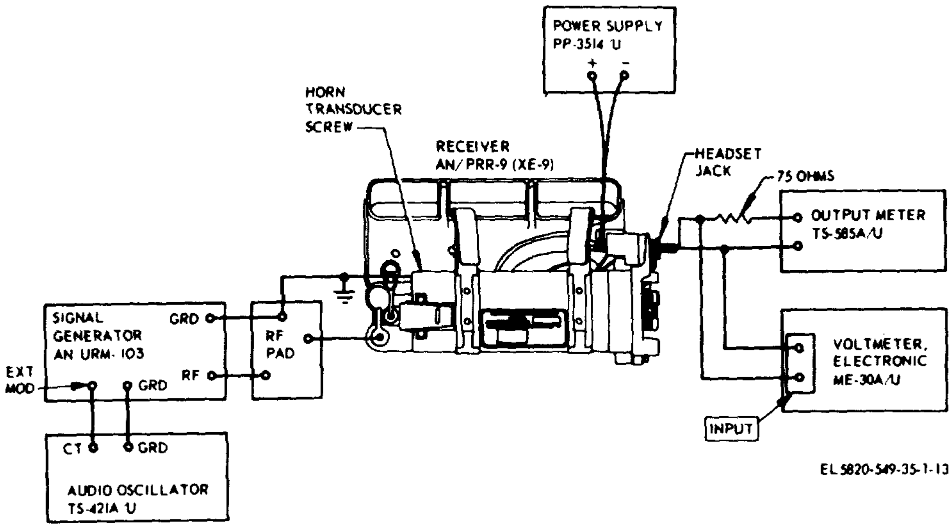

Figure 4-4. AN/PRR-9(XE-9) audio frequency response test.

Frequency. cps	Response
1,000	0 db reference level
150	-8 db or greater
300	-4db ±2
600	0 db ±u2
2,500	-4 db ±2
5,000	-8 db or greater

4-10. AN/PRR-9(XE-9) Audio Distortion Test

a. Connect the test equipment as shown in figure 4-5.

b. Set the PP-3514/U for 3.2 +0.1 volts input to the receiver.

c. Set the AN/URM-103 for 5,000 microvolt output level at the receiver channel frequency with +8.0 kc deviation at 1000 cps.

d. Set the TS-585A/U for 150 ohms.

e. Set the receiver volume control to squelch "off" operation and adjust for a 3.5 milliwatt level as indicated on the TS-585A/U.

f. Adjust the TS-723A/U for distortion measurement and note the distortion indication which shall not exceed 10 percent.

4-11. AN/PRR-9(XE-9) DC Power Consumption Test

a. Connect the test equipment as shown in figure 4-6.

b. Set the PP3514/U for 3.2 ±0.1 volts input to the receiver.

c. Set the TS-585A/U for 150 ohms.

d. Set the receiver volume control to approximately mid-position (squelched operation).

e. TS-352 meter indication shall not exceed 10.0 milliamperes.

4-12. AN/PRR-9(XE-9) Local Oscillator and 10.245 MHz Oscillator Tests

For these tests the receiver electronic unit assembly must be removed from the receiver case.

a. Connect the test equipment as shown in figure 4-7.

b. Set the PP-3514/U for 3.2 ±0.1 volts input to the receiver.

c. Set the receiver volume control to mid-position.

d. Hold capacitor firmly to pad 24 (Z1-6) on printed circuit board (fig. 2-1) so that capacitor lead penetrates protective varnish.

e. Note frequency indication on AN/USM-207. Frequency shall be within +.008 percent of frequency stamped on case of receiver crystal, Y1.

f. Hold capacitor firmly to pad 49 (Z2-5) on printed circuit board (fig. 2-1) so that capacitor lead penetrates protective varnish.

g. Note frequency indication on AN/USM207. Frequency shall be 10.245 MHz ±008 percent.

4-13. AN/PRR-9(XE-9) I.F. Selectivity Test

For this test the receiver electronic unit assembly must be removed from the receiver case.

a. Connect the test equipment as shown in figure 4-8.

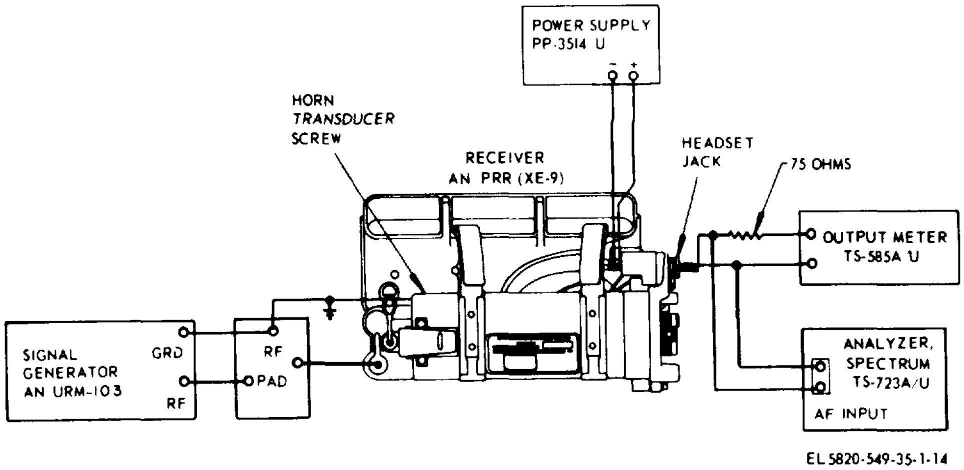

Figure 4-5. AN/PRR-9(XE-9) audio distortion test.

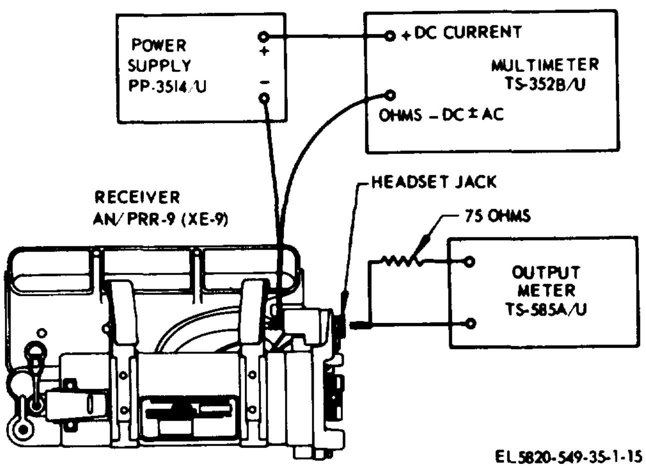

Figure 4-6. AN/PRR-9(XE-9) dc power consumption test.

