TECHNICAL MANUAL

DIRECT SUPPORT, GENERAL SUPPORT, AND

DEPOT MAINTENANCE MANUAL

FOR

TRANSMITTER GROUP

OA-3986/TSC-26

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1974

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Coverage of the following equipments contain extracts from manufacturers commercial literature.

Mast AB-155B/U.. . . . . Barker & Williamson
Transmitter, Telegraph Carrier T-1001/TSC-26. . . . . Northern Radio
Converter, Frequency Shift CV-1981/TSC-26. . . . . Northern Radio
Transmitter, Telegraph Carrier T-947/TSC-26. . . . . Northern Radio
Power Supply PP-4381/G. . . . . Transistor Devices
Low Led Signaling Device/TT-76. . . . . Honeywell
Antenna AS-1612/TSC-26. . . . . Collins
Control-Indicator C-6758/TSC-26. . . . . Collins
Antenna Coupler CU-1642/TSC-26. . Munston
Converter, Single Side Band CV-1982/TSC-26. . Kahn Rearch
Reproducer Sound RP-149/GR. . . Broadcast Electronics
Transmitter, Tone, Remote Control T-1035/TSC-26 Quindar
Power Supply PP-4645/TSC-26 . Quindar
Receiver Tone, Remote Control R-1443/TSC-26 Quindar
Speaker-Amplifier Assy. LS-352/TSC-26 Artic
Dummy Load, Electrical DA-434A/TSC-26 Bird
Test Set, Radio AN/URM-160A . Singer

The following are general safety precautions that are not related to any specific procedure and, therefore, do not appear elsewhere in this publication. These are recommend& precautions that personnel must understand and apply during many plases of operation and maintenance.

WARNING

Maintenance personnel should be familiar with the safety requirements before attempting maintenance or operation of the equipment covered by this manual. Failure to follow requirements and observe safety precautions could result in injury or DEATH.

WARNING

Performance of any field expedient repair creates a condition possibly dangerous to equipment and personnel. The equipment so repaired, should be taken out of service as soon as possible for replacement of the defective parts.

WARNING

Do not operate or perform maintenance on the equipment without a suitable ground connection. Electrical defects in the unit, load lines, or load equipment can cause DEATH by electrocution when contact is made with an ungrounded system.

WARNING

HIGH VOLTAGE is used in this equipment. DEATH ON CONTACT may result if safety precautions are not observed.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 August 1974

DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

FOR

TRANSMITTER GROUP OA-3986 / TSC-26

Chapters 1 through 4 are contained in TM 11-5895-482-35-3-1.

LIST OF ILLUSTRATIONS

CHAPTER 5

DEPOT MAINTENANCE

Section I. INTRODUCTION

5-1. General

Complete rebuild of the AN/TSC-26 and/or of individual components may be accomplished by depot maintenance facilities when authorized. Rebuild procedures of the AN/TSC-26 will include all repairs, rebuild, replacement, and testing operations necessary to make the equipment suitable for return to Department of the Army supply system stocks for reissue to using organizations as equipment equivalent to new material.

5-2. Maintenance Procedures

Detailed procedures for accomplishing the repair and adjustments established in the preceding portions of this manual and such additional repair and rebuild operations as deemed necessary, will be established by the maintenance facility performing the work. Restore the appearance, performance, and life expectancy of the various units of the AN/TSC-26 to a standard comparable to that of new equipment by performing the following procedures:

a. Disassemble all units of the AN/TSC-26 as required.

b. Inspect all component parts of the AN/TSC-26.

c. Repair or replace any worn or unserviceable part with a part that conforms to the original manufacturing specifications and tolerances.

d. Reassemble the various units of the AN/-TSC-26.

e. Perform the testing procedures as outlined in Section II.

Reference designation	Panel marking	Description
DS1	DS1	Lamp, pilot
DS2	DS2	Lamp. pilot
DS3	DS3	Lamp. pilot
DS4	DS4	Lamp. pilot
DS5	DS5	Lamp. pilot
DS6	DS6	Lamp. pilot
DS7	DS7	Lamp. pilot
J1	(+)	Connector, binding post
J2	(-)	Connector, binding post
P1		Plug, facility, 208VAC
P2		Connector plug electrical

5-3. Tools and Test Equipment Required for Depot Maintenance.

a. Signal Generator SG-71/FCC.
b. Voltmeter ME-30/U.
c. Spectrum Analyzer TS-723/U.
d. Multimeter TS-352B/U.
e. Tool Kit, Electronic Equipment TK-100/G.
f. Tool Kit, Electronic Equipment TK-105/G.
g. Transistor Test Set TS-1836/U.
h. Signal Generator AN/USM-205.
i. Frequency Meter AN/USM-207.
j. Multimeter ME-26/U.
k. Electronic Voltmeter AN/URM-145.
1. Signal Generator AN/URM-127.
m. Wave Analyzer TS-1830/U.
n. Signal Generator AN/GRM-50.
o. Test Set, Radio AN/URM-160A.
p. 686A power supply.
q. Frequency synthesizer.
r. 639 test panel.
s. 652S and 652T if. unit test harness.
t. Variable Attenuator CN-796/U.
u. Power Supply PP-3940/G
u. Electron Tube Test Set TV-7/U.
w. Test fixture 50012-TEF-7100341 (Litcom).
x. Variable Power Transformer CN-16A/U.
y. Test fixture 50012-TEF-7100340 (Litcom).
z. Test fixture 20006-TEF-311A1.

5-4. Test Box Fabrication.

a Fabrication of a test box is required to perform bench tests on the 9151 linear power amplifier. Refer to figures 5-l and 5-2 and to the list of materials below to fabricate the 9151 test box into a convenient housing.

Reference designation	Panel marking	Description	Manufacturer	Part number
P3		Connector, plug electrical	Cannon	MS3106A20-29S
S1	S1	Switch. toggle. spst	Cutler Hammer	8280K16
S2	S2	Switch, toggle. spst	Cutler Hammer	8280K16
S3	S3	Switch. toggle. spst	Cutler Hammer	8280K16
S4	S4	Switch, toggle. spst	Cutler Hammer	8280K16
S5	S5	Switch, toggle. spst	Cutler Hammer	8280K16
S6	S6	Switch. toggle. spst	Cutler Hammer	8280K16
S7	S7	Switch, toggle. spst	Cutler Hammer	8280K16

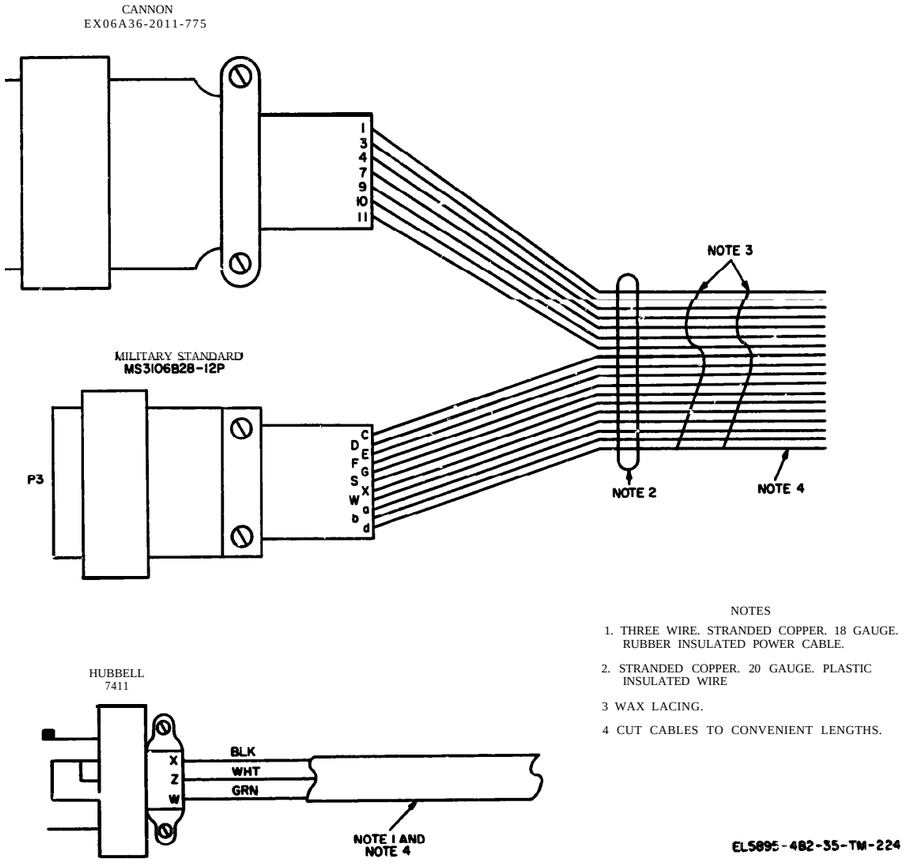

Figure 5-1. 9151 linear power amplifier test cable, fabrication diagram

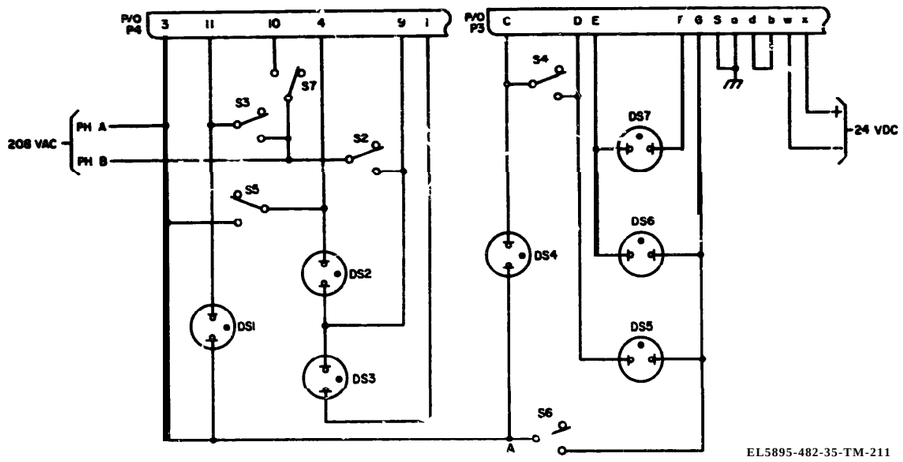

Figure 5-2. 9151 teat box, schematic diagram.

5-5. 9200B Driver Test Box Fabrication

a. General. The 9200B driver test box is required to perform bench tests on the 9200B driver. Refer to figures 5-3, 5-4, and 5-5 and to the list of materials below to fabricate the 9200B driver test box into a convenient housing,

b. List of Materials.

Reference designation	*Panel Marking*	*Description*	Manufacturer	*Part number*
DS1	PA HV	Lamp. pilot	E.F. Johnson Company	147-1142 bulb-NE-51H
DS2	PA FIL	Lamp, pilot	E. F . Johnson Company	147-1142 bulb-NE-51H
J1	GND	Connector, binding post	E.F. Johnson Company	111-103
J2	AM: THRESH-OLD	Connector, binding post	E.F . Johnson Company	111-102
J 3	GND	Connector. binding post	E.F. Johnson Company	111-103
J 4	***HV***	Connector, binding post	E.F. Johnson Company	111-102
K1		Relay. time delay	**Amperite**	115N060
P1		Plug, facility 208 vac	Hubbell	7411
P2		connector. plug. electrical	Military Standard	MS3106A20-29S
P3		Connector, plug. electrical	Military Standard	MS3106A20-29P
R1		Resistor, fixed, 220K, ¼ w	**Allen** Bradley	CB2241
R2		Resistor, fixed, 6.2K, ½ W	**Allen** Bradley	EB6221
R3		Resistor fixed, 220K, ¼ W	**Allen** Bradley	CB2241
R4		Resistor. fixed, 1 meg. ½ W	**Allen** Bradley	EB1051
R5		Resistor, fixed. 120K. ***½W***	Allen Bradley	EB1241
S1	PWR	Switch, toggle spst	Cutler Hammer	**8280K16**
S2	ADC	Switch. toggle, spst	Cutler Hammer	8280K16
XK1		Socket, relay	ELCO	TS101PO

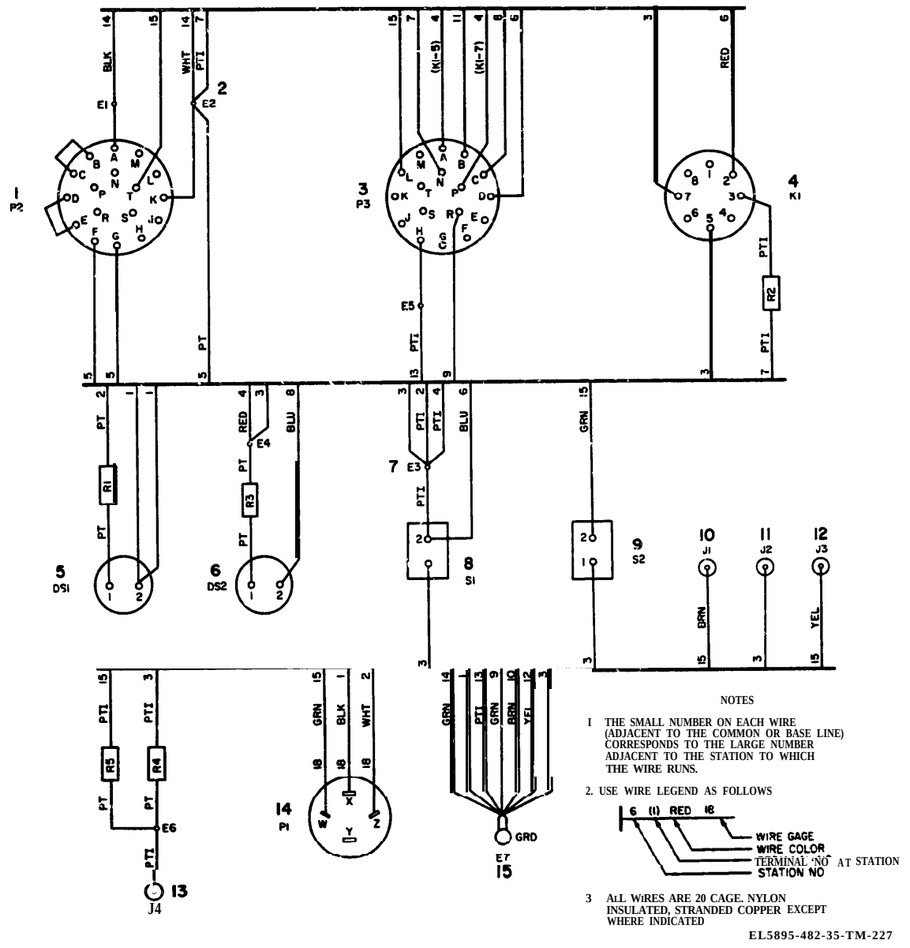

Figure 5-2. 9200B driver test box, wiring diagram.

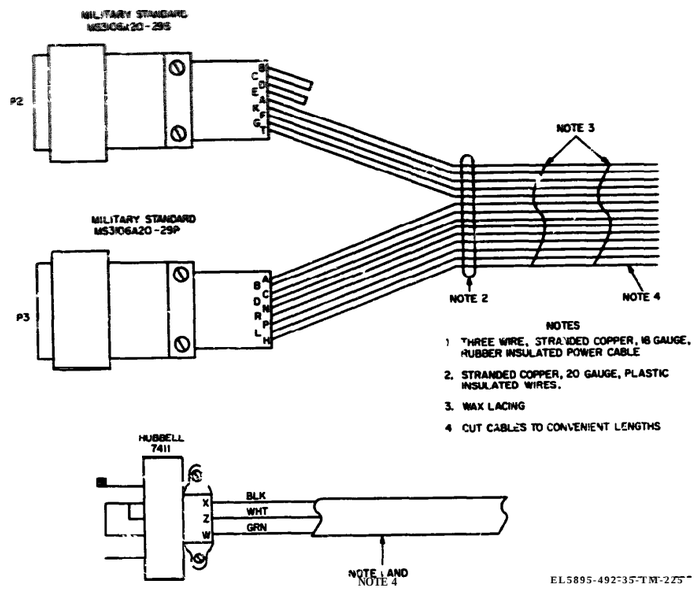

Figure 5-4. 9200B driver test cable, fabrication diagram.

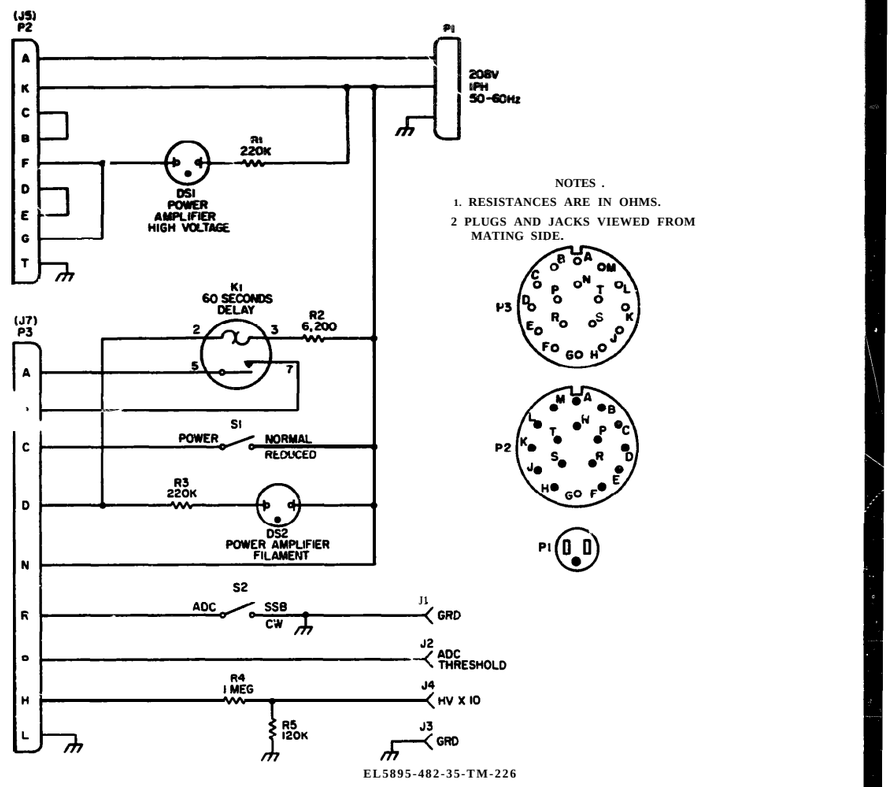

Figure 5-5. 9200B test box, schematic diagram

Section II. TESTING PROCEDURES

5-6. Spectrum Analyzer Group Test Procedure (fig. 5-6)

The teat procedure for the spectrum analyzer group is outlined in the following chart:

Step No	*Test* equipment *Control settings* *Equipment* under test	*Test procedure*	*Performance standard*
1	*ME-30/U* SELECTOR: *3* +10 *MF-50* POWER: ON *MF-5* SCALE ILLUMINATION: **Rotated clockwise until b** crt graticule illuminate3 BRIGHTNESS: **Adjusted for** a **suitable trace on the crt.**	*a.* Adjust **the TTG-3 LEVEL A** screwdriver control to obtain a *2.45-volt* root-mean-square (rms) (or +10-dBm) indication on the ME-SO/U. While observing the medication on the crt, rotate the FREQ A control through its entire range	a. **None.** ***b.*** The ME-30/U should indicate 2.45 volts rms (± 0.5 dB) as the control is adjusted through its entire range.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1 (Cont)		CA-5 FREQ SCALE-Hz/DIV:1.4K ATTENUATOR: All in OUT positions. GAIN: Fully clockwise IF ATTENUATOR: 20DB **AMPLITUDE** SCALE: LOG TEST SIGNAL-HE: OFF SWEEP MODE: **NORMAL VIDEO FILTER: OFF RF-8** ***RANGE: 2.0-4.5*** ***TTG-3*** ATTENUATOR DB: 0 ATTENUATOR DB **ADD: 0 6 0 0 Ω** TERMINATION: IN FREQ **A:** 100 FREQ B: 100 FREQ A range: X10 FREQ B range: x10 OUTPUT: **A**	c. Set the TTG-3 OUTPUT switch to B. Adjust the LEVEL B screwdriver control to obtain a 2.45-volt rms indication on the ME-30/U.	c. None
			d. **While** observing the indication on the ME-30/U. slowly adjust the FREQ B control through its **entire range.**	d. The ME-30/U should indicate 2.45 volts rms.
2		Leave **controls** in positions hat indicated.	a Set the **CA-5** TEST SIGNAL-HZ switch to 3.0M & 3.002M. Carefully adjust the RF-8 tuning control (and the ***CA-5*** CENTER' FREQ 2 COARSE and FINE controls, as required) until the two tones are cantered on the crt	a None.
			b. Adjust the CA-6 GAIN control until l fullscale deflection is obtained on the crt.	b. None.
			c. Set the IF ATTENUATOR switch to ODB and observe the intermodulation distortion products on the crt.	c. Intermodulation products fall below the -40DB mark on the crt (-60DB below the two-tone signal level).

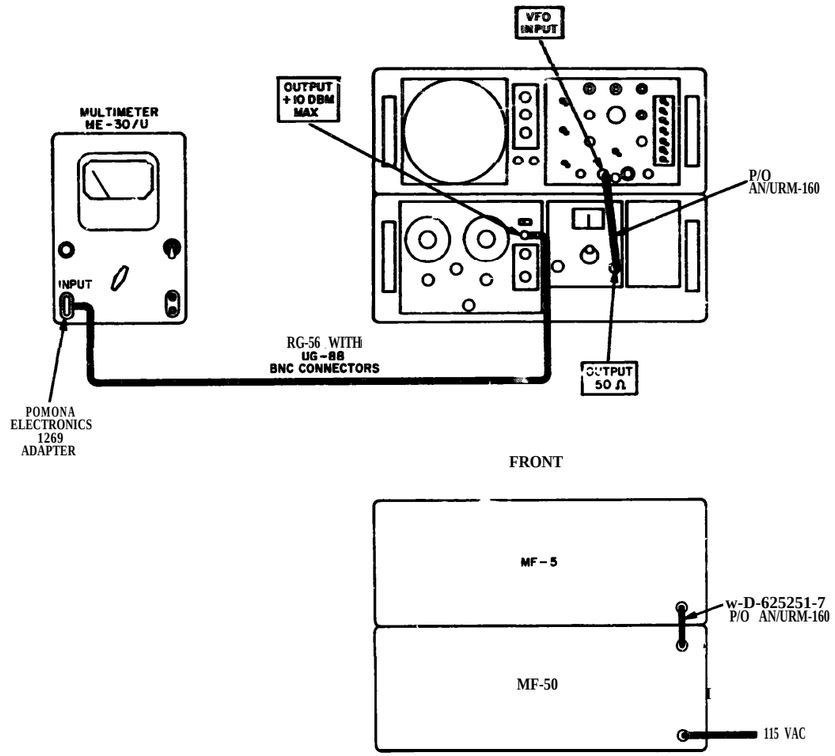

Figure 5-6. Spectrum analyzer group, teat setup diagram.

5-7. Main Frame MF-5 Controls, Deflection Circuits, and Remote Display Circuits Test Procedure

Connect the equipment as shown in A, figure 5-7, and perform the test-procedures outlined in the following chart:

NOTE

The POWER switch on main frame MF-50 must be set to ON to perform **the tests** outlined in the following chart.

Step No.	Test equipment	***Control* settings** Equipment under test	***Test procedure***	***Performance standard***
1	None	110VAC-220 vac: **As** required. SCALE ILLUMINATION:. **Fully counter-clockwise**	a. Set the SCALE ILLUMINATION control fully clockwise and observe that the crt ***graticule*** illumination indicator lamps light.	a None.
			b. After approximately 30 seconds. observe that a trace **is** visible on the crt.	b. None

Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			NOTE Allow the equipment under test a 10-minute warmup period before proceeding.	
			c. Slowly vary the INTENSITY control through its entire range. Observe that the brilliance of the at sweep varies, increasing with clockwise rotation of the control.	c None.
			d. Slowly vary the FOCUS control through its entire range and observe that the crt sweep can be **focused to satisfaction.**	*d. None.*
			e. Slowly vary the VERT POS control through its entire range. Observe that the crt sweep moves up and down, moving upward with clock&e rotation of the control.	e. None.
			f. Slowly vary the HORIZ POS control through its entire range Observe that the crt sweep movement follows the rotational direction of the control.	f. None.
2	None	SCALE ILLUMINATION: **As** desired. INTENSITY: As desired. FOCUS: Optimum setting VERT POS: **As** required to obtain the desired vertical position of sweep. HORIZ POS: *As* required to obtain a desired horizontal position of sweep.	a Set the CA-5 controls as indicated below: FREQ SCALE-HZ/DIV: VAR FREQ SCALE: Fully counterclockwise. IF BANDWIDTH: Fully clockwise. GAIN: Fully clockwise. SWEEP RATE-HZ: 1.5-30 VARIABLE: Fully clockwise AMPLITUDE SCALE: LOG ATTENUATOR: All in OUT position IF ATTENUATOR: 20DB VIDEO FILTER: OFF SWEEP MODE: NORMAL TEST SIGNAL-HZ: CF	a None.
			b. Adjust the CA-S CENTER *FREQ* LEVEL control for a full-scale signal pip on the MF-5 crt NOTE The CA-5 GAIN control and ATTENUATOR switches may be used to reduce the CF signal level.	b. None
3	*AN/USM-140* SWEEP OCCURENCE: NORMAL HORIZONTAL DISPLAY: INTERNAL SWEEP Xl SWEEP MODE: INT TRIGGER	Same as step *2* above.	Adjust the AN/USM-140 SWEEP TIME control to obtain a sawtooth waveform on the AN/USM-140 screen (equipment connected as shown in A. figure 5-7).	A sawtooth waveform of approximately 2 volts peak to peak appears on the AN/USM-140
3 (Cont)			a Disconnect test equipment and connect as shown in B, figure 5-7.	A test signal of at least 1.4 volts peak to peak appears on AN/UMS-140.
			b. Adjust the AN/USM-140 SWEEP TIME control to obtain a test signal on the AN/USM 140 screen which is similar to the obtained in step 2b above.	

