ARMY TM 11-5895-1090-34
AIR FORCE TO 31R2-2TSC-152

TECHNICAL MANUAL

DIRECT SUPPORT AND GENERAL SUPPORT

MAINTENANCE MANUAL

AMPLIFIER-MIXER AM-6704/TSC

(NSN 5895-01-083-0726)

DEPARTMENTS OF THE ARMY, AND THE AIR FORCE

12 APRIL 1983

WARNING

- High voltage that can cause death or serious injury is present in the amplifier-mixer unit. High voltage from the 115-volt ac primary power source is normally always present at the ac POWER circuit breaker, CBI, when the power cable is connected to ac input connector J6 on amplifier-mixer unit. Always disconnect the power cable before working on the amplifier- mixer unit.

- Lethal voltages are present in the power supply when power is applied to the 115-volt ac input connector, J6. Be extremely careful when working on the amplifier-mixer; otherwise, serious injury or death may result. Adequate ventilation should be provided while using TRICHLOROTRI-FLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUORO- ETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

CAUTION

- Do not apply heat at a pad or through hole for longer than 8 seconds.

TECHNICAL MANUAL NO. 11-5895-1090-34
TECHNICAL ORDER NO. 31R2-2TSC-152

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

WASHINGTON, DC, *12 April 1983*

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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, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DR- SEL-NIE-MP, Fort Monmouth, NJ 07703.
For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, section VI, T. 0. 00-5-1. Forward direct to prime ALCIMST. In either case, a reply will be furnished direct to you.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual contains maintenance instructions for direct support and general support maintenance personnel. These instructions apply to Amplifier- Mixer AM-6704/TSC (hereinafter referred to as amplifier-mixer) shown in figure 1-1. Maintenance procedures cover replacement of front panel and chassis mounted components and test,troubleshooting, and repair of super-high frequency (shf) combiner assembly A1, transient suppressor assembly A4, and rf low power alarm assembly A5. These procedures supplement the maintenance functions contained in the lower level manuals. The manual also includes a list of references in appendix A. A maintenance allocation chart is provided in TM 11-5895-846-14.

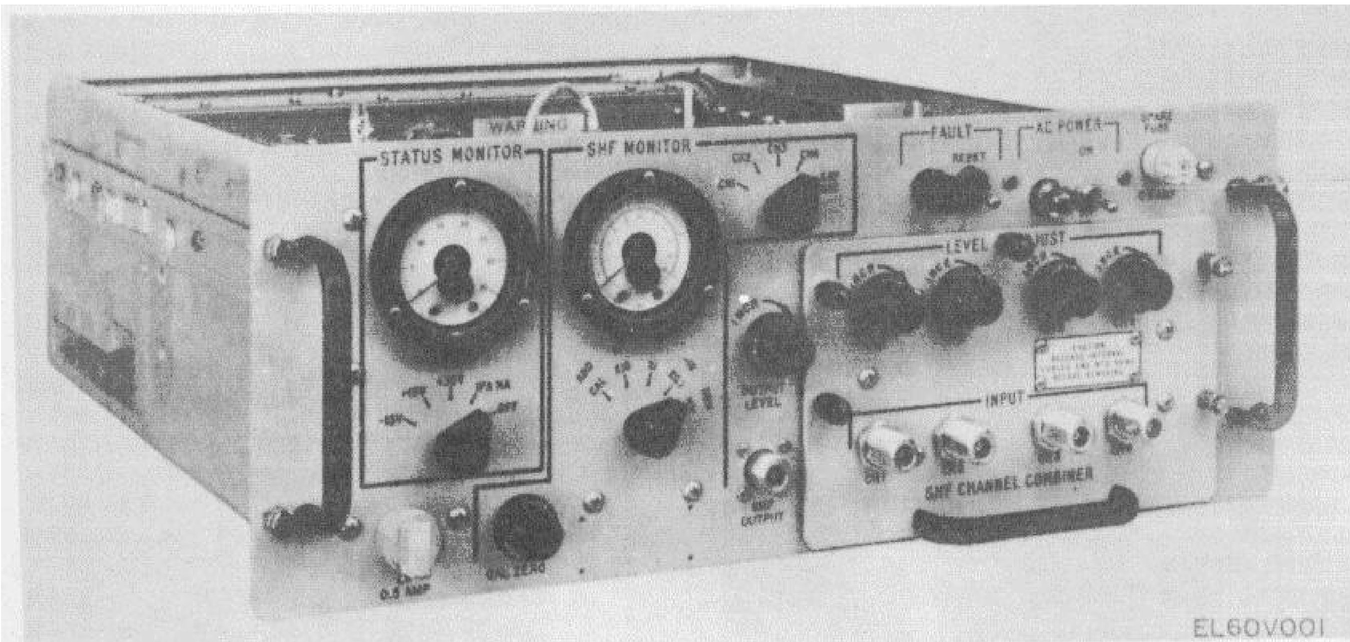


Figure 1-1. Amplifier-Mixer AM-6704/TSC.

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). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting.

b. Report of Item and Packaging Discrepancies. 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.E.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO 4610.19C and DLAR 4500.15.

1-4. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-5. Reporting Equipment Improvement Recommendations (EIR)

a. Army. If your amplifier-mixer 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 36'5 (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.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

Section II. DESCRIPTION AND DATA

1-6. Description

The amplifier-mixer combines modulated shf signals from up to four upconverters and feeds a single high power amplifier for multicarrier operation. The amplifier-mixer contains the following assemblies:

Assembly	*Part No.*	*Reference Designation*
Shf combiner assembly	SM-D-935052	A1
Shf channel assemblies	SM-D-935053	A1A1 thru A1A4
Shf drive assembly	SM-D-935081	A2
Twt amplifier assembly	SM-A-773715	A3
Fet amplifier assembly	SM-C-937563	A3
Transient suppressor assembly	SM-D-935507	A4
Rf low power alarm assembly	SM-D-775384	A5
Shf output assembly	SM-D-935082	A6
Thermoelectric power monitor assembly	SM-A-916470	A7
Power supply assemblies	SM-A-935200	PS1 and PS2

1-7. Tabulated Data

The electrical and physical characteristics of the amplifier-mixer are listed in table 1-1.

Table 1-1. Amplifier-Mixer Performance Data

Characteristics	Parameter
ELECTRICAL PERFORMANCE CHARACTERISTICS	
Rf Input Power/Channel	Four channels
Frequency Range	+ 19.0 dbm (minimum)
Instantaneous Bandwidth	7.9-8.4 GHz
Gain Under Multicarrier Service	500 MHz (I db
Total Power Output Under Multicarrier Service	+ 3.0 db
Power Output Adjustment Range/Channel Under	+ 22.0 dbm (minimum)
Multicarrier	14 db (minimum)
Service	+3.0 db
Gain Under Single-Carrier Service	+22.0 dbm (minimum)
Power Output Under Single-Carrier Service	
Intermodulation Distortion (Third Order) with Two Equal Carriers	Power output *(Total)* / (Ref either *carrier)* 17.0 dbm / -42 db 14.0 dbm / -50db 10.0 dbm / -58db
Power Output Adjustment Range, Composite	23 db (minimum)
Input VSWR @ Fo	1.25:1, referenced to 50 ohms
Harmonic Output Level	15 db below fundamental
Noise Figure (Drawer)	60 db (maximum)
Spurious Output Level (Single Carrier)	-80 dbc (1 MHz or greater from carrier)
Gain Stability	+0.3 db/8 hours
AMIPM Conversion	4°ldb

Table 1-1. Amplifier-Mixer Performance Data-Continued

Characteristics	Parameter
ELECTRICAL PERFORMANCE CHARACTERISTICS - continued	
Residual AM	70 db below unmodulated + 21.4 dbm output
Residual FM	50 db below unmodulated carrier
In-Band Noise (Less Upconverters)	-110 dbm/Hz
Receive-Band Noise (7.25-7.75 GHz) (Less Upconverters	-150 dbm/Hz
Phase Linearity	+ 2.2110 MHz
Warm - Up Time	3 minutes
Individual Carrier Power Control and Monitoring Accuracy (Input)	I db
Total Output Power Monitoring Accuracy	± 1 db
PHYSICAL CHARACTERISTICS	
Rf Input Connectors	Type N female
Rf Output Connector	Type N female
Height	7.00 inches
Width	19.00 inches
Depth	20.00 inches
Weight	47 pounds
INPUT POWER REQUIREMENTS	
Voltage	120 volts + 10%
Frequency	50-60 Hz + 5%
Phase	Single
Power	130 watts
COOLING REQUIREMENTS	
Forced Air from External Source:	50 cfm @ 1.0 inch water static pressure (sea level)
Required Air Flow	66°C (150°F)
Maximum Temperature of Inlet Air	

CHAPTER 2
FUNCTIONING OF EQUIPMENT

Section I. INTRODUCTION

2-1. General

This chapter describes the functioning of the amplifier-mixer. It begins with a block diagram description of the amplifier-mixer in section II. This is followed in section III with a detailed analysis of the functioning of the amplifier-mixer which is keyed to the unit schematic diagram and assembly schematic diagrams.

2-2. System Application

The amplifier-mixer is part of the transmitting group of the terminal and provides interface between up to four upconverters and a single high power amplifier (hpa) for multicarrier operation. The amplifier-mixer includes power combining circuitry which provides isolation between the multiple input ports, level setting controls for the individual ports, a broadband amplifier providing adequate drive to the hpa, a fault alarm circuit, and a selectable power monitoring circuit.

Section II. BLOCK DIAGRAM FUNCTIONING

2-3. General

A block diagram of the amplifier-mixer is shown in figure FO-1. As shown in the block diagram, the amplifier-mixer consists of shf combiner assembly A1, shf drive assembly A2, amplifier assembly A3, transient suppressor assembly A4, rf low power alarm assembly A5, shf output assembly A6, thermoelectric power monitor assembly A7, and power supplies PS1 and PS2.

2-4. Block Diagram Functioning
(fig. FO-1)

a. The amplifier-mixer receives 7900-to 8400-MHz shf inputs from up to four upconverters. These signals are routed via the front panel SHF CHANNEL COMBINER INPUT connectors CH1-CH4 to shf channel assemblies AlAl-AIA4 in shf combiner assembly Al. Each shf channel assembly consists of input and output isolators, HY1 and HY2, two manually operated variable attenuators AT1 and AT2, and a directional coupler, DC1. Attenuator AT1 in each shf channel assembly is adjustable by means of front panel LEVEL ADJUST controls CH1-CH4. The signals from output isolator HY2 of each shf channel assembly are added in an in-phase, four-to-one power combiner. The power combiner provides a minimum of 18 db isolation between channels and each shf channel assembly adds at least 40 db of reverse isolation, providing 58 db minimum isolation between input signals. The combined signal output from shf combiner assembly Al is fed shf drive assembly A2. Directional coupler DC1 in each shf channel assembly samples the input power for application to thermoelectric power monitor assembly A7 via variable attenuator AT2 and coax switch S1.

b. Shf drive assembly A2 consists of an input isolator (HY1), a 10-db directional coupler (DC1), a diode detector (CR1) for rf input sensing, a gain set attenuator (ATI) for initial adjustment of the unit, an output level attenuator (AT2) which is adjusted by the front panel OUTPUT LEVEL control, and a fixed output attenuator (AT3).

c. Amplifier assembly A3 is a broadband amplifier (twt or fet) which provides a fixed gain approximately 40 db to the signal from shf drive assembly A2. The amplified signal from A3 is fed to shf output assembly A6.

d. Shf output assembly A6 consists of an input isolator (HY1), two 10-db directional couplers (DC1 and DC2), a diode detector (CR1), a variable attenuator (AT1), and an output filter (FL1) which reduces harmonics and receive-band noise from the signal fed to the front panel SHF OUTPUT connector. Directional coupler DC1 and diode detector CR1 sample the shf output for application to rf low power alarm assembly A5. Directional coupler DC2 samples the shf output power for application to thermoelectric power monitor assembly A7 through variable attenuator AT1 and coax switch A1S1.

e. Power monitoring is accomplished by a thermoelectric power monitor A7 in conjunction with five-pole coaxial switch (A1S1). The coaxial switch can select a signal from any of the four channel couplers or from the shf output coupler A6DC2. The coaxial switch is controlled by manual operation of front panel channel select switch S3. Front panel SHF MONITOR meter M1 has full- scale markings of 15 milliwatts and 11.8 dbm. Three power ranges (X10, X1, and X0.1) are selected by front panel SHF MONITOR meter switch S1. The meter switch also has a CAL (calibrate) position which permits zeroing of the SHF MONITOR meter by front panel CAL ZERO control R1.

f. Rf low power alarm assembly A5, with adjustable threshold, alerts the operator in the event that rf output level falls below a preset level. The rf low power alarm assembly includes a dual channel comparator. One channel of the comparator accepts an analog signal from diode detector CR1 of shf output assembly A6. This signal is compared with an adjustable threshold which is preset by potentiometer R3 on transient suppressor assembly A4. A reduction in rf output level below this preset threshold actuates a FAULT lamp on the front panel. The second channel of the comparator accepts an analog signal from diode detector CR1 of shf drive assembly A2 which is proportional to the rf drive power present at the input of the amplifier- mixer. This channel of the comparator will inhibit the FAULT lamp when rf drive is not present.

g. Transient suppressor assembly A4 mounts the miscellaneous components used in the amplifier-mixer.

h. Power supply PS1 furnishes +15 vdc and -15vdc to thermoelectric power monitor assembly A7 and rf low power alarm assembly A5. A second identical power supply (PS2) provides +30 vdc for operation of coaxial selector switch A1Si. The + 15 vdc, -15 vdc, and +30 vdc voltages, as well as intermediate power amplifier (ipa) current, may be selected by front panel STATUS MONITOR meter switch for monitoring on the STATUS MONITOR meter.

Section III. DETAILED ANALYSIS

2-5. General

A detailed analysis of each assembly comprising the amplifier-mixer is given in paragraphs 2-6 through 2-13. The overall schematic diagram for the amplifier-mixer is shown in figure FO-2.

2-6. Shf Combiner Assembly A1
(fig. FO-2)

Shf combiner assembly A1 consists of four identical shf channel assemblies (A1A1 thru A1A4, power combiner DC1, and coax switch S1). These items are described in a, *b,* and c below.

a. Each of the four 7900-to 8400-MHz shf signals connected to front panel SHF CHANNEL COMBINER INPUT connectors CH1-CH4 are applied to one of four shf channel assemblies, A1A1 through A1A4. In the shf channel assembly, the input shf signal passes through input isolator HY1, variable attenuator AT1, directional coupler DC1, and output isolator HY2 to power combiner DC1 (b below). The level of the signal fed to DC1 is con- trolled by variable attenuator AT1, which is manually adjusted by the front panel CH1-CH4 LEVEL ADJUST controls. The 10-db directional coupler (DC1) samples the input power for application to thermoelectric power monitor assembly A7 (para 2-12) via variable attenuator AT2 and coax switch S1 (*c* below). The level of the sampled input power fed to coax switch S1 is controlled by AT2, which is a manually adjustable attenuator.

b. Power combiner DC1 combines the shf input signals from the four shf channel assemblies (A1A1thru A1A4). The combiner provides at least 18-db isolation between channels and each shf channel assembly adds at least 40 db of reverse isolation, providing 58-db minimum isolation between input signals. The combined signal output from shf combiner assembly Al is fed to shf drive assembly A2 (para 2-' 7).

c. Coax switch S1 is a single pole, five-throw coaxial switch which is used to select a sample of the four input signals (CH1-CH4) or the shf output signal for application to thermoelectric power monitor assembly A7 (para 2-12). The coax switch requires +30 vdc for operation. This voltage is applied to the appropriate section of the switch by the front panel channel select switch.

2-7. Shf Drive Assembly A2
(fig. FO-2)

Shf drive assembly A2 consists of isolator HY1, directional coupler DC1, diode detector CR1, gain set attenuator AT1, output level adjust attenuator A2, and a fixed output attenuator (AT3). The combined shf signal from shf combiner assembly Al (para 2-6) is passed through isolator HY1 to a 10-db directional coupler (DC1), which samples the shf input signal. Diode detector CR1 detects this signal and provides an output to rf low power alarm assembly A5 (para 2-10) that is proportional to the level of the shf input. The main signal path output of directional coupler DC1 is passed through gain set attenuator AT1, output level adjust attenuator AT2, and the fixed attenuator AT3 to amplifier assembly A3 (para 2-8). Gain set attenuator AT1 is manually adjusted to set the desired gain of the unit. Output level attenuator AT2 is adjustable by means of the OUTPUT LEVEL control and allows varying the output power of the amplifier-mixer. AT3 reduces range required for AT1.

2-8. Amplifier Assembly A3
(fig. FO-2)

a. Twt amplifier assembly A3 consists of a fixed broadband amplifier (approximately 40 db) and its power supply packaged as a unit. The twt amplifier provides amplification of the shf signal for application to shf output assembly A6 (para 2-11). The twt power supply has its own built-in fault protection which trips under conditions of excessive beam current and/or excessive twt heat sink temperature. This fault circuit is resettable by means of front panel FAULT RESET switch S4. Twt cathode current is monitored by front panel STATUS MONITOR meter M2 when the STATUS MONITOR switch is placed in IPA MA position.

b. Amplifier assembly A3 may contain an fet amplifier in place of the twt amplifier. The fet amplifier performs the same functions and at the same level as the twt amplifier and is directly interchangeable with it.