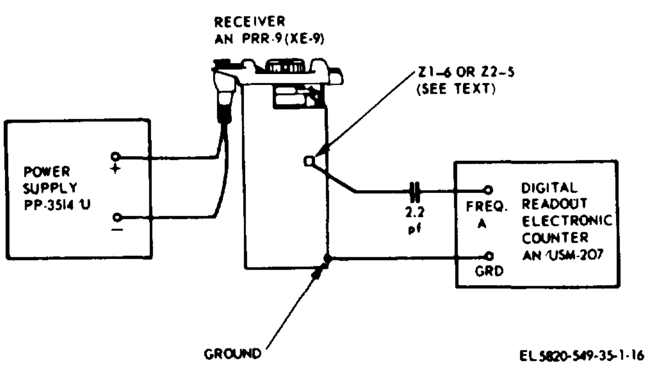

Figure 4-7. AN/PRR-9(XE-P) oscillator tests.

b. Set the PP-3514/U for 3.2 +0.1 volts input to the receiver.

c. Set the AN/URM-103 for receiver channel frequency. Read frequency on AN/USM-207.

d. Adjust receiver volume control for squelch "off" operation.

e. Adjust output of AN/URM-103 for an indication on the ME-30A/U of 4.8 millivolts at TP2 (fig. 2-2).

f. increase the output signal level of the AN/ URM-103 by 6 db.

g. Tune the AN/URM-103 on each side of the channel frequency until the ME-30A/U again reads 4.8 mv. Note and record the frequencies, as indicated on the AN/USM-207, at which the ME-30A/U reads 4.8 mv.

h. The spread between the two frequencies recorded in step g shall be 40 kHz + 10 kHz.

i. Increase the output signal level of the AN/ URM-103 by an additional 54 db.

j. Repeat step g.

k. The spread between the two frequencies recorded in step j shall be no more than 72.0 kHz.

4-14. AN/PRR-9(XE-9) Discriminator Characteristics Test

For this test the receiver electronic unit assembly must be removed from the receiver case.

a. Connect the test equipment as shown in figure 4-9.

b. Set the PP-3514/U for 3.2 +0.1 volts input to the receiver.

c. Set the AN/GRM-50 for 455 kHz as indicated on the AN/USM-207.

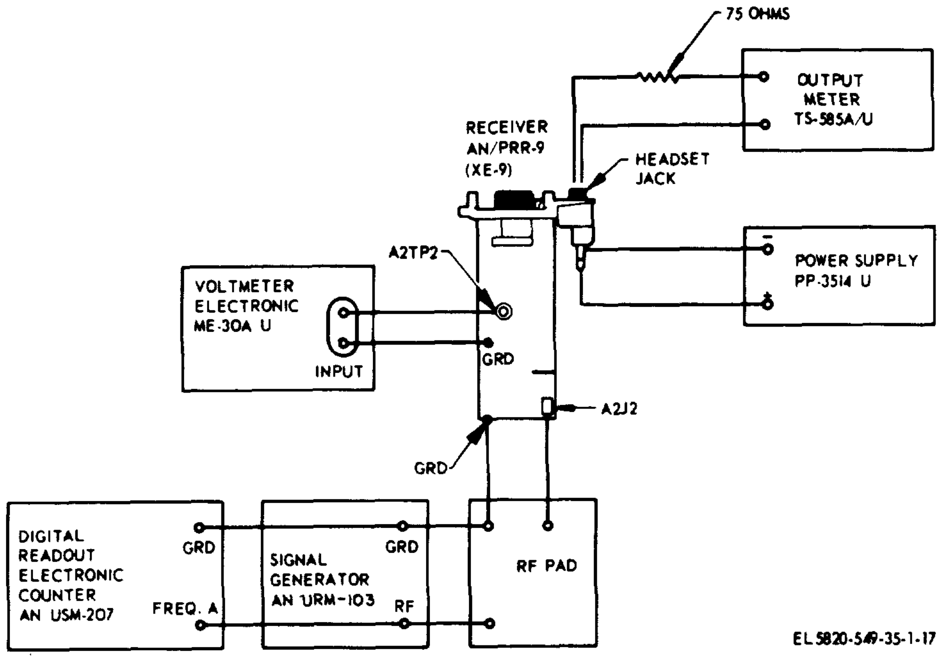

Figure 4-8. AN/PRR-S(XE-9) if. selectivity test.

d. Adjust the receiver volume control for squelch "off" and midposition.

e. Adjust the AN/GRM-50 output for 500 microvolts.

f. Note and record the voltage reading on the ME-26/U. This is the reference level for the test.

g. Vary the frequency of the AN/GRM-50 on each side of 455 kHz until the ME-26/U indicates maximum difference from the reference level noted in step f. above.

h. Note and record the frequencies at which maximum difference occurs, as indicated by the AN/USM-207. The peak to peak separation shall be at least 40 kHz.

i. Return AN/GRM-50 to 455 kHz and tune each side of 455 kHz until the ME-26/U indicates 0.6 volts difference from reference level noted in step f. above.

j. Note and record the 0.6 volt difference frequency, as indicated on the AN/USM-207.

k. Determine the Af, and Af, of each 0.6 volt difference frequency.

l. The asymmetry ratio of the discriminator shall not exceed 1.3:1.