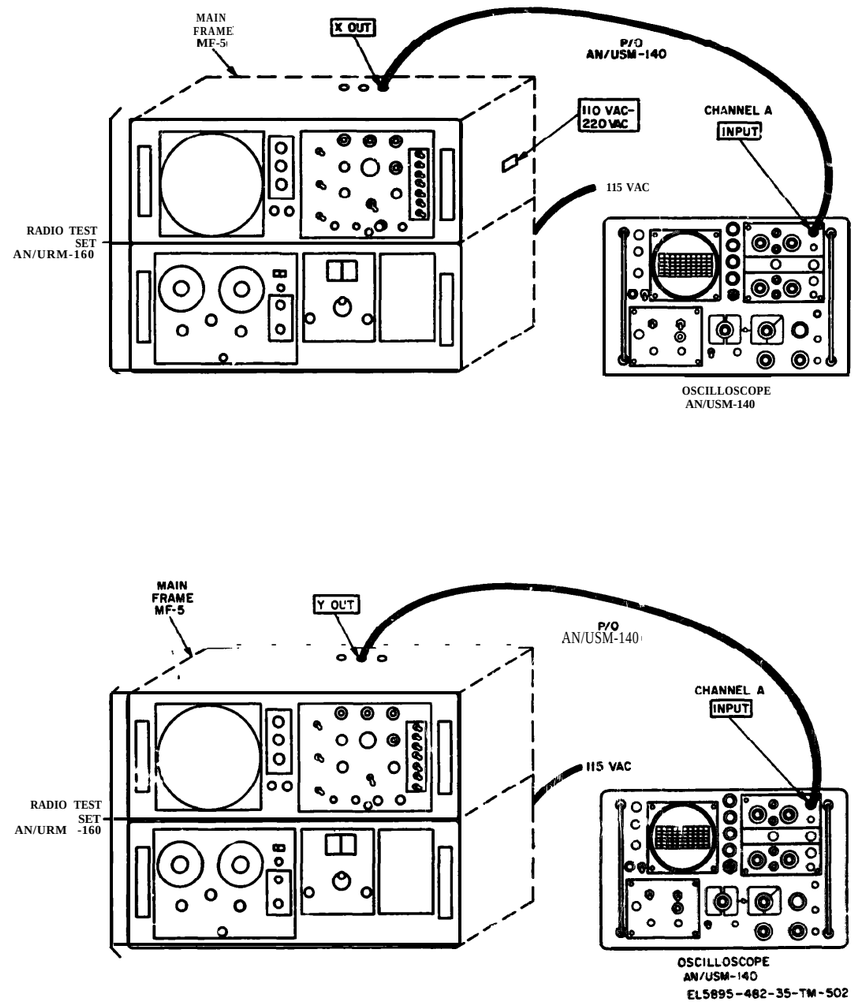

Figure 5-7. Main Frame MF-5 controls, deflection and display circuits, test setup diagram

5-8. CA-5 Sweep Width and Sweep Rate Accuracy Test Procedure (fig. 5-8)

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	AN/USM-205 FREQUENCY: 50 KHz AN/USM-207 FUNCTION: FREQ SENSISITIVTY: 10V	FREQ SCALE-HZ/ DIV: VAR FREQ SCALE: Fully clockwise IF BANDWIDTH: Fully clockwise GAIN: Fully clockwise SWEEP RATE-HZ: 1.5-30 VARIABLE- Fully clockwise TEST SIGNAL-HZ: OFF AMPLITUDE SCALE: LOG IF ATTENUATOR: 20DB VIDEO FILTER: OFF SWEEP MODE: NORMAL ATTENUATOR: All in OUT position.	a. Set the MF-5 controls as indicated below: SCALE ILLUMINATION: Rotated clockwise until the graticule illuminates. FOCUS: Adjusted for a sharp trace on the crt. BRIGHTNESS: As desired. VERT POS: Adjusted so that the baseline trace coincides with the frequency scale. HORIZ POS: Adjusted to approximately center the baseline trace on the crt. NOTE Allow the equipment under test a lo-minute warmup period below proceeding	a None.
			b. Set the TEST SIGNAL-HZ switch to CF and adjust the CENTER FREQ LEVEL and GAIN controls to display a fullscale signal pip on the crt. Adjust the CENTER FREQ 2 COARSE and FINE controls until the pip is under the CF line engraved on the crt graticule.	b. None.
			c. Connect the AN/USM-205 output to the CA-5 EXT CF MOD connector. Adjust the AMPLITUDE and R.M.S. VOLTS/DB controls until visible sideband pips are obtained at the extreme left and right screen calibrations NOTE A alight readjastment of the CENTER FREQ 1 control may be necessary to position the sideband pipe w e -	c. None
			d. Record the indication on the AN/USM-207.	d. AN/USM-207 should indicate 50kHz ± 5.
2	AN/USM-205 FREQUENCY: 7KHz	Same as step 1 above except FREQ SCALE-HZ/DIV switch is set to 1.4 K	a. Disconnect the AN/USM-205 output from the CA-5 EXT CF MOD connector.	a None.
			b. Repeat steps 1 b and c above.	b. None.
			c. Record the indication on the AN/USM-207.	c. AN/USM-207 should indicate 7kHz ± 700 Hz.
3	AN/USM-205 FREQUENCY: 3 5KHz	Same as step 1 above. except FREQ SCALE-HZ/DIV switch is set to	a Repeat step 2a above. b. Repeat steps 1b and c above.	a. None. b. None.
4	AN/USM-205 FREQUENCY: 1.75KHz	Same as step 1 above, except FREQ SCALE-HZ/DIV switch is set to 350.	a. Repeat step 2a above. b. Repeat steps 1b and c above. c. Record the indication on the AN/USM-207.	a. None. b. None. c. AN/USM-207 should indicate 1.75 kHz ± 1.75 Hz.
5	AN/USM-205 FREQUENCY: 250Hz	Same as step 1 above, except FREQ SCALE-HZ/DIV switch is set to 50.	a Set the SWEEP MODE switch to MANUAL and adjust the MANUAL SWEEP control until the dot is under the CF line engraved on the at graticule.	a. None.
			b. Slowly adjust the CENTER FREQ 1 control until the dot rises to a maximum. Return the SWEEP MODE switch to NORMAL and adjust the CENTER FREQ 1 control, as necessary, to place the signal pip under the CF line.	b. None.
			c. Adjust the AN/USM-207 AMPLITUDE and R.M S. VOLTS/DB controls until visible sideband pips are obtained at the extreme left and right screen calibrations. NOTE A slight readjustment of the CENTER FREQ 2 controls may be necessary to position the sideband pips correctly.	c. None.
			d. Record the indication on the AN/USM-207.	d AN/USM-207 should indicate 250 Hz ± 25.
6	AN/USM-205 FREQUENCY. 76Hz.	Same as step 1 ‘above, except FREQ SCALE-HZ/DIV switch is set to 15.	a Repeat steps 5a through d above. b. Record the indication on the AN/USM-207.	a None. b. AN/USM-207 should indicate 75 Hz ± 7.5.
7	Leave controls in positions last indicated.		a. Using the stopwatch, record the time required for two sweeps on the crt.	a. Stopwatch should indicate from 18 to 22 seconds.
			b. Set the FREQ SCALE HZ/DIV switch to 1.4K. Record the time required for 10 sweeps on the crt	b. Stopwatch should indicate from 9 to seconds.
			c. Set the FREQ SCALE-HZ/DIV switch to VAR and rotate the FREQ SCALE control fully clockwise.	c. None.
			d. Adjust the AN/USM-207 FREQUENCY, AMPLITUDE, and R.M.S. VOLT/DB controls to produce 2 cycles of a sine wave pattern on the crt (wave may be distorted)	d. None.
			e. Record the indication on the AN/USM-207.	e. AN/USM-207 should indicate at least 15 Ht.
			f. Rotate the VARIABLE control fully counterclockwise and set the SWEEP RATE-HZ switch to 0.1-1.5.	f. None.
			g. Using stopwatch, record the time required for two sweeps on the crt	g. Stopwatch should indicate 20 seconds or more

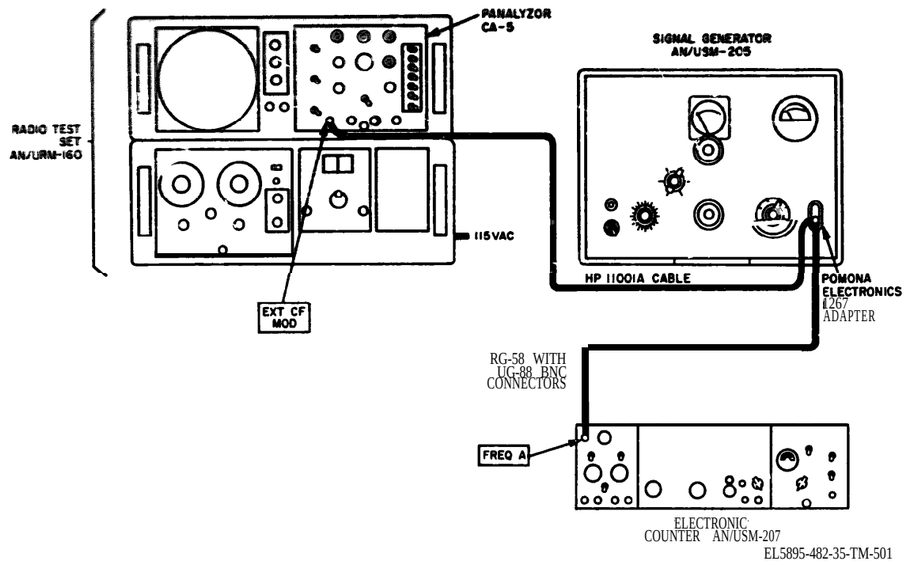

Figure 5-8 Panalyzor DA-5 sweep width and sweep rate accuracy, test setup diagram.

5-9. Panalyzor CA-5 Frequency Response and Image Rejection Test Procedure

NOTE

The POWER switch on the MF-50 main frame must be set to ON to perform the tests outlined in the following chart.

Step No.	Test equipment	Control settings Equipment under test	Test Procedure	Performance standard
1	AN/GRM-50 FREQUENCY: 500 kHz MODULATION SELECTOR: CW	FREQ SCALE-HZ/DIV: VAR FREQ SCALE: Fully clockwise IF BANDWIDTH: Fully clockwise GAIN: Fully clockwise SWEEP RATE-HZ: 1.5-30 VARIABLE: Fully clockwise TEST SIGNAL-HZ: OFF AMPLITUDE SCALE: LIN IF ATTENUATOR: 20 DB VIDEO FILTER: OFF SWEEP MODE-NORMAL ATTENUATOR: All in OUT position	a. Set the MF-5 controls as indicated below : SCALE ILLUMINATION: Rotated clockwise until the crt graticule illuminates. FOCUS: Adjusted for a sharp trace on the crt. BRIGHTNESS: As desired. VERT POS: Adjusted so that the baseline trace coincides with the frequency scab. HORIZ POS- Adjusted to approximately center the baseline trace on the crt. NOTE Allow the equipment under test a 10-minute warmup period before proceeding	a. None
			b. Using the AN/GRM-50 ATTENUATOR and VERNIER controls, adjust the signal generator output level to obtain a fullscale signal pip on the crt.	b. None.
			c. while observing for the maximum and minimum pip amplitudes on the crt, adjust the FREQUENCY control on the AN/GRM-50 to move the signal pip between the left and right calibrated screen limits on the crt graticule.	c. None.
			d. Set the FREQUENCY control on the AN/GRM-50 to the frequency which produced the maximum pip amplitude in step c above. Adjust the AN/GRM-50 ATTENUATOR and VERNIER controls, a8 necessary, to obtain a full-scale signal pip on the crt.	d. None.
			e. Set the AN/GRM-50 FREQUENCY control to the frequency which produced the minimum pip amplitude in step c above. Observe the pip amplitude on the LIN scale of the crt graticule.	e The signal pip amplitude should be at least 9 divisions (LIN) for the frequency producing the minimum pip amplitude.
2	Same as step 1 above.	Same a8 step 1 above.	a Disconnect the AN/GRM-50 output from the CA-6 SIGNAL INPUT connector	a None.
			b Set the TEST SIGNAL HZ switch to CF and adjust the CENTER FREQ LEVEL and GAIN controls to display a full-scale signal pip on the crt. Adjust the CENTER FREQ 2 COARSE and FINE Controls until the pip is under the CF line engraved on the crt graticule.	
			c Set the TEST SIGNAL-HZ switch to OFF, and reconnect the AN/GRM-50 output to the CA-5 SIGNAL INPUT connector.	c. None
			d. Adjust the AN/GRM-50 FREQUENCY control until the signal pip IS under the CF line engraved on the crt graticule Then, adjust the AN/GRM-50 ATTENUATOR and VERNIER controls to obtain a full-scale signal pip on the crt.	d. None.
			e Record the output level of the AN/GRM-50, as indicated on the R.M.S VOLTS/DBM 60 Ωmeter.	e. None.
			f. set the AN/GRM-50 FREQUENCY control to 700 kHz. Readjust the AN/GRM-50 ATTENUATOR and VERNIER controls. if necessary. to obtain e full-scale signal pip on the crt	f. None.
			g Record the output level of the AN/GRM-50, as indicated on the R MS. Volts/DBM 60 meter.	g None.

Step No.	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
2 (Cont)			h. Divide the recorded output level of step g above by the recorded output level of step g above.	step g / step e > 100

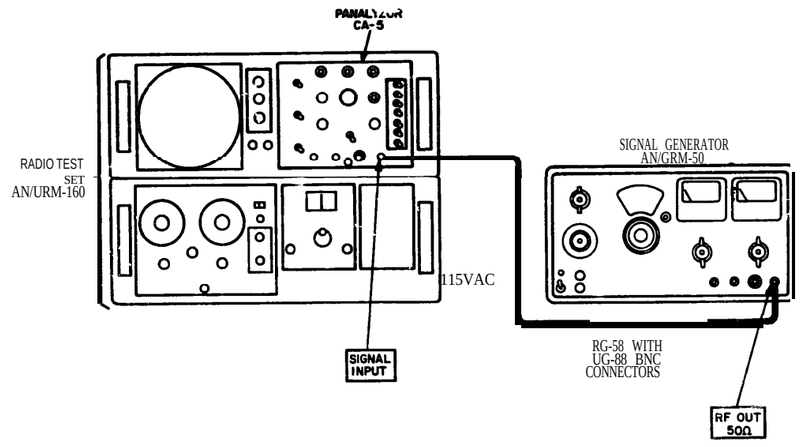

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Figure 5-9. Panalyzor DA-5 frequency response and image rejection, test setup diagram

5-10. Panalyzor CA-S If. Bandwidth, Sensitivity, and Intermodulation Distortion Tests

Test connections to be used are shown in A, figure 610; however, do not connect Signal Generator AN/GRIM-60 and Signal Generator AN/USM-205 outputs to the SIGNAL INPUT and VFO INPUT connectors, respectively, on panalyzor CA-S.

NOTE

The POWER switch on main frame MF-50 must be set to ON to perform the tests outlined in the following chart.

Step No.	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
1	AN/USM-205 FREQUENCY: 500 kHz. AN/GRM-50 FREQUENCY* 500 kHz AN/USM-207 FUNCTION: FREQ SENSI-TIVITY: 10V	FREQ SCALE-HZ/ DIV: 1.4K FREQ SCALE: Fully clockwise. IF BANDWIDTH: Fully clockwise. GAIN: Fully clockwise SWEEP RATE-HZ: 1.5-30 VAIRABLE: Fully clockwise TEST SIGNAL-HZ: OFF AMPLITUDE SCALE: LIN IF ATTENUATOR: 20DB	a. Set the MF-5 controls as in- dicated below. SCALE ILLUMINATION: Rotated clockwise until the crt graticule illuminates. FOCUS: Adjusted for a sharp trace on the crt. BRIGHTNESS: As desired. VERT POS: Adjusted so that the baseline trace coincides with the frequency scale. HORIZ POS: Adjusted to approximately center the baseline trace on the crt. NOTE Allow the equipment under test a 10-minute warmup period before proceeding.	a. None.

Step No.	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
1 (Cont)		VIDEO FILTER: OFF SWEEP MODE: NORMAL ATTENUATOR-AR in OUT position.	b. Set the TEST SIGNAL-H2 switch to CF and adjust the CENTER FREQ LEVEL and GAIN controls to display a full-scale signal pip on the crt. Adjust the CENTER FREQ 2 COARSE and FINE controls until the pip is under the CF line engraved on the crt graticule.	b. None.
			C. Measure the width of the signal pip (in divisions) at 0.5 of full-scale deflection.	c. Width of signal pip (measured at 0.5 vertical graduation) should not be greater than 0 25 division.
			d Set the FREQ SCALE-HZ/DIV switch to 700, and repeat steps b and c above.	d. Width of signal pip should not be greater than 0.30 division.
			e. Set the FREQ SCALE-HZ/DIV switch to 350, and repeat steps b and c above	e. Width of signal pip should not be greater than 0.45 division.
			f. Set the FREQ SCALE-HZ/DIV switch to 50, and repeat steps b and c above. However, use the CENTER FREQ 1 control to center the signal pip, instead of the FREQ 2 COARSE and FINE controls	f. Width of signal pip should not be greater than 0 40 division
			g. Set the FREQ SCALE-HZ/DIV switch to 15, and repeat steps b and c above	g. Width of signal pip should not be greater than 0.70 division.
			NOTE Use the CENTER FREQ 1 control to center the signal pip, instead of the FREQ 2 COARSE and FINE controls	
2	Same as step 1 above.	Leave controls in positions last indicated.	a. Set the AMPLITUDE SCALE switch to LOG, and adjust the CENTER FREQ LEVEL and/or GAIN control(s) to obtain a full-scale signal pip on the crt	a. None-
			b. Set the IF ATTENUATOR switch to ODB and measure the width of the signal pip at the -40DB screen calibration mark on the LOG amplitude scale.	b. Width of signal pip, measured at 40DB screen calibration mark. should not be greater than 6.0 divisions.
			e. Set the FREQ SCALE-HZ/DIV switch to 700 and the IF AT-TENUATOR switch to 20DB Repeat steps a and b above	e. Width of signal pip should not be greater than 2.2 division.
			f. Set the FREQ SCALE-HZ/DIV switch to 1 4K and the IF ATTENUATOR switch to 20DB Repeat steps a and b above.	f Width of signal pip should not be greater than 1 5 divisions
3	Same as step 1 above	Leave controls in positions last indicated	a. Set the AMPLITUDE SCALE switch to LIN. the TEST SIGNAL-HZ switch to OFF. the FREQ SCALE-HZ/DIV switch to VAR. and the IF AT-TENUATOR switch to 20DB Connect the AN/GRM-50 and AN/USM-205 outputs to the CA-5 as shown in A, figure 5-8	a. None.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
3 (Cont)			b. Connect the AN/USM-207 frequently meter to the AN/USM-205 as shown in B. figure 5-10. Adjust the AN/USM-205 FREQUENCY control until the digital display on the AN/USM-207 indicates 500.00 kHz (or as close as practicable).	b. None.
			c. Connect the AN/USM-207 to the AN/GRM-50 as shown in C. figure 5-10 Adjust the AN/USM-205 FREQUENCY control until the digital display on the AN/USM-207 Indicates 502.80 Hz (or as close as practicable)	c. None.
			d. Using the AN/USM-205 AMPLITUDE and R.M.S VOLTS/DB controls and the AN/GRM-50 ATTENUATOR and VERNIER controls, adjust the output level to produce equal amplitude signal pips at full scale. NOTE The tops of the signal pips may have a double-humped shape. If so, slowly adjust the IF BAND-WIDTH control counterclockwise until the pips are no longer double-humped. Misadjustment of the control will cause the amplitude of the signal pips to be reduced	d None.
			e. Adjust the VARIABLE control, as necessary, to produce two adjacent pips that intersect at or below the 0.7 scale line (LIN).	e None.
			f. Note the rotational position of the VARIABLE control after the display mentioned in step e above is obtained.	f. The VARIABLE control should be at or above midposition when the signal pips are resolved
4	AN/USM-205 FREQUENCY: 2.5MHz AN/GRM-50 FREQUENCY: 2MHz	Leave controls in a positions last indicated.	Set the AMPLITUDE SCALE switch to LOG and the GAIN control fully clockwise. Using the AN/GRM-50 ATTENUATOR and VERNIER controls, set the output level to 200 microvolts.	a. None.
			b. Using the AN/USM-205 AMPLITUDE and R.M.S. VOLTS/DB controls, set the output level to approximately 0.3 volt. Adjust the **FREQUENCY control, as required, to center the signal pip on the crt.**	b. None.
			c. Adjust the AN/GRM-50 ATTENUATOR and VERNIER controls to obtain a full-scale signal pip on the crt. Record the output level	**c. The AN/GRM-50 output level should be 200 microvolts or less.**
4 (Cont)			d. set the FREQ SCALE-HZ/DIV switch to 700 and repeat step c above.	d same as step c above
			e. Set the FREQ SCALE-HZ/DIV switch to 350 and repeat step c above.	e. Same as step c above
			f Set the FREQ SCALE-HZ/DIV switch to 50, adjust the CENTER FREQ 1 control to center the signal pip on the crt. and repeat step c above.	f Same as step c above
			g Set the FREQ SCALE-HZ/DIV switch to 15, adjust the CENTER FREQ 1 control to center the signal pip on the crt, and repeat step c above	g. Same a* step c above
			h Set the FREQ SCALE-HZ/DIV switch to VAR and the VARIABLE control fully clockwise Adjust the IF BANDWIDTH control for a single-peaked pip on the crt and repeat step c above	h Same as step c above
5	AN/USM-205 FREQUENCY. 3.5MHz	Same as step 1 above.	a. Disconnect the AN/GRM-50 output from the CA-5 SIGNAL INPUT connector Set the TEST SIGNAL-HZ switch to 3 OM & 3.002M, and the AMPLITUDE SCALE switch to LOG	a. None.
			b Using the AN/USM-205 AMPLITUDE and R.M S VOLTS/DB controls, set the output level to 0 3 volt Adjust the AN/USM-205 FREQUENCY control until the two-tone pips are centered on the crt	b. None.
			c. Obtain a full-scale deflection of the two-tone pips, using the ATTENUATOR switches and GAIN control.	c. None.
			d. Set the IF ATTENUATOR switch to ODB and observe the intermodulation distortion products on the crt	d. Intermodulation distortion products fall below the -40 DB mark on the crt (-60 dB below the two-tone signal level).

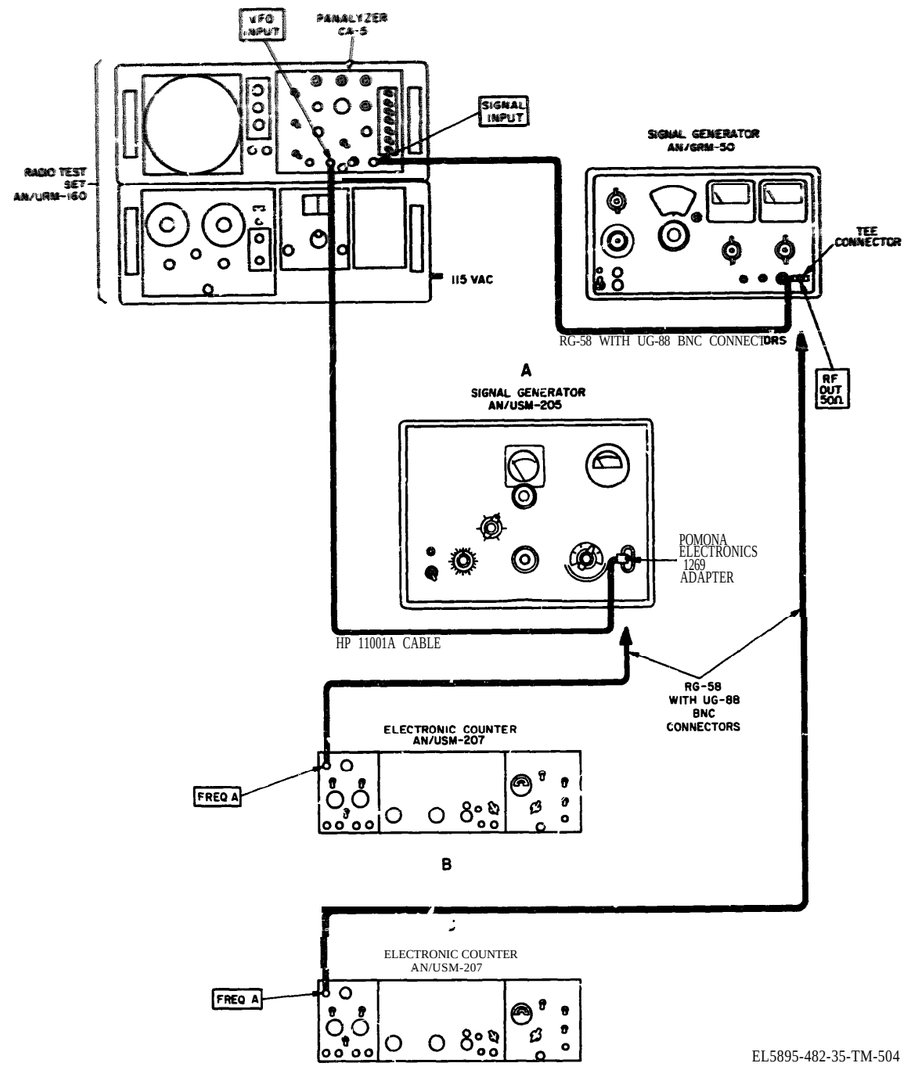
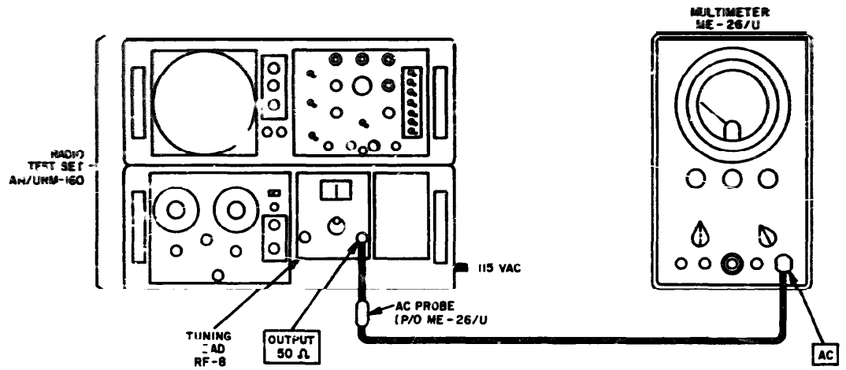


Figure 5-10. Panalyzor DA-5 bandwidth, sensitivity, and intermodulation distortion, test setup diagram.

5-11. Tuning Head RF-8 Output Level, **Frequency** Dial Accuracy, and Frequency **Drift Tests**

Connect the equipment as shown in A, figure 5-11. Ground the clip of the ac probe to the shell of the OUTPUT connector on tuning head RF-8. Turn on the test equipment and allow it to warm up for 10 minutes before proceeding.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	***ME-26B/U*** **SELECTOR: AC RANGE: 1V**	**RANGE: 2.0-4.5**	**a. Set the MF-50 POWER switch to ON.**	**a. None.**
			b. Observe the indication on the ME-26/U.	**b. The ME-26/U should indicate between 0.250 and 0.550 volt rms.**
			c. Set the RF-8 RANCE switch to 4.5-9.5, and repeat step b above	c. Same as step b above.
			d. Set the RF-% RANGE **switch to** 9.5-19.5. and repeat step b above.	d. Same as step b above.
			c. Set the RF-8 RANGE switch to 19.5-40.0. and repeat step b above.	e. Same as step b above.
2	AN/USM-207 FUNCTION: FREQ SENSITIVITY: IV	Same a8 step 1 above.	a Connect the equipment as shown in B, figure 5-11.	a. None.
			b. Adjust the RF-8 tuning control to obtain the highest frequency in the selected range.	b. None.
			c. Observe the indication on the AN/USM-207.	c. AN/USM-207 should indicate the selected frequency plus 500 kHz; within a tolerance of ± 1 percent.
			a. Set the RF-8 RANGE switch to 4.5-9 5, and repeat steps b and c above.	d. Same as step c above.
			e. Set the RF-8 RANGE switch to 9.5-19.5, and repeat steps b and c above.	e Same as step c above.
			f. Set the RF-8 RANGE switch to 19.5-40.0, and repeat steps band c above.	f Same as step c above
3	AN/USM-207 FUNCTION. FREQ SENSITIVITY: 1V TIME BASE 10-	RANGE. 19.5-40.0	a Allow the RF-6 to warm up for at least 20 minutes	a None
			b. Set the RF-6 tuning control to 30MHz Observe the frequency change on the AN/USM-207. while using the 10-second sampling mode	b The frequency change on the AN/USM-207 should be less than 18 Hz per second interval



A

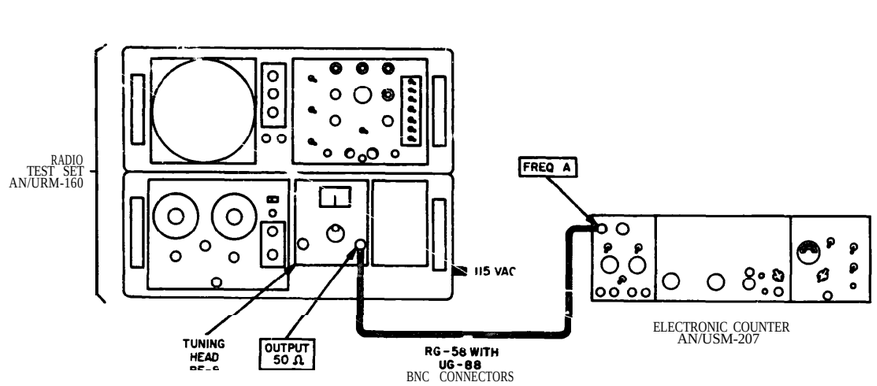


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Figure 5-11. Tuning head RF-8 output level, frequency dial accuracy, and frequency drift, test setup diagram.

