TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT

SUPPORT, AND

GENERAL SUPPORT MAINTENANCE MANUAL
SIGNAL GENERATOR
AN/USM-44C

(NSN 6625-00-138-7773)

This copy is a reprint which includes current pages from Changes 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 1977

CHANGE
No 1

HEADQUARTERS
DEPARTMENT OF THE ARMY,
WASHINGTON, DC, *28 January 1983*

Operator's, Organizational, Direct Support, and
General Support Maintenance Manual
SIGNAL GENERATOR, AN/USM-44C
(NSN 6625-00-138-7773)

TM 11-6625-2697-14, 8 February 1977, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin of the page.
2. Added or revised illustrations are indicated by a vertical bar in front of the figure caption.
3. Remove and insert pages as indicated in the page list below:

Remove	*Insert*
i and ii	i and ii
1-1 through 1-4	1-1 through 1-4
3-3 and 3-4	3-3 and 3-4
7-1 through 7-6	7-1 through 7-6
7-9 and 7-10	7-9 and 7-10
7-15 and 7-16	7-15 and 7-16
7-23 through 7-28	7-23 through 7-28
A1	A1
FO-2(2) and FO-2(3)	FO-2 (2) and FO-2 (3)

4. File this change sheet in front of the publication for reference purposes.

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TECHNICAL MANUAL

No. 11-6625-2697-14

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DEPARTMENT OF THE ARMY
WASHINGTON, DC, *8 February 1977*

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SIGNAL GENERATOR AN/USM-44C

(NSN 6625-00-138-7773)

Current as of December 15, 1976

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), direct to Commander US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.
A reply will be furnished direct to you.

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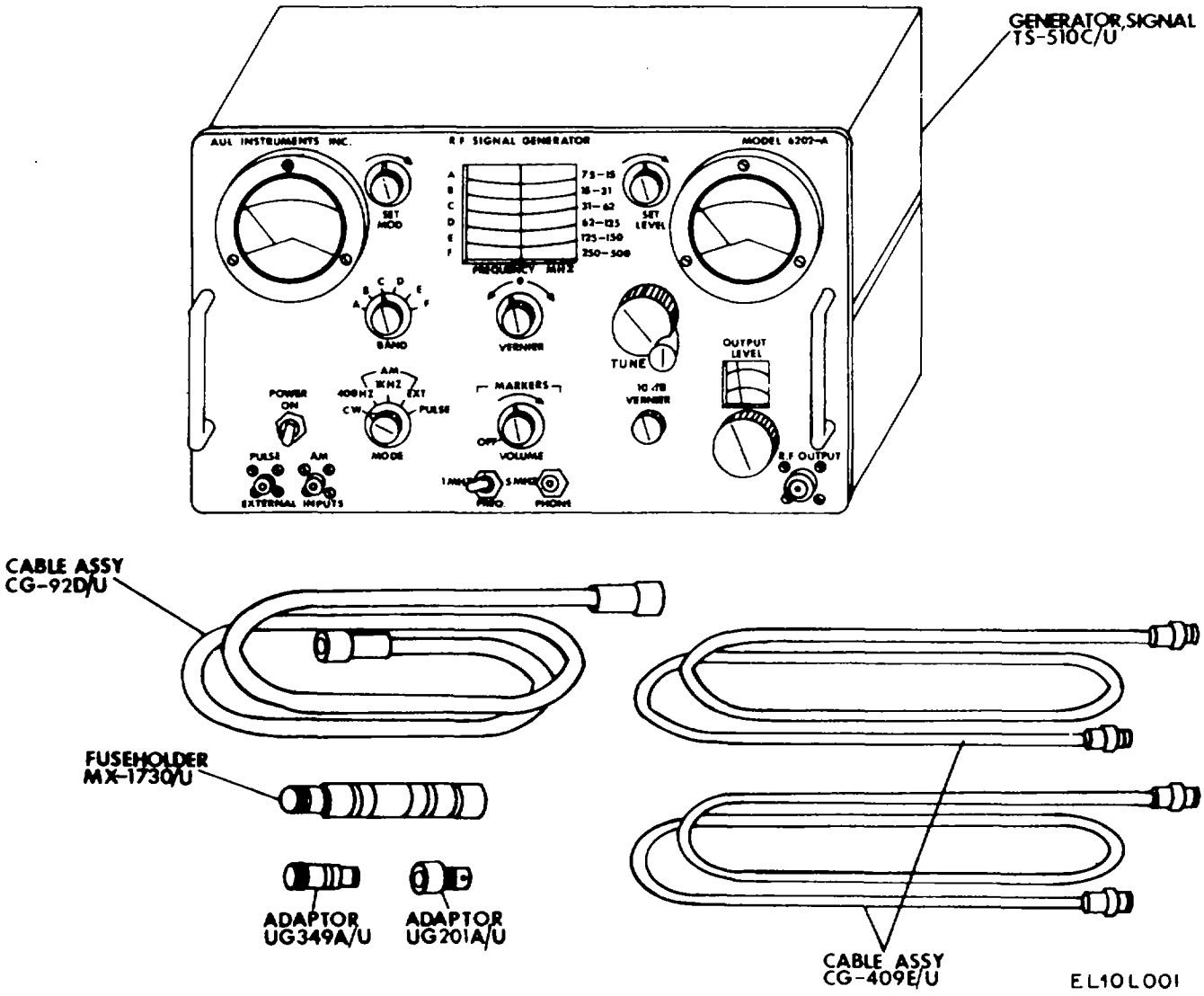


Figure 1-1. Signal Generator AN/USM-44C, less Case CY-7520/USM-44C

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual describes Signal Generator AN/USM44C and covers the installation, operation, organizational, direct support, and general support maintenance instructions for the equipment.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/ NAVMATINST 4355.73/AFR 400-54/MCO 4430.3E.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 5538/ NAV SUPINST 4610.33B/AFR 7518/MCO P4610.19 C/DLAR 4500.15.

1-4. Administrative Storage

Refer to TM 740-90-1 for administrative storage procedures.

1-5. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel shall be in accordance with TM 750-244-2 under the direction of the commander.

1-6. Reporting Equipment Improvement Recommendations (EIR)

If your Signal Generator AN/USM44C needs improvement, let us know. Send us an EIR. You the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703. We'll send you a reply.

Section II. DECRIPTION AND DATA

1-7. Purpose and Use

Signal Generator AN/USM-44C is a general purpose, high-frequency signal generator set (fig. 1-1) that provides radio frequency (rf) signals used to test, evaluate and align radio receivers, rf equipment and amplifiers. The AN/USM-44C provides continuous wave (cw), amplitude modulated (am.), and pulse modulated (pm) signals in the frequency range of 10 megaHertz (MHz) to 480 MHz, with an output level range of - 127 to + 13 dbm. The output is calibrated, metered, and leveled across the entire range of frequencies and levels.

1-8. Description

The AN/USM-44C consists of Signal Generator TS-510C/U, Case, Signal Generator CY-7520/USM-44C (fig. 1-2), three cable assemblies (two each CG-409E/U and one CG-92D/U), Fuseholder MX-1730/U and two Adapters UG-349A/U and UG-201A/U Table 1-1 lists the items comprising an operable equipment with their National Stock number (NSN), dimensions and weights.

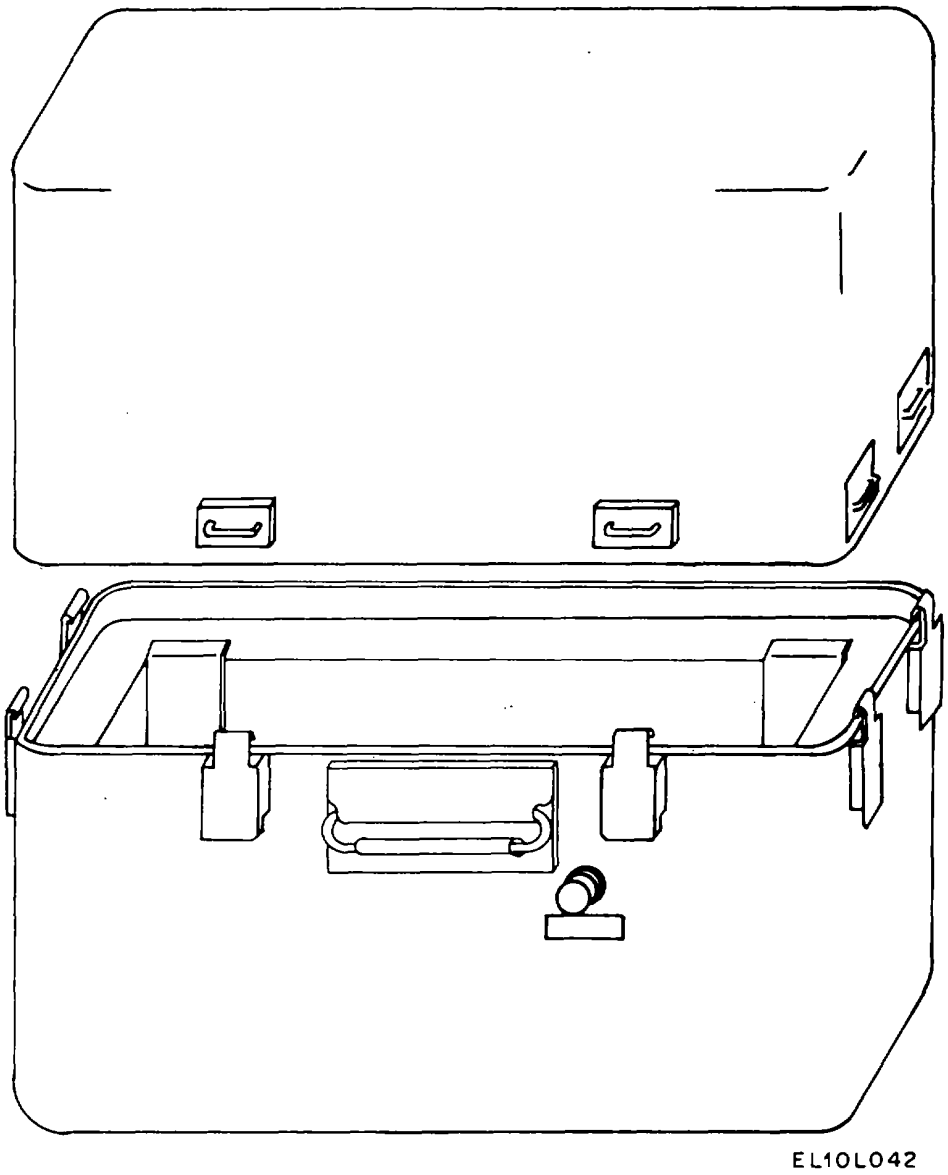


Figure 1-2. Case, Signal Generator CY-7520/USM-44C

Table 1-1. Items Comprising an Operable Equipment

Qty	NSN	Item	Dimension (in.)			Unit weight (lb.)
			Height	Depth	Width	
1	6625-00-138-7773	Signal Generator AN/USM-44C	15	9.5	14.4	
1		Signal Generator TS-510C/U				
1		Case, Signal Generator CY-7520/ USM-44C				
1	5920-00-636-0679	Fuseholder MX-1730/U				
1	6625-00-519-0348	Cable Assembly CG-92D/U	72 inches long			
2	5995-00-503-0470	Cable Assembly CG-409E/U	48 inches long			
1	5935-00-258-7429	Adapter UG-201A/U				
1	5935-00-732-1919	Adapter UG-349B/U				

1-9. Components

a. Major Components. The only major component of the AN/USM44C is Signal Generator TS510C/U. This unit contains all of the circuits and equipment required for operation.

b. Accessory Components. The accessory components supplied with the AN/USM-44C are a carrying case, three cable assemblies, a fuseholder and two cable adapters.

(1) *Case, Signal Generator CY7520/USM-44C*. The CY7520/USM44C provides protection for the major components when in transit or in storage. The case is constructed of epoxy filled fiberglass and is lined with a formfitting foam. Fasteners on the sides of the case lid and base, tighten the closed case to provide moisture protection; however, the case is not immersible.

(2) *Cable Assembly CG409E/U*. Two CG409E/U cables are supplied with the equipment. They are 50ohm coaxial cables 48 inches long, with BNC connectors on both ends. These connectors mate with the EXTERNAL INPUTS connectors on the front panel of the TS510C/U and with Adapters UG201A/U and UG349A/U.

(3) *Cable Assembly CG92D/U*. The CG92D/U is used as the rf output cable. It is 72 inches long and has two type N connectors on the ends. One end mates with the RF OUTPUT connector on the front panel.

(4) *Fuseholder MX1730/U*. The MX1730/U contains a 1/16 ampere fuse and is used in series with the RF OUTPUT connector to protect the output circuits from inadvertent inputting of high rf signal levels from the equipment under test. The connectors on the ends of the MX1730/U mate with the type N connectors of the RF OUTPUT and the output cable.

(5) *Adapters UG201A/U and UG349B/U*. These adapters permit the use of cables with BNC connectors to be mated with cables with type N connectors. The UG201A/U has a BNC female connector and a type N male connector, while the UG349B/U has a BNC male connector and a type N female connector.

1-10. Tabulated Data

The pertinent technical characteristics of the TS-510C/U are listed in table 1-2.

Table 1-2. Tabulated Data

Parameter	Specification	Limits
Frequency	Range	10 MHz to 480 MHz
	Number of bands	6
	Accuracy (5-minute warmup)	±0.5%
	Fine frequency control	0 01% of output frequency
	Resetability (with change of 10% or more)	±0.1%
	Stability:	
	15° C to 35° C (60° to 965 F)	0.005%/10 minutes
	115/230V ±10%, 50, 60, 400 Hz	±0.01%comb. volt and freq.
Modulation	Internal am	
	Frequency Control	400 and 1,0OW Hz ±10% 0 to 95% carrier levels up to 0.5 volt
	External am.	
	Control	0 to 95% at carrier levels up to 0.5 volt.
	Required signal	1 0 volt rms
	Frequency	20 to 20,000 Hz
	Input Impedance	10,000 ohms ±10%
	Pulse modulation'	
	Total rise and decay time	
	40 to 220 MHz	4 microseconds.
	220 to 480 MHz	2.5 microseconds.
	Pulse on/off ratio	20 db with at least 0.5 volt
	Modulation characteristics:	
	Modulation level control	0 to 95% for internal and external signals
	Envelope distortion at 30%	2% over frequency - 20 Hz to 15 kHz.
	Envelope distortion at 70%	5% over frequency - 20 Hz to 20 kHz.
	Incidental fin with am.	
	30% am., 10 to 100 MHz	0.001%
	50% am , 100 to 480 MHz	1000 Hz

Table 1-2. Tabulated Data-Continued

Parameter	Specification	Limits
Modulation-Continued	Spurious signals and harmonics	35 db below cw level (below 500 MHz)
Output voltage(50 ohms)	Range	[a] 0.1 microvolt to 1.0 volt continuously variable (-127 to +13 dbm)
	Accuracy	± 1 db over frequency and attenuation range
	Leveled output:	
	Accuracy 10 to 215 MHz	±1 db (one adjustment)
	Accuracy 215 to 480 MHz	±1 db (two adjustments)
	Output attenuator	Microvolts, millivolt and dbm
	Uncalibrated output:	
	Level	0.18 volts rms
	Location	Rear of unit
	Output SWR	Less than 1.2, attenuation below -7 dbm
	Leakage output	1.0 microvolt maximum
Crystal calibration	1 MHz (referenced to 5 MHz)	Up to 270 MHz
	5 MHz	10 to 480 MHz
	Accuracy	±0.01 % at 23° C
	Detector	Amplify audio beat note between rf and calibrator front panel jack
Meter circuits	Modulation meter:	
	Calibration	0 to 100%
	Accuracy	10% at 30%o to 95%o mod
	Output meter	
	Range (0 to 1.0 volt)	0 1 volt increments from 0 to 1.0 volt
	Range 0 to +13 dbm)	1 db increments from 0 to +13 dbm.
	Accuracy	±1 db
Power requirements	Voltage	115 volts ac +10%, or 230 volts ac ±10%
	Frequency	50 Hz, 60 Hz or 400 Hz ±5 single phase
	Power consumption	Less than 150 watts

[a] 0.5 is obtained by using the OUTPUT LEVEL and 10 dB controls with SET LEVEL meter adjusted to SET LEVEL. 1.0 Volt is then obtained by readjusting SET LEVEL control clockwise until OUTPUT LEVEL meter indicates full scale (1.0 on the upper scale). +7 dBm is obtained by using the OUTPUT LEVEL control and the 10 dB control with SET LEVEL meter set to SET LEVEL. +13 dBm is then obtained by readjusting SET LEVEL control clockwise until OUTPUT LEVEL meter indicates full scale.

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SITE AND SHELTER REQUIREMENTS

2-1. Siting

The AN/USM-44C does not require special siting. The unit should be bench-mounted in a shop or work area. The AN/USM-44C requires a source of 50, 60, or 400 Hertz, 115 or 230 volt ac power. The equipment has a three-prong plug and power cord for grounded power sources.

2-2. Shelter Requirements

The AN/USM-44C may be used in work areas, shops, laboratories or mobile shelters having the proper power sources available. The unit should be used in shelter and should be protected from wind, rain, snow or blown sand and dust.

Section II. SERVICE UPON RECEIPT OF MATERIEL

2-3. Packing Data

The AN/USM-44C is packed for shipment in a corrugated carton. The carton may be overpacked in a wooden crate. The accessories supplied with the AN/USM-44C are stored in a compartment in the lower half of the CY-7520/USM-44C.

2-4. Unpacking

Refer to figure 2-1 and unpack the AN/USM-44C as follows:

a. If the equipment is shipped in a packing crate, open the crate and remove the cardboard carton.
b. Open the corrugated carton and fold back the top flaps.
c. Remove the top pads.
d. Remove the AN/USM-44C from the carton.
e. Release the latches and open the lid of the CY-7520/USM-44C.
f. Remove the TS-510C/U from the CY-7520/USM-44C.

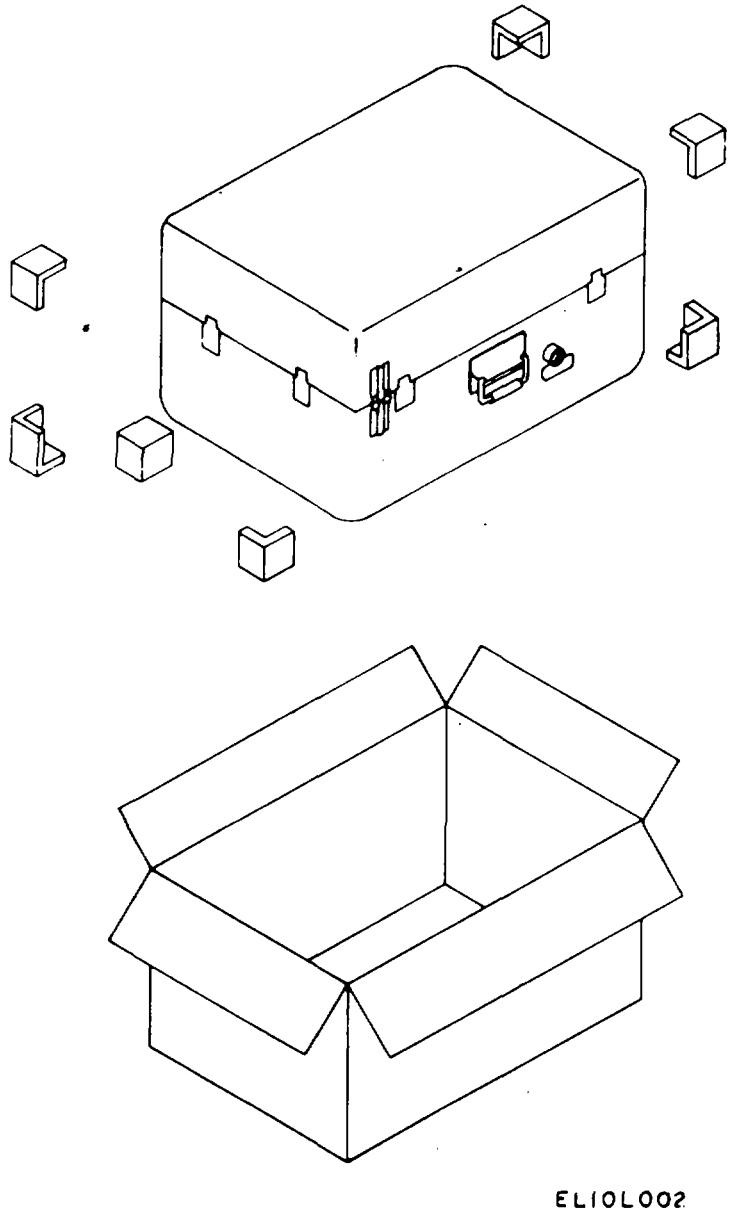


Figure 2-1. Packaging diagram.

2-5. 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 (para 1-3).

b. Check the equipment against the packing list and table 1-1 to see if the equipment is complete. Report all discrepancies in accordance with the instructions in TM 38750. The equipment should be placed in service even though a minor accessory, that does not affect proper operation, is missing.

c. Check to see if the equipment has been modified. Equipment which has been modified will have the modification work order (MWO) number on the front panel, near the nomenclature plate. Also check to see that all currently applicable MWO's have been applied. Current MWO's Applicable to the equipment are listed in DA Pam 310-7.

Section III. INSTALLATION INSTRUCTIONS

2-6. Tools, Test Equipment, and Materials Required

No tools, test equipment or special materials are required for installation of the AN/USM-44C.

2-7. Assembly and Installation

The AN/USM-44C is shipped fully assembled and requires no special installation procedures. Set the unit up on a bench or other solid surface. The unit is provided with a three-wire line cord which will ground the unit when connected to the proper type receptacle. The line fuse is located on the rear of the unit. Check to see that the proper size fuse is installed (1 ampere, 3AG slo-blo).

Section IV. PRELIMINARY ADJUSTMENT AND ALIGNMENT

2-8. Power Requirement

The AN/USM-44C will operate on 115 vac or 230 vac, 50 to 400 Hz. Power consumption is 150 watts maximum. A switch on the rear panel of the unit provides for quick conversion between 115- and 230-volt operation. For 1165-volt operation, set the switch to the up position (115 showing), and for 230-volt operation, set the switch to the down position (230 showing) .

2-9. Circuit Alignment.

No circuit alignment is required at the time of installation. Perform the daily and weekly preventive maintenance checks and services when the unit is first installed and prior to first operation.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

3-1. Damage From Improper Settings

The AN/USM-44C is designed so that no damage to equipment or hazard to personnel will result from any setting or combination or control settings. Fuseholder MX-1730/U is a coaxial fuse used to protect the AN/USM-44C output circuits from damage from any inadvertent application of high energy rf or dc voltages from the equipment under test. This is especially likely to happen when the unit is used in testing transceivers. Use the MX-1730/U whenever the AN/USM-44C is connected to a device capable of producing high level signals or dc out-puts. Connect the MX-1730/U to the output con-nector on the front panel and then connect the output cable to the MX-1730/U.

3-2. Operator's Controls

Operator controls and instruments are shown in figure 3-1. All controls, connectors and instruments used by the operator are listed, with their functions, in table 3-1.