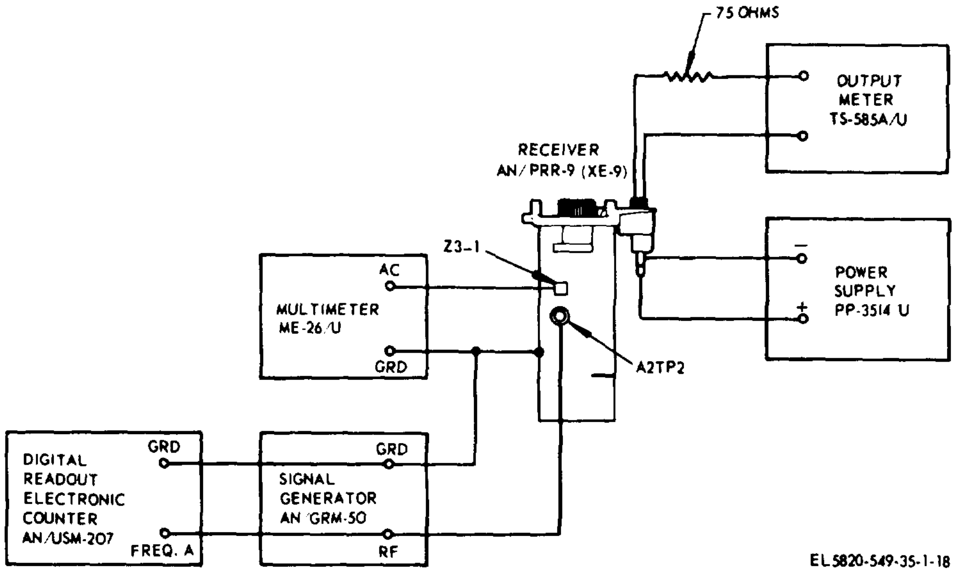

Figure 4-9. AN/PRR-9(XE-9) discriminator characteristics test.

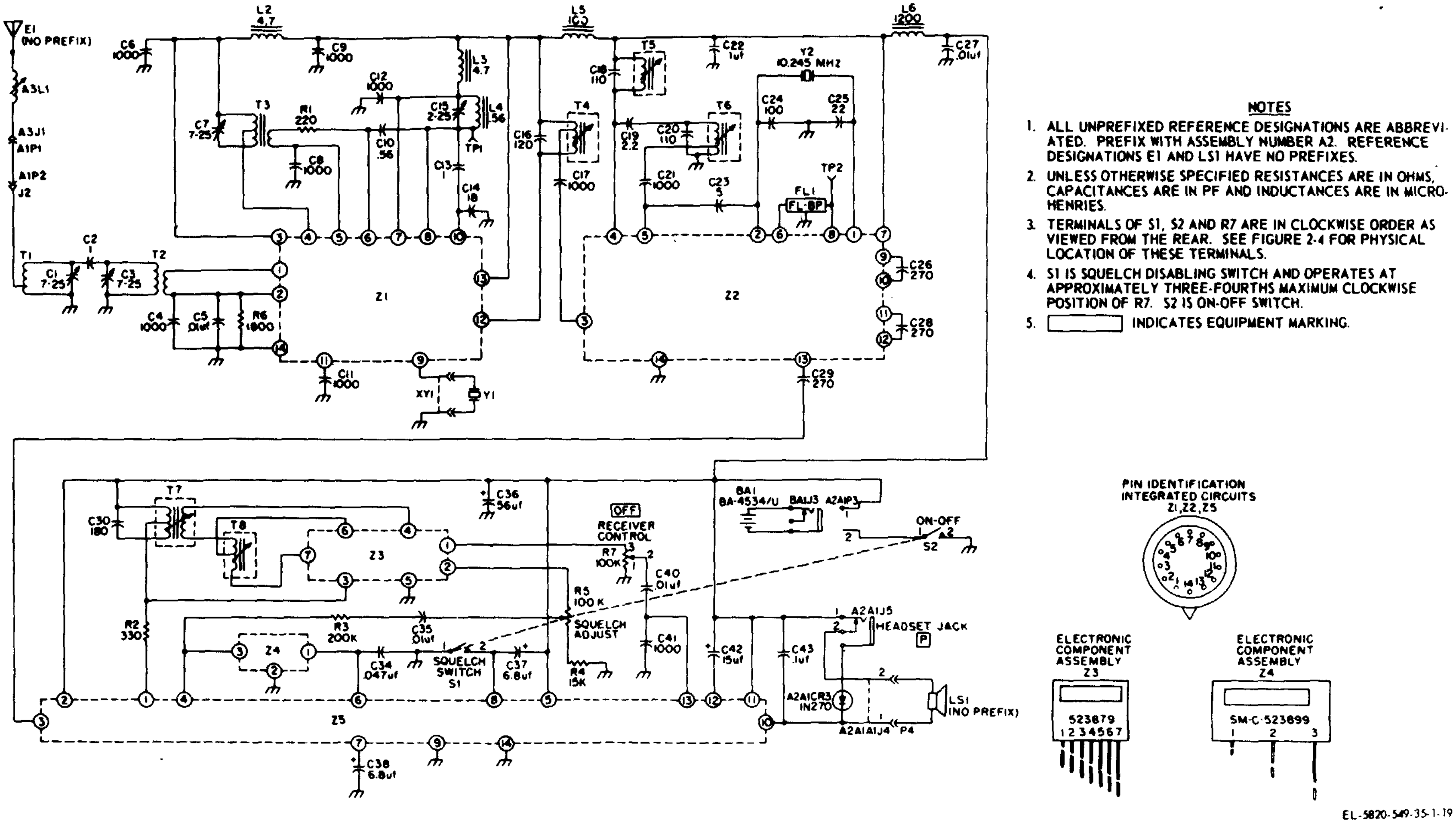

Figure 4-10. AN/PRR-9(XE-9), schematic diagram.

APPENDIX A

REFERENCES

Following is a list of applicable references available to the depot repairman for Receiving Set, Radio AN/PRR-9(XE-9)

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8 and 9), Supply Bulletins, Lubrication Orders and Modification Work Orders
TM 11-5820-549-12-1	Operator and Organizational Maintenance Manual: Receiving Set, Radio AN/PRR-9(XE-9)
TM 11-6625-937-12	Organizational Maintenance Manual: Indicators Channel Alignment, ID-1189/PR and ID-1189 (XE-2)/PR
TM 11-6625-937-45	DS, GS and Depot Maintenance Manual: Indicators, Channel Alignment, ID-1189/PR and ID-1189(XE-2)/PR
TM 11-1257	Signal Generator, AN/URM-48
TM 11-5017	Output Meter, TS-585A/U
TM 11-5097	Analyzer, Spectrum, TS-723A/U
TM 11-6625-200-15	Organizational, DS, GS and Depot Maintenance Manual: Multimeter, ME-26/U
TM 11-6625-320-12	Operator and Organizational Maintenance Manual: Voltmeter, Meter, ME-30A/U
TM 11-6625-355-12	Organizational Maintenance Manual: Oscillator, Audio, TS 421A/U
TM 11-6625-366-15	Organizational, DS, GS and Depot Maintenance Manual: Multimeter, TS-352B/U
TM 11-6625-524-14	Organizational, DS, GS and Depot Maintenance Manual: Voltmeter, Electronic AN/URM-145
TM 11-6625-573-15	Organizational, DS, GS and Depot Maintenance Manual: Signal Generator AN/GRM-50
TM 11-6625-617-12	Operator and Organizational Manual: Power Supply, PR3514/U
TM 11-6625-700-10	Operator Manual: Digital Readout Electronic Counter, AN/USM-207

APPENDIX B

DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists repair parts and special tools required for the performance of direct support, general support, and depot maintenance of the AN/PRR-9 (XE-9).

