

**ARMY  
MARINE CORPS**

**TM 11-5820-882-23  
TM 06827A-23/2**

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**TECHNICAL MANUAL**

**ORGANIZATIONAL AND DIRECT SUPPORT  
MAINTENANCE MANUAL**

**RADIO SET AN/PRC-68  
(NSN 5820-01-079-9260)**

<p>This copy is a reprint which includes current pages from Changes 1</p>
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**DEPARTMENTS OF THE ARMY AND THE NAVY,  
19 JANUARY 1981**

## **WARNING**

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No. 1 )

HEADQUARTERS DEPARTMENT OF THE ARMY  
HEADQUARTERS US MARINE CORPS  
Washington, DC, 30 June 1981

**ORGANIZATIONAL AND DIRECT SUPPORT  
MAINTENANCE MANUAL  
RADIO SET AN/PRC-68  
(NSN 5820-01-079-9260)**

TM 11-5820-882-23/TM 06827A-23/2, 19 January 1981, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin.
2. Remove and insert pages as indicated in the page list below:

Remove	Insert
i and ii . . . . .	i and ii
1-1 and 1-2 . . . . .	1-1 and 1-2
2-3 through 2-10 . . . . .	2-3 through 2-10
3-15 and 3-16 . . . . .	3-15 and 3-16
A-1 and A-2 . . . . .	A-1 and A-2
B-3 through B-5 . . . . .	B-3 through B-5

3. File this change sheet in front of the manual for reference purposes.

**By Order of the Secretary of the Army:**

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TECHNICAL MANUAL

No. 11-5820-882-23 }

No. 06827A-23/2 }

HEADQUARTERS DEPARTMENT OF THE ARMY

HEADQUARTERS, US MARINE CORPS

WASHINGTON, DC 19 January 1981

## ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

### RADIO SET AN/PRC-68

(NSN 5820-01-079-9260)

#### REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. Marine Corps units should submit a NAVMC 10772. A reply will be furnished to you.

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## HOW TO USE THIS MANUAL

- Army maintenance levels and related Marine Corps maintenance levels are as follows:

Operator/Crew	Echelon 1 Maintenance
Organizational	Echelon 2 Maintenance
Direct Support	Echelon 3 Maintenance
General Support	Echelon 4 Maintenance
Depot	Echelon 5 Maintenance
- This manual contains all the necessary information to service Radio Set AN/PRC-68 at the organizational (echelon 2) and direct (echelon 3) support maintenance levels.
- Use the MAC (located in Appx. B) to determine the proper maintenance levels.
- To service Radio Set AN/PRC-68 at organizational (echelon 2) maintenance level, consult chapters 1 and 2.
- To service Radio Set AN/PRC-68 at direct support (echelon 3) maintenance level, consult chapters 1 and 3.



EL5VQ001

*Figure 1-1. Radio Set AN/PRC-68.*



CHAPTER 1  
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope

This manual describes Radio Set AN/PRC-68 (fig. 1-1) and provides instructions for organizational and direct support maintenance. Maintenance allocation chart (MAC) is included in appendix B.

1-2. Maintenance Forms, Records, and Reports

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750. The Army Maintenance Management System. Marine Corps units should refer to the current edition of TM 4700-15/1.

1-3. Destruction of Army Materiel to Prevent Enemy Use

Demolition and destruction of electronic equipment will be under the direction of the commander and in accordance with TM 750-244-2.

1-4. Preparation for Storage or Shipment

Refer to Chapter 2, section VI for administrative storage instructions.

1-5. Reporting Equipment Improvement Recommendations (EIR)

EIR can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR maybe submitted on standard Form (SF) 368 (Quality Deficiency Report). Mail directly to Commander, US Army Communications - Electronics Command, ATTN: DRSEL-ME- MQ, Fort Monmouth, NJ 07703. Marine Corps units mail to Commanding General, Marine Corps Logistics Base (P840), Albany, GA 31704. A reply will be furnished to you.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-6. Equipment Characteristics, Capabilities, and Features

Radio Set AN/PRC-68 (radio set) is a hand-held receiver-transmitter that provides ground-to-ground voice communications in the 30 megahertz (MHz) to 79.95 MHz band. The unit is capable of secure speech operation when it is used with the secure voice module (svm). The radio set can be used with a short or long antenna, with a standard military handset such as H-138/U, H-189/U or H-250/U, or with its built-in speaker-microphone.

1-8. Equipment Data

GENERAL

Frequency -----	30.00 MHz—79.95 MHz	Long antenna -----	1 mile ( 1.6 Kilometers)
Available channels-----	1000	Operating temperature range -----	- 40°F to + 159°F (-40°C to + 65°C)
Channel spacing -----	50 kHz	Weight (including battery and antenna, no headset)-----	40oz. (1.30 kg)
Preset channels-----	10	Size .....	8.35 in (212.0 mm)
Preset channel spacing-----	200 kHz		x 3.80 in (96.0 mm)
Modulation -----	frequency modulation (fro)		x 1.52 in (38.6 mm)
Range			
Short antenna -----	330 yards (300 meters)		

Frequency stability .....	± 0.005 percent
Spurious and harmonics radiation.....	50 dB below rf carrier level
Modulation limiting .....	± 15 kHz deviation (maximum)
Squelch tone (2.5—3.5 kHz deviation) .....	148 to 152 Hz

#### RECEIVER

Adjacent channel rejection .....	— 60 dB
Image rejection .....	— 40 dB

$$\bullet \text{ SINAD} = \frac{\text{Signal} + \text{Noise} + \text{Distortion}}{\text{Noise} + \text{Distortion}}$$

Sensitivity- . . . . .	.05 uV for 10 dB SINAD*
Squelch sensitivity .....	0.5 uV
Selectivity: 6 dB down.....	bandwidth greater than ± 15 kHz
60 dB down.....	bandwidth less than ± 50 kHz
Response to spurious signals .....	— 60 dB
Frequency stability .....	± 0.005 percent
Audio output .....	less than 10 percent distortion at 20 m W

## Section III. PRINCIPLES OF OPERATION

### 1-9. General Information

The radio set contains eight plug-in modules which provide all the circuitry necessary for receive and transmit operation. These operations can be broken down into two basic functions, described below.

### 1-10. Receiver Operation (fig. 1-3)

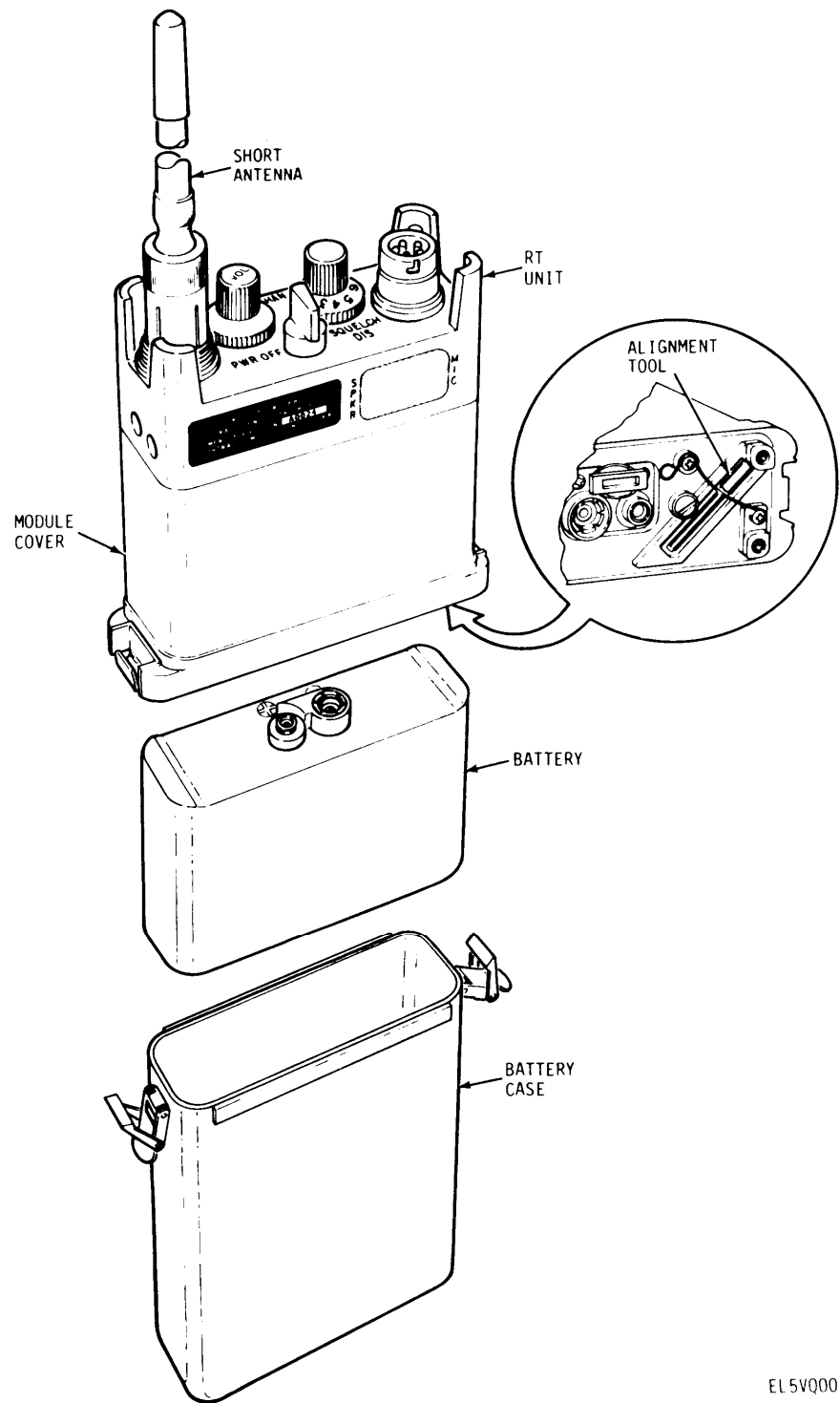
When the radio set is turned on (PWR OFF/ON/SQUELCH DIS switch in the ON position), the unit is in the receive mode (squelch is on, no receiver noise present). Signals entering the antenna are routed through the antenna coupler to the converter stage. The frequency synthesizer and voltage controlled oscillator (vco) provide a mixer frequency for the converter stage. This mixer signal is determined by the setting of the frequency select switches (three located on the synthesizer module and one located on the top panel of the radio set). After the incoming signal is converted to a 12.0 MHz signal, it is routed to the filter/i-f module for amplification and a second conversion to 6.5 MHz and then to the i-f/a-f module. The intermediate frequency and audio frequency (i-f/a-f) module detects and amplifies the signal and connects it to the built-in speaker/microphone or external handset.

### 1-11. Transmitter Operation (fig.1-4)

When the radio set is in the transmit mode (unit turned on and PUSH TO TALK switch depressed), the speaker/microphone is used as a microphone to apply a voice signal to the modulator/mixer. Here the signal is frequency modulated on a carrier signal determined by the synthesizer and voltage controlled oscillator (controlled by the frequency select switches). The output of the modulator/mixer goes to the transmitter module where it is amplified to 1 watt minimum. The antenna coupler matches the transmitter circuit impedance to the antenna (long or short) for maximum power transfer.

### 1-12. Secure Voice Operation

Secure voice operation may be utilized on the radio set by connecting the secure voice module (svm) to the bottom of the rt unit. The battery case and battery must be removed first. The svm connector (located next to the battery connector) has a small black shorting plug installed. This plug must be removed to install the svm in its place. If the radio set is not being used with secure voice equipment, the shorting plug must be installed in the svm connector for normal set operation. The retainer (attached to SVM plug) must be wrapped around the connector before installation of plug to prevent damage to retainer line.



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Figure 1-2. Radio set, major components.

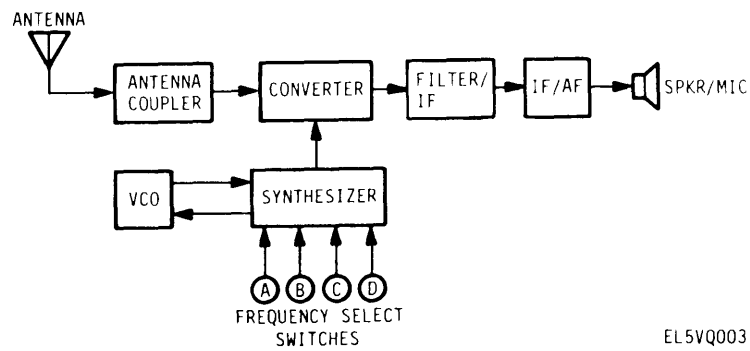


Figure 1-3. Receiver operation, simplified block diagram.

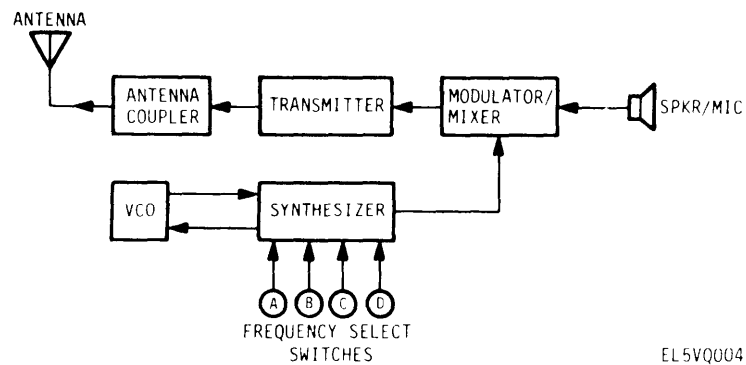


Figure 1-4. Transmitter operation simplified, block diagram.

## CHAPTER 2

### ORGANIZATIONAL MAINTENANCE

#### Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

##### 2-1. Common Tools and Equipment

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

##### 2-2. Special Tools, TMDE, and Support Equipment

Refer to the maintenance allocation chart (Appx. B),

for tools and equipment to be used at the organizational maintenance level. Refer to applicable T/F (table of equipment) for Marine Corps units.

##### 2-3. Repair Parts

Repair parts are listed in the Repair Parts and Special Tools List (TM 11-5820-882-23P) covering organizational and direct support maintenance for this equipment.

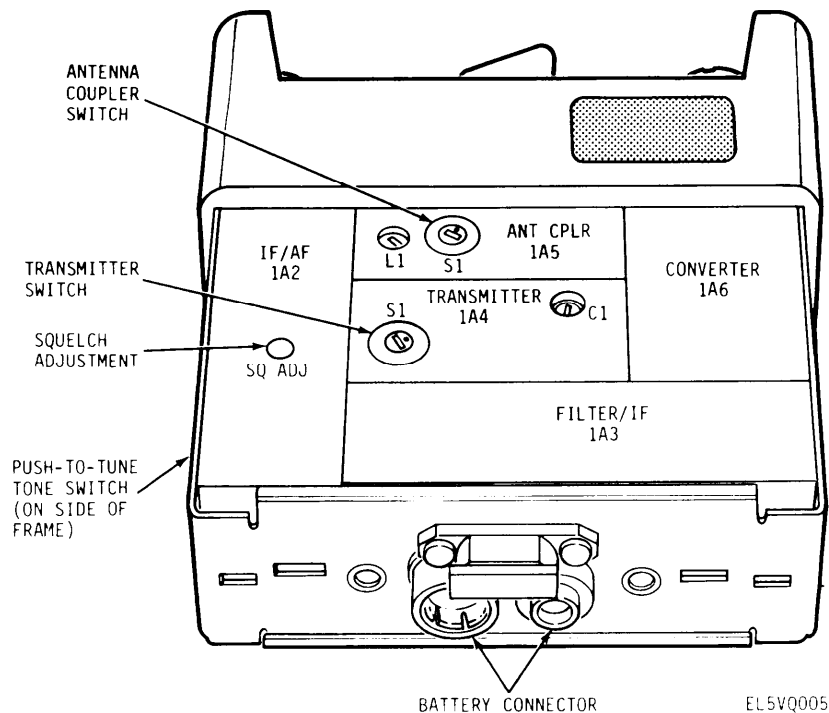


Figure 2-1. Radio set component locations, front view.

## Section II. SERVICE UPON RECEIPT

### 2-4. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750. Marine Corps units should refer to current edition of TM 4700-15/1.

c. Check DA PAM 310-7 to see whether there are any modification work orders pertaining to this equipment.

### 2-5. Disassembly Instructions

To disassemble the radio set for battery replacement or channel changing and alignment (fig. 1-2), perform the following:

a. Unfasten latches on battery case and remove battery case. (Handle case carefully as damaged case will not seal properly).

b. Remove battery by disconnecting snap ter-

minals.

c. Remove module cover by turning the two captive screws counterclockwise (located on bottom of module cover).

#### NOTE

Make sure that the svm shorting plug (located next to the battery terminal connector in the rt unit, fig. 2-2), is installed and in good condition. The radio set will not work unless the shorting plug or svm is installed.