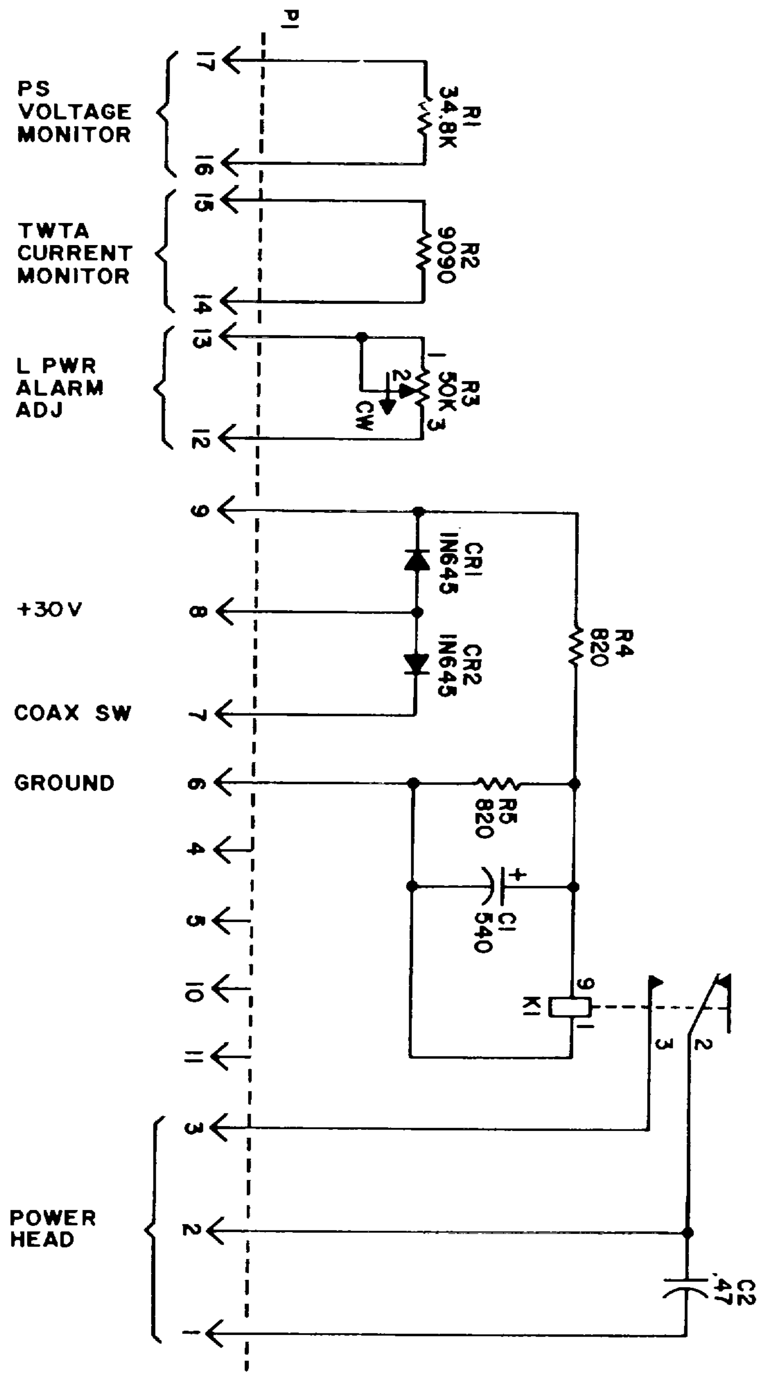
2-9. Transient Suppressor Assembly A4
(fig. FO-2 and 2-1)

Transient suppressor assembly A4 contains miscellaneous components required by the amplifier-mixer. These components are described below.

a. Resistor R1 is a voltage dropping resistor connected in series with the positive terminal of STATUS MONITOR meter M3.

b. Resistor R2 is a current limiting resistor used to drop twt cathode current applied to STATUS MONITOR meter M3 via the STATUS MONITOR switch.

c. Potentiometer R3 allows adjusting a preset threshold used by a comparator circuit on rf low power alarm assembly A5.



NOTES:

1. UNLESS OTHERWISE INDICATED CAPACITANCE VALUES ARE IN UF RESISTANCE VALUES ARE IN OHMS
2. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH A4.

EL60V005

Figure 2-1. Transient Suppressor Assembly A4, Schematic Diagram.

d. Diodes CR1 and CR2 are transient suppressors. When SHF MONITOR switch S1 is placed in the X10 position, diode CR1 applies +30 vdc to relay K1 on the transient suppressor board and diode CR2 applies +30 vdc to relay K1 on the transient suppressor board and diode CR2 applies +30 vdc to the common terminal of channel select switch S3.

e. Relay K1 applies a short circuit between terminals G and J of thermoelectric power monitor assembly A7 when energized. The relay is energized when SHF MONITOR switch SI is placed in the X10 position.

2-10. Rf Low Power Alarm Assembly A5

(fig. FO-2 and FO-3)

Rf low power alarm assembly A5 comprises two comparators in U1 which have an adjustable threshold set by potentiometer R3 on transient suppressor assembly A4. The comparators also receive inputs from diode detectors in shf drive assembly A2 and shf output assembly A6. If the shf output level drops below the level preset by A4R3, the output at pin 1 of comparator U1 goes positive, causing NPN transistor switch Q1 to turn on. This in turn energizes relay K1, causing the front panel FAULT lamp to light. If the shf input level drops below the preset level, the output at pin 8 of comparator U1 goes positive, causing NPN transistor switch Q1 to turn on. This in turn energizes relay K2, thereby inhibiting the front panel FAULT lamp when rf drive is not adequate. A truth table describing the status of the FAULT lamp is presented below:

Condition	*Fault Lamp*
RF In + RD Out	OFF
RF In + Low	
RF Out	ON
No RF In	OFF

2-11. Shf Output Assembly A6

(fig. FO-2)

Shf output assembly A6 consists of isolator HY1, directional couplers DC1 and DC2, diode detector CRI, variable attenuator AT1, and output filter FLI. The amplified shf signal from twt amplifier assembly A3 is passed through isolator HY1 to a 10-db directional coupler (DC1) which samples the shf output signal. Diode detector CR1 detects this signal and provides an output to rf low power alarm assembly A5 (para 2-10) that is proportional to the level of the shf output. The main signal path output of directional coupler DCI is applied to a second 10-db directional coupler (DC2) which provides a sample of the shf output to thermo electric power monitor A7 (para 2-12) via variable attenuator AT1. The level of the sampled output power fed to the thermoelectric power monitor is controlled by AT1, which is a manually adjustable attenuator. The main signal path output of directional coupler DC2 is fed through output filter FL1 to front panel SHF OUTPUT connector J5 via cable assembly W2. The filter is a bandpass type which reduces both harmonics and receive-band noise.

2-12. Thermoelectric Power Monitor Assembly A7

(fig. FO-2 and FO-4)

Thermoelectric power monitor assembly A7 consists of an integrated circuit thin-film thermoelectric (tft) element, thermistor RT1, a filter, and an amplifier. Power to be monitored is selected by coaxial switch A1S1 and can be from any of the four shf channels (CH1-CH4) or shf output power. The coaxial switch is controlled by the front panel channel select switch. Rf power to be monitored is absorbed by the thin-film thermoelectric element, producing a temperature rise in the element. This results in a thermoelectric electromotive force (emf), proportional to the temperature rise. Thermistor RT1 keeps the temperature rise in the thin-film thermoelectric small. By so doing, the tft element acts as a true square-law (rms) device, producing a dc voltage directly proportional to the absorbed power. The dc voltage is applied through a filter (L1, L2, C1, C2) to an amplifier which produces a constant voltage output to SHF MONITOR meter that is linearly proportional to the incidental rf power. The SHF MONITOR meter has full-scale markings of 15 milliwatts and 11.8 dbm. Three power ranges (X10, X1, and XO.1) are selected by SHF MONITOR switch S1. The switch also has a CAL (calibrate) position which permits zeroing of the SHF MONITOR meter by adjustment of CAL ZERO potentiometer R1. Full scale calibration of the SHF MONITOR meter for each channel is set by introducing an external power-measuring standard and adjusting the appropriate AT2 channel attenuator. The SHF MONITOR meter is calibrated to give accurate indication of power at front panel SHF CHANNEL COMBINER CH1--CH4 INPUT connectors when the respective LEVEL ADJUST controls are set for maximum level (minimum attenuation). SHF MONITOR indication of output power is calibrated at SHF OUTPUT connector J5 by use of an external power monitor standard and adjustment of variable attenuator A6AT1.

2-13. Power Supplies PS1 and PS2

(fig. FO-2)

Power supply PS1 furnishes +15 vdc and -15 vdc to thermoelectric power monitor assembly A7 and rf low power alarm assembly A5. This supply is rated to deliver 200 milliamperes at both voltages. A second identical supply (PS2) provides +30 vdc for operation of coaxial selector switch A1S1. Power supplies PS1 and PS2 require 120 vdc, 60 Hz for operation. This voltage is applied to the power supplies via AC POWER circuit breaker CB1 and fuse Fl. The front panel AC POWER lamp lights when CB1 is placed in ON position. An elapsed time meter (M3) indicates operating time of the unit. The + 15 vdc, - 15 vdc, and +30 vdc voltages, as well as ipa current, may be selected by front panel STATUS MONITOR switch for monitoring on the STATUS MONITOR meter.

CHAPTER 3

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. MAINTENANCE INSTRUCTIONS

3-1. General

This chapter contains instructions for the removal and replacement of faulty components on the front panel and chassis of the amplifier-mixer. In addition to removal and replacements of these components, the direct support maintenance function is responsible for repair of shf combiner assembly Al and test and replacement of shf channel assemblies A1A1 thru A1A4. Instructions for these maintenance functions are covered in TM 11-5895-846-14. The maintenance functions in this chapter supplement the maintenance procedures contained in the lower level manual.

3-2. Tools and Test Equipment Required

a. Tool Kit, Electronic Equipment TK-105/G (NSN 5180-00-610-8177). Required for removal and replacement of panel/chassis mounted components and shf channel assemblies A 1A-AlA4.

b. Torque Wrench O/S- T8438 (NSN 5120-00-169-5772).

NOTE

No test equipment is required to perform direct support maintenance.

Section II. TROUBLESHOOTING

3-3. Front Panel and Drawer Mounted Components and Wiring

The amplifier-mixer front panel and chassis mounted components to be checked and replaced (if faulty) by direct support maintenance personnel are listed in table 3-1 and located in figure FO-5. Wiring details are shown in figure FO-2.

Table 3-1. Replaceable Fault-Detected Amplifier-Mixer Panel/Chassis Components

Reference designation	Description	Para ref
CB1	AC POWER circuit breaker	3-7*a*
J5	SHF OUTPUT connector	3-7*b*
J6	Power connector	3-7*c*
M1	SHF MONITOR meter	3-7*d*
M2	STATUS MONITOR meter	3-7*e*
M3	ELAPSED TIME meter	3-7*f*
R1	CAL ZERO variable resistor	3-7*g*
S1	SHF MONITOR switch	3-7*h*
S2	STATUS MONITOR switch	3-7*i*
S3	Channel select switch	3-7*j*
S4	FAULT RESET switch	3-7*k*
XDS1	AC POWER indicator lamp socket	3-7*l*
XDS2	FAULT indicator lamp socket	3-7*m*
XF1	LV 0.5 AMP fuse socket	3-7*n*
XF2	SPARE FUSE socket	3-7*o*

3-4. Shf Combiner Assembly A1

Testing of shf combiner assembly A1 is not required at direct support maintenance level.

3-5. Mechanical Inspection

Prior to performing any troubleshooting or component replacement procedures, inspect the components for loose or missing hardware and frayed or broken electrical connections.

3-6. Component Resistance Check

As an aid to troubleshooting, the resistance value of front panel and chassis-mounted components of the amplifier-mixer are listed in table 3-2.

Table 3-2. Resistance Check of Amplifier-Mixer Front Panel and Chassis Mounted Components

Item of Check	Test conditions	Meter conditions	Normal conditions	Additional checks and remarks
	No power inputs or signal inputs to amplifier-mixer			
CB1	Switch:			Disconnect leads from circuit breaker
	ON		0 ohm	
	OFF		∞ ohms	
R1		R1-1,R1-3	10K ohms	A7 assembly removed.
		R1-1, center arm of R1	0 ohm	Rotate control from minimum to maximum resistance.
S1	CAL	S1A-1, S1A-2 S1B-7, S1B-8	0 ohm	Inspect switch for broken or frayed wires. Rotate switch through its complete range of operation. There should be no binding of contacts.
	X10	S1A-1, S1A-3 S1B-7, S1B-9		
	X1	S1A-1, S1B-4 S1B-7, S1B-10		
	X01	S1A-1, S1A-5 S1B-7, S1B-11		
S2	-15V	S2B-1, S2B-2 S2C-7, S2B-8		Inspect switch for broken or frayed wires. Rotate switch through its complete range of operation. There should be no binding of contacts.
	+15V	S2B-1, S2B-3 S2C-7, S2C-9		
	+30V	S2B-1, S2B-4 S2C-7, S2C-10		
	IPAMA	S2A-12, S2A-6 S2B-1, S2B-4 S2C-7, S2C-11		
S3	CH1	S3-7, S3-1		Inspect switch for broken or frayed wires. Rotate switch through its complete range of operation. There should be no binding of contacts
	CH2	S3-7, S3-2		
	CH3	S3-7, S3-3		
	CH4	S3-7, S3-4		
	SHF OUT	S3-7, S3-5		
S4		S4-common S4-contact		Press switch.
XDS1		TB1-8, TB1-1		Disconnect from TB1-8.
XDS2		XDS2-3, XDS2-1		Disconnects leads to XDS2-1, XDS2-2.
		XDS2-3, XDS2-2		
XF1		Xf1-load XF1-line		Fuse in socket.

Section III. REMOVAL AND REPLACEMENT

3-7. Front Panel and Drawer Mounted Components

Refer to figure FO-5 and the following procedures to remove and replace the front panel and drawer mounted components of the amplifier-mixer:

a. CB1--ACPOWER Circuit Breaker.

(1) Remove two screws securing circuit breaker cover to front panel and remove cover.

(2) Tag and unsolder leads to circuit breaker.

(3) Remove hex nut securing circuit breaker to front panel.

(4) Install new circuit breaker and secure to front panel.

(5) Solder leads to terminals.

(6) Replace circuit breaker cover and secure with two screws.

b. J5-SHF OUTPUT Connector.

(1) With a torque wrench, loosen and

remove both ends of the semirigid coaxial cable W4, which is connected between jack CP1 on the shf channel combiner assembly Al, and attenuator AT1 on the shf output assembly A6.

(2) Loosen the four captive screws securing the shf output assembly A6 to the amplifier-mixer chassis.

(3) With a torque wrench, loosen and remove both ends of semirigid coaxial cable W2, which is connected between FLI, J1 on the shf output assembly A6 and the rear of J5, SHF OUTPUT connector.

(4) With a torque wrench, loosen and remove semirigid coaxial cables W1 and W3 at their connections on the rear of the shf channel combiner assembly Al.

(5) Unscrew the two screws securing the J6 connector at the rear of the shf channel combiner assembly Al and remove connector J6.

(6) On the front panel of the amplifier-mixer, loosen the five captive screws securing the shf channel combiner assembly Al to the front panel of the amplifier-mixer chassis.

(7) Loosen the two captive screws which secure the shf channel combiner assembly Al to the base of the amplifier-mixer chassis.

(8) Pull out on the handle on the front panel of the shf channel combiner assembly Al and remove it from amplifier-mixer chassis.

(9) Remove the four screws and nuts that secure the J5 SHF OUTPUT jack to the front panel and remove the jack.

(10) Inspect gasket and replace, if necessary.

(11) Install new J5, SHF OUTPUT jack, in place and secure it to front panel with the four mounting screws and nuts.

(12) Slide the shf channel combiner assembly A 1 back into place in the amplifier-mixer chassis.

(13) Secure the shf channel combiner assembly Al to the amplifier-mixer chassis by tightening the two captive screws at the base of the assembly and the five captive screws on the front panel.

(14) Replace J6 connector and secure in place by tightening the two captive screws.

(15) With a torque wrench, replace and tighten semirigid coaxial cables W1 and W3 into place at the rear of shf channel combiner assembly Al.

(16) With a torque wrench, replace and tighten semirigid coaxial cable W2 between FL1, J1 on the SHF OUTPUT assembly A6 and the rear of J5 SHF OUTPUT connector.

(17) With a torque wrench, replace and tighten semirigid coaxial cable W4 between jack CP1 on the shf channel combiner assembly Al and attenuator AT1 on the SHF OUTPUT assembly A6.

(18) Secure SHF OUTPUT assembly A6 into place by tightening the four captive screws.

c. J-6 Power Connector.

NOTE

If pins are bent, straighten them. If they are broken or otherwise defective, replace the connector as outlined below.

(1) Remove the four screws and nuts holding the connector to the rear panel.

(2) Remove the connector from the rear of the frame.

(3) Grasp the connector by the main body and unscrew the knurled retaining ring on the wire entrance side of the connector.

(4) Slide the retaining ring back from the connector along the wires.

CAUTION

When removing the soft rubber insulating wire separator and plastic jacket in the next step, be very careful not to damage the soft rubber. If it is damaged, each wire must be threaded through its proper hole on the replacement unit.

(5) Using extreme care, grasp the plastic jacket on the outside of the soft rubber insulating wire separator and slowly work it back along the wires until adequate clearance is obtained to unsolder the wires from their pins.

(6) Tag the wires and unsolder them from the connector pins.

(7) Using good soldering practices, solder the wires to the pins on the replacement connector

CAUTION

Once again. be very careful not to damage the soft rubber insulating wire separator when performing the next step.

(8) Using extreme care, -lowly work the soft rubber insulating wire separator and plastic jacket back along the wires until it is sealed in place in the connector.

(9) Slide the knurled retaining ring back along the wire and screw it into the connector.