B-2. General

This Repair Parts and Special Tools List is divided into the following sections:

a. Repair Parts-Section II. A list of repair parts authorized for the performance of maintenance at the direct support, general support, and depot level.

b. Special Tools, Test and Support Equipment-Section III. Not applicable.

c. Federal Stock Number and Reference Number Index-Section IV. A list of Federal stock numbers in ascending numerical sequence followed by a list of reference numbers in ascending alpha-numeric sequence, cross-referenced to illustration figure number and item number.

d. Reference Designation Cross-reference to Page Numbers-Section V. A list of reference designations cross-referenced to page number.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular lists:

a. Source, Maintenance, and Recoverability Codes (SMR), Column 1:

(1) Source code indicates the selection status and source for the listed item. Source codes are:

Code	*Explanation*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.
P2	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end-item dictates that a minimum quantity be available in the supply system.
P9	Assigned to items which are NSA. design controlled: unique repair parts, special tools, test, measuring and diagnostic equipment, which are stocked and supplied by the Army COMSEC logistic system, and which are not subject to the provisions of AR 380-41.
P10	Assigned to items which are NSA design controlled: special tools, test, measuring and diagnostic equipment for COMSEC support, which are accountable under the provisions of AR 380-41, and which are stocked and supplied by the Army COMSEC logistic system.
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately, and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end-item or component. The failure of such part or assembly should result in retirement of the end-item from the supply system.
X1	Repair parts which are not procured or

Code	*Explanation*
	stocked. The requirement for such items will be filled by use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
G	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DS and GS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level codes are:

Code	*Explanation*
C	Operator/Crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R	Repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. Federal Stock Number, Column 2. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description, Column 3. This column indicates the Federal item name and any additional description of the item required. The index number has been included as part of the description to aid in the location of "same as" items. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses.

d. Unit of Measure (U/M), Column 4. A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit, Column 5. This column indicates the quantity of the item used in the AN/PRR-9(XE-9). A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.). Subsequent appearances of the same item in the same assembly are indicated by the letters "REF".

f. 30-Day DS/GS Maintenance Allowances, Columns 6 and 7.

NOTE

Allowances in GS column are for GS maintenance only.

(1) The allowance columns are divided into three subcolumns. Indicated in each subcolumn, opposite the first appearance of each item, is the total quantity of items authorized for the number of equipments supported. Subsequent appearances of the same item will have the letters "REF" in the applicable allowance columns. Items authorized for use as required but not for initial stockage are identified with an asterisk in the allowance column.

(2) The quantitative allowances for DS/GS levels of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

(3) Determination of the total quantity of parts required for maintenance of more than 100 of these equipments can be accomplished by converting the equipment quantity to a, decimal factor by placing a

decimal point before the next to last digit of the number to indicate hundredths, and multiplying the decimal factor by the parts quantity authorized in the 51-100 allowance column. Example authorized allowance for 51100 equipments is 40; for 150 equipments multiply 40 by 1.50 or 60 parts required.

g. 1-Year Allowances Per 100 Equipments/ Contingency Planning Purposes, Column 8. This column indicates opposite the first appearance of each item the total quantity required for distribution and contingency planning purposes. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

h. Depot Maintenance Allowance Per 100 Equipments, Column 9. This column indicates opposite the first appearance of each item, the total quantity authorized for depot maintenance of 100 equipments. Subsequent appearances of the same item will have the letters "REF" in the allowance column. Items authorized for use as required but not for initial stockage are identified with an asterisk in the allowance column.

i. Illustration, Column 10. This column is divided as follows:

(1) *Figure Number, Column 10a.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number, Column 10b.* Indicates the callout number used to reference the item in the illustration.

B-4. Special Information

Repair parts mortality is computed from failure rates derived from experience factors with the individual parts in a variety of equipments. Variations in the specific application and periods of use of electronics equipment, the fragility of electronic piece parts, plus intangible material and quality factors intrinsic to the manufacture of electronic parts, do not permit mortality to be based on hours of end-item use. However, long periods of continuous use under adverse conditions are likely to increase repair parts mortality.

B-5. Location of Repair Parts

a. This manual contains two cross-reference indexes (sec IV and V) to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), or reference designation is known. The first column in each index is prepared in alpha-numerical sequence. The reference numbers (manufacturer's part numbers) are listed immediately following the last listed Federal stock number in the index of Federal stock numbers.

b. When the Federal stock number is known, follow the procedures given in (1), (2), and (3) below.

(1) Refer to the index of Federal stock numbers (sec IV) and locate the Federal stock number. The FSN is cross-referenced to the applicable figure and item or reference designation.

(2) Refer to the RPSTL (sec II) and locate the figure number (col 10a) and item or reference number (col 10b) as noted in the FSN index.

(3) If the FSN or manufacturer's part number is not listed in the index, refer to columns 2 and 3 of the RPSTL (sec II) and locate the Federal stock number by scrutiny of the numbers listed in columns 2 and 3.

c. When the reference designation is determined, refer to the reference designation index (sec V). The reference designations are listed in alpha-numerical order and are cross-referenced to the page number on which they appear in the repair parts list (sec II). Refer to the page number noted in the index and locate the reference designation (col 10b). If the word "REF" appears in the allowance column for the repair part, note the Federal stock number (col 2) or manufacturer's part number (col 3). Refer to the FSN index and note the reference designation for that FSN or part number. Refer to the reference designation index and note the page number given for the reference designation. Refer to the page noted in the RPSTL (sec II) and locate the reference designation incolumn 10b of the repair parts list.