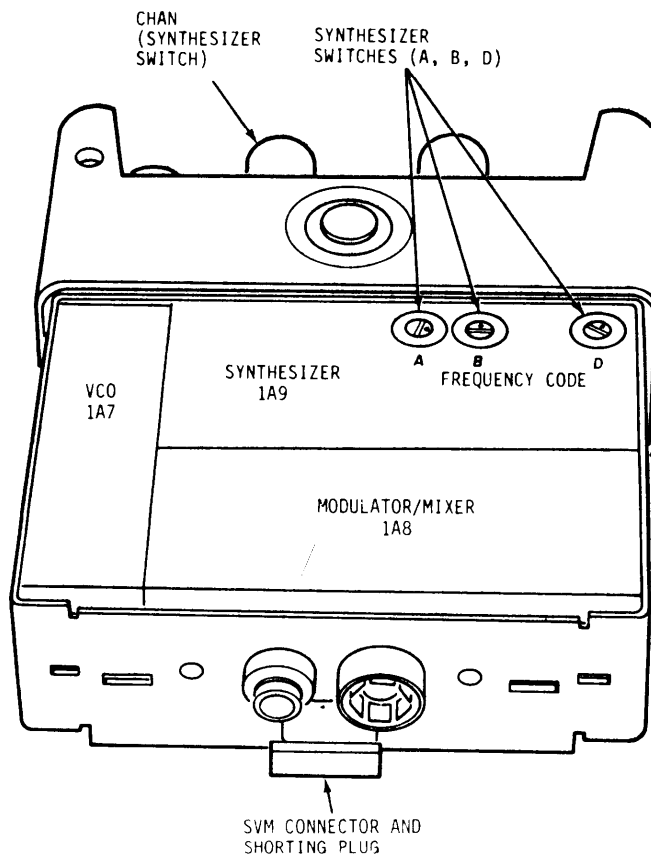
### 2-6. Reassembly Instructions

To reassemble the radio set, perform the following:

a. Apply a thin coat of silicone grease (NSN 6850-00-177-5094) to top edge of the module cover. Slide module cover over rt unit and secure with the two captive screws located on the bottom of the cover (turn clockwise),

b. Attach battery to battery connector on rt unit,

c. Apply a thin coat of silicone grease to the top edge of the battery case and attach battery case and secure with the two latches,



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Figure 2-2. Radio set component locations, rear view.

## 2-7. Frequency Changing and Alignment Procedures.

The ten position (0 through 9) CHAN switch on the front panel provides ten preset sequential channels spaced 200 kHz apart over a 2 MHz bandwidth. Any portion of the 30.00 MHz to 79.95 MHz range can be selected by changing the three switches (A, B, and D) on the synthesizer module and the CHAN switch on the top panel of the radio set. (Refer to table 2-1 or table 2-2 for frequencies and their respective switch settings). Whenever the frequency of a radio set is changed (excluding the ten preset channels), the transmitter module and antenna coupler module must be realigned to ensure proper matching and maximum power transfer of the radio set to the antenna.

a. *Changing Frequency.* To change the frequency of the radio set, perform the following:

- (1) Disassemble unit (para 2-5).
- (2) refer to figure 2-2. Set synthesizer switches, with the enclosed alignment tool (or JFD 5284 alignment tool), and the top panel CHAN switch, to the new frequency using table 2-1 or table 2-2, as applicable.

### NOTE

The frequency chart shown in table 2-1 is printed on the battery. Table 2-2 is a complete listing of all frequencies including degraded (low sensitivity) channels.

- (3) Set the transmitter switch and antenna coupler switch (fig. 2-1) with the enclosed alignment tool to the same position as switch A on the synthesizer module.

- (4) Connect battery.

b. *Alignment.* After the frequency of the radio set has been changed, perform the following procedures for radio set alignment (fig. 2-1 ):

- (1) Install antenna (either short or long).
- (2) Set CHAN switch to 5.
- (3) Preset C1 on the transmitter module fully clockwise (use enclosed alignment tool of JFD 5284).
- (4) Set PWR OFF/ON/SQUELCH DIS switch to ON.
- (5) Press push-to-tune switch (on side of radio set) and adjust VOL control for comfortable level.
- (6) Using the alignment tool, adjust C1 on the transmitter module counterclockwise for the lowest tone.
- (7) Release push-to-tune switch.
- (8) The antenna coupler adjustment (L1) must be made using Test Set TS-3354/PRC-68 (test set),
  - (a) Remove cover from test set.
  - (b) Install test set antenna.
  - (c) Set FUNCTION switch to FSM position.
- (9) Hold radio set so the antenna is approximately 6 to 24 inches from FSM antenna on test set.
- (10) Press PUST TO TALK switch on radio set and use alignment tool to adjust L1 (located on antenna

coupler) for maximum (peak) indication on the test set meter.

- (11) Release PUSH TO TALK switch.

(12) With alignment tool, adjust squelch (SQ ADJ) control on i-f/a-f module counterclockwise until noise is heard.

(13) Slowly turn SQ ADJ control clockwise until receiver quiets, then advance control one full turn clockwise.

(14) Return CHAN switch to channel originally selected.

(15) Set PWR OFF/ON/SQUELCH DIS switch to PWR OFF.

- (16) Remove battery.

- (17) Reinstall alignment tool on module cover.

- (18) Reassemble unit (para 2-6).

c. *Frequency Chart (Battery).* To use the chart in table 2-1, select the frequency value for each synthesizer switch in turn, that comes closest to (but not over) the desired frequency. Then add the values of the switches (A, B, CHAN (C), and D) to determine the operating frequency. By using the proper combination, any frequency between 30.00 to 79.95 MHz (in 50 MHz steps) may be selected.

	Set Switch	To	Which Equals
Example: To operate at 51.30 MHz	A	2	40.00
	B	5	10.00
	CHAN (C)	6	1.20
	D	2	0.10

Therefore, switch positions 2562 = 51.30 MHz

Table 2-1. Frequency Chart (Printed on Battery)

Switch	A	B	C	D
positions	(CHAN)			
0	—	0.00	.00	.00
1	30.00	2.00	.20	.05
2	40.00	4.00	.40	.10
3	54.00	6.00	.60	.15
4	64.00	8.00	.80	—
5	—	10.00	1.00	—
6	—	12.00	1.20	—
7	—	14.00	1.40	—
8	—	—	1.60	—
9	—	—	1.80	—

d. *Frequency Chart (Switch Code).* The following charts in table 2-2 may be used to determine an operating frequency from the synthesizer switch codes or the synthesizer switch codes from a known frequency. (Each chart covers a 2 MHz band). To find the

operating frequency (in MHz) from the switch codes, find the numbers that correspond to the A, B, CHAN and D positions.

Example: Switch code is 3412, where:

A = 3

B = 4

CHAN = 1

D = 2

(1) Find the chart which has A = 3 and B = 4 at the top left hand corner.

(2) Next locate 1 in the CHAN column.

(3) Read across until you come to the frequency number under the 2 in the D column.

(4) Answer should be 62.30 MHz.

To find the synthesizer switch codes when the frequency (in MHz) is known, find the frequency in the chart and read off the A, B, CHAN, and D switch codes.

Example: Frequency is 53.15 MHz

(1) Find the chart which contains the frequency.

(2) Read the upper left hand corner codes (A, B,) first (2, 6).

(3) Go to the CHAN column and locate the number that corresponds to frequency (5).

(4) Read the number in the D column that corresponds to the frequency (3).

(5) The synthesizer switch code is 2653.

Table 2-2. Frequency Chart  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
1	0	0	*30.00	30.05	30.10	30.15
		1	30.20	30.25	30.30	30.35
		2	30.40	30.45	30.50	30.55
		3	30.60	30.65	*30.70	30.75
		4	*30.80	30.85	30.90	30.95
		5	31.00	31.05	31.10	31.15
		6	*31.20	31.25	31.30	31.35
		7	31.40	31.45	31.50	31.55
		8	31.60	31.65	31.70	31.75
		9	31.80	31.85	31.90	31.95
1	1	0	*32.00	32.05	32.10	*32.15
		1	32.20	32.25	32.30	32.35
		2	32.40	32.45	32.50	32.55
		3	32.60	32.65	32.70	32.75
		4	32.80	32.85	32.90	32.95
		5	33.00	33.05	33.10	*33.15
		6	33.20	33.25	33.30	33.35
		7	*33.40	33.45	33.50	33.55
		8	*33.60	33.65	33.70	33.75
		9	33.80	33.85	33.90	33.95
1	2	0	34.00	*34.05	34.10	34.15
		1	34.20	34.25	34.30	34.35
		2	*34.40	34.45	34.50	34.55
		3	34.60	34.65	34.70	34.75
		4	34.80	34.85	34.90	34.95
		5	*35.00	35.05	35.10	35.15
		6	35.20	35.25	35.30	35.35
		7	35.40	35.45	35.50	35.55
		8	35.60	35.65	35.70	35.75
		9	35.80	35.85	35.90	**35.95

• See Notes at foot of table.



Table 2-2. Frequency Chart—Continued  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
1	3	0	**36.00	**36.05	36.10	*36.15
		1	36.20	*36.25	36.30	36.35
		2	36.40	36.45	36.50	36.55
		3	36.60	36.65	36.70	36.75
		4	36.80	36.85	36.90	36.95
		5	*37.00	37.05	37.10	37.15
		6	37.20	37.25	37.30	37.35
		7	37.40	37.45	*37.50	37.55
		8	37.60	37.65	37.70	37.75
		9	37.80	37.85	37.90	*37.95
1	4	0	38.00	38.05	38.10	38.15
		1	38.20	38.25	38.30	38.35
		2	38.40	38.45	38.50	38.55
		3	38.60	38.65	38.70	38.75
		4	38.80	38.85	38.90	38.95
		5	39.00	39.05	39.10	39.15
		6	*39.20	39.25	39.30	39.35
		7	39.40	39.45	39.50	39.55
		8	39.60	39.65	39.70	39.75
		9	39.80	39.85	39.90	39.95
2	0	0	*40.00	40.05	40.10	40.15
		1	40.20	*40.25	40.30	40.35
		2	40.40	40.45	40.50	40.55
		3	40.60	40.65	40.70	40.75
		4	40.80	40.85	40.90	40.95
		5	41.00	41.05	41.10	41.15
		6	*41.20	41.25	41.30	41.35
		7	41.40	41.45	41.50	41.55
		8	41.60	41.65	41.70	41.75
		9	*41.80	*41.85	41.90	*41.95
2	1	0	*42.00	42.05	42.10	42.15
		1	42.20	*42.25	42.30	42.35
		2	42.40	42.45	42.50	42.55
		3	42.60	42.65	42.70	*42.75
		4	42.80	42.85	42.90	42.95
		5	43.00	43.05	43.10	*43.15
		6	43.20	43.25	43.30	43.35
		7	43.40	43.45	43.50	43.55
		8	43.60	43.65	43.70	43.75
		9	43.80	43.85	*43.90	43.95
2	2	0	44.00	44.05	44.10	44.15
		1	44.20	44.25	44.30	44.35
		2	*44.40	44.45	44.50	44.55
		3	44.60	44.65	44.70	44.75
		4	44.80	44.85	44.90	44.95
		5	45.00	45.05	45.10	*45.15
		6	45.20	45.25	45.30	45.35
		7	45.40	45.45	45.50	45.55
		8	*45.60	45.65	45.70	45.75
		9	45.80	45.85	*45.90	45.95
2	3	0	*46.00	46.05	46.10	46.15
		1	46.20	46.25	46.30	46.35

Table 2-2. Frequency Chart—Continued  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
2	3	2	46.40	46.45	46.50	46.55
		3	46.60	46.65	46.70	*46.75
		4	46.80	46.85	46.90	46.95
		5	47.00	47.05	47.10	47.15
		6	47.20	47.25	47.30	*47.35
		7	47.40	47.45	*47.50	47.55
		8	47.60	*47.65	47.70	47.75
		9	47.80	47.85	47.90	47.95
2	4	0	48.00	48.05	48.10	48.15
		1	48.20	48.25	*48.30	48.35
		2	48.40	48.45	48.50	48.55
		3	48.60	48.65	48.70	48.75
		4	48.80	48.85	48.90	48.95
		5	49.00	*49.05	49.10	49.15
		6	49.20	49.25	49.30	49.35
		7	49.40	49.45	49.50	49.55
		8	49.60	49.65	49.70	49.75
2	5	9	49.80	49.85	49.90	49.95
		0	*50.00	50.05	50.10	50.15
		1	50.20	50.25	50.30	50.35
		2	50.40	50.45	50.50	50.55
		3	50.60	50.65	50.70	50.75
		4	50.80	50.85	50.90	50.95
		5	51.00	51.05	51.10	51.15
		6	51.20	*51.25	51.30	51.35
		7	51.40	51.45	51.50	51.55
2	6	8	51.60	51.65	51.70	51.75
		9	51.80	51.85	51.90	51.95
		0	52.00	52.05	52.10	52.15
		1	52.20	52.25	52.30	52.35
		2	52.40	52.45	52.50	52.55
		3	52.60	52.65	52.70	52.75
		4	52.80	52.85	52.90	52.95
		5	53.00	53.05	53.10	53.15
		6	*53.20	*53.25	53.30	53.35
3	0	7	53.40	53.45	53.50	53.55
		8	53.60	53.65	53.70	53.75
		9	53.80	53.85	53.90	53.95
		0	*54.00	54.05	54.10	54.15
		1	54.20	54.25	54.30	54.35
		2	54.40	54.45	54.50	54.55
		3	*54.60	54.65	54.70	54.75
		4	54.80	*54.85	54.90	54.95
		5	55.00	55.05	55.10	55.15
3	1	6	*55.20	*55.25	55.30	55.35
		7	55.40	55.45	*55.50	55.55
		8	55.60	*55.65	55.70	55.75
		9	55.80	55.85	55.90	55.95
		0	*56.00	56.05	56.10	56.15
		1	56.20	56.25	56.30	56.35
		2	56.40	56.45	56.50	56.55
		3	56.60	56.65	56.70	56.75
		4	56.80	56.85	56.90	56.95

Table 2-2. Frequency Chart-Continued  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
3	1	5	57.00	57.05	57.10	57.15
		6	*57.20	57.25	57.30	57.35
		7	57.40	57.45	57.50	57.55
		8	57.60	57.65	57.70	57.75
		9	57.80	57.85	57.90	57.95
3	2	0	58.00	58.05	58.10	58.15
		1	58.20	58.25	*58.30	58.35
		2	58.40	58.45	58.50	58.55
		3	58.60	58.65	58.70	58.75
		4	58.80	58.85	58.90	58.95
		5	59.00	59.05	59.10	59.15
		6	59.20	59.25	*59.30	59.35
		7	59.40	59.45	59.50	59.55
		8	59.60	59.65	59.70	59.75
		9	59.80	59.85	59.90	**59.95
3	3	0	**60.00	**60.05	60.10	60.15
		1	60.20	60.25	60.30	60.35
		2	60.40	60.45	60.50	60.55
		3	60.60	60.65	60.70	60.75
		4	60.80	60.85	60.90	60.95
		5	*61.00	61.05	61.10	61.15
		6	61.20	61.25	61.30	*61.35
		7	61.40	61.45	61.50	61.55
		8	61.60	61.65	61.70	61.75
		9	61.80	61.85	61.90	61.95
3	4	0	62.00	62.05	62.10	62.15
		1	62.20	62.25	62.30	62.35
		2	*62.40	62.45	*62.50	62.55
		3	62.60	*62.65	62.70	62.75
		4	62.80	62.85	62.90	*62.95
		5	63.00	63.05	63.10	63.15
		6	*63.20	63.25	63.30	63.35
		7	*63.40	63.45	63.50	63.55
		8	63.60	63.65	63.70	63.75
		9	63.80	63.85	63.90	63.95
4	0	0	*64.00	64.05	64.10	64.15
		1	64.20	64.25	64.30	64.35
		2	64.40	64.45	64.50	64.55
		3	64.60	64.65	64.70	64.75
		4	64.80	*64.85	64.90	64.95
		5	65.00	65.05	*65.10	65.15
		6	*65.20	65.25	65.30	65.35
		7	65.40	65.45	65.50	65.55
		8	65.60	65.65	65.70	65.75
		9	65.80	65.85	65.90	65.95
4	1	0	**66.00	66.05	66.10	66.15
		1	66.20	66.25	66.30	*66.35
		2	66.40	66.45	66.50	66.55
		3	66.60	66.65	66.70	66.75
		4	66.80	66.85	66.90	66.95
		5	67.00	67.05	67.10	67.15
		6	67.20	67.25	67.30	67.35
		7	67.40	67.45	67.50	67.55

Table 2-2. Frequency Chart—Continued  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
4	1	8	67.60	67.65	67.70	67.75
		9	67.80	67.85	67.90	67.95
4	2	0	68.00	*68.05	68.10	68.15
		1	*68.20	68.25	68.30	68.35
		2	68.40	68.45	68.50	68.55
		3	68.60	68.65	68.70	68.75
		4	68.80	68.85	68.90	68.95
		5	69.00	69.05	69.10	69.15
		6	69.20	69.25	69.30	69.35
		7	69.40	69.45	69.50	69.55
		8	69.60	69.65	69.70	*69.75
		9	69.80	69.85	69.90	69.95
4	3	0	*70.00	70.05	70.10	70.15
		1	70.20	70.25	70.30	70.35
		2	70.40	70.45	70.50	*70.55
		3	70.60	70.65	*70.70	70.75
		4	70.80	70.85	70.90	70.95
		5	*71.00	71.05	71.10	71.15
		6	71.20	71.25	71.30	71.35
		7	71.40	*71.45	71.50	71.55
		8	71.60	71.65	71.70	71.75
		9	71.80	71.85	71.90	71.95
4	4	0	72.00	72.05	72.10	72.15
		1	72.20	72.25	72.30	72.35
		2	72.40	72.45	72.50	72.55
		3	72.60	72.65	72.70	72.75
		4	72.80	72.85	72.90	72.95
		5	*73.00	73.05	73.10	73.15
		6	73.20	73.25	73.30	73.35
		7	*73.40	73.45	73.50	73.55
		8	74.60	*73.65	73.70	73.75
		9	73.80	73.85	73.90	73.95
4	5	0	*74.00	74.05	74.10	74.15
		1	74.20	74.25	74.30	74.35
		2	*74.40	74.45	74.50	74.55
		3	74.60	74.65	74.70	74.75
		4	74.80	74.85	74.90	74.95
		5	*75.00	*75.05	75.10	75.15
		6	*75.20	75.25	75.30	75.35
		7	75.40	75.45	75.50	75.55
		8	75.60	75.65	75.70	75.75
		9	75.80	75.85	75.90	75.95
4	6	0	76.00	76.05	76.10	76.15
		1	76.20	76.25	76.30	76.35
		2	76.40	76.45	76.50	76.55
		3	76.60	76.65	76.70	76.75
		4	76.80	76.85	*76.90	76.95
		5	77.00	77.05	77.10	77.15
		6	77.20	77.25	77.30	77.35
		7	77.40	77.45	*77.50	77.55
		8	77.60	77.65	77.70	77.75
		9	77.80	77.85	77.90	77.95

Table 2-2. Frequency Chart—Continued  
(Switch Code)

A	B	C H A N	D			
			0	1	2	3
			Preset channel frequency (MHz)			
		0	*78.00	78.05	78.10	78.15
		1	78.20	78.25	78.30	78.35
		2	78.40	78.45	*78.50	78.55
		3	78.60	78.65	78.70	78.75
		4	78.80	78.85	78.90	78.95
		5	79.00	79.05	*79.10	79.15
		6	79.20	79.25	79.30	79.35
		7	*79.40	79.45	*79.50	79.55
		8	79.60	79.65	79.70	79.75
		9	79.80	79.85	79.90	79.95

\*Denotes possible degraded sensitivity channels  
(squelch may not quiet)

\*\*Denotes unusable channels

## Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

### 2-8. General

To insure that the radio set is always ready for operation, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Organizational preventive maintenance procedures are designed to help maintain equipment in serviceable condition. They include what items should be checked and how to check them. These checks and services are to be made at specific (W) weekly, (M) monthly, (Q) quarterly, (S) semiannually, and (A) annual intervals.