10) Reinsert the connector into the frame and secure it by replacing the four screws and nuts.

d. M1-SHF MONITOR Meter.

(1) Remove the two hex nuts from the screw posts on the rear of the meter.

(2) Tag and remove the solder terminal lugs which hold the wire to the rear of the meter.

(3) Remove three screws and nuts securing meter and gasket to front panel.

(4) Inspect the gasket and replace if worn or damaged.

(5) Place gasket over meter and secure meter to front panel with three screws and nuts.

e. M2-STATUS MONITOR Meter.

(1) Remove the two hex nuts from the screw posts on the rear of the meter.

(2) Tag and remove the solder terminal lugs which hold the wires to the rear of the meter.

(3) Remove three screws and nuts securing meter and gasket to the front panel.

(4) Inspect the gasket and replace if worn or damaged.

(5) Place gasket over meter and secure meter to front panel with three screws and nuts.

(6) Reconnect leads to the meter.

(7) Remount the solder terminal lugs on the screw posts on the rear of the meter.

(8) Fasten the solder terminal lugs to the rear of the meter using two hex nuts.

f. M3-ELAPSED TIME Meter.

(1) Remove two screws, lockwashers, and nuts securing ELAPSED TIME meter to chassis.

(2) Tag and unsolder leads at rear of meter.

(3) Reconnect leads to meter.

NOTE

In 4 below, the elapsed time indicator will be *temporarily* secured to its supporting frame with the screw upside down in order to facilitate installation.

(4) Hold the elapsed time indicator in place and insert one screw from the bottom of the mounting bracket. From the top, tighten a nut sufficiently so that the elapsed time indicator is held in place.

(5) In the remaining hole, insert the screw from the top and tighten on lockwasher and nut.

(6) Remove the first nut and screw which temporarily held the meter to the mounting bracket. Reinsert the screw from the top and tighten on lockwasher and nut.

g. R1-CAL ZERO Variable Resistor.

(1) Loosen the two setscrews on control knob and remove it.

CAUTION

In the following step, be careful not to damage the soft rubber gasket or- the rubber coating on the hex nut. If damaged, the knob lock must be replaced.

(2) With one hand, push in on the knob lock. Using the tip of a 1/2 inch open-end wrench, remove knob lock by turning the hex nut and plastic ring counterclockwise.

(3) Remove hex nut securing variable resistor to front panel.

(4) Tag and unsolder leads at rear of variable resistor.

(5) Reconnect leads to new variable attenuator.

(6) Install variable resistor and secure to front panel with hex nut.

(7) Replace knob lock and tighten it finger tight on threaded shaft of the variable resistor.

(8) Gently turn the plastic knob control counterclockwise until the mechanism is in the unlocked position, taking care not to unscrew the knob lock assembly from the threaded shaft.

(9) Replace knob so that it is in close proximity but not touching the soft rubber gasket of the knob lock. Tighten the two setscrews.

h. S1-SHF MONITOR Switch.

(1) Loosen setscrew on switch knob; remove knob and knob lock.

(2) Tag and solder leads to switch.

(3) Remove hex nut securing switch to front panel.

(4) Remove lockwasher from shaft of switch.

5) Place lockwasher over shaft of new switch and install switch.

(6) Secure switch to front panel with hex nut.

(7) Reconnect leads to switch.

(8) Replace knob lock and knob; tighten the setscrew in knob.

i. S2-STA TUS MONITOR Switch.

(1) Loosen setscrew on switch knob; remove knob and knob lock from front panel.

(2) Tag and unsolder leads to switch.

(3) Remove hex nut securing switch to front panel.

(4) Place lockwasher over shaft of the new switch and place switch in position.

(5) Secure switch to front panel with hex nut.

(6) Reconnect leads to switch.

(7) Replace knob lock and knob; tighten set-screw in knob.

j. S3--Channel Select Switch.

(1) Loosen setscrew on switch knob; remove knob and knob lock from front panel.

(2) Tag and unsolder leads to switch.

(3) Remove hex nut securing switch to front panel.

(4) Place lockwasher over shaft of the new switch and install switch in position.

(5) Secure switch to front panel with hex nut.

(6) Reconnect leads to switch.

(7) Replace knob lock and knob; tighten the setscrew in knob.

k. S4-FAULT RESET Switch.

(1) Tag leads and remove the two screws securing leads to the rear of the fault reset switch.

CAUTION

Be very careful in the next step not to damage the rubber boot on the hex nut.

(2) Remove the hex nut securing the switch to the front panel and remove the switch.

CAUTION

Be very careful in the next step not to damage the rubber boot on the hex nut.

(3) Place new switch in position and secure in place with hex nut.

(4) Reconnect leads to switch and secure them in place with two mounting screws.

l. XDSI-ACPOWER Indication Lamp Socket.

(1) Remove two screws securing circuit breaker cover to front panel and remove cover.

(2) Tag and unsolder leads to indicator lamp.

(3) Unscrew lamp socket jewel and remove from socket. Remove indicator lamp DS1.

(4) Remove hex nut on rear of lamp socket securing lamp socket to front panel.

(5) Install the new socket and secure to the front panel with hex nut, and reconnect leads to socket.

(6) Replace lamp in socket and replace jewel.

(7) Replace circuit-breaker cover and secure to rear of front panel with two screws.

m. XDS2-FA ULT Indicator Lamp Socket.

(1) Tag and unsolder leads to lamp socket.

(2) Unscrew lamp socket jewel from lamp socket.

(3) Loosen hex nut securing lamp socket to front panel.

(4) Remove the plastic retaining collar and gasket from front panel holding the socket in place.

(5) Install the new socket in place.

(6) Replace the gasket and tighten the plastic retaining collar to the front of the socket on the front panel.

(7) Tighten the hex nut on the rear of the socket to secure it in place on the front panel.

(8) Replace lamp and jewel back into socket.

n. XF1-LVO.5 AMP Fuse Socket.

CAUTION

In the following procedure the front panel must be removed to provide access to the hex nut on the rear of the front panel, which secures the fuse socket to the front panel. The alinement of the front panel is extremely critical. Before removal of the front panel, the greatest care should be taken to mark the original alinement of the chassis and the front panel, so that when the front panel is replaced, the proper realinement can be made.

(1) Scribe a line around the right angle flanges of the side panels which join the side panels to the front panel to insure their proper realinement when remounting the front panel.

(2) Remove the cover and fuse FI from the fuse socket.

(3) Remove the OUTPUT LEVEL knob, knob lock, hex nut and washer as indicated in paragraph 3-7g(l) through (3).

(4) Remove the shf channel combiner assembly Al and the J5 power connector as indicated in paragraph 3-7b(l) through (9).

CAUTION

In the next step the front panel will be removed from the amplifier-mixer chassis. The wiring to front panel components will allow movement of a few inches, but be very careful not to place stress on wires or solder joints as this could damage the amplifier-mixer.

(5) Remove the 13 screws that secure the front panel to amplifier-mixer chassis and carefully slide the front panel away from the chassis, taking care not to damage any wires.

(6) Tag and unsolder the leads from the fuse socket.

(7) Remove the hex nut and washer on the rear of the front panel which secures the fuse-socket to the front panel.

(8) Replace the fuse socket and secure it to the front panel by tightening the washer and hex nut.

(9) Reconnect the leads to fuse socket.

CAUTION

In the next step, the proper alignment of the front panel is extremely important. Take care to remount the front panel exactly as it was mounted prior to removal using the alignement marks scribed in step (1) above. If extreme care is not taken, the drawer may not fit back into its rack properly.

(10) Remount front panel taking extreme care to make proper alinement and tighten the mounting screws.

(11) Slide the amplifier-mixer drawer into its position in the equipment rack. Make sure that the front panel does not rub against adjacent drawers and is properly aligned. If not in alinement repeat steps (10)and (11).

(12) Reinstall J5 SIIF OUTPUT jack and shf channel combiner assembly Al as indicated in paragraph 3-7b(11) through (18).

(13) Replace OUTPUT LEVEL washer, hex nut, knob lock and knob as indicated in paragraph 3-7g(6) through (9).

(14) Reinstall fuse cover and fuse F1 into fuse socket.

o. XF2-SPARE FUSE Socket.

(1) Remove cover and fuse F2 from socket.

(2) Remove hex nut securing rear of socket base to front panel.

(3) Install new socket and secure with hex nut. Reconnect leads.

(4) Replace fuse in socket if necessary and replace socket cover.

3-8. Shf Combiner Assembly A1

Direct support repair procedures for shf combiner Al is limited to removal and replacement of shf channel assemblies A1A1-A1A4. Refer to figure 3-1 and the following procedures to remove and replace these assemblies.

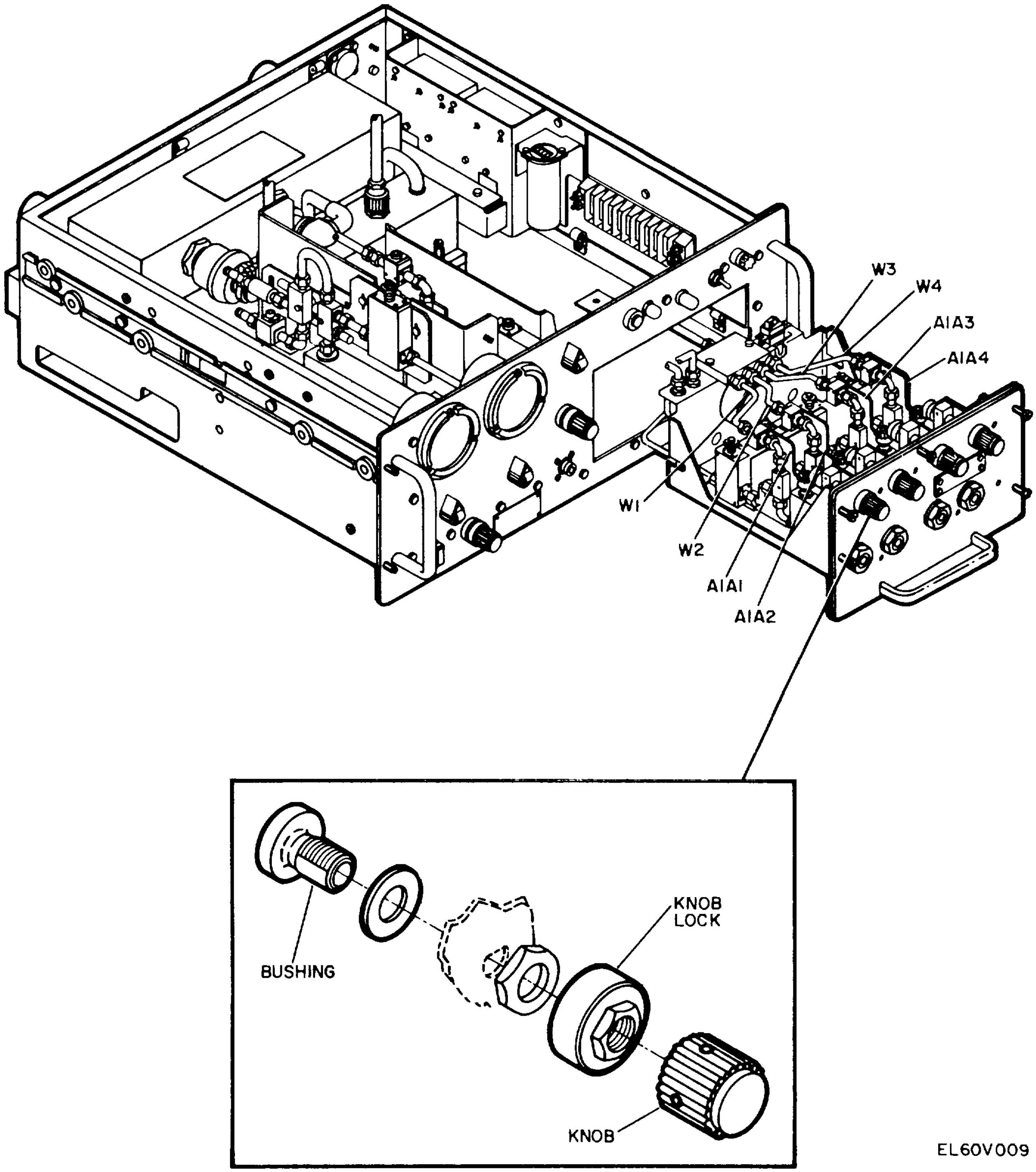


Figure 3-1. Amplifier-Mixer Shf Combiner Assembly A1. Component Location.

a. Loosen, but do not remove, the two screws securing the power combiner (power divider) to the frame.

CAUTION

In the next step throughout the procedure, be careful not to bend the semirigid coaxial cabling in the shf channel combiner assembly.

b. Alternately loosen each of the four semirigid coaxial cables (W1-W4) which are connected to the isolators on the shf channel assemblies A1A1-A1A4.

c. When all four have been completely un-threaded, push back on the power divider until the semirigid coaxial cables are freed from the isolators.

d. Loosen the connection to the power divider of the semirigid coaxial cable that corresponds to the shf channel assembly being replaced and swing the semirigid coaxial cable out of the way.

e. On the shf channel assembly to be replaced, alternately loosen and remove the two ends of the BITE semirigid coaxial cable (W5-W8), and connect between the rear of the shf channel assembly and the coaxial switch.

f. Loosen both captive screws securing the appropriate brace which is attached between P 1A1 and A1A2 or A1A3 and A1A4; and remove it from between the modules. Remove the brace.

g. On the front panel, remove the two setscrews on the level adjust knob and remove the knob.

CAUTION

In the following step, use care not to damage the soft rubber gasket or the rubber coating on the hex nut. If damaged, the knob lock must be replaced.

h. With one hand push in on the knob lock, and, by using the tip of a 1/2 inch open-ended wrench, remove knob lock by turning the hex nut and plastic ring counterclockwise.

i. Remove the screw which secures the shf channel assembly frame to the front panel.

j. Remove the hex nut, securing the level adjust shaft to the front panel.

k. Remove the hex nut and lock washer, securing the input shf channel assembly jack to the front panel.

l. When removing either channel 2 or 3, remove the two screws securing the LEVEL ADJUST shaft to the channel assembly. Remove shaft.

m. Loosen the two captive screws securing the assembly to the bottom of the combiner chassis. Slide back and remove shf channel assembly.

n. Install new shf channel assembly into place in the combiner chassis. Secure to bottom of chassis by tightening the two captive screws on the shf channel assembly.

o. Replace lockwasher and tighten hex nut on input shf channel assembly jack connector on the front panel.

p. When replacing either channel 2 or 3, replace LEVEL ADJUST shaft. Secure to shf channel assembly by tightening the two mounting screws.

q. Tighten on hex nut LEVEL ADJUST shaft on the front panel.

r. Replace knob lock and tighten it finger tight on threaded LEVEL ADJUST shaft.

s. Gently turn the knob lock control counterclockwise until the mechanism is in the unlocked position. Take care not to unscrew the knob lock assembly from the threaded shaft.

t. Replace knob so that it is in close proximity but not touching the soft rubber gasket of the knob lock. Tighten the two setscrews.

u. On the front panel, replace the mounting screw, and secure the shf channel assembly to the front panel.

v. Replace the brace between the new shf channel assembly and the adjacent assembly, and tighten the two captive screws to secure it in place.

w. Using a torque wrench, replace and alternately tighten both ends of the BITE semirigid coaxial cable (W5-W8).

x. Using a torque wrench, alternately tighten the four semirigid coaxial cables to the isolators on the shf channel assemblies. Also, make sure all connections to the power divider are tight.

y. Tighten the two captive screws to secure the power divider to the shf channel combiner.

CHAPTER 4

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. MAINTENANCE INSTRUCTIONS

4-1. General

This chapter contains maintenance instructions authorized at the general support level and supplements the maintenance instructions contained in the lower level manuals. The information covers test, troubleshooting, and repair of the transient suppressor and rf low power alarm assemblies of the amplifier-mixer. Schematic and parts location diagrams are included to support bench testing and troubleshooting procedures. Diagrams showing the test equipment setup requirement for each item to be tested are provided. A parts list and chassis layout, chassis markings, and schematic diagrams are also included for each special test fixture.

4-2. Tools Required

a. Tool Kit, Electronic Equipment TK-100/U (NSN 5180-00-605-0079). Required for removal and replacement of rf low power alarm assembly A5.

b. PCB Repair Kit MK- 772/U (NSN 5999-00-757-5042). Required for repair of transient suppressor assembly A4 printed circuit board.

c. Torque Wrench O/S-T8438 (NSN 5120-00-169-5772).

d. Tool Kit, Electronic Equipment TK-105/G (NSN 5180-00-610-8177). Required for removal and replacement of transient suppressor assembly A4.

4-3. Test Equipment Required

Test equipment required for general support maintenance is listed in table 4-1.

Table 4-1. Test Equipment Required for General Support Maintenance

Nomenclature	NSN or FSCM no	Use
Power Supply, 0 to 40 vdc adjustable (Hewlett-Packard 6202B)	6625-00-439-5080	Test of transient suppressor assembly A4.
Digital Multimeter (Fluke 800A)	6625-00-322-8715	Test of transient suppressor assembly A4 and rf low power alarm assembly A5

4-4. Fabricated Equipment Required

Table 4-2 lists all the locally fabricated test fixtures required to perform the maintenance tasks described in this chapter. The table also identifies the schematic diagram of each item to be fabricated, the parts required to fabricate each item, and the paragraph where the item is used. Refer to table 4-3 for a list of manufacturer codes.