B-6. Federal Supply Code for Manufacturer's Name

Code	*Manufacturer's Name*
00639	Bevin and Wilcox Line Co.
16758	Delco Radio Div. of General Motors Corp.
80063	Army Electronics Command
81349	Military Specifications
96906	Military Standards

Section II. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF. NUMBER & MFR CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUS-TRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
	5820-177-1510	A001 REC. SET RADIO AI/PRR-9(XE-9): (This is nonexpendable) SMD523900;(80063)	EA	1										
P-0	5985-926-2590	A002 ANTENNA,ASSEMBLY YAS-1998/PRR-9 SM-C-523228; (80063)	EA	1								4	1-2	E1
X2-F		A0013 MAST ANTENNA: SMD523492; (80063)	EA	1										E1MP1
X2-F		A004 BASE,ANTENNA SUPPORT: SMC523491; (80063)	EA	1										E1MP2
X2-F		A0055 PLATE, IDENTIFICATION: SM523463; (80063)	EA	1										E1MP3
X2-F		A006 CASE, RECEIVER: SMD523910; (80063)	EA	I										A1
X2-F		A008 INSULATION SHEET, ELECTRICAL: SMB523905; (80063)	EA	1										A1E1
X2-F		A009 TERMINAL, FEEDTHRU, INSULATED: SMC523939; (80063)	EA	1										A1P1P2
P-D-T	5820-491-0609	A010 ELECTRONIC UNIT ASSEMBLY: SMD523920; (80063)	EA	1								3	2-2	A2
X1		A011 SCREW, MACHINE: SMB523379-2; (80063)	EA	1										H1
X1		A012 SCREW, MACHINE: SMB523379-3; (80063)	EA	1										H1
X1		A013 WASHER FLAT: SMB523378-1; (800635	EA	3										H2
X1		A014 WASHER, LOCK: SMC523L15-2; (80063)	EA	3										H2
X1		A015 BRACKET ASSY, CRYSTAL MTG: SMB523915; (80063)	EA	1										A2XY1
X1		A016 CAPACITOR, FIXED CER DIELECTRIC: SMB523337-2; (80063)	EA	9										A2C4
X1		AC17 CAPACITOR, FIXED CRT DIELECTRIC: SAME AS A016	EA	REF										A2C6
X1		A018 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C8
X1		A019 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C9
X1		A020 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C11
X1		A021 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C12
X1		A021A CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C17
X1		A021B CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C21
X1		A021C CAPACITOR, FIXED CER DIELECTRIC: SAME AS A016	EA	REF										A2C41
X1		A022 CAPACITOR, FIXED CER DIELECTRIC: SMB523337-3; (80063)	EA	6										A2C5
X1		A023 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A022	EA	REF										A2C27
X1		A024 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A022	EA	REF										A2C31
X1		A025 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A022	EA	REF										A2C34
X1		A026 CAPACITOR, FIXED CER DIELECTRIC: SAME AS A022	EA	REF										A2C35

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF. NUMBER & MFR CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
X1		A026A CAPACITOR, FDXED CER DIELECTRIC: SAME AS A022		EA	REF										A2C40
X1		A027 CAPACITOR, FIXED CER DIELECTRIC: SMB523337-6; (80063)		EA	1										A2C39
X1		A030 CAPACITOR, FIXED CER DIELECTRIC: SMB523884; (80063)		EA	2										A2C22
X1		A031 CAPACITOR, FDXED CER DIELECTRIC: SAME AS A030		EA	REF										A2C43
X1		A032 CAPACITOR, FIXED ELECTROLYTIC: CSR13B476MM; (81349)		EA	1										A2C36
X1		A033 CAPACITOR, FIXED ELECTROLYTIC: CSR13B685M; (81349)		EA	3										A2C37
X1		A034 CAPACITOR, FIXED ELECTROLYTIC: SAME AS A033		EA	REF										A2C38
X1		A035 CAPACITOR, FIXED ELECTROLYTIC: SAME AS A033		EA	REF										A2C42
X1		A035A CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-1; (80063)		EA	1										A2C23
X1		A036 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-6; (80063)		EA	1										A2C14
X1		A037 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-7; (80063)		EA	1										A2C25
X1		A038 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-12; (80063)		EA	1										A2C18
X1		A039 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-14; (80063)		EA	1										A2C30
X1		A040 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-17; (80063)		EA	3										A2C26
X1		A041 CAPACITOR, FIXED MICA DIELECTRIC: SAME AS A400		EA	REF										A2C28
X1		A042 CAPACITOR, FIXED MICA DIELECTRIC: SAME AS A040		EA	REF										A2C29
X1		A043 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-18; (80063)		EA	2										A2C32
X1		A044 CAPACITOR, FIXED MICA DIELECTRIC: SAME AS AO43		EA	REF										A2C33
X1		A045 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-22; (80063)		EA	2										A2C16
X1		A046 CAPACITOR, FIXED MICA DIELECTRIC: SAME AS A045		EA	REF										A2C20
X1		A047 CAPACITOR, FIXED MICA DIELECTRIC: SMC523339-23; (80063)		EA	1										A2C24
X1		A048 CAPACITOR, FIXED TI DIOX1DE: SMC523358-1; (80063)		EA	1										A1C19
X1		A049 CAPACITOR, FIXED TI DIOX1DE: SMC523358-7; (8o063)		EA	2										A2C2
X1		A050 CAPACITOR, FIXED TI DIOX1DE: SAME AS AO49		EA	REF										A2C13
X1		A051 CAPACITOR, FIXED TI DIOX1DE: SMC523358-8; (80063)		EA	1										A2C10