### 2-9. PMCS Table

Table 2-3 describes the organizational preventive maintenance checks and services for the radio set. Routine checks like CLEANING, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES AND CHECKING FOR LOOSE NUTS AND BOLTS are not listed as PMCS checks. They are things that you should do anytime you see they must be done. If you find a routine check like one of those listed, in your PMCS, it was listed because other operators reported problems with this item.

WHEN YOU ARE DOING ANY PMCS OR  
ROUTINE CHECKS, KEEP IN MIND THE

#### WARNINGS AND CAUTIONS.

##### WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flames; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately. Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Compressed air shall not be used for cleaning purposes except where reduced to less than 30 p.s.i.g. and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when trichlorotrifluoroethane has been used.

Table 2-3. Organizational Preventive Maintenance Checks and Services

**NOTE**

The checks in the interval column are to be performed in the order listed.

W—Weekly

M—Monthly

Q—Quarterly

S—Semiannually

A—Annually

Item no.	Interval					Item to be inspected	Procedures
	W	M	Q	S	A		
1					•	Radio set	Check for missing or damaged knobs, antenna, lanyard.
2					•	Radio set	Operational check using Test Set TS-3354/PRC-68 (table 3-1).
3			•			Battery	Check voltage using Test Set TS-3354/PRC-68.

Section IV. TROUBLESHOOTING

2-10. Visual Inspection

When the radio set fails to operate properly, visually check the items listed below.

- a. Setting of switches and controls.
- b. Battery; weak or missing.
- c. Antenna; broken or stripped connector.
- d. Knobs; broken or missing.

2-11. Troubleshooting Procedures

If visual inspection does not locate the trouble, consult troubleshooting table 2-4. Use the applicable section of this table as determined by the malfunction. If the

malfunction is still not located, higher level troubleshooting is required. Note on the repair tag how the equipment performed at time of failure.

NOTE

Low band (1001; 30.05 MHz) and high band (3001; 54.05 MHz) operation should be checked for each malfunction in the table.

2-12. Test Equipment Required

Test Set TS-3354/PRC-68 (test set) is used to troubleshoot the radio set. Refer to figures 2-3, 2-4, and 2-5 for test equipment hookups.

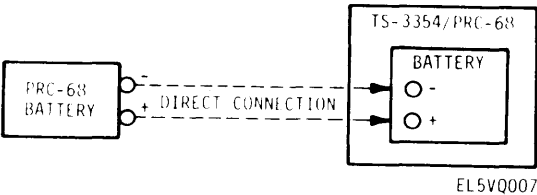
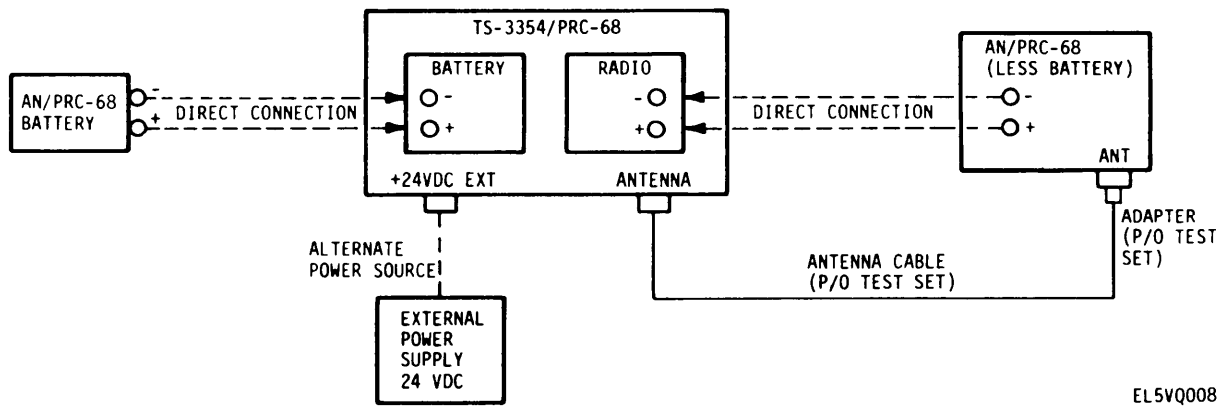
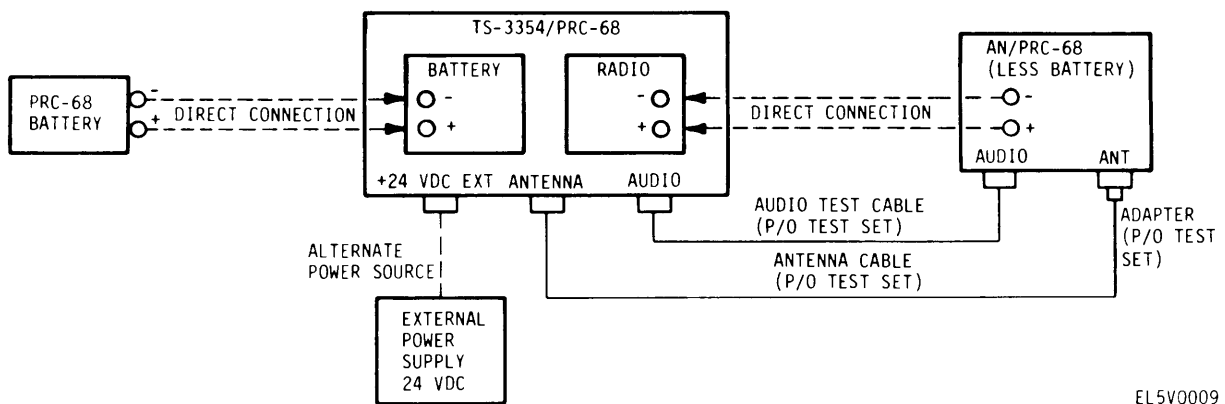


Figure 2-3. Battery test.



EL5VQ008

Figure 2-4. Transmitter power output test.



EL5VQ009

Figure 2-5. Sensitivity test.

Table 2-4. Troubleshooting Procedures

Malfunction	Test or inspection	Corrective action
Radio set will not transmit or receive	<p>a. Check battery using test set. Connect battery to battery terminals on test set (fig. 2-3) and proceed as follows:</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Do not connect radio set to test set for this test.</p> <ol style="list-style-type: none"> <li>1. Set test set POWER switch to BAT position and RESET switch to upper position.</li> <li>2. Hold test set FUNCTION switch in BAT position.</li> <li>3. Wait approximately five seconds and observe meter indication. A meter reading in green portion of meter scale indicates a usable battery. A reading in red portion of meter scale indicates a weak (less than 12.0 volts) battery.</li> <li>4. Set POWER switch on test set to OFF, detach battery and reassemble.</li> </ol> <p>b. Check condition of antenna. Remove antenna and check connector for damage, dirt, or corrosion</p>	<p>a. Replace battery if defective (para 2-18).</p>
Radio set has poor or no transmit functions, receive OK	<p>c. Svm plug missing or broken (fig. 2-2).</p> <p>a. Check alignment of radio set.</p> <p>b. Check transmitter output using test set as follows:</p> <ol style="list-style-type: none"> <li>1. Remove battery case, battery, antenna, and module cover from radio set (para 2-5) and connect battery or power supply and radio set as shown in figure 2-4.</li> <li>2. Adjust radio set and test set (using FREQUENCY CODE switches) to the same channel (para 2-7).</li> <li>3. Set antenna coupler switch to 0 (fig 2-1).</li> <li>4. On test set, set following switches:</li> </ol> <p style="text-align: center;">POWER — BAT or EXT FUNCTION — XMT RESET — UP</p> <ol style="list-style-type: none"> <li>5. Press PUSH TO TALK switch on radio set.</li> <li>6. Observe test set meter indication. A meter reading in green portion of scale indicates an acceptable transmitter; a reading in red portion of scale indicates a defective transmitter.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Power output readings are valid only when a new battery is used as the power source.</p> <ol style="list-style-type: none"> <li>7. Release PUSH TO TALK switch, turn POWER switch OFF, detach radio set from test set, set antenna coupler switch S1 to same position as synthesizer switch A. Check alignment of L1 (para 2-7b) and reassemble (para 2-6).</li> </ol>	<p>b. Replace antenna if damaged (para 2-17). If connector is dirty, clean it; if stripped or damaged in any other way, higher level maintenance is required.</p> <p>c. Replace svm plug.</p> <p style="padding-left: 20px;">a. Refer to paragraph 2-7.</p> <p>b. If defective, higher level maintenance is required.</p>
Radio set has poor or no receive function, transmit OK	<p>c. Check radio set by talk-testing to another unit to check for quality of modulation, distortion, and on-channel operation.</p> <p>a. Check squelch operation by placing PWR OFF/ON/SQUELCH DIC switch to SQUELCH DIS position and listen for receiver noise.</p> <p>b. Check receiver sensitivity using test set as follows:</p> <ol style="list-style-type: none"> <li>1. Remove battery, module cover, and antenna from radio set (para 2-5) and connect radio set and battery or power supply as shown in figure 2-5.</li> <li>2. Adjust radio set and test set (FREQUENCY CODE switches) to the same channel (para 2-7).</li> <li>3. Set antenna coupler switch to 0 (fig. 2-1).</li> <li>4. On test set, set following switches:</li> </ol>	<p>c. If defective, higher level maintenance is required.</p> <p>a. Readjust squelch control (para 2-7b).</p> <p>b. If defective, higher level maintenance is required.</p>



Table 2-4. Troubleshooting Procedures—Continued

Malfunction	Test or inspection	Corrective action
	<p>POWER — BAT or EXT FUNCTION — RCV RESET — UP</p> <p>5. With squelch disabled (SQUELCH DIS) adjust VOL control on radio set for a test set meter indication of 5 (mid-scale). 6. Hold PWR OFF/ON/SQUELCH DIS switch in SQUELCH DIS position and press SENS READ switch on test set. 7. Observe test set meter indication. A reading in green portion of scale indicates an acceptable receiver; a reading in red portion of scale indicates a defective receiver. Release PWR OFF/ON/SQUELCH DIS switch. 8. Set POWER switch to OFF, detach radio set from test set, set antenna coupler switch to same position as synthesizer switch A. Check alignment of L1 (para 2-7b) and reassemble (para 2-6). c. Check radio set by talk-testing to another unit to check for quality of receiver audio and/or low sensitivity.</p>	<p>c. If defective, higher level maintenance is required.</p>

## Section V. MAINTENANCE PROCEDURES

### 2-13. General

Maintenance procedures at the organizational level for the radio set are limited to cleaning, painting, and replacement of broken external parts (knobs and antenna) and battery replacement.

### 2-14. Cleaning

Inspect the exteriors of the radio set. The exterior surfaces should be clean, free from dust, dirt, grease and fungus.

- a. Remove dust and loose dirt with a clean soft cloth, item 2, App. C.

#### WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

- b. Remove grease, fungus, and ground-in dirt from the radio set; use a cloth dampened (not wet) with trichlorotrifluoroethane, item 6, App. C.

- c. Remove dust or dirt from antenna and audio connectors with a brush, item 1, App. C.

### 2-15. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper, item 4, App. C. Brush two thin coats of paint on the bare metal to protect from further corrosion, items 3 and 7, App. C. Refer to SB 11-573 and 43-0118.

### 2-16. Knob Replacement

The three knobs on the radio set are held onto their shafts by setscrews. If knob replacement becomes necessary:

- a. Loosen setscrew with an appropriate wrench.
- b. Remove defective knob.
- c. Install new knob.
- d. Tighten setscrews (if knob has two setscrews, tighten the setscrew that engages the flatted shaft first).

### 2-17. Antenna Replacement

Remove damaged antenna from connector by turning antenna counterclockwise. Check connector on radio set for corrosion or thread damage. Remove and signs of corrosion. If connector is damaged, refer radio set to higher level of maintenance. Insert new antenna into connector and hand tighten clockwise.

### 2-18. Battery Replacement

Remove battery case by unfastening latches on side of radio set case and sliding case off. (Handle case carefully as damaged case will not seal properly). Detach old battery from battery connector and attach new battery to connector. Apply a thin coat of silicone grease, item

5, App. C, to the top edge of the battery case (to facilitate "O" ring sealing). Reinstall battery case and fasten latches.

**CAUTION**

In order to prevent water seepage make sure battery case and rubber gasket are not damaged. Make sure battery case and module cover are properly aligned before fastening latches.

**Section VI. PREPARATION FOR STORAGE OR SHIPMENT**

**2-19. Packaging, Marking and Shipping Requirements**

Refer to figure 2-6 for packaging diagram.

**2-20. Type of Storage**

Short term (administrative storage) = 1 to 45 days. Administrative storage covers storage of equipment which

can be readied for mission performance within 24 hours. Before placing an item in administrative storage, the next scheduled preventive maintenance checks and services should be performed, all known deficiencies corrected, and all current modification work orders applied. The administrative storage site should provide required protection from the elements and allow access for visual inspection and exercising when applicable.

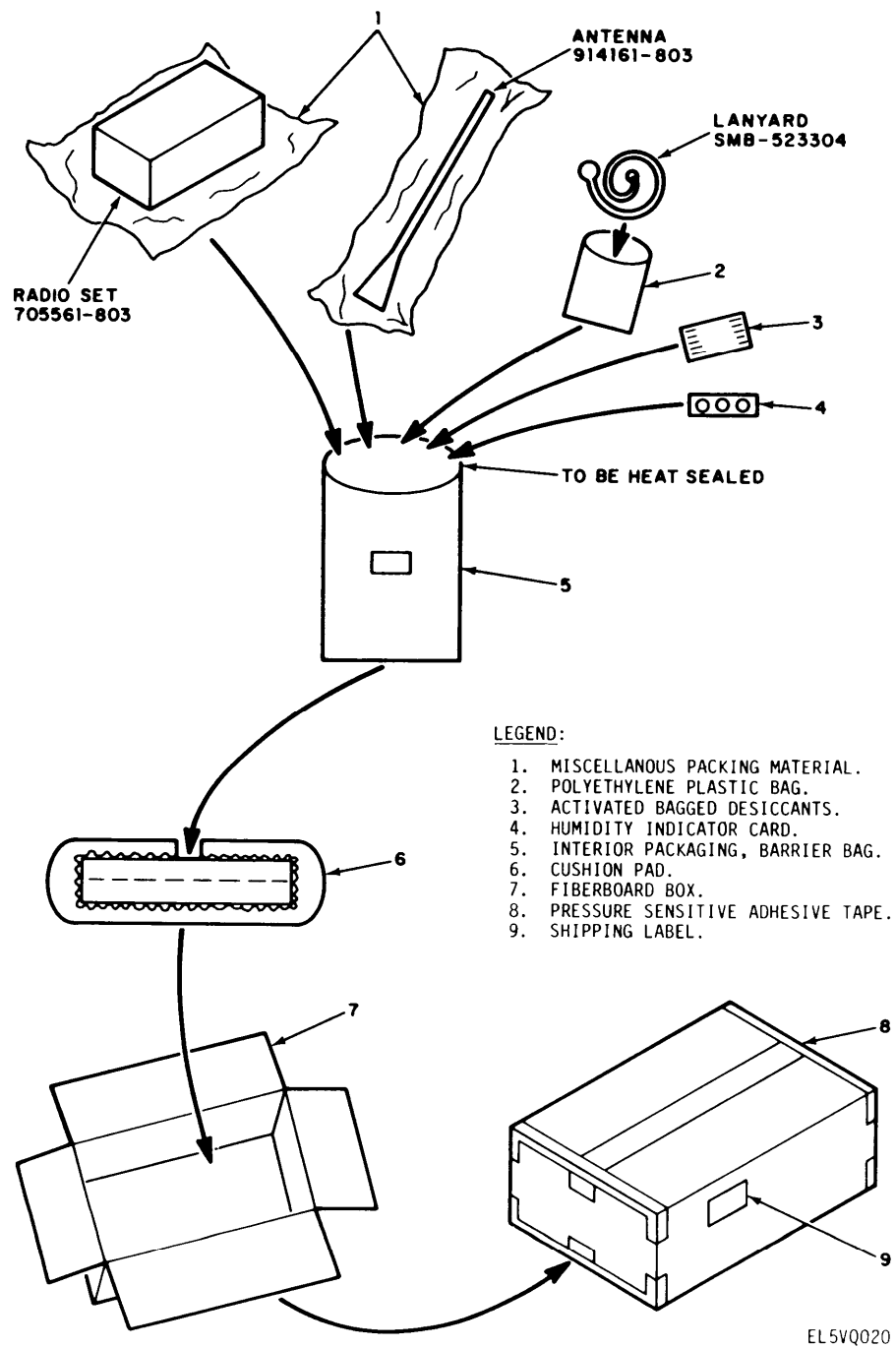


Figure 2-6. Radio set packaging diagram.