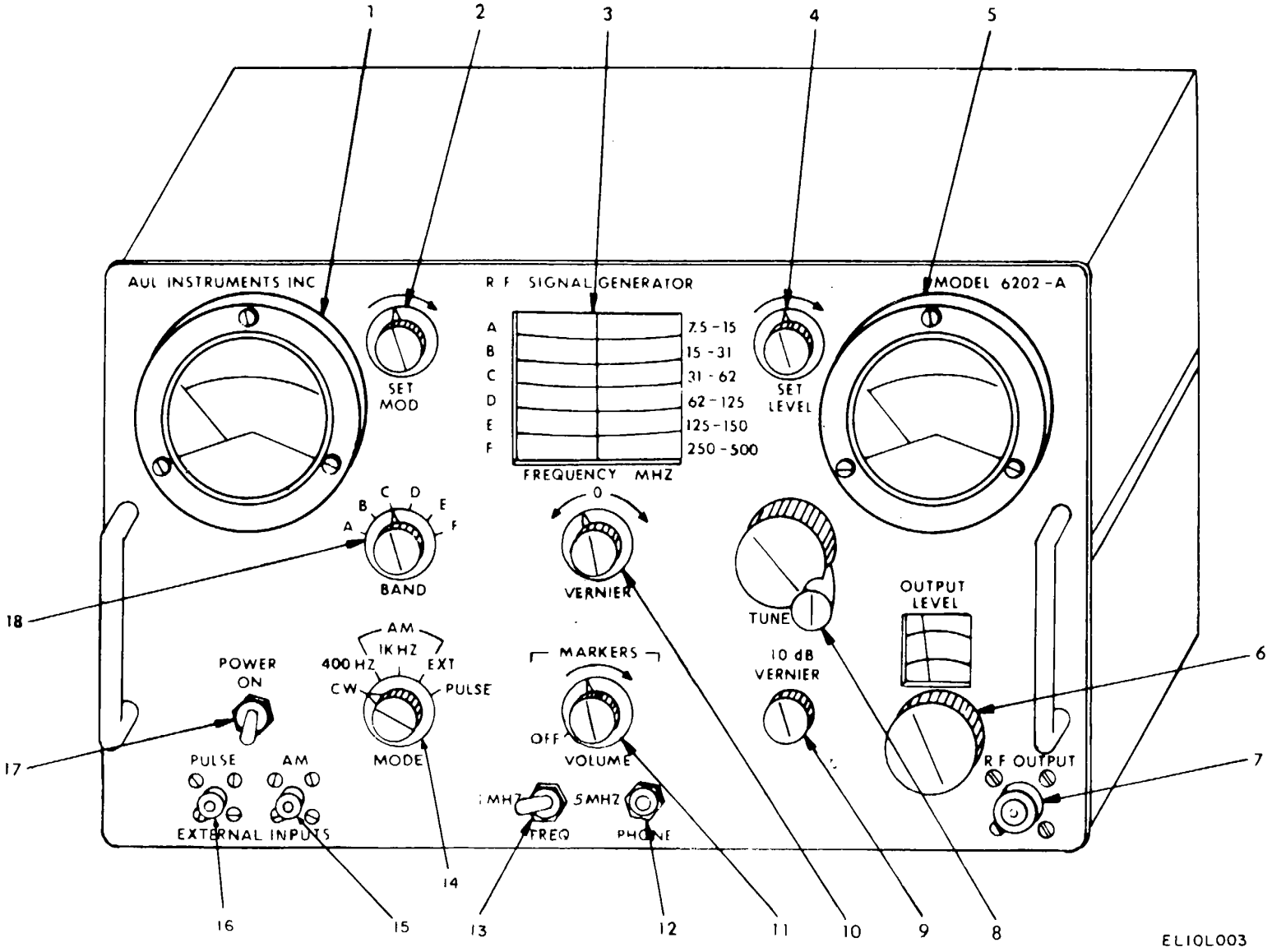


Figure 3-1. Operator's controls and instruments

Table 3-1. Operator's Controls and Instruments

Index number	Control. indicator or connector	Function
1	PERCENT MODULATION meter	Indicates level of am. modulation Scale is read 0 to 100%
2	SET MOD control	Varies amplitude modulation from 0 to 100%.
3	FREQUENCY MHZ indicator	Drum dial indicates output frequency in MHz.
4	SET LEVEL control	Provides fine setting of output level in 13 db range
5	OUTPUT LEVEL meter	Indicates output level between 0 and 1.0 in microvolts, millivolts or volts, depending on setting of OUTPUT LEVEL switch, SET LEVEL and 10 DB VERNIER controls 0 to +13 dbm scale is relative to OUTPUT LEVEL switch dbm scale. When OUTPUT LEVEL is set to +7 dbm (SET LEVEL) output voltage is that shown on OUTPUT LEVEL switch dial.
6	OUTPUT LEVEL switch	Controls step attenuator that sets output level in 10 db range
7	RF OUTPUT connector	Rf output through type N female connector
8	TUNE control	Coarse frequency control.
9	10 dB VERNIER control	Sets actual output level within range set by OUTPUT LEVEL switch.
10	VERNIER control	Fine frequency control
11	MARKERS VOLUME control	Sets audio level of marker beat note Extreme ccw posi tion (OFF) turns marker off.
12	MARKERS PHONE jack	Marker audio output for external headphones
13	MARKERS FREQ 1 MHz-5 MHz	Position of toggle switch selects frequency interval between markers. Left position selects 1 MHz marker and right position selects 5 MHz marker
14	MODE switch	Selects modulation mode CW-no modulation AM 400 Hz - 400 Hz internal am. 1 kHz - 1000 Hz internal am EXT - am. from external signal PULSE-Pulse modulation from external signal
	EXTERNAL INPUTS connectors	
15	AM	External am. signal input.
16	PULSE	External pulse modulation input.
17	POWER switch	Applies or removes ac power to and from unit Energized In ON position.
18	BAND switch	Selects frequency ranges A through F. Proper range to select can be determined by looking at panel markings by main frequency dial.

Section II. OPERATION UNDER USUAL CONDITIONS

3-3. Preliminary Starting Procedure

Although the AN/USM-44C may be turned on with the controls in any position, the initial control settings in table 3-2 are recommended as a good starting position.

3-4. Operating Procedure

CAUTION

When connecting the AN/USM-44C to an equipment capable of producing high-level rf or dc voltages, connect Fuseholder MX-1730/U in series between the RF OUTPUT connector and the output cable being used. This will prevent damaging the output circuits from inadvertent connection to a high level source.

NOTE

The AN/USM-44C will operate within specifications with less than 1 minute of warmup time, however, it is preferable to allow 10 to 15 minutes warmup for greater frequency stability.

a. Connect the RF OUTPUT connector terminal of the AN/USM-44C to the equipment to be driven through a 50-ohm cable.

Table 3-2. Preliminary Control Settings

Reference No.	Control or indicator	Setting
17	POWER switch	off
14	MODE switch	CW
18	BAND switch	A
2	SET MOD control	Fully ccw
3, 8	FREQUENCY MHz and TUNE control	Set for 10 mHz
4	SET LEVEL control	Fully ccw
6	OUTPUT LVEFL switch	fully ccw
9	10 dB VERNIER	(-127 dBm)
11	MARKERS VOLUME	Fully ccw

b. Connect the power cable to a 115-volt or 230-volt ac source (para 2-8) and operate the POWER switch to ON.

c. Set the BAND switch to the desired frequency range.

d. Rotate the tune control until the desired frequency is indicated on the FREQUENCY MHZ dial.

e. Adjust the SET LEVEL control until an in-dication is obtained on the OUTPUT LEVEL meter. The SET LEVEL control is normally adjusted for a SET LEVEL(+7 DBM) indication on the OUTPUT LEVEL meter.

f. Set the OUTPUT LEVEL switch and the 10 DB VERNIER control to give the final desired output level.

g. When the OUTPUT LEVEL meter indicates SET LEVEL (+ 7 DBM), the actual output level can be read directly from the OUTPUT LEVEL dial, if the output is terminated in 50 ohms.

h. When internal amplitude modulation is to be used, rotate the MODE selector switch to 400 Hz or 1 kHz position. Adjust the SET MOD control so that the PERCENT MODULATION meter in-dicates the desired modulation level.

i. When external am. is to be used, connect the external modulating signal to the EXTERNAL INPUTS AM connector, set the external source to a level between 1 and 10 volts rms, and rotate the MODE selector switch to the EXT position. Adjust the SET MOD control so that the PERCENT MODULATION meter indicates the desired modulation level.

j. For pulse modulation, connect external positive pulse generator to the EXTERNAL INPUTS PULSE connector. Set the pulse input level between 10 and 50 volts peak. Rotate the MODE switch to PULSE. The specified pulse modulation characteristics are obtained at output frequencies of 40 MHz or higher.

3-5. Dial Calibration

The operator may check the calibration of the FREQUENCY MHz indicator using the built-in 1 MHz and 5 MHz marker frequencies.

a. Set MARKERS FREQ switch to either 1 MHz or 5 MHz as desired.

b. Set MARKERS VOLUME control for desired level.

c. Rotate FREQUENCY MHz indicator until a beat note is obtained. The beat should occur at each exact multiple of the setting of the MARKERS FREQ switch (every 1 MHz or every 5 MHz).

3-6. Standby and Shutdown.

To place the equipment in standby condition, set the controls as specified in table 3-2. To shut the equipment down, set the POWER switch off.

3-7. Operation Under Unusual Conditions

THE AN/USM-44C should not be used under extreme conditions of temperature, moisture and humidity, dust or sandy conditions. Avoid exposing or operating the equipment under these conditions.

3-8. Preparation for Movement

a. Install the cables, adapters, TM and accessories in the compartment located in the bottom of the transit case.

b. Insert the TS-51OC/U into the lower half of the case.

c. Attach the top half of the case and close latches.

CHAPTER 4

OPERATOR MAINTENANCE

Section I. GENERAL

4-1. Scope of Operator Maintenance

Operator maintenance consists of performing preventive maintenance checks and services, keeping the equipment clean and free of foreign material and reporting any discrepancies, malfunctions or other problems to organizational maintenance.

4-2. Operator Tools and Test Equipment

No special tools or test equipment are required for maintenance by the operator. A high impedance (600 ohms or greater) headset, with a standard telephone plug is required for checking equipment calibration. This plug mates with the front panel MARKERS PHONE jack.

4-3. Lubrication

No operator lubrication is required. When the equipment does require lubrication, refer it to organizational maintenance.

Section II. PREVENITIVE MAINTENANCE

4-4. General

Preventive maintenance consists of the systematic care and inspection of the equipment to help prevent deterioration, provide early detection of impending failure and maintain the equipment in good working condition. When preventive maintenance reveals defects in the equipment, it should be referred to higher category of maintenance for correction or repair.

4-5. Preventive Maintenance Checks and Services

The preventive maintenance checks and services assigned to the operator are listed in table 4-1. The item number indicates the correct sequence and frequency of the procedures. Defects discovered during operation of the equipment should be noted and reported to higher category of maintenance for correction. If a major defect is noted during operation, which could damage the equipment, stop operation immediately and notify organizational maintenance.

4-6. Trouble Indications

a. Turn On. Failure of the OUTPUT LEVEL switch lamp dial light to come on indicates a malfunction. Refer the unit to organizational maintenance for repair.

b. Tuning Mechanism. If binding or slipping of the tuning dial is observed, refer the unit to organizational maintenance for repair.

c. Level Set and Modulation. Failure of the OUTPUT LEVEL meter or PERCENT MODULATION meter to respond normally in-dicates a malfunction of the unit; refer it to organizational maintenance for repair.

Table 4-1. Operator Preventive Maintenance Checks and Services

B- Before operation **D- During operation** **A -After operation**

Sequence No			ITEM TO BE INSPECTED PROCEDURE	Paragraph reference
B	D	A		
1			TUNING MECHANISM Turn throughout range. No binding or rough operation should be observed.	4-6b
2			ELECTRICAL POWER Turn POWER switch to ON. OUTPUT LEVEL switch dial lamp should light.	4-6a
3			OUTPUT LEVEL Turn SET LEVEL control from ccw to cw. OUTPUT LEVEL meter should indicate from 0 to full scale.	4-6c
4			MODULATION LEVEL Set MODE switch to 400 Hz. Rotate SET MOD control from ccw to cw PERCENT MODULATION meter should indicate from 0 to past full scale (100 %).	4-6c
5			FREQUENCY ACCURACY Plug headset into MARKERS PHONE jack and MARKERS FREQ switch to 5 MHz. Turn MARKERS VOLUME control fully cw. Tune AN/USM-44C throughout its bands. Markers should be heard every 5 MHz, within 0.5% of frequency indicated on dial.	3-5

CHAPTER 5
ORGANIZATIONAL MAINTENANCE

5-1. Scope of Organizational Maintenance

Organizational maintenance of this equipment is limited to preventive maintenance, lubrication, minor refinishing and replacement of lamps and fuses.

5-2. Repainting and Refinishing

CAUTION

The unpainted strips on the dust cover bottom flange and the support flanges on the front and rear panels are unpainted for electrical conductivity. Do not paint or retouch these surfaces.

The paint color for the AN/USM-44C is Navy Grey per MIL-E-15090, Type II semigloss. Touchup may be done with airbrush or hand brush. Refer to TB 43-0118 for care and preserving US Army equipment.

5-3. Lubrication

CAUTION

Do not attempt to disassemble or change the position of the tuning drum or the gearbox. Any attempt to do so will affect the calibration of the equipment. These ad-justments may only be made at general support maintenance.

The tuning mechanism of the AN/USM-44C should be lubricated at annual intervals, using GL Grease (Aircraft and Instrument), as follows:

a. Remove top cover.

b. Apply light coating of grease to right angle and spur gears on rear of tuning shaft. Wipe off any excess grease.

c. Reinstall the cover.

5-4. Preventive Maintenance Checks and Services

Refer to table 5-1 for preventive maintenance checks and services to be performed at the organizational category.

5-5. Fuse and Lamp Replacement

Failure of the dial lamp to light, when the POWER switch is turned to ON, may be caused by failure of the fuse or lamp. The fuse is located on the rear panel. Replace it with a 1 ampere 3AG slo-blo fuse. The lamp is located on the removable bracket on the underside of the chassis. Replace the lamp as follows:

a. Remove the two screws holding the lamp bracket, and remove the bracket and holder.

b. Remove the defective lamp from the holder. Replace it with a number 1829 lamp.

c. Reposition the lampholder and bracket and fasten with the two screws removed in a above.

Table 5-1. Organizational Preventive Maintenance Checks and Services

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Worktime (task hrs)
1	TUNING MECHANISM Turn throughout range. No binding or rough operation should be observed.	0.2
2	ELECTRICAL POWER Turn POWER switch to ON. OUTPUT LEVEL switch dial lamp should light.	0.1
3	OUTPUT LEVEL Turn SET LEVEL control from ccw to cw. OUTPUT LEVEL meter should indicate from 0 to full scale.	0.1
4	MODULATOR LEVEL Turn MODE switch to 400 Hz. Rotate SET MOD control from ccw to cw PERCENT MODULATION meter should indicate from 0 to past full scale (100%).	0.1
5	TUNING ACCURACY Insert headset into MARKERS PHONE jack. Set MARKERS FREQ switch to 5 MHz. Turn MARKERS VOLUME control cw Tune throughout all bands. Markers should be heard every 5 MHz within 0.5% of indicated frequency	
6	LUBRICATION Follow lubrication instructions of paragraph 5-3	0.2

Table 5-1. Organizational Preventive Maintenance Checks and Services

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Worktime (task hrs)
7	PHYSICAL INSPECTION Check exterior of equipment for scratches, evidence of breaks or cracks, etc. Check to see that attenuator detent is functioning. Inspect line cord for breaks fraying or deterioration. Use ohmmeter to verify that line cord ground is connected to chassis. Repaint or refinish as required, in accordance with paragraph 5-2.	0 1

5-6. Replacing Fuse in Fuseholder MX-1730/ U

a. Unscrew both ends of the MX-1730/U, using an open-end wrench to secure the connector.

b. Remove and replace the fuse; be careful not to disturb the alignment of the center conductor.

c. Replace the connectors. When checking the continuity of the fuse with an ohmmeter, be certain to use a high-resistance scale to avoid blowing the fuse.

CHAPTER 6

FUNCTIONING OF EQUIPMENT

Section I. FUNCTIONAL DESCRIPTION

6-1. General

The AN/USM-44C is a general-purpose signal generator capable or producing a sinewave rf output over a frequency range from 7.6 to 500 MHz. The output frequency is controlled by a six-position switch and a frequency dial. The amplitude of the signal can be controlled through a SET LEVEL control and an OUTPUT LEVEL switch. Amplitude modulation may be applied from 0 to 95 percent from internal sources of 400 Hz and 1000 Hz sinewave, or from 20 Hz to 20 kHz externally applied sinewave. Pulse modulation may also be applied from an external source. A precision internal oscillator provides frequency markers at 1 MHz and 5 MHz intervals for accurate calibration of the frequency dial by the operator. An overall block diagram of the unit is shown in figure 6-1. The following paragraphs explain the functions of the individual circuits.

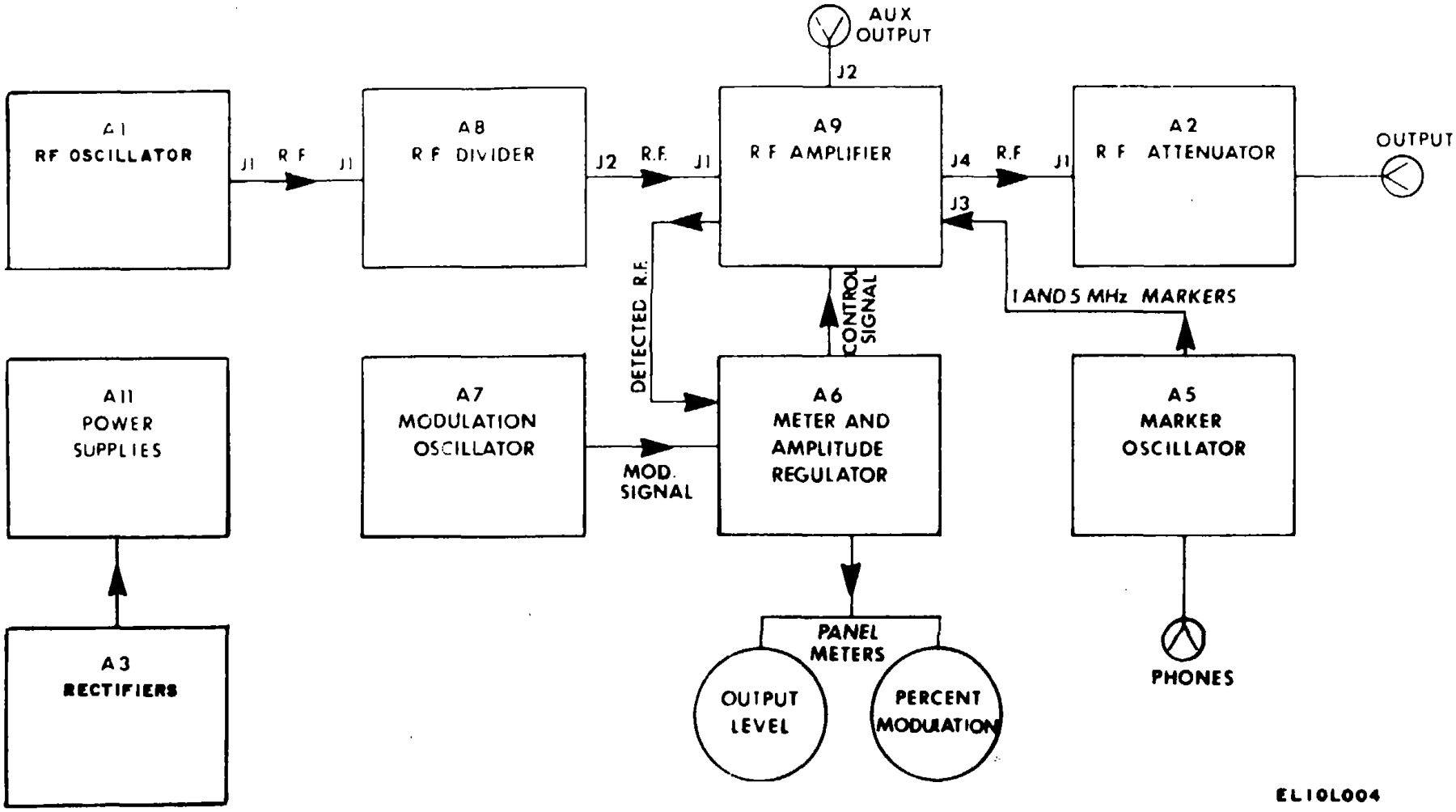


Figure 6-1. AN/USM-44C, block diagram.

6-2. Oscillator Assembly A1.

Oscillator assembly A1 provides the basic radiofrequency (rf) signal for use on all bands. This signal is a +16 dbm signal which is variable from 242 MHz to 500 MHz, depending on the position of the FREQUENCY MHz indicator. The oscillator is a sealed, nonrepairable module.

6-3. Divider Assembly A8

Divider assembly A8 receives the 242 MHz to 500 MHz signal from the oscillator assembly and produces the lower frequency signals for bands A through E. This is accomplished through a series of digital dividers and filters. The output of the divider assembly is a signal at approximately -5 dbm at a frequency determined by the range setting and the position of the tuning dial.

6-4. Amplifier and Leveler Assembly A9

The amplifier and leveler assembly receives the output signal from the divider assembly. This signal is then amplified by an amount determined by the SET LEVEL control and the 10 DB VERNIER control. Amplitude modulation and pulse modulation are also accomplished in the amplifier and leveler assembly.

6-5. Modulation Oscillator Assembly A7.

Modulation oscillator assembly A7 generates the 400 Hz and 1000 Hz modulating signals used for internal amplitude modulation. The assembly also provides shaping for pulse modulation signals.

6-6. Meter and Amplitude Regulator Assembly A6

Meter and amplitude regulator assembly A6 provides the regulation signals for amplifier and leveler assembly A9, producing leveling and am-plitude modulation. Outputs from A6 are also provided to the OUTPUT LEVILL meter and the PERCENT MODULATION meter.

6-7. Marker Oscillator Assembly A5

Marker oscillator assembly A5 contains a crystal controlled oscillator which provides calibration markers used when checking the calibration of the frequency dial. The assembly also contains a hysteresis switch to control the response of the filters in divider assembly A8 and in amplifier and leveler assembly A9.

6-8. Rectifier and Power Supply Regulator Assemblies

Rectifier assembly A3 provides unregulated dc power to power supply regulator assembly All, which provides the regulated dual-pole 15-volt and 24-volt output power for the entire unit.

6-9. Attenuator Assembly A2.

Attenuator assembly A2 is a mechanically switched attenuator used to reduce the output level of the equipment to the desired level.

Section II. DETAILED DESCRIPTION

6-10. General

The following paragraphs in this section discuss the electrical operation of each of the assemblies. Refer to the overall schematic diagram in figure FO-2. Note that each assembly is defined and outlined by a dashed line. The reference designations used for individual circuit elements should be prefixed with the reference designation for the assembly being discussed.

6-11. Oscillator Assembly A1.

The oscillator assembly is a solid-state nonrepairable sealed unit. The unit has two terminals and an rf output. Terminal 1 is a power connection and is connected to the -20 volt power supply through series resistor R1 and shunt capacitor C2. Resistor R1 and capacitor C2 act as a noise filter for the power lead. Terminal 2 is a fine-tuning connection, which is connected to the arm of R1, the VERNIER control. Shunt capacitor C1 reduces ‘any noise on the fine-tuning lead. The frequency of the assembly output is variable through a mechanical drive connection.

6-12. Divider Assembly A8.

a. Divider assembly A8 produces and selects the rf signals for the five lower bands (A through E), which are all exact subharmonics of the rf output (242 MHz to 500 MHz) of the oscillator assembly. The circuits comprising the divider assembly are mounted on divider board A8A1, which is mounted inside A8.

b. The incoming rf signal from Al is applied through attenuator network R49 through R51 to a pulse shaping network consisting of diodes CR30 through CR33 and resistor R48. This conditions the incoming signal for division by two in divider integrated circuit U1. The incoming signal is also applied through a second attenuator network consisting of resistors R22 through R26. When band F is selected, -15 volts dc is applied from switch S2 to P.I.N. diodes CR7 and CR18 which pass the signal directly to RF OUTPUT connector J2.

c. Integrated circuits U1, U2, U3A, U3B and U4 make up a digital frequency divider which provides

division by 2, 4, 8, 16 and 32, to provide the output frequencies for bands E, D. C, B and A. The complementary outputs of U1 are combined in transformer T5 and applied through an rc coupling circuit to low-pass filter assembly A2. The filter assembly removes unwanted frequencies generated by the divider circuit and reshapes the output into a sinewave signal. The filters reject all frequencies above the high limit of the selected band. Each filter may also have its pole lowered so that it will reject all frequencies above the midpoint of the band when operating in the lower half of the band. This is controlled by P.I.N. diodes CR1 and CR2 and capacitors C1 and C2 in each filter.

d. The output of filter assembly A2 is outputted through P I.N. diodes CR8 and CR17, which are enabled when switch S2 is in BAND E position. The same output from S2 is applied to the base of transistor Q2, turning it on and disabling divider U2, which turns off the rest of the divider network. Each of the other dividers operates the same way, depending on the position of the BAND switch.

e. Power for the logic circuits (U1 through U4) is provided by voltage divider CR19 through CR24 and filter capacitors C30 and C31, which provide +2 volts and -3.2 volts dc.

6-13. Amplifier and Leveler Assembly A9

a. Amplifier and leveler assembly A9 performs four basic functions:

(1) Amplifies the rf signal from the divider board to the required level.

(2) Regulates the output level.

(3) Provides amplitude modulation.

(4) Provides pulse modulation.

b. The amplifier assembly consists of two circuit boards (A9A1 and A9A2) mounted in a shielded enclosure. Circuit board A9A2 amplifies the rf signal from rf divider assembly A8. The amplification stages are functionally identical throughout assembly A9.

c. Transistor Q1 is the first stage of the input amplifier. The collector supply of Q1 is filtered by L3 and C1. Resistors R5 and R6 provide a collector load which determines the operating collector current. Resistors R3 and R4 determine collector voltage. Resistor R4 is connected to a negative bias supply, which is bypassed by inductor L4 and capacitor C3. Capacitors C4 and C6 are coupling capacitors. The second stage of A9A2 performs identically. Each amplifier stage has a nominal gain of 7 db. The output of A9A2 is provided through coupling capacitor C11 to the P.I.N. leveling diodes and A9A1. Another output through C9 is connected to the auxiliary output jack on the rear panel and to the birdie marker circuit on A9A1.

d. The marker circuit is a mixer which combines the harmonics of a 5 MHz or 1 MHz crystal output and the rf output. Transistors A2Q3 and A2Q4 produce a high level of harmonics from the crystal signal. Diodes A2CR1 and A2CR2 mix the harmonic signal with the rf output to produce a beat note. The audio output of the mixer is then returned to assembly A5 for amplification.

e. The level of the rf signal into amplifier board A9A1 is controlled by AlCR1 and A1CR2, which are P.I.N. diodes. The controlling current for these diodes comes from the A6 assembly. The rf is then amplified in AIQ1, A1Q2, A1Q3 and A1Q4. These stages are functionally identical with those used in A2.

f. Following the last amplifier stage are filters, identical with those used in the A8 assembly, which are used to reduce the harmonics produced in the amplifier assembly. The output of the filters is detected by CR15. The detected signal is returned to assembly A6 as a feedback signal. After detection, the rf signal is connected to pulse circuit consisting of P.I.N. diodes CR16 through CR]9. These diodes act as switches which direct the output either to dummy load R38, or to the output circuit. The output circuit consists of a high-pass filter. The output is then connected to output attenuator assembly A2.