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF. NUMBER & MFR CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUS-TRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
X1		A052 CAPACITOR, VAR, CER DIELECTRIC: SMC523354; (80063)		EA	3										A2C1
X1		A053 CAPACITOR, VAR, CER DIELECTRIC: SAME AS A052		EA	REF										A2C3
X1		A054 CAPACITOR, VAR, CER DIELECTRIC: SAME AS A052		EA	REF										A2C7
X1		A055 CAPACITOR, VAR, GL DIELECTRIC: SMC523352-1; (80063)		EA	1										A2C15
X1		A056 CHOKE, RADIO FRSLUENCY: SMC523886; (80063)		EA	1										A2L4
X1		A057 CHOKE, RADIO FRE4UENCY: SMC523308-2; (80063)		EA	1										A2L6
X1		A058 CHOKE, RADIO FREQUENCY: SMC523309-4; (80063)		EA	2										A2L2
X1		A059 CHOKE, RADIO FREQUENCY: SAME AS A058		EA	REF										A2L3
X1		A060 CHOKE, RADIO FREQUENCY: SMC523309-7; (80063)		EA	1										A2L5
X1		A061 CONNECTOR, RECP, ELECTRICAL: SMB523431; (80063)		EA	2										A2TP1
X1		Ao62 CONNECTOR, RECP, ELECTRICAL: SAME AS A061		EA	REF										A2TP2
X1		A063 CONNECTOR, RECP, ELECTRICAL: SMC523941; (80063)		EA	1										A2J2
X1		A064 RIVET, TUBULAR: SMB523882; (80063)		EA	1										A2H1
P-D	5905-011-8863	A065 RESISTOR, VARIABLE: SMC523297; (80063)		EA	1								4	3-1	A2S1
P-D	5905-011-8863	A066 RESISTOR, VARIABLE: SAME AS A065		EA	REF										A2S2
P-D	5905-01-8863	A067 RESISTOR, VARIABLE: SAME AS Ao65		EA	REF										A2R7
X1		A068 NUT, PLAIN, HEXAGON: 7302662; (16758)		EA	1										A2H2
X1		A069 WASHER, FLAT: sMB523378-3; (80063)		EA	1										A2H3
X1		A070 CRYSTAL UNIT, QUARTZ: SMB523331-1; (80063)		EA	1										A2Y2
X1		A071 ELECTRONIC COMPONENTS ASSY: SMC523 879 (80063)		EA	1										A2Z3
X1		A072 ELECTRONIC COMPONENTS ASSY: SMC523899; (80063)		EA	1										A2Z4
X1		A073 FILTER, BAND PASS: SMD523357; (80063)		EA	1										A2FL1
X1		A074 INTEGRATED CIRCUIT, RF: SMC523896; (80063)		EA	1										A2Z1
X1		A075 INTEGRATED CIRCUIT, IF: SNC523897; (80063)		EA	1										A2Z2
X1		A076 INTEGRATED CIRCUIT, DETECTOR: SWC523898; (80063)		EA	1										A2Z5
X1		A077 PLATE ASSEMBLY, FRONT: SMD523930; (80063)		EA	1										A2A1
X1		A078 RIVET, TUBULAR: M4B523669; (80063)		EA	4										A2H4
X1		A079 COVER, TELEPHONE: SMC523364; (80063)		EA	1										A2A1MP1

AN/PRR-9(XE-9)

Section II. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) REF. NUMBER & MFR CODE	(3) DESCRIPTION	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
X1		A080	NUT, PLAIN, HEXAGON: SMB523938; (80063)		EA	1										A2A1H1
X1		A081	CONNECTOR, RECP, ELECTRICAL: SMB523924; (80063)		EA	1										A2A1P3
X1		A082	GASKET: SMB523406; (80063)		EA	1										A2A1MP2
X1		A083	HOUSING ASSEMXBLY, JACK: SMC523931; (80063)		EA	1										A2A1A1
X1		A084	SCREW, MACHINE: SMB52342i; (80063)		EA	2										A2A1H2
X1		A085	CONNECTOR, RECP, ELECTRICAL: SMB523221; (80063)		EA	2										A2A1A1J4A
X1		A086	CONNECTOR, RECP, ELECTRICAL: SAME AS A085		EA	REF										A2A1A1J4B
X1		A087	SPACER HOUSING: SMC523407; (80063)		EA	1										A2A1A1MP1
X1		A088	INSULATOR, BUSHING: SMB523949; (80063)		EA	1										A1A1E1
X1		A089	INSULATOR, WASHER: SMB523944; (80063)		EA	1										A2A1E2
X1		A090	JACK, TELEPHONE: SMB523286; (80063)		EA	1										A2A1J5
X1		A091	PLATE, FRONT: SNC523937; (80063)		EA	1										A2A1MP3
X1		A092	SEMICONDUCTIDOR DEVICE, DIODE: MB523374; (80063)		EA	1										A2A1CR3
X1		A093	PRINTED WIRING BOARD: SMD523912; (80063)		EA	1										A2E1
X1		A094	RESISTOR, FIXED, COMPOSITION: RC05CF2K; (81349)		EA	1										A2R3
X1		A095	RESISTOR, FIXED, COMPOSITION: RCO5GF221K; (81349)		EA	1										A2R1
X1		A096	RESISTOR, FIXED, COMPOSITION: RC05GF223K; (81349)		EA	1										A2R6
X1		A097	RESISTOR, FIXED, COMPOSITION: RC05GF33LK; (81349)		EA	1										A2R2
X1		A099	RESISTOR, VARIABLE: SHB523484; (80063)		EA	1										A2R5
X1		A100	SEMICONDUCTOR DEVICE, DIODE: SMB523375; (80063)		EA	2										A2CR1
X1		A101	SEMICONDUCTOR DEVICE, DIODE: SAME AS A100		EA	REF										A2CR2
X1		A102	TRANSFORMER, INTERMEDIATE FREQ: SMC523346; (80063)		EA	1										A2T5
X1		A103	TRANSFORMER, INTERMEDIATE FREQ: SMC523347; (80063)		EA	1										A2T7
X1		A104	TRANSFORMER, INTERMEDIATE FREQ: SMC523348; (80063)		EA	1										A2T8
X1		A105	TRANSFORMER, INTERMEDIATE FREQ: SMC523894; (80063)		EA	1										A2T4
X1		A106	TRANSFORMER, INTERMEDIATE FREQ: SMC523895; (80063)		EA	1										A2T6
X1		A107	TRANSFORMER, RADIO FRERUENCY: SMC523891; (80063)		EA	1										A2T1
X1		A108	CORE, ADJUSTABLE TIVNIN: SMB523276; (80063)		EA	1										A2T1E1
X1		A109	TRANSFORMER, RADIO FREQUENCY: SMC523892; (80063)		EA	1										A2T2