5-12. Two-tone Generator TTG-3 Frequency **Accuracy, Flatness,** and Output Attenuator **Accuracy Tests**

Connect the equipment as shown in A, figure 5-12. Turn on the test equipment and allow it to warm up for 10 minutes before proceeding.

Step NO.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	AN/USM-207 FUNCTION: FREQ A SENSITIVITY: 10V	OUTPUT: PWR OFF 600 Ω TERMINATION: IN FREQ A: 20 FREQ A range: Xl FREQ B- 20 FREQ B range: Xl ATTENUATOR DB: 0 ATTENUATOR DB ADD: 0	a. Set the MF-50 POWER switch to ON.	a. None.
			b. Set the TTG-3 OUTPUT selector switch to A, and observe the indication on the AN/USM-207.	b. The AN/USM-207 should indicate within ± 3 percent of the selected frequency.
			c. Repeat step b above all numerical markings on the FREQ A control (e.g.. 20, 25, 30, 40, etc).	c. Same as step b above.
			d. Set the FREQ A range multiplier switch to X10 and repeat step c above.	d. Same as step b above.
			e. Set the FREQ A range multiplier switch to X100 and repeat step c above.	e. Same as step b above.
			f. Set the OUTPUT selector switch to B, and repeat steps c, d, and e above, using the FREQ B control and FREQ B range multiplier switch.	f. Same as step b above.
2	ME-30A/U Range selector- 600Ω 3 +10	OUTPUT. A 600 Ω TERMINATION. IN FREQ A: 100 FREQ A range- X10 FREQ B- 100 FREQ B range- Xl0 ATTENUATOR DB- 0 ATTENUATOR DB ADD: 0	a. Connect the equipment as shown in B. figure 5-12.	a. None.
			b. Adjust the TTG-3 LEVEL A screwdriver control to obtain a 2 45-volt rms (or +10 dBm) indication on the ME-30/U.	b. None.
			c. While observing the indication on the ME-30/U, slowly adjust the FREQ A control through its entire range	c. The ME-30/U should indicate 2.45 volts rms (± 0.5 dB) as the FREQ A control is adjusted through its entire range. NOTE Disregard transient fluctuations as the FREQ A or FREQ B control is adjusted.
			d. Set the FREQ A range multiplier switch to Xl and repeat step c above	d. Same as step c above.
			e Set the FREQ A range multiplier switch to X100 and repeat step c above.	e. Same as step c above
			f. Set the OUTPUT selector switch to B, and adjust the TTG-3 LEVEL B screwdriver control to obtain a 2 45-volt rms indication on the ME-30/U.	f. None.
			g. Repeat steps c, d, and e, above using the FREQ B control and FREQ B range multiplier switch.	g. Same as step c above, except the FREQ B control is adjusted through its entire range.
3	Same as step 2.	OUTPUT: B 600 0 TERMINATION: IN FREQ B. 100 FREQ B range: Xl0 ATTENUATOR DB: 0 ATTENUATOR DB ADD: 0	a. With the equipment connected as shown in B, figure 5-12, observe the indication on the ME-30/U.	a. The ME-30/U should indicate 2.45 volts rms (or +10 dBm)
			b While observing the indication on the ME-30/U, vary the setting of the ATTENUATOR DB ADD switch in 1-dB steps. from 0 to 10.	b. The indication on the ME-30/U **should decrease in 1-dB steps (approximately) as the ATTENUATOR DB ADD switch setting is increased.**
			c. Set the ATTENUATOR DB ADD switch to 0 dB.	c. None.
			d. While observing the indication on the ME-30/U. vary the setting of the ATTENUATOR DB **switch in 10-dB steps, from 0 to 60**	**d. The indication on the ME-30/U should decrease in 10-dB steps (± 0.5 dB/dB) as the ATTENUATOR DB switch setting is increased**

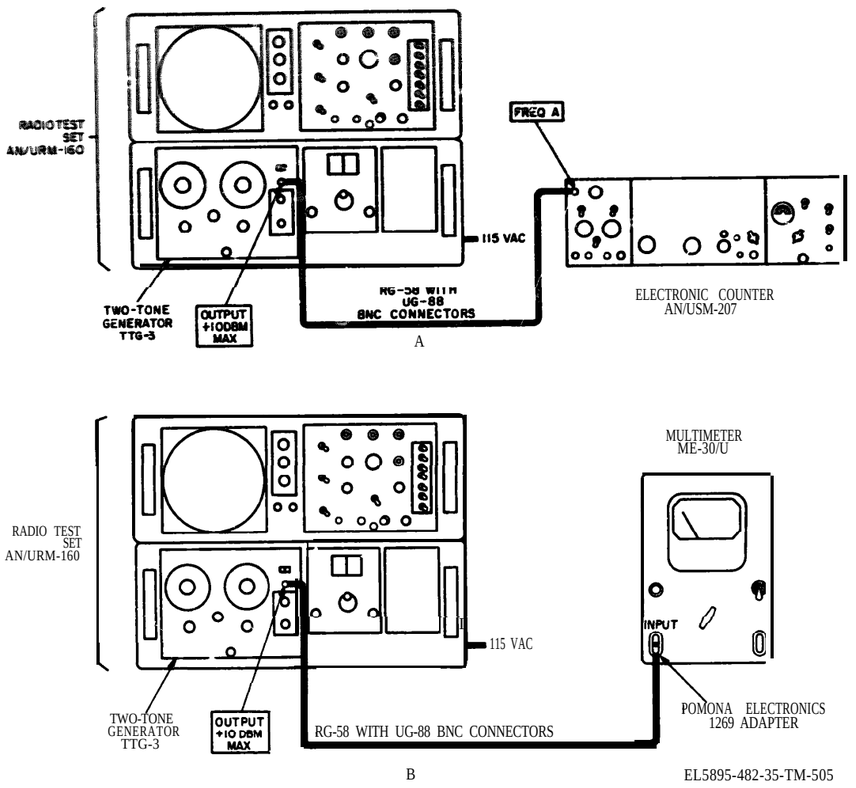


Figure 5-12. Two-tone generator TTG-3 frequency, flatness. and output attenuation accuracy, test setup diagram.

5-13. Summary of 'Pest Data

Personnel may find it convenient to arrange the performance data checklist in a manner similar to that shown below:

	Performance standard
1. SYSTEM OPERATION:	
Two-tone generator	
TTG-3 output	2.45 vrms (0.5 dB)
Panalyzor CA-5	
Intermodulation	
Distortion	60 dB below two-tone signal level
2. MAIN FRAME MF-5:	
X out	2 volts peak to peak (vpp)
Y out	1.4 vpp minimum.

	Performance Standard
3. PANALYZOR CA-5:	
a. Sweep Width:	
(1) Var . .	50 ±5-kHz input produces sideband pips at extreme left and right screen calibrations.
(2) 1.4K . .	Same as (1) above except 7 kHz 700-Hz input.
(3) 700 .	Same as (1) above, except 3.5 kHz ±350-Hz input.
(4) 350	Same as (1) above, except 175 kHz ± 75-Hz input.
(5) 50	Same as (1) above, except 250 ±25-Hz input.
(6) 15.	Same as (1) above, except 75 ±7.5-Hz input.
b. Sweep Rate:	
(1) Preset, 0.1 Hz	18 to'22 seconds for two sweeps.
(2) Preset, 1.0 Hz	9 to 11 seconds for 10 sweeps.
(3) Var, 30 Hz .	15-Hz input produces two sine waves on trace.
(4) Var, 0.1 Hz. .	20 seconds minimum for two sweeps.
c. Frequency Response	9 divisions (LIN) minimum for min-imum pip ampli-tude.
d. Image Rejection.	E 700 kHz E 500 kHz 100
e. If. Bandwidth:	
(1) 1.4K	0.25 div, max
(2) 700 . .	0.30 div. max
(3) 350	0.45 div, max
(4) 50	0.40 div. max
(5) 15	0.70 div, max
(6) 15	6.0 div, max
(7) 50	3.0 div, max
(8) 350,	3.0 div. max
(9) 700	2.2 div. max
(10) 1.4K	1.5 div. max
(11) Var ..	VARIABLE control at or above mid-position when signal pips.
f. Sensitivity . . .	200 microvolt8 minimum produces full-scale pip on LOG scale.

	Performance Standard
g. Intermodulation: Distortion	60 dB below two-tone signal level.
4. RF-8 TUNING HEAD:	
a. Output Level	0.250 to 0.550V rms.
b. Frequency Dial:	
Accuracy	'Within 1 percent of the selected fre-quency +500 kHz.
c. Frequency Drift	18 Hz maximum per 10-second interval
5. TWO-TONE GENERATOR TTG-3:	
a. Frequency Accuracy.	Within ± 3 percent of the selected fre-quency.
b. Flatness	±0.5 dB from 20 Hz to 20 kHz.
c. Output Attenuator:	
Accuracy . . .	0.05 dB/dB, reference to 0 dB.

S-14. Speaker and Amplifier Test Procedure

a Test Equipment and Materials Required

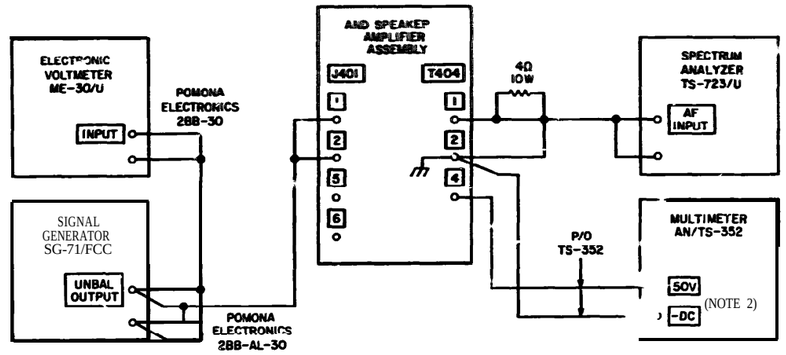
(1) Signal Generator SG-71/FCC
(2) Electronic Voltmeter ME-30/U.
(3) Spectrum Analyzer TS-723/U.
(4) Multimeter TS-352B/U.
(5) Cable assembly, Pomona No. 2BB-30.
(6) Cable assembly, Pomona No. 2BB-AL-30.
(7) Load resistor, 4-ohm, lo-watt.
(8) Transistor Test Set TS-1836/U.
(9) Tool Kit, Electronic Equipment TK-100/G.
(10) Tool Kit, Electronic Equipment TK-106/G.

b Test Connections and Conditions.

(1) Connect the equipment as shown in figure 6-13.
(2) Connect the power cords of all equipment to the 115-volt ac power source.
(3) Allow a 10-minute warmup period before performing the procedure.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	SG-71/FCC: Set frequency to 1000 Hz. Set for unbalanced output and amplitude for 0.24-volt indication at ME-30/U. ME-30/U. Range selector switch: 0.3 VOLTS TS-352B/U- FUNCTION 20000 OHM/VDC REV	VOLUME control fully a counterclockwise.	a. Verify that the TS-352B/U in-dicates - 18 volts dc. With 0 24-volt test signal applied to the speaker and amplifier assembly input. advance VOLUME control until 2 40 volts is in-dicated at the TS-723/U This 2.40-volt reading represents the minimum 43-dB gain.	a. Gain shall be 43 dB minimum
			b. Advance speaker and amplifier assembly VOLUME control until 2 50 volts is indicated at the TS-723/U This 2 50-volt reading represents 2-watt output	b Output shall be 2 watts minimum

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TS-723/U (Cont) Set for MIN AF input and adjust frequency to 1000 Hz Set for 3-volt range meter indication.		**NOTE** **Do not disturb VOLUME control during remainder of these gain. frequency response. and distortion tests**	
2			With speaker and amplifier assembly receiving 0 24 volt at 1000-Hz test signal input. verify that the TS-723/U indication is 2.50 volts Observe the TS-723/U meter and vary the SG-71/FCC frequency from 1000 Hz to 300 Hz. and then up to 3000 Hz Observe that the TS-723/U meter indication does not vary more than 3 dB from the 1000-Hz level	Output frequency response shall not vary more than 3 dB. with input between 300 Hz and 3000 Hz.
3	SG-71/FCC Frequency 1000 Hz output 0 24 volt		With speaker and amplifier assembly receiving 0 24 volt at 1000-Hz test signal input. use the TS-723/U and measure distortion as follows a. Slowly rotate TS-723/U INPUT control clockwise until TS-723/U meter indicates full-scare deflection (1 0) of function at SET LEVEL b Turn function switch to DISTORTION c Adjust upper FREQUENCY control (coarse) until sharp dip is indicated by meter needle d Decrease meter range switch setting to maintain near-midscale indications e Adjust lower FREQUENCY control (fine) for minimum meter indication f Adjust BALANCE control for minimum meter indication. g Note and record distortion as indicated on TS-723/U meter (Read scale corresponding to meter range switch setting) Distortion shall not be greater than 5 percent.	Distortion shall not exceed 5 percent at 1000 Hz.
4	SG-71/FCC Set frequency for 300 Hz and output for 0 24 volt		With speaker and amplifier assembly receiving 0.24 volt at 300-Hz test signal input, measure distortion by repeating the TS-723/U procedures given in step 3	Distortion shall not exceed 5 percent at 300 Hz
5	SG-71/FCC Set frequency for 3000 Hz and output for 0.24 volt.		With speaker and amplifier assembly receiving 0 24 volt at 3000-Hz test signal. measure distortion by repeating the TS-723/U procedures given in step 3.	Distortion shall not exceed 5 percent at 3000 Hz



NOTES
1 CONNECT ALL EQUIPMENT TO A COMMON GROUND
2 SET TS-352 FUNCTION SWITCH TO REV
3 ▭ INDICATES EQUIPMENT MARKING

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Figure 5-13. Speaker and amplifier assembly gain. frequency response, and distortion. test setup diagram

5-15. Voice Frequency Tone Facility Test Procedure

Testing of the voice frequency tone facility covers the 12-volt dc power supply, 2-kHz oscillator, and tone receiver. Only the tone receiver is covered in this paragraph. Refer to TM 11-5895-482-35/1 for coverage of the 12-volt dc power supply and 2-kHz oscillator, respectively.

a. Test Equipment and Materials Required.

(1) 12-volt dc power supply (part of 8A10).
(2) Signal Generator AN/USM-205.
(3) Frequency Meter AN/USM-207.
(4) Electronic Voltmeter ME-30/U.
(5) Multimeter ME-26/U.
(6) Hookup wire, Pomona No. 2BB-48 (or equivalent).
(7) Cable assembly, Pomona No. 1152-C-48.
(8) Tool Kit, Electronic Equipment TK-100/G.
(9) Tool Kit, Electronic Equipment TK-105/G.
(10) Transistor Test Set TS-1836/U.

b. Test Connections and Conditions.

(1) Connect the equipment as shown in figure 5-14 and connect the equipment to the 115-volt ac power source.

(2) Turn on all equipment and allow a 15-minute warmup period before proceeding.

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	AN/USM-205: FREQUENCY-X100. Adjust vernier control for an output frequency of 365 Hz. 465 Hz, 565 Hz, 665 Hz. 765 Hz. or 865 Hz depending on tone receiver under test. RMS VOLTS: -30. .03 ME-30/U: Range selector switch: -30, .03 ME-26/U: RANGE: RX1 **SELECTOR: OHMS**		a Adjust the frequency output of the AN/USM-205 to the center frequency (either 365 Hz, 465 Hz. 565 Hz. 665 Hz, 765 Hz. or 865 Hz) ± 5 Hz of the tone receiver under test Read frequency on AN/USM-207 frequency meter	A None
			b Slowly increase the output of the AN/USM-205 until the ME-26/U suddenly indicates zero or very low resistance	b ME-30/U indicates -35 dBm or lower.
			c Vary frequency control on AN/USM-205 by 100 Hz from the center frequency of the tone receiver under test	c ME-26/U indicates a maximum resistance whenever AN/USM-205 frequency exceeds 100 Hz in either the plus (+) or minus (—) direction

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1 (Cont)	AN/USM-207 POWER: TRACK FUNCTION: FREQ SENSITIVITY: Set to first counterclockwise position at which readout is displayed. GATE TIME: 10^4			

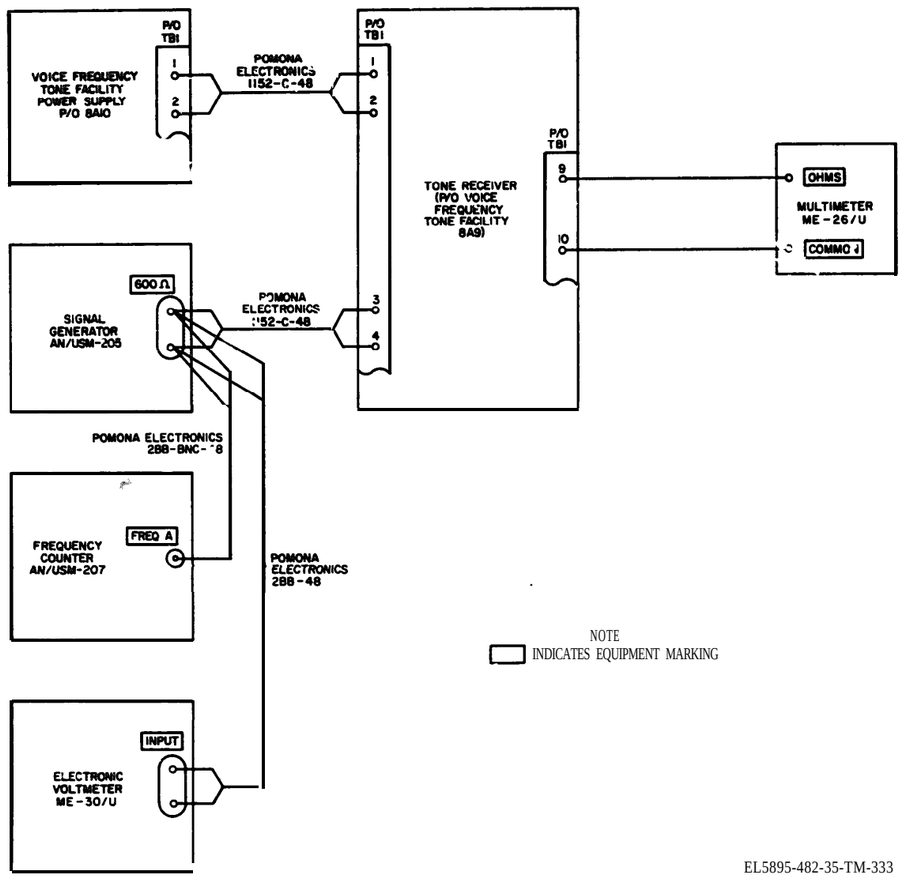


Figure 5-14 Voice frequency tone facility remote control tone converter operational test setup diagram

5-16. 652S If. Unit Test Procedure
(figs. S-15 through 5.29)

a- Test Equipment and Materials Required

(1) 686A power supply (part of AN/TSC-26).
(2) Multimeter ME-26/U.
(3) 652S and 652T if. unit test harness.
(4) Frequency synthesizer (part of AN/TSC-26).
(5) Electronic Voltmeter AN/URM-145.
(6) 639 test panel (part of AN/TSC-26).
(7) Signal Generator AN/URM-127 (2 required).
(8) Wave Analyzer TS-1830/U.
(9) Hybrid transformer.
(10) Signal Generator AN/GRM-50.
(11) Frequency Meter AN/USM-207.
(12) Teat Set, Radio AN/URM-160A (part of AN/TSC-26).
(13) Tool Kit, Electronic Equipment TK-100/G.
(14) Tool Kit, Electronic Equipment TK-105/G.

b. Test Connections and Conditions.

(1) With 652S if. unit removed from rack for bench check, connect the equipment as shown in figure 5-23.
(2) Connect all equipment to the 115-volt ac power source.
(3) Turn on the equipment and allow a 10-minute warmup period before proceeding.

NOTE

In the procedure, a test point is nomenclatured by assembly designator and terminal number. For example, A5-23 means terminal 23 on decoupling filter assembly A5.

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	ME-26/U Set up to measure negative, dc voltages in 100-volt range	INPUT LEVEL Counterclockwise ADC Counterclockwise MODE SEL CW	Check voltage at the following test points on 652S if unit Testpoint A5-23 A5-24 A5-31 A5-33 A5-34	ME-26/U indicates as follows. Test point / Indication (volts dc) A5-23 / 0 A5-24 / -85 ± 3 A5-31 / -85 ± 3 A5-33 / -85 ± 3 A5-34 / -85 ± 3
2	ME-26/U Set up to measure resistance in O-100 ohm range		Remove power and check resistance between A5-30 and ground and A5-25 and ground on 652S if unit	ME-26/U indicates as follows Test point / ME -26/U Indication (ohms) A5-30 / 15 A5-25 / infinity
3	ME-26/U Set up to measure negative. de voltages in 100-volt range	MODE SEL TUNE	Apply power and check voltage at the following test points on 652S if unit Test point A5-24 A5-31 A5-33 A5-34	ME-26/U indicates as follows Test point / ME-26/U Indication (volts dc) A5-24 / 0 AS-31 / 0 A5-33 / -85 ± 3 A5-34 / -85 ± 3
4	ME-26/U Set up to measure positive. dc voltages in 100-volt range		Check voltage at A5-23 on 652S if unit	ME-26/U indicates +24 volts dc
5	ME-26/U up to measure instance in 0-100 ohm range.		Remove power and check resistance between A5-25 and ground. and AS-30 and ground on 652S if unit	ME-26/U indicates as follows Test point / ME-26/U Indication (ohms) A5-25 / 15 AS-30 / infinity
6	ME-26/U Set up to measure negative. dc voltages in 100-volt range	MODE SEL SSB	Apply power and check voltage at the following test points Test point A5-23 A5-24 A5-31 A5-33 AS-34	ME-26/U indicates 0 at each test point

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
a	ME-26/U Set up to measure resistance in 0-100 ohm range.		Remove power and check resistance between A5-25 and ground on 652S if unit	ME-26/U indicates infinity at each test point.
8	ME-26/U Set up to measure negative, dc voltages in 100-volt range	MODE SEL AME	Apply power end check voltage at the following test points Test points AS-23 A 5-24 AS-31 A5-33 AS-34	ME-26/U indicates as follows: Test point / ME-26/U Indication (volts dc) AS-23 0 AS-24 0 AS-31 -85 ± 3 AS-33 -85 ± 3 AS-34 -85 ± 3
9	ME-26/U Set up to measure resistance in O-100 ohm range		Remove power and check resistance between AS-25 and ground and AS-30 and ground on 652S if unit	ME-26/U indicates infinity at each test point
10			Reconnect the equipment as shown in figure 5-24	None
11	AN/URM-145 Set up to measure voltages in O-3 volt range.	INPUT LEVEL Counterclockwise ADC- Counterclockwise MODE SEL SSB	Check voltage between terminals Al-8 and Al -9 on 652S if unit	AN/URM-145 indicates 10 volt ac ± .02.
12		MODE SEL SSB Test- 4	a. Insert 639 test panel test plug into 652S if unit TEST jack b. Press 639 test panel PRESS TO TEST button	a None b. 639 test panel meter indicates between 40 and 60
13		TEST 2	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates between 40 and 60
14		MODE SEL CW	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates 0
15		MODE SEL TUNE	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates between 40 and 60
16		MODE SEL AME	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates between 40 and 60
17		MODE SEL TUNE TEST 5	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates between 35 and 65
18			Reconnect equipment as shown in figure 5-25	
19	Frequency synthesizer Set up for 1 75 MHz at 1 volt rms TS-1830/U Set up to measure voltages in 9-1 volt range AN/URM-127 Set up for 400 Hz at -50 dBm.	MODE SEL SSB 1 INPUT LEVEL. Midrange ADC- Counterclockwise	a Tune TS-1830/U for a maximum indication on meter. b. Adjust 652S if. unit INPUT LEVEL control for 340 millivolts on TS-1830/U.	a None b TS-1830/U indicates 340 millivolts ± 2
20	AN/URM-127. Set up for -5-dBm output.		a. Tune TS-1830/U for a maximum indication on meter. b. Adjust 652S if unit INPUT LEVEL control for 340 millivolts on TS-1830/U.	a. None b. TS-1830/U indicates 340 millivolts ± 2
21	AN/URM-127: Set up for - 15-dBm output.		a. Tune TS-1830/U for a maximum indication on meter. b Adjust 652S if. unit INPUT LEVEL control for 340 millivolts on TS-1830/U.	a. None. b TS-1830/U indicates 340 millivolts ± 2.
22	AN/URM-127 Set up for 1700-Hz output.		a. Tune TS-1830/U for a maximum indication on meter. b. Adjust 652S if. unit INPUT LEVEL control for 340 millivolts on TS-1830/U.	a. None. b. None.
23			o. Adjust 652S if unit INPUT LEVEL control for a 0-dBm indication on TS-1830/U b Set 652S if. unit MODEL SEL switch to AME	a None b TS-1830/U should indicate -6 dB.
24	AN/URM-145 Set up to measure voltages in 0-01 volt range	MODE SEL: SSB	Observe voltage indication on AN/URM-145	AN/URM-145 indicates 5 millivolts ± 05
25		TEST 1	a Adjust 652S if unit INPUT LEVEL control for 340 millivolts on TS-1830/U. b Insert 639 test panel plug into 652S if unit TEST Jack c Press 639 test panel PRESS TO TEST button and observe meter indication	a None b. None. c 639 test panel indicates between 40 and 60
26			Reconnect equipment as shown in figure 5-26	None
27	Frequency synthesizer Set up for 1.75-MHz output. AN/URM-127 (signal generator 1): Set up for 400 Hz at -15 dBm. AN/URM-145. Set up to measure voltages m 0-.01 volt range. AN/URM-127. (signal generator 2). Set up for -100-dBm output	INPUT LEVEL. Counterclockwise ADC Counter-clockwise	a Adjust 652S if unit INPUT LEVEL control for 5-millivolt output as observed on AN/URM-145 b Adjust AN/URM-127 (signal generator 1) for -100 dBm and AN/URM-127 (signal generator 2) for 2500 Hz at -15 dBm. c Adjust AN/URM-127 (signal generator 2) for a 5-millivolt indication on AN/URM-145. d Disconnect AN/URM-145 e Adjust AN/URM-127 (signal generator 1) for 400 Hz at - 15 dBm	a None b None c None. d. None e None.
28	Frequency synthesizer AN/URM-160A Set up for two-tone analyzation. AN/GRM-50 Set up for 3.75 MHz at 1 volt rms. Verify 3 75 MHz using AN/USM-207.		a Connect AN/URM-160A to J1-AZ, on 652S if. unit as shown in figure 5-26. b Adjust AN/URM-160A until two tones are displayed on screen c Set IF ATTENUATOR on AN/URM-160A to 20 dB d Adjust AN/URM-160A to display the two tones up to 0-dB reference on graticule	a None b None c None. d. AN/URM-160A displays two tones as shown in A. figure 5-27
29	AN/URM-160A Remove 20-dB attenuation.		Observe waveform on AN/URM-160A.	AN/URM-AN/URM-160A display is as shown in B. figure 5-27, with all distortion products below 55 dB
30			Disconnect AN/URM-127 (signal generator 1 and 2) from test setup and note amplitude of unwanted carrier on AN/URM-160A	AN/URM-160A display is as shown in C. figure 5-27. with the amplitude of unwanted carrier 55 dB below two-tone signal The amplitude of the unwanted carrier should be 55 dB below two-tone signal
31	AN/URM-127 (signal generator 1): Set up for 400 Hz at −5 dB. AN/URM-127 (signal generator 2): Set up for 2500 Hz at −5 dB.	ADC: Counter-clockwise	a. Connect AN/URM-127 (signal generators 1 and 2) as shown in figure 5-26 b Connect jumper between TB1-15 (adc output) and TB1-6 (adc input) on 652S if unit test harness and observe AN/URM-160A	a None- b Amplitude of two-tone signal should be 0