## CHAPTER 3

### DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

#### Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

##### 3-1. Common Tools and Equipment

For authorized common tools and equipment refer to the Modified table of Organization and Equipment (MTOE) applicable to your unit.

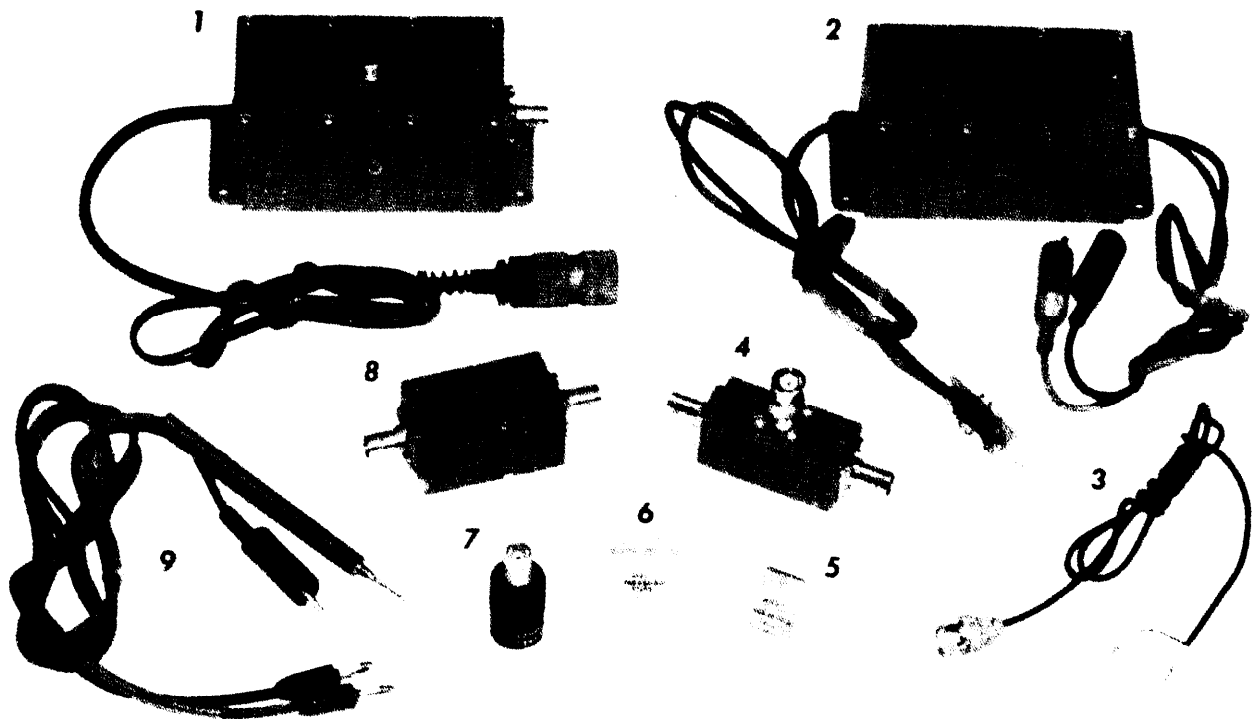
##### 3-2. Special Tools, TMDE, and Support Equipment

Refer to the maintenance allocation chart (App. B), for

tools and equipment to be used at direct support maintenance level.

##### 3-3. Maintenance Kit

Figure 3-1 shows Maintenance Kit MK-( ) /PRC-68 used with the test equipment to troubleshoot the radio set. Table 3-1 provides a brief description of the contents of the kit.



EL5VQ025

Figure 3-1. Maintenance Kit MK-( ) /PRC-68.

Table 3-1. Maintenance Kit Description MK-( ) /PRC-68

Item Part no.	Name	Use	no.
1	914877-801	Audio adapter assembly	Provides means of keying transmitter and interfacing test equipment through the audio connector on the radio set.
2	565460-801	Power cable assembly	Provides regulated 15 ± 0.5 vdc to radio set from external power supply (20 to 30 vdc).
3	565461-801	RF cable assembly	Provides means of connecting test equipment to the test points on the radio set circuit board.
4	914876-801	RF attenuator assembly	Provides means of connecting wattmeter and frequency counter to radio set.
5	565462-801	Jumper plug assembly	Provides B+ continuation in radio set when transmitter module is removed.
6	565462-802	Jumper plug assembly	Provides B+ continuation in radio set when i-f/a-f module is removed.
7	914598-801	Antenna adapter	Provides means of connecting antenna of radio set to test equipment.
8	914878-801	150 Hz filter assembly	Provides filtering of 150 Hz squelch tone during distortion tests.
9	565463-801	Test lead assembly	Provides means of connecting digital voltmeter for voltage checks on radio set printed circuit board.

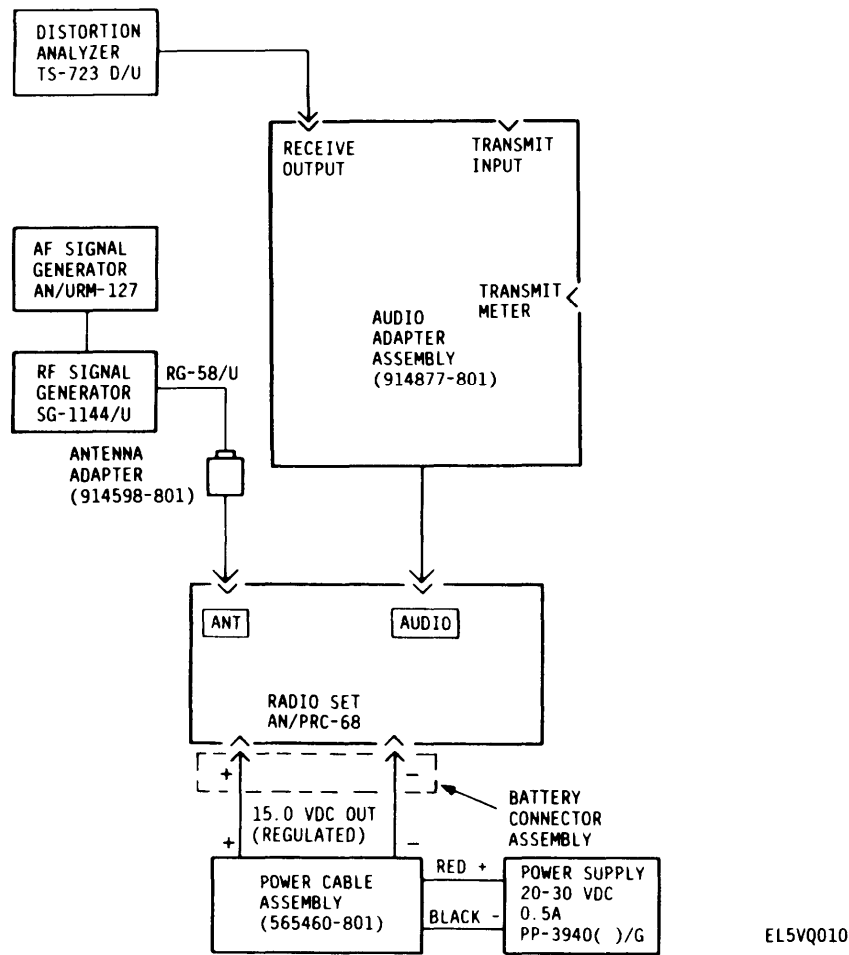


Figure 3-2. Receiver troubleshooting test setup.

### 3-4. Repair Parts

Repair parts are listed in the repair parts and special tools list (TM 11-5820-882-23P) covering

organizational and direct support maintenance for this equipment.

## Section II. TROUBLESHOOTING

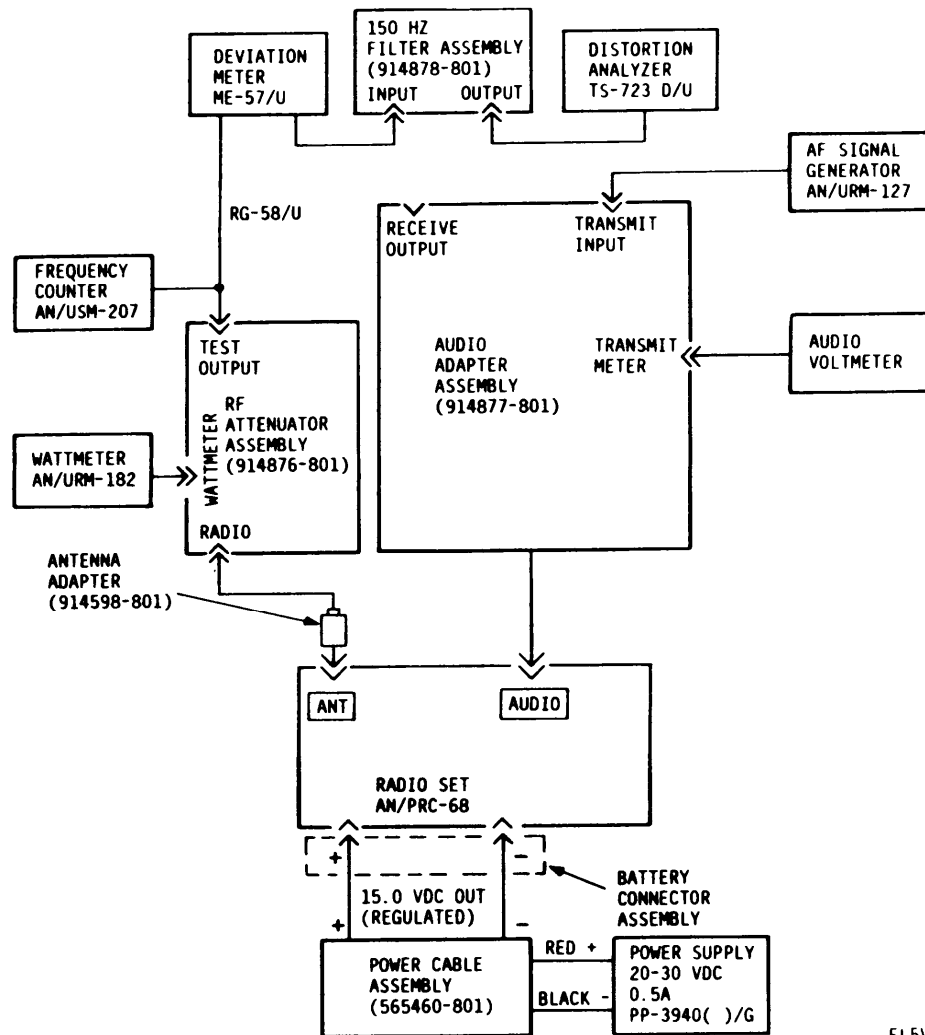
### 3-5. Troubleshooting Procedures

Troubleshooting instructions for the radio set contained in this section are separated into two procedures. The first procedure consists of a minimum performance test, as outlined in table 3-2. This table will be used to determine the general nature of the malfunction and, after a repair has been made, to ensure the radio set is working properly for all functions. Minimum performance of the radio set may also be performed using the test set (table 2-4). The second procedure consists of a fault

isolation test, as outlined in table 3-3. This table will isolate a problem down to a particular module which will then be replaced. If module replacement does not repair unit, higher level maintenance is required.

### 3-6. Test Equipment Setups

The test setup requirements for performing the troubleshooting procedures are shown in figures 3-2 and 3-3. The maintenance kit required for the test setups is described in table 3-1.



EL5VQ011

Figure 3-3. Transmitter troubleshooting test setup.

Table 3-2. Radio Set Minimum Performance Test

Step	Procedure	Required indication	Fault isolation step
	<p align="center"><b>NOTE</b></p> <p>The minimum performance tests should be performed with radio set tuned to operating frequencies of 30.05 MHz, 43.05 MHz, 54.05 MHz, and 67.05 MHz to ensure a complete operational checkout of all transmitter and receiver bands.</p> <p align="center"><b>RECEIVER MEASUREMENTS</b></p> <p>Remove antenna, battery case, battery, and module cover. Set radio set frequency to 30.05 MHz (1001).</p> <p align="center"><b>CAUTION</b></p> <p>Do not depress PUSH TO TALK switch on radio set or PUSH TO TRANSMIT switch on audio adapter assembly when radio set is connected for receiver measurements.</p> <p align="center"><i>Receiver Sensitivity</i></p> <ol style="list-style-type: none"> <li>1. Connect radio set and equipment as shown in figure 3-2 and apply power. Set antenna coupler switch S1 to 0. Turn radio set ON.</li> <li>2. Adjust rf signal generator at 30.05 MHz for 0.5 microvolt output level with modulation set for 1 kHz at 8 kHz deviation. Adjust radio set VOL control for 1.2 vrms audio output level on distortion analyzer VOLTMETER.</li> <li>3. Measure audio output SINAD* ratio on distortion analyzer.</li> </ol> <p align="center">*SINAD = <math>\frac{\text{Signal} + \text{Noise} + \text{Distortion}}{\text{Noise} + \text{Distortion}}</math></p> <p align="center"><i>Receiver Squelch Sensitivity</i></p> <ol style="list-style-type: none"> <li>4. Disconnect audio adapter assembly from radio set. Reduce rf signal generator output level to minimum (zero). The squelch should activate and quiet audio output of receiver. Slowly increase rf signal generator output level until squelch releases and normal audio output is restored.</li> <li>5. Observe rf signal generator output level.</li> </ol> <p align="center"><i>Receiver Audio Output Distortion</i></p> <ol style="list-style-type: none"> <li>6. Reconnect audio adapter assembly to radio set. Adjust rf signal generator at 30.05 MHz for 1.0 millivolt output level on distortion analyzer VOLTMETER.</li> <li>7. Measure receiver audio output harmonic distortion on distortion analyzer.</li> </ol> <p align="center"><i>Receiver Speaker and Speaker Muting</i></p> <ol style="list-style-type: none"> <li>8. Adjust rf signal generator at 30.05 MHz for 1.0 millivolt output with modulation set for 1 kHz at 8 kHz deviation. Adjust radio set VOL control for 1.2 vrms receiver output on distortion analyzer VOLTMETER.</li> <li>9. Disconnect audio adapter assembly from radio set. The 1 kHz modulation tone should be heard from speaker.</li> <li>10. Reconnect audio adapter assembly to radio set. The 1 kHz modulation tone should not be heard (muted) from speaker.</li> <li>11. Turn power supply off.</li> </ol>	<p>SINAD* RADIO 10 db minimum for 0.5 microvolt input.</p> <p>Less than 0.5 microvolt</p> <p>Less than 10 percent distortion.</p> <p>1 kHz tone from speaker.</p> <p>1kHz tone muted.</p>	<p>Table 3-3, steps 1 through 11</p> <p>Table 3-3, steps 1 through 11.</p> <p>Table 3-3, steps 1 through 11.</p> <p>Table 3-3, steps 1 through 11.</p> <p>Table 3-3, steps 1 through 11.</p>



Table 3-2. Radio Set Minimum Performance Test—Continued

Step	Procedure	Required indication	Fault isolation step
<b>TRANSMITTER MEASUREMENTS</b>			
<b>NOTE</b>			
The PUSH TO TRANSMIT switch on audio adapter assembly must be depressed and held for duration of measurement to obtain a reading.			
<i>Transmitter Power Output</i>			
12.	Connect radio set and equipment as shown in figure 3-3 and apply power. Set antenna coupler switch S1 to 0. Set radio set PWR OFF/ON/SQUELCH DIS switch to ON.		
13.	Set audio generator output level to minimum (zero).		
14.	Depress audio adapter assembly PUSH TO TRANSMIT switch and measure power output on wattmeter. Release PUSH TO TRANSMIT switch. (Adjust C1 on transmit module if necessary to get required indication).	1 watt minimum.	Table 3-3, steps 12 through 21.
15.	Depress radio set PUSH TO TALK switch and measure power output on wattmeter. Release PUSH TO TALK switch.	1 watt minimum.	Table 3-3, steps 12 through 21.
<i>Transmitter Frequency Stability</i>			
16.	Set audio generator output level to minimum (zero).		
17.	Depress PUSH TO TRANSMIT switch on audio adapter assembly. Measure transmitter output frequency on frequency counter. Release PUSH TO TRANSMIT switch.	30.0485 to 30.0515 MHz.	Table 3-3, steps 12 through 21.
<i>Transmitter Modulation</i>			
18.	Set audio generator frequency to 1 kHz and output level to minimum (zero).		
19.	Depress PUSH TO TRANSMIT switch on audio adapter assembly and measure deviation on deviation meter. Release PUSH TO TRANSMIT switch.	2.5 to 3.5 kHz deviation.	Table 3-3, steps 12 through 21.
20.	Disconnect frequency counter from RF INPUT of deviation meter and connect to deviation meter audio output. Depress PUSH TO TRANSMIT switch and measure squelch tone frequency on counter. Release PUSH TO TRANSMIT switch.	148 to 152 Hz	Table 3-3, steps 12 through 21.
21.	Depress PUSH TO TRANSMIT switch and increase audio generator output level until modulation deviation is 8 kHz on deviation meter. Measure transmit input level with audio voltmeter (connected to TRANSMIT METER on audio adapter assembly). Release PUSH TO TRANSMIT switch.	Less than 1 millivolt	
22.	Reconnect frequency counter as shown in figure 3-3. Depress PUSH TO TRANSMIT switch and measure harmonic distortion of 1 kHz modulation tone from deviation meter audio output. Release PUSH TO TRANSMIT switch.	Less than 10 percent distortion.	Table 3-3, steps 12 through 21.
23.	Increase output of audio signal generator until a reading of 10 millivolts on audio voltmeter is obtained. Depress PUSH TO TRANSMIT switch and measure limited modulation deviation on deviation meter. Release PUSH TO TRANSMIT switch.	Less than 15 kHz deviation.	
<i>Transmitter Microphone</i>			
24.	Disconnect audio adapter assembly from AUDIO connector on radio set.		
25.	Depress PUSH TO TALK switch on radio set. Speak into	Approximately 8 kHz deviation	Table 3-3, steps 2 through 21.