Table 4-2. Fabricated Equipment Required to Perform General Support Maintenance

Equipment	Fabrication paragraph	Schematic diagram figure No.	Parts List table No.	Reference paragraph of use
Transient suppressor test fixture	4-5	4-3	4-4	4-9
Rf low power alarm test fixture	4-6	4-6	4-5	4-8

Table 4-3. Federal Supply Code for Manufacturer(FSCM), Code-to-Name Sequence

Code	Manufacturer
04713	Motorola Inc. Semiconductor Products Group 5005 E. McDowell Rd. Phoenix, AZ 85005
09353	C and K Components Inc. 103 Morse St. Watertown, MA 02172
09769	Amp Inc. Automatic Machine Div. Eisenhower Blvd. Harrisburg, PA 17105
15605	Cutler-Hammer Inc. 4201 N. 27th St. Milwaukee, WI 53216
44655	Ohmite Mfg. Co. 3601 W. Howard St. Skokie, IL 60076
49671	RCA Corp. 30 Rockefeller Plaza New York, NY 10020
71279	Cambridge Thermionic Corp. 445 Concord Ave. Cambridge, MA 02138
72619	Dialight Div. Amperex Electronics Corp 203 Harrison Pi Brooklyn, NY 11237
74970	E. F. Johnson Co. 299 10th Ave. SW Waseca, MN 56093
83330	Smith, Herman H. Inc. 812 Snediker Ave. Brooklyn, NY 110207
91662	Elco Corp., A Gulf & Western Mfg. Co. Connector Div. Huntington Industrial Park Huntington, PA 16652
71218	Bud Radio Inc. 4605 E. 355th St. Willoughby, OH 44094

4-5. Transient Suppressor Test Fixture Fabrication Instructions

a. Parts List. The parts required to fabricate the transient suppressor test fixture are listed in table 4-4.

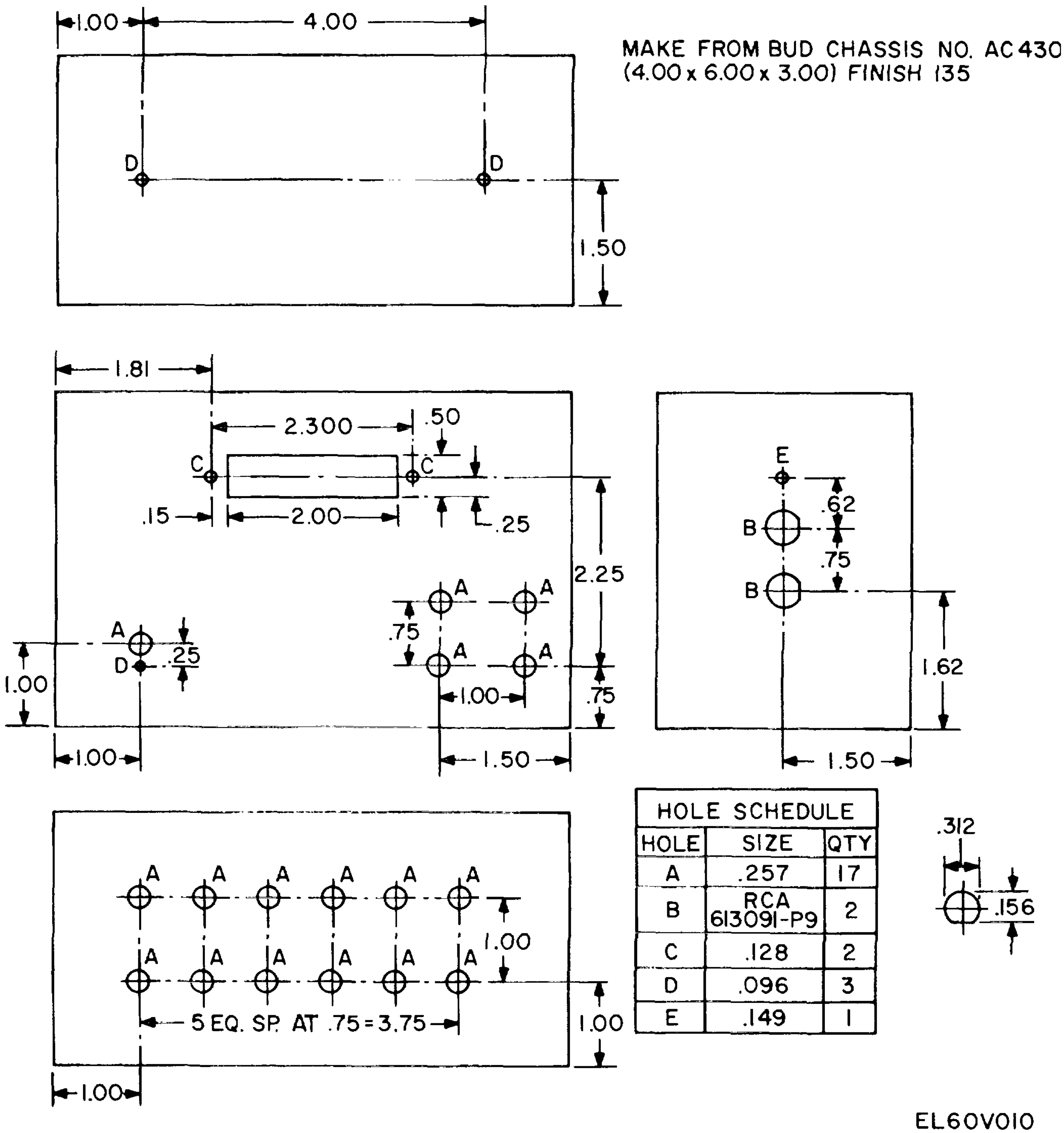
b. Chassis Layout. A layout diagram of the transient suppressor test fixture is shown in figure 4-1.

c. Chassis Markings. Chassis markings for the transient suppressor test fixture are shown in figure 4-2.

d. Schematic Diagram. The schematic diagram for the transient suppressor test fixture is shown in figure 4-3.

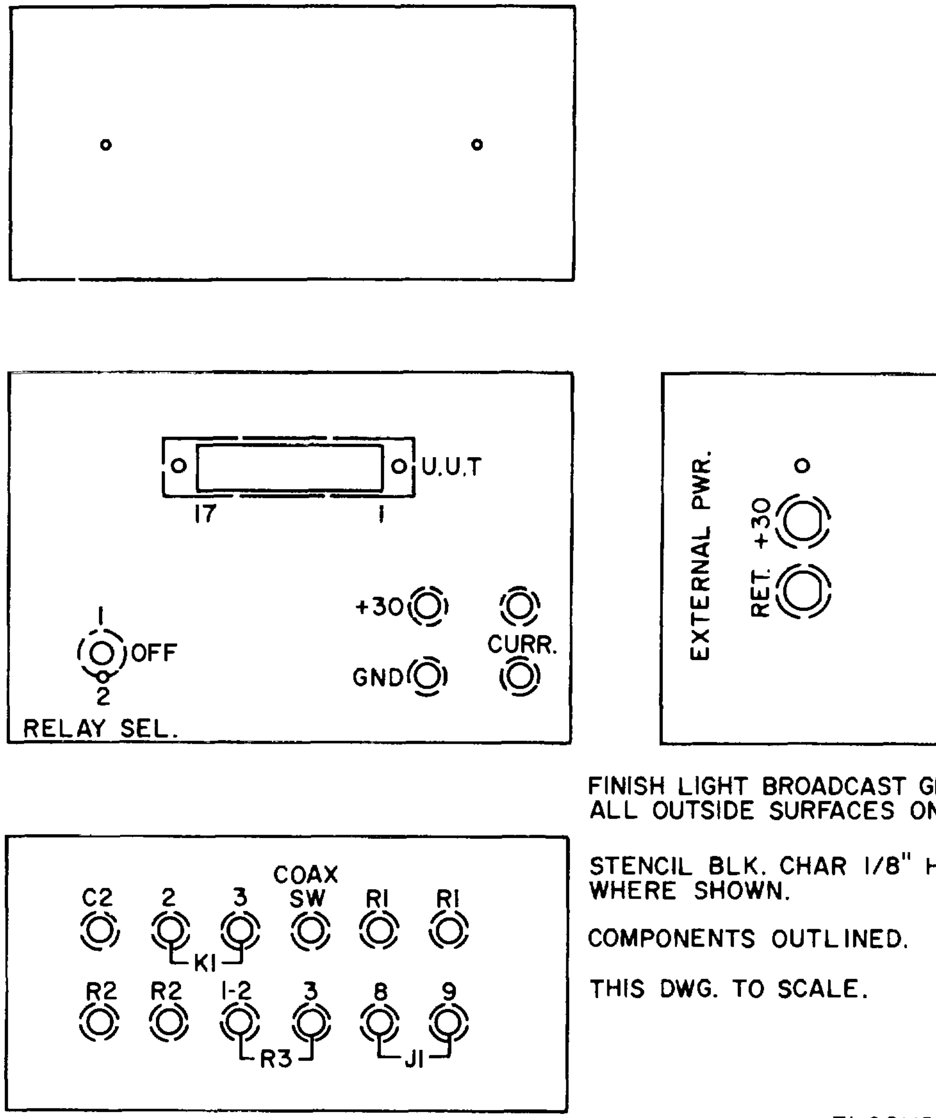
Table 4-4. Transient Suppressor A1547616 Test Fixture Parts List

Reference designation	Qty	Description	FSCM	Part No.
D1	1	Diode	04713	1N4006
E1	1	Terminal	71279	4815-1-05-12
J1	1	Connector	95146	163-110
J2-J11, J18	12	Pin jack, orange	83330	1506-106
J19	1	Pin jack, red	83330	1506-102
J12 J13	2	Pin jack, green	83330	1506-104
J14	1	Pin jack, black	83330	1506-103
J15	1	Binding post, black	74970	111-0103-001
J16	1	Binding post, red	74970	111-0102-001
J17	1	Switch, SPDT, center off	09353	7103
S1	1	Current loop	49671	A1547454
	1	Chassis	71218	AC-430
	1	Bottom plate	71218	BPA-1505
	1	Nameplate	49671	A1547694



HOLE SCHEDULE		
HOLE	SIZE	QTY
A	.257	17
B	RCA 613091-P9	2
C	.128	2
D	.096	3
E	.149	1

Figure 4-1. Transient Suppressor Test Fixture, Chassis Layout.



FINISH LIGHT BROADCAST GRAY ALL OUTSIDE SURFACES ONLY.

STENCIL BLK. CHAR 1/8" HIGH WHERE SHOWN.

COMPONENTS OUTLINED.

THIS DWG. TO SCALE.

EL6OV011

Figure 4-2. Transient Suppressor Test Fixture, Chassis Markings.

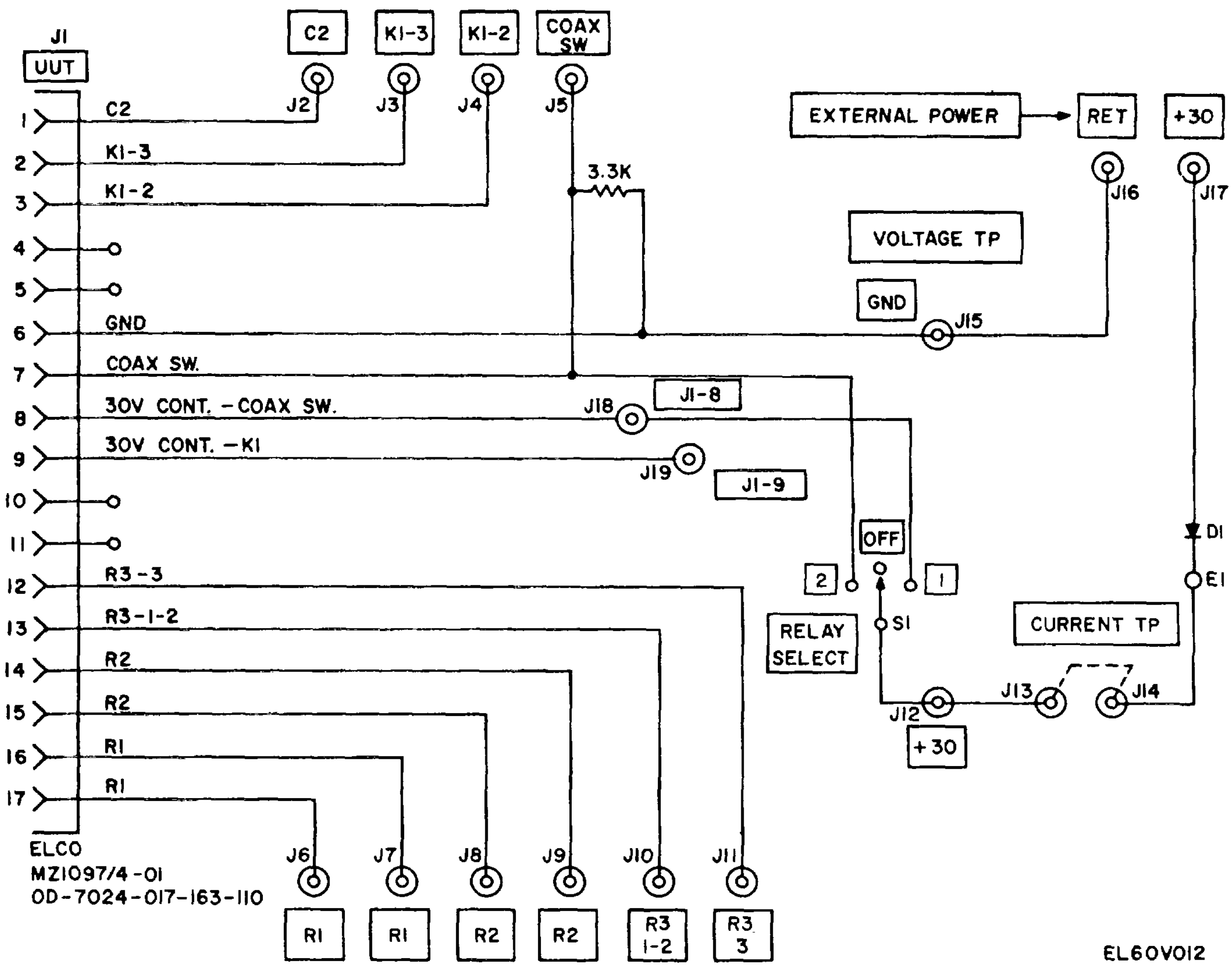


Figure 4-3. Transient Suppressor Test Fixture, Schematic Diagram.

4-6. Rf Low Power Alarm Test Fixture Fabrication Instructions

a *Parts List.* The parts required to fabricate the rf low power alarm test fixture are listed in table 4-5.

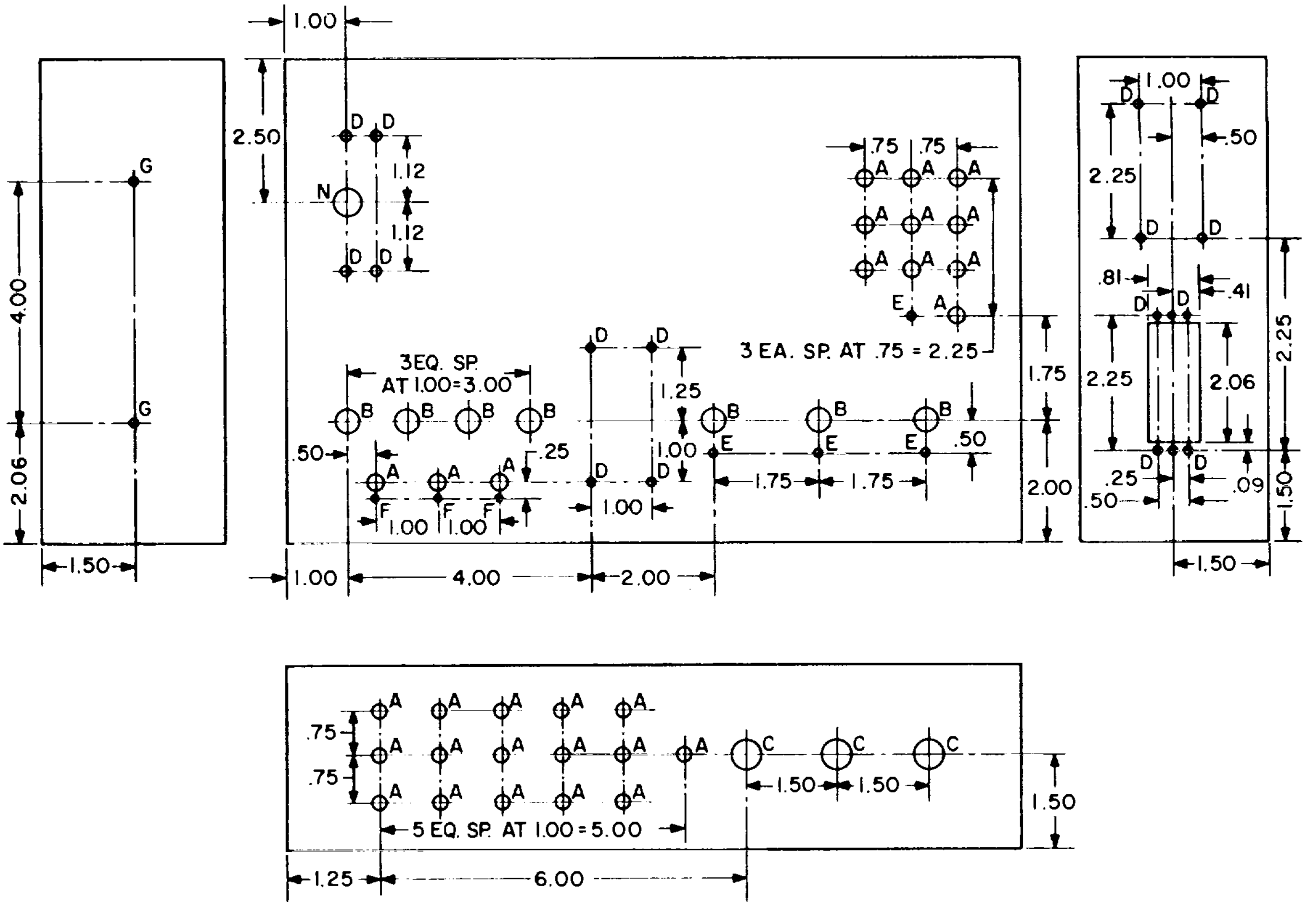
Table 4-5. Rf Low Power Alarm A1545821 Test Fixture Parts List