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
31 (Cont)			c. Rotate 652S if. unit ADC control maximum clockwise and observe waveform on AN/URM-160A.	c. AN/URM-160A displays two tones up to 0-dB reference (within 3 dB) as shown in A. figure 5-27.
32			Reconnect the equipment as shown in figure 5-28.	None.
33	**Frequency synthesizer: Set up for 1 75-MHz output.** AN/URM-127: Set up for 350 Hz at -15 dBm. AN/USM-207. Set up to read frequency synthesizer and AN/URM-127 frequencies. AN/URM-145: Set up to measure voltages in 0-.01 volt range.	ADC- Counter-clockwise	NOTE AN/URM-127 output frequency must be maintained at 350 Hz during step lo.	
			a Adjust 652S if. unit INPUT LEVEL control for 5 millivolts as indicated on AN/URM-145.	a None.
			b Slowly increase AN/URM-127 output frequency from 350 Hz to 3040 Hz and observe minimum and maximum response voltages in dB on AN/URM-145 Record minimum and maximum response voltages in dB.	b. None
			c Compute bandpass ripple as follows: Maximum response in dB minus minimum response in dB (indicated on AN/URM-145) equals bandpass ripple	c Bandpass ripple should not exceed 2 5 dB

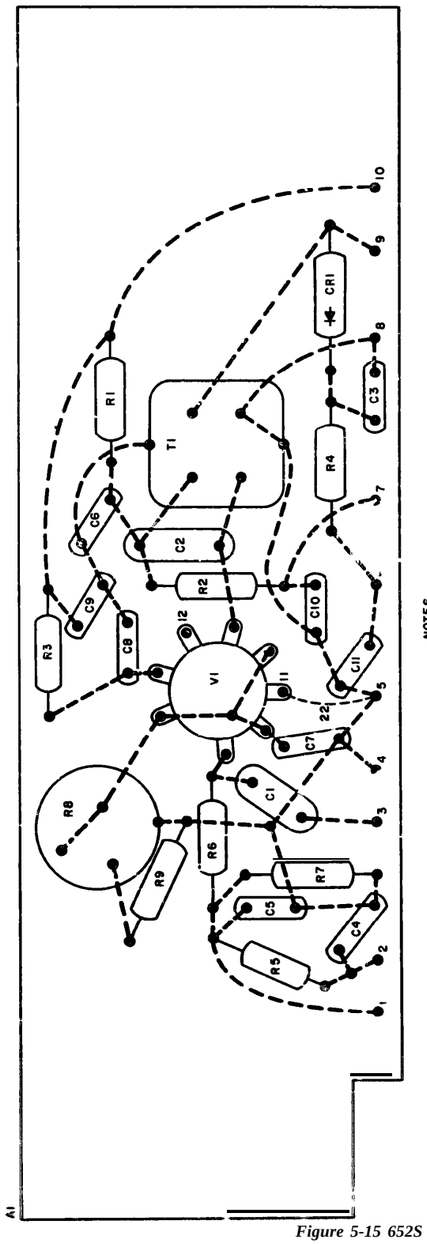
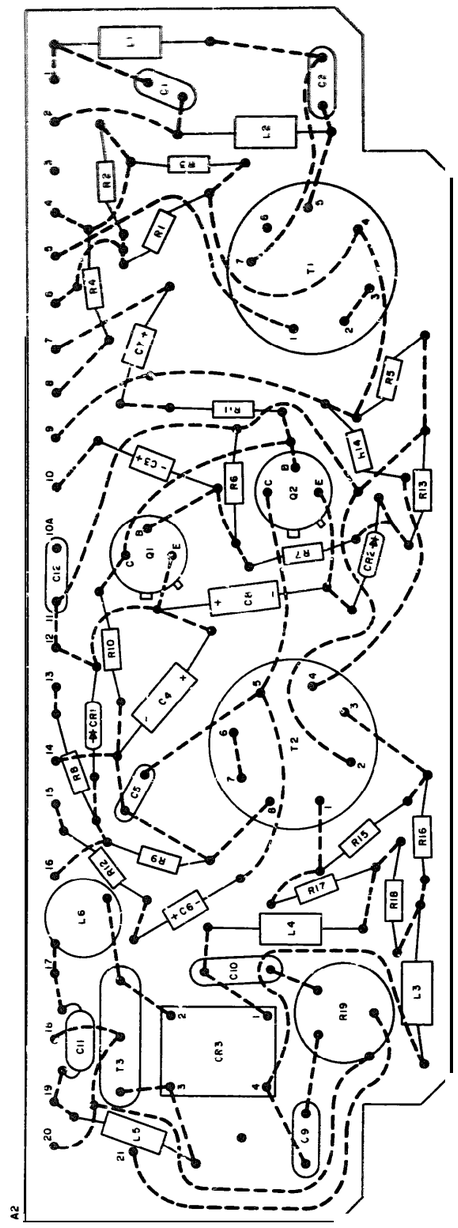


Figure 5-15 652S if units carrier isolation amplifier assembly A1, wiring diagram and parts location.

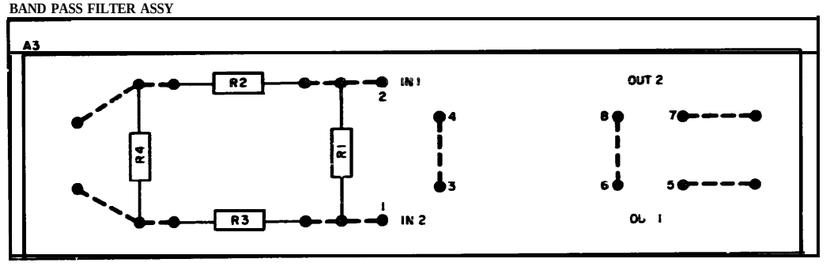


EL5895-482-35-TM-160

NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ———— WIRING, PARTS AND PIGTAILS ON FRONT OF BOARD
3 ----- PRINTED WIRING ON BACK OF BOARD

Figure 5-16 652S if unit audio amplifier-modulator assembly A2, wiring diagram and parts location

BAND PASS FILTER ASSY



NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ———— WIRING, PARTS AND PIGTAILS ON FRONT OF BOARD
3 ----- PRINTED WIRING ON BACK OF BOARD

EL5895-482-35-TM-161

Figure 5-17 652S if unit bandpass filter assembly A3, wiring diagram and parts location

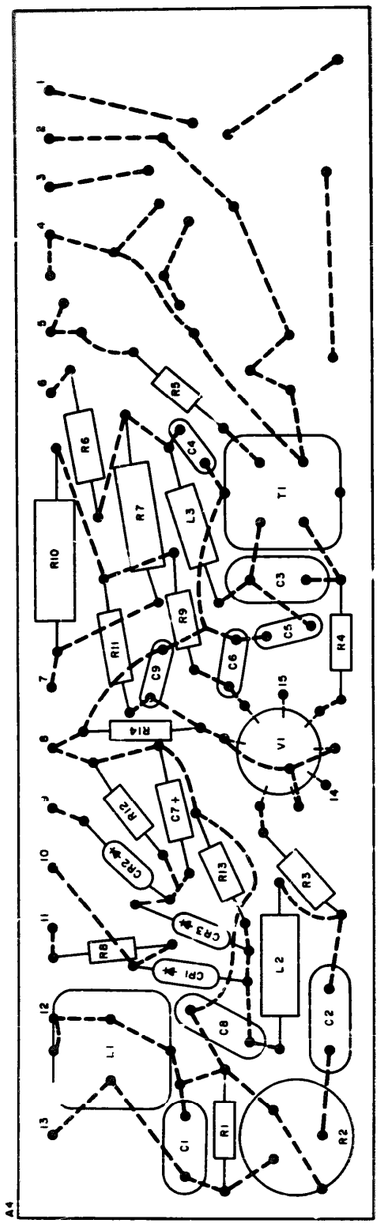


Figure 5-18 652S if unit if. output amplifier assembly A4, wiring diagram and parts location

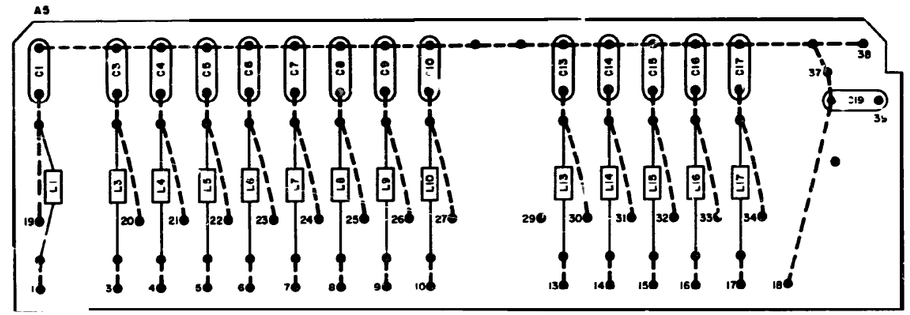


Figure S-19.6625 and 652T if units decoupling filter assembly A5, wiring diagram and parts location

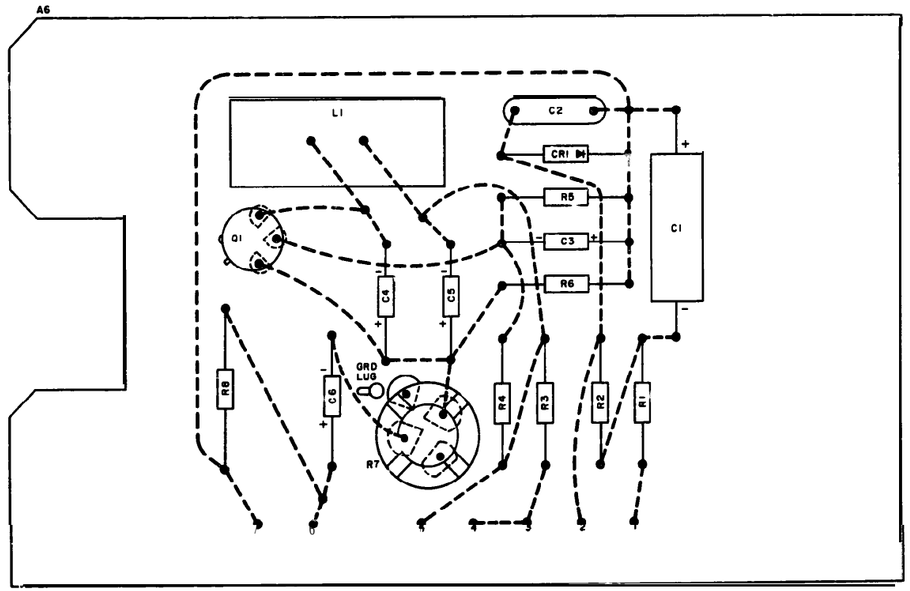


Figure 5-20. 652S if unit audio oscillator assembly A6, wiring diagram and parts location

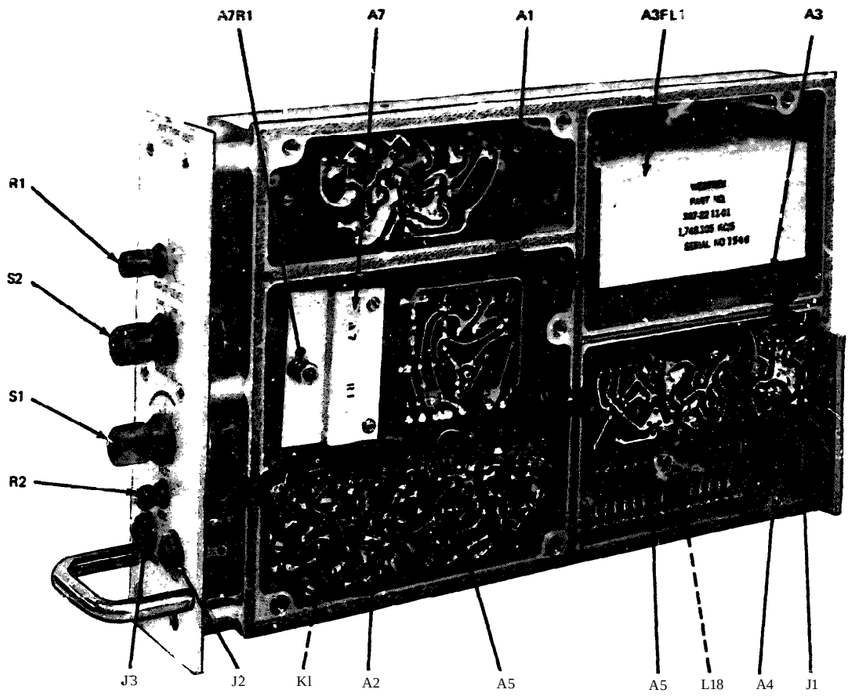


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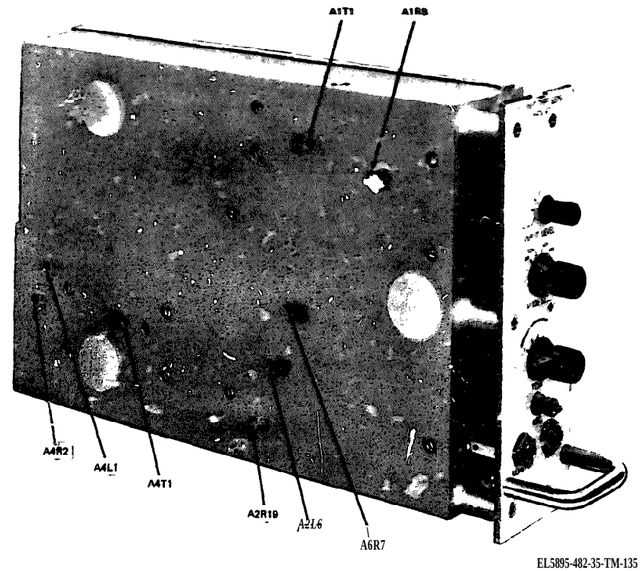
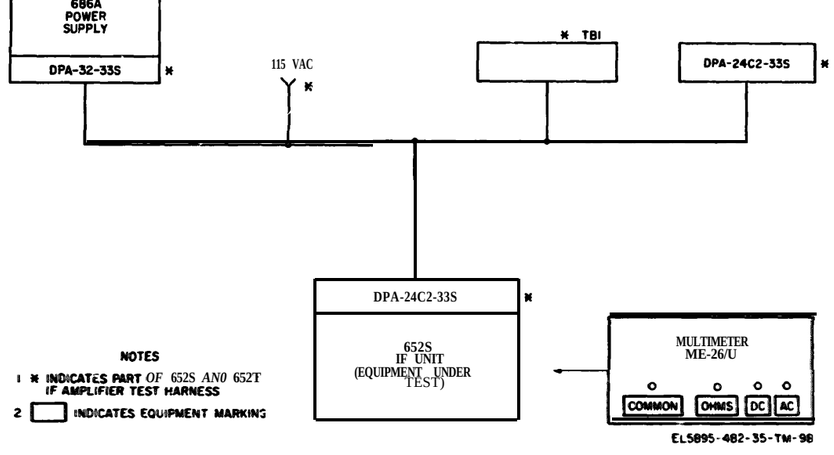
Figure 5-21 652S if unit, right side three-quarter view, parts location



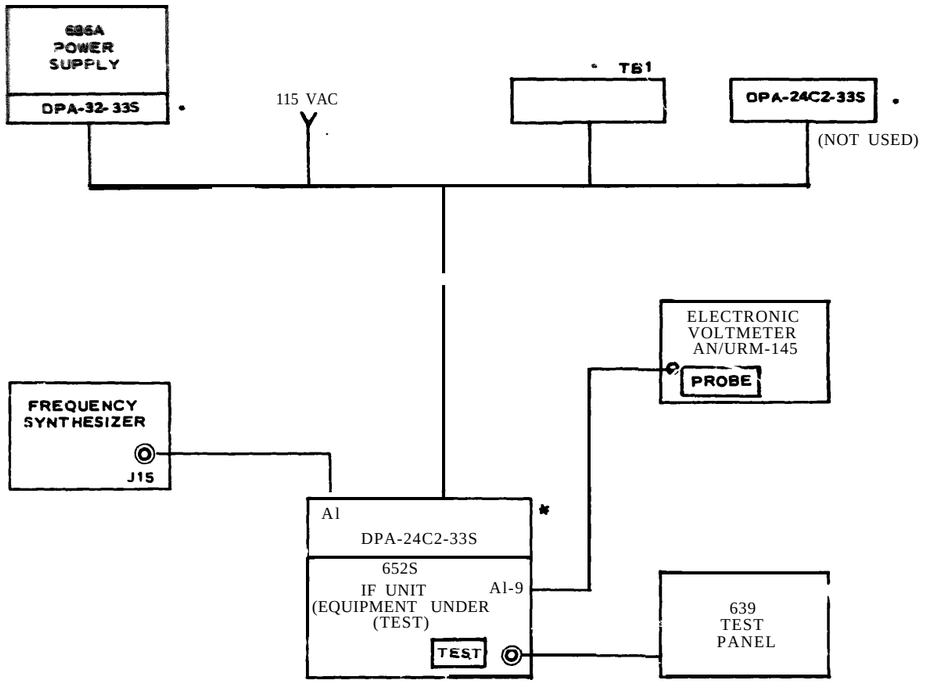
EL5895-482-35-TM-135

Figure 5-22 652S if *unit left side three-quarter view. location of adjustments*



EL5895-482-35-TM-98

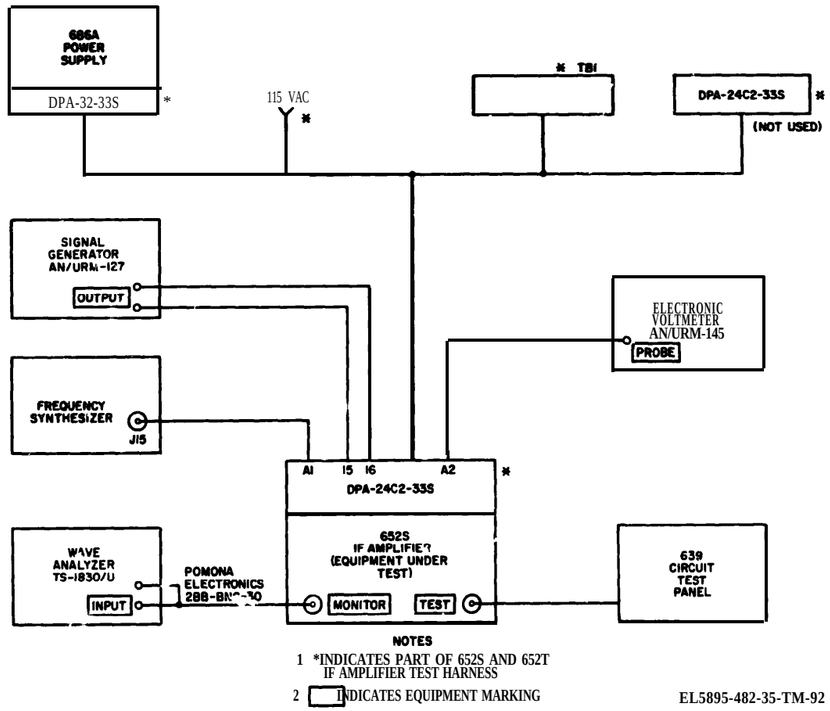
Figure 5-23 652S if unit mode slect output function, *test setup diagram*



1. *INDICATES PARTS 652S AND 652T IF AMPLIFIER TEST HARNESS
2. INDICATES EQUIPMENT MARKING

EL5895-482-35-TM-91

Figure 5-24 652S ***if unit carrier*** isolation ***amplifier, test setup diagram***



NOTES
1 *INDICATES PART OF 652S AND 652T IF AMPLIFIER TEST HARNESS
2 INDICATES EQUIPMENT MARKING

EL5895-482-35-TM-92

Figure 5-25 652S if unit audio amplifier and modulator, test setup diagram

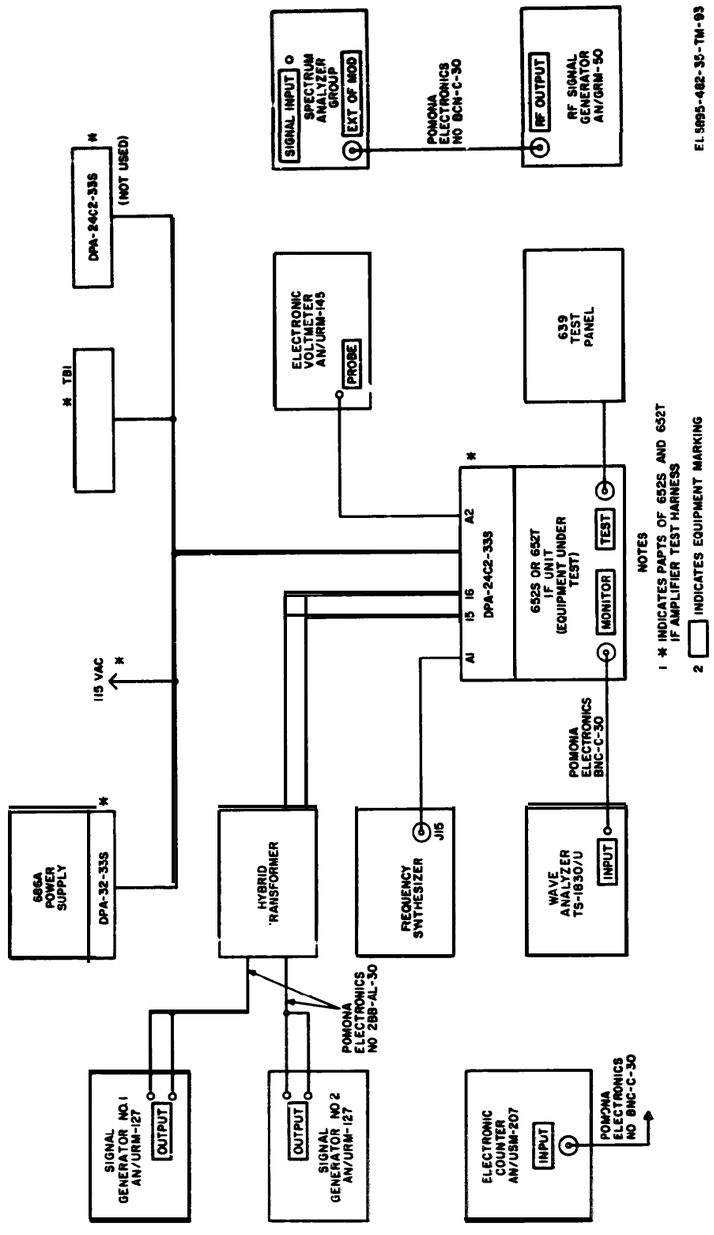
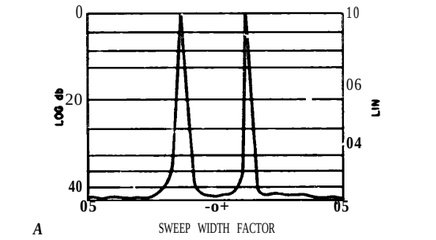
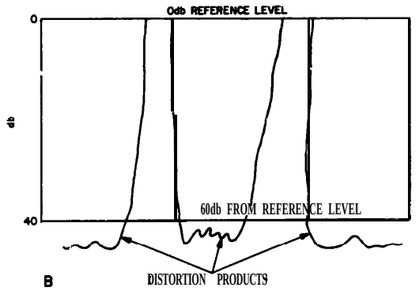


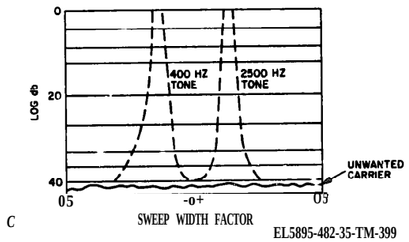
Figure 5-26 652S and 652T if units two-tone, carrier rejection, and adc, test set diagram



A SWEEP WIDTH FACTOR



B



C SWEEP WIDTH FACTOR

EL5895-482-35-TM-399

Figure 5-27. 652S and 652T if. units two-tone, distortion, and carrier rejection waveforms

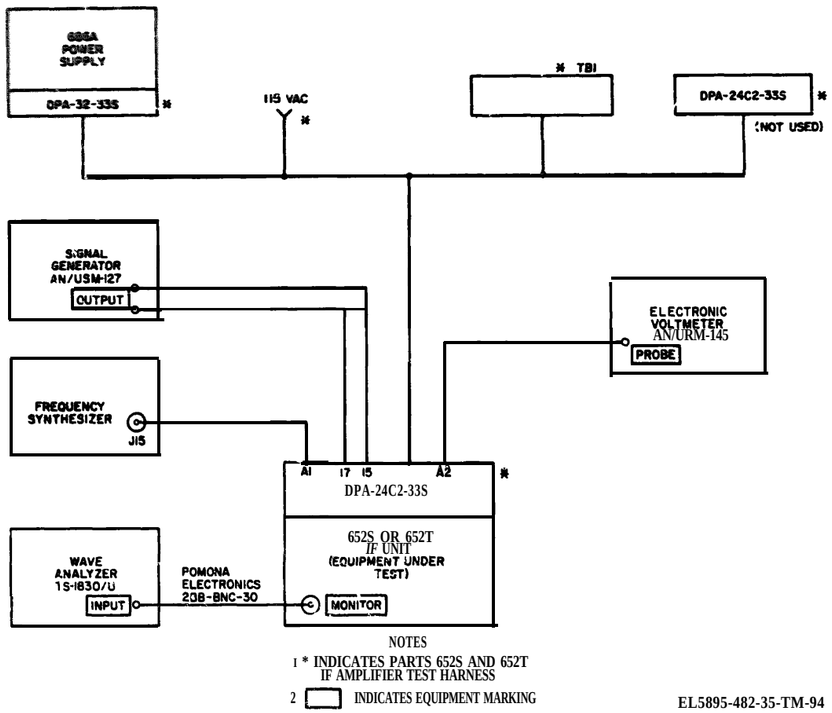


Figure 5-28. 652S and 652T if units bandpass ripple, test *setup diagram*

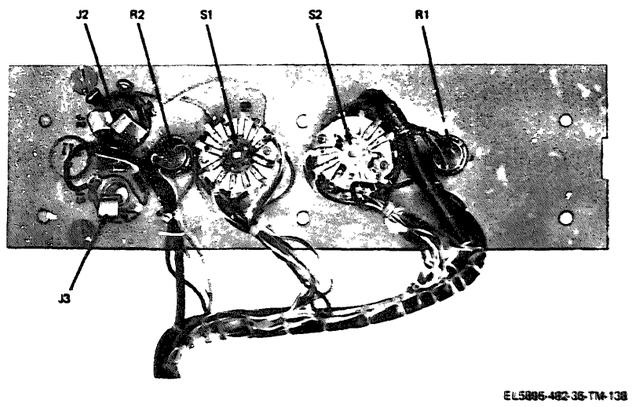


Figure 5-29 652S if unit front panel back view, parts location

5-17. 652T If. Unit Teat Procedure
(figs. 5-30 through 5-41)

a. Test Equipment and Materials Required.

(1) Frequency synthesizer (part of AN/TSC-*26).*

(2) Signal Generator AN/URM-127 (2 required).

(3) Electronic Voltmeter AN/URM-145.

(4) Wave Analyzer TS-1830/U.

(5) 639 test panel (part of AN/TSC-26).

(6) 686A power supply (part of AN/TSC-*26).*

(7) Test Set, Radio AN/URM-160A (part of AN/TSC-26).