Table 3-2. Radio Set Minimum Performance Test—Continued

Step	Procedure	Required indication	Fault isolation step
	microphone (hold microphone about 1 inch from mouth) and observe modulation deviation meter. Release PUSH TO TALK switch.	with peaks limited to less than 15 kHz.	<b>NOTE</b> If step 23 indication is normal but step 25 indicates abnormally low microphone sensitivity, internal speaker-microphone is probably defective.
26.	Turn radio set and power supply off. Connect battery and antenna to radio set. Set radio set synthesizer switches to 30.05 MHz (1001). align antenna coupler and transmitter (para 2-7). Use Test Set TS-3354/PRC-68 field strength meter to verify operation of antenna coupler when coupler is adjusted for maximum rf peaking.	Maximum rf peaking on field strength meter of test set.	Table 3-3, steps 12 through 21.
27.	Repeat step 26 for operating frequencies of 43.04 (2151), 54.05 MHz (3001), and 67.05 MHz (4151).	Same as step 26.	Same as step 26.
28.	Release PUSH TO TALK switch. Reassemble radio set.		

### 3-7. Fault Isolation Test

Table 3-3 is a fault isolation test for the radio set. By using these tests and the associated test equipment, the radio set may be fault isolated to a defective module. If the problem cannot be located to a defective module or other DS level maintenance, then higher level maintenance is required. In all cases, after a defective module has been replaced or a repair made to the radio set, the minimum performance test (table 3-2), or minimum performance check using the test set (table 2-4), must be performed to ensure the radio set is fully operational.

### 3-8. Fault Isolation Test Equipment Set-ups

Figure 3-4 and 3-6 show the equipment setups necessary to perform the fault isolation tests.

### 3-9. Test Point Locations

Figures 3-7 and 3-8 show the test point locations used in fault isolation testing. Test point connections are made by a special rf cable assembly 565461-801 (part of Maintenance Kit MK-( ) /PRC-68). In all cases where this cable is used, the center conductor is connected to the test point called for, and the shield is connected to the nearest ground point on the printed circuit board. The BNC connector end mates with the applicable test equipment unit, when called for.

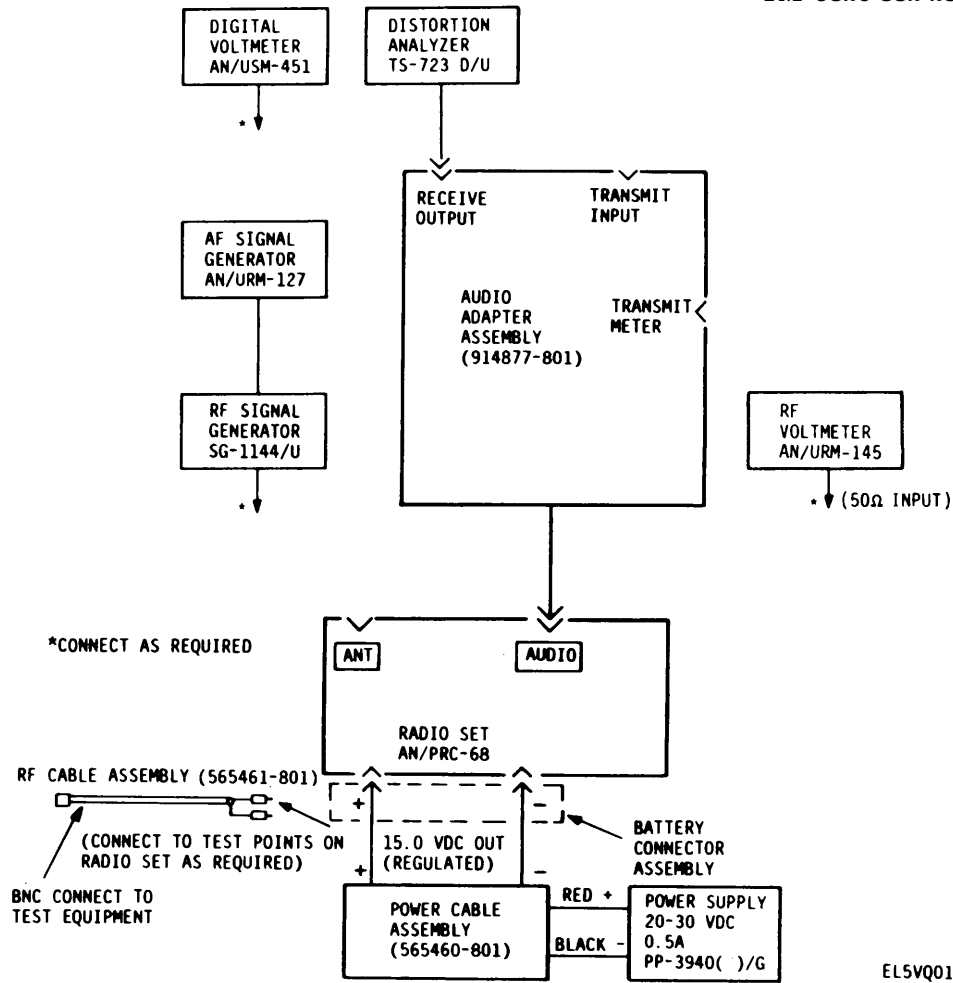


Figure 3-4. Receiver fault isolation test setup.

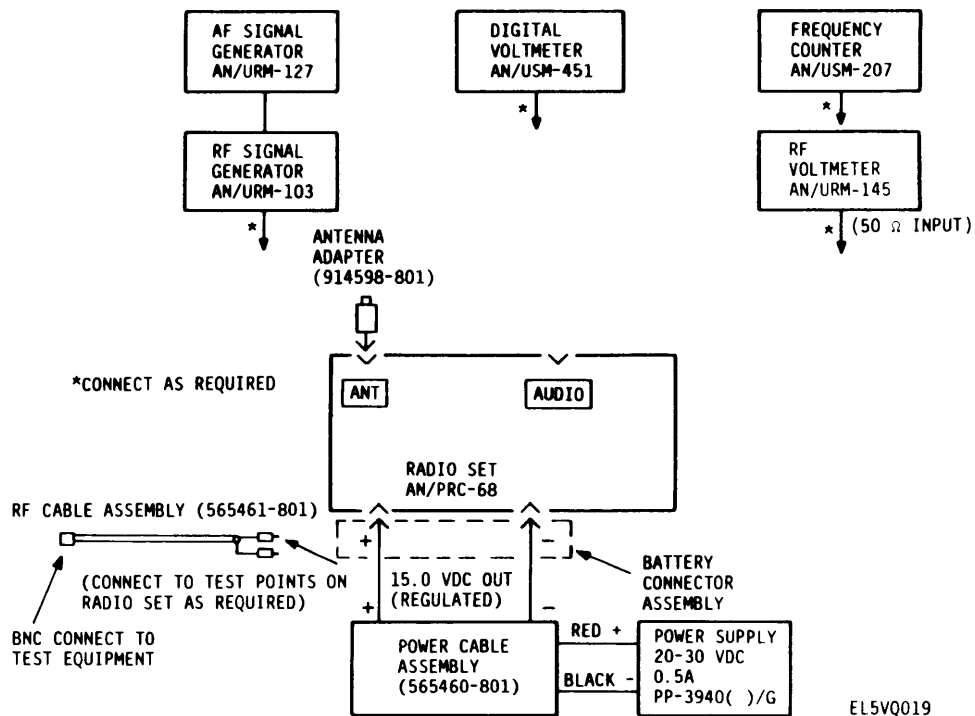


Figure 3-5. Receiver fault isolation test set up (alternate procedure).

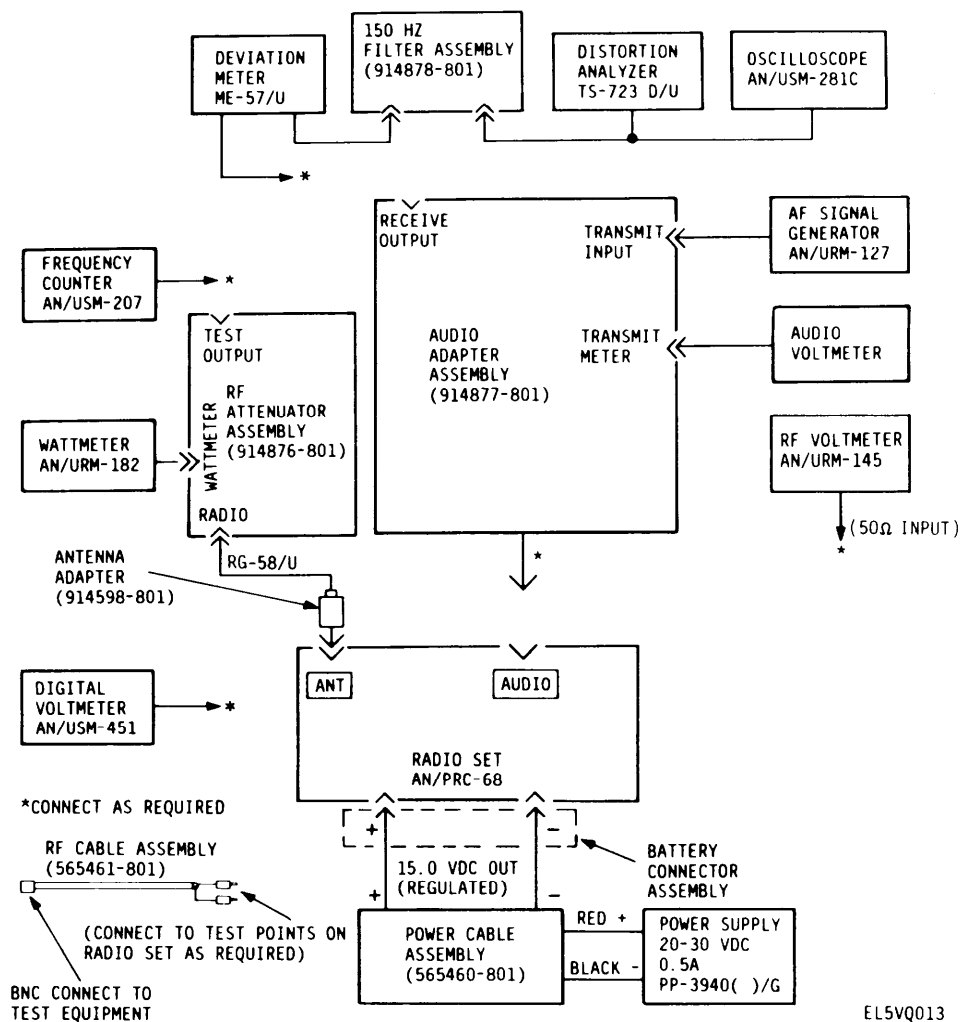


Figure 3-6. Transmitter fault isolation test setup.

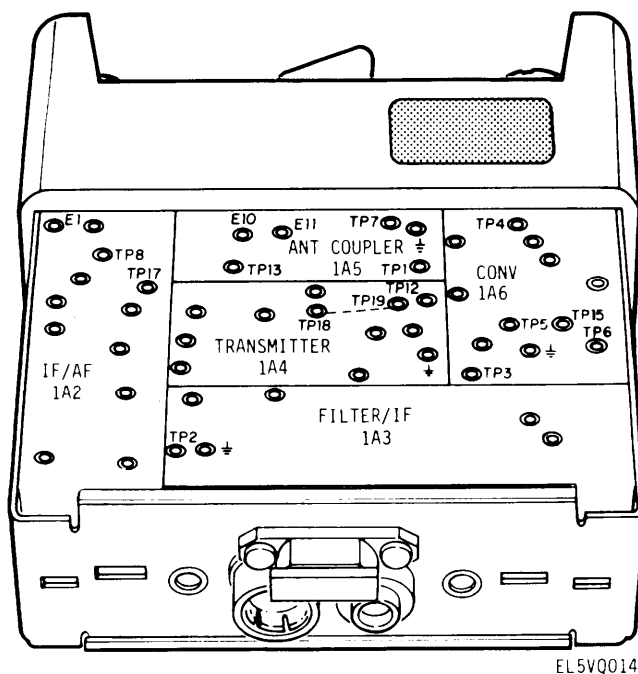


Figure 3-7. Module socket test point location, front.

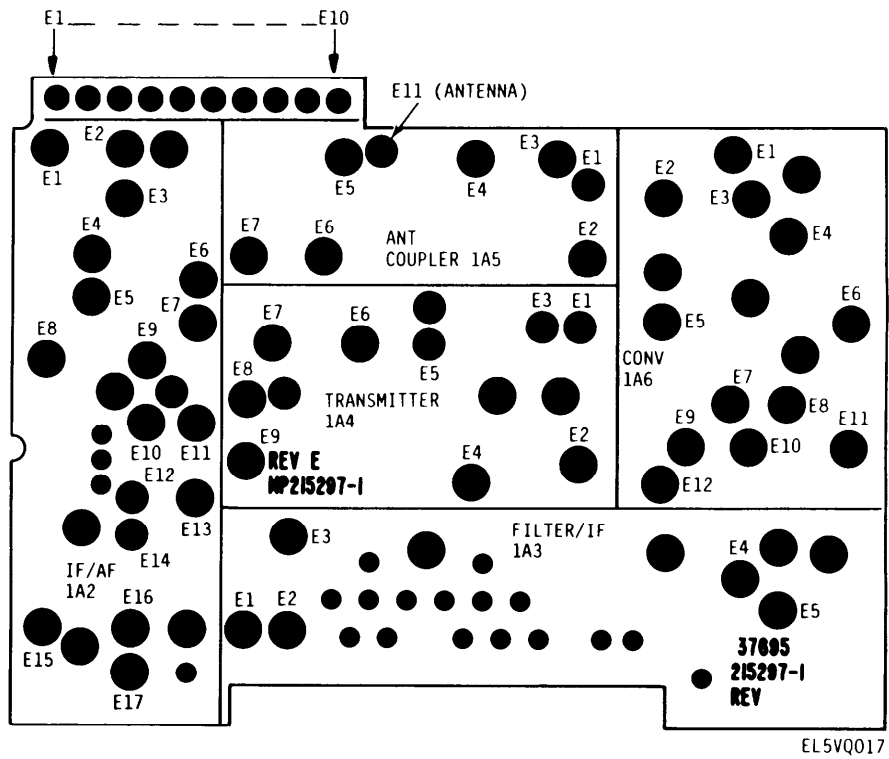


Figure 3-8. Module socket test point (E numbers) location, front.

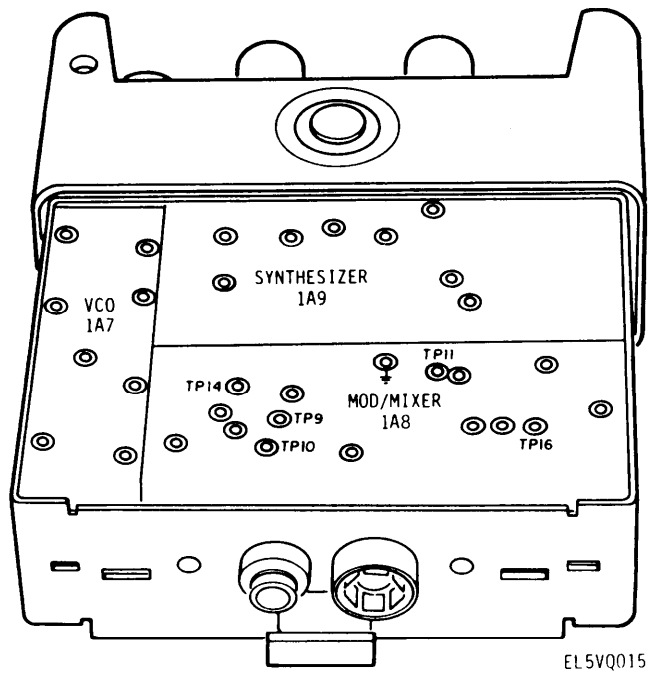


Figure 3-9. Module socket test point location, rear.