Section II. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF. NUMBER & MFR CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUS-TRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
X1		A110 CORE, ADJUSTABLE TUNING: SAME AS A108	EA	1										A2T2E1
X1		A111 TRANSFORMER, RADIO FRIQUENCY: SMC523893; (80063)	EA	1										A2T3
X1		A112 CORE, ADJUSTABLE TUNING: SAME AS AO18	EA	1										A2T3E1
P-O		A113 HEADSET, ELECTRICAL H- 302CX2-1/PRR-9: SMC523760; (80063)	EA	1								3	1-2	HT1
X2-F		A114 CORD ASSEMBLY, ELECTRICAL: SMC523288; (80063)	EA	1										HT1W1
X2-F		A115 PLATE, IDENTIFICATION: SMB523462; (80063)	EA	1										HT1W1MP1
X2-F		A116 EARPHONE: SMB523761; (80063)	EA	1										HT1HT1
X2-F		A117 PLATE, IDENTIFICATION: SMB523762; (80063)	EA	1										HT1HT1MP1
X2-F		A118 EARPIECE: SMB523333; (80063)	EA	1										HT1MP1
X2-F		A119 HOLDER, EARPHONE: SMB523332; (80063)	EA	1										HT1MP2
P-0	5895-933-2878	A120 HOUSING, ANTENNA, ASSEMBLY: SMC523218; (80063)	EA	1								4	2-3	A3
X2-F		A121 SCREW, MACHINE: SMC523231-4; (80063)	EA	1										H1
X2-F		A122 WASHER, FLAT: SAME AS A013	EA	REF										H1
X2-F		A123 WASHER, LOCK: SAME AS A014	EA	1										H1
X2-F		A124 CAP, RETAINING: SMC523227; (80063)	EA	1										A3MP1
X2-F		A125 COIL, RADIO FREQUENCY: SMD523224; (80063)	EA	1										A3L1
X2-F		A126 CONNECTOR, RECP, ELECTRICAL: S1B523251; (80063)	EA	1										A3J1
X2-F		A127 HOUSING, ANTENNA: SMD523219; (80063)	EA	1										A3A1
X2-F		A128 HOUSING: SMD523219-1; (80063)	EA	i										A3AMP1
X2-F		A129 INSERT, SCREW THREAD: SRC523298; (80063)	EA	1										A3AMP2
X2-F		A130 KNOB ASSEM4BLY: SMC523373; (80063)	EA	1										A3A2
X2-F		A131 SPRING, HELICAL, CCMPRESSION: SM1523494; (80063)	EA	1										A3A2MP1
X2-F		A132 STUD, DRIVE: SM1523226; (80063)	EA	1										A3MP2
X2-F		A133 WASHER FLAT: SB523220; (80063)	EA	1										A3MP3
P-0	5355-933-2666	A134 KNOB: SMC523360; (80063)	EA	1								3	5-2	MP1
X2-F		A135 SETSCREW: SMB523434; (80063)	EA	2										H3
X2-F		A136 SETSCRDI: SAME AS A135	EA	REF										H4
P-O	5985-933-2879	A137 LANYARD ASSEMBLY: SMB523304; (80063)	EA	1								3	1-2	A4
X2-F		A138 CORD, NYLON: 1-16INDIA200LB; (00639)	FT	1										A4MP1
X2-F		A139 HOOK: SMB523306; (80063)	EA	1										A4MP2
X2-F		A140 SLEEVE: SMB523307; (80063)	EA	2										A4MP3
X2-F		A141 SLEEVE: SAME AS A140	EA	REF										A4MP4

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF. NUMBER & MFR CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY DS MAINT ALLOWANCE (a) 1-20	(6) (b) 21-50	(6) (c) 51-100	(7) 30 DAY GS MAINT ALLOWANCE (a) 1-20	(7) (b) 21-50	(7) (c) 51-100	(8) 1-YR ALW PER EQUIP CNTGY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUS-TRATION (a) FIG. NO.	(10) (b) ITEM OR REF. DESIG
P-D		A142 LOUDISPEAKER, PERMAIET MAGNET: SMD523902; (8'063)		EA	1								3	1-2	LS1
X2-F		A143 SCREW, MACHINE: SMB523379-1; (80063)		EA	4										LS1H4
X2-F		A144 WASHER, FLAT: SAME AS A013		EA	4										LS1H4
X2-F	5310-965-1805	A145 WASHER, LOCK: MS35337-78; (96906)		EA	4										LS1H4
X2-F		A146 PLATE, IDENTIFICATION: SMD523901; (80063)		EA	1										MP2
P-O	5820-995-2261	A147 SLIDE, HARNESS: SMB523391; (80063)		EA	1								3	1-2	MP3

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Section IV. FEDERAL STOCK NUMBER AND REFERENCE NUMBER INDEX

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF. DESIGNATION
5310-965-1805		LS1H4
5355-933-2666	5-2	MP1
5820-491-0609	2-2	A2
5820-995-2261	1-2	MP-3
5985-926-2590	1-2	E1
5985-933-2878	2-3	A3
5985-933-2379	1-2	A4
5905-011-8863	3-1	A251

REFERENCE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION
CSR13B476MM	81349		A2C36
CSR13B685MM	81349		A2C37
CSR13B685MM	81349		A2C38
CSR13B685MM	81349		A2C42
RCC5GF204K	81349		A2R3
RC053F221K	81349		A2R1
RC05GF223K	81349		A2R6
RC05GF331K	81349		A2R2
SMB523220	80063		A3MP3
SMB523221	80063		A2A1A1J4A
SMB523221	80063		A2A1A1J4B
SMB523251	80063		A3J1
SMB523276	80063		A2T1E1
SMB523276	80063		A2T2E1
SMB523276	80063		A2T3E1
SMB523286	80063		A2A1J5
SMB523306	80063		A4MP2
SMB523307	80063		A4MP3
SMB523307	80063		A4MP4
SMB523331-1	80063		A2Y2
SMB523332	80063		HT1MP2
SMP523333	80063		HTIMP1
SMP523337-2	80063		A2C4
SME523337-2	80063		A2C6
SMB523337-2	80063		A2C8
SMB523337-2	80063		A2C9

REFERENCE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION
SMB523337-2	80063		A2C11
SMB523337-2	80063		A2C12
SMB3523337-2	80063		A2C17
SStB523337-2	80063		A2C21
SMB523337-2	80063		A2C41
SEMB523337-3	80063		A2C5
SMB523337-3	80063		A2C27
SMB3523337-3	80063		A2C31
SMB523337-3	80063		A2C34
SMBC523337-3	80063		A2C35
SMB523337-3	80063		A2C40
SMB523337-6	80063		A2C39
SMB523374	80063		A2A1CR3
SMB523375	80063		A2CR1
SMB523375	80063		A2CR2
SMB523378-1	80063		H1
SMB523378-1	80063		H2
SMB523378-1	80063		LS1H4
SMB523378-3	80063		A2H3
SNB523379-1	80063		LS1H4
SMB523379-2	80063		H1
SMB523379-3	80063		H1
SMB523406	80063		A2MP2
SMB523421	80063		A2A1H2
SMB523431	80063		A2TP1
SMB523431	80063		A2TP2
SMB523434	80063		H3
SMB523434	80063		H4
SMB523462	80063		HT1W1MP1
SMB523463	80063		E1MP3
SMB523484	80063		A2R5
SMB523494	80063		A3A2MP1
SMB523669	80063		A2H4
SMB523760	80063	1-2	HT1