(8) Signal Generator AN/GRM-50.

(9) Frequency Meter AN/USM-207.

(10) Hybrid transformer.

(11) 652S and 652T if. unit test harness.

(12) Tool Kit, Electronic Equipment TK-100/G.

(13) Tool Kit, Electronic Equipment TK-105/G.

(14) Variable Attenuator CN-796/U (2 required).

b. Test Connections and Conditions.

(1) With 652T if. unit removed from rack for bench check, connect the equipment as shown in ***figure 5-26.***

(2) Connect all equipment to the 115-volt ac power source.

(3) Turn on the equipment and allow a 10-minute warmup period before proceeding.

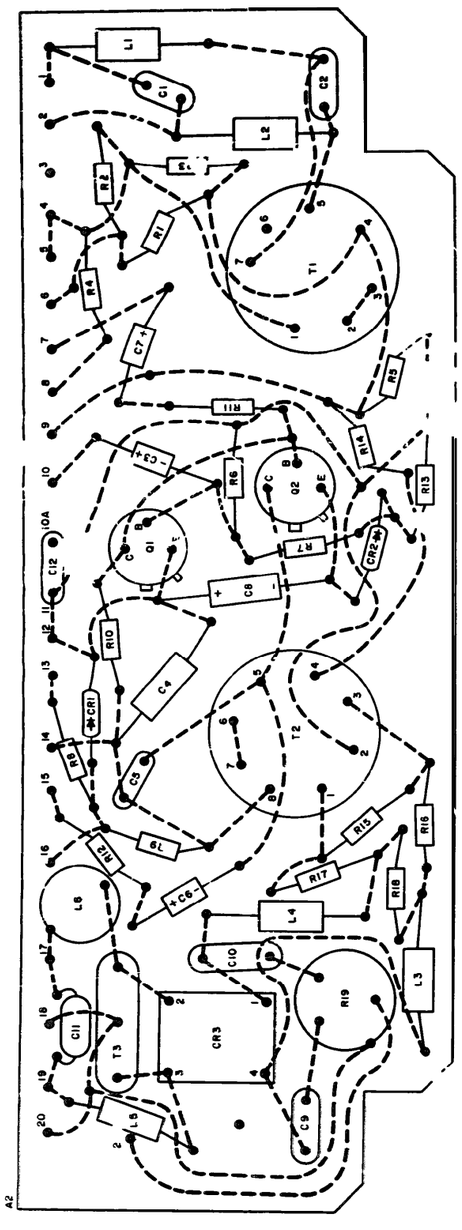
NOTE

In the procedure, a test point is nomenclatured by assembly designation and terminal number. For example, AS-23 means terminal 23 on assembly A5.

Step No	*Test* equipment	Control settings *Equipment under test*	*Test procedure*	*Performance standard*
1	***Frequency synthesizer*** Set up for 1 75-MHz output. ***AN/URM-127 (signal generator 1).*** Set up for 400 Hz at -15 dBm ***AN/URM-145.*** Set up to measure voltage in 0- 01-volt range. ***AN/URM-127. (signal generator 2):*** Set up for -100 dBm output.	INPUT LEVEL: Counterclockwise ADC: Counterclockwise	a Adjust 652T if unit INPUT LEVEL control for 5-millivolt output as observed on AN/URM-145.	a None.
			b Adjust AN/URM-127 (signal generator 1) for -100 dBm and AN/URM-127 (signal generator ***2)*** for 2500 Hz at - 15 dBm	***b.*** None
			c Adjust AN/URM-127 (signal generator 2) for a 5-millivolt indication on AN/URM 145	c None
			d Disconnect AN/URM-145	***d*** None.
			e Adjust AN/URM-127 (signal generator 1) for 400 Hz at - 15 dBm.	e None
2	***AN/URM-160A*** Set up for two-tone analyzation AN/GRM-50. Set up for 3.75 MHz at l-volt rms. Verify ***3 75*** MHz using ***AN/USM-207***		a Connect AN/URM-160A to J1. A2, on 652T if unit as shown in figure 5-26.	a None
			b Adjust AN/URM-160A until two tones are displayed on screen	***b None***
			c Set IF ATTENUATOR AN/URM-160A to 20DB	c None
			d Adjust AN/URM-160A to display the two tones up to 0-dB reference on graticule	***d*** AN/URM-160A displays two tones as shown in **figure 5-27**
3	***AN/URM-160A:*** **Remove 20-dB attenuation**		Observe waveform **on** AN/URM-160A analyzer	**AN/URM-160A display is as shown in figure 5-27 with all distortion products below 55 dB**
4			**Disconnect AN/URM-127 (signal generators 1 and 2) from test setup and note amplitude of unwanted carrier on AN URM 160A**	**AN/URM 160A display is as shown in figure 5-27 with the amplitude of unwanted carrier 55 dB below two tone signal** **The amplitude of the unwanted carrier should be 55 dB below two tone signal**

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
5	***AN/URM-127 (signal generator 1):*** **Set up for 400 Hz at −5 dB** ***AN/URM-127 (signal generator 2):*** Set up for 2500 Hz at -5 dB.	**ADC: Counterclockwise**	**a. Connect AN/URM-127 (signal generators 1 and 2) as shown in figure 5-26.**	**None.**
			b. Connect jumper between TB1-15 (ADC output) and TB1-6 (adc input) on 652T if. **unit test** harness and observe AN/URM-160A.	***b.*** Amplitude of two-tine signal should be 0.
			c. Rotate 652T if. **unit** ADC control maximum clockwise and observe waveform on AN/URM-160A.	c. AN/URM-160A displays two **tones** up to 0-dB reference (within 3 dB).
S			Reconnect the equipment as shown in figure S-28, and allow a 10-minute warmup period before proceeding	None.
7	***Frequency synthesizer*** Set up **for** 1 75-MHz **output** ***AN/URM-127*** Set up for 350 Hz at -15 dBm ***AN/USM-207.*** Set up to read frequency synthesizer and AN/URM-127 frequencies ***AN/URM-145*** Set up to measure voltages in 0- 01-volt range	ADC Counterclockwise	NOTE AN/URM-127 output frequency must **be** maintained at 350 Hz during a below.	
			a. Adjust 652T if unit INPUT LEVEL Control for **5** millivolts as indicated on AN/URM-145.	a None
			b Slowly increase AN/URM-127 output frequency from 350 Hz to 3040 Hz and observe minimum and maximum response voltages us dB on AN/URM-145 Record minimum and maximum response voltages in dB	b None
			c Compute bandpass ripple as follows* Maximum response in dB minus minimum response in dB (indicated on AN/URM-145) equals bandpass ripple	c Bandpass ripple should not exceed 2.5 dB
8			Reconnect the equipment as shown **in figure** 5-38	None
9	***AN/URM-145*** Set up to measure voltages in O-3 volt **range** ***Frequency synthesizer*** Set up for 1 75MHz at 1 volt rms	VOX SENS OFF ANTIVOX OFF VOX HOLD counter-clockwise	Check voltage between terminals Al-8 **and** Al-9 on 652T if unit	AN/URM-145 indicates 10 volt ac ± .02
10		TEST 2	a. Insert 639 test panel test plug into 652T if. unit TEST **jack.**	a None
			b Press 639 test panel PRESS-TO-TEST button.	639 test panel meter indicates between 40 and 60
11		TEST 4	Press 639 test panel PRESS TO TEST button	639 test panel meter indicates between 40 and 60
12			Connect jumper between TB1-14 and TB1-3 on 652S and 652T if unit test harness	AN/URM-145 and 639 test panel indications should drop to 0.
13			Reconnect the equipment as shown in figure 5-39 and allow a 10-minute warmup period before **proceeding**	None
14	***Frequency synthesizer*** **Set up for I 75 MHz at 1** volt **rms**	CARRIER OFF VOX SENS OFF INPUT LEVEL Midrange ANTIVOX OFF	**a. Tune TS-1830/U for a maximum indication on meter**	**a. None**
			b Adjust 652T if unit INPUT LEVEL control for 340 millivolts on TS-1830/U	**b TS-1830/U indicates 340 millivolts ± 2**
14 (Cont)	***TS-1830/U*** Set up to **measure** voltages in 0- volt range. ***AN/URM-127:*** Set up for 400 Hz at ***-50*** dBm.			
15	***AN/URM-127*** Set up for -5-dBm output.		a Tune TS-1830/U for a maximum indication on meter	a None
			b. Adjust 652T if unit INPUT LEVEL control for 340 millivolts on TS-1830/U	***b*** TS-1830/U indicates 340 millivolts ± 2
16	***AN/URM-127.*** Set up for -15-dBm output		a Tune TS-1830/U for a maximum indication on meter	a None
			b Adjust 652T if unit INPUT LEVEL control for 340 millivolts on TS-1830/U	b. None
17	***AN/URM-127*** Set up for 1700-Hz output. ***AN/URM-145:*** Set up to measure voltages in 0- 01-volt range		c Observe AN/URM-145 indication	c AN/URM-145 indicates 5 millivolts ± 05
18		TEST 1	a Insert 639 test panel plug into 652T if. unit TEST Jack	a None
			b Press 639 test panel PRESS TO TEST button and observe meter indication	b 639 test panel should indicate between 40 and 60
19			Connect a Jumper between TB1-12 and TB1-2 on 652S and 652T if unit test harness and observe AN/URM-145 indication	AN/URM-145 indication drops to 0
20			Reconnect equipment as shown in figure 5-41, and allow a 10-minute warm-up period before proceeding	None
21	***Frequency synthesizer*** Set up for 1 75 MHz at **1** volt rms. ***AN/URM-127*** Set up for 400 Hz at -100 dBm ***AN/URM-145.*** Set up to measure voltages in 0-.01-volt range.	CARRIER - 6DB	a Adjust A1R8 on 652T if unit for a 5-mv indication on AN/URM-145	a None
			b Disconnect AN/URM-145 from J1-A2 on 652T if unit	b None
22	***AN/URM-160A:*** Set up for a display on scope- ***AN/GRM-50:*** **Set up for 3.75 MHz at 1 volt rms. Verify 3.75 MH using AN/USM-207 meter.** ***CN-796/U:*** **Adjust attenuator 1 for 10 dB and attenuator 2 for 20 dB.**	CARRIER -3DB	a Connect CN-796/U to J1-A2. on 652T if unit. as **shown** in figure 5-40	a None
			b Adjust AN/URM -160A **until a** tone is displayed on screen	**b None**
			c Operate AN/URM-160A to. a maximum display up to 0-dB reference	**c None**
			d. Set 652T if **unit CARRIER switch in −6 DB position and observe on AN/URM 160A that signal drops 3 dB**	***d*** **None**
			e **Adjust CN 796/U No 1 and 2 until tone on AN/URM 160A is at the 0-dB reference**	**The total amount of attenuation required to display tone up to 0 dB reference should be 3 dB ± 3**

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
22 (Cont)			f. Set 652T if. unit CARRIER switch to each of the positions listed below. For each position listed, repeat e above. CARRIER switch positions: 9, 12, 15, 18, 21, 24, 27, and 30.	f. Same as e above for each setting of CARRIER switch.
23			Reconnect equipment as shown in figure 5-42 and allow a IO-minute warmup period before proceeding.	None.
24	*Frequency synthesizer:* Set up for 1.75 MHz at 1 volt rms. AN/URM-127 (signal generator 1): Set up for 2 kHz at - 15 dBm *AN/URM-145.* Set up to measure voltage in 0-.01-volt range	VOX SENS: Counterclockwise VOX HOLD: Counterclockwise ANTIVOX. Counterclockwise CARRIER: OFF INPUT LEVEL Midrange	Adjust 652T if. unit INPUT LEVEL control for 2-millivolt indication on AN/URM-145.	None
25	ME-26/U- Set up to measure negative de voltage in 0-100-volt range	VOX SENS Fully clockwise	a Observe 652T if. unit VOX indicator. b Using ME-26/U, voltage at pin 11 of TB1 on 652S and 652T if. unit test harness. c Adjust AN/URM-127 (signal generator 1) for a -100-dBm output and observe 652T if. unit VOX indicator	a 652T if. unit VOX indicator lights. b ME-26B/U vtvm should indicate -85 volts dc ± 3. c 652T if unit VOX indicator extinguishes after a 100-milliseconds hold time as determined by setting of 652T if. unit VOX HOLD adjustment.
26		VOX HOLD Maximum clockwise	Adjust AN/URM-127 (signal generator 1) for a -100-dBm output and observe 652T if. unit VOX indicator	652T if unit VOX indicator extinguishes after a 2 5-second hold time as determined by setting of 652T if unit VOX HOLD adjustment NOTE For different settings of VOX HOLD adjustment, VOX hold tune should vary correspondingly (as indicated by VOX light) each time audio signal is removed from 652T if unit
27	*AN/URM-127 (signal* generator 1) - 100-dBm output		Using ME-26/U. check voltage at pin IO of TB1 on 652S and 652T if. unit test harness	ME-26/U indicates -85 volts dc ± 3
28	*Frequency* synthesizer Set up for 1 75 MHz at 1 volt rms *AN/URM-127 (signal generator 1)* Set up for 2 kHz at -5 dBm AN/URM-127 (signal generator 2) Set up for 400 Hz at 80 millivolts	ANTIVOX Maximum clockwise	Observe 652T if unit VOX indicator	652T if unit VOX indicator extinguishes
29	*AN/URM-127 (signal generator 2):* Set up for —100-dBm output.		Observe 652T if. unit VOX indicator.	652T if. unit *VOX* indicator lights



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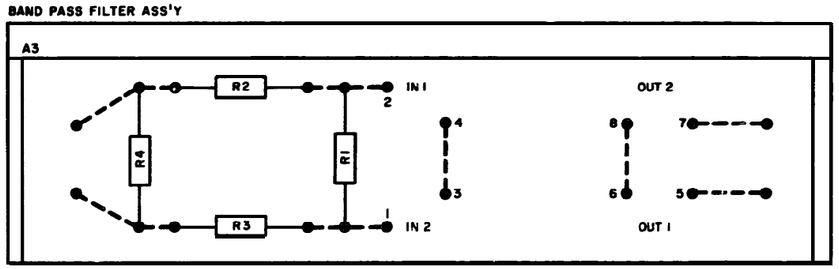
NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ——— WIRING, PARTS AND PIGTAILS ON FRONT OF BOARD
3 – – – PRINTED WIRING ON BACK OF BOARD

Figure 5-30 652T if unit audio amplifier-modulator assembly A2, wiring diagram and parts location



NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ——— WIRING, PARTS AN0 PIGTAILS ON FRONT OF BOARD
3 -----PRINTED WIRING ON BACK OF BOARD

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Figure 5-31 652T if unit bandpass filter assembly A3, wiring diagram and parts location

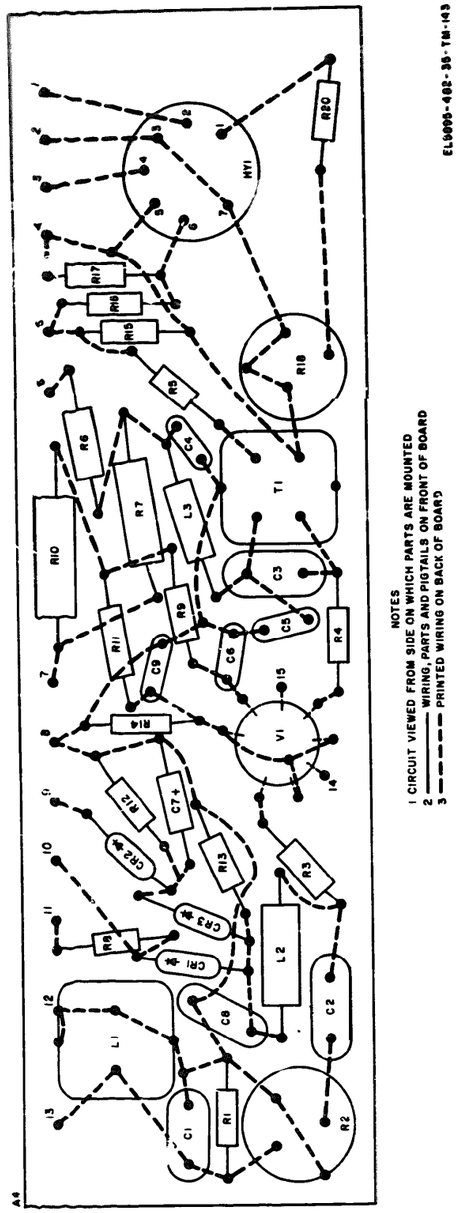

Figure 5-32 652T if. unit if output amplifier assembly A4, wiring diagram and parts location

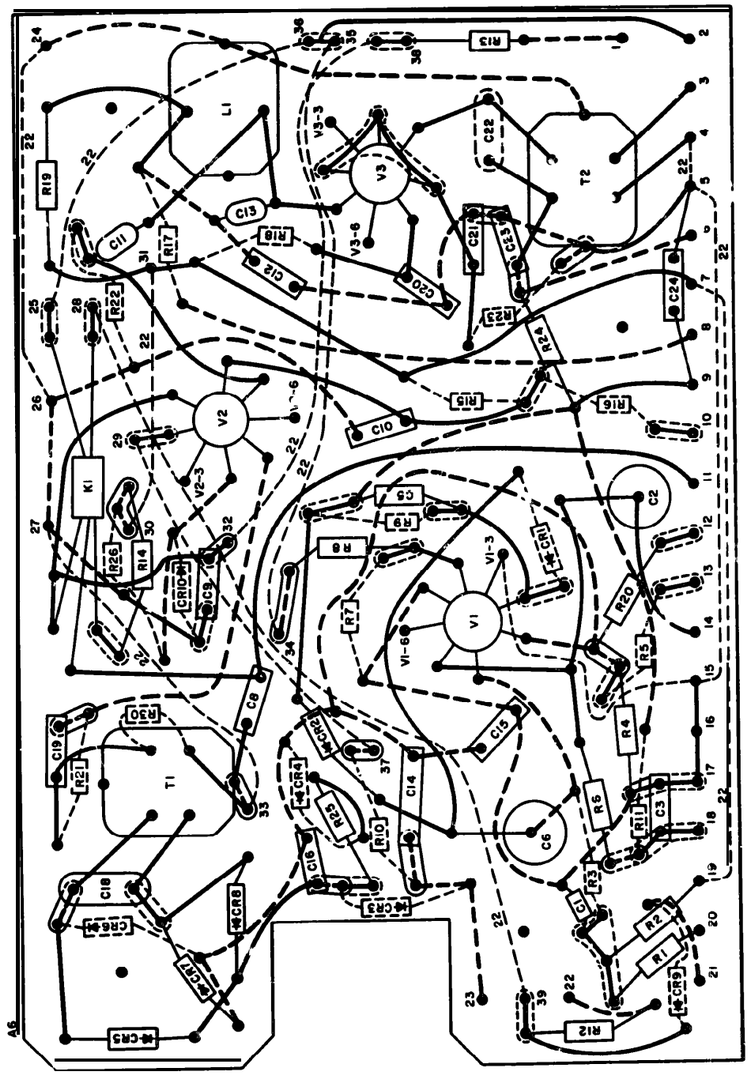

Figure 5-33 652T if. unit vox and antivox assembly A6, wiring diagram and parts location

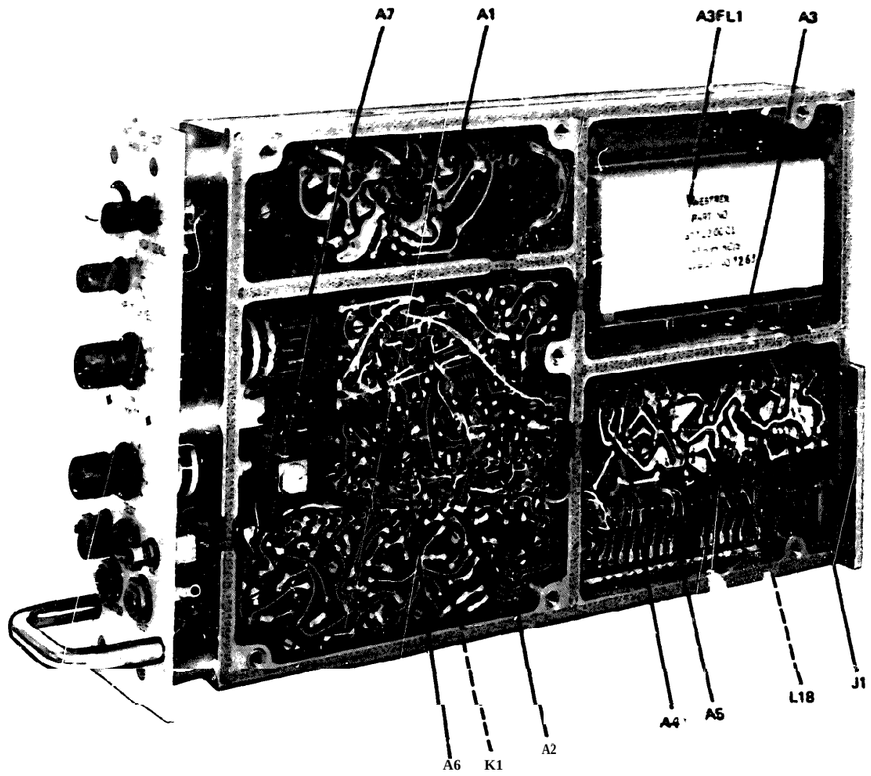

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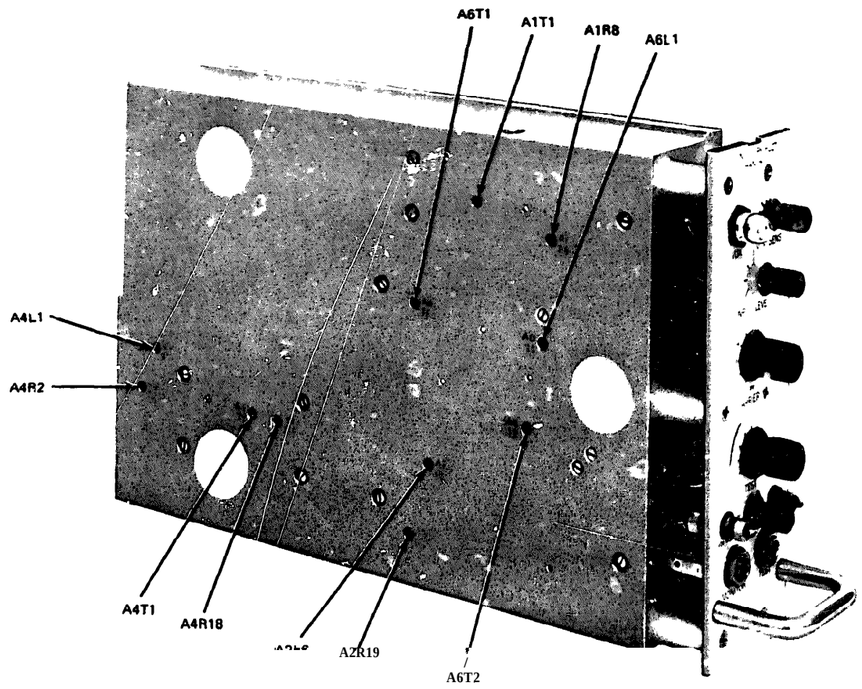
Figure 5-34 652T if. **unit** *right side three-quarter view, parts location*



EL5895-482-35-TM-136

Figure 5-35 652T if unit left side three-quarter view. location of adjustments

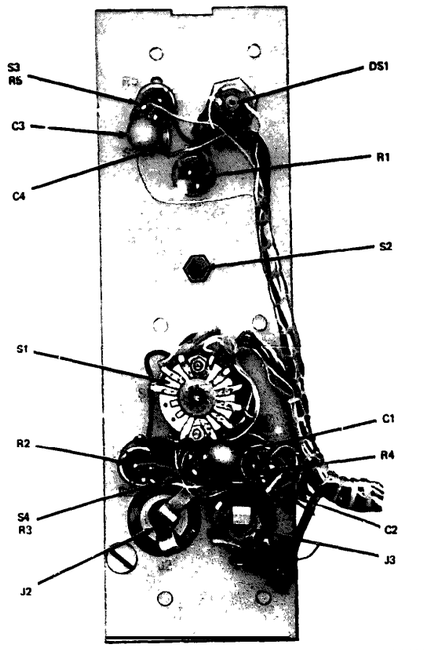
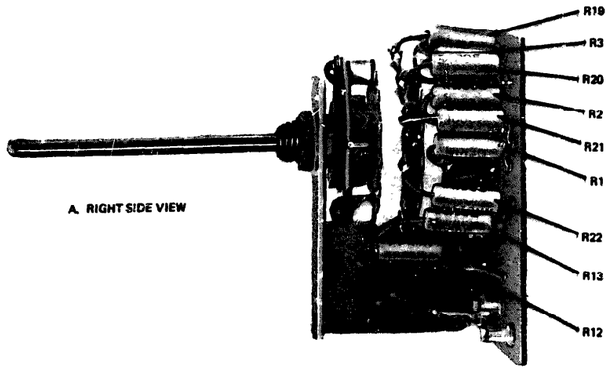


Figure 5-36 652T if. unit front panel back view. parts location



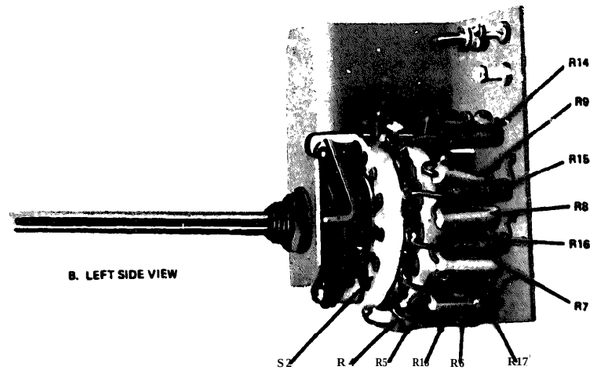


Figure 5-37. 652T if unit carrier insertion switch assembly A7, parts ***location***