6-14. Modulation Oscillator Assembly

a. Modulation oscillator assembly A7 contains a sinewave oscillator for internal amplitude nodulation and a pulse conditioner for pulse modulation. The sinewave oscillator is a function generator integrated oscillator is a function generator integrated circuit (U1) with an internal shaping circuit. Resistors R2 and R3 adjust the distortion of the sinewave output. Potentiometer R1 adjusts the symmetry of the waveform. Fine-frequency adjustment if provided by R4 for 400Hz and R5 for 1kHz. Circuit AR1 provides output amplification.

b. The pulse conditioner consists of transistors Q1 through Q5 and their associated circuits. Transistor Q3 acts as a control circuit. When the unit is in pulse mode and no pulse is present, Q3 is on, causing Q2 and Q5 to conduct. A positive direction current is then sent to the pulse switch circuit in assembly A9. When the pulse is present, Q2 and Q5 shut off an Q1 and Q4 conduct, sending a negative direction current to A9. The negative direction current turns on the output rf. In the cw mode, Q3 is held cut off, holding the output rf on.

6-15. Meter and Amplitude Regulator Assembly A6

The meter and amplitude regulator assembly generates a reference envelope signal. This signal is supplied, through an error amplifier, to the P.I.N. attenuator in assembly A9. such that the detected rf output has the desired output in level and modulation. Integrated circuit ARI amplifies the modulation waveform to the proper level. The signal is then detected by AR2 and AR3. Rectification is accomplished by CR6. which allows the output of

AR2 to produce a negative response only to the positive half of the modulation waveform. Circuit AR3 then adds twice the response of AR2 to the original signal, producing a full-wave rectified sinewave. This wave is filtered by C5 and the dc component is displayed on the PERCENT MODULATION meter. The modulating signal at the output of AR4 is added to the dc voltage corresponding to the maximum cw rf level by AR4. The SET LEVEL control varies the gain of AR4 such that the modulation percentage remains constant. The output of AR4 is connected to the 10 dB VERNIER control on the front panel. The output from this control is compared to the actual rf envelope by AR6. Any difference is amplified by AR6 and a correcting signal is applied to the P.I.N. attenuator in A9. Integrated circuit AR5 displays the dc component of the reference envelope on the front panel OUTPUT LEVEL meter.

6-16. Marker Oscillator Assembly A5

a. Marker oscillator assembly A5 contains a 10-MHz crystal oscillator. The output of the oscillator is divided by 2, then by 5 to produce the 5 MHz and 1 MHz signals. The oscillator consists of Q1, crystal Y1 and the associated circuits. The output level of the oscillator is set by R3 and fine frequency is adjusted by C3. The two-to-one and five-to-one divisions are accomplished in integrated circuit U1. Selection of 5 MHz or 1 MHz markers is made through integrated circuit U2. The selected output of U2 is amplified through transmitters Q2 and Q3 and sent to assembly A9. The audio mixer output from A9 is amplified by differential amplifier ARI and supplied to the MARKERS PHONE jack.

b. Schmitt trigger circuit AR2 is also located on assembly A5. This circuit is used to switch the poles of the filters in A8 and A9. Transistors Q5, Q6, and Q7 amplify the dc output of the Schmitt trigger.

6-17. Rectifier Assembly A3

Rectifier assembly A3 contains the main rectifier diodes and filter capacitors for the power supply. Inputs to the circuit are from power transformer T1. Either 115-volt or 230-volt power selection is made through POWER switch S4.

6-18. Power Supply and Regulator Assembly A11.

The unregulated outputs of rectifier assembly A3 are supplied to assembly All which produces the regulated outputs of -15, +15, -24 and +24 volts. Series pass transistors Q1, Q2, Q3, and Q4 are mounted on the main chassis. The remainder of the regulator circuits are mounted on All. Regulation for the +15 and -15 volt outputs is provided by integrated circuits ARI and AR2. Regulation for the +24 and -24 volt outputs is provided by AR3 and AR4 Output voltage ad-justments are provided through feedback potentiometers R4, R10, R15 and R21.

6-19. Output Attenuator Assembly A2.

The output attenuator assembly contains the output attenuator and the mechanical portion of the 10 dB VERNIER. The output attenuator is a nonrepairable assembly which attenuates the output signal in 10 db steps. The 10 dB VERNIER is an electronic attenuator with part of its circuitry located in meter and amplitude regulator assembly A6.

CHAPTER 7

DIRECT AND GENERAL SUPPORT MAINTENANCE

NOTE

No direct support maintenance is authorized for this equipment. Refer all repairs above the organizational category to general support maintenance.

Section I. GENERAL

7-1. Maintenance Diagrams

This chapter includes parts location diagrams, voltage resistance and waveform diagrams, and test equipment setup diagrams. A complete schematic diagram for the equipment and its assemblies is shown in figure FO-2. Figure FO-3 is a wiring diagram of the equipment. Figure FO-4 shows the locations of the major assemblies, chassis-mounted parts and certain test points. Dc resistance values for power transformer T1 are provided in table 7-1.

7-2. Tools and Test Equipment Required

a. A complete list of tools and test equipment required for the maintenance of the AN/USM-44C is given in appendix C. Appendix C also defines maintenance tasks and allocations. General support maintenance personnel are automatically authorized to perform all tasks allocated to lower categories of maintenance.

b. Throughout this chapter, references made to test equipment reflect the equipments specified in appendix C. These equipments may be referenced by common names as listed in the following chart.

Equipment	*Common name*
Generator. Signal AN/USM-44C	Signal generator
Analyzer, Spectrum AN/UPM-84	Spectrum analyzer
Counter, Electronic Digital Readout AN/USM-207A	Frequency counter
Generator, Pulse AN/PPM-1	Pulse generator
Generator, Signal Sweep AN/USM-203A	Sweep generator
Multimeter TS-352B/U	Multimeter
Oscilloscope AN/USM-281(*)	Oscilloscope
Wattmeter AN/URM-98	Wattmeter
Analyzer, Spectrum TS-723/U	Distortion Analyzer

Table 7-1. Dc Resistance of Transformer Windlngs

Terminals	*Resistance (Ohms)*
1--2	10.3
3--4	10.3
5--6	2.0
6--7	2.0
8--9	0.9
9--10	0.9

Section II. TROUBLESHOOTING

7-3. General

This section contains instructions for isolating a fault in the equipment to a particular defective assembly or subassembly and then to the particular defective part of component on the assembly or subassembly. Table 7-2 lists faults that may be encountered during performance of the general support testing procedures, or which may be reported as failure from a lower category of maintenance. The table references particular paragraphs for procedures to be followed for further fault isolation.

NOTE

The power supply tests in paragraph 7-4 should be performed before any other tests.

Be certain that the output voltages are correct, because they will seriously affect the results of any other tests.

7-4. Power Supply Tests

a. Using Multimeter TS-352B/U, measure the voltages listed in table 7-3. Refer to figure FO-4 for the location of the power supply assemblies and to figures 7-1 and 7-2 for parts location and test point location on the A11 assembly. Figure 7-3 gives circuit voltage and resistance measurements for assembly A11.

Table 7-2. Troubleshooting and Fault Isolation

Item No	Malfunction	Probable cause	Corrective action
1	Rf output level incorrect	Defective assembly A9 or A8	Perform troubleshooting procedure of paragraph 7-5.
2	Rf output frequency incorrect on all bands. Level correct	Defective or misaligned oscillator A1	Align in accordance with paragraph 7-13. If alignment does not correct, replace oscillator A1A1
3	Rf level and frequency correct in CW, but AM incorrect in 400Hz and 1 KHz positions of MODE switch and correct in EXT AM position.	Defective or misaligned A7 assembly	Perform procedures of paragraph 7-10
4	Same as item 3, except EXT AM is also incorrect.	Defective or misaligned A6 assembly	Perform procedures of paragraph 7-9.
5	Rf level and frequency correct and PULSE mode incorrect	Defective or misaligned A7 assembly	Perform procedures of paragraph 7-10.

Table 7-3. Power Supply Voltages

Test point	*Nominal voltage*	*Acceptable range (V)*
A	+ 15	14.5--15.5
B	--15	--14.5-- --15 5
C	+24	20 V--28
D	--24	--20-- --28

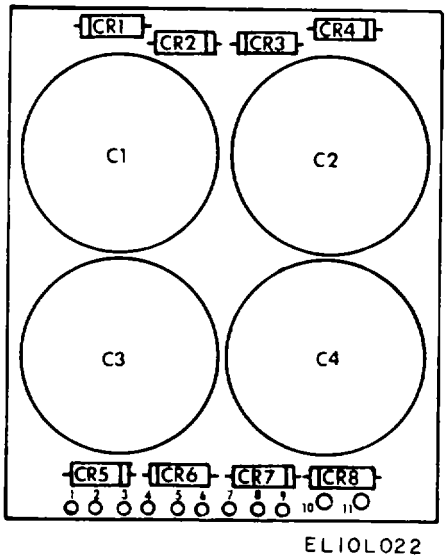


Figure 7-1. Rectifier board A3, parts location

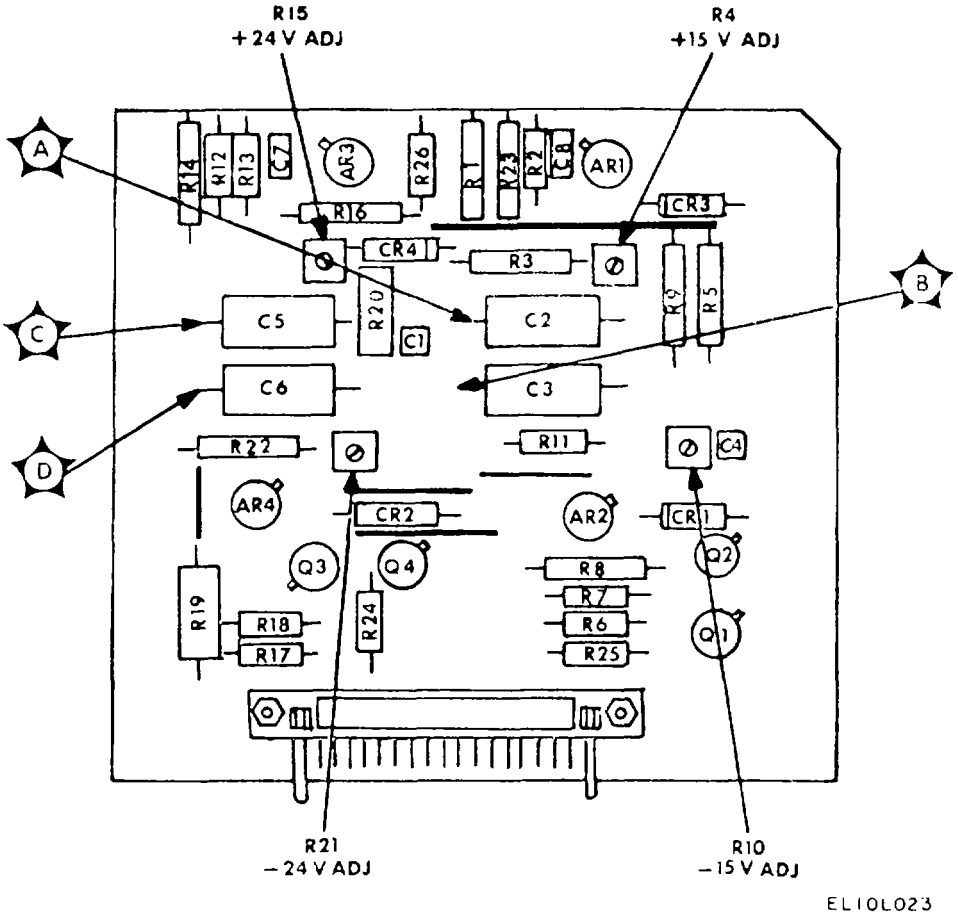


Figure 7-2. Power supply regulator A11, parts location

NOTE

The word replace in the following procedures may mean reinstall or replace depending upon whether a removed component is found, after testing, to be good or bad.

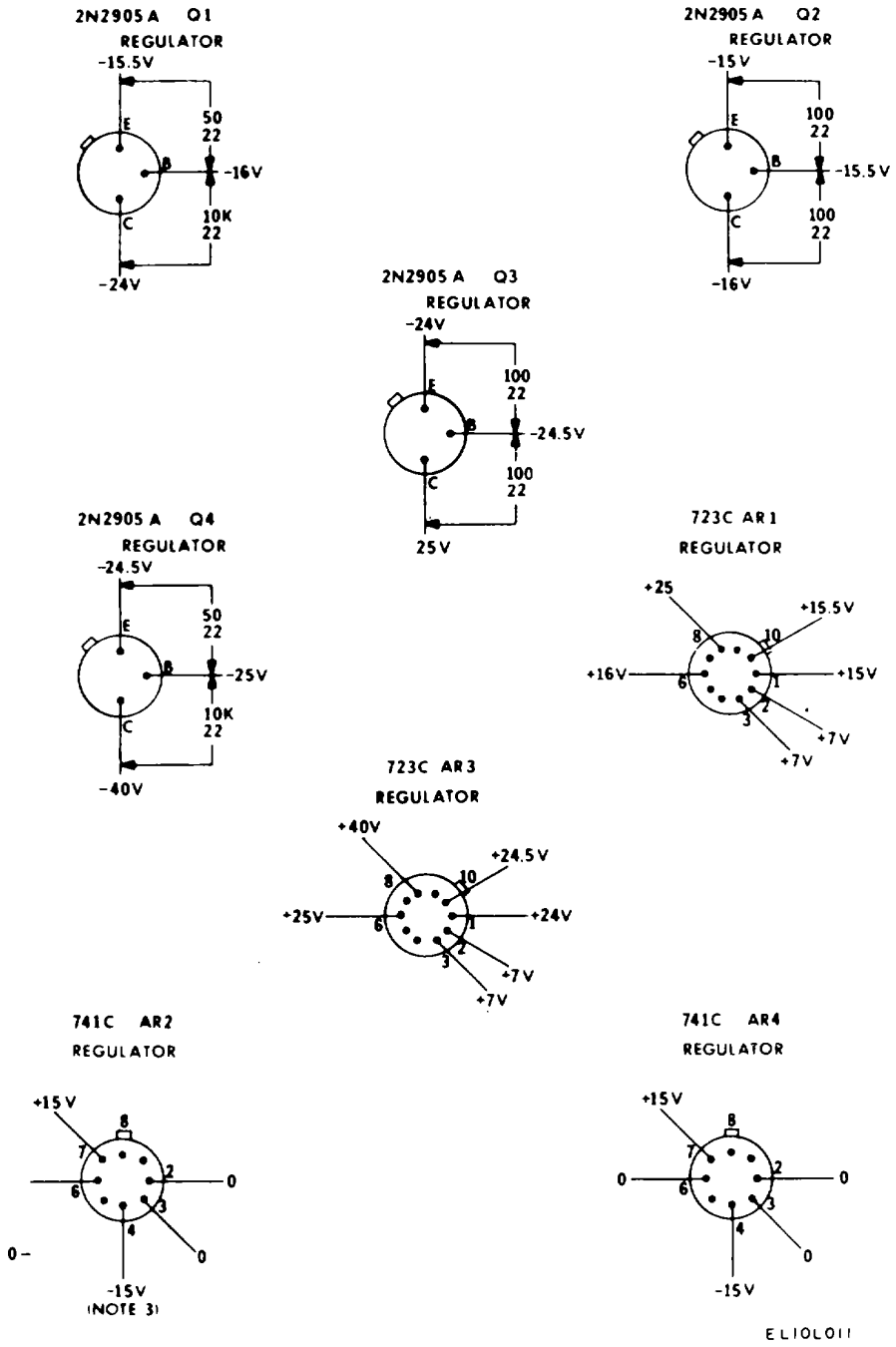


Figure 7-3. Power supply regulator, circuit measurements

b. If the power supply voltages are incorrect, perform the adjustments in paragraph 7-16. If the adjustment procedure will not bring the voltages in, perform the procedure below.

(1) Remove assembly All from its socket and perform the resistance measurements in table 7-4, using the RX1 scale on the multimeter. Make the measurements at the socket.

(2) If the resistance measurements are correct, reinstall A11 and perform voltage and resistance measurements as indicated in figure 7-3 to locate the defective part. If the resistance readings are lower than indicated, there may be a short circuit in the equipment. Systematically remove and replace the other assemblies to determine the location of the defect.

Table 7-4. Power Supply Resistances

Pin number	Correct resistance (ohms)
9 (+15V)	65
7 (-15V)	76
13 (+24V)	80
15 (-24V)	80

NOTE

Use the positive lead of the multimeter for ground and the negative lead for the resistance measurement.

7-5. Rf Output Level Troubleshooting

a. This procedure isolates the defective assembly in case of incorrect rf output level. Test points for these tests are illustrated in figure FO-4. Using the wattmeter, perform the following measurements in the order indicated:

(1) Disconnect cable from divider assembly A8 to oscillator assembly Al at the oscillator connector.

(2) Measure the output of the rf oscillator at test point 1. The level should be between +15 and +20 dbm, and the frequency should be variable between 250 and 500 MHz on all bands. If these results are not obtained, refer to paragraph 7-6.

(3) Reconnect the cable from the oscillator assembly and connect the wattmeter to the output of the divider board at test point 2. The output should be variable between 10 and 5 dbm. If these levels are not obtained, go to paragraph 7-7.

(4) Replace the original cable on the output of divider assembly A8 and disconnect the cable from the output of A9. Connect the wattmeter to the output of A9 (test point 3). This signal should be variable in amplitude between -3 and +7 dbm as indicated by the 10 db vernier when the OUTPUT LEVEL meter indicates +7 dbm (SET LEVEL). If this level is not obtained, go to paragraph 7-8.

b. Perform an ohmmeter check point on the output attenuator subassembly as follows:

(1) Set the 10 DB VERNIER control and the OUTPUT LEVEL switch fully cw.

(2) Disconnect the cable between A9 and A2.

(3) Measure the resistance between the center and outer conductors on the RF OUTPUT jack. This should be an open circuit.

(4) Measure the resistance between the center conductors on the RF OUTPUT jack and the plug (P2) on the rear of the attenuator. This should indicate a short circuit (0Oohm).

(5) If these readings are not obtained, check the cables and the output attenuator separately and replace the defective part.

(6) Reconnect the cables.

7-6. Oscillator Assembly Troubleshooting

a. Troubleshooting. Since the oscillator (A1A1) is a nonrepairable subassembly, troubleshooting is limited to determining that the oscillator is functioning, that the proper output levels are present, and that power connections are complete.

(1) Using Multimeter TS-352B/U, check voltage at A 1C 1. Voltage should be -24 volts. If not, check AlR1 (A6) (fig. FO-5).

(2) Connect the TS-352B/U to A1C2. Measure voltage while turning VERNIER control on front panel from ccw to cw position. Voltage should vary from 0 to approximately 15 volts. If not, check VERNIER potentiometer R1 and subassembly A5.

(3) Disconnect cable from A1J1 and connect Wattmeter AN/URM-98 to oscillator output connector. Output should measure between +15 and + 18 dbm.

(4) If output is low or missing, remove cover assembly (9, fig. FO-5) by removing four screws (13). If necessary, remove either or both bracket angles (10).

(5) Disconnect internal cable connector (12) from AlAl and connect Wattmeter AN/URM-98 to A1A1. Output should measure between +15 and +18 dbm. If correct, check cable and connector A1J1.

(6) If output is low or missing, check voltages at input connectors of A1A1. If voltages are correct, replace A1A1 as specified in b below.

b. Removal and Replacement of Oscillator A1A1. If subassembly A1A1 is defective, turn off all power and remove the subassembly. Replace it with a new unit. The procedure is as follows:

(1) With the unit on its side, disconnect shaft coupling (2, fig. FO-5).

(2) Remove four mounting machine screws (1) and lift assembly A1 from unit. If necessary, unsolder wires from standoff (24) and feed-through capacitor C2 (16).

(3) Remove top spur gear (3) and hub (4).

(4) Loosen setscrews on horizontal miter gear (5) and remove shaft (6). Leave limiting stop parts on shaft. Remove miter gear (5).

(5) Loosen setscrews on vertical miter gear (7).

(6) Remove vertical screws (8).

(7) If not already removed, remove cover (9) and bracket angles (10).

(8) Withdraw oscillator (11) and disconnect cable (12).

(9) Flag and unsolder wires from oscillator (11).

(10) Draw oscillator out of unit.

(11) Install new oscillator and connect wires unsoldered in (9) above.

(12) Connect AN/URM-98 to oscillator A1A1 output connector and turn on power. Be careful not to short out exposed wires. Allow 1 minute for warmup and measure output power. The AN/URM-98 should indicate between + 15 and + 18 dbm.

(13) Turn power off and disconnect Wattmeter AN/URM-98.

(14) Install gearbox on oscillator shaft and install horizontal shaft and miter gear. Be certain

that miter gears (5 and 7) mesh properly before tightening setscrews in miter gear (7).

(15) Install assembly Al in unit and tighten screws (1).

(16) Connect and tighten shaft coupling (2).

(17) Connect cable (12) to A1A1 output connector.

(18) Install cover brackets (10) and cover (9) with screws (13).

(19) Connect cable from A8 to A1J1.

(20) -Perform oscillator alignment procedure as outlined in paragraph 7-13.

7-7. Divider Assembly Troubleshooting

a. Divider assembly A8 divides the output of oscillator assembly Al for the five lower bands (A through E). Troubleshooting techniques for the assembly include oscilloscope and frequency counter measurements of the output for each band, voltage measurements with the equipment operating and resistance measurements with the equipment power off. The proper voltage and resistance measurements are listed in table 7-5. The listings are grouped by band and reflect the readings with the BAND switch in the proper position (as listed in the table). If signal tracing techniques are used, start with the highest band (B AND F) and work down to BAND A. The schematic diagram of the A8 assembly is shown in figure FO-2, sheet 2. For disassembly and parts location diagrams, refer to figures FO-6 and 7-4. Transistor and integrated circuit measurements are shown in figure 7-5.

Table 7-5. Rf Divider A8, Voltage and Resistance Measurements

BAND switch	Positive meter lead position	Voltage indication (volts)	Resistance (ohms)	Reverse resistance (ohms)	Remarks
A	+2V test point	+ 2±0.2	30 ±4	35±4	
A	-3V test point	--3 2 ±3	20±4	100 ±10	
A	CR33 anode	0	20 ±4	20±4	
A	CR31 anode	0	20±4	20 ±4	
A	U1, pin 7	+0.7	Open	Open	Note 2
A	U1, pin 2	+1.0	Open	Open	
A	U1, pin 3	+1.0	Open	Open	
A	U2, pin 2	+1.0	Open	Open	
A	U2 Pin 3	+1 0	Open	Open	
A	U3, pin 2	+1 0	Open	Open	
A	U3, pin 3	+1.0	Open	Open	
A	U3, pin 15	+1.0	Open	Open	
A	U3, pin 14	+1.0	Open	Open	
A	U4, pin 2	+1.0	Open	Open	
A	U4, pin 3	+1.0	Open	Open	
A	CR1 anode	-0.7	22 ±4	30 ±4	Band A
B	CR1 anode	+0.7	22 ±4	30 ±4	Band A
A	CR29 anode	+2.7	Open	Open	Band A
B	CR29 anode	+1.3	Open	Open	Band A
B	CR2 anode	-0.7	22 ±4	30 ±4	Band B
C	CR2 anode	+0 7	22 ±4	30 ±4	Band B
B	CR28 anode	+2.7	Open	Open	Band B
C	CR28 anode	+1.3	Open	Open	Band B
C	CR3 anode	-0.7	22 ±4	30 ±4	Band C
D	CR3 anode	+0 7	22 ±4	30 ±4	Band C
C	CR27 anode	+2.7	Open	Open	Band C
D	CR27 anode	+ 1.3	Open	Open	Band C
D	CR4 anode	-1.4	22 ±4	70 ±8	Band D
E	CR4 anode	+0.7	22 ±4	70 ±8	Band D
D	CR26 anode	+2.7	Open	Open	Band D
E	CR26 anode	+1.3	Open	Open	Band D
E	CR5 anode	-1.4	22 ±4	70 ±8	Band E
F	CR5 anode	+0.7	22 ±4	70 ±8	Band E
E	CR25 anode	+2 7	Open	Open	Band E
F	CR25 anode	+1 3	Open	Open	Band E
F	CR6 anode	-1.4	30 ±4	75 ±8	Band F
E	CR6 anode	+0.7	30 ±4	75 ±8	Band F

NOTES

1. All resistances should be measured with the multimeter set to RX1 with reference to ground. The listed plus or minus amount in the table is a recommended specification only. In order to balance the circuit properly some resistance values may have to exceed the specified amount.