Reference designation	Qty	Description	FSCM	Part No.
D1-D3	3	Diode	04713	1N40006
J1	1	Connector	71279	KP702A-14-19S
	1	Grommet		5B-562-Y
J2, J11 J12 J24 J27	5	Pin jack, red	83330	
J3 J4 J25 J26	4	Pin jack, black	83330	1505-103
J18 J23	6	Pin jack, green	83330	1505-104
J5- J10 J13 J17	11	Pin jack, orange	83330	1505-106
J28	1	Connector block	09769	202515-1
	1	Connector pin	09769	66102-3
	1	Guide, male	09769	200833-4
	1	Guide, female	09769	203964-2
R1	1	Jackscrew	44655	200874-2
R2	1	Resistor, variable, 10K ohms, 2W	44655	RV4N-AVSD-CMU-1031
R3	1	Resistor, 24K ohms, 2W	44655	RC20GF243J
R4	1	Resistor, variable 50K, 2W	44655	RV4N-AVSD-CMU-5031
R5	1	Resistor, variable 500 ohms, 2W	44655	RV4N-AVSD-CMU-5011
R6	1	Resistor, 250 ohms, ½ W.5%	44655	RC20GR251J
R7	1	Resistor, 3K,1/2 W .5%	44655	RC20GR302J
R8	1	Resistor, 100 ohms, ¼ W.1%	44655	9525493-97
S1-S3	3	Resistor, 68 ohms, ½ W , 5%	44655	RC20GR620J
S4-S6	3	Switch, SPST	09353	7101
TB1	1	Switch, SPST	15601	8803K6
	1	Terminal board	83330	2811
	1	Knob	-	MS-91528-2F23
	1	Chassis	Bud	AC-424
	1	Bracket	49671	A1545494
	1	Nameplate	49671	A1547245
	1	Label, caution	49671	A1545880
	1	Bottom plate	49671	C2052596
	4	Bumper, rubber	83330	2195
	3	Plug, vent	83330	656
	4	Lampholder, LED	Dialco	24-7871-3731-504
	8	Spacer	83330	2340

b. Chassis Layout. A layout diagram of the rf low power alarm test fixture is shown in figure 4-4.

c. Chassis Markings. Chassis markings for the rf low power alarm test fixture are shown in figure 4-5.

d. Schematic Diagram. The schematic diagram for the rf low power alarm test fixture is shown in figure 4-6.



HOLE SCHEDULE		
HOLE	SIZE	QTY.
A	.257	29
B	.386	7
C	.468	3
D	.128	18
E	.149	4
F	.081	3
G	.070	2
H	.50	1

EL60V013

Figure 4-4. Rf Low Power Alarm Test Fixture, Chassis Layout.

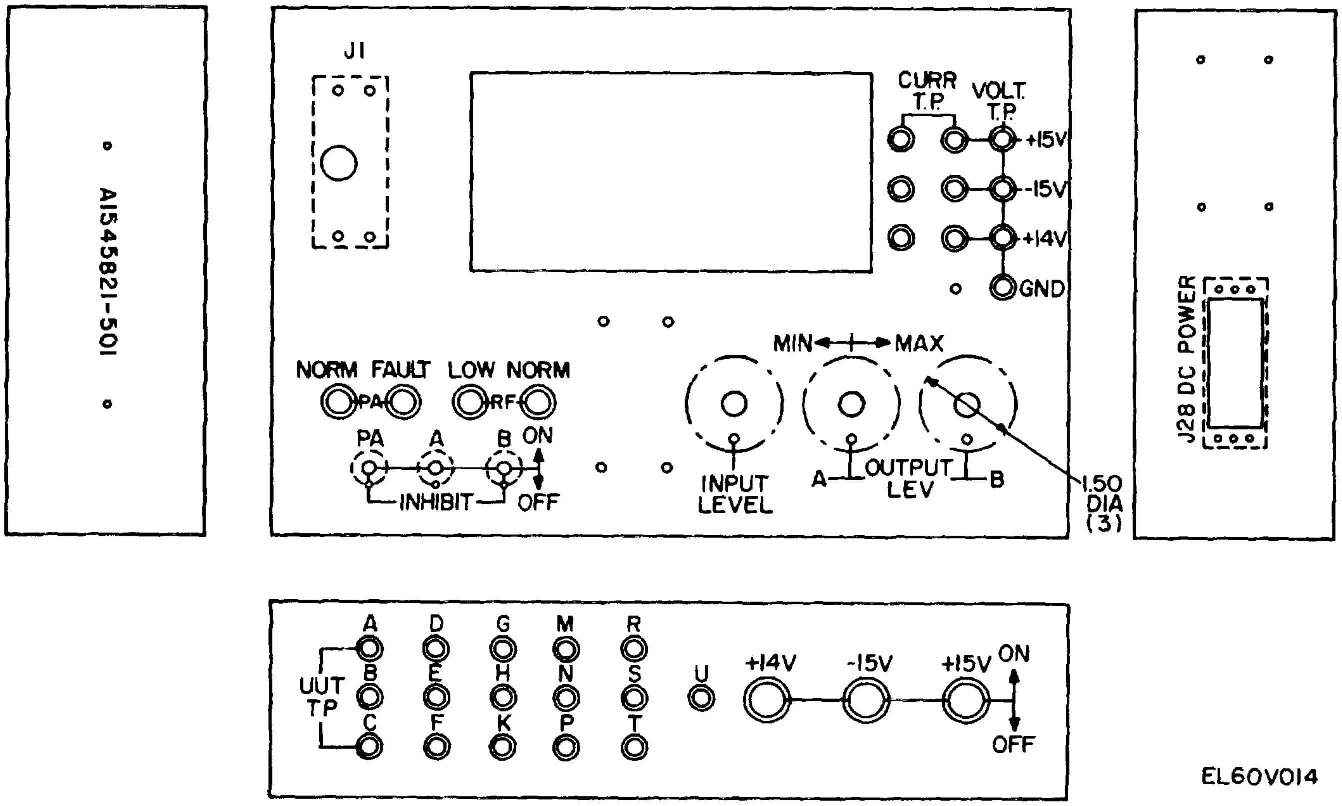


Figure 4-5. Rf Low Power Alarm Test Fixture, Chassis Markings.

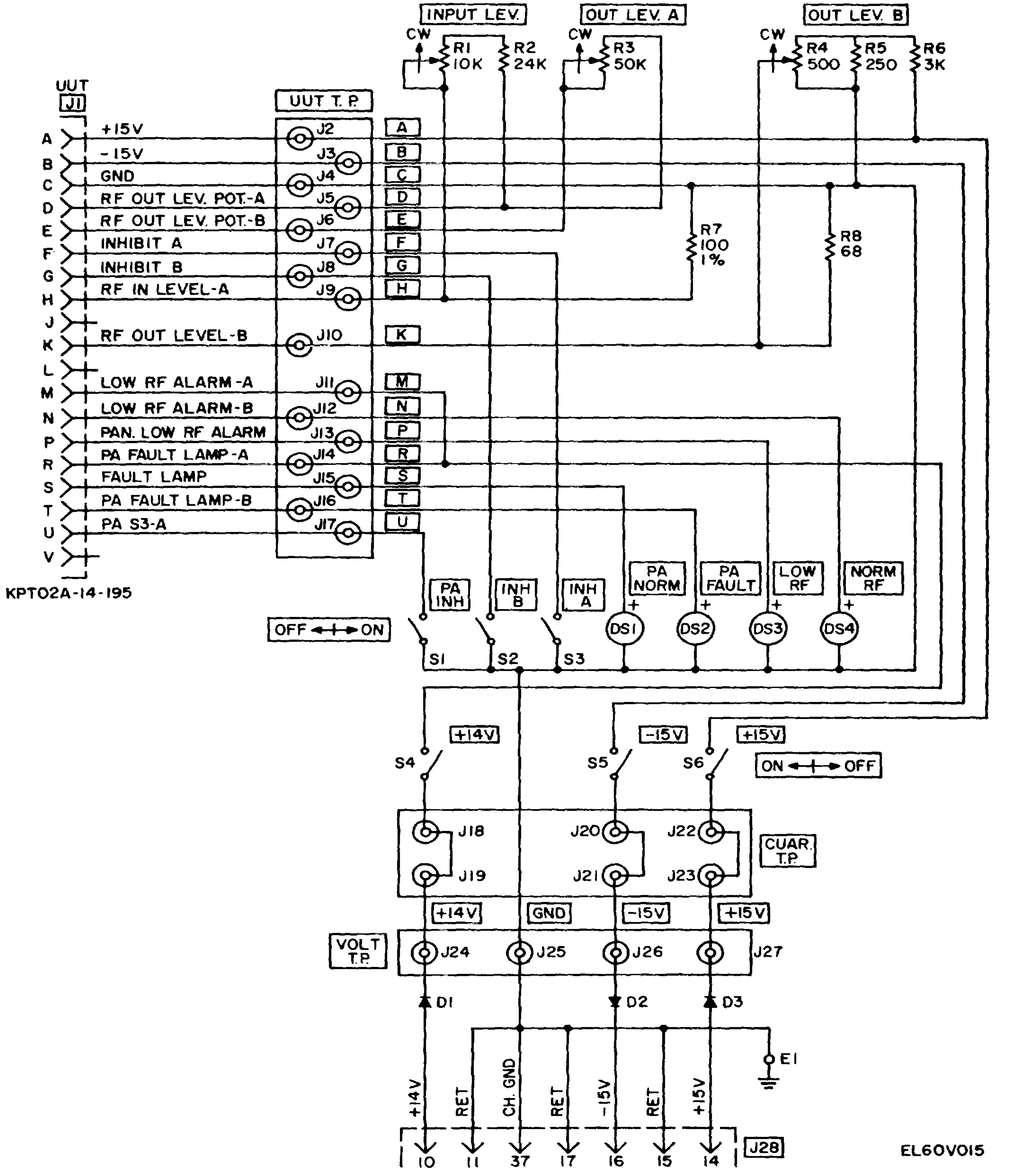


Figure 4 - 6. Rf Low Power Alarm Test Fixture, Schematic Diagram.

Section II. TROUBLESHOOTING

4-7. General

This section contains test and troubleshooting procedures for rf low power alarm assembly A5 and transient suppressor assembly A4. These procedures should be performed if a malfunction was detected at a lower level of maintenance.

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4-8. Rf Low Power Alarm Assembly A5

a. Test Equipment. Table 4-6 contains a list of the test equipment required to perform the rf low power alarm test and troubleshooting procedures of table 4-7. If any test equipment must be sub- stituted, be sure to verify that the substituted equipment has the capability and accuracy to perform the functions required.

Table 4-6. Test Equipment Required for Rf Low Power Alarm Assembly A5 Test and Troubleshooting

Test equipment	Qty	NSN or part No.	Function
Power Supply (Hewlett-Packard 6202B)	3	6625-00-439-5080	Supply voltages required for test and troubleshooting.
Digital Multimeter (Fluke 8000A)	1	6625-00-322-8715	Voltage measurements.
Rf Low Power Alarm Test Fixture (RCA)	1	A1545821	Provide interface between UUT and test setup.

b. Initial Procedures. Perform the following procedures prior to performing the rf low power alarm test and troubleshooting procedures in c below:

(1) Place all test fixture switches in the OFF position.

CAUTION

Do not make connections to the low power alarm assembly with power applied. The rf low power alarm contains solid-state circuits that will be damaged if connections are made with power applied.

(2) Connect the rf low power alarm to the test setup as shown in figure 4-7.

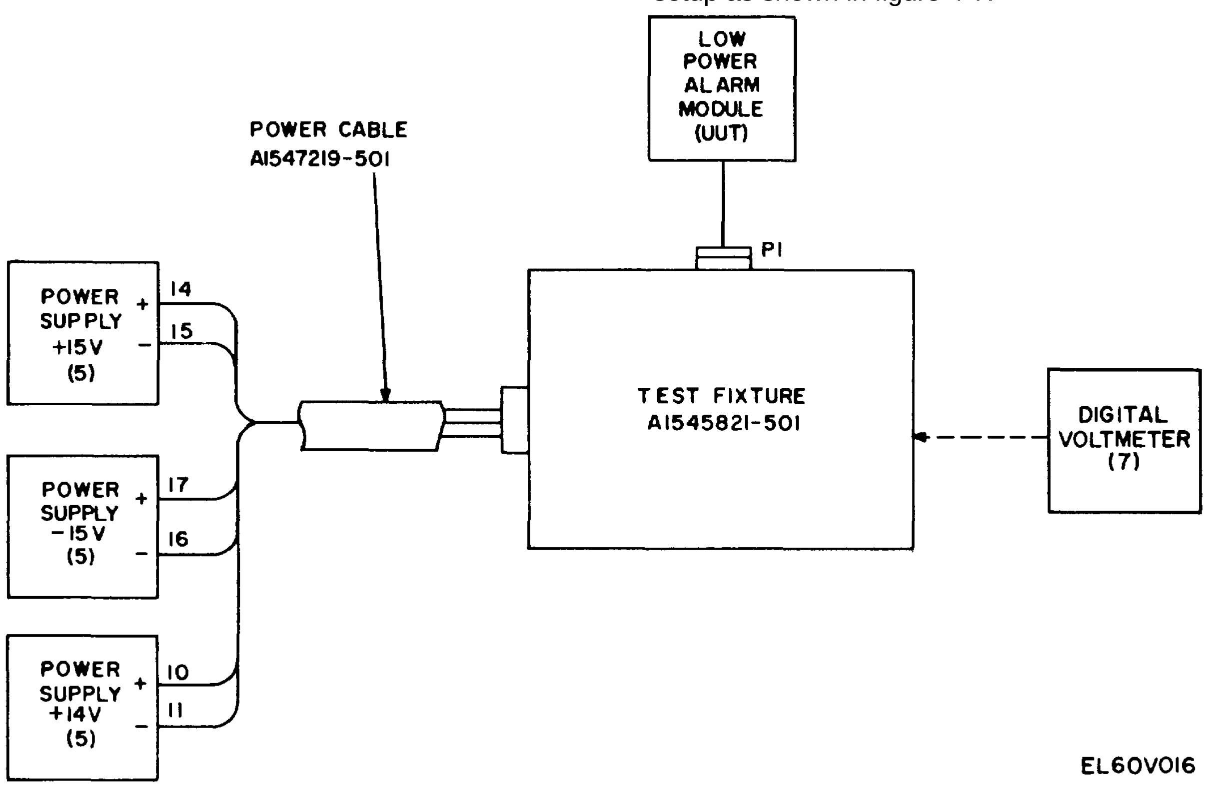

Figure 4 - 7. Rf Low Power Alarm Assembly, Test Setup

(3) Connect the equipment to a 120 +5 vac source and turn on equipment.

(4) Connect digital voltmeter (dvm) between each of the power supply volt TP's and GND on the test fixture, and adjust each power supply to its appropriate level as indicated below:

VOL T TP	*ADJUSTMENTLEVEL*
+ 15V	+ 15 +0.2 vdc
- 15V	- 15 +0.2 vdc
+ 14V	+ 14 +0.2 vdc

c. Test and Troubleshooting Procedures. Perform the procedures in table 4-7 to test and troubleshoot a suspected faulty rf low power alarm assembly. Always perform the procedures from the beginning. When the steps of table 4-7 have been performed with no abnormal indications, the rf low power alarm can be returned to stock or normal operation in the terminal. If an abnormal indication is obtained during performance of the procedures, instructions to correct the problem are given in the remarks column of table 4-7. When the fault is repaired, retest the rf low power alarm to confirm that it is normal. See figure 4-8 for rf low power alarm assembly component location and figure FO-3 for schematic diagram. Refer to figure FO-3 for voltage measurements.

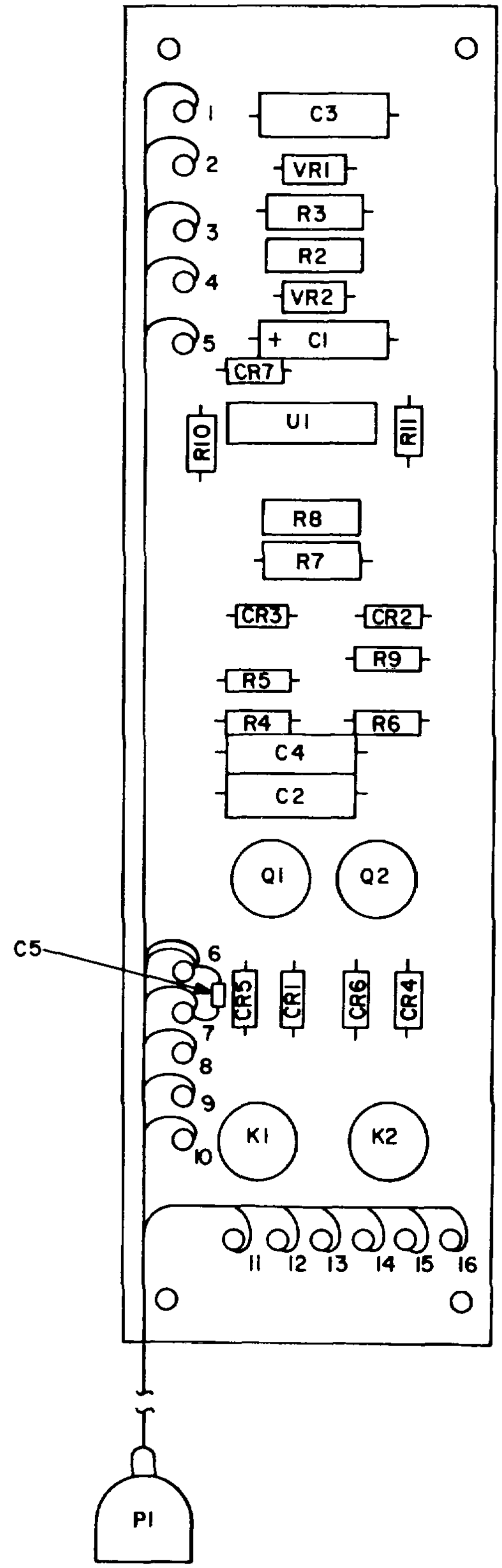

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Figure 4-8. Component Location Diagram, Rf Low Power Alarm Assembly A5.