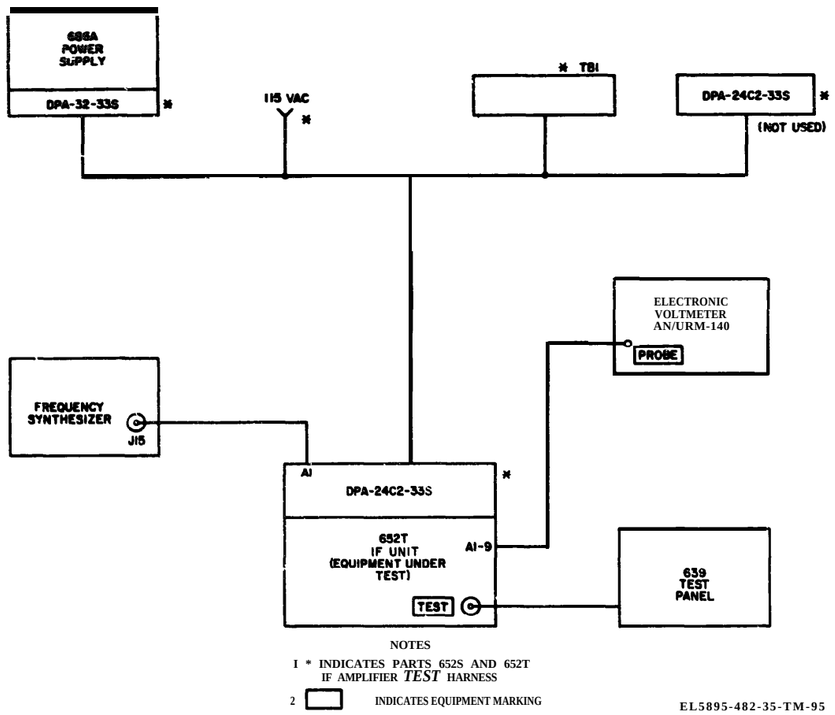


Figure 5-38 *652T if* unit *carrier isolation amplifier. test setup diagram*

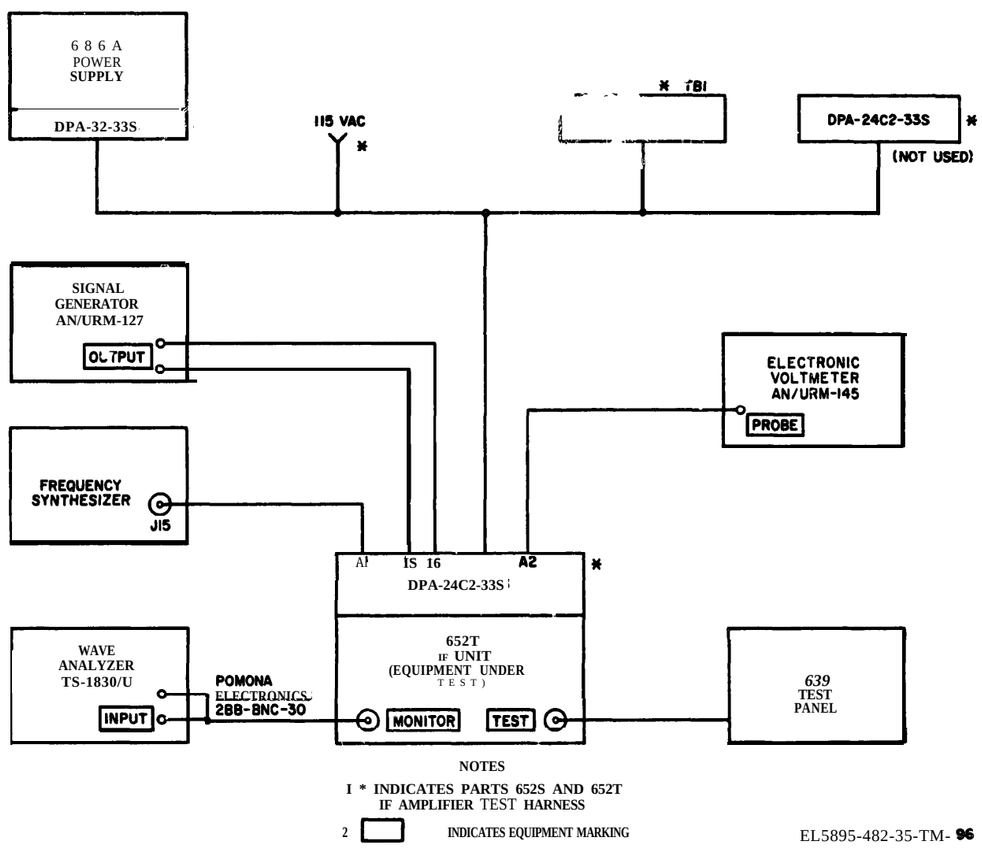


Figure 5-39 652T if. unit audio amplifier and modulator, test setup diagram

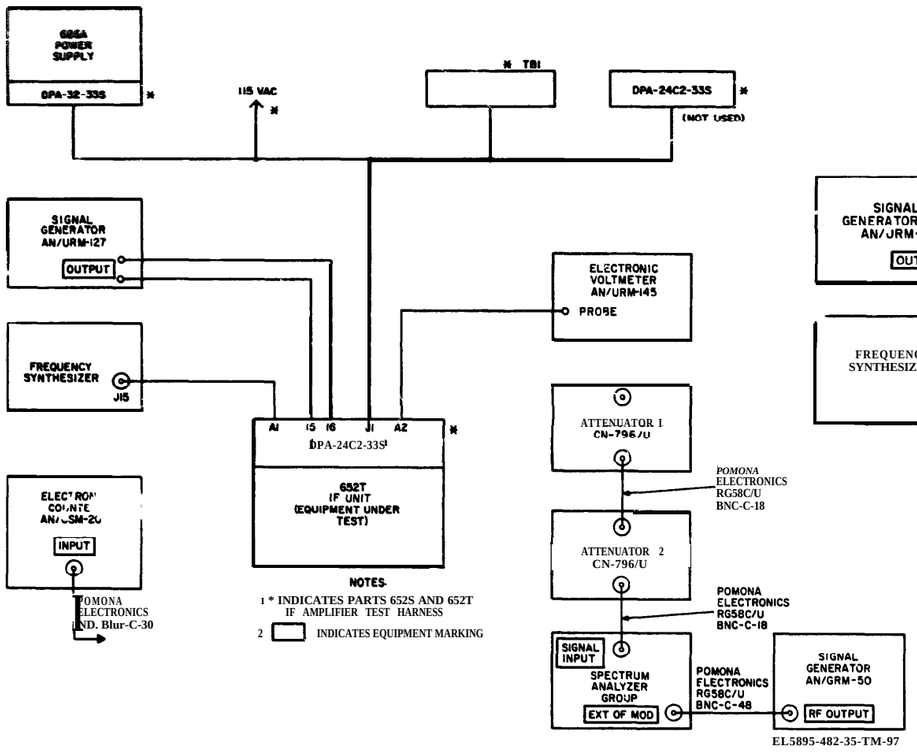


Figure 5-40 652T if unit carrier insertion. test setup diagram

Figure 5-41 652T if unit VOX and anti-vox, test setup diagram

5-18. 653B Modulator Test Procedure
(figs. 5-42 through 5-54)

a. Test Equipment and Materials Required.

(1) 686A power supply.
(2) Frequency synthesizer (part of AN/TSC-*26).*
(3) Signal Generator AN/GRM-50 (2 required).
(4) 639 test panel.
(5) Electronic Voltmeter AN/URM-145.
(6) Electronic Voltmeter ME-30/U.
(7) w-ohm load. applied research HFT-50.
(8) Probe T-connector HP-11042A
(9) 653B modulator test harness
(10) Frequency Meter AN/USM-207.
(11) Power Supply PP-3940/G
(12) Test Set, Radio AN/URM-160A

b. Test Connections and Conditions.

(1) Connect the equipment as shown **in** figure *5-42.*
(2) Connect the equipment to the 115-volt ac power source.
(3) Allow the **equipment to warm**up for 10 minutes before s**tarting the procedure**

Control Settings

Step No.	*Test equipment*	*Equipment under test*	*Test procedure*	*Performance standard*
	AN/GRM-50 (signal generator No 1) Set up for 1 748000 MHz ± 200 Hz at −10 dBm Verify output frequency using AN USM 207 *AN GRM 50 (signal generator No 2)* Set up for 1 752000 MHz ± 200 Hz at 110 dBm Verify output frequency using AN USM 207			
a			Adjust AN GRM 50 (signal generator No 1) until 5 millivolts is measured on the AN URM 145	*a* None
b			Adjust AN GRM 50 (signal generator No 1) for 110 dBm without disturbing vernier control	*b* None
c			Set up AN GRM 50 (signal generator No 2) for 80 dBm	*c* None
d			Adjust AN GRM 50 (signal generator No 2) until 5 millivolts is measured on AN URM 145	*d* None

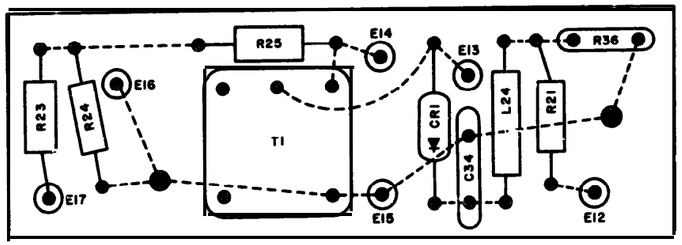
Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1 (Cont)	AN/URM-145: Set up to measure voltages in 0- 01-volt range.			
2	*Frequency* **synthesizer** Set up for 3.75 MHz at 10 volt rms. *ME-30/U* Set up to measure ac voltage in the 0-5-volt range.	BAND SEL: 1 TUNE: 2 MHz OUTPUT LEVEL Maximum counter- *clockwise.*	a. Vary the 653B modulator TUNE control for a peak indication on the ME-30/U. b. Set 653B modulator OUTPUT LEVEL control maximum clock- **wise.** c. Adjust 653B modulator OUTPUT LEVEL control to produce a 2.3-volt ac output.	a. ME-30/U indication does **not** exceed 1.8 volts ac. b. ME-30/U indicates at least 3.0 volts ac. c. Adjustment of 653B modulator OUTPUT LEVEL control produces an output of 2.3 volts ac as indicated by ME-30/U.
3			Repeat step 2 for frequencies in- dicated below.	Same performance standards as Indicated in step 2.

653B *BAND SEL* switch *position*	Frequency *synthesizer output* frequency *(MHz)*	*653B TUNE control* frequency *(MHz)*
1	4.75	3
1	5.75	4
2	5.75	4
2	7.75	6
2	9.75	8
3	9.75	8
3	13.75	12
3	17 75	16
4	17 75	16
4	21.75	20
4	25.75	24
4	27.75	26
4	31 75	30

4	Same as step 2	Same as step 2.	a. Insert plug 639 test panel into 653B modulator TEST jack b Place 653B modulator TEST switch in I position c. Press 639 test pant' PRESS TO TEST button and observe meter indication. d. Repeat c above with 653B modulator TEST switch in each of positions 2 through 6. a. Connect a jumper between pin 6 (-85 volts dc) and pin 3 (vox cutoff) of 653B modulator test harness terminal board TB1. b. Remove jumper. c Connect a jumper between pin 6 (-85 volts dc) and pin 5 (cw cutoff) of 653B modulator test harness terminal board TB1. d Intermittently short TB1 pin 1 (key) to TB1 pin 4 (ground) to simulate keying action. e. Remove jumpers and note that **output voltage** returns to 2.3 volts ac as indicated by ME 30/U.	a None. ***b None*** c. 639 test panel meter indicates within the green band d. 639 test panel meter indicates within the green band for each position of the 653B modulator TEST switch a. The output voltage monitored on ME-JO/U drops to zero. ***b.*** None c. The output voltage monitored on ME-30/U drops to zero d. Voltage monitored on ME-30/U rises and decreases to zero following the keying action. e. None.

Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
6	***PP-3940/G*** **Set up for -4.5 volt dc output.**		**a. Connect the PP-3940/G to TB1-7 and TB1-4 of 653B modulator test harness.** **b. Connect a jumper between TB1-7 (-4.5 volts dc) and TB1-2 (ADC) of 653B modulator test harness and observe voltage indication on ME-30/U.**	**a. None.** **b. The indication on ME-30/U is at least 6 dB below the output voltage (2.3 volts ac) recorded in step 2*c* above.** **NOTE** **The typical decrease is 10 dB.**
7	AN/GRM-50 (signal generator No. 1): Set up for 1.748000 MHz ± 200 Hz at -30 dBm. AN/GRM-50 (signal generator No. 2): Set up ***for 1.752000*** MHz ± 200 Hz at -110 dBm. AN/URM-145: Set up to measure voltages in 0- .01 -volt range. ***Frequency synthesizer:*** Set up for 5.75 MHz at 1.0 volt rms. ***ME-30/U:*** Set up to measure ac voltage in O-&-volt range.	BAND SEL: 1 TUNE: 4 MHz	a Vary 653B modulator TUNE control and OUTPUT LEVEL control for a Peak indication on ME-30/U. b. Decrease frequency synthesizer output frequency until ME-30/U indicates 1.79 volts ac. This is the lower end (- 1.0 dB) point. Record frequency synthesizer frequency. c. Increase frequency ***synthesizer*** output frequency until ME-30/U again indicates 1.79 volts ac. Note frequency **synthesizer** frequency.	**a. ME-30/U indicates 2.0 volts ac.** ***b. None.*** c. The difference between this frequency and the **frequency** noted in ***b above is the*** bandwidth, and should be at least 16 kHz.
8			Reconnect the equipment as shown in figure S-53, and allow a 10-minute warmup period before proceeding.	None.
9			Repeat steps 1 and 2 above	None.
10	***AN/URM-160A*** Set up for distortion analyzation with 20-dB attenuation		a Adjust AN/URM-160A so that peak of waveform is at 0-dB level. b Locate third-order distortion peak displayed on AN/URM-160A c Remove 20-dB attenuation from AN/URM-160A and observe third-order distortion	a Note b None. * c The peak of the thud-order distortion signal should be a minimum of 55 dB below the 0-dB level as shown in figure 5-54
11			Repeat step 10 for the frequencies indicated below.	

653B BAND SEL switch position	***Frequency synthesizer output*** frequency ***(MHz)***	***653B TUNE control frequency (MHz)***
2	7.75	6 00
3	11 75	10 00
3	15.75	14 00
4	19 75	18 00
4	25 75	24 00
4	31 75	30 00



NOTES:
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 —— PARTS AND PIGTAILS ON FRONT OF BOARD.
3. - - - WIRING ON BACK OF BOARD

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Figure 5-42 *653B modulator monitor assembly* A2, *wiring diagram* and *parts location*

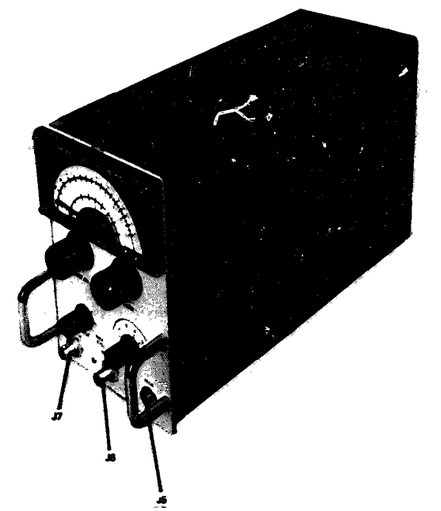

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Figure 5-43. 653B modulator, right side view, parts *location.*

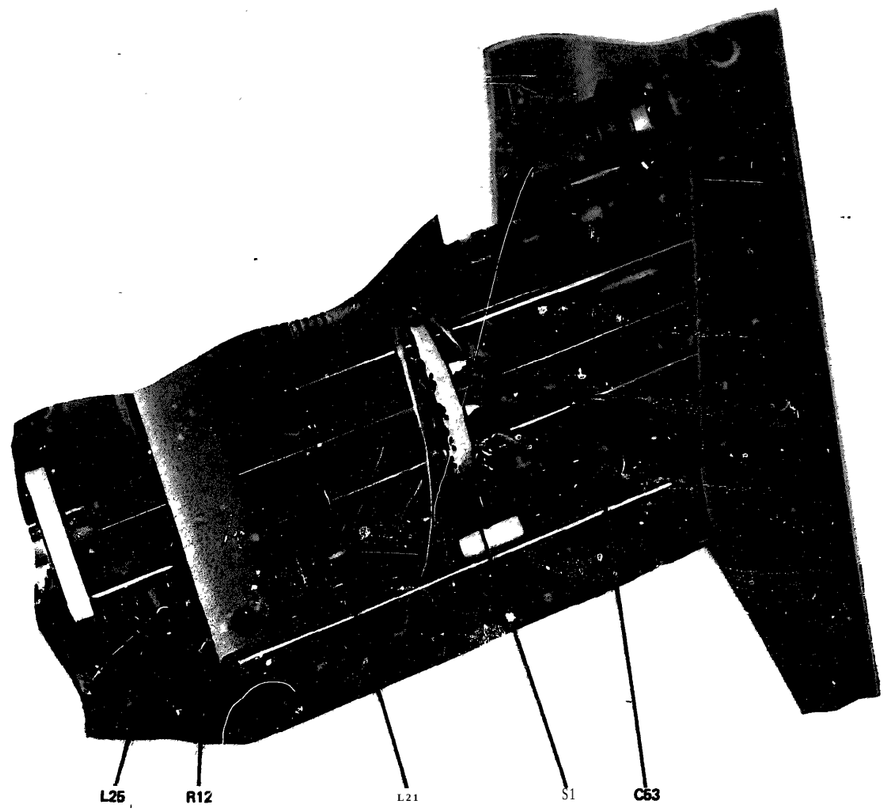

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Figure 5-44. 653B modulator partial left side view, cover removed. parts location

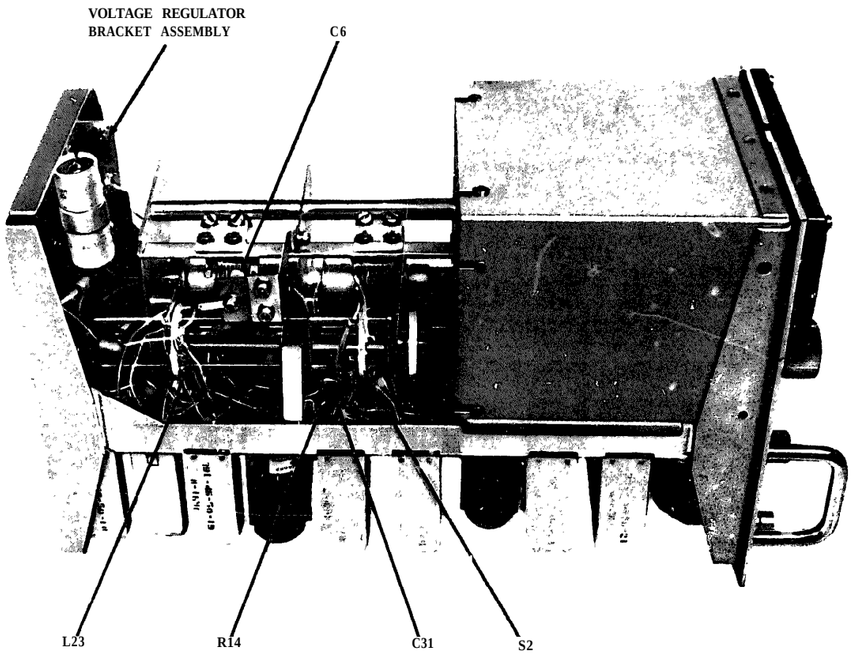


Figure 5-45 653B modulator left side view. parts location

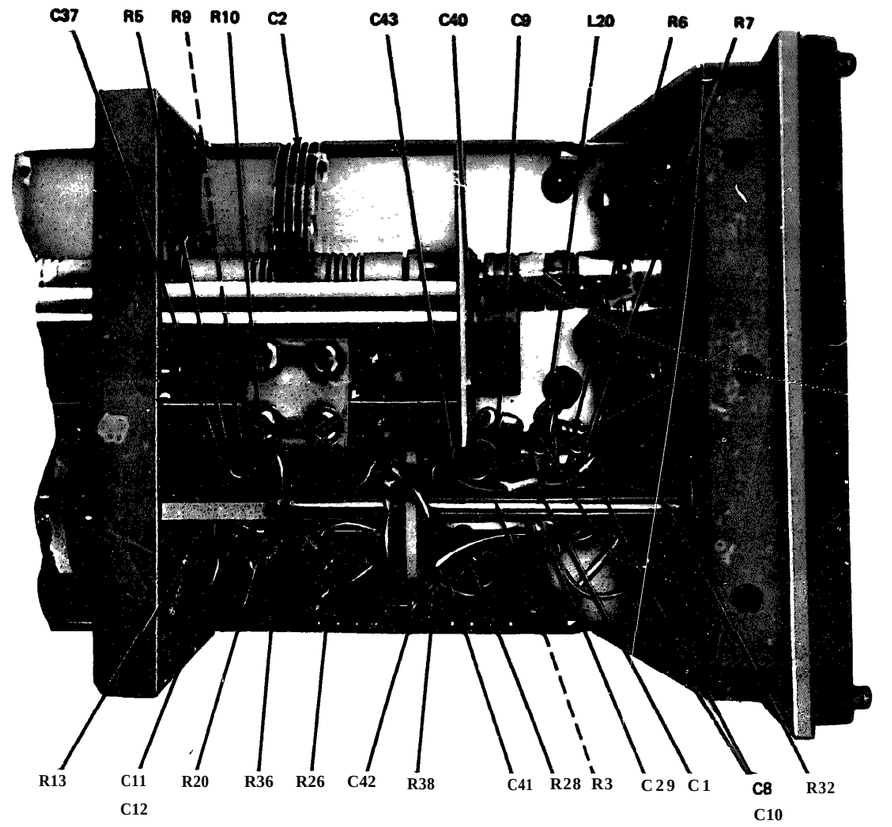


Figure 5-46 653B modulator front half with cover removed, top view, parts location

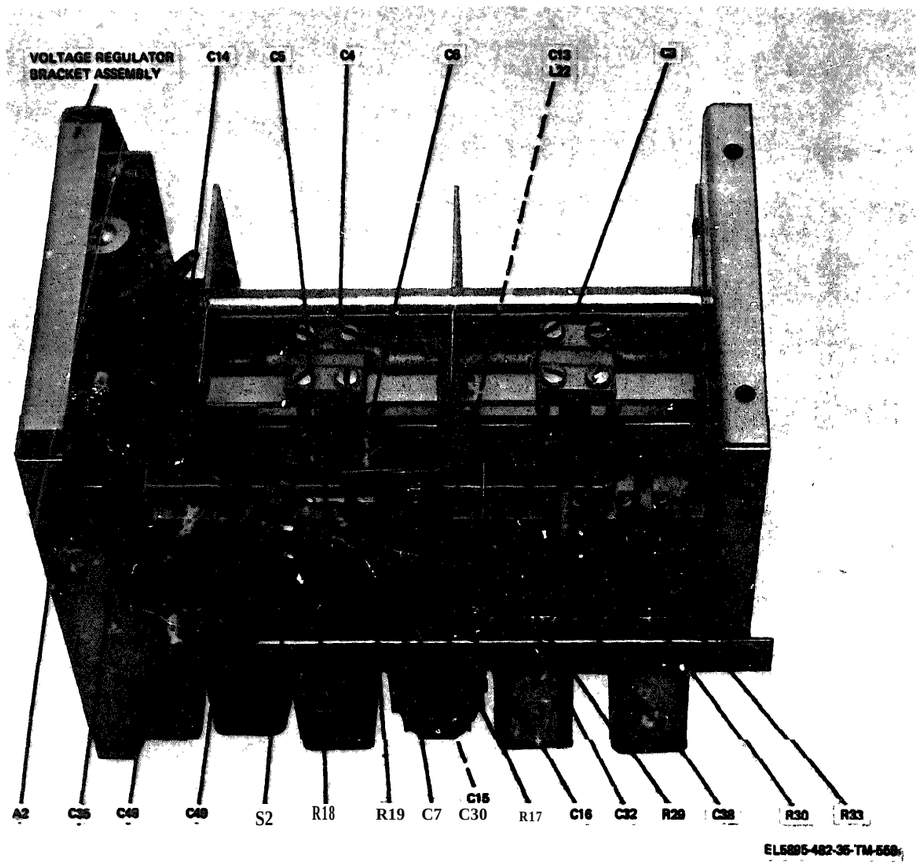


Figure 5-47. 653B modulator rear half, top view, parts location.

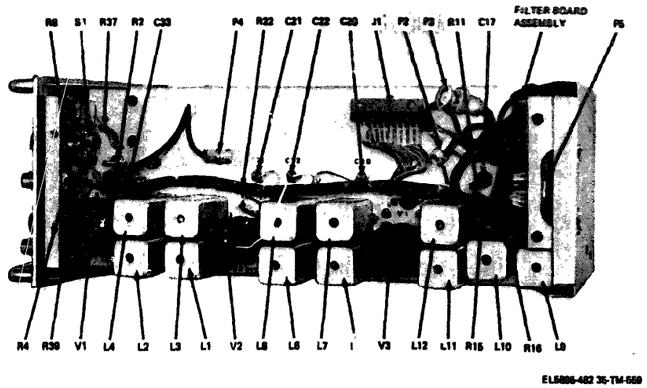


Figure 5-48. 653B modulator with modulator assembly removed. bottom view, parts location

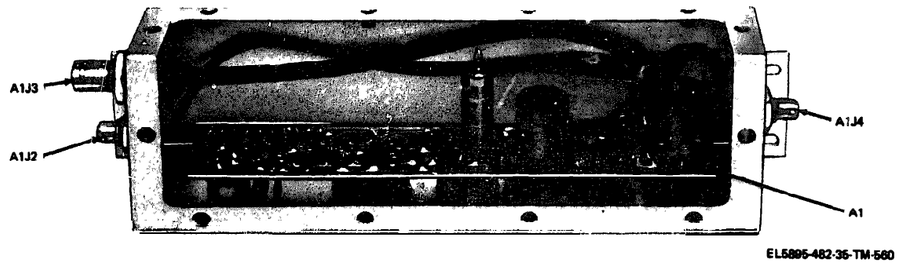


Figure 5-49. 653B modulator, modulator assembly, parts location

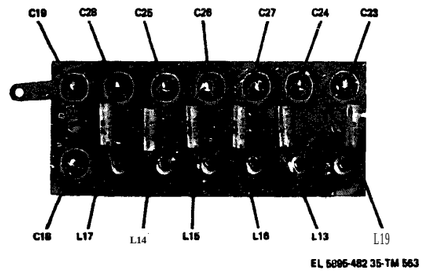


Figure 5-50.6598 modulator, filter board assembly, parts location

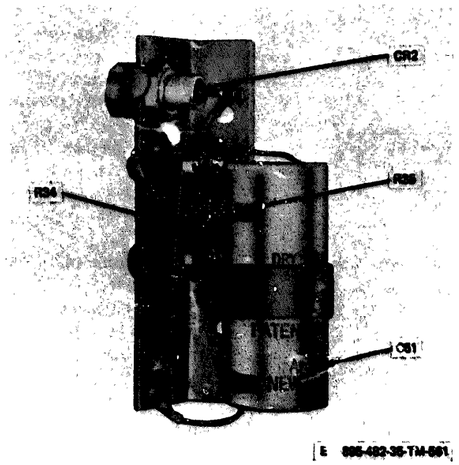


Figure 5-51. 653B modulator voltage regulator bracket assembly, parts location.