2. This voltage depends on the setting of R42. Refer to the alignment section for this adjustment.

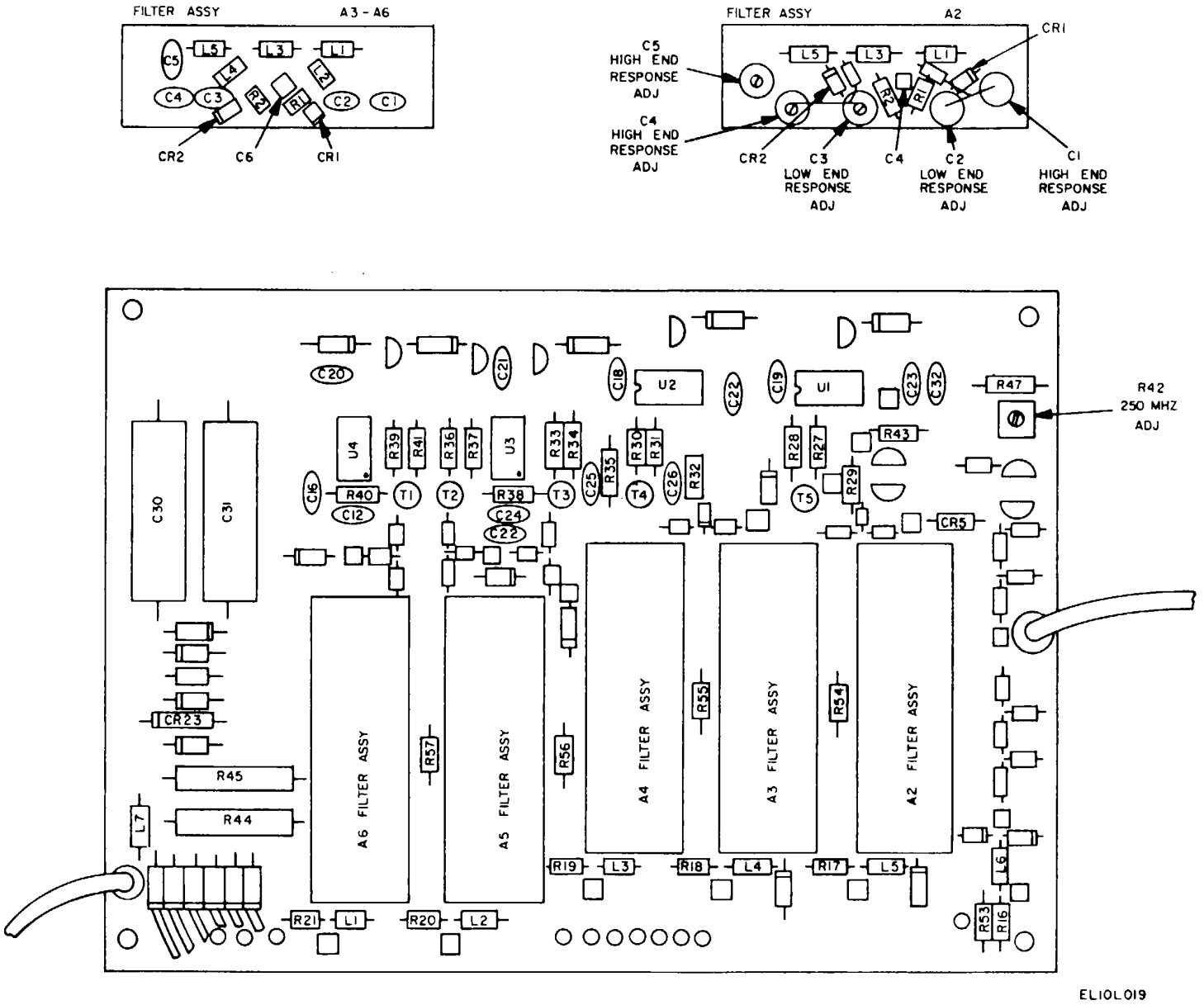


Figure 7-4 (1). Rf divider board A8A1, parts location (Sheet 1 of 2)

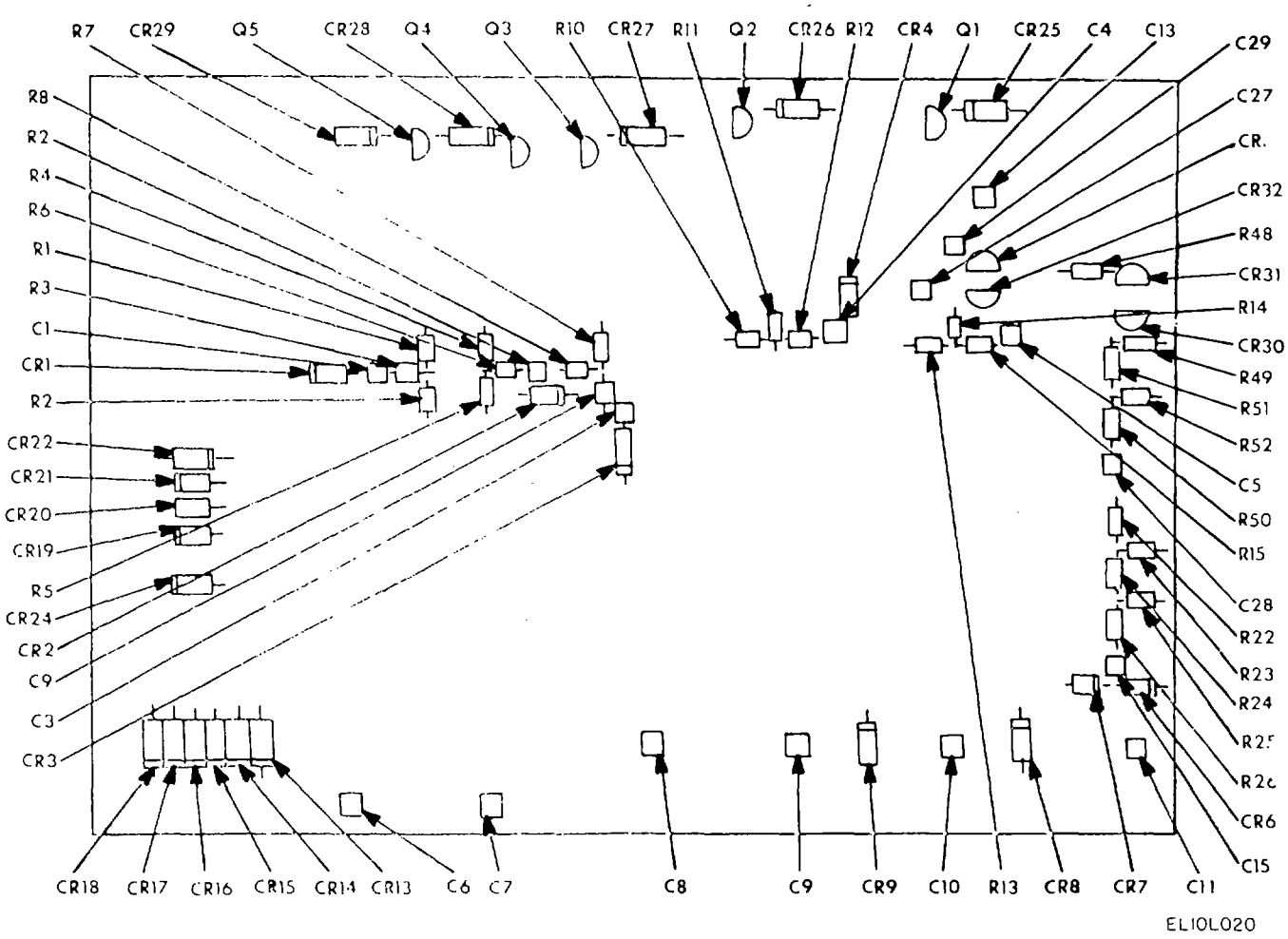


Figure 7-4 (2). Rf divider board A8A1, parts location (Sheet 2 of 2)

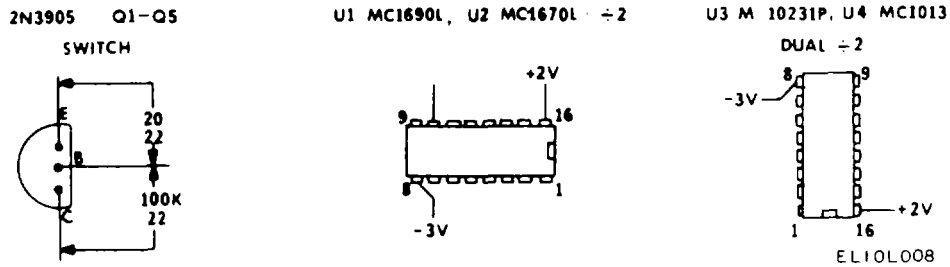


Figure 7-5. Rf divider board A8A1, circuit measurements

b. The filter assemblies used in A8A1 are all functionally identical and schematically similar. Peculiar part values for the filter assemblies are listed in the chart in figure FO-2. Normal voltage and resistance values for the filters are listed in table 7-6.

7-8. Rf Amplifier Assembly Troubleshooting

a. Rf amplifier assembly A9 amplifies the signal from A8 to the required level and provides amplitude and pulse modulation. For troubleshooting assembly A9 and subassemblies A9A1 and A9A2, refer to figure FO-2, sheet 3 for the schematic diagram, figures 7-6 and 7-7 for transistor and integrated circuit voltage and resistance data, figures 7-8 and FO-8 for parts location and figure FO-7 for disassembly information.

b. Signal tracing techniques, using an oscilloscope and a frequency counter, may be used to isolate a fault to a defective stage. Voltage measurements based on figures 7-6 and 7-7 and table 7-7 should then be made to further isolate the fault to a defective part. Voltage measurements should be made with the equipment operating. Resistance measurements can then be made to confirm the defect. Use the multimeter on the RX1 scale with the equipment turned off.

c. The filter assemblies used in A9A1 are identical with those used in A8A1. Troubleshooting techniques for the filters are detailed in paragraph 77b. Component values are listed in the chart in figure FO-2, sheet 3.

Table 7-6. Filter Assemblies, Voltage and Resistance Measurements

FREQUENCY dial position	Positive meter lead position	Voltage indication (volts)	Resistance * (ohms)	Reverse * resistance (ohms)
Maximum frequency	CR1 anode	−14 ±2	25 ±4	GT 1K
	CR2 anode	−14 ±2	25 ±4	GT 1K
Minimum frequency	CR1 anode	+10 ±4	Open	GT 1K
	CR2 anode	+10 ±4	Open	GT 1K

*See note 1, table 7-5.

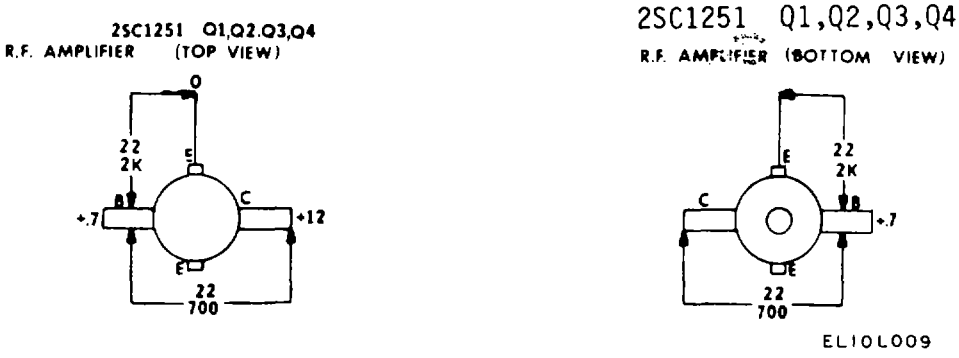


Figure 7-6. Rf amplifier board A9A1, circuit measurements.

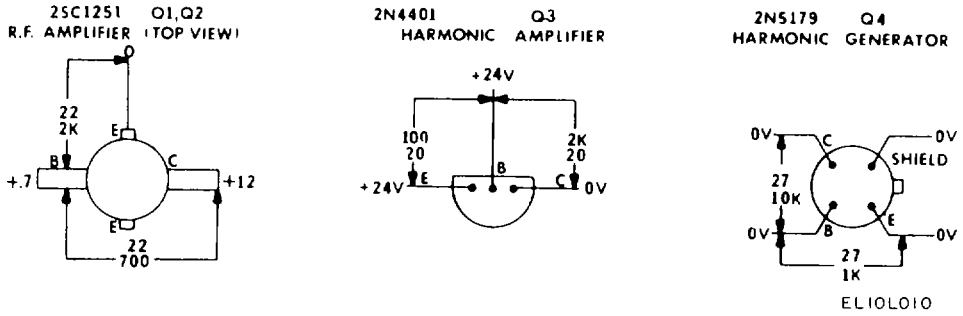


Figure 7-7. Rf preamplifier board A9A2, circuit measurements.

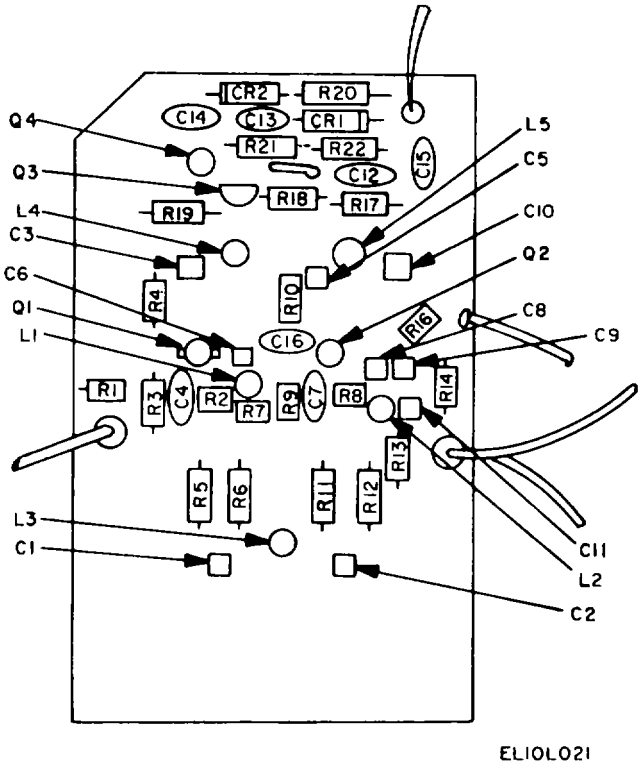


Figure 7-8. Rf preamplifier board A9A2, parts location

Table 7-7. Rf Amplifier and Resistance Measurements

BAND switch	Positive meter lead position	Voltage indication (volts)	Resistance (ohms)	Reverse resistance (ohms)	Remarks
A	Junction of A1R2 & A1R42	+1.0	Open	Open	Note 2
A	A1CR8 anode	±0.7	GT 1K	24 ±4	
B	A1CR8 anode	0.0	GT 1K	24 ±4	
B	A1CR7 anode	+0.7	GT 1K	24 ±4	
C	A1CR7 anode	0.0	GT 1K	24 ±4	
C	A1CR6 anode	+0.7	GT 1K	24 ±4	
D	A1CR6 anode	0.0	GT 1K	24 ±4	
D	A1CR5 anode	+0.7	GT 1K	24 ±4	
E	A1CR5 anode	0.0	GT 1K	24 ±4	
E	A1CR4 anode	+0.7	GT 1K	24 ±4	
F	A1CR4 anode	0.0	GT 1K	24 ±4	
F	A1CR3 anode	+0.7	GT 1K	24 ±4	
E	A1CR3 anode	0.0	GT 1K	24 ±4	
A	A1CR18 anode	+0.8	24 ±4	24 ±4	Note 3
A	A1CR18 anode	−0.8	24 ±4	24 ±4	Note 4
A	A1CR17 anode	−0.8	24 ±4	24 ±4	Note 3
A	A1CR17 anode	+0.8	24 ±4	24 ±4	Note 4
A	A2CR1 anode	0.0	75 ±10	400 ±100	

NOTES

1. Measure resistance on RX1 scale.
2. This voltage should rise to +14V with SET LEVEL control fully cw and −14V when SET LEVEL control is fully ccw.
3. MODE switch at CW.
4. MODE switch at PULSE.

7-9. Meter and Amplitude Regulator Assembly Troubleshooting

a. Troubleshooting assembly A6 consists of making the voltage and resistance measurements indicated in figure 7-10. Parts location for A6 are shown in figure 7-9. The following test may also be performed on operational amplifiers AR1 through AR6.

(1) Set the multimeter on a range to measure 30 volts dc.

(2) Measure the voltage at pin 2 of the amplifier, with respect to pin 3 and note the polarity of the voltage.

(3) Measure the voltage at the output with respect to ground. If it is not of the opposite polarity measured in (2) above, the amplifier is defective and should be replaced.

b. The adjustments required for assembly A6 are described in paragraph 7-18. Before replacing any parts, attempt to correct the problem by performing the alignment adjustments.

7-10. Modulation Oscillator Assembly Troubleshooting

Troubleshooting modulation oscillator assembly A7 consists primarily in measuring voltages and resistances in the circuits and observing waveforms in the oscilloscope. Parts location for assembly A7 are shown in figure 7-11. Voltage and resistance measurements are shown in figure 7-12. Waveform data for integrated circuit U1 is shown in figure 7-13.

Integrated circuit AR1 may be tested using the technique described in paragraph 7-7. Adjustment procedures for A7 are provided in paragraph 7-19. Attempt to correct faults by adjustments before replacing parts.

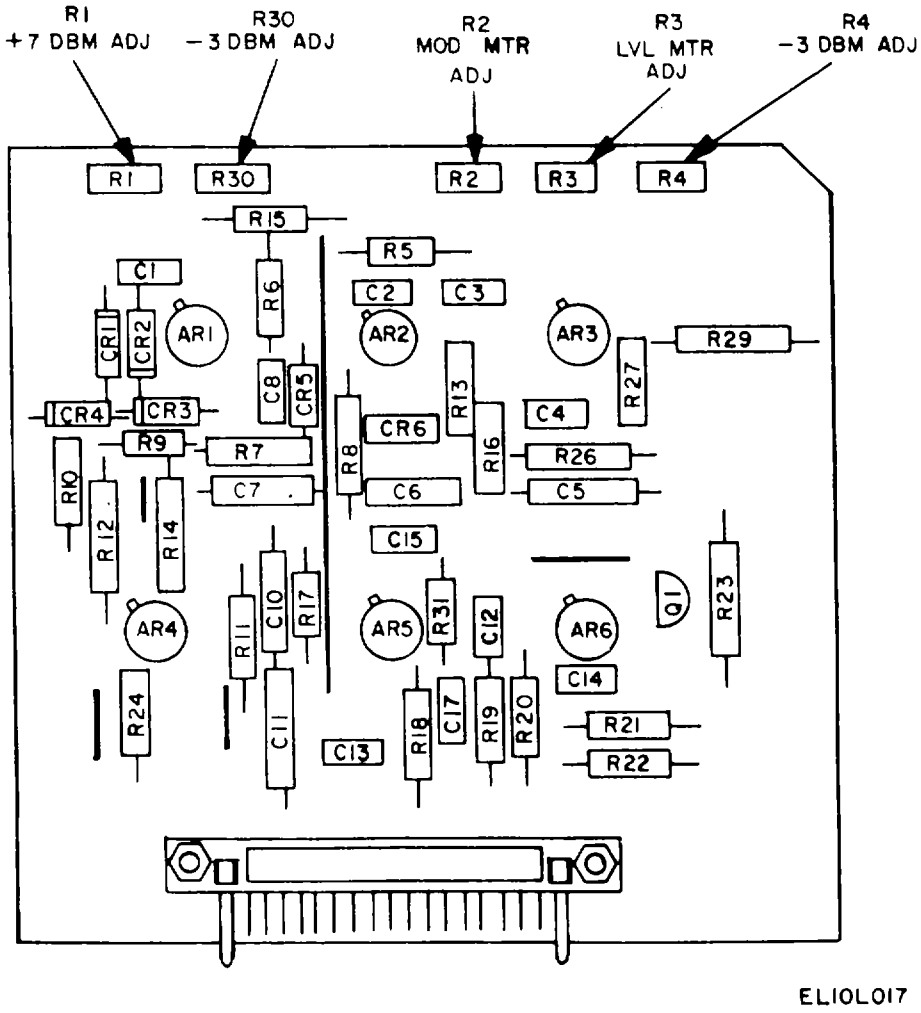


Figure 7-9. Meter and amplitude regulator A6. parts location

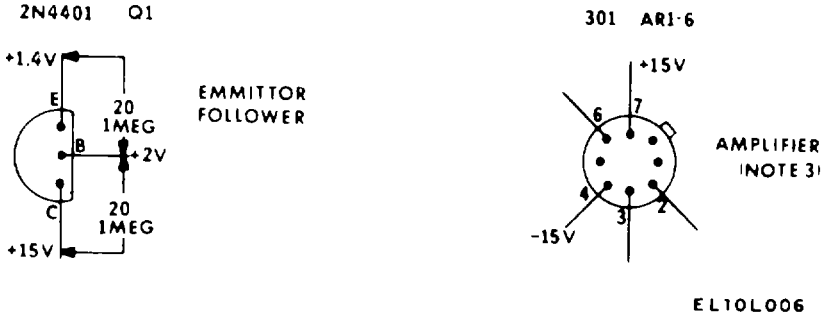


Figure 7-10. Meter and amplitude regulator A6, circuit measurements

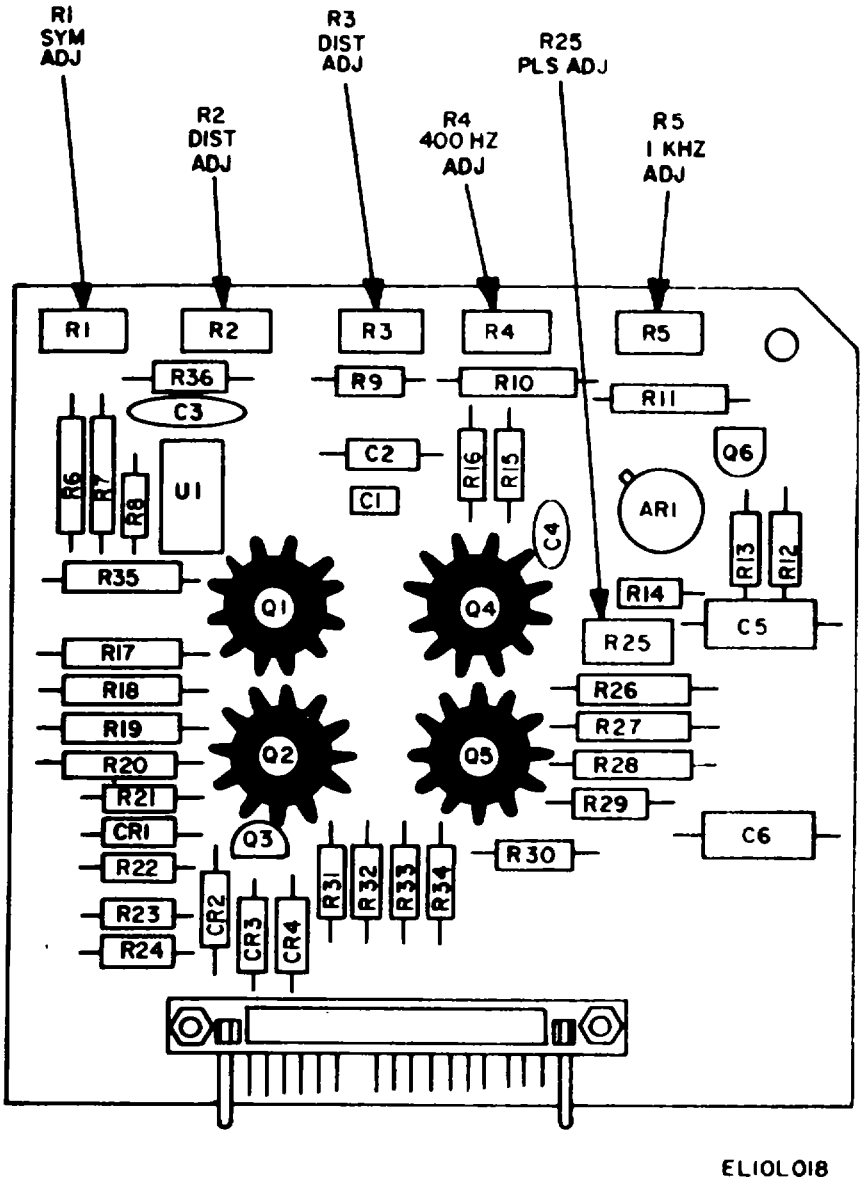


Figure 7-11. Modulation oscillator A7. parts location

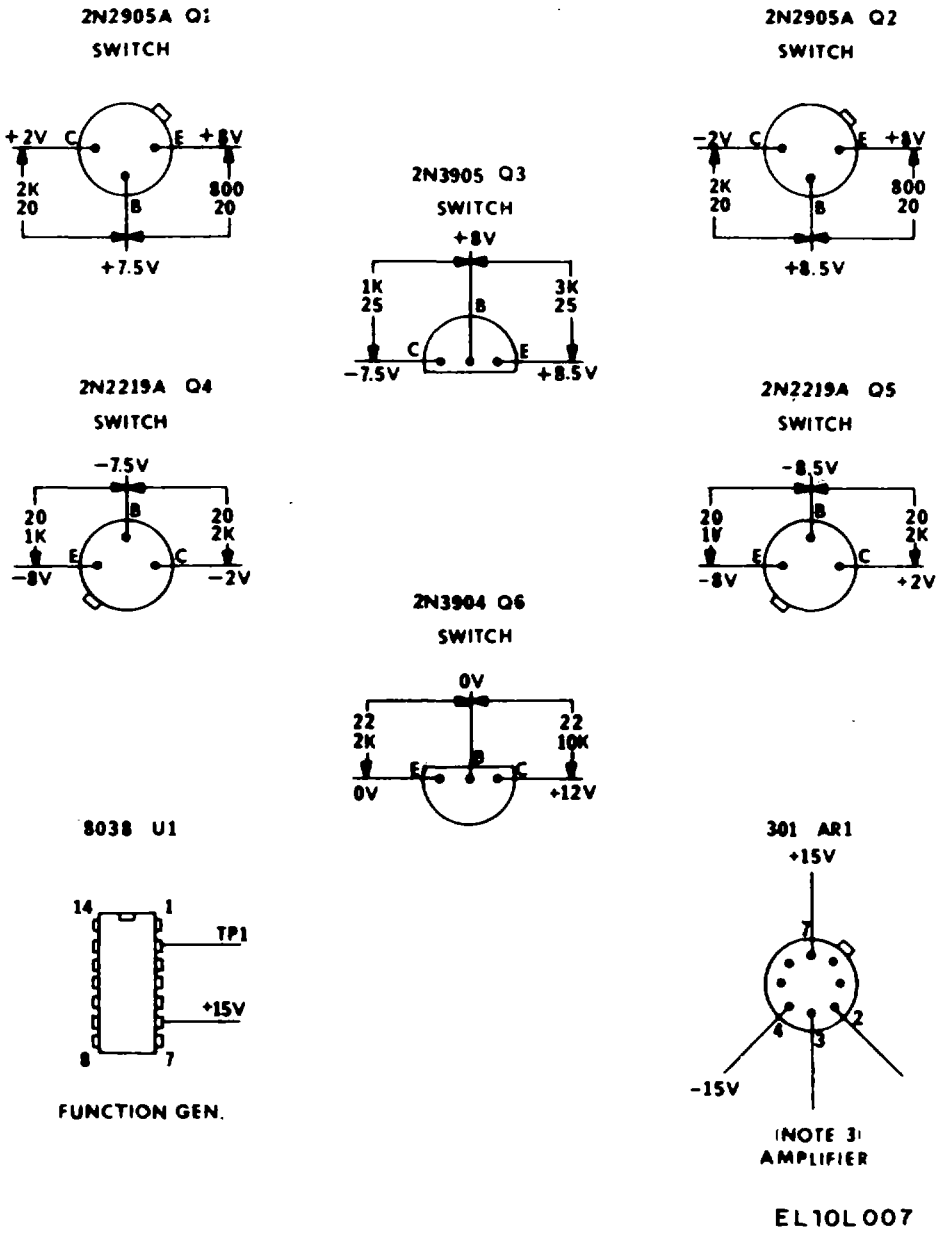
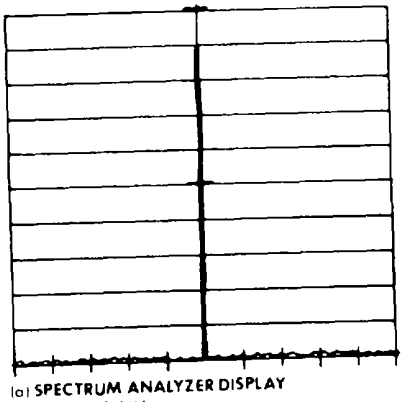


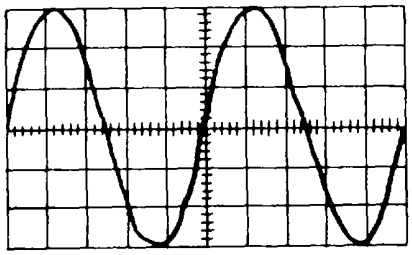
Figure 7-12. Modulation oscillator A7, circuit measurements.