Table 4-7. Low Power Alarm Assembly A5, Test and Troubleshooting

Step	Test conditions	Normal indication	Remarks
	ALARM OPERATION		
1	Perform the initial procedures in paragraph 4-8.		
2	On the test fixture, turn the +14V, +15V and -15V switches to ON.		
3	Readjust the +15V power supply to +15 +0.2 vdc, - 15V power supply to - 15 +0.2 vdc, and the + 14V power supply to + 14 +0.2 vdc.		
4	On the test fixture, turn the three potentiometers INPUT LEVEL, OUTPUT LEV A and OUTPUT LEV B fully ccw and turn switches PA, A, B INHIBIT to the OFF position.	RF LOW lamp and PA NORM lamps ON.	Check Q1 and Q2, U1, and relays K1 and K2.
5	Slowly turn the potentiometer OUTPUT LEV B clockwise until LOW RF lamp goes off and RF lamps ON < 30 mv. NORM goes on test fixture. Measure and record the voltage present at UUT TP K using the dvm.	RF NORM lamp and PA NORM	Check U1, Q, and K1.
6	On the test fixture, slowly turn OUTPUT LEV B control ccw until RF NORM lamp goes off and LOW RF lamp goes on. Measure the voltage present at UUT TP K with the dvm.	O to 8 mv less than reading in step 5.	Check Ul,Q1, and K1.
7	On the test fixture turn OUTPUT LEV B control fully ccw and INHIBIT B switch to ON.	PA NORM lamp OFF PA FAULT lamp ON RF LOW lamp ON RF NORM lamp OFF	Check Q2, and K2.
8	On the test fixture, turn switch INHIBIT A to ON.	PA NORM lamp ON PA FAULT lamp OFF RF LOW lamp OFF RF NORM lamp ON	Check K1, K2, CR5, and CR6.
9	On the test fixture turn switch INHIBIT A to OFF.	PA NORM lamp OFF PA FAULT lamp ON RF LOW lamp ON RF NORM lamp OFF	Check K1 and K2.
10	On the test fixture, turn PA INHIBIT switch to ON.	PA NORM lamp ON PA FAULT lamp OFF RF LOW lamp OFF RF NORM lamp ON	Check CR5, CR6, K1,and K2.
11	On the test fixture, turn PA INHIBIT switch to OFF.	PA NORM lamp OFF PA FAULT lamp ON RF LOW lamp ON RF NORM lamp OFF	Check K1 and K2.
12	On the test fixture, turn switch INHIBIT B to OFF.	PA NORM lamp ON PA FAULT lamp OFF RF LOW lamp ON RF NORM lamp OFF	Check Q2 and K2.
13	On the test fixture, slowly turn the INPUT LEVEL control cw until the PA FAULT lamp goes on and PA NORM lamp goes off. Measure and record the voltage present at UUT TP H on the test	52 to 60 mv	Check U1, Q2, and K2.
14	On the test fixture, slowly turn the INPUT LEVEL control ccw until the PA FAULT lamp goes off and PA NORM lamp goes on. Measure and record the voltage present at UUT TP H using the dvm.	0 to 8 mv less than reading in step 13 above.	Check U1, Q2, and K2
15	On the test fixture, turn INPUT LEVEL pot fully ccw and the OUTPUT LEV A control to the		
16	On the test fixuture, turn the OUTPUT LEV B control cw just until the LOW RF lamp goes off and the RF NORM lamp goes on. Record the voltage present at UUT TP K using the dvm.	215mv+20mv	Check U1,Q1. AndK1.
17	On the test fixture, slowly turn the OUTPUT LEV B ccw until RF NORM lamp goes off and LOW RF lamp goes on. Measure the voltage present at TP K using the dvm.	0 to 8 mv less than reading in step 16 above.	Check U1, Q1, and K1.
18	Set all the DC power switches on the test fixture OFF and disconnect UUT.		

4-9. Transient Suppressor Assembly A4

a. Test Equipment Required. Table 4-8 contains a list of the test equipment required to perform the transient suppressor test and troubleshooting procedures of table 4-9. If any test equipment must be substituted, be sure to verify that the substituted equipment has the capability and accuracy to perform the functions required.

Table 4-8. Test Equipment Required for Transient Suppressor Assembly A4, Test and Troubleshooting

Test equipment	Qty	NSN or part No.	Function
Power Supply (Hewlett-Packard 6202B	1	6625-00-439-5080	Supplies voltage required for test and troubleshooting.
Test Fixture, Transient Suppressor (RCA)	1	A1547616	Provides interface between UUT and test setup.
Multimeter, Digital (Fluke 8000A)	1	6625-00-322-8715	Voltage measurements.

b. Initial Procedures. Perform the following procedures prior to performing the transient sup- pressor assembly test and troubleshooting procedures in c below:

(1) Place the test fixture RELAY SEL switch in the OFF position.

CAUTION

Do not make connections to the transient suppressor assembly with power applied. The transient suppressor assembly contains solid-state circuits that will be damaged if connections are made with power applied.

(2) Connect the transient suppressor assembly (UUT) to the test set-up as shown in figure 4-9 without connecting the power supply.

(3) Connect equipment to 120 +_5 VAC source and turn on equipment.

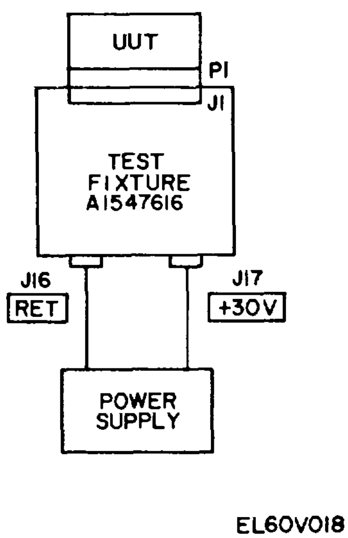


Figure 4-9. Transient Suppressor Assembly A4, Test Setup.

c. Test and Troubleshooting Procedures. Perform the procedures in table 4-9 to test and troubleshoot a suspected faulty transient suppressor assembly. Always perform the procedures from the beginning. When the steps of table 4-9 have been performed with no abnormal indications, the transient suppressor assembly can be returned to stock or normal operation in the terminal. If an abnormal indication is obtained during performance of the procedures, instructions to correct the problem are given in the "if indication abnormal" column of table 4-9. When the fault is repaired, retest the transient suppressor assembly to confirm that it is normal. See figure 4-10 for transient suppressor assembly component location and figure 2-1 for schematic diagram.

Table 4-9. Transient Suppressor Assembly (SM-D-935507)A4 Performance Test Procedure

Step	Operation	Normal indication	If Indication abnormal
1	Refer to paragraph 4-9 for initial procedures and set up.		
2	With the digital multimeter set to measure resistance, measure the resistance between the two test points labeled R1 on the test fixture.	34.8 K Ω.+ 10%	Replace R1.
3	Using the digital multimeter, measure the resistance between the two test points labeled R2 on the test fixture.	9090 Ω +o10%	Replace R2.
4	While observing the digital multimeter, measure the resistance between test points R3-1-2 and R3-3 on the test fixture while adjusting R3 on the UUT through its entire range.	Continuously variable from 0 to 50 KΩ + 10%	Replace R3.
5	Set the digital multimeter to measure dc voltage and connect between the test points +30 and GND on the test fixture.		
6	Verify that the power supply is off and turn the VOLTAGE adjust control fully counterclockwise Connect the power supply to the test fixture as shown in figure 4-9.		
7	Turn the powersupply switch to ON. Turn the VOLTAGE adjust control clockwise until +30 +0.5V is indicated on the digital multimeter.		
8	Set the RELAY SEL switch to the 2 position and readjust the power supply, if necessary. Connect the digital multimeter between test points COAX SW and J 1-8 on the test fixture.	+29.5 ±0.6V	Replace CR2.
9	Set the RELAY SEL switch to the 1 position and connect the leads between JI-9 (+ lead) and J1 8 (- lead) and observe the indication	-0.7 +0.2V	Check CR1, R4, and R5.
10	Connect the digital multimeter leads between COAX SW (+ lead) and J 1 8 (- lead) and observe the indication.	-0.7 ±0.2V	Replace CR2.
11	Set the digital multimeter to measure resistance and connect between K1 2 and K1 3 test points on the test fixture.		
12	Set the RELAY SEL switch to position 1 and observe the indication on the digital multimeter	0 +0.2 Ω	Check K1 and C1.
13	Set the RELAY SEL switch to OFF and observe multimeter display for a flashing display of 1999 when set on highest scale. This indicates infinite ohms.	Infinite ohms	Replace K1.
14	Set the RELAY SEL switch to position 2 and observe the indications on the multimeter.	Infinite ohms	Replace CR2.

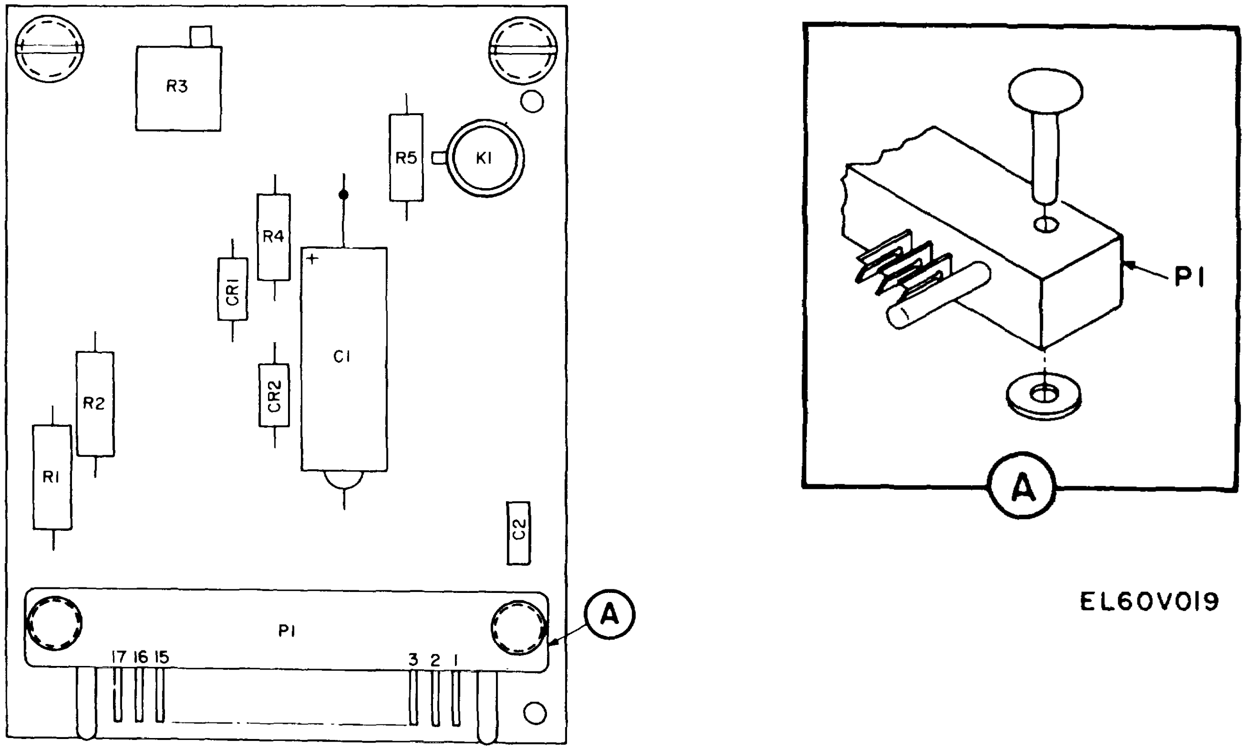


Figure 4-10. Component Location Diagram, Transient Suppress or Assembly A4.

Section III. REPAIR

4-10. General

Repair of the rf low power alarm assembly and thermoelectric power alarm consists of removing and replacing faulty components on the circuit boards. Standard shop practices should be used for these repairs. A low wattage (30 watts or less) soldering iron along with suitable heatsinks should be used to remove and replace components. The general practices and precautions for printed circuit boards and microelectronic components should be observed when performing the repairs.

4-11. Replacement of Resistors, Diodes, and Capacitors

a. *Removal.* Remove leads not connected to the ground plane first.

CAUTION

Do not apply heat at a through hole for more than 8 seconds.

NOTE

Before removing diodes or polarized capacitors, note polarity markings and orientation on the circuit board.

(1) On the back of the board (side opposite components), place soldering iron on the pad of the component to be removed until the solder begins to melt (fig. 4-11.

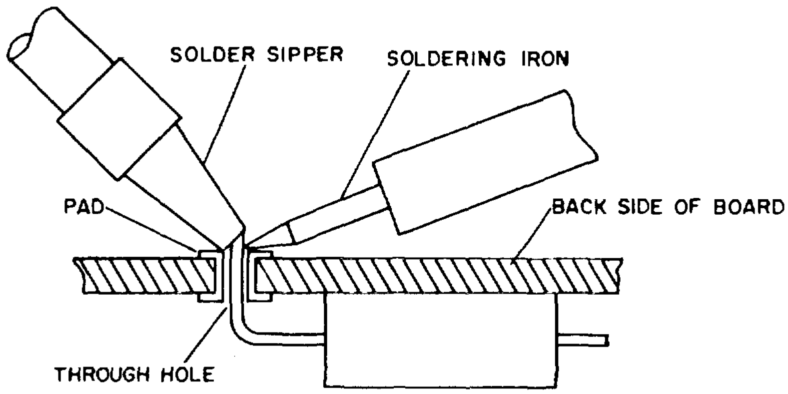


Figure 4-11. Two Lead Component Removal Diagram.

(2) Use a solder sipper and remove the solder from the hole. More solder may be required to conduct heat into the hole and provide better suction for removal.

(3) With long-nose pliers, remove the lead from the hole. It may be necessary to reheat the lead as a certain amount of solder will remain in the through hole.

(4) Repeat the procedure if the remaining lead is not connected to the ground plane. If the lead is connected to the ground plane, proceed with steps (5) and (6).

(5) On the component side of the circuit board, clip the lead as shown in figure 4-12.

(6) Apply soldering iron tip to the pad and lead. When the solder begins to melt, grasp the lead end with long-nose pliers. Gently extract the lead from the through hole. Be sure that the through hole is completely heated, and that the solder has melted on both sides of the board. If excessive force is applied, the through hole may be pulled out of the board along with the lead.

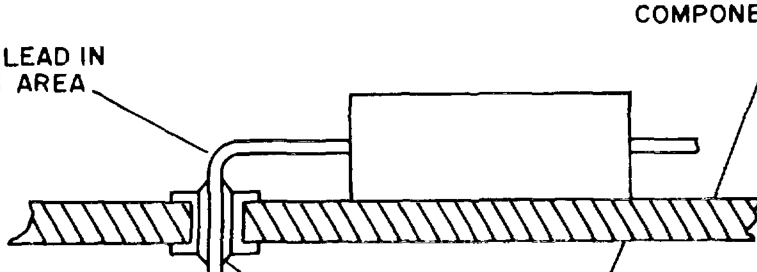


Figure 4 - 12. Ground Plane Lead Removal Diagram.

(7) When all leads have been unsoldered, remove component from the circuit board.

NOTE

It may be necessary to reheat some through holes. While reheating, use the tip of the soldering aid to push the lead to the center of the hole to prevent resoldering.

(8) When component has been removed, reheat the ungrounded holes. When the solder is melted, use a solder sipper to remove excess solder. Repeat procedure as necessary until the holes are clear as indicated by lack of solder on the walls, top, or bottom.

b. Installation.

WARNING

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

(1) Use a small paint brush or the tip of a pipe cleaner dipped in trichlorotrifluoroethane; and carefully clean both sides of the surface area, the through holes, and pads.

(2) Observe polarity markings, and properly orient the component. Shape the leads of the new component so that the leads fit freely into the correct through holes.

CAUTION

When installing diodes, attach a heatsink to the lead, near the body of the diode, before soldering. Do not apply heat at a through hole for longer than 8 seconds. Figure 4-13.

NOTE

If one lead of the component is to be connected to a ground plane, connect that first. If no connection is to be made to the plane, proceed to (4) below.

(3) Preheat the through hole connected to the ground plane. When the solder begins to melt, insert the lead. Refer to figure 4-13.