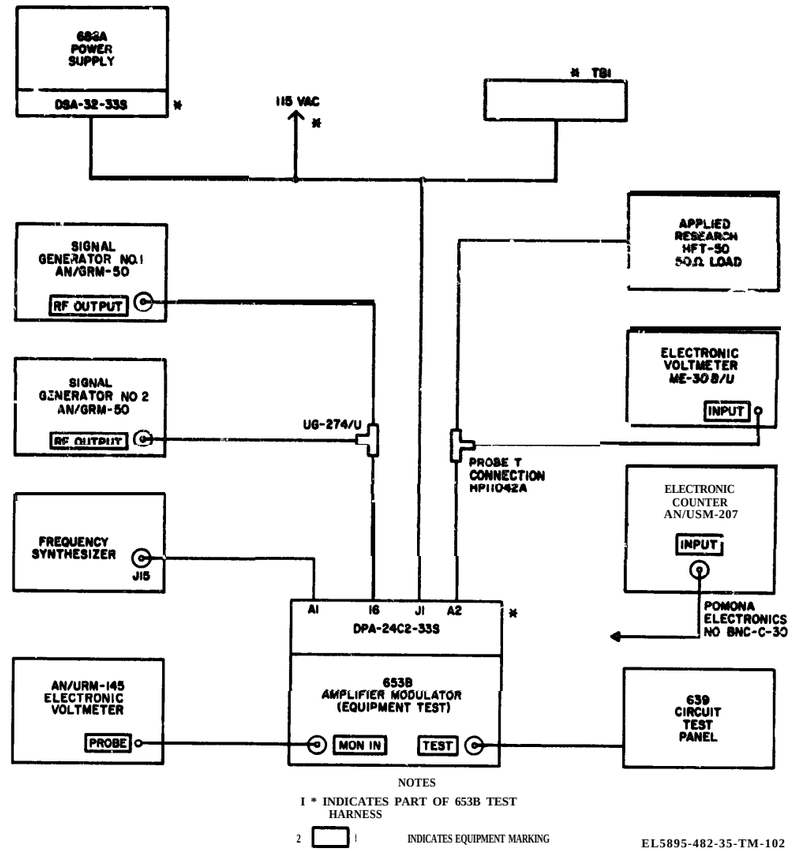


Figure 5-52 653B modulator signal and dc levels, test setup diagram

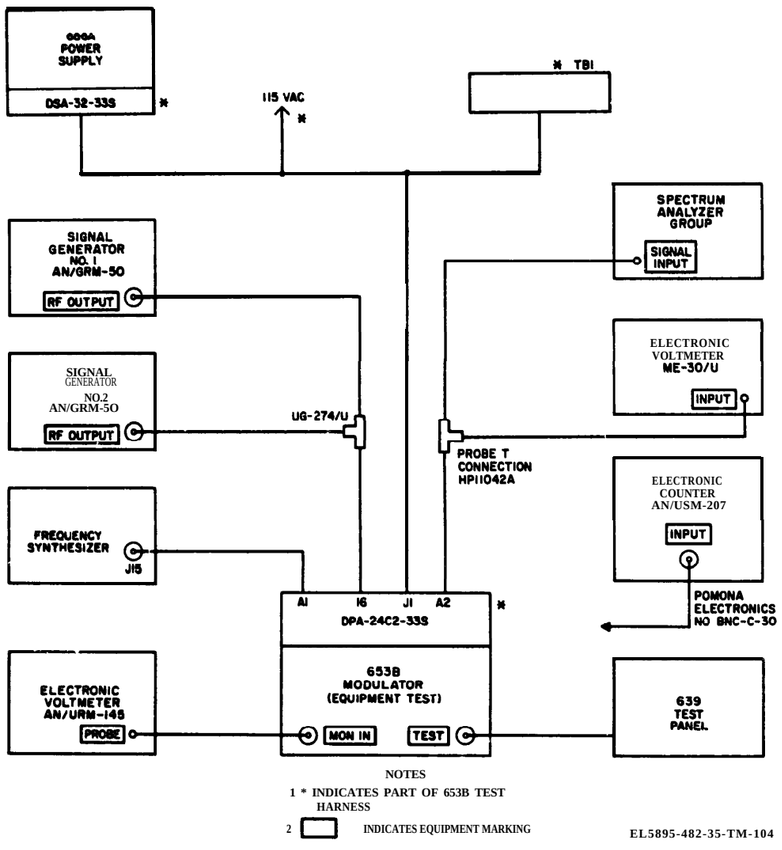


Figure 5-53. 653B modulator distortion. test *setup diagram.*

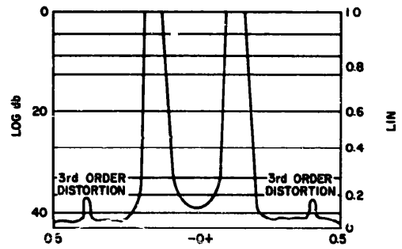


Figure 5-54 653B modulator third-order distortion waveforms

5-19. 686A Power Supply Test Procedure (figs. 5-55 through 5-62)

a. Test Equipment and Materials Required.

(1) Multimeter ME-26/U.

(2) Electronic Voltmeter ME-30/U.

(3) 686A power supply test cable and resistive load.

(4) Electron Tube Test Set TV-?/U.

(5) Transistor Test Set TS-1836/U.

b. Test Connections and Conditions.

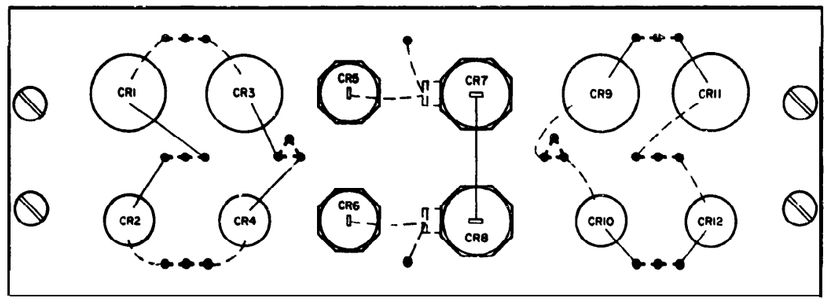
(1) Connect the equipment as shown in figure 5-62.

(2) Connect all equipment to the 115-volt ac power source.

(3) Turn on all equipment, and allow a 10-minute warmup period-before proceeding with the procedure.

Step No.	*Test equipment*	*Control settings Equipment under test*	*Test* procedure	*Performance standard*
1	***686A power supply test cable and resistive load*** S1 - S7. Open ***ME-26/U.*** Set up to measure positive dc voltages in 300-volt range ME-30/U Set up to measure ac voltages in 5-millivolt range		***a*** Close **686A** power supply resistive load switch S1	a None
			b Using ME-26/U. check voltage between P1-1 and P1-6 on **686A** power supply test cable	***b*** ME-36/U indicates between 170 and 173 4 volts dc
			c Using ME-30/U. check ripple voltage between P1-1 and P1-6 on 686A power supply test cable	c ME-30/U indication does not exceed 5 0 millivolts rms
2	***ME -26/U.*** Set up to measure positive dc voltages in 100-volt range		***a*** Close 686A power supply resistive load switch S2	***a*** None
			b Using ME-26/U. check voltage between P1-2 and P1-4 on 686A power supply test cable	***b*** ME-26/U indicates between 14 4 and 17 6 volts dc
			c Using ME-30/U. check ripple voltage between P1-2 **and** P1-4 on 686A power supply test cable	c ME-30/U indication does not exceed 3 0 millivolts rms
3	***ME-30/U-*** Set up to measure ac voltage in lo-volt range		a Close 686A power supply resistive load switch S3	***c None***
			b Using ME-26/U. **check** voltage between P1-3 and P1-4 on 686A power supply test cable	***b*** ME-26/U indicates between 24 and 27 volts dc
			c Using ME-30/U. check ripple voltage between P1-3 and P1-4 on 686A power supply test cable	c ME-30/U indication does not exceed 2 5 volts rms
4	***ME-26/U-*** Set up to measure negative dc voltage in 100-volt range. ***ME-30/U:*** **Set** up to measure ac voltage in 15-millivolt range		***a*** Close 686A power supply resistive load switch S4	a None
			b. Using ME-26/U, check voltage between P1-7 and P1-6 on 686A power supply test cable	***b*** ME-26/U indicates between -85 and -88 volts dc
			c Using ME-30/U, check ripple voltage between P1-7 and P1-6 on 686A power supply test cable	c ME-30/U indication does not exceed 15 millivolts rms

Step No.	Test Equipment	Control settings Equipment under test	Test procedure	Performance standard
5	ME-26/U: Set up co measure positive de voltage in 500-volt range. ME-30/U: Set up to measure ac voltage in 0.5-volt range		a. Close *686A* power supply resistive load switch S5.	a. None.
			b. Using *ME-26/U,* check voltage between P1-9 and P1-6 on 686X power supply test cable.	b. ME-26/U indicates between 280 and 300 volts dc.
			c. Using ME-30/U, check ripple voltage between P1-9 and P1-6 on 686A power supply test cable.	c. ME-30/U indication does not exceed 0.5 volt rms.
6	*ME-30/U:* Set up to measure ac voltage in 10-volt range.		a Close 686A power supply resistive load switch S6.	a. None.
			b. Using ME-30/U, check filament voltage between P1-30 and P1-31 on *686A* power supply test cable	*b.* ME-30/U indicates between 6.18 and 6.83 volts ac
			c. Open 686A power supply resistive load switch S6 and close switch *S7.*	c. *None.*
			d. Using ME-30/U. check filament voltage between P1-32 and P1-31 on 686A power supply test cable.	*d.* Same as *b* above



NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ——— WIRING, PARTS AND PIGTAILS ON FRONT OF BOARD
3 — — — WIRING, PARTS AND PIGTAILS ON BACK OF BOARD
4 - - - PRINTED WIRING ON RACK OF BOARD

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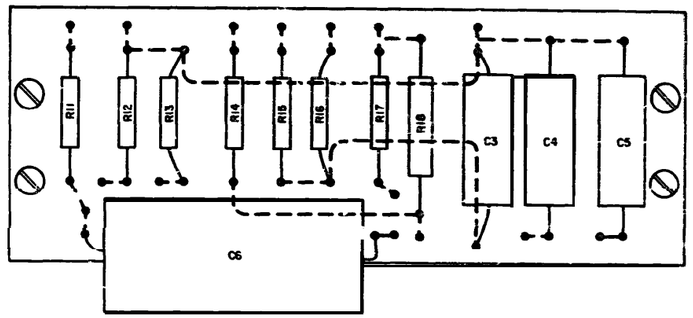
Figure 5-55 686A power supply printed circuit board assembly A1, wiring diagram and parts location



NOTES
I CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ——— WIRING, PARTS AND PIGTAILS ON FRONT OF BOAR3
3 — — — PRINTED WIRING OR BACK OF BOARD

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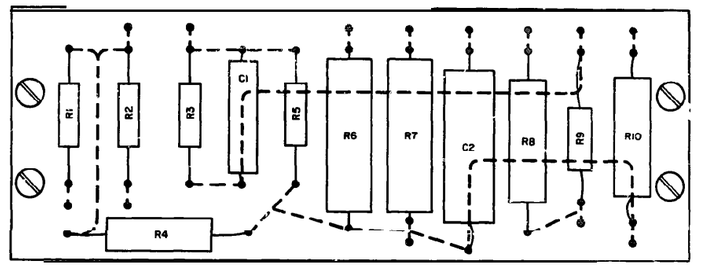
Figure 5-56. 686A power supply printed circuit board assembly A2, wiring diagram and parts location



NOTES
I CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ——— WIRING PARTS AND PIGTAILS ON FRONT OF BOARD
3 — — — PRINTED WIRING ON BACK OF BOARD

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Figure 5-57 686A power supply printed circuit board assembly A3, wiring diagram and parts location

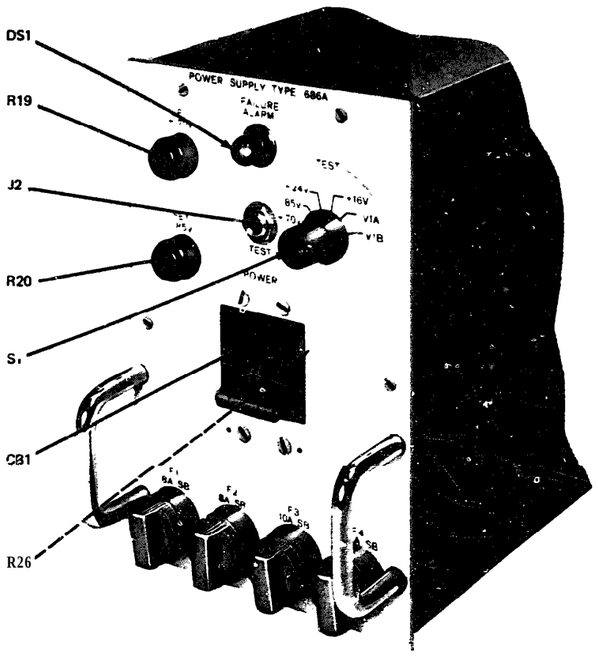

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Figure 5-58 686A power supply front view, parts location

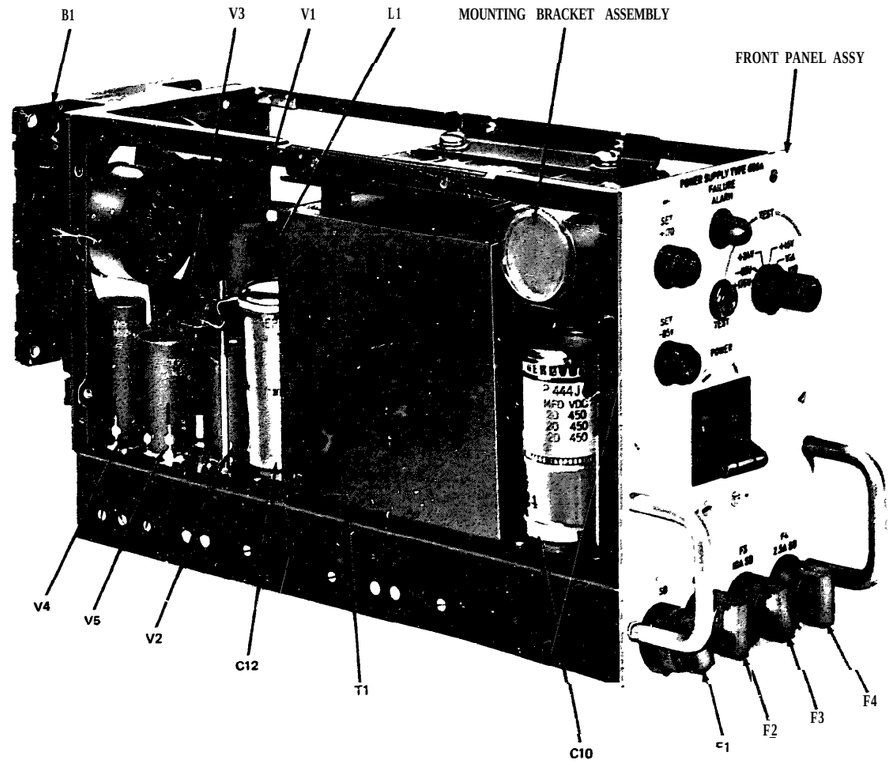

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Figure 5-59 686A power supply left side view, parts location

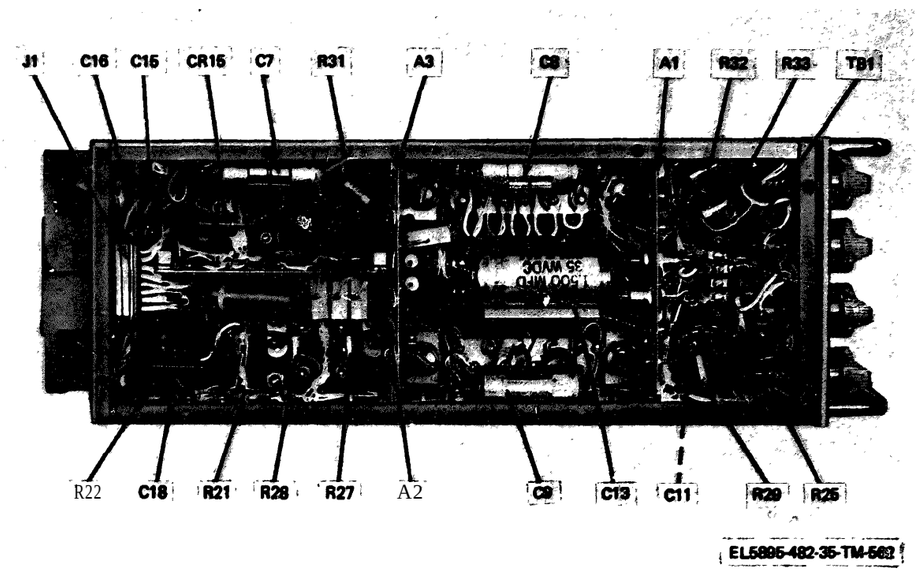


Figure 5-60. 686A power supply bottom view, parts location.

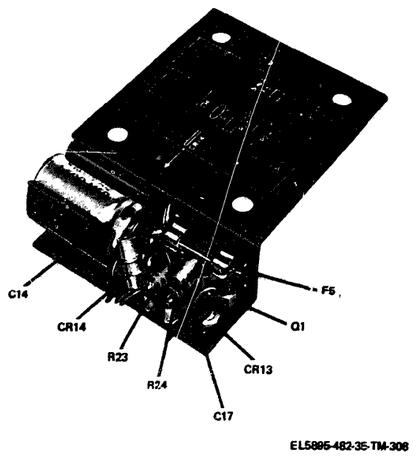


Figure 5-61 *686A power supply* mounting bracket assembly, ports location

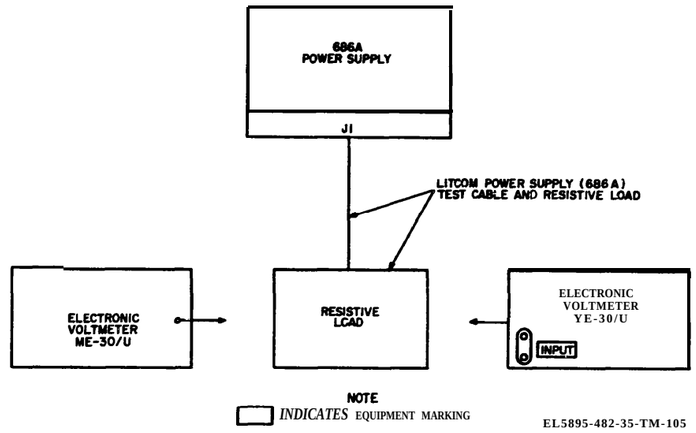


Figure 5-62. 686A power supply output voltage, ripple, and regulation, test setup diagram

5-20. 645C VSWR Alarm Test Procedure (figs. 5-63 through S-68)

a. Test Equipment and Materials Required.

(1) Test Fixture 50012-TEF-7100341 (Litcom).
(2) Power Supply PP-3940/G (3 required).
(3) Variable Power Transformer CN-16A/U.
(4) Multimeter ME-26/U.
(5) Test fixture 50012-TEF-7100340 (Litcorn).
(6) Test fixture 2006-TEF-311A1.

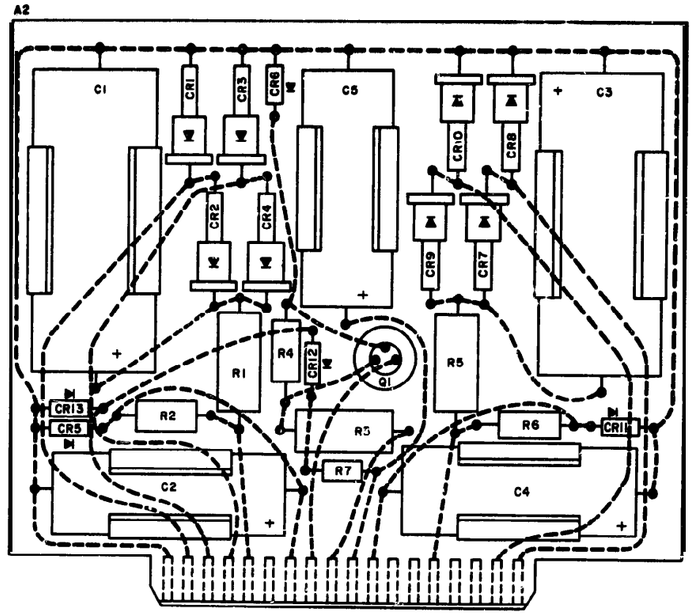
b. Test Connections and Conditions,

(1) Connect the equipment as shown in figure S-66.
(2) Connect all equipment to the 115-volt ac power source.
(3) Turn on the equipment and allow a 10-minute warmup period before proceeding with the procedure.

Step No.	*Test equipment*	*Control settings Equipment under test*	*Test procedure*	*Performance standard*
1	***50012-TEF-7100341 test fixture*** AC OFF DC- OFF FORWARD CCW REFLECTED CCW ***PP-3940/G*** Set up for - 15 volts dc ± 3 %		a Set 50012-TEF-7100341 test fixture AC and DC switches to ***AC*** and DC. respectively	50012-TEF-7160341 test fixture RESET indicator lights
			b Press and release 645C VSWR alarm ALARM RESET switch	***b*** 50012-TEF-7100341 test fixture RESET indicator extinguishes when ALARM RESET switch is pressed and lights again when **switch is** released
	CN-16A/U Set up for 115-volt ac output ME-26/U Set up to measure negative dc voltages in 3 O-volt range		a Adjust 645C VSWR alarm potentiometer A1R35 for a zero reading on 645C VSWR alarm meter	a None
			b Connect ME-26/U to TP1 and ground on 50012-TEF-7100341 test fixture	***b*** None
			c Adjust 50013-TEF-7100341 test fixture FORWARD control for - 16 volts dc as indicated on ME-26/U	c None
			d Disconnect ME-26/U from TP1 and connect to TP2 on 50012-TEF-7100341 test fixture	***d*** None

Step No.	Control settings: Test equipment	Equipment under test	Test procedure	Performance standard
1 (Cont)			e Adjust 50012-TEF-7100341 test fixture REFLECTED control for - 8 volt dc as indicated on ME-26/U	e None
			f Adjust 645C VSWR alarm **potentiometer** A1R18 for a vswr of 4-1 as indicated on 645C VSWR alarm meter	f 645C VSWR alarm ALARM indicator and 50012-TEF-7100341 test future ALARM indicator light.
			g Adjust 50012-TEF-7100341 test fixture REFLECTED control for - 4 volt dc ***as*** indicated on ME-26/U.	g None
			h Adjust 645C VSWR alarm potentiometer A1R31 for a vswr of 2 I as indicated on 645C VSWR meter	h. 645C VSWR alarm ALARM indicator and 50012-TEF-7100341 test fixture ALARM indicator extinguish
2 3			Remove power supply card A2 from 645C VSWR alarm and connect the equipment as shown in figure 5-67. Allow a lo-minute warmup period before proceeding.	
4	***50012-TEF-7100340 test fixture*** S1. OFF S2. 1 S3 OFF ***PP-3940/G*** Set up for +24 volts dc ± 3 % CN-16A/U set up for 22 volts ac ± 3%. ME-26/U. Set **up to measure** dc voltages in the 30-volt range.		a Set 50012-TEF-7100340 test fixture switch S1 to ON, S3 to position 1, and **connect** ME-26/U between TP1 **(+)** and TP2 (ground)	a ME-26/U indicates +30 volts dc ±15
			b Set 50012-TEF-7100340 test fixture switch S3 to positron 2	***b*** ME-26/U indicates i-26 volts dc ± 6
			c Set 50012-TEF-7100340 test fixture switch S2 to position 2 and S3 to position 3.	c ME-26/ indicates - 28.5 volts dc ± 15
			d Set 50012-TEF-7100340 test fixture switch S3 to position 4	***d.*** ME-26/U indicates - 16 volts dc ± 5
			e Set 50012-TEF-7100340 test fixture switch S3 to position 5	e ME-26/U indicates -14 75 volts dc ± 0 75
5			Remove the VSWR monitor and durable circuit Al from the 645C VSWR alarm and connect the equipment as shown in figure 5-68. Allow 10 minutes for the equipment to warmup before proceeding	None
6	***20006-TEF-311A1-1 test fixture:*** POWER. OFF FORWARD- CCW REFLECTED- CCW ***PP-3940/G (power supply No. I)-*** Set up for +24 volts dc ± 3 %. ***PP-3940/G (power supply No. 2)*** Set up for +15 volts dc ± 3% ***PP-3940/G*** **(power** supply No. 9): set **up** for - 15 volts dc ± 3%	A1R18- Midrange	a Set 20006-TEF-311A1-1 test fixture POWER switch to ON	a. 20006-TEF-311A1-1 test fixture NORMAL indicator lights
			b. Adjust potentiometer A1R35 for a zero indication on test fixture 20006-TEF-311A1-1 VSWR meter	b None

Step No	Control settings: Test equipment	Equipment under test	Test procedure	Performance standard
7	ME-26/U Set up to measure negative dc voltages in 3 O-volt range		***a*** Connect HE-26/U to TP1 and ground on 20006-TEF-311A1-1 test fixture	a None
			b Adjust 20006-TEF-311A1-1 test fixture FORWARD control for an output level of - 15 volts dc as indicated on ME-26/U	b **None**
			c Remove YE-26/U from TP1 and connect to TP2 on 20006-TEF-311A1-1 test fixture	c None
			d Adjust 20006-TEF-311A1-1 test fixture REFLECTED control for an output level of -0 75 volt dc as indicated on ME-26/U	***d*** None
			e Adjust potentiometer A1R18 for VSWT of 4 1 as indicated **on** 20006-TEF-311A1-1 VSWR meter	e 20006-TEF-311A1-1 test fixture NORMAL indicator extinguishes and ALARM indicator lights
			f Adjust 20006-TEF-311A1-1 test fixture REFLECTED control for an output level of - 0 375 volt dc as indicated on ME-26/U	***f*** None
			g Adjust 645C VSWR alarm potentiometer A1R31 for a vswr of 2 1 as indicated on test fixture 20006-TEF-311A1-1 VSWR meter	g 20006-TEF-311A1-1 test future NORMAL indicator lights and ALARM indicator extinguishes
			h Set 20006-TEF-311A1-1 test fixture REFLECTED and FORWARD controls maximum counterclockwise	h 20006-TEF-311A1 1 VSWR meter indicates a vswr of 1 1



NOTES
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED
2 ———— PARTS AND PIGTAILS ON FRONT OF BOARD
3 ----- PRINTED WIRING ON BACK OF BOARD

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Figure 5-63 645C VSWR alarm power supply assembly A2, wiring diagram and parts location

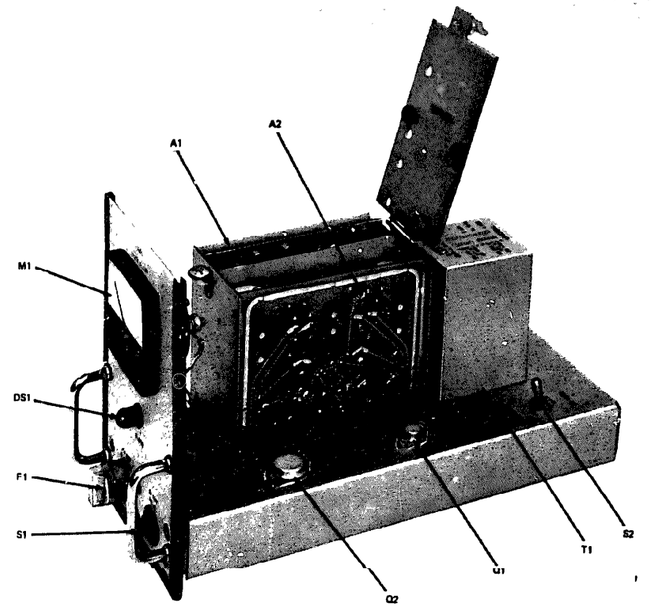

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Figure 5-64 645C VSWR alarm right side three-quarter view, parts location

I

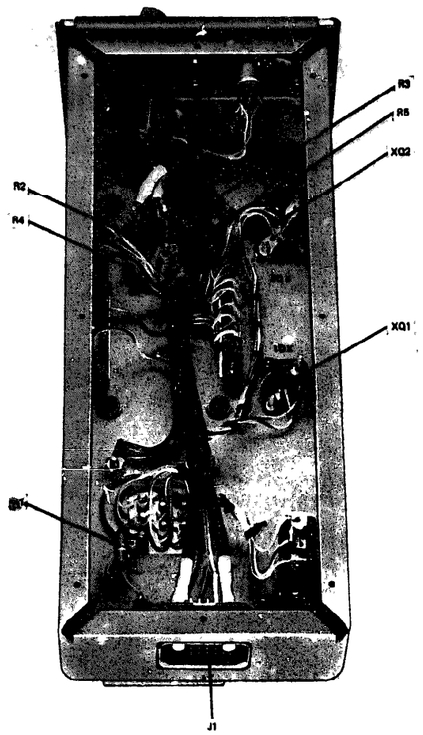

Figure 5-65 645C VSWR alarm bottom view, parts location.