7-11. Marker Oscillator Assembly Troubleshooting

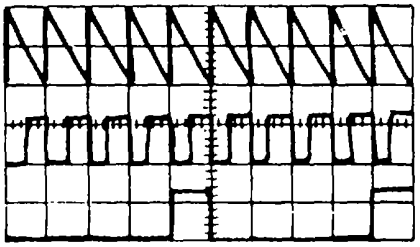
Troubleshooting marker oscillator assembly A5 consists primarily in measuring waveforms, voltage and resistance in the circuit. Waveform data is provided in figure 7-13. Parts location and test points are shown in figure 7-14 and voltage and resistance values are given in figure 7-15. Adjustments which can be performed on AS are detailed in paragraph 7-20. Attempt to correct apparent failures by adjustment before replacing parts, unless the parts are obviously defective.



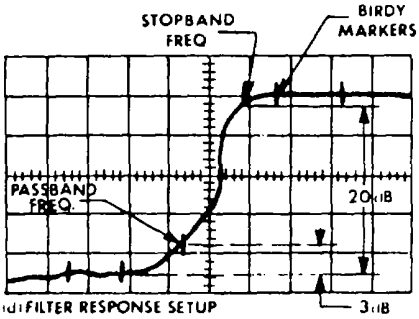
(a) SPECTRUM ANALYZER DISPLAY
VERTICAL: LIN
BANDWIDTH: MAX
HORIZONTAL: MAX DISPERSION
FREQ: 500 MHz



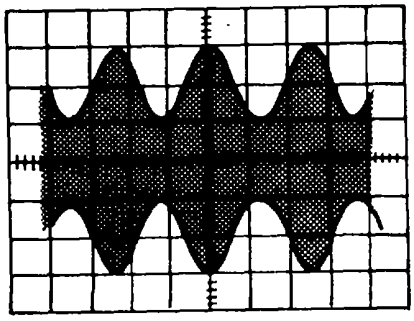
(b) OSCILLOSCOPE DISPLAY OF A7U1TP1
VERTICAL: .5 V/DIV AC COUPLED
HORIZONTAL: 5MSEC/DIV



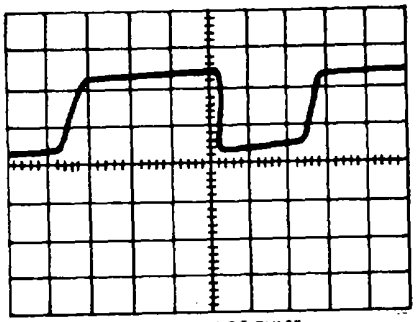
(c) OSCILLOSCOPE DISPLAY OF A5U1, TP1, TP2 & TP3
VERTICAL: 2 V/DIV
HORIZONTAL: 2 USEC/DIV



(d) FILTER RESPONSE SETUP
SET VERTICAL: HORIZONTAL AND SWEEP WIDTH TO OBTAIN ABOVE DISPLAY
PASSBAND FREQUENCY IS WHERE RESPONSE IS 30dB DOWN.
STOPBAND FREQUENCY IS WHERE RESPONSE IS 20dB DOWN



(e) OSCILLOSCOPE DISPLAY OF 50% A.M.



(f) OSCILLOSCOPE DISPLAY OF PULSE

EL10L012

Figure 7-13. Waveform data.

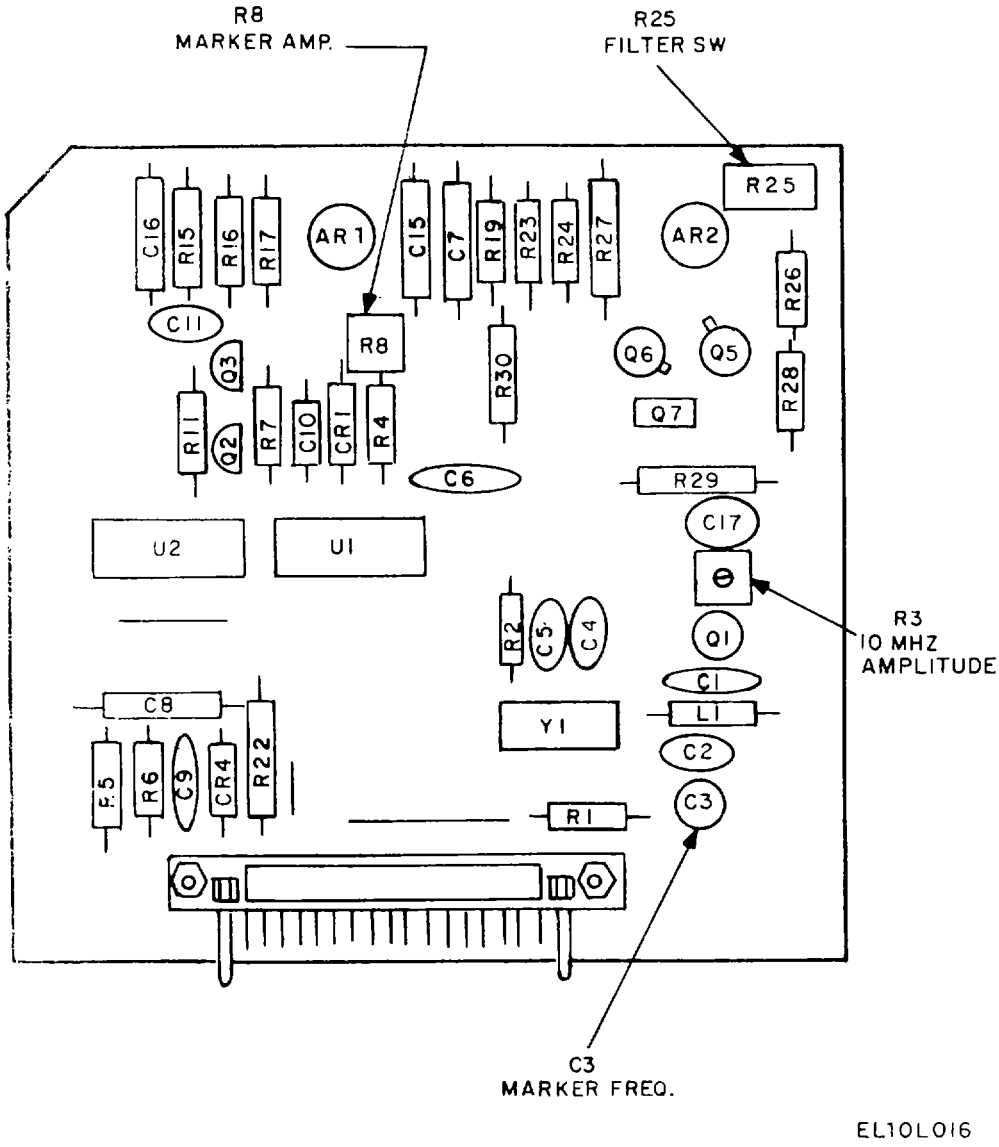


Figure 7-14. Marker oscillator A5, parts location.

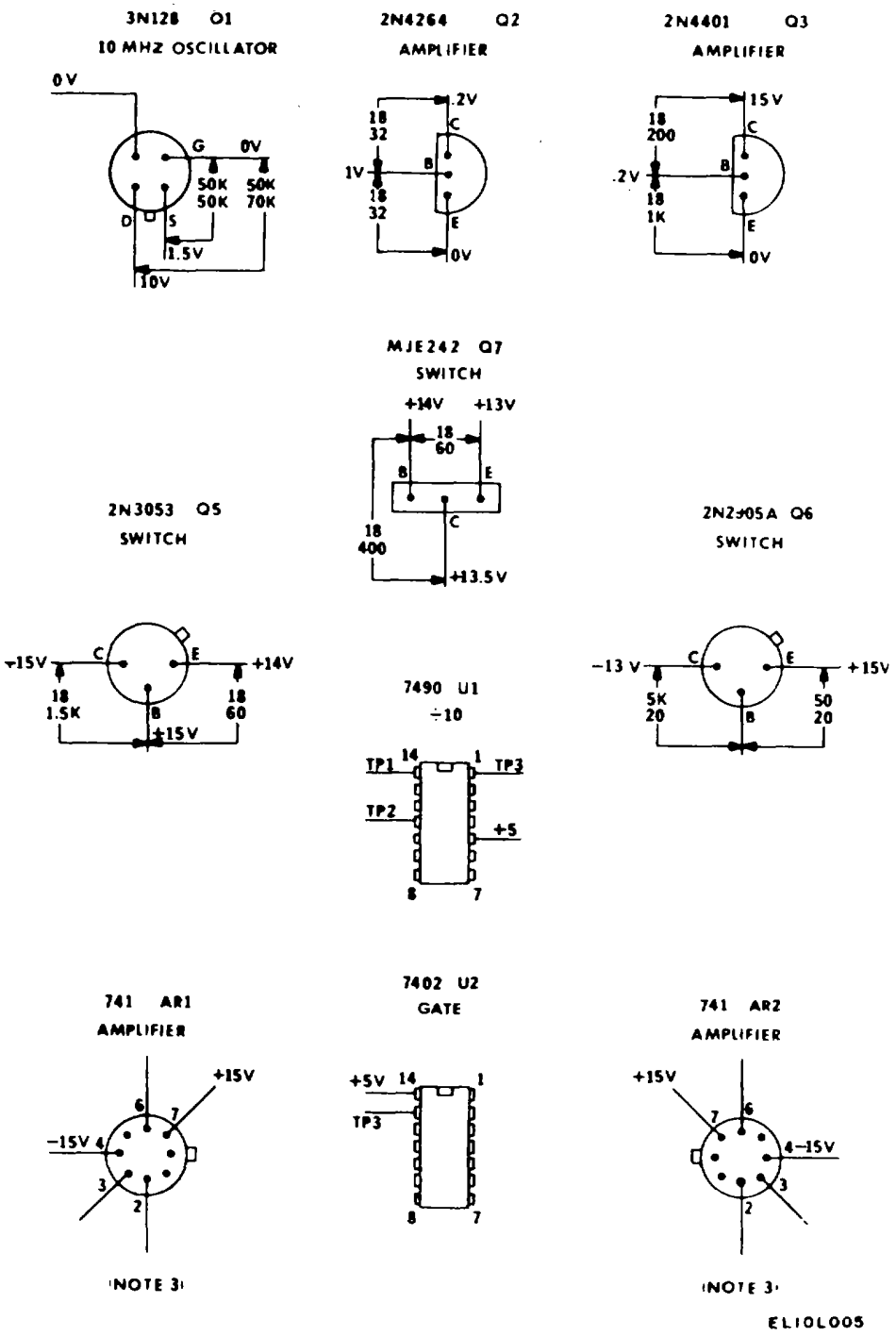


Figure 7-15. Marker oscillator AS, circuit measurements.

Section III. ALIGNMENT AND ADJUSTMENT

7-12. General

This section contains alignment and adjustment procedure for the AN/USM-44C. No disassembly of the unit is required for these procedures other than removal of the top or bottom cover, as appropriate. Table 7-8 lists all of the alignment procedures, the assemblies and subassemblies

affected and paragraph references for the procedure.

7-13. Oscillator A1.

This procedure covers adjustment of the frequency dial drum and oscillator assembly A1.

a. Loosen four setscrews on hub on top spur gear of oscillator assembly A1 (3 and 4, fig. FO-5).

b. Gently rotate main tuning drum through its travel. Drum should rotate approximately 1 inch past end of calibrate scale on each end. If not, reset flexible coupling setscrews (fig. 7-16).

c. Connect test equipment as shown in figure 7-17.

d. Set BAND switch to F and turn tuning crank until frequency counter indicates exactly 400 MHz.

e. While holding tuning crank to maintain 400 MHz on frequency counter, rotate drum to indicate 40; MHz.

f. Tighten setscrews on upper spur gear.

g. Turn tuning crank counterclockwise until tuning dial indicates 500 MHz.

Table 7-8. Alignment Schedule

Alignment	Assembly	Paragraph Reference
Frequency accuracy	A1	7-13
Output level calibration	A6	7-18a
Modulation percent calibration	A6	7-18b
Modulation distortion	A7	7-19a
Modulation frequency	A7	7-19a
Pulse shape	A7	7-19b
Rf harmonic distortion	A8A1A2 A9A1A1 A9A1A2	7-17
Rf harmonic distortion	A5	7-20a
Spectral purity	A8	7-16
Step attenuator	A2	7-14
Maximum rf level	A11	7-15
Marker frequency	A5	7-20b
Marker amplitude	A5	7-20c

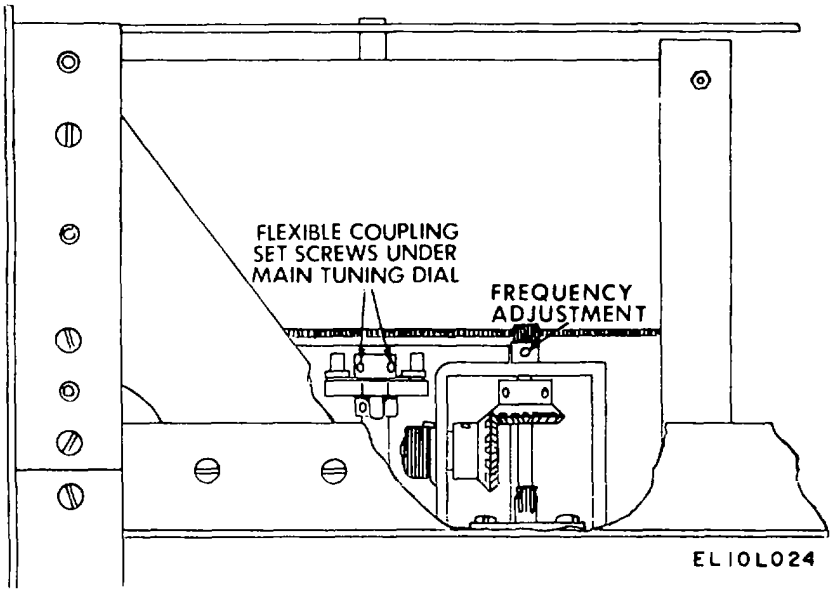


Figure 7-16. Tuning dial adjustment

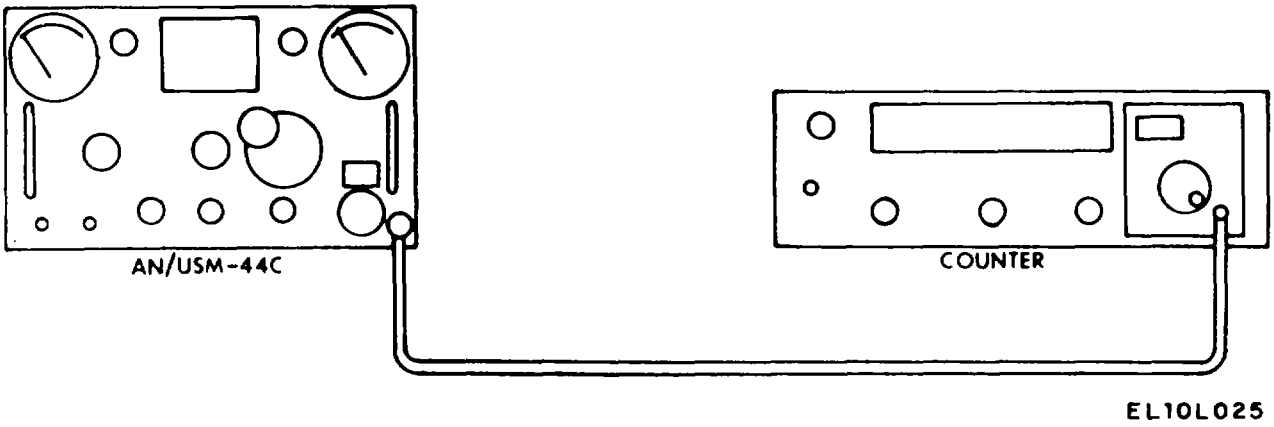


Figure 7-17. Frequency accuracy test setup.

h. Frequency counter should indicate 500 MHz ±1 MHz; if not, remove bottom cover of oscillator Al and adjust frequency to exactly 500 MHz, using Allen wrench (#6 size).

i. Turn tuning crank clockwise to 400 MHz. Frequency counter should indicate 400 MHz ±1 MHz. If it does not, repeat entire procedure.

j. Perform hysteresis switch adjustment as described in paragraph 7-20a.

7-14. Attenuator A2 Alignment

NOTE

The attenuator alignment is used only to mechanically set the dial and cursor assembly. It should be performed only when a mechanical misalignment of the moving portion of the attenuator dial and the cursor is observed.

a. Remove the attenuator assembly from the unit as follows:

(1) Remove two flat head screws (16 fig. 7-18).

(2) Remove panhead screws (8).

(3) Remove attenuator and vernier knobs (1 and 24).

(4) Disconnect output cable from attenuator (17).

(5) Remove attenuator assembly from unit.

b. Loosen the two setscrews (22} on the attenuator dial (19).

c. Rotate the attenuator to the fully clockwise position.

d. Set the attenuator dial so that the + 5 and 0 dbm numerals are aligned with the cardinal points on the dbm scale (4). The face of attenuator dial (19) should be in the same position as the face of the dbm scale (4).

e. If the cursor assembly has been removed, reengage the cursor gear (5) with the vernier gear (2) so that the cursor traverses the entire dbm scale on the dbm scale bracket when the vernier control is rotated.

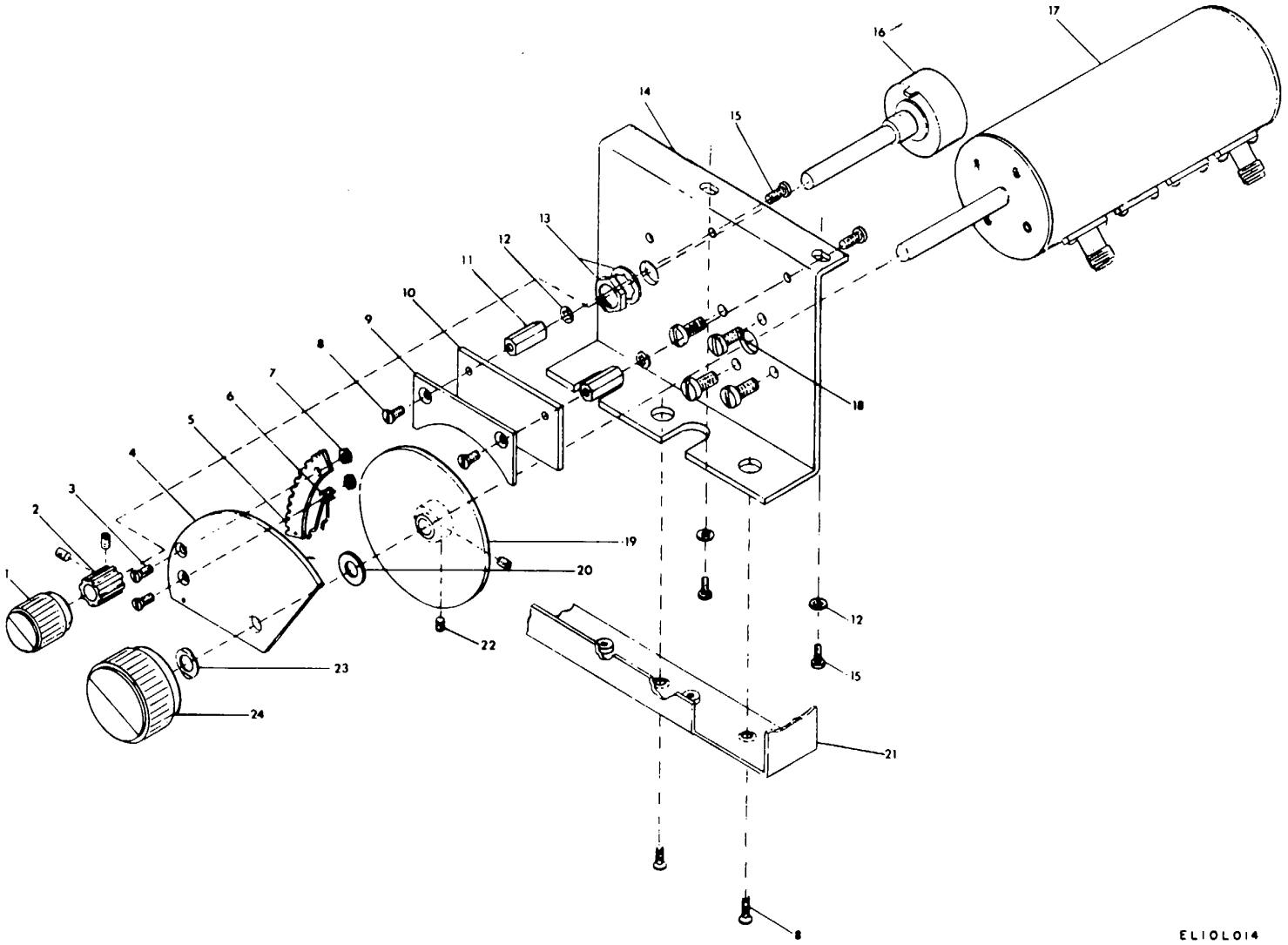


Figure 7-18. Attenuator assembly, exploded view.

Key to figure 7-18:

1	Vernier knob	13A	Lockwasher (p/o item 16)
2	Spur gear	14	Mounting bracket
3	Machine screw, 2-56 x 3/8	15	Machine screw 6-32 x 5/16
4	Cursor	16	Potentiometer RI
5	Vernier gear	17	Attenuator Al
6	Spring	18	Machine screw 8-32 x 3/8
7	Nut, 2-56	19	Dial
8	Screw, 4-40 x 5/16	20	Flat washer
9	Dbm bracket	21	Chassis bracket
10	Light diffuser	22	Setscrew
11	Standoff	23	Washer
12	Lockwasher	24	Attenuator knob
13	Nut (p/o item 16)		

f. Replace the attenuator assembly in the unit, reinstalling flat head screws (15) and panhead screws (8). Reconnect the attenuator cable and reinstall the attenuator and vernier knobs (1 and 24) and tighten setscrews.

7-15. Power Supply All Adjustment

NOTE

During the adjustment of assembly A9, the power supply output voltages may be adjusted to values other than +24 and -24 volts. After the alignment is completed perform the following adjustments.

a. Connect multimeter positive lead to C2 (fig. 7-2) and negative lead to ground.

b. Adjust R4 for exactly +15 volts on multimeter.

c. Connect multimeter positive lead to ground and negative lead to negative end of C3.

d. Adjust R10 forexactly-15 volts on multimeter.

e. Connect positive lead of multimeter to positive end of C5 and negative lead to ground.

f. Adjust R15 for exactly + 24 volts on rnultimeter.

g. Connect positive lead of multimeter to ground and negative lead to negative end of C6.

h. Adjust R21 for exactly --24 volts on multimeter.

i. After maximum power output test of paragraph 7-21 has been performed. recheck all power supply voltages and reset if necessary.