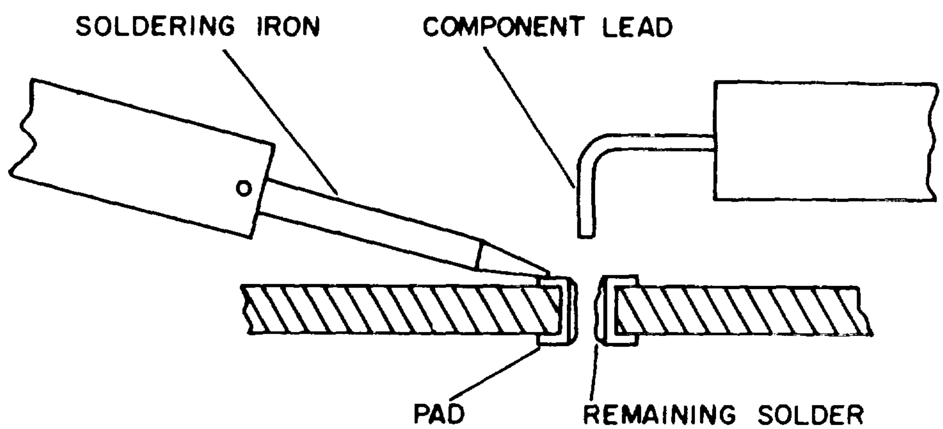
(4) Gently maneuver the component to insert leads into the proper through holes. Continue with a gentle rocking movement until the component is inserted to the proper depth, or until the body of the component makes contact with the surface of the circuit board. Heat through holes as necessary to install component.

NOTE

Do not crimp or bend leads to hold the component in position for soldering. The protruding portion of the lead should remain straight to prevent damage to the circuit board if subsequent replacement is required.

(5) Use diagonal cutting pliers to cut leads so that the protruding lengths match those of other components, approximately 1.5 mm (0.063 in.).

(6) Use flux and solder sparingly. Solder each lead at the side opposite the component. Be sure that the component does not shift position during the soldering procedure.



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(7) Carefully inspect all new solder points for evidence of poor connections, cold solder, or short circuit. Solder should completely fill the through hole without excess solder. Refer to figure 4-14.

(8) Use a small paint brush or the tip of a pipe cleaner dipped in solvent and thoroughly clean all new soldered points. Be sure that all flux and rosin are removed. A round toothpick may be used to help remove heavy rosin deposits. Solder points should appear clean, smooth, and bright.

(9) Use a small paint brush dipped in urethane coating (M4605-8 Type UR or equivalent) and cover all new solder points on both sides of board.

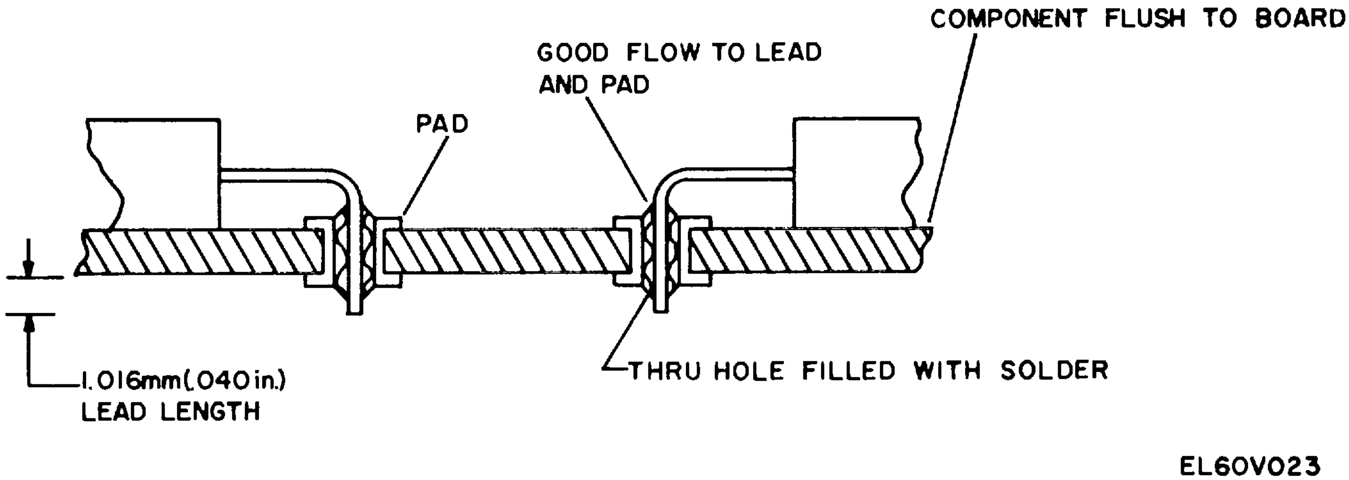

Figure 4 - 14. Two - Lead Component Installation.

4-12. Replacement of Multilead Components

a. Removal (fig. 4-15).

(1) Locate the component to be removed. Note the position, lead conformation, and physical alignment of the component. Observe the position of the orientation tab (if any). Determine the pads and through holes used for mounting.

(2) Lay the circuit card on a clean surface with the component side down.

CAUTION

Do not apply heat at a pad or through hole for longer than 8 seconds.

NOTE

If any lead is connected to the ground plane, remove that lead last. Do not remove the solder from the associated through hole.

(3) Place the soldering iron tip to one pad and lead until the solder beings to melt. Use a solder sipper to remove excess solder. More solder may be required to conduct heat into the hole and to provide suction for solder removal.

(4) Allow circuit board to cool before applying heat to through holes in the same area. Repeat procedure for each lead not connected to the ground plane, then perform (5) below.

(5) Apply soldering iron tip to the pad and lead connected to the plane. When the solder begins to melt, grasp the component and gently extract the lead from the through hole. Be sure that the through hole is completely heated and that the solder has melted on both sides of the circuit board. If excessive force or twisting motion is applied, the through hole may be pulled out of the board along with the lead.

NOTE

It may be necessary to reheat some through holes because of residual solder in the holes. While reheating, use the tip of a soldering aid to push the lead to the center of the hole to prevent resoldering. Refer to figure 4-15.

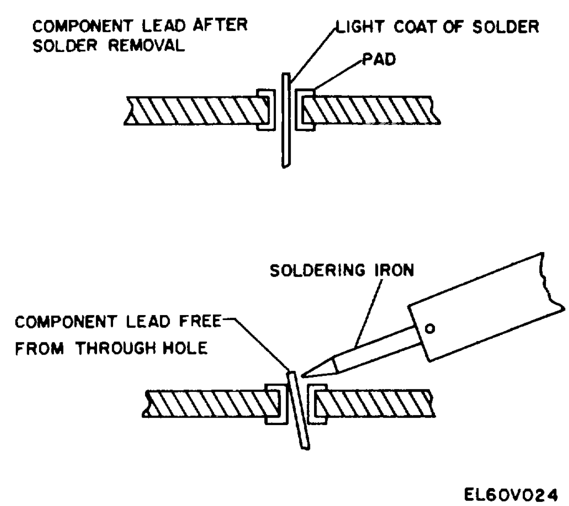

Figure 4-15. Multilead Component Removal Diagram.

(6) When all leads have been unsoldered, remove the component from the board.

(7) When the component has been removed, reheat each hole that is not connected to the ground plane. When the solder is melted, use a solder sipper to remove excess solder. Allow the circuit board to cool before reapplying heat in the same area. Repeat procedure as required until each through hole is

clean as indicated by the absence of solder on the walls, top, and bottom.

b. Installation (fig. 4-16).

(1) Use a small paint brush or the tip of a pipe cleaner dipped in solvent and carefully clean both sides of the circuit card in the mounting area. Clean the mounting holes and pads.

(2) Carefully bend the leads of the new component to the same configuration of the old one so that the leads fit into the correct through holes. Do not cut the leads at this time.

CAUTION

Do not apply heat at a through hole for longer than 8 seconds.

(3) Apply soldering iron tip to the through hole that is connected to the plane. When the solder begins to melt, insert the proper lead into the through hole. Be sure that the component is properly oriented on the circuit board.

(4) Gently maneuver the component, inserting the leads into the proper through holes. Continue with rocking movement until the component is inserted to the proper depth.

NOTE

Do not crimp or bend leads to hold the component in position for soldering. The protruding portion of the lead should remain straight to prevent damage to the circuit card if subsequent replacement is required.

(5) Use diagonal cutting pliers. Cut the leads so that the protruding lengths match those of other components, approximately 1.5 mm (0.063 in.).

CAUTION

Do not apply heat at a through hole for longer than 8 seconds.

(6) Use flux and solder sparingly. Solder each lead at the side opposite the component. Be sure that the component does not shift position during the soldering procedure.

(7) Allow circuit card to cool before applying heat to the other through holes. Repeat procedure for each lead.

(8) Carefully inspect all new solder points for evidence of poor connections, cold or excess solder, or short circuits. Solder should completely fill the hole without excess solder (fig. 4-16).

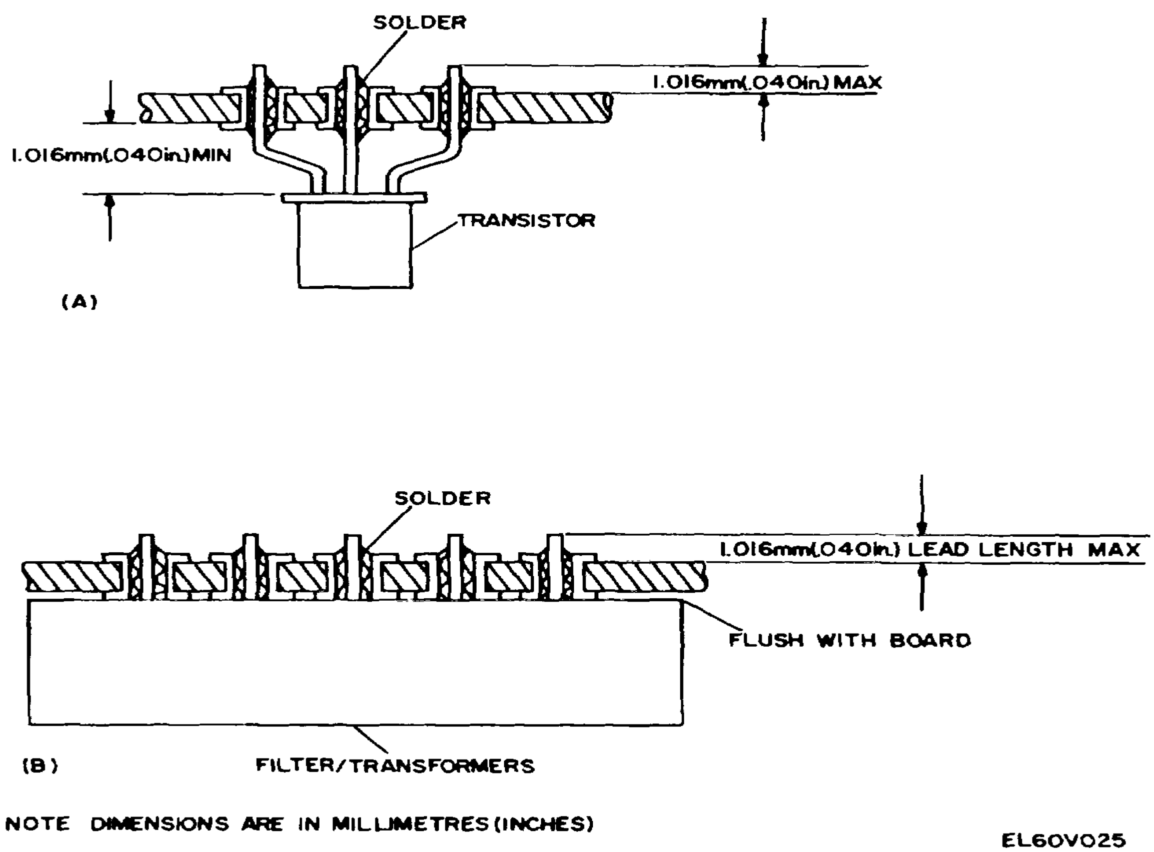

Figure 4 - 16. Multilead Component Installation.

WARNING

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

(9) Use a small paint brush or the tip of a pipe cleaner dipped in trichlorotrifluoroethane. Thoroughly clean all newly soldered points. Be sure that all flux and resin are removed. A round toothpick may be used to remove heavy resin deposits. Solder points should be clean, smooth, and bright.

(10) Use a small paint brush dipped in urethane coating (M4605-8 type UR or equivalent) and cover all new solder points on both sides of the board.

CHAPTER 5
PRESERVATION, PACKAGING, PACKING, MARKING AND SHIPPING

5-1. General

If the amplifier-mixer unit or any of the assemblies tested in chapters 3 and 4 are found to be defective, they should be packaged in accordance with MIL-E-17555G and returned to the depot. When packing, use sufficient insulation to provide adequate cushioning between the unit and the container. Desiccant dehydrators (Military Specification MIL-D-9394A, or equivalent) should be included in the shipping case. Cards and printed circuit boards should be packed in cartons lined with urethane foam fingers to provide maximum protection for the integrated circuits and other components.

APPENDIX A
REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
TM 11-5895-846-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Satellite Communications Terminal AN/TSC-86 (NSN 5895-01-083-6891) (To be published).
TM 11-5895-846-24P	Operational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Satellite Communications Terminal AN/TSC-86 (NSN 5895-01-083-6891) (To be published).
TM 11-5895-1090-24P	Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Amplifier-Mixer AM-6704/TSC (NSN 5895-01-083-0726).
TM 11-6625-654-14	Operator's, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for Multimeter AN/USM-223.
	TM 38-750 The Army Maintenance Management System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).
	TO-00-35D54 US Air Force Material Efficiency Reporting and Investigating System.

By Order of the Secretaries of the Army and the Air Force:

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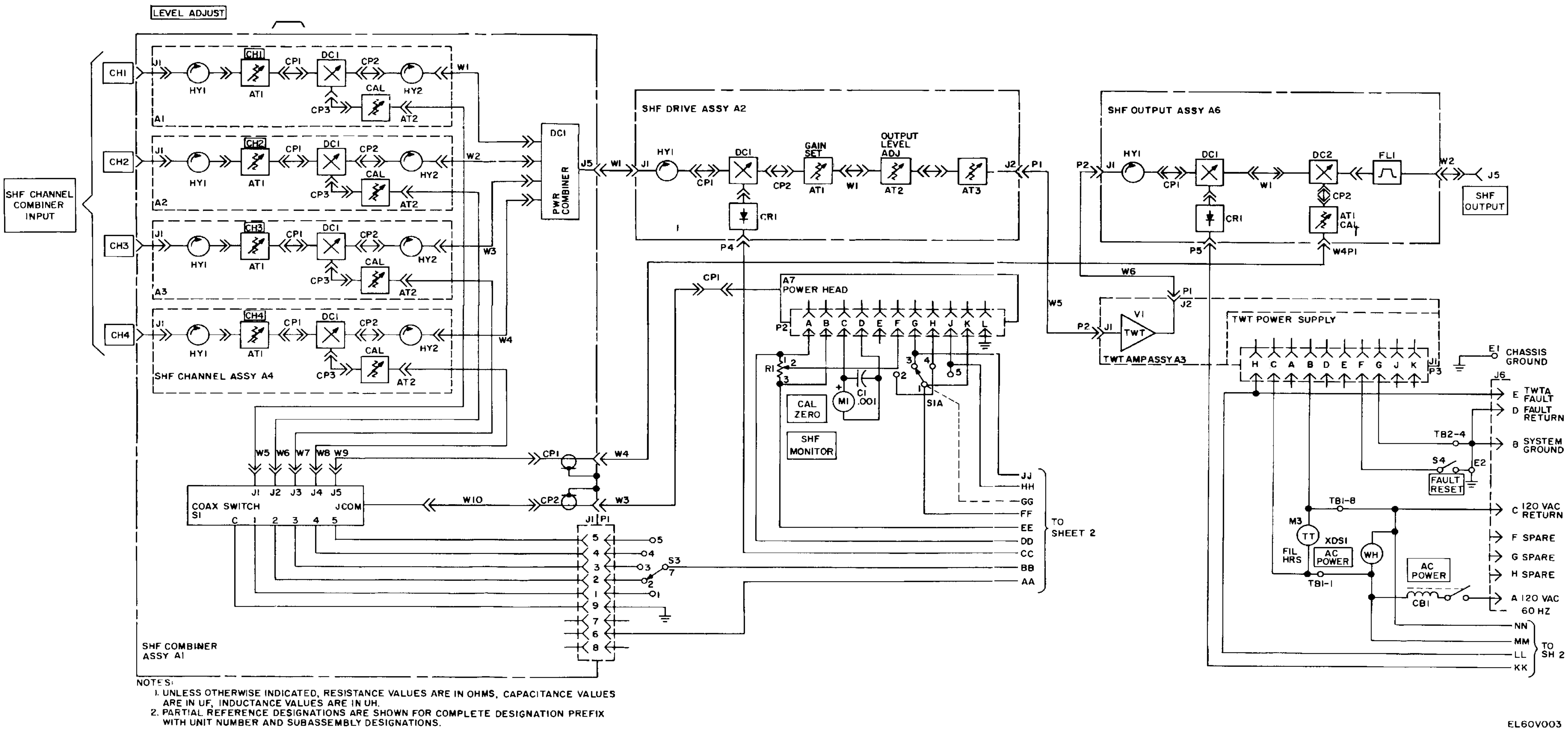


Figure FO-2. (1). Amplifier-mixer Schematic Diagram (Sheet 1 of 2).