Table 3-3. Fault Isolation Test

Step	Test point	Procedure	Normal indication	Next step
<p align="center"><b>RECEIVE MODE OPERATION</b></p> <p align="center"><b>NOTE</b></p> <p>If rf generator SG-1144/U is not available, use steps 1A through 15A of table 3-3 (alternate procedure) and figures 3-5 and 3-8. Remove antenna, battery case, battery and module cover (para 2-5). Set antenna coupler switch S1 to 0 (fig. 2-1). Set transmitter switch S1 to same position as synthesizer switch A.</p> <p align="center"><b>CAUTION</b></p> <p>Do not remove or install modules in radio set with power applied</p>				
1.		Connect radio set and test equipment as shown in figure 3-4. Remove antenna coupler module (para 3-10).		
2.		Set power supply to 25.0 vdc and the current limiter for 100 ma. (Output of power cable assembly is regulated 15 vdc).		
3.	1	Set radio set PWR OFF/ON/SQUELCH DIS to ON. Use digital voltmeter and test lead assembly (565463-801) to check for B+ at TP1 (fig. 3-7). Turn power off.	14.5 to 15.5 vdc.	If voltage is normal, proceed to step 4. If voltage at TP1 is not normal, turn power off and remove (one at a time) i-f/a-f, filter/i-f, voc, synthesizer, and converter modules. Apply power after each module has been removed and check B+ at TP1. If voltage returns to normal, replace that module.
4.	2	Remove filter/i-f module. Set rf/af signal generator combination for 6.500 MHz at 10 millivolts, modulated with 1000 Hz with 8 kHz deviation. Use rf cable assembly and apply this signal to TP2. Apply power. Adjust VOL control fully clockwise. Measure voltage and distortion on distortion analyzer.	Greater than 1.0 vac with less than 10 percent distortion.	If voltage and distortion are not normal, replace i-f/a-f module. If voltage and distortion are normal, proceed to step 5.
5.	2	Reduce rf input level until audio output drops by 3 dB as measured on the distortion analyzer. Connect the rf voltmeter to the output of rf signal generator (use T connector, UG-274/U) and measure rf input to radio set. Disconnect rf voltmeter.	Less than 600 $\mu$ v rf input.	If input level is not normal, replace i-f/a-f module. If input level is normal, proceed to step 6.
6.	3	Remove power, reinstall filter/i-f module, and remove converter module. Apply power. Use rf cable assembly and apply a 2.0 $\mu$ v, 12.000 MHz signal modulated at 1000 Hz with 8 kHz deviation to TP3. Measure receiver audio output SINAD* ratio on distortion analyzer.	Greater than 10 dB SINAD* ratio.	If SINAD* ratio is not normal, replace filter/i-f module. If SINAD* ratio is normal, proceed to step 7.
$*SINAD = \frac{\text{Signal} + \text{Noise} + \text{Distortion}}{\text{Noise} + \text{Distortion}}$				
7.	4	Set frequency switches to 1001 (30.05 MHz). Measure dc voltages (with digital voltmeter and test lead assembly) at TP4 and TP5 and rf frequency and level at TP6 (with frequency counter and rf voltmeter).	TP4, 1.92 to 2.12 vdc; TP5, 14.5 to 15.5 vdc; TP6, 42.049 to 42.051 MHz; TP6, 100 to 300 millivolts	If voltages and/or frequency are not normal or fluctuate radically, then there are problems in synthesizer or vco modules (reinstall antenna coupler and refer to step 20). If voltages and frequency are normal, proceed to step 8.
8.	7	Remove power. Reinstall converter module. Apply power. Set rf/af signal generator combination for 30.	Greater than 10 dB SINAD* ratio.	If SINAD* ratio is not normal, replace converter

Table 3-3. Fault Isolation Test—Continued

Step	Test point	Procedure	Normal indication	Next step
8. Cont		05 MHz at 0.5 uv and modulated at 1000 Hz with 8 kHz deviation. Use rf cable assembly and apply this signal to TP7. Measure receiver audio output SINAD* ratio on distortion analyzer.		module. If SINAD* ratio is normal, proceed to step 9 to check high band operation.
		$\text{*SINAD} = \frac{\text{Signal} + \text{Noise} + \text{Distortion}}{\text{Noise} + \text{Distortion}}$		
9.	4 5 6 7 15	Remove power. Remove converter module. Repeat steps 7 and 8 with rf generator set at 54.04 MHz and synthesizer switches set at 3001.	TP4, 1.92 to 2.12 vdc; TP5, 0 vdc; TP6, 42.049 tp 42.051 MHz. TP7, greater than 10 dB SINAD* ratio; TP15, 14.5 to 15.5 vdc.	If SINAD* ratio is not normal, replace converter module. If voltages and/or frequency are not normal or fluctuate radically, then there are problems in synthesizer or vco modules (reinstall antenna coupler and refer to step 20). If SINAD* ratio is normal, proceed to step 10. Replace i-f/a-f module.
10.		All the above tests are satisfactory but squelch cannot be properly set.		
11.		Remove power, disconnect equipment and reassembly radio set. If above tests cannot isolate problem, higher level maintenance is required.		
		$\text{*SINAD} = \frac{\text{Signal} + \text{Noise} + \text{Distortion}}{\text{Noise} + \text{Distortion}}$		
		<b>RECEIVE MODE OPERATION (ALTERNATE PROCEDURE)</b>		
		<b>NOTE</b>		
		Remove antenna, battery case, battery and module cover (para 2-5). Set antenna coupler switch S1 to 0 (fig. 2-1). Set radio set to 30.05 MHz (1001). Set transmitter switch S1 to same position as synthesizer switch A.		
		<b>CAUTION</b>		
		Do not remove or install modules in radio set with power applied.		
1A.		Connect radio set and test equipment as shown in figure 3-5. Remove antenna coupler module (para 3-10).		
2A.		Set power supply to 25.0 vdc and current limiter for 100 ma. (Output of power cable assembly is regulated 15 vdc.)		
3A.	1	Set radio set PWR OFF/ON/SQUELCH DIS to ON. Use digital voltmeter and test lead assembly (565463-801) to check for B+ at TP1 (fig. 3-7). Turn power supply off.	14.5 to 15.5 vdc.	If voltage is normal, proceed to step 4A. If voltage at TP1 is not normal, turn power off and remove (one at a time) i-f/a-f, filter/i-f, vco, synthesizer, and converter modules. Apply power after each module has been removed and check B+ at TP1. If voltage returns to normal, replace that module.
4A.		Reinstall antenna coupler module and remove converter module.		

Table 3-3. Fault Isolation Test—Continued

Step	Test point	Procedure	Normal indication	Next step
5A.		Apply power. Connect rf signal generator and af signal generator to antenna connector (J2) on radio set (use antenna adapter, 914598-801).		
6A.		Adjust output of af generator for 1000 Hz and 8 kHz deviation. Adjust output of rf generator for 10 mv at 30.05 MHz.		
7A.	7	Connect rf cable assembly to E3 and E4 (ground) on converter circuit board (see fig. 3-8). Connect the BNC connector of the cable assembly to the rf voltmeter and measure the signal. Turn power supply off. Disconnect rf cable assembly from printed circuit board.	7 to 10 mv	If voltage is normal, proceed to step 8A. If voltage is not normal, replace antenna coupler module.
8A.		Reinstall converter module and remove filter/i-f module. Reduce output level of rf generator to 3.0 mv.		
9A.	3	Apply power. Connect rf cable assembly to E4 and E5 (ground) on filter/i-f circuit board (see fig. 3-8). Connect the other end of cable assembly to rf voltmeter and measure signal.	Greater than 30 mv (20 dB gain).	If voltage is normal, proceed to step 12A, if voltage is not normal, replace converter module. If voltage is still not returned to normal, proceed to step 10A.
10A.	4 5 6	Remove power, remove converter module. Apply power. Measure dc voltages (with digital voltmeter and test lead assembly) at TP4 and TP5 and rf frequency and level at TP6 (with frequency counter and rf voltmeter).	TP4, 1.92 to 2.12 vdc; TP5, 14.5 to 15.5 vdc; TP6, 42.049 to 42.051 MHz; TP6, 100 to 300 millivolts.	If voltages and/or frequency are not normal or fluctuate radically, then there are problems in synthesizer or vco modules (remove power, replace all modules and proceed to step 20). If voltages and frequency are normal, proceed to step 11A.
11A.	4 5 6 15	Remove power. Set radio synthesizer switches to 54.05 MHz (3001) and rf generator to 54.05 MHz. Repeat step 10A (check for high band operation).	TP4, 1.92 to 2.12 vdc; TP5, 0; TP6, 42.049 to 42.051 MHz; TP15, 14.5 to 15.5 vdc.	Same as step 10A except if voltages and frequency are normal, proceed to step 12A.
12A.		Remove power. Reinstall converter and filter/i-f modules.		
13A.		Remove i-f/a-f module. Install jumper plug assembly (565462-802) between pins E7 and E14 on the i-f/a-f printed circuit board (B+ continuity). (See figure 3-8) Apply power.		
14A.	2	Adjust the rf generator for 30 microvolts at the antenna connector. Connect rf cable assembly to pin E16 and E17 (ground) on the i-f/a-f circuit board (see fig. 3-8). Connect other end of cable assembly to rf voltmeter and measure signal.	Greater than 100 millivolts	If voltage is normal, replace i-f/a-f module. If voltage is not normal, replace filter/i-f module.
15A.		Remove power, disconnect equipment and reassemble radio set. If above tests cannot isolate problem, higher level maintenance is required.		
TRANSMIT MODE OPERATION				
NOTE				
Remove antenna, battery case, battery, and module cover (para 2-5). Set antenna coupler switch S1 to 0 (fig. 2-1). Set transmitter switch to same position as synthesizer switch A.				
CAUTION				
Do not remove or install modules in radio set with power applied.				



Table 3-3. Fault Isolation Test—Continued

Step	Test point	Procedure	Normal indication	Next step
12.	8	Connect radio set and equipment as shown in figure 3-6. Remove i-f/a-f module (para 3-10). Set power supply to 25.0 vdc and current limiter to 400 ma. (Output of power cable assembly is regulated 15 dvc.) Apply power and turn radio set on. Depress PUSH TO TALK switch on radio set and measure dc voltage at TP8 with digital voltmeter and test lead assembly. Remove power and reinstall i-f/a-f module.	14.5 to 15.5 vdc	If voltage is normal, proceed to step 13. If voltage is not normal, remove power, and remove (one at a time), modulator/mixer, transmitter, and antenna coupler modules. If voltage returns to normal when transmitter is keyed and power applied, replace that module.
13.	9 10 14 11	Remove modulator/mixer module. Set the synthesizer frequency switches for 1001 (30.05 MHz). Apply power and measure the dc voltage at TP9, TP14, and TP10 (use digital voltmeter and test lead assembly) and the rf frequency and level at TP11 (use rf cable assembly, frequency counter, and rf voltmeter). Remove power.  <b>NOTE</b>  Jumper plug assembly (565462-801) must be installed between TP18 and TP19 (fig. 3-7) when transmitter module is removed to provide power to modulator/mixer.	TP9, 1.92 to 2.12 vdc; TP10, 14.5 to 15.5 vdc; TP14, 0 vdc; TP11, 42.049 to 42.051 MHz; TP11, 100 to 300 millivolts.	If voltages and frequencies are not normal, or fluctuate radically, then there are problems in synthesizer or vco (refer to step 20 and table 3-4). If voltages are normal, proceed to step 14.
14.	12	Reinstall modulator/mixer module and remove transmitter module. Install jumper plug assembly. (See not above.) Set synthesizer switches for 1001 (30.05 MHz). Connect frequency counter (with rf cable assembly) to TP12. Disconnect audio adapter assembly if connected. Apply power. Depress PUSH TO TALK switch on radio set and measure frequency at TP12. Disconnect frequency counter and connect rf voltmeter to TP12. Depress PUSH TO TALK switch on radio set and measure rf level. Remove power.	30.0485 to 30.0515 MHz; greater than 100 millivolts.	If frequency and/or voltage are not normal, replace modulator module. If normal, proceed to step 15.
15.	9 10 14 11 12	Repeat steps 13 and 14 with synthesizer switches set to 3001 (54.05 MHz).	TP9, 1.92 to 2.12 vdc; TP10, 0 vdc; TP14, 14.5 to 15.5 vdc; TP11, 42.049 to 42.051 MHz; TP11, greater than 100 millivolts. TP12, 54.0485 to 54.0515 MHz; greater than 100 millivolts.	Same as step 13 except if normal, proceed to step 16.
16.	12	Disconnect distortion analyzer and 150 Hz filter assembly. Connect deviation meter (AUDIO, AF OUTPUT) to oscilloscope. Connect deviation meter RF input to TP12 with rf cable assembly. Connect af signal generator and audio voltmeter to audio adapter assembly. Connect audio adapter assembly to radio set.		
16.	12	a. Set audio output to minimum (zero). Disconnect audio voltmeter from audio adapter. Depress PUSH TO TRANSMIT switch and measure deviation of 150 Hz squelch tone oscillator (should produce a low deviation). Release PUSH TO TRANSMIT switch.	a. 2.5-3.5 kHz deviation (with no audio input).	If deviations and/or wave shape are not normal, replace modulator/mixer module. If normal, proceed to step 17.

Table 3-3. Fault Isolation Test—Continued

Step	Test point	Procedure	Normal indication	Next step
16. Cont		<p>b. Reconnect audio voltmeter to audio adapter. Adjust af signal generator for 1000 Hz and 0.6 millivolts as measured on audio voltmeter. Depress PUSH TO TRANSMIT switch and note deviation and observe waveshape. Release PUSH TO TRANSMIT switch.</p>	<p>b. Waveshape with 0.6 mv audio input should be the squelch tone (150 Hz) swperimposed on the 1000 Hz audio signal. Deviation should be 8 to 11 kHz.</p>	
17.	13	<p>c. Increase the audio input by 6mv. Depress PUSH TO TRANSMIT switch and note the deviation. Release PUSH TO TRANSMIT switch.</p> <p>Remove power. Remove rf cable assembly and jumper plug assembly. Reinstall transmitter module and remove antenna coupler. Connect rf attenuator assembly to wattmeter and frequency counter to TEST OUTPUT. Connect RADIO of rf attenuator assembly. Set synthesizer switches to 1001 (30.05 MHz) and transmitter switch S1 to 1. Preset C1 of transmitter module fully clockwise. Apply power.</p> <p>a. Depress PUSH TO TALK switch and adjust C1 counterclockwise for peak power output. Measure power output and frequency. Release PUSH TO TALK switch.</p> <p>b. Repeat step a with synthesizer set a 2115 (43.05 MHz) and transmitter switch S1 set to 2.</p> <p>c. Repeat step a with synthesizer set at 3001 (54.05 MHz) and transmitter switch S1 set at 3.</p> <p>d. Repeat step a with synthesizer set at 4151 (67.05 MHz) and transmitter switch S1 set to 4.</p>	<p>c. 15 kHz max. deviation.</p> <p>a. 1 watt minimum at 30.0485 to 30.0515 MHz.</p> <p>b. 1 watt minimum at 43.0479 to 43.0522 MHz.</p> <p>c. 1 watt minimum at 54.0473 to 54.0527 MHz.</p> <p>d. 1 watt minimum at 67.0467 to 67.0534 MHz.</p>	<p>If output and frequency are not normal, replace transmitter module. If</p> <p>normal, replace antenna coupler module.</p>
18.		If for any reason tone tuner does not operate properly, replace i-f/a-f module. (Tone tuner is located within this module.)		
19.		Remove power, disconnect test equipment, and reassemble radio set. If above tests cannot isolate problem, higher level maintenance is required.		
		<p><b>FREQUENCY SYNTHESIS FAULTS</b></p> <p><b>NOTE</b></p> <p>Remove antenna, battery case, battery, and module cover (para 2-5).</p> <p><b>CAUTION</b></p> <p>Do not remove or install modules in radio set with power applied. Remove power. Remove modulator/mixer and converter modules (para 3-10). Connect radio set to power supply with power cable assembly. Turn radio set on. Connect frequency counter to TP11 with rf cable assembly. Apply power.</p>		
20.	9 10 11 14	<p>a. Measure rf frequency at TP11 and dc voltages (with digital voltmeter and test lead assembly) at TP9, TP10 and TP14 with the synthesizer switches set for the frequencies listed in table 3-4. (Use at least two frequencies from table 3-4, high and low, to check bands of operation.)</p>	<p>a. Frequencies and voltages should be as listed in table 3-4.</p>	<p>If voltages or frequencies are not normal, or fluctuate rapidly, replace vco and/or synthesizer module.</p>

Table 3-3. Fault Isolation Test—Continued

Step	Test point	Procedure	Normal indication	Next step
21.		<b>b. Disconnect frequency counter and connect rf voltmeter to TP11 with rf cable assembly and measure rf voltage.</b> Remove power, disconnect test equipment, and reassemble radio set. If above tests cannot isolate problem, higher level maintenance is required.	<b>b. TP11, 100 to 300 millivolts.</b>	

Table 3-4. Synthesizer Test Voltages and Frequencies

Operating frequencies (MHz)	Code switches				Voltage (dc) at test points			Frequency (MHz) at test point 11
	A	B	CHAN	D	9	10	14	
30.05	1	0	0	1	1.92 to 2.12	14.5 to 15.5	0	42.04895 to 42.05105
34.20	1	2	1	0	3.48 to 3.85	14.5 to 15.5	0	46.19885 to 46.20116
36.50	1	3	2	2	4.25 to 4.70	14.5 to 15.5	0	48.49879 to 48.50121
38.75	1	4	3	3	4.87 to 5.38	14.5 to 15.5	0	50.74873 to 50.75127
43.05	2	1	5	1	5.94 to 6.57	14.5 to 15.5	0	55.04862 to 55.05138
50.80	2	5	4	0	8.05 to 8.90	14.5 to 15.5	0	62.79843 to 62.80157
53.20	2	6	6	0	8.97 to 9.91	14.5 to 15.5	0	65.19837 to 65.20163
54.05	3	0	0	1	1.92 to 2.12	0	14.5 to 15.5	42.04895 to 42.05105
57.40	3	1	7	0	3.19 to 3.52	0	14.5 to 15.5	45.39886 to 45.40114
59.60	3	2	8	0	3.95 to 4.36	0	14.5 to 15.5	47.59881 to 47.60119
67.05	4	1	5	1	5.94 to 6.57	0	14.5 to 15.5	55.04862 to 55.05138
79.95	4	7	9	3	10.40 to 11.49	0	14.5 to 15.5	67.94830 to 67.95170

### Section III. MAINTENANCE PROCEDURES

#### 3-10. Removal and Replacement of Modules

The following procedures are used for removal and insertion of the modules in the Radio Set. The Special instructions in paragraph 3-11 should also be observed to prevent secondary damage and failures. Refer to paragraph 2-5 for disassembly instructions.