7-16. Rf Divider A8 Adjustment

NOTE

The filter adjustment for A8A1A2 is covered in paragraph 7-17. Performances of other filters may be verified using those procedures. This paragraph covers only the 250 MHz divider adjustment.

a. Set up the equipment as shown in figure 7-19.

b. Set BAND switch to E. Adjust frequency to 250 MHz.

c. Remove divider subassembly A8 cover (fig. FO-6).

d. Adjust R42 (fig. 7-4) for 250 MHz without spurious signals. If a dead zone exists, where it is possible to turn R42 a small amount with no degration in the signal, set the adjustment in the center of the zone.

e. Vary the tuning from 125 to 250 MHz. There should be no spurious signals or discontinuities in the signal. The normal waveform to be shown on the spectrum analyzer is shown in figure 7-13(a).

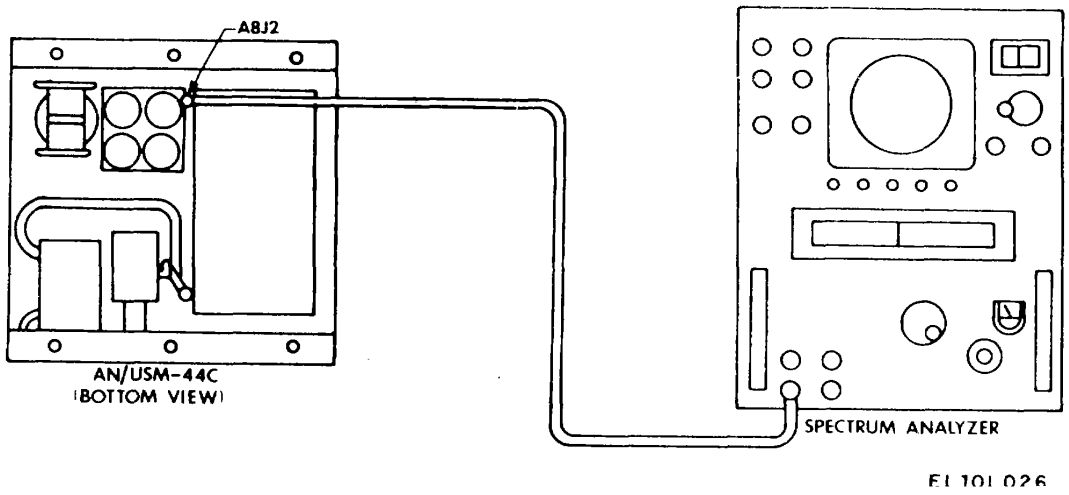


Figure 7-19. Rf divider A8, alignment test setup

7-17. Filter Alignment Test

a. The filter alignment test should be performed only if a filter has been repaired or if the harmonics in the rf output are greater than -35 db. All filters are

tested in the A1 socket of the A9A2 assembly. The test setup for the filters is shown in figure 7-20. The frequencies specified for each filter are listed in table 7-9. Note that there are two operational modes for the filters; one for the low half of the band and one for the high half. To set for the low half, set the FREQUENCY MHz indicator to 500 MHz and set the other controls as follows:
BAND-F
MODE-CW
SET LEVEL-Maximum clockwise.

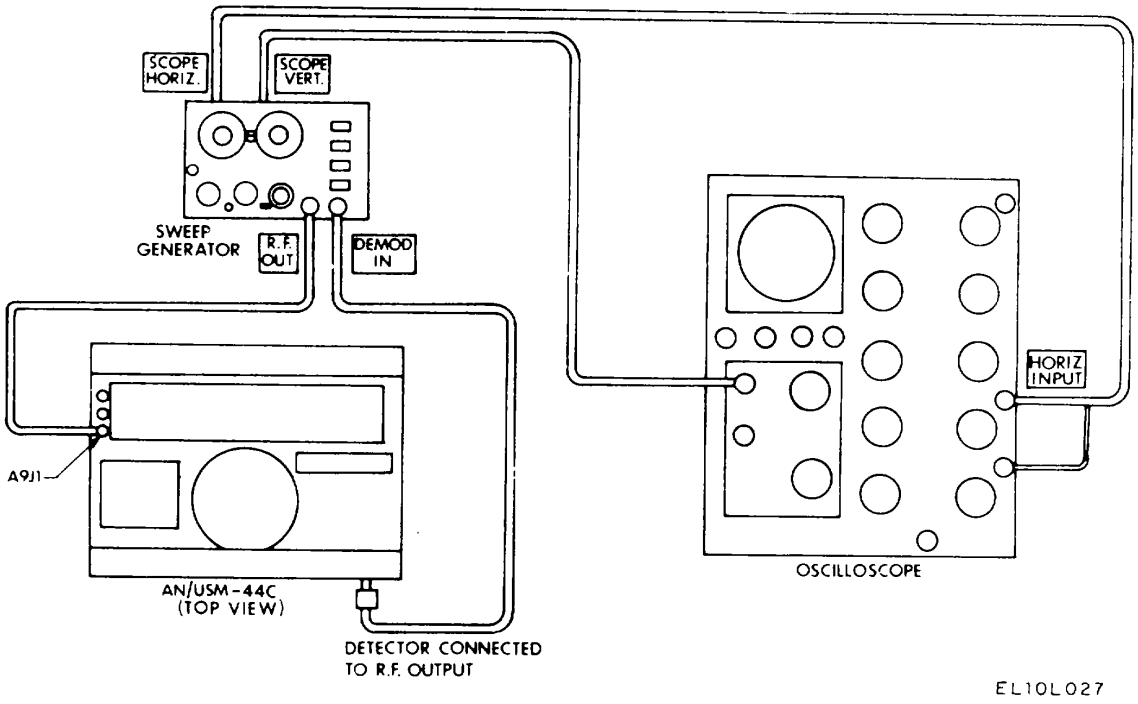


Figure 7-20. Filter Alignment test setup.

Table 7-9. Filter Specifications

Filter designation	Low end response		High end response	
	Passband frequency	Stopband frequency	Passband frequency	Stopband frequency
A1	346	490	500	692
A2	173	244	250	346
A3	84 5	120	125	l69
A4	42	60	62.5	84
A5	21	30	31	42
A6	10.5	15	15.5	21

NOTES

1 All frequencies in MHz

2 Use sweep generator markers to locate frequent

b. To test the filters on the A8 assembly, remove them and install them on position Al of the A9 assembly. To align the A1 and A2 filters, first set the FREQUENCY MHZ indicator to 500 MHz and adjust C1, C4, and C5 to obtain the high end response specified in figure 7-13(d) and table 7-9. Next, set the FREQUENCY MHZ indicator for the scope display. low end response listed in table 7-9. And adjust C2 and C3 to obtain the correct response. Recheck the high end and readjust C1, C4 and C5, if necessary. Do not adjust C2 and C3 at the high end.

c. The A3, A4, A5 and A6 filters may be checked using the procedure in b above, but they are not adjustable. Inset them in the A1 socket and check

their response at the high and low ends. If they are out of tolerance, they should be replaced.

7-18. Meter and Amplitude Regulator Assembly A6 Alignment

a. Output Level Adjustments.

(1) Set up equipment as shown in figure 7-21.

(2) Set BAND switch to B.

(3) Set FREQUENCY MHZ to 30 Mhz.

(4) Set OUTPUT LEVEL for -3 dbm using OUTPUT LEVEL and 10DB VERNIER controls.

(5) Set SET LEVEL control fully clockwise.

(6) Adjust R1 on assembly A6 for +5 dbm indication on wattmeter.

(7) Reset SET LEVEL control +7 dbm indication on OUTPUT LEVEL meter.

(8) Set OUTPUT LEVEL control for +7 dbm.

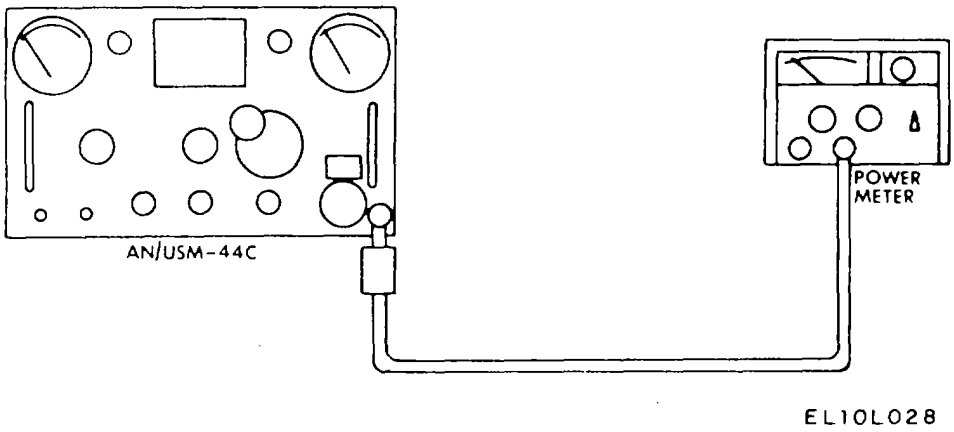


Figure 7-21. Output power adjustment, test setup.

(9) Adjust SET LEVEL control for +7 dbm on wattmeter.

(10) Adjust R3 on assembly A6 for +7 dbm indication on OUTPUT LEVEL meter.

(11) Set 10 dBVERNIERcontrolfor-3 dbm.

(12) Adjust R4 on A6 for -3 dbm indication on wattmeter.

b. Modulation Adjustments.

(1) Position AN/USM-44C controls as follows:

(a) BAND switch to A.

(b) FREQUENCY MHZ dial to 10.

(c) OUTPUT LEVEL fully clockwise.

(d) 10 DB VERNIER fully clockwise.

(e) MODE switch to 400 HZ.

(2) Connect AN/USM-44C RF OUTPUT through an N type to BNC adapter and cable to the vertical input of Oscilloscope AN/USM-281C.

(3) Adjust SET MOD control for a 50 percent modulation indication on the oscilloscope as displayed in figure 7-13(e) (revised). If PERCENT MODULATION meter does not indicate between 40 and 60 percent, adjust R2 on A6 for PERCENT power adjustment, test setup MODULATION meter indication of 50.

(4) Adjust SET MOD control for indications of 30 and 80 percent on the oscilloscope. PERCENT MODULATION meter will indicate 20 to 40 percent for a SET MOD control reading of 30, 70 to 90 percent for a SET MOD control reading of 80.

(5) Repeat (3) and (4) above with MODE switch set to 1 KHZ.

(6) Readjust R2 if necessary.

(7) Set MODE switch to 400 HZ.

(8) Set 10 DB VERNIER counterclockwise and set OUTPUT LEVEL switch to -3 dbm.

(9) Display on the oscilloscope should not vary by more than 1.0 cm from the display obtained in (3) above. If it does, adjust R30 on A6 to obtain the display cited in (3) above.

(10) If R30 is adjusted, repeat steps (1) through (9) above readjusting R2 and R30 if necessary for best possible compromise between the two adjustments and the displays.

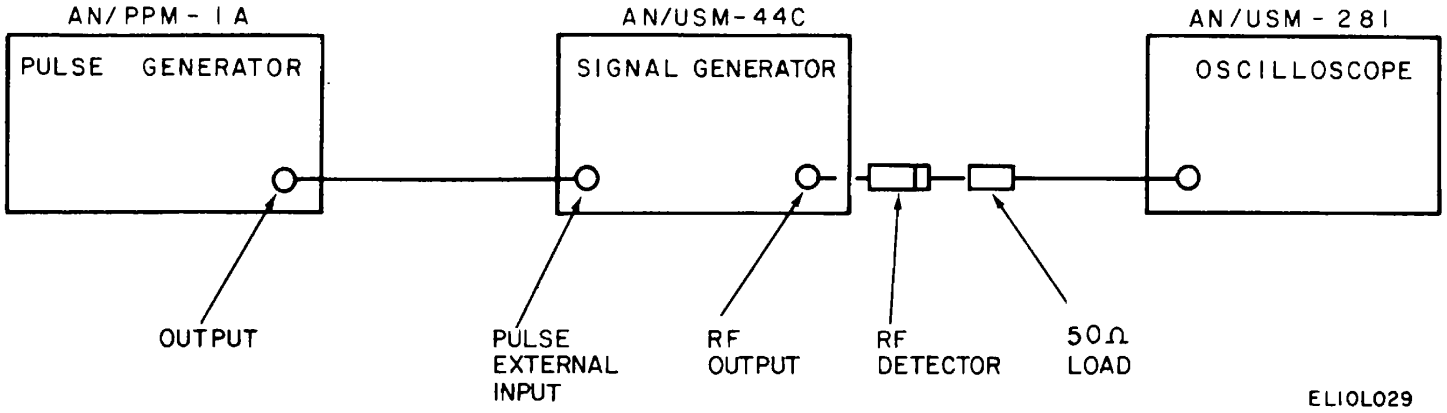


Figure 7-22. Modulation adjustment test setup.

(8) Set oscilloscope for ac coupling. Adjust vertical gain control for two divisions peak to peak.

(9) Set 10 dB VERNIER control ccw and set OUTPUT LEVEL switch for -3dbm.

(10) If oscilloscope display is more than 0.1 division different between (8) and (9) above, adjust R30 on A6 to obtain the same display as in (8) above. If R30 is reset, repeat a(ll1) and (12) above.

(11) Reset AN/USM-44C for +7 dbm output. Reset oscilloscope as in (4) above.

(12) If display is more than ±0.1 division from 2.0 volts, repeat (6) through (10) above.

7-19. Modulation Oscillator A7 Adjustments

a. Modulation Envelope.

(1) Connect equipment as shown in figure 7-22.

(2) Set AN/USM-44C for 30 MHz, +7 dbm output with 50 percent 400 Hz am. modulation.

(3) Do not connect 50-ohm load to detector.

(4) Set oscilloscope display for sinewave centered in screen.

(5) Connect TS-723/U to scope vertical output.

(6) Adjust R2, R3 and R1 on A7 for minimum distortion (1 percent or less).

(7) Connect AN/USM-207A to oscilloscope vertical output.

(8) Adjust R4 on A7 for 400 Hz modulation frequency as indicated onAN/USM-207.

(9) Set MODE switch to 1 kHz am.

(10) Adjust R5 for 1 kHz modulation as indicated on AN/USM-207.

b. Pulse Modulation Adjustment.

(1) Connect 50-ohm load to detector output (fig. 7-22).

(2) Connect AN/PPM-1 to PULSE EXTERNAL INPUTS jack.

(3) Set AN/PPM-1 for +30 volts, 10usecpulseat 1000pps.

(4) Set sweep on oscilloscope for 2 usec/division.

(5) Set SET LEVEL control fully counterclockwise.

(6) Adjust R25 on A7 for minimum transient feedthrough.

7-20. Marker Oscillator Assembly A5 Alignment

a. Hysteresis Switch Adjustment.

(1) Connect positive lead of multimeter to collector of Q7 (fig. 7-14).

(2) Set AN/USM-44C output frequency to 346 MHz.

(3) Adjust R25 on A5 so that voltage changes polarity as output frequency is increased.

b. Marker Frequency Adjustment.

(1) Set MARKERS FREQ switch to 5 MHz and MARKERS VOLUME control fully clockwise.

(2) Connect test equipment as shown in figure 7-23

(3) Adjust C3 on A7 for exactly 5MHz as indicated on the frequency counter.

c. Marker Amplitude Adjustment.

(1) Connect test equipment as shown in figure 7-24

(2) Adjust R8 on A5 for maximum waveform amplitude.

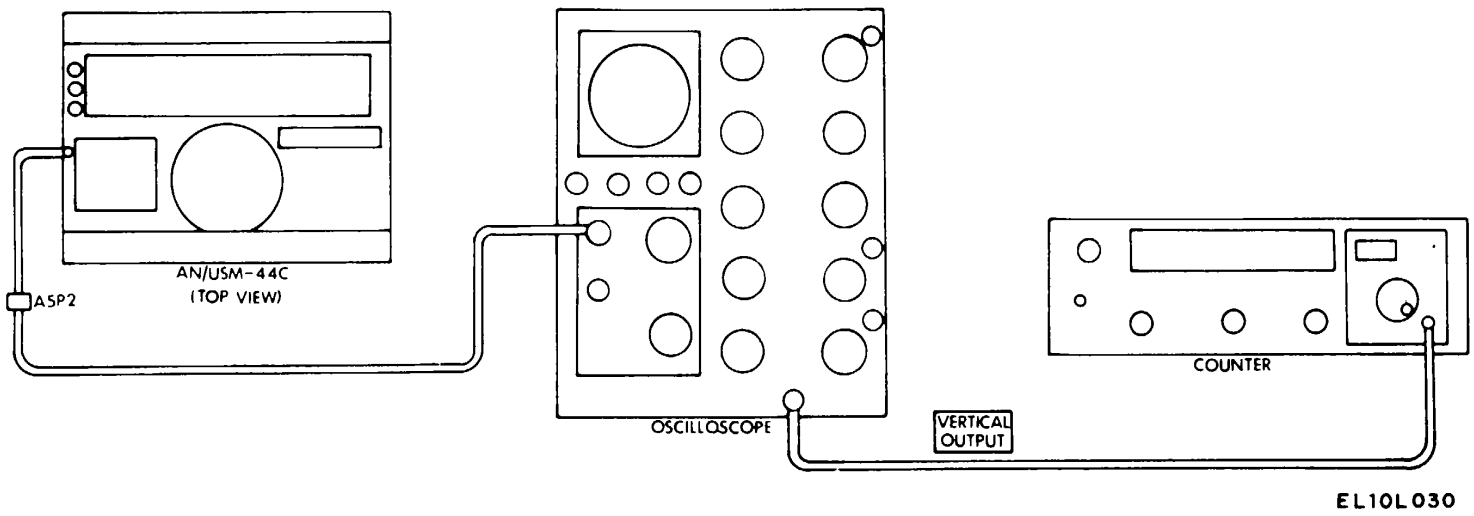


Figure 7-23. Marker frequency adjustment, test setup.

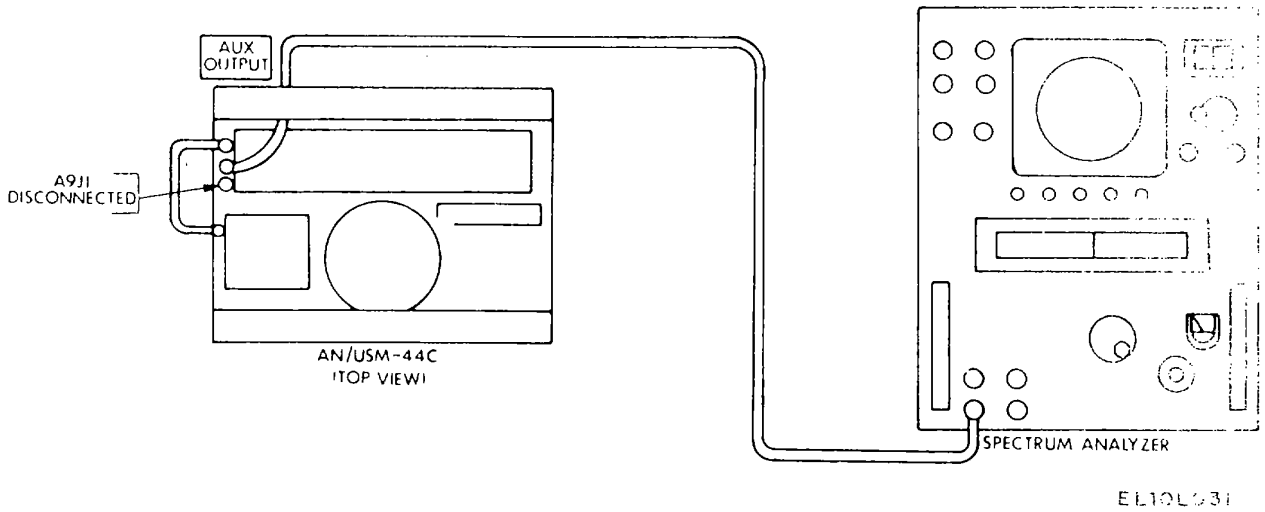


Figure 7-24. Marker amplitude adjustment, test setup.

7-21. Rf Amplifier A9 Alignment.

NOTE
The following procedure should be performed after alignment of All or if A9 has been repaired. This procedure may also be performed if the output rf level is low.

a. Connect test equipment as shown in figure 7-21.

b. Set OUTPUT LEVEL switch -3 dbm with 10 DB VERNIER control fully clockwise. Rotate SET LEVEL control fully clockwise.

c. Set frequency for 500 MHz.

d. Adjust A11R15 (+24 VADJ) and A11R21(--24 V ADJ) for a maximum indication on wattmeter (+5 dbm minimum).

e. Tune continuously through all frequencies. Level should not drop below + 5 dbm. Readjust R15 or R21, if neces-sary.

Section IV. GENERAL SUPPORT TESTING PROCEDURES

7-22. General

This section contains the procedures and tests which will determine if performance of repaired equipment is adequate for return to the users or to issue stock. Test setup diagrams are referenced as required. Test equipment required are listed by name as referenced in appendix C.

7-23. Mechanical Tests and Inspections

a. Remove the top and bottom covers.

b. Perform the tests and inspections listed in table 7-10.

c. Replace the top and bottom covers.

7-24. Electrical Tests

Perform the tests and procedures outlined in table 7-11.

Table 7-10. Mechanical Tests and Inspection

Step No	Control settings		Test procedure	Performance standard
	Test equipment	Equipment under test		
1	N/A	Any position	Inspect all controls and mechanical assemblies for missing screws, bolts and nuts.	Screws nuts, and bolts must l)e tight with none missing
2	N/A	Any position	Rotate all controls and tuning knobs	Controls and knobs must turn smoothly without binding.
3	N/A	Any position	Check seating of assemblies and connectors. Look for damaged parts.	All assemblies must be firmly seated Connectors must be well connected

Table 7-11. Electrical Tests

Steps No	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	FREQUENCY-500 MHz DISPERSION-WIDE	MODE-CW SET LEVEL- +7 dbm OUTPUT LEVEL- + 7 dbm FREQUENCY MHz-500 BAND--F	a Refer to figure 7-17 Turn through each band and observe output frequency on analyzer	a Frequency shall be 500 MHz. Spurious signals of output shall be more than 35 db below output.
2	RANGE-- +10 dbm	MODE-CW SET LEVEL- +7 dbm OUTPUT LEVEL- +7 dbm OUTPUT LEVEL- -3 dbm	a Refer to figure 7-21 Tune generator through each band and observe output level on wattmeter. b Same as a above	a Amplitude shall remain between +6 and +8 dbm. b Amplitude shall remain between -4 and -2 dbm.
3	Per figure 7-22	BAND - A FREQ MHZ - 10 OUTPUT LEVEL fully cw 10 DB VERNIER fully cw MODE - 400 SET MOD - 30	Set vertical gain of oscilloscope for dc shift of two divisions when scope is switched from ac to dc coupling.	Refer to fig 7-13e for modulation envelope display.
4	Same as step 3	MODE--1000 HZ AM All others--same as step 3.	Same as step 3	Same as step 3.
5	Same as step 3 PULSE GENERATOR: WIDTH--10 usec AMPLITUDE between 10 and 50V -p-p RATE - 1000 pps OSCILLOSCOPE: HORIZONTAL- 10 usec per div.	MODE-PULSE All others-same as step 3	Connect pulse generator to AN/USM-44C PULSE EXTERNAL INPUTS jack	Pulse is displayed on oscilloscope (fig 7-13f) Rise and fall times shall be 2 usec or less Width-10 usec $\pm$1 usec .
6		BAND-F All others-same as step 1	Tune to 250 MHz, 300 MHz, 400 MHz and 500 MHz Record reading of counter (fig 7-17). Repeat tuning process as above for the remaining frequency bands.	Counter indicates within H% of indicated setting. Counter indicates as above.

APPENDIX A

REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6625-237-14	Operator, Organizational, Direct Support and General Support Maintenance Manual:Generator, Pulse AN/PPM-1 (NSN 6625-00-503-0661), and AN/ PPM-1A, (NSN 6625-00-503-3621).
TM 11-6625-359-10	Operator's Manual: Spectrum Analyzer Set AN/ UPM-84 (Polaroid).
TM 11-6625-359-12-1	Operator's and Organizational Maintenance Manual, Including Repair Parts and Special Tools Lists: Spectrum Analyzer AN/UPM-84A.
TM 11-6625-433-15	Organizational, Direct Support, General Support and Depot Maintenance Manual, Including Repair Parts and Special Tools Lists: Wattmeters AN/ URM-98 and AN/URM-98A (NSN 6625-00-566-4990).
TM 11-6625-700-14-1	Operator, Organizational, Direct Support and General Support Maintenance Manual, Including Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Digital Readout Electronic Counter AN/USM-207A (NSN 6625-00-044-3228).
TM 11-6625-1559-12	Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Generator, Signal Sweep AN/USM-203 (NSN 6625-00935-0145).
TM 11-6625-1703-15	Operator, Organizational, DS, GS and Depot Maintenance Manual Including Repair Parts and Special Tools List: Oscilloscope AN/USM-281A (NSN 6625-00-228-2201).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations for the AN/USM-44C 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.

C-2 Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect To determine the serviceability of an item by comparing 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, preserve, drain, paint, or to replenish fuel/lubricants/hydraulic fluids or compressed air supplies.

d. Adjust 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 equipment used in precision measurement Consists of the comparison 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/system.

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

i. 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/assembly, end item or system This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul That periodic maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., 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 material 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 equipment/components.

C-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 "worktime" 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 varies at different maintenance categories, appropriate "worktime" figures will be shown for each category The number of task hours specified by the "worktime" 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.