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SECTION IV. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

REFERECE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION	REFERECE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION
SMB523761	80063		HT1HT1	SMC523339-23	80063		A2C24
SMB523762	80663		HT1HTMP1	SMC523346	80063		A2T5
SMB523882	80063		A2H1	SD523348	80063		A2T8
SMB523884	80063		A2C22	SMC523352-1	80063		A2C15
SMB523884	80063		A2C43	SMC523354	80063		A2C1
SMB523905	80063		A1El	SMC523354	80063		A2C3
SMB523915	80063		A2XY1	SMC523354	80063		A2C7
SMB523924	80063		A2A1P3	SMC523358-1	80063		A2C19
SMB523938	80063		A2A1H1	SMC523358-7	80063		A2C2
SMB523944	50063		A2A1E2	SMC523358-8	80063		A2C10
SMB523949	80063		A2AlE1	SMC523358-7	80063		A2C13
SMC523226	80063		A3MP2	SMC523364	80063		AP2AMP1
SMB523227	80063		A3MP1	SMC523373	80063		A3A2
SMC523231-4	80063		H1	SMC523374	80063		A2T7
SMC523288	80063		HT1W1	SMC523407	80063		A2A1A1MP1
SMC523297	80063		A2R7	SMC523456-2	80063		H2
SMC523297	80063		A252	SMC523491	80063		E1MP2
SMC523298	80063		A3A1MP2	SMC523886	80063		A2L4
SMC523308-2	80063		A2L6	SMC523891	80063		A2T1
SMC523309-4	80063		A2L2	SMC523892	80063		A2T2
SMC523309-4	80063		A2L3	SMC523893	80063		A2T3
SM523309-7	80063		A2L5	SMC523894	80063		A2T4
SMC523879	80063		A2Z3	SMC523895	80063		A2T6
SMC523339-1	80063		A2C23	SMC523896	80063		A2Z1
SMC523339-6	80063		A2C14	SMC523897	80063		A2Z2
SMC523339-7	80063		A2C25	SMC523893	80063		A2Z5
SMC523339-12	80063		A2C16	SMC523099	80063		A2Z4
SMC523339-14	80063		A2C30	SMC523931	80063		A2A1A1
SMC523339-17	80063		A2C26	SMC523937	80063		A2A1MP3
SMC523339-17	80063		A2C28	SMC523939	80063		A1P1P2
SMC523339-17	80063		A2C29	SMC523941	80063		A2J2
SMC523339-18	80063		A2C32	SMC523219	80063		A3A1
SMC523339-18	80063		A2C33	SMC523219-1	80063		A3A1MP1
SMC523339-22	80063		A2C16	SMC523224	80063		A3L1
SMC523339-22	80063		A2C20	SMC523357	80063		2FL1

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REFERECE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION	REFERECE NO.	MFG. CODE	FIG. NO.	ITEM NUMBER OR REF. DESIGNATION
SMD523910	80063		A1				
SMD523912	80063		A2E1				
SMD523933	80063		A2A1				
SMD523492	80063		E1MP1				
SMD523901	80063		MP2				
SMD523902	80063		LS1				
1-16INDIA200LB	00639		A4MP1				
7302662	16758		A2H2				

FEDERAL STOCK NUMBER **FIGURE NUMBER** **ITEM NUMBER OR REF. DESIGNATION**

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Section V. REFERENCE DESIGNATION CROSS REFERENCE 10 PAGE NUMBER

REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER
A1	B-4	A2C15	B-6	A2H1	B-6
A1E1	B-4	A2C16	B-5	A2H2	B-6
A1P1P2	B-4	A2C17	B-4	AH3	B-6
A2	B-4	A2C18	B-5	A2HB	B-6
A2A1.	B-6	A2C19	B-5	A2J2	B-6
A2ALA1	B-7	A2C20	B-5	A2L2	B-6
A2ALA1J4A	B-7	A2C21	B-4	A2L3	B-6
A2ALA1J4B	B-7	A2C22	B-5	A2L4	B-6
A2ALA1MP1	B-7	A2C23	B-5	A2L5	B-6
A2ALR3	B-7	A2C24	B-5	A2L6	B-6
A2ALE1	B-7	A2C25	B-5	A2R1	B-7
A2A1E2	B-7	A2C26	B-5	A2R2	B-7
A2A1H1	B-7	A2C27	B-4	A2R3	B-7
A2A1H2	B-7	A2C26	B-5	A2R5	B-7
A2A1J5	B-7	A2C29	B-5	A2R6	B-7
A2ALMP1	B-6	A2C30	B-5	A2F07	B-6
A2A1MP2	B-7	A2C31	B-4	A2S1	B-9
A2A1MP3	B-7	A2C32	B-5	A2S2	B-6
A2A1P3	B-7	A2C33	B-5	A2T1	B-7
A2C1	B-6	A2C34	B-4	A2T2	B-7
A2C2	B-5	A2C35	B-4	A2T3	B-8
A2C3	B-6	A2C36	B-5	A2T4	B-7
A2C4	B-4	A2C37	B-5	A2T6	B-7
A2C5	B-4	A2C38	B-5	A2T7	B-7
A2C6	B-4	A2C39	B-5	A2T8	B-7
A2C7	B-6	A2C4C	B-5	A2T1E1	B-7
A2C8	B-4	A2C41	B-4	A2T2E1	B-5
A2C9	B-4	A2C42	B-5	A2T3E1	B-8
A2C10	B-5	A2C43	B-5	A2T5	B-7
A2C11	B-4	A2CR1	B-7	A2TP	B-6
A2C12	B-4	A2CR2	B-7	A2TP2	B-6
A2C13	B-5	A2E1	B-7	A2Y2	B-6
A2C14	B-5	A2FL1	B-6	A2Z1	B-6

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SECTION V. INDEX- REFERENCE DESIGNATION
CROSS REFERENCE TO PAGE NUMBER (CONTINUED)

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By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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