##### a. Converter Module.

(1) Hold radio in left hand with control panel toward palm, thumb over converter module and fingers over radio on opposite side.

(2) Inset corner of screwdriver tip into forward (panel end) pry slot on converter module. Extend left thumb over converter module to stop module travel and pry up this end of the module (see fig. 3-10). Move screwdriver to other slot on the converter module and pry up. Remove module from radio with fingers.

(3) To insert converter module, align module pins with frame sockets and gently press module into place, *b. I-f/A-f Module.*

(1) Hold radio in left hand with bottom side (battery connector side) in palm and left thumb over i- f/a-f module and fingers on back side of radio.

(2) Insert screwdriver into side slot nearest bottom side (battery side) of radio and pry up module using the left thumb to restrict travel. Move screwdriver to the middle slot on i-f/a-f module and pry up. Remove module with fingers by using slight side to side rocking motion of module.

(3) To inset i-f/a-f module, align module pins with frame sockets and *gently* push module into place.

c. *Filter/ I-F Module.*

(1) First remove the i-f/a-f module.

(2) Hold radio in left hand with bottom side (battery connector side) in palm and left thumb over antenna coupler module (rear part of thumb should be over the filter/i-f module). Carefully pry up the i-f/a-f end of the filter/i-f module with the screwdriver. Then pry up the opposite end of filter/i-f module and remove module with your fingers.

(3) To insert filter/i-f module, align module pins with frame sockets and *gently* push module into place.

d. *Transmitter Module.*

(1) First remove the i-f/a-f and converter modules.

(2) Hold radio in left hand with transmitter module facing up. Remove module with right thumb and forefinger on ends. Use a top (panel) -to-bottom rocking motion to loosen the module in the frame sockets.

(3) To insert the module, align module pins with frame sockets and gently push module into place.

e. *Antenna Coupler Module.*

(1) First remove i-f/a-f and converter modules.

(2) Hold the radio in left hand with antenna coupler module facing up. Remove module with right thumb and forefinger on the ends. Use a top (panel) -to-bottom rocking motion to loosen the module in the sockets.

(3) To insert antenna coupler module, align module pins with frame sockets and *gently* push

module into place.

f. *Vco, Modulator Mixer, and Synthesizer Modules.*

(1) Hold radio in left hand with modules facing up. Insert screwdriver into slots in frame and *gently* pry up the removable circuit board with the three modules attached.

modules from frame sockets and pull it away from the radio panel to expose the CHAN switch cable connector. Pull removable circuit board far enough away from panel (approximately 3/4 inch) to grip the cable connector with the thumb and forefinger of the left hand; then unplug the connector by gently pulling away with the removable circuit board assembly.

(3) The three modules may be removed now by pulling them up from the removable circuit board with the fingers.

(4) To insert the vco, modulator/mixer, or synthesizer module, align the module pins with the sockets on the removable circuit board. *Gently* push the module into place. When all three modules are installed on the removable circuit board, connect the synthesizer cable assembly. Align the removable circuit board pins with the frame sockets and gently push the removable circuit board into place. Make sure the modules and removable circuit board are properly seated.

### 3-11. Special Instructions

a. Always inspect a module for bent or broken pins before inserting it into the frame sockets. To straighten bent pins, use needle-nose or long-nose pliers with smooth jaws. Position the jaws so that the whole pin is straightened simultaneously (see fig. 3-11 ).

b. When inspecting for bent pins, the pins should appear to be reasonably vertical in relation to the module bottom surface. Bent pins usually result when excessive prying force is applied to only one end or side of a module. The thumb of the opposite hand should

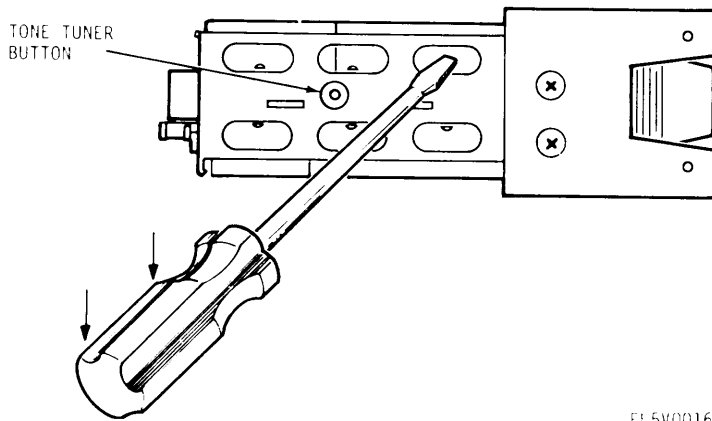


Figure 3-10. Module removal.

always be used to stop the module travel and oppose the prying force.

c. Always inspect frame sockets for damage before inserting a module. A normal socket should have four spring leaves visible. If a spring leaf is pushed over to the wrong side of a socket, it can be pushed back into place with a sharp pointed tool (pin, needle, scribe, etc.). If the leaf breaks off or is smashed into the bottom of the socket, the socket should be replaced if possible. However, the socket will still make good contact with the module pin after the damaged leaf is removed from the socket. The radio set is still operational until repairs can be made at a higher level.

### 3-12. Lubrication

## Section IV. PRINCIPLES OF OPERATION

### 3-14. General

Radio Set AN/PRC-68 consists of eight plug-in modules, a frame assembly, and battery assembly. Principles of operation of the radio set is limited to description of the modules and their interfacing with each other. Refer to figures 2-1 and 2-2 for module locations.

### 3-15. Circuit Functioning

Circuit functioning of the radio set (fig. FO-1) can be broken down into modules that comprise separate functions (receive and transmit) and modules that are used for both functions (synthesizer and voltage controlled oscillator). The battery saver circuitry, tone tuning, and 150 Hz squelch tone signal are also discussed.

All sealing surfaces (module cover and battery case) should have a thin film of silicone grease (NSN 6850-00-177-5094) applied to help preserve watertightness and keep the rubber seals pliable. If a handset is used with the radio set, a small amount of silicone grease should also be applied to the "O" ring in the connector to facilitate insertion.

### 3-13. Placing in Service

After the radio set has been repaired, the unit must be checked out completely with the minimum performance test (table 3-2). Upon the completion of the test, the radio set should be set to some predetermined frequency and properly aligned before being returned to service.

### 3-16. Receive Operation

The receiver is packaged in three modules. These modules are:

a. *Converter Module (1A6)*. The converter module consists of two bandswitched, varactor-tuned rf amplifiers and the receiver 1st mixer which converts the operating frequency to the first i-f of 12 MHz. The low-band rf amplifier tunes the frequency range from 30 to 54 MHz while the high-band tunes 54 to 80 MHz. The settings of the frequency select switches (A, B, and D, on synthesizer module, and preset CHAN switch) determine the operating frequency of the rf amplifier and the local oscillator injection frequency to the first mixer. This injection signal is provided by the voltage controlled oscillator (vco) module. For the low-band (30 to 54

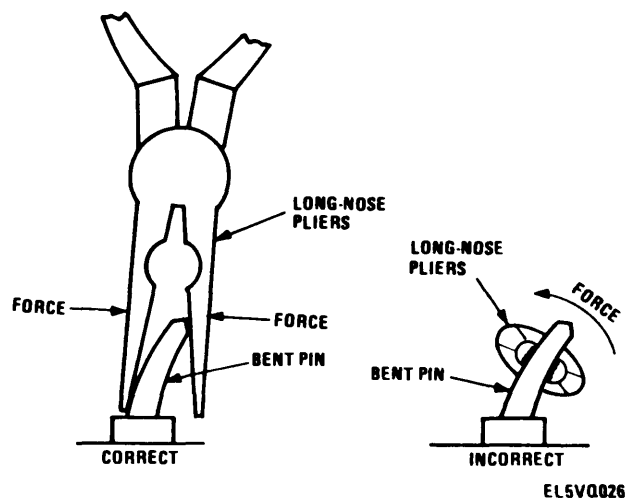


Figure 3-11. Pin Straightening procedure.

MHz), it is 12.000 MHz above the rf input frequencies; for the high-band (54 to 80 MHz), it is 12.000 MHz below the rf input frequencies.

*b. Filter/I-f Module (1A3).* The filter/i-f module contains a 12 MHz crystal filter, 12 MHz i-f amplifier, 18.5 MHz crystal oscillator, and a 6.5 mixer/amplifier (2nd mixer). The output of the second mixer (6.5 MHz) is the difference of the 12.0 MHz input and 18.5 MHz input from the crystal oscillator.

*c. I-f/A-f Module (1A2).* The i-f/a-f module contains a 6.5 MHz i-f amplifier/discriminator, squelch circuits, audio amplifier, and a low-pass filter. Other functions contained within the module are a tone tuner circuit and battery saver switch. The input signal to the i-f/a-f module is the 6.5 MHz frequency modulated signal from the filter/i-f module. The signal is detected and routed through the low-pass filter to the audio amplifier. When a handset or other audio accessory is connected to the AUDIO connector of the radio set, the speaker mute circuit electronically switches off the audio signal to the speaker and routes it to the handset. The squelch threshold is adjusted by a potentiometer located in the module. The squelch circuit is normally on when the radio set is turned on. However, squelch can be disabled by turning the function switch to the SQUELCH DIS position.

### 3-17. Transmit Operation

The transmitter is packaged in three modules. These modules are:

*a. Modulator/Mixer Module (1A8).* The modulator/mixer module contains a speech amplifier and filter, 150 Hz (squelch tone) buffer, 12 MHz deviation oscillator rf mixer, and two bandswitched, varactor-tuned rf preamplifiers. The speech amplifier increases the level of the microphone signal sufficiently for clipping action. The output of the amplifier passes through a low-pass filter before it is superimposed upon a 12 MHz deviation oscillator. The 150 Hz squelch tone from the synthesizer is also routed to the deviation oscillator after passing through a buffer and the speech filter network. The frequency modulated output of the oscillator is combined in a varactor-tuned mixer stage with the frequency synthesizer output signals to create the desired rf output frequency. The rf output is amplified by two bandswitched, varactor-tuned rf preamplifiers. For frequencies in the low-band (30 to 54 MHz), the output frequency is 12.000 MHz below the synthesizer frequency; and for the high-band (54 to 80 MHz), the output frequency is 12.000 MHz above the synthesizer frequency.

*b. Transmitter Module (1A4).* The transmitter module contains an rf preamplifier, driver, final power amplifier and low-pass band filters. The output from the modulator is applied to the preamplifier for ampli-

fication to approximately 1 vrms. The output of the driver stage is approximately 100 mw. This stage has a tuned circuit which tunes the output of the transmitter. Tuning is accomplished by using the built-in tone tuner and adjusting C1 on the module. The tone tuner circuitry is located in the i-f/a-f module and converts the variation in the collector currents of the transmitter stages to a tone frequency when the tone tuner button (located on the side of the frame assembly) is depressed. The final output (approximately 1.5 watts) is routed through one of four band-selected low-pass harmonic filters to the antenna coupler (1A5).

*c. Antenna Coupler Module (1A5).* The antenna coupler module contains the rf transmit/receive diode switching circuits and the antenna matching circuit. Pin diodes in the module provide transmit/receive switching functions to the antenna matching network. These diodes also isolate the transmit/receive circuitry to prevent the transmitted signal from entering the receiver input. The antenna matching network provides an impedance match between the antenna and transmitter circuits (between 50 ohms and 100 ohms). The matching range is determined by the position (1 through 4) of the rotary switch located on the module (set the same as the A switch on the synthesizer). Optimum tuning is accomplished by using the field strength meter on the test set and adjusting L1 on the coupler module (tune for maximum indication).

### 3-8. Frequency Synthesizer (1A7 and 1A8)

The radio set frequency synthesizer consists of the vco module (1A7) and the synthesizer module (1A9). The function of the frequency synthesizer is to generate the required mixer injection frequency and tuning voltage for the converter and modulator modules when a given operating frequency is selected. The frequency synthesizer also determines which band (low or high) is active depending upon selection of the operating frequency.

*a.* The frequency range of the synthesizer is from 42.000 MHz to 67.950 MHz which corresponds with a generated tuning voltage range from 2.0 vdc to 11.0 vdc respectively. The frequency synthesizer is programmable in 50 kHz steps with the frequency select (A, B, and D) switches on the synthesizer module and the CHAN (C) switch on the panel of the radio set.

*b.* The frequency range of the synthesizer is generated twice to provide low-band radio set operation from 30.000 MHz to 53.950 MHz (positions 1 and 2 of the A switch), and high-band radio set operation from 54.000 MHz to 79.950 MHz (positions 3 and 4 of the A

switch). The two bands are required to cover the 30 to 80 MHz range of the radio set with varactor tuning.

c. The basic purpose of the frequency synthesizer is to generate the discrete channel frequencies with an accuracy of  $\pm 25$  ppm. This is accomplished by phase locking a voltage controlled oscillator (vco) to a standard crystal controlled reference frequency. The reference frequency of the synthesizer is 12.5 kHz crystal oscillator by a factor of 800, or dividing the output of the 12.5 MHz crystal oscillator by a factor of 1000. The division factor is determined by the position of the A switch. The reference divider ( $\div K$ ) consists of an injection locked oscillator which divides by 4 (10 MHz) or 5 (12.5 MHz), and a fixed divide ratio (200) digital counter. The 12.5 kHz output of the reference divider is routed to the phase comparator (detector).

d. To achieve phase locking, the output of the vco (42 to 68 MHz) must be frequency translated and divided down to 12.5 kHz for phase comparison with the 12.5 kHz reference frequency. Because the vco must provide 520 discrete frequencies spaced 50 kHz apart, a variable frequency divider is required to divide each one of these discrete frequencies down to 12.5 kHz. The variable divider ( $\div N$ ) ratio is determined (programmed) by setting the synthesizer switches to the code corresponding with the desired operating frequency. Once the  $\div N$  ratio is programmed, the vco can phase lock only at that frequency which translates down to 12.5 kHz.

e. Because the maximum counting speed of the cmos programmable divider is 5 MHz, the 42 to 68 MHz range of the vco must be frequency translated down to less than 5 MHz. This is accomplished by first dividing

the output frequency of the vco with the  $\pm 4$  prescaler in the vco module. The prescaler output is routed to the mixer in the synthesizer module. The output of the mixer is the difference frequency of the prescaler input and the 10 MHz or 12.5 MHz reference oscillator.

f. Because the capture range of the phase detector is narrow (approximately  $\pm 500$  kHz at the vco frequency), the vco must be swept over its frequency range to a frequency within this capture range. When this occurs, the phase detector output control voltage (superimposed on the sweep voltage) pulls the vco into phase-lock with the reference frequency of the synthesizer.

g. The sweep voltage is a sawtooth staircase waveform consisting of additive coarse tune voltage steps over a voltage range from 1.5 vdc to 13.0 vdc. The ramp sweeps the vco over its frequency range by stepping up from 1.5 vdc to the coarse tune voltage required to put the vco frequency within the capture range of the phase detector. Once phase lock is achieved, the ramp stops and holds at that coarse tune voltage. The tune voltage output from the synthesizer is the phase detector control voltage superimposed on the ramp coarse tune voltage. The level of the phase-locked tuning voltage is proportional to the selected operating frequency, and varies from 2.0 vdc to 11.0 vdc.

h. The loop filter attenuates the 12.5 kHz reference frequency to minimize frequency modulation of the Vco.

i. The synthesizer also generates the battery saver timing waveform and the 150 Hz squelch tone waveform. Both of these signals are derived from the crystal reference frequency with digital frequency dividers.





## APPENDIX A REFERENCES

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### A-1. Scope

This appendix lists the forms and publications that are referenced in this manual or that contain information applicable to the operation and maintenance of Radio Set AN/PRC-68.