C-4 Tool & Test Equipment Requirements (Table 1)

a. Tools or Test 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 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.

SECTION II. MAINTENANCE ALLOCATION CHART

FOR

SIGNAL GENERATOR, AN/USM-44C

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOL/ EQUIPMENT
00	Generator, Signal AN/USM-44C	Test				0.8		1 thru 11
		Adjust				0.3		1 thru 12
		Repair[2]				0.6		12
		Overhaul				1.5		1 thru 12
		Rebuild					2.0	3 thru 14
01	Generator, Signal TS-510C/U	Inspect		0.2				
		Service		0.5				12
		Repair[1]		0.2				
02	Cable Assemblies	Inspect		0.1				
		Test		0.3				
		Replace		0.3				
		Repair				0.2		
03	Fuse Holder	Inspect		0.2				
		Test		0.3				
		Replace		0.1				
		Repair[3]		0.4				

(1) Replace fuses, knobs
(2) Replace defective PC boards and piece parts.
(3) Replace fuse.

TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS
AND
SIGNAL GENERATOR AN/USM-44C

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	HD	ANALYZER SPECTRUM AN/UPM-84	6625-00-557-8262	
2	HD	ANALYZER SPECTRUM T8-723/U	6625-00-668-9418	
3	HD	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207A	6625-00-911-6368	
4	HD	GENERATOR, PULSE AN/PPM-1	6625-00-504-9603	
5	HD	GENERATOR, SWEEP SIGNAL AN/USM-203A	6625-00-086-7165	
6	HD	MULTIMETER TS-352B/U	6625-00-553-0142	
7	HD	OSCILLOSCOPE AN/USM-281A	6625-00-053-3112	
8	HD	TEST SET, TRANSISTOR TS-1836C/U	6625-00-893-2628	
9	HD	WATTMETER AN USM-98	6625-00-966-1990	
10	HD	SEMICONDUCTOR DEVICE, DIODE MX-3671/U		
11	HD	50 OHM TERMINATION HP 11593A		
12	HD	TOOL KIT, ELECTRONIC EQUIPMENT TK 100/U		
13	HD	TOOLS AND EQUIPMENT AVAILABLE TO THE ORGANIZATIONAL REPAIR TECHNICIAN BECAUSE OF ASSIGNED MISSION.	5180-00-605-0079	

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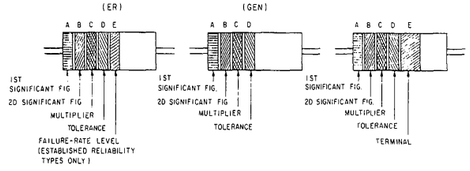
Armies (2)
Corps (2)
HISA (Ft Monmouth) (33)
Svc Colleges (1)
USASIGS (56)
USAADS (2)
USAFAS (2)
USAARMS 12)
USAIS (21
USAEU (2)
USAICS (31
YM O (1)
USARMIS (11
Instl (2) eat
Fort Gilleam (10)
Fort Gordon (10
Fort Huachuca (10)
Fort Carson (6}
Ft Richardson (ECOMI (2)
LBAD (141
SAAD (SO)
TOAD (14)
SHAD S9)
Sig FLDMS (1)
USAERDAA (1
USAERDAW 11)

NG: None
USAR: None
For explanation of abbreviations used see AR 10-40.

* U.S. GOVERNMENT PRINTING OFFICE - 1990 0 - 276-913



COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS

TABLE I
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	*TERM
BLACK	0	BLACK	0	BLACK	1			BROWN	M=1.0	
BROWN	1	BROWN	1	BROWN	10			RED	P=0.1	
RED	2	RED	2	RED	100			ORANGE	R=0.01	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S=0.001	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP. TYPE ONLY)	WHITE		SOLDERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT AVAILABLE FOR ESTABLISHED RELIABILITY)			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.)

BAND D — THE RESISTANCE TOLERANCE

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL (PERCENT FAILURE PER 1,000 HOURS) ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

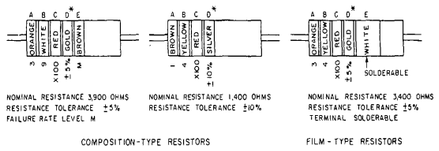
RESISTANCES IDENTIFIED BY NUMERICAL AND LETTERS (THESE ARE NOT COLOR CODED)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE.

2R7 = 2.7 OHMS 10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

EXAMPLES OF COLOR CODING



NOMINAL RESISTANCE 3,900 OHMS
RESISTANCE TOLERANCE ±5%
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 1,400 OHMS
RESISTANCE TOLERANCE ±10%

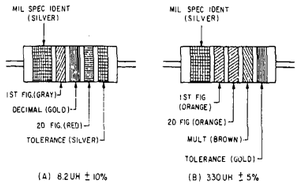
NOMINAL RESISTANCE 3,400 OHMS
RESISTANCE TOLERANCE ±5%
TERMINAL SOLDERABLE

COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS.



(A) 8.2 UH ± 10%

(B) 330 UH ± 5%

COLOR CODING FOR TUBULAR ENCAPSULATED R.F CHOKES. AT A, AN EXAMPLE OF THE CODING FOR AN 8.2 UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED.

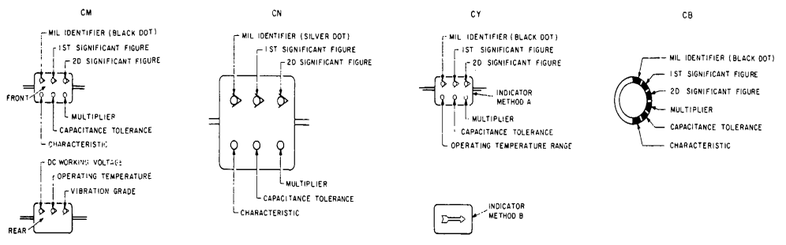
TABLE 2
COLOR CODING FOR TUBULAR ENCAPSULATED R.F CHOKES.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB.



MICA-DIELECTRIC

PAPER-DIELECTRIC

GLASS-DIELECTRIC, GLASS CASE

MICA, BUTTON TYPE

TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL ID	1ST SIG FIG.	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE			CHARACTERISTIC			3DC WORKING VOLTAGE	OPERATING TEMP RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CB	CM	CY, CM	CM
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A				-55°C TO +70°C	10-55 Hz
BROWN		1	1	10					B	E	B		-55°C TO +85°C	
RED		2	2	100	±2%		±2%	±2%	C					
ORANGE		3	3	1,000		±30%			D		D	300		
YELLOW		4	4	10,000					E				-55°C TO +125°C	10-2,000 Hz
GREEN		5	5		±5%				F			500		
BLUE		6	6										-55°C TO +150°C	
PURPLE (VIOLET)		7	7											
GRAY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN			0.01	±10%	±10%	±10%	±10%						

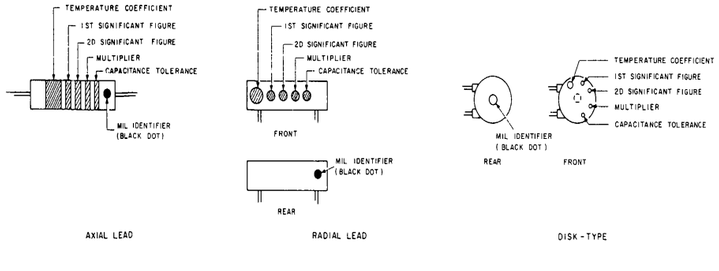


TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC

COLOR	TEMPERATURE COEFFICIENT[4]	1ST SIG FIG.	2D SIG FIG.	MULTIPLIER[1]	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		±2.0 UUF	CC
BROWN	−30	1	1	10	±1%		
RED	−80	2	2	100	±2%	±0.25 UUF	
ORANGE	−150	3	3	1,000			
YELLOW	−220	4	4				
GREEN	−330	5	5		±5%	±0.5 UUF	
BLUE	−470	6	6				
PURPLE (VIOLET)	−750	7	7				
GRAY		8	8	0.01*			
WHITE		9	9	0.1*	±10%		
GOLD	+100			0.1		±1.0 UUF	
SILVER				0.01			

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF.
2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS: MIL-C-5, MIL-C-25D, MIL-C-11272B, AND MIL-C-10950C RESPECTIVELY.
3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.
4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.

* OPTIONAL CODING WHERE METALLIC PIGMENTS ARE UNDESIRABLE.

C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS.

ESC-FM 913-73

Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.

Figure FO-1. Color code markings for MIL STD resistors, inductors, and capacitors.

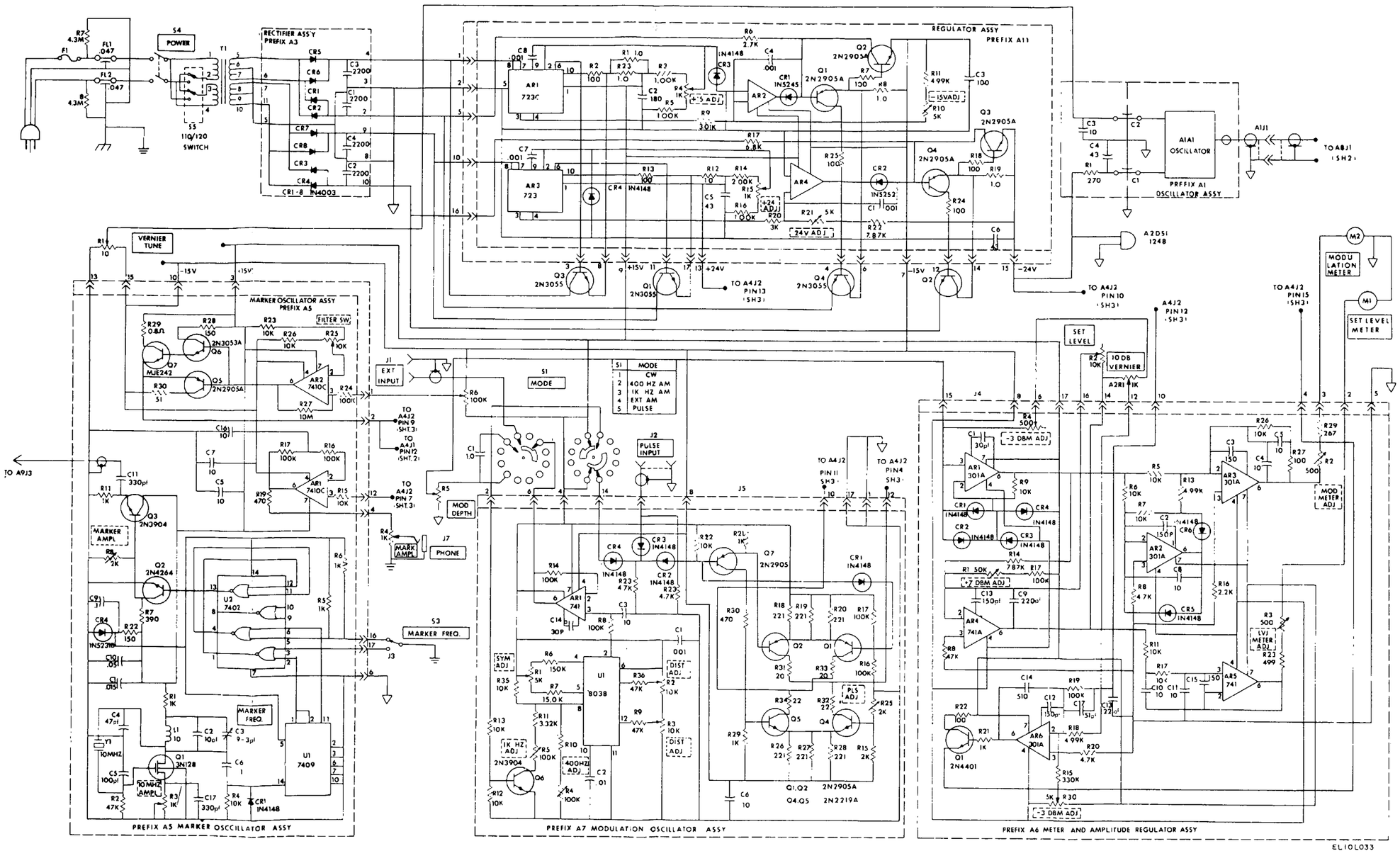
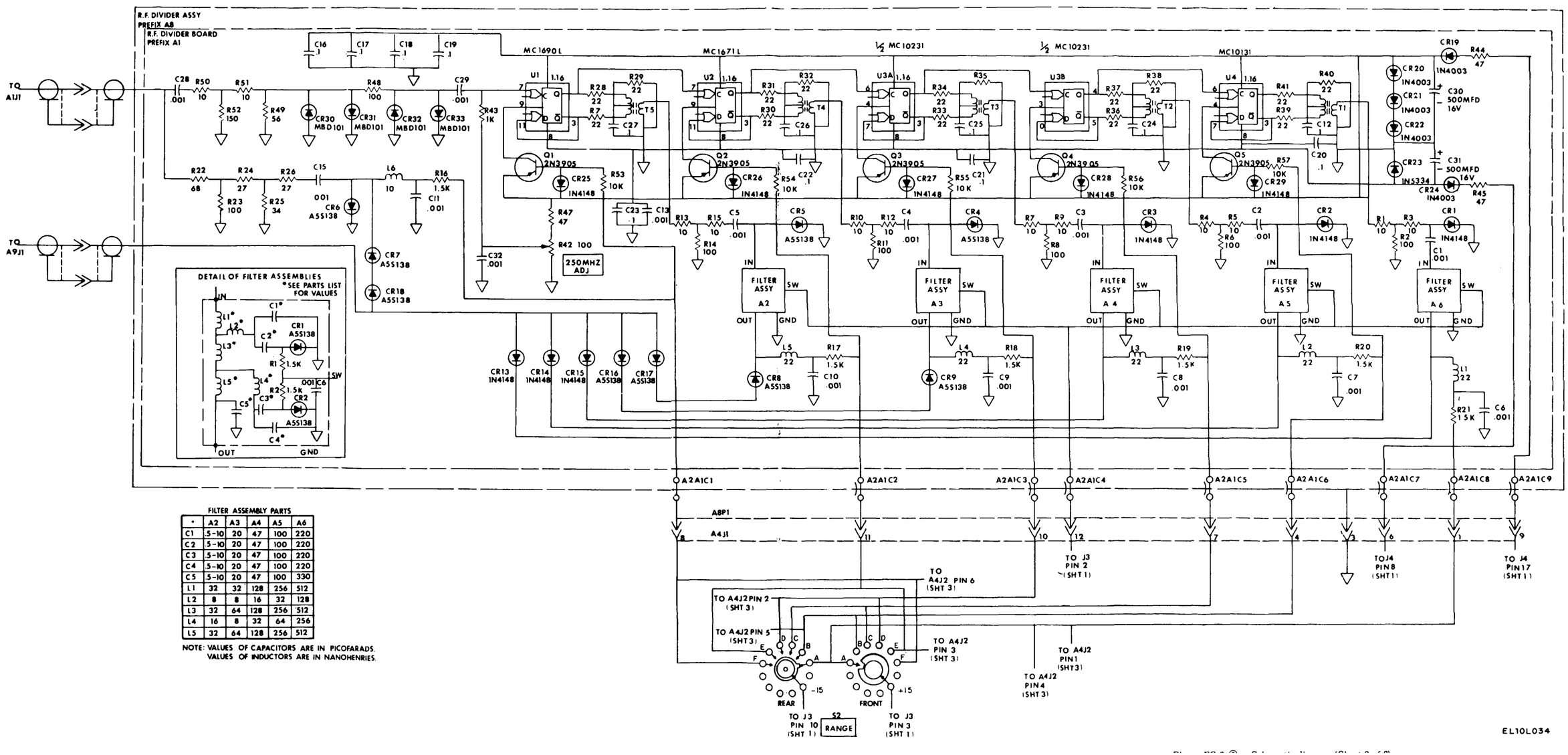


Figure FO-2 (1). Schematic diagram (Sheet 1 of 3).

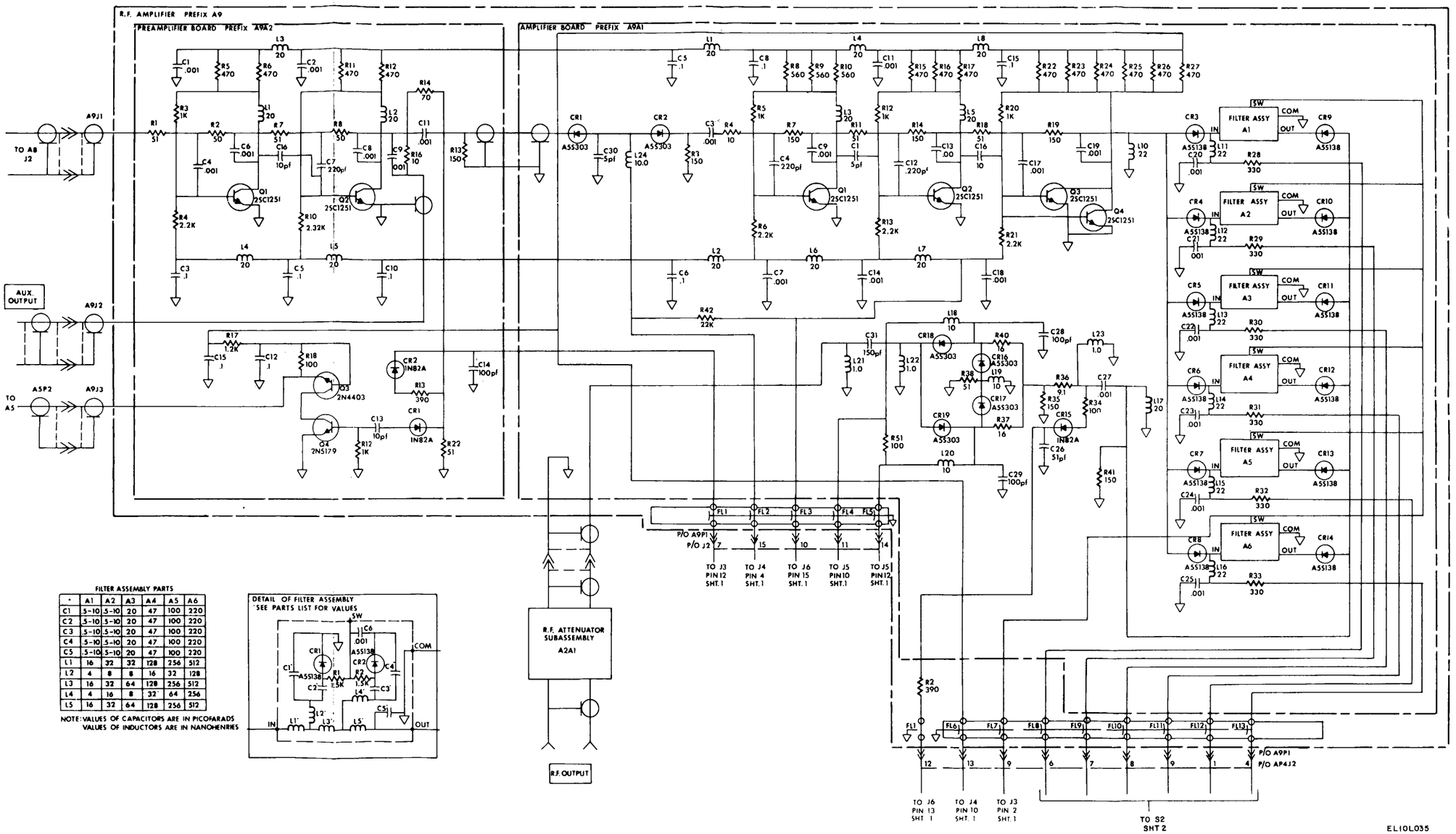


FILTER ASSEMBLY PARTS

*	A2	A3	A4	A5	A6
C1	.5-10	20	47	100	220
C2	.5-10	20	47	100	220
C3	.5-10	20	47	100	220
C4	.5-10	20	47	100	220
C5	.5-10	20	47	100	330
L1	32	32	128	256	512
L2	8	8	16	32	128
L3	32	64	128	256	512
L4	16	8	32	64	256
L5	32	64	128	256	512

NOTE: VALUES OF CAPACITORS ARE IN PICOFARADS.
VALUES OF INDUCTORS ARE IN NANOHENRIES.

Figure FO-2 (2). Schematic diagram (sheet 2 of 3).



FILTER ASSEMBLY PARTS

·	A1	A2	A3	A4	A5	A6
C1	5-10	5-10	20	47	100	220
C2	5-10	5-10	20	47	100	220
C3	5-10	5-10	20	47	100	220
C4	5-10	5-10	20	47	100	220
C5	5-10	5-10	20	47	100	220
L1	16	32	32	128	256	512
L2	4	8	8	16	32	128
L3	16	32	64	128	256	512
L4	4	16	8	32	64	256
L5	16	32	64	128	256	512

NOTE: VALUES OF CAPACITORS ARE IN PICOFARADS
VALUES OF INDUCTORS ARE IN NANOHENRIES

Figure FO-2 (3). Schematic diagram (Sheet 3 of 3).

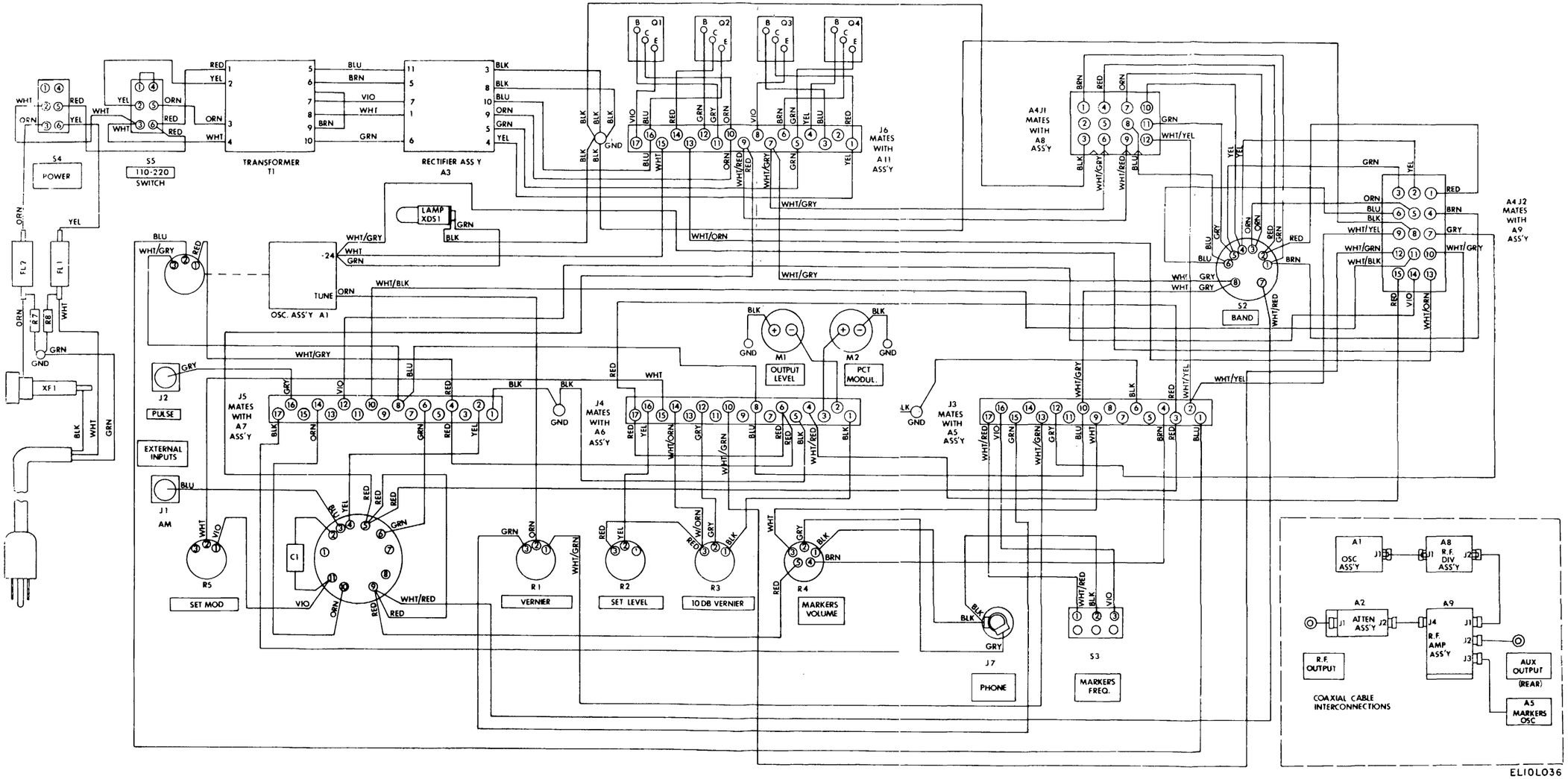


Figure FO-3. Overall wiring diagram.