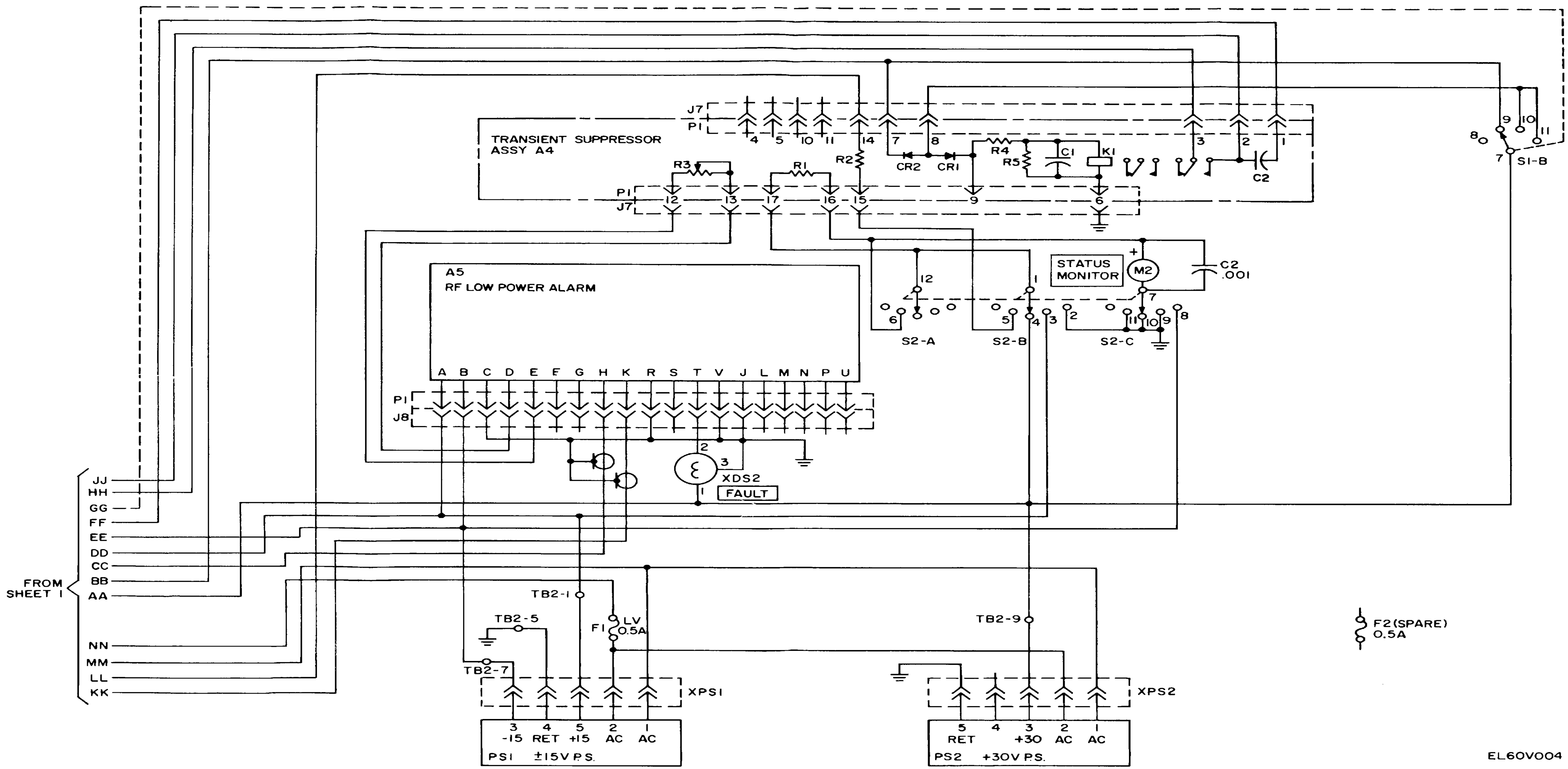


Figure FO-2. (2). Amplifier-Mixer Schematic Diagram (Sheet 2 of 2).

STEPS IN TABLE 4-7

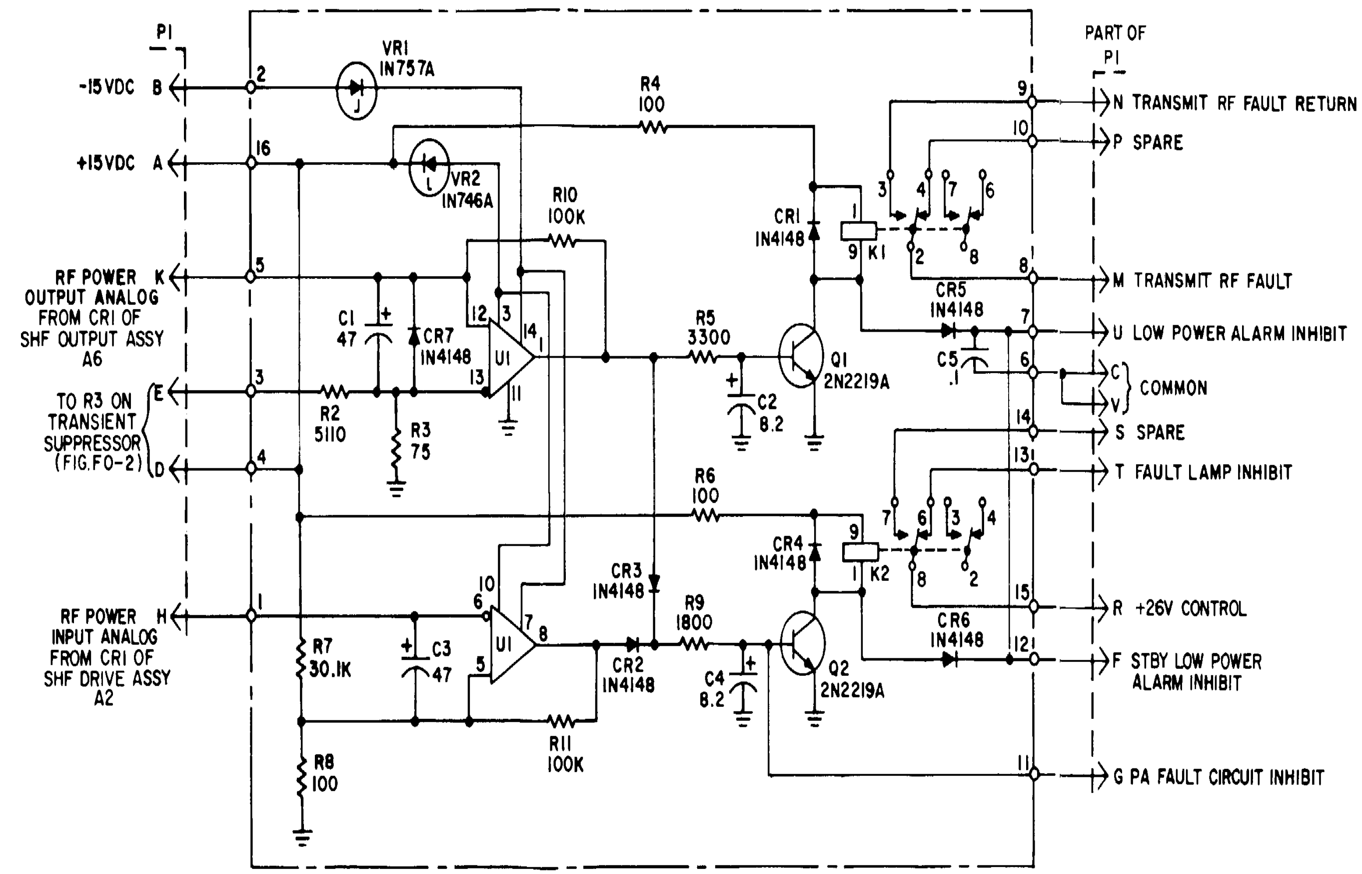
COMPONENT	4	5	6	7	8	9	10	11	12	13	14	15	16
UI-12	0	0.025	0.023	0	0					0	0	≥.265	≥.198
UI-13	0.024	0.024	0.024	0.024	0.024		0.024			0.024	0.024	≥.205	≥.193
UI-1	+0.5 TO -0.7	3.5	+0.5 TO -0.7	+0.5 -0.7	+0.5 -0.7		+0.5 -0.7			+0.5 -0.7	+0.5 -0.7	3.5	+0.5 -0.7
UI-6	0.045	0.045	0.045	0.045	0.045	SAME AS STEP 7	0.045	SAME AS STEP 7	SAME AS STEP 4	0.052 TO 0.060	+0.045 +0.060	0.055	0.055
UI-5	0.055	0.055	0.055	0.055	0.055		0.055			0.055	0.055	0.055	0.055
UI-8	3.5	3.5	3.5	3.5	3.5		3.5			+0.5 -0.7	3.5	3.5	3.5
CRI CATHODE	15	13.5	15	15	13.5		13.5			15	15	13.5	15
CRI ANODE (QI-C)	15	0.6	15	15	0.8*		0.8*			15	15	0.6*	15
C2+(QI-B)	+0.5 -0.7	0.8*	+0.5 -0.7	+0.5 -0.7	+0.5 -0.7		0.8*			+0.5 -0.7	+0.5 -0.7	0.8*	+0.5 -0.7
CR4 CATHODE	13.5	13.5	13.5	15	13.5		13.5			15	13.5	13.5	13.6
CR4 ANODE (Q2-C)	0.6*	0.6*	0.6*	15	0.8*		0.8*			15	0.6*	0.6*	0.6*
C4+(Q2-B)	0.8*	0.8*	0.8*	0	0		0			0+	0.8*	0.8*	0.8*

UNLESS OTHERWISE SPECIFIED ALL VOLTAGES ARE POSITIVE WITH RESPECT TO GROUND

* MAXIMUM VALUES

ALL OTHER VOLTAGES ±20%

+CAPACITOR C4 IN THIS STEP HAS A VERY LARGE TIME CONSTANT. IF READING IS NOT 0 VOLTS SWITCH INHIBIT B TO ON AND THEN OFF TO MAKE MEASUREMENT.



1. UNLESS OTHERWISE SPECIFIED
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
2. KI DE-ENERGIZED UPON FAULT
3. PI IS CONNECTOR AT END OF CABLE
4. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION PREFIX WITH A5.

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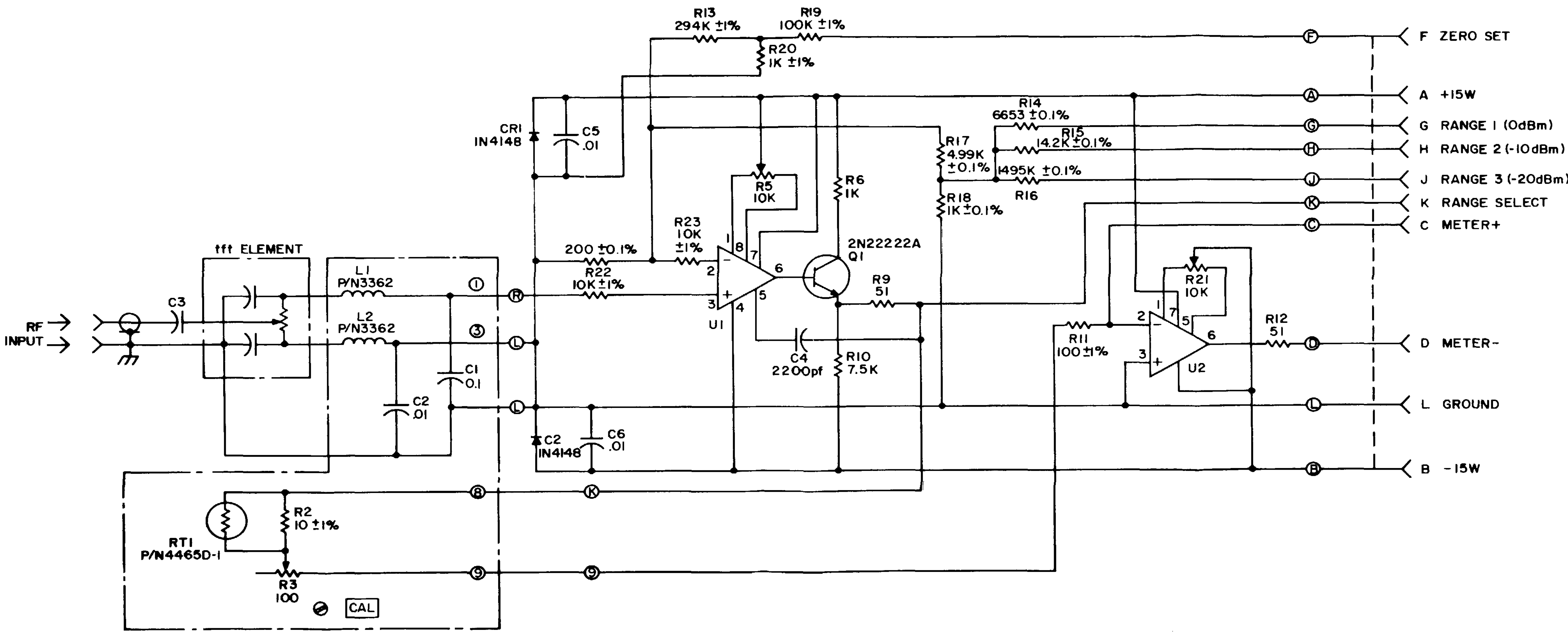
Figure FO-3. Rf Low Power Alarm Assembly A%, Schematic Diagram.



NOTE:
1. UNLESS OTHERWISE INDICATED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.
2. PARTIAL REFERENCE DESIGNATIONS ARE USED. FOR COMPLETE DESIGNATION PREFIX WITH A7.

EL60V007

Figure FO-4. Thermoelectric Power Monitor assembly A7, Schematic Diagram.

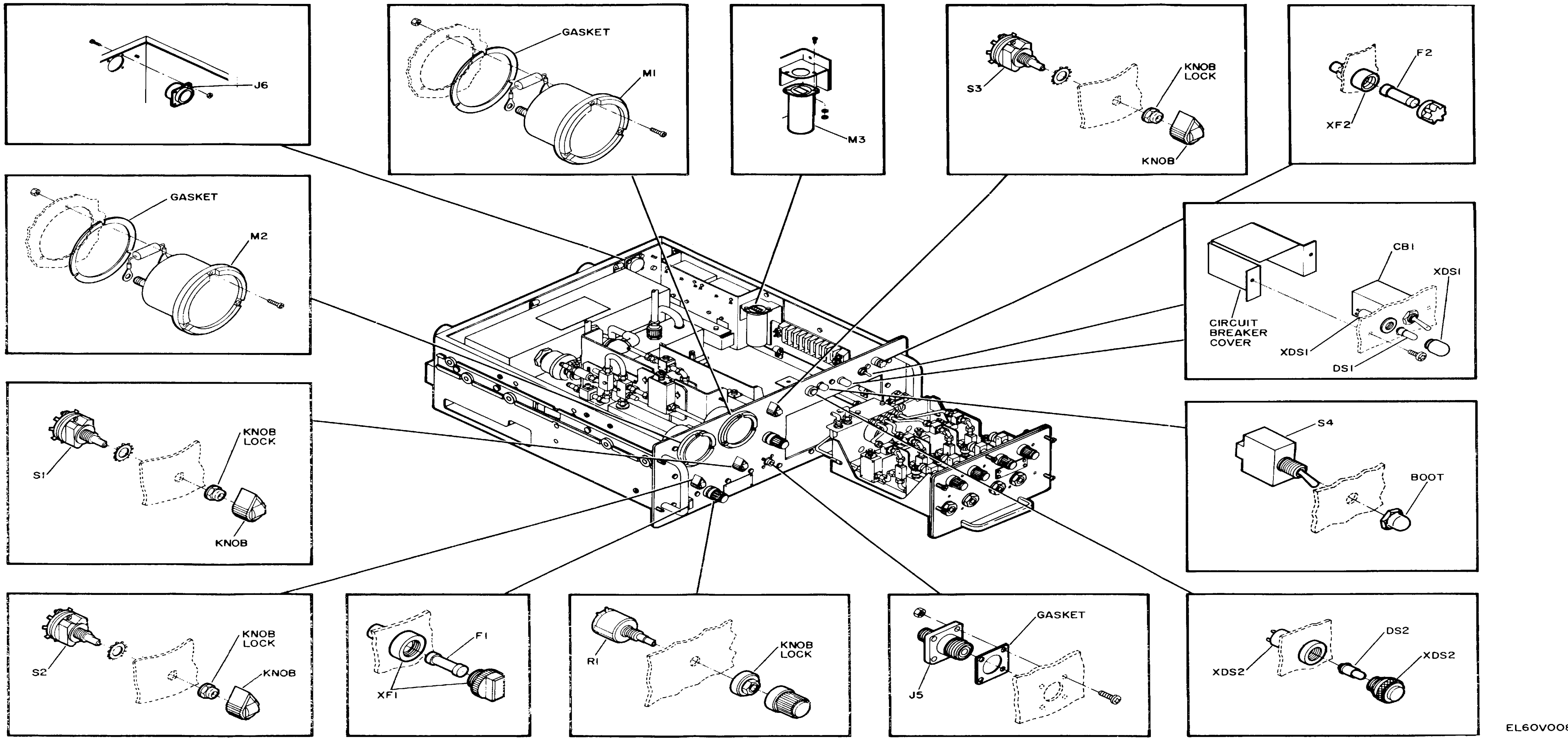


Figure FO-5. Amplifier-Mixer Panel Chassis Component Location.

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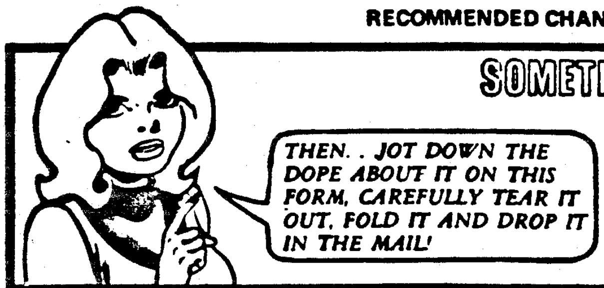

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