### A-2. Forms

DA Form 2028  
DA Form 2028-2  
NAVMC 10772 (USMC)  
  
SF 364  
SF 368  
TM 4700-15/1 (USMC)

Recommended Changes to Publications and Blank Forms  
Recommended Changes to Equipment Technical Publications  
Suggested Recommendations and Improvements for Marine Corps  
Technical Manuals  
Report of Discrepancy (ROD)  
Quality Deficiency Report  
Forms and Records Procedures

### A-3. Publications

DA Pam 310-4  
SB 11-573  
  
SB 38-100  
  
SC 5180-91 -CL-R07  
SC 5180-91 -CL-R13  
TB 43-0118  
  
TM 11-5820-882-10  
TM 11-5820-882-23P  
(To Be Published)  
TM 11-5965-257-15  
  
TM 11-5965-280-15  
  
TM 11-6130-247-15  
  
TM 11-6625-255-14  
  
TM 11-6625-400-12  
  
TM 11-6625-444-15  
  
TM 11-6625-524-14  
  
TM 11-6625-586-12  
  
TM 11-6625-683-15

Index of Technical Publications  
Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment  
Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army  
Tool Kit, Electronic Equipment TK-105/G (NSN 5180-00-610-8177)  
Tool Kit, Electronic Equipment TK-101/G (NSN 5180-00-064-5178)  
Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters  
Operator's Manual: Radio Set AN/PRC-68 (NSN 5820-01-079-9260)  
Organizational and Direct Support Maintenance Repair Parts and Special Tools Lists for Radio Set AN/PRC-68  
Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Handset H-138/U (FSN 5965-892-0972)  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Handset H-189/GR (NSN 5965-00-069-8886)  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual for Power Supply PP-3940/G  
Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Spectrum Analyzer TS-723A/U, TS-723B/U, TS-723C/U, and TS-723D/U (NSN 6625-00-668-9418)  
Operator's and Organizational Maintenance Manual for Meter, Modulation ME-57/U  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Digital Voltmeter AN/GSM-64  
Operator's, Organizational and Field Maintenance Manual: Voltmeter Electronic AM/URM-145  
Operator and Organizational Maintenance Manual: Generator, Signal AN/URM-103  
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Signal Generator AN/URM-127 (NSN 662540783-5965)

TM 11-6625-700-10	Operator's, Manual: Digital Readout, Electronic Counter, AN/USM-207 (NSN 6625-00-911-6368)
TM 11-6625-1576-15	Organizational, Direct Support, General Support, and Depot Maintenance Manual for Distortion Analyzer, Hewlett-Packard Model 333A and 334A, (AN/URM-184A)
TM 11-6625-2658-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Oscilloscope AN/USM-281C (NSN 6625-00-106-9622)
TM 11-6625 -2718-14-1	Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Test Set, Radio Frequency, Power AN/URM-182A
TM 11-6625-2941-14&P	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Counter, Electronic Digital Readout AN/USM-459 (NSN 6625-01-061-8928)
TM 11-6625-2946-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Test Set TS-3354/PRC-68 (NSN 6625-01-091-3157)
TM 11-6625-2953-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual: Multimeter, AN/USM-451 (NSN 6625-01-060-6804)
TM 11-6625-2954-14&P	Operator's, Organizational, Direct Support, and General Support Maintenance Manual (Including Repair Parts and Special Tools Lists) for Signal Generator SG- 1144/U (NSN 6625-01-075-8478)
TM 38-750	The Army Maintenance Management System (TAMMS)
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)

## APPENDIX B

### MAINTENANCE ALLOCATION

---

#### Section I INTRODUCTION

##### **B-1. General**

This appendix provides a summary of the maintenance operations for AN/PRC-68. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

##### **B-2. Maintenance Function**

**Maintenance functions will be limited to and defined as follows:**

*a. Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

*b. Test.* To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

*c. Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies,

*d. Adjust.* To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

*e. Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

*f. Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

*g. Install.* The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

*h. Replace.* The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

*Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing)

to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

*j. Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

*k. Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

##### **B-3. Column Entries**

*a. Column 1, Group Number.* Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly,

*b. Column 2, Component/Assembly.* Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

*c. Column 3, Maintenance Functions.* Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

*d. Column 4, Maintenance Category.* column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn (s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical

field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

- C—Operator/Crew
- O—Organizational
- F—Direct Support
- H—General Support
- D—Depot

*e. Column 5, Tools and Equipment.* Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

*f. Column 6, Remarks.* Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

#### **B-4. Tool and Test Equipment Requirements (Sect III)**

*a. Tools or Equipment Reference Code.* The

numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

*b. Maintenance Category.* The codes in this column indicate the maintenance category allocated the tool or test equipment.

*c. Nomenclature.* This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

*d. National/NATO Stock Number.* This column lists the National/NATO stock number of the specific tool or test equipment.

*e. Tool Number.* This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

#### **B-5. Remarks (See IV)**

*a. Reference Code.* This code refers to the appropriate item in section II, column 6.

*b. Remarks.* This column provides the required explanatory information necessary to clarify items appearing in section II.

## SECTION II MAINTENANCE ALLOCATION CHART

FOR

## RADIO SET AN/PRC-68

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	RADIO SET AN/PRC-68 705956-803	Inspect Test Service Repair Service	0.05	0.10 0.05 0.10 0.20				1 1 1,13	A E
01	RECEIVER-TRANSMITTER RT-1113/PRC-68 705561-803	Inspect Replace Adjust Test Repair		0.05 0.05 0.05	0.10 0.20			1,13 1 1 thru 12, 14	B
0101	FRAME/PANEL ASSEMBLY 917327-803	Inspect Test Replace Repair			0.05 0.15		0.20 2.30	2,3,10,15 14 2,3,10,14, 15	C
	SYNTHESIZER MODULE 917327-803	Inspect Replace			0.05 0.20				D
	CONVERTER MODULE 917831-803	Inspect Replace			0.05 0.20				D
	FILTER/IF MODULE 917829-803	Inspect Replace			0.05 0.20				D
	IF/AF MODULE 917830-803	Inspect Replace			0.05 0.20				D
	TRANSMITTER MODULE 917832-803	Inspect Replace			0.05 0.20				D
	VCO MODULE 917833-803	Inspect Replace			0.05 0.20				D
	MOD/MIX 917834-803	Inspect Replace			0.05 0.20				D
	ANTENNA COUPLER 910800-803	Inspect Replace			0.05 0.20				D

Change 1

B-3

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS  
FOR

## RADIO SET AN/PRC-68

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	U,F	TEST SET TS-3354/PRC-68	6625-01-091-3157	
2	F,D	MULTIMETER, DIGITAL AN/USM-451	6625-01-060-6804	
		OR		
		VOLTMETER, DIGITAL AN/GSM-64B	6625-00-022-7894	
3	F,D	POWER SUPPLY PP-3940/G	6130-00-404-1727	
4	F	RF SIGNAL GENERATOR AN/URM-103	6625-00-868-8352	
		OR		
		RF SIGNAL GENERATOR SG-1144/U	6625-01-075-8478	
5	F	RF VOLTMETER AN/URM-145	6625-00-973-3986	
6	F	FREQUENCY COUNTER AN/USM-459	6625-01-061-8929	
		OR		
		FREQUENCY COUNTER AN/USM-207	6625-00-911-6368	
7	F	FM DEVIATION METER ME-57/U	6625-00-647-3737	
8	F	OSCILLOSCOPE AN/USM-281C	6625-00-106-9622	
9	F	DISTORTION ANALYZER TS-723/U *	6625-00-668-9418	
10	F,D	AUDIO SIGNAL GENERATOR AN/URM-127	6625-00-783-5965	
11	F	WATTMETER AN/URM-182	6625-00-148-9371	
12	F	MAINTENANCE KIT MK-( )/PRC-68		
13	O	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G	5180-00-064-5178	
14	F,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	
15	D	TEST FIXTURE, FRAME/PANEL ASSEMBLY		
		* OR DISTORTION ANALYZER AN/URM-184A	6625-00-802-8718	

## SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	<p>Repair of Radio Set AN/PRC-68 at the organizational level of maintenance consists of tightening/replacing the front panel knobs, replacing the antennna, and replacing the battery. Defective knobs, antennas, and batteries are considered throwaway items.</p>
B	<p>Repair of the RT-1113/PRC-68 at the direct support level of maintenance consists of replacing the following items:</p> <ol style="list-style-type: none"> <li>1) synthesizer module</li> <li>2) i-f/a-f module</li> <li>3) converter module</li> <li>4) transmitter module</li> <li>5) filter/i-f module</li> <li>6) vco module</li> <li>7) modulator/mixer module</li> <li>8) antenna coupler module</li> <li>9) frame and panel assembly</li> </ol> <p>All these items are throwaway with the exception of the frame and panel assembly.</p>
C	Sent through GS to depot for repair.
D	Throwaway items.
E	<p>Replace battery. Return defective battery to Property Disposal Office for salvage and recovery of the mercury content (see SB 11-30, April 1977).</p>





## APPENDIX C

### EXPANDABLE SUPPLIES AND MATERIALS LIST

---

#### Section I INTRODUCTION

##### 1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain Radio Set AN/PRC-68. These items are authorized to you by CTA 50-970, Expandable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

##### 2. Explanation of Columns

*a. Column 1—Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. C").

*b. Column 2—Level.* This column identifies the lowest level of maintenance that requires the listed item. (enter as applicable)

C—Operator/Crew

O—Organizational Maintenance

F—Direct Support Maintenance

H—General Support Maintenance

*c. Column 3—National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

*d. Column 4—Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

*e. Column 5— Unit of Measure (UM).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e. g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(Next printed page is C-2)

## SECTION II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEAS
			PART NO AND FSCM	
1	0	8020-00-721-9657	BRUSH, PAINT	EA
2	0	7920-00-862-6710	CLOTH, LINT-FREE	YD
3	0		PAINT	OZ
4	0		SANDPAPER	SH
5	0	6850-00-177-5094	SILICON GREASE	OZ
6	0	6850-00-105-3084	TRICHLOROTRIFLUOROETHANE	GAL
7	0		THINNER	GAL

# INDEX

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS



# SOMETHING WRONG WITH THIS MANUAL?

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

Commander  
Stateside Army Depot  
ATTN: AMSTA-US  
Stateside, N.J. 07703

DATE 10 July 1975

PUBLICATION NUMBER

FM 11-5610-34-12

DATE

23 Jan 74

TITLE

Radar Set AN/SPC-76

BE EXACT...PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
2-25	2-25		
3-10	3-3	3-1	
5-6	5-8		
		FO3	

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°.

REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 20 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."

REASON: This is the output line of the 5 VDC power supply. + 24 VDC is the input voltage.

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SSG I. M. DeSpirito 999-1776

SIGN HERE:

*SSG I. M. DeSpirito*

DA FORM 2028-2  
1 AUG 74

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WJA 1686-75



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PAGE  
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PARA-  
GRAPH

FIGURE  
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TABLE  
NO.

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FIGURE  
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Radio Set AN/PRC-68

TABLE  
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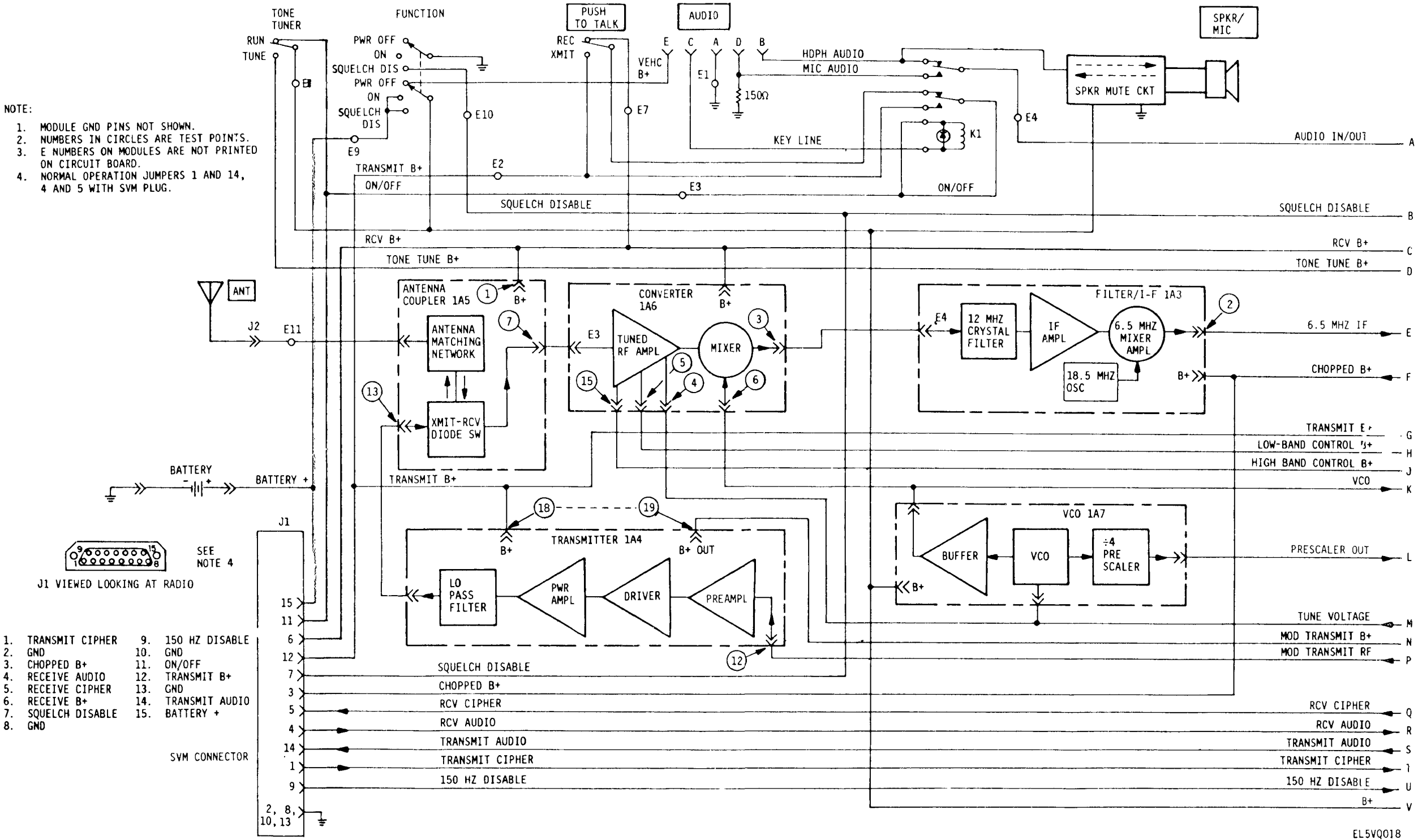
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EL5VQ018

Figure FO-1. Radio Set Block Diagram (Sheet 1 of 2).

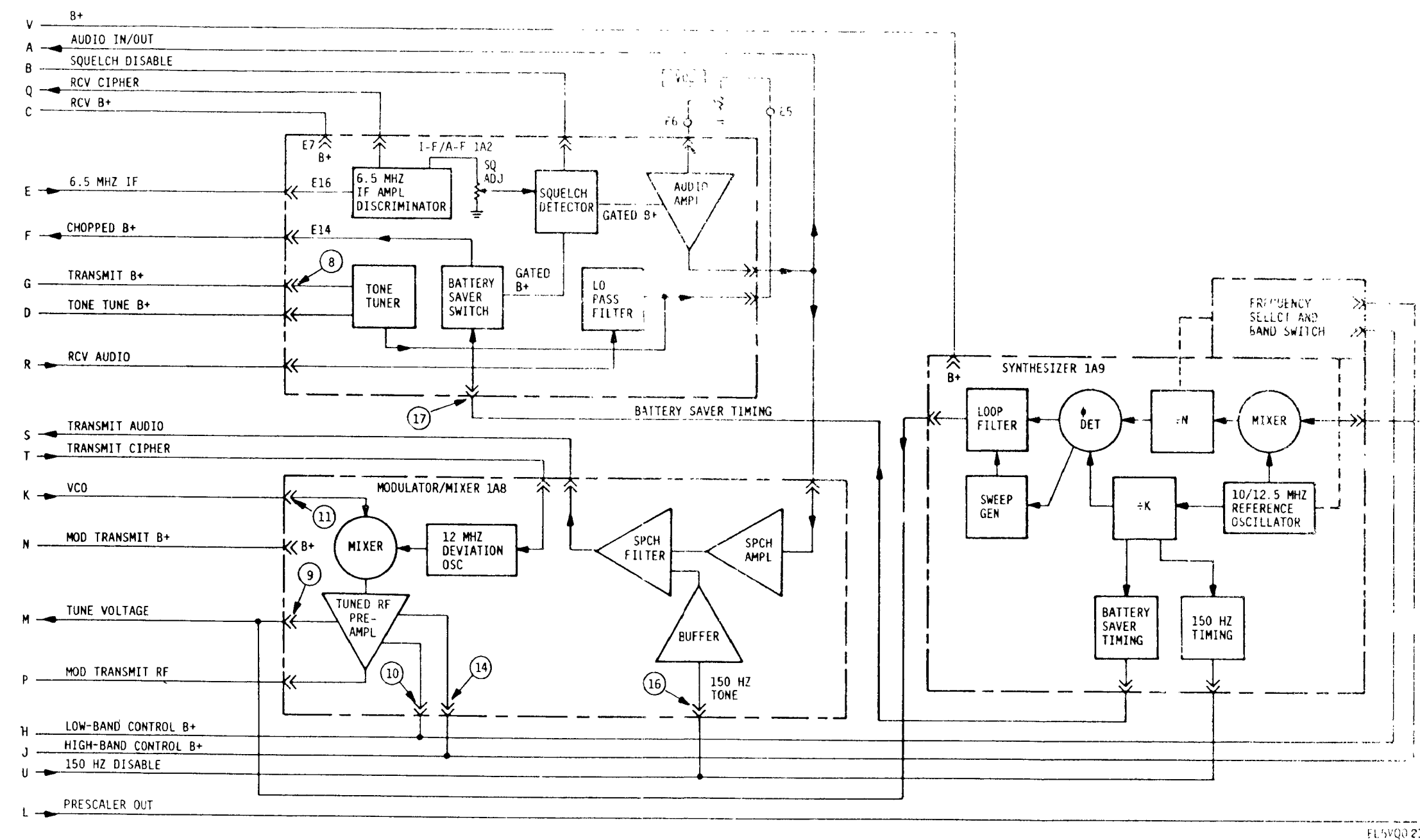


Figure FO-1. Radio Set Block Diagram (Sheet 2 of 2).



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    TOAD (14)  
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    29-207 (2)  
    29-610 (2)

*ARNG:* None

*USAR:* None

For explanation of abbreviations used, see AR 310-50.



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