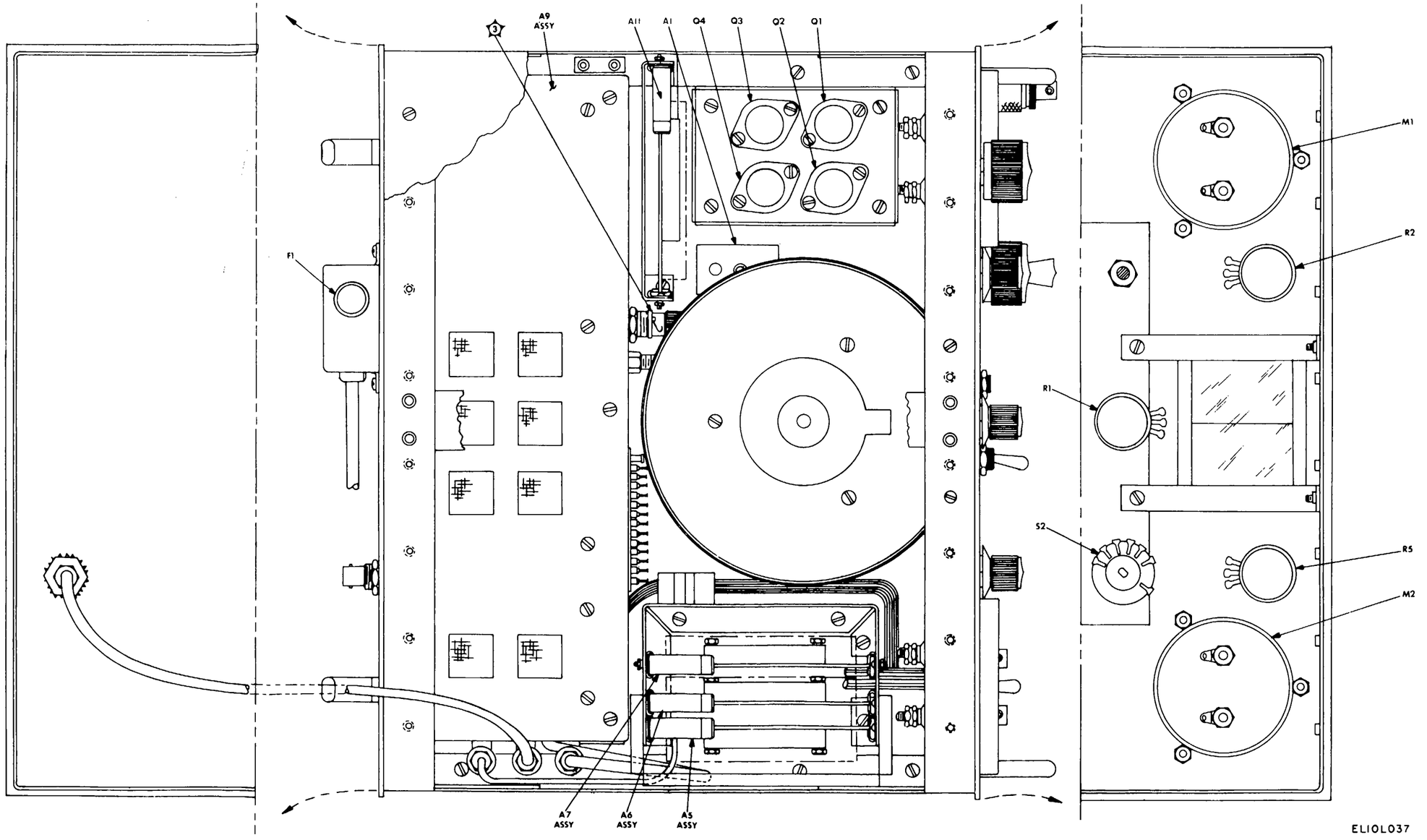


Figure FO-4 (1). Main chassis parts location (sheet 1 of 2).

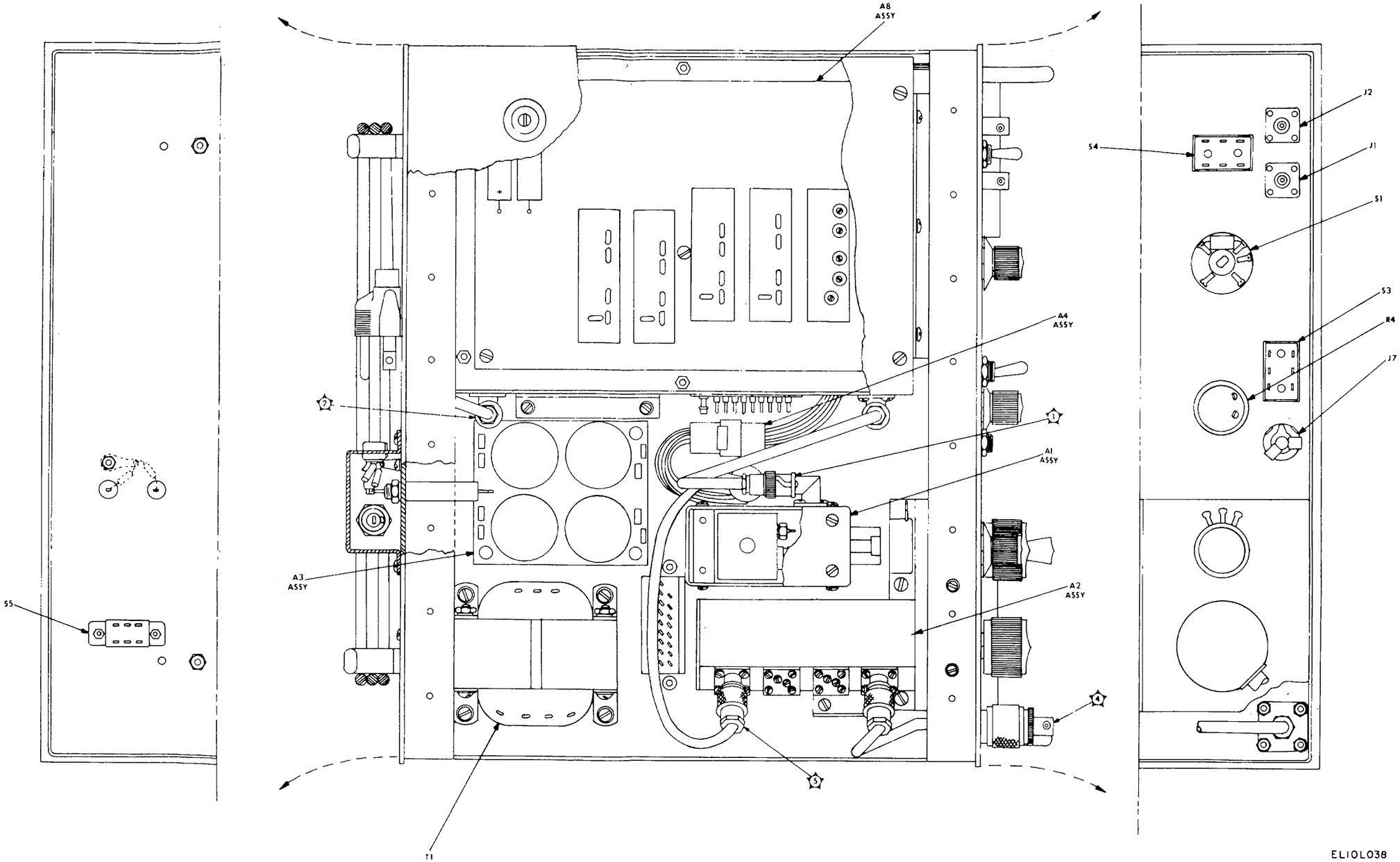


Figure FO-4 (2). Main chassis parts location (Sheet 2 of 2).

INDEX

1	SCREW, MACHINE 4-40 X 5/16
2	COUPLING
3	GEAR SPUR
4	COLLAR
5	MITER GEAR
6	SHAFT
7	MITER GEAR
8	SCREW, MACHINE 6-32 X 3/8
9	COVER ASSEMBLY
10	BRACKET ANGLE
11	OSCILLATOR
12	CONNECTOR, PLUG
13	SCREW, MACHINE 4-40 X 5/16
14	R.F. SHIELD ASSEMBLY
15	SCREW, MACHINE 6/20 X 1/4
16	CAP, FEED THRU, C1, C2
17	LOCK WASHER, 5/16
18	LIMIT WASHER
19	BOX (OSCILLATOR)
20	FOOT
21	BRACKET SHAFT
22	COLLAR
23	STOP PLATE
24	STANDOFF
25	CONNECTOR, RCPT ELEC
26	RESISTOR, R1
27	CAP, C3
28	CAP, C4
29	WASHER
30	WASHER LOCK, #6
31	WASHER LOCK #4
32	NUT PLN HEX, #6-32
33	LUG
34	SCREW, MACHINE 4-40 X 1/4

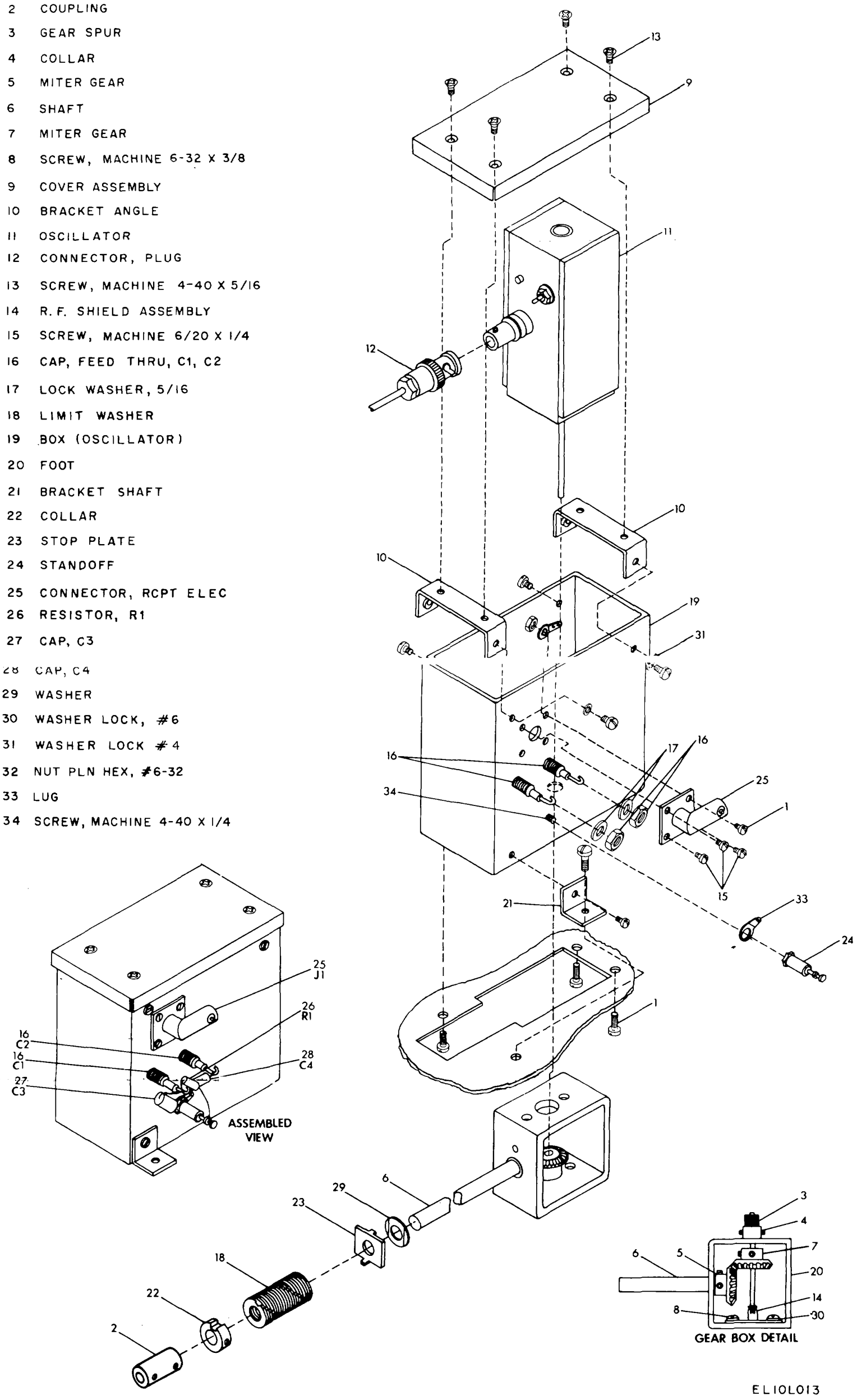
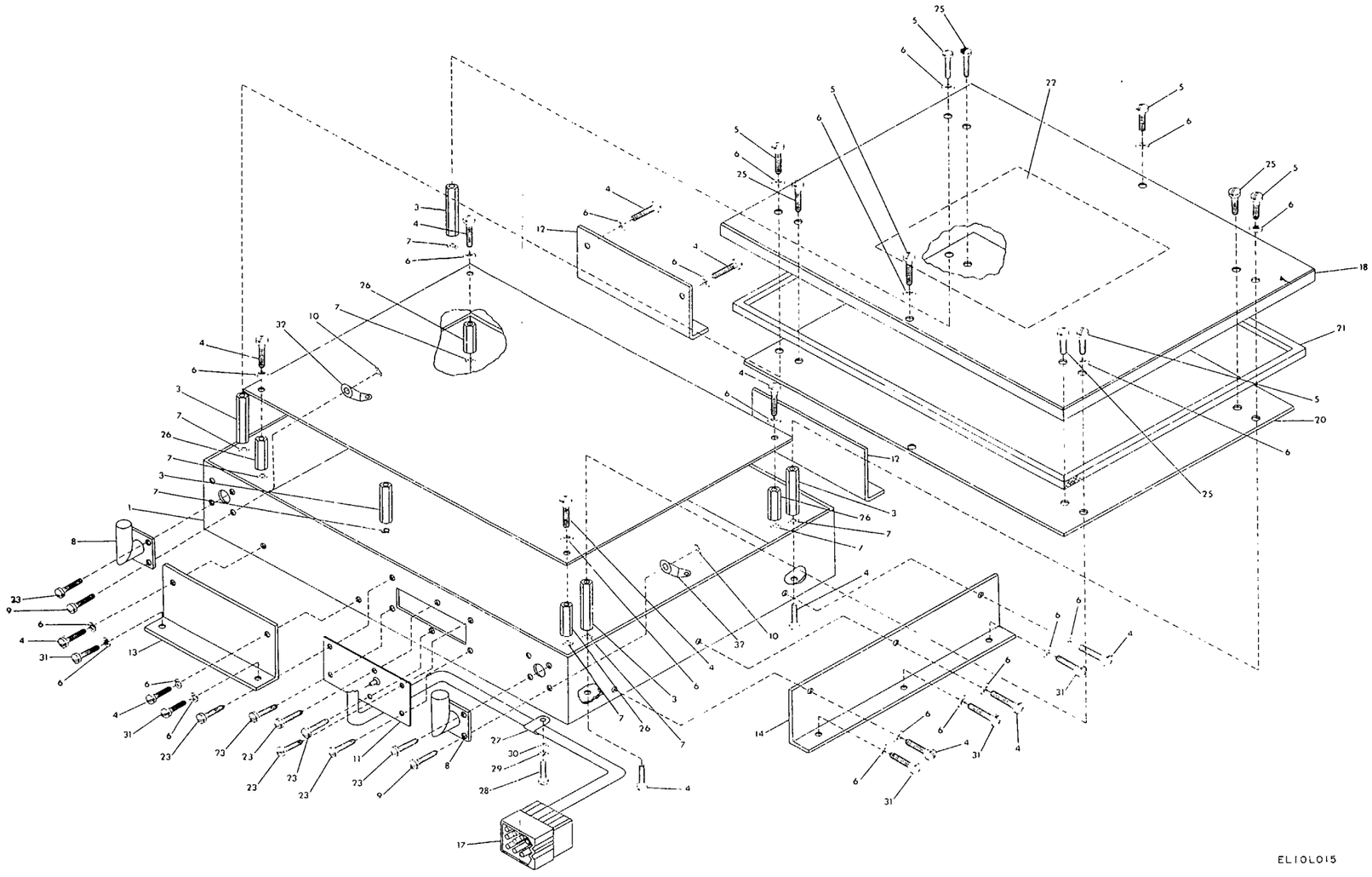


Figure FO-5. Oscillator assembly A1, parts location.

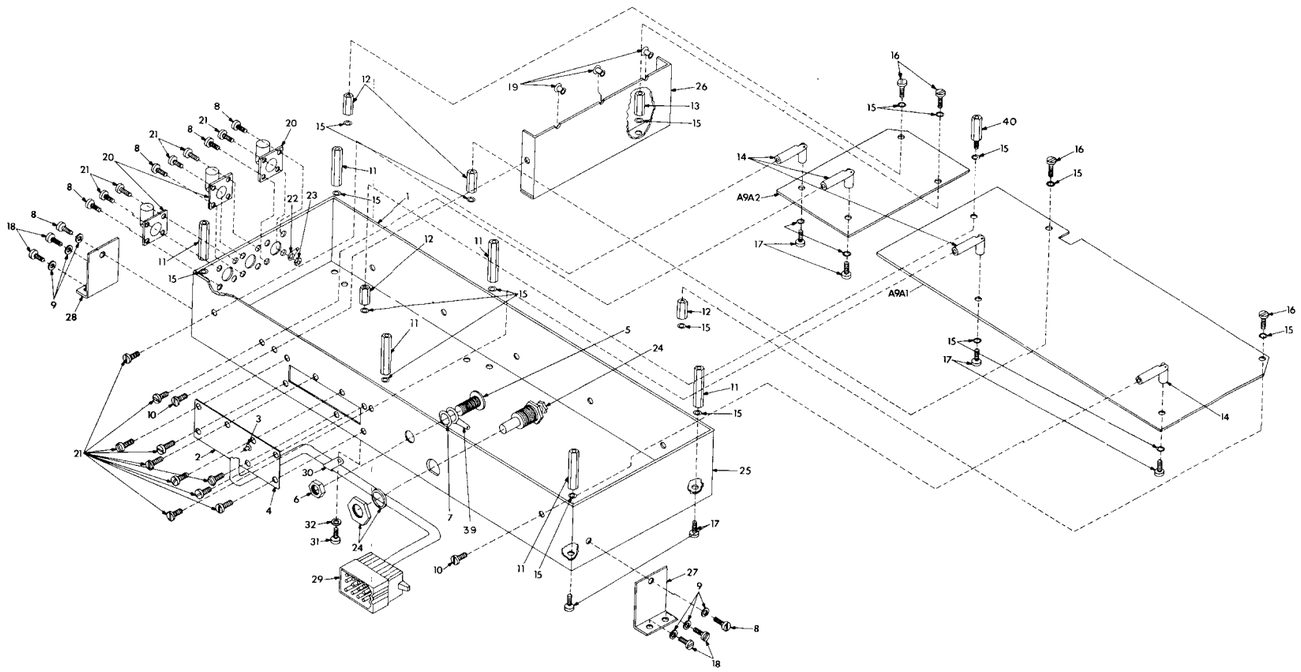
Figure FO-5. Oscillator assembly A1, parts location.

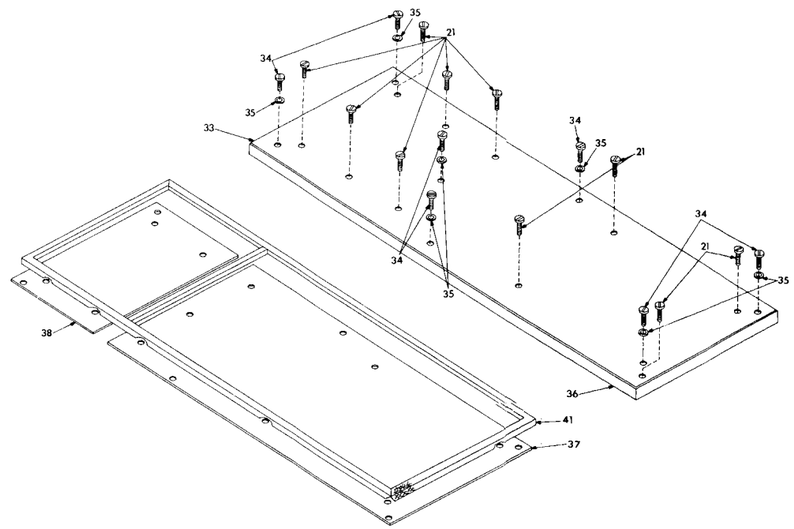


1 Box assembly
2 Capacitor plate assembly
3 Standoff
4 Screw, machine 6-32 x 5/16
5 Screw, Machine 6-32 x 3/8
6 Washer, lock #6
7 Washer, lock #6
8 Connector
9 Screw, machine 4-40 x 3/8
10 Nut, plain hex 6-32
11 Plate
12 Bracket, angle
13 Bracket, angle
14 Bracket, angle
15 Bracket, angle
16 Box shield
17 Plug
18 Cover assembly
19 Cover
20 Retainer
21 Shield
22 Screen
23 Screw, machine 6-20 x ¼
24 Circuit card assembly
25 Screw, machine 6-20 x ¼
26 Standoff
27 Tiewrap
28 Screw, machine 4-40 x ½
29 Washer, lock #4
30 Washer, flat #6
31 Screw, machine #6, captive
32 Lug

Figure FO-6. Rf divider assembly A8, parts location.

TM 11-6625-2697-14





1 Box assembly
2 Cap, plate assembly
3 Filter
4 Plate
5 Feed thru
6 Nut, 5-16 x 24
7 Lock washer, 5/16
8 Machine screw, 4-40 x 3/8
9 Lock washer, #4
10 Machine screw, 6-32 x 5/16
11 Standoff
12 Standoff
13 Standoff
14 Standoff
15 Lock washer, #6
16 Machine screw, 6-32 x ¼
17 Machine screw, 4-40 x 1
18 Machine screw, 4-40 x 5/16
19 Grommet
20 Connector, recepticle
21 Machine screw
22 Lug
23 Nut
24 Connector, recepticle elect
25 Box
26 Partition
27 Bracket
28 Bracket
29 Plug
30 Ty-wrap
31 Machine screw
32 Flat washer
33 Cover assembly
34 Machine screw
35 Lock washer
36 Cover
37 Retainer
38 Retainer
39 Lug
40 Standoff
41 Shield

Figure FO-7. Rf amplifier assembly A9, exploded view.

Figure FO-7. Rf amplifier assembly A9, exploded view.

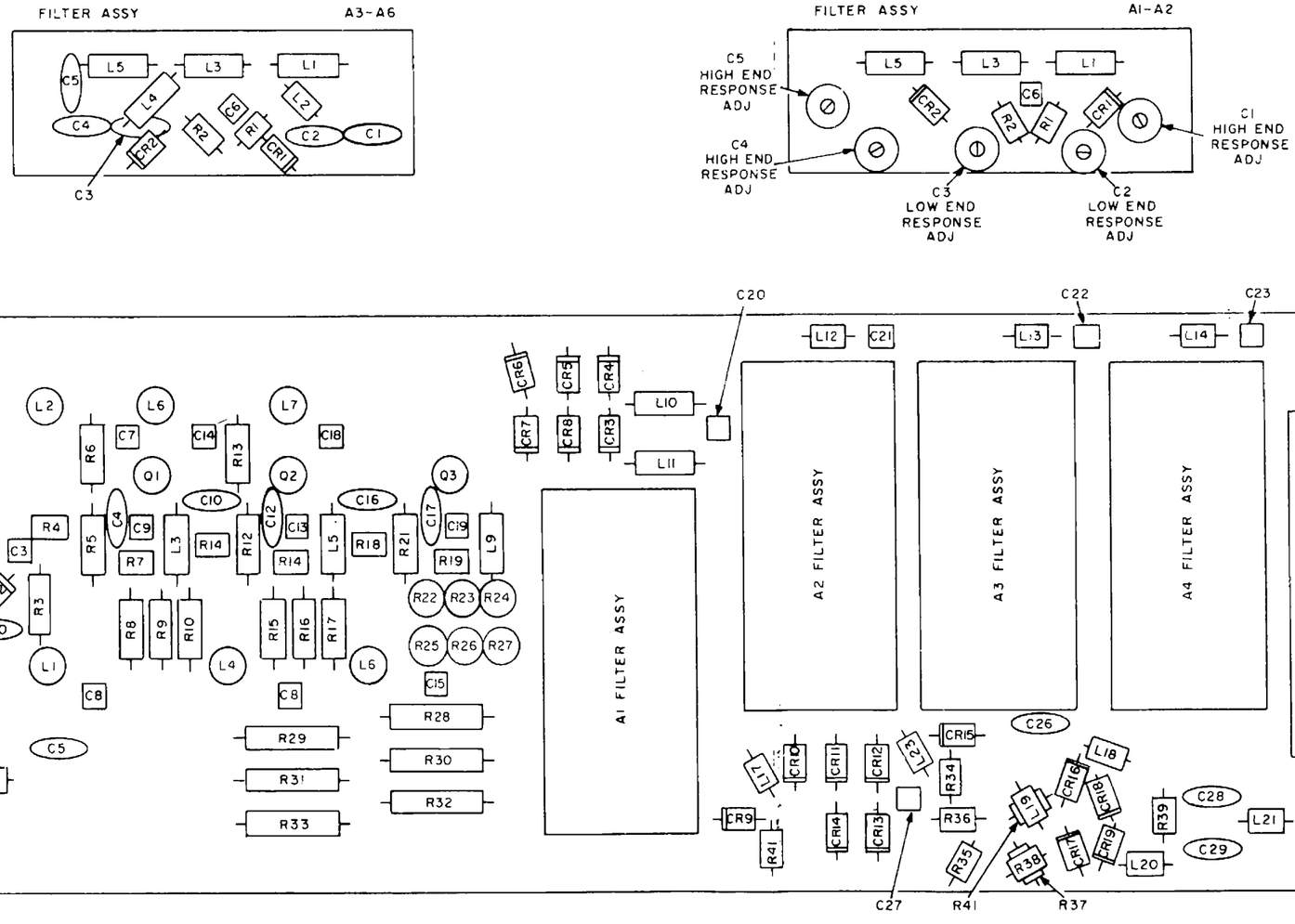


Figure FO-8. Circuit board A9A1, parts location.

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