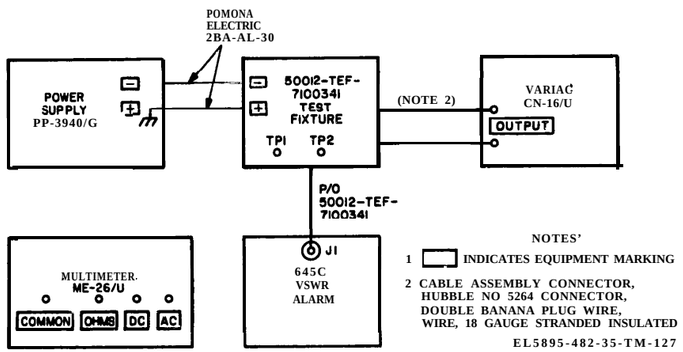

Figure 5-66. 645C VSWR alarm, test setup diagram

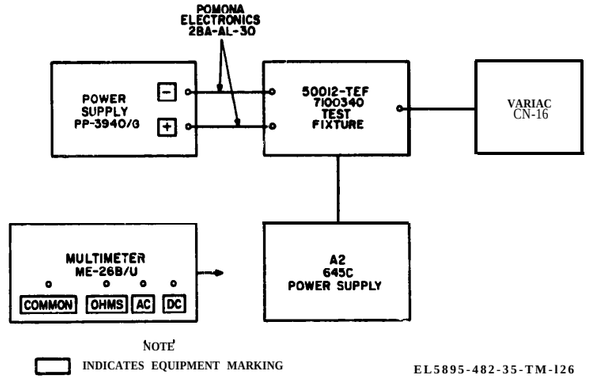

Figure 5-67 645C VSWR a&arm power supply, test setup diagram

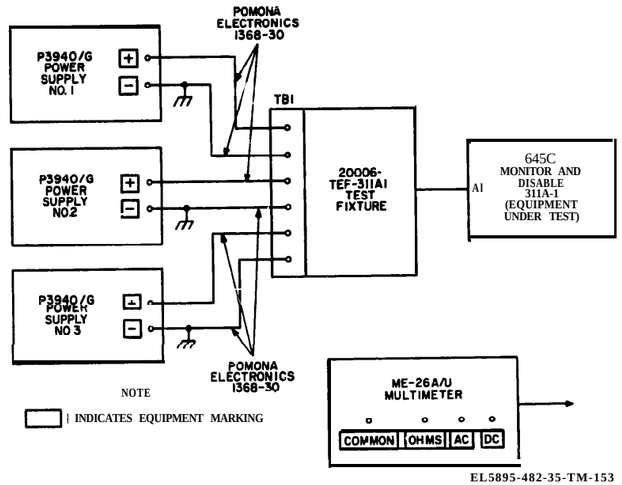

Figure 5-68 645C VSWR alarm monitor and disable, test setup diagram

5-21. 9151 Linear Power Amplifier Test Procedure
(figs. 5-69 through 6-81)

Test equipment and materials required are listed below:

a. 9151 test box.
b. Power supply PS-12.
c. Signal Generator AN/GRM-50.
d. Electronic Voltmeter AN/URM-145 (2 required).
e. Variable Power Transformer CN-16A/U.
f. Multimeter ME-26/U.
g. Frequency Meter AN/USM-207.
h. Tool Kit, Electronic Equipment TK-100/G.
i. Tool Kit, Electronic Equipment TK-105/G.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	**9151 test box:** S1:ON S2: OFF S3: OFF **S4: OFF** S5: OFF S6: OFF S7: OFF ***2 9151*** test ***box:*** S1: OFF S2: OFF S3: ON S4: OFF S5: OFF ***S6:*** OFF S7: OFF ***3 9151 test box.*** S1: OFF ***S2: ON*** S3: OFF S4: OFF S5: OFF S6: OFF ***S7:*** OFF 4 ***9151*** **test** box: S1- ON ***S2: ON*** S3- OFF ***S4: ON*** S5: OFF S6: ON ***S7:*** OFF ***PS-12 power*** **supply** Set up for ***24*** volts dc	ALM: OPR PWR: NORM	Observe indicators **on** 9151 linear power amplifier and 9151 test box.	9151 linear power amplifier INTLK indicator lights, 9151 test box indicator DS4 lights, and 9151 test box indicator DS1 lights dimly.
			Observe indicators on 9151 linear power amplifier and 9151 test box.	9151 linear power amplifier INTLK indicator and 9151 test box indicator DS1 light
			a Observe indicators on 9151 linear power amplifier.	a. 9151 linear power amplifier BL 0 indicator light momentarily, blower operates, and F1L and DISABLE indicators lights.
			b Observe filament of 9151 linear power amplifier tube V1.	b Filament of 9151 linear power amplifier tube V1 glows.
			a Observe indicators on 9151 linear power amplifier and 9151 test box	a. 9151 linear power amplifier INTLK indicator lights, 9151 test box indicators DS4 and DS5 light, and 9151 test box indicator DS1 lights dimly. The 9151 teat box indicators DS6 and DS7 light approximately 2 minutes after S2 is set to ON
			b Set 9151 linear power amplifier ALM switch to DISABLE	***b.*** 9151 linear power amplifier buzzer sounds.
			c Set 9151 linear power amplifier ALM switch to OPR and note that buzzer stops sounding	c None.
5 9151 test box S1: OFF ***S2 ON*** S3 OFF ***S4*** OFF ***S5*** OFF ***S6*** OFF ***S7*** OFF	ALM. DISABLE		a Observe indicators on 9151 linear power amplifier and 9151 test box	a 9151 linear power amplifier BIAS indicator lights and 9151 test box indicator DS5 lights dimly
			b Set 9151 test box switch S1 to ON.	***b.*** 9151 linear power amplifier BIAS indicator and 9151 test box indicator DS5 extinguish: 9151 linear power amplifier INTLK indicator lights, 9151 test box indicator DS4 lights, and DS1 lights dimly.
			c Set 9151 test box switch S1 to OFF	c 9151 linear power amplifier INTLK indicator and 9151 test box Indicators DS1 and DS4 extinguish After a short time delay, 9151 linear power amplifier BIAS indicator lights and 9151 test box indicator DS5 lights dimly
6 9151 test box S1: OFF ***S2 ON*** ***S3*** OFF S4 OFF ***S5*** OFF ***S6:*** OFF ***S7*** OFF	ALM OPR PWR REDUCED		a Observe Indicators on 9161 test box	**a** 9151 test box indicator DS3 lights
			b Set 9151 linear power amplifier PWR switch to NORM and observe that 9151 test box indicator DS3 is extinguished	***b*** None

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
7 9151 test box: S1: OFF ***S2: ON*** ***S3:*** OFF ***S4*** OFF ***S5:*** ON ***S6:*** OFF ***S7:*** OFF	***9151:*** ALM: OPR PWR: NORM		a Observe that 9151 test box indicator DS2 lights	a None
			b. Set 9151 test box switch S7 to ON.	***b.*** 9151 linear power amplifier buzzer sounds and ALARM indicator lights.
			c. Set 9151 linear power amplifier ALM switch to DISABLE.	c 9151 linear power amplifier ALARM indicator remains lighted, the butter should silence, the BIAS indicator lights, and 9151 test box indicator DS5 lights dimly
			d Set 9151 test box switches S5 and ***S7*** to OFF	***d.*** 9151 linear power amplifier ALARM indicator and 9151 test box indicator DS2 extinguish The 9151 linear power amplifier DISABLE indicator lights.
			e Set 9151 test box switch S6 to ON	e 9151 linear power amplifier BIAS indicator and 9151 test box indicator DS5 extinguish 9151 linear power amplifier buzzer sounds.
			f. Set 9151 linear power amplifier ALM switch to OPR.	f. 9151 linear power amplifier buzzer should silence
8			Reconnect the equipment as shown in figure 5-80 and allow the equipment to warmup for 10 minutes before proceeding.	
9 AN/URM-145 (voltmeter No 1): Set up to measure voltages in 0-3-volt rms range. ***AN/GRM-50.*** Set up for 30 MHz at 2 volts rms. Verify output frequency using AN/USM-207. ***ME -26/U*** Set up to measure voltages m the 10-volt **rms** range. ***CN-16/U*** Set up for 10 volts rms ***AN/URM-145 (voltmeter No 2)*** Set up to measure voltages in the 0-3-volt rms range			a Adjust capacitor A2C21 in 9151 linear power amplifier for a reading of 0 8 volt rms on AN/URM-145 (voltmeter No 2)	a None
			NOTE Maintain input at 2 volts rms as indicated on AN/USM-145 (voltmeter No 1)	
			b Adjust AN/GRM-50 for at output of 2 MHz at 2 volts rms as indicated on AN/URM-145 (voltmeter No. 1)	***b*** None
			c Observe output reading on AN/URM-145 (voltmeter No 2)	c AN/URM-145 (voltmeter No 2) indicates 1 45 **volt5 rms ± 1**
10			Connect the equipment as shown in figure 6-81 end allow the equipment to warmup for 10 minutes before proceeding	None
11 ***AN/URM-145 (voltmeter No I)*** Set up to measure voltages in 0-3-volt rms range ***AN/GRM-50*** Set up for 30-MHz output Verify output frequency **using** AN/USM-207			Adjust AN/GRM-50 for 30 MHz at 1 **5** volts rms as indicated on AN/URM-145 (voltmeter No 1)	None

Step No.	Test equipment	Control settings *Equipment* under test	*Test procedure*	*Performance standard*
11 (Cont)	ME-26/U: Set up to measure voltage in *he 10-volt rms range CN-16/U- Set up for 10 volts rms. *AN/URM-145* (voltmeter No 2): Set up to measure voltage in 0-3-volt rms range.			
12			Disconnect AN/URM-145 (voltmeter No. 1) from AN/GRM-50 output and connect between A2XV1-1 and ground on 9151 linear power amplifier.	AN/URM-145 (voltmeters No. 1 and No. 2) indications are within 5 % of each other.
13			a. Reconnect AN/URM-145 (voltmeter No. 1) to output of AN/GRM-50	a None
			b Adjust AN/GRM-50 for 2 MHz at 1.5 volts rms as indicated on AN/URM-145 (voltmeter No. 1).	b. None.
			c. Rotate potentiometer A2R3 in 9151 linear power amplifier for a zero (center) reading on 9151 linear power amplifier TUNE meter.	c. 9151 linear power amplifier TUNE meter should be zeroed

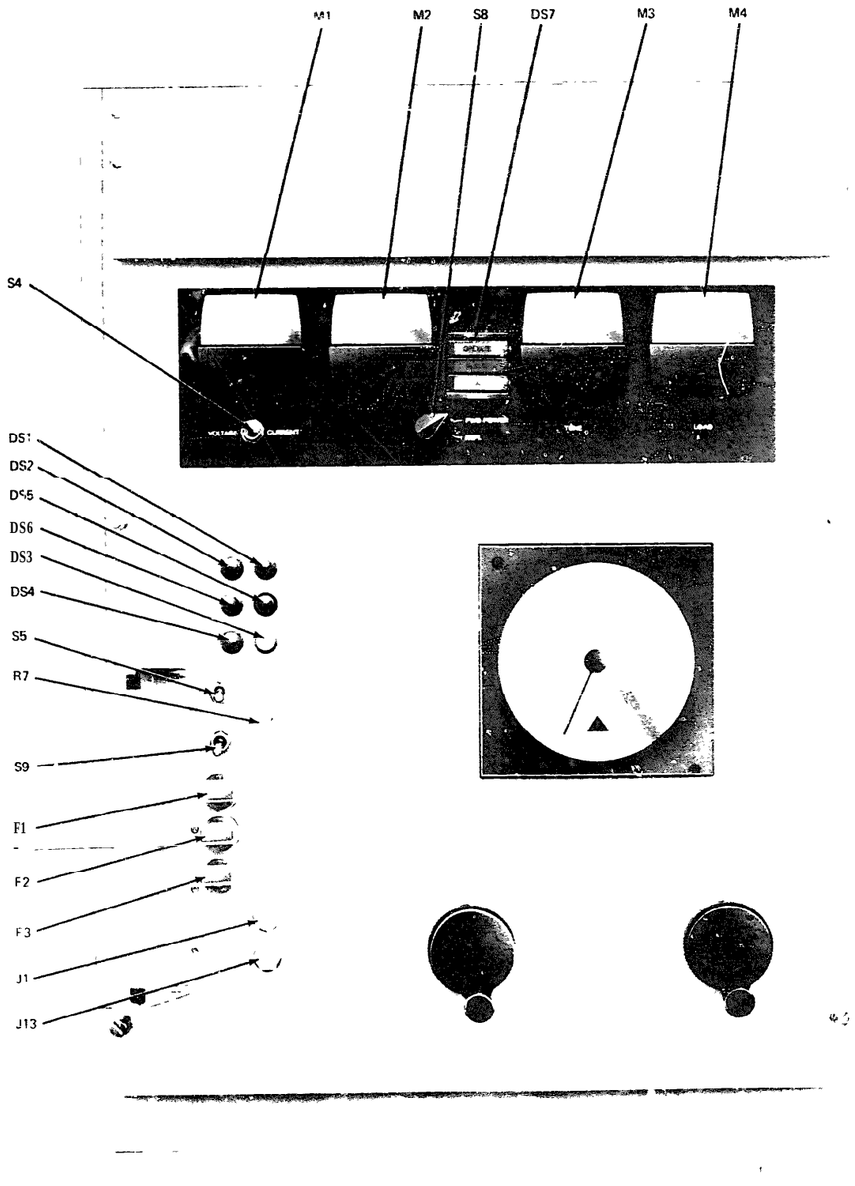

Figure 5-69 9151 linear power amplifier front view. parts location

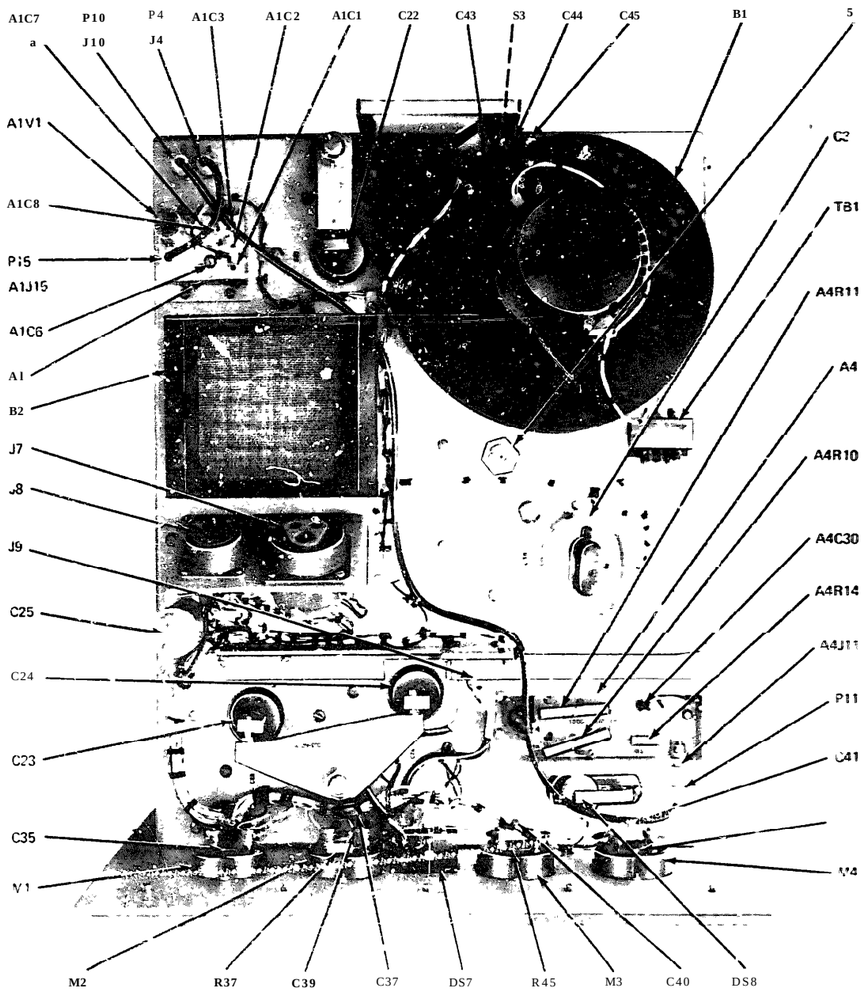

Figure 5-70 9151 linear power amplifier top view, parts location

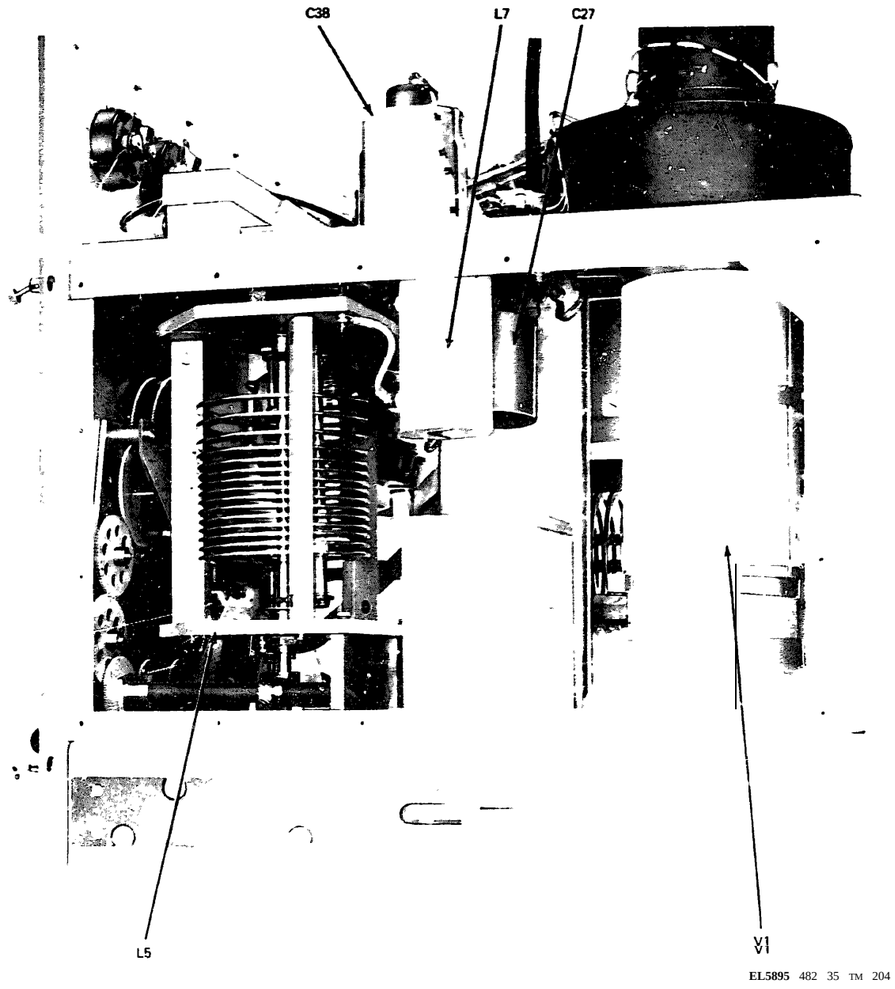

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Figure 5-71 9151 linear power amplifier right side view parts location

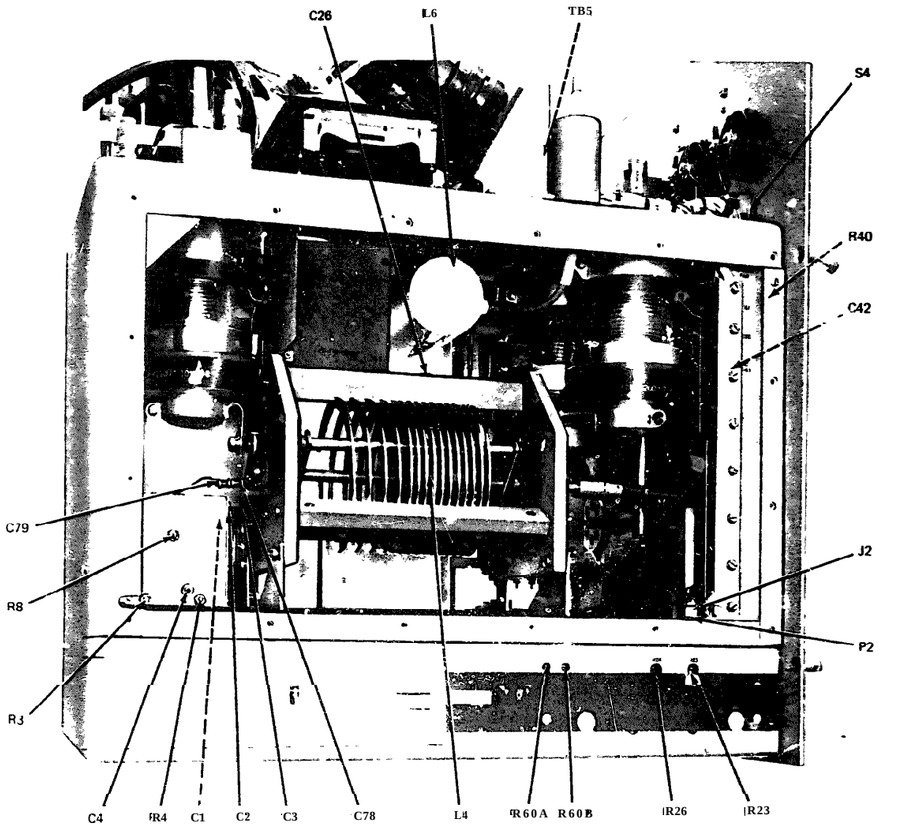

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Figure 5-72 9151 hear power amplifier left side view, parts location

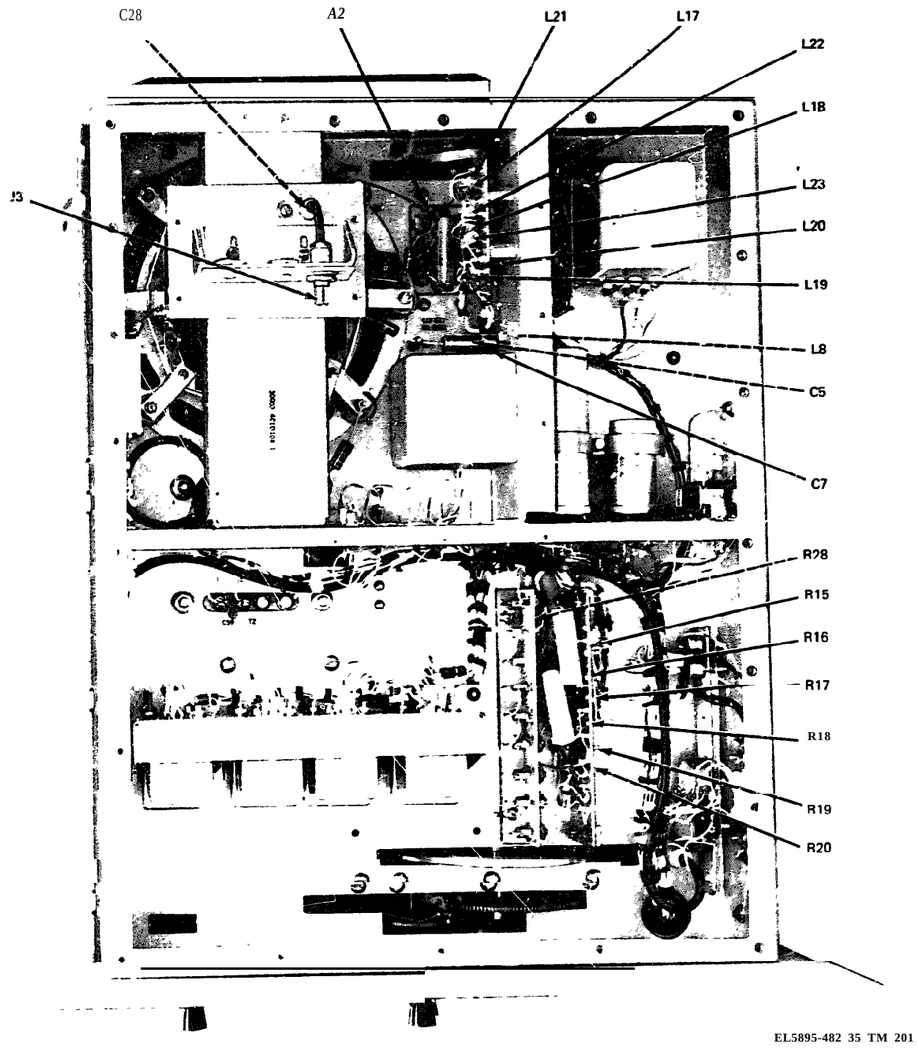

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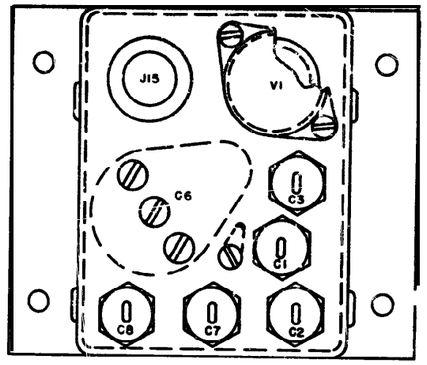
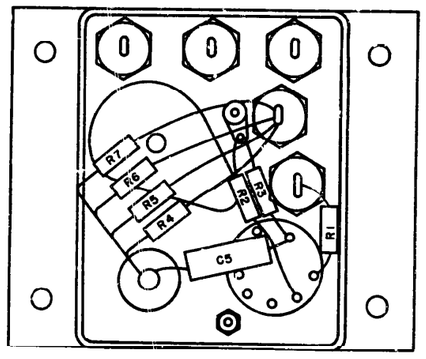
Figure 5-73 9151 linear power amplifier bottom view, parts location



TOP VIEW



BOTTOM VIEW

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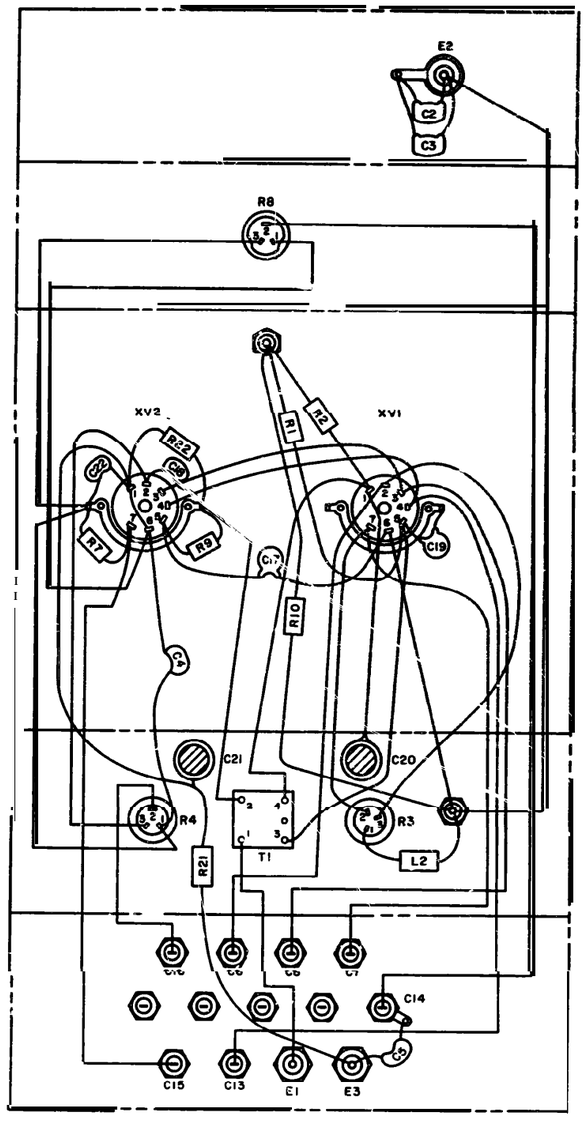
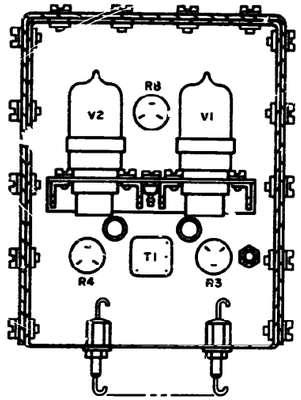
Figure 5-74 9151 ***hear power amplifier automatic drive control assembly A1,. parts location***





INTERNAL VIEW

EL5895-482-35-TM-197

Figure 5-75 9151 hear power amplifier tune and load assembly A2 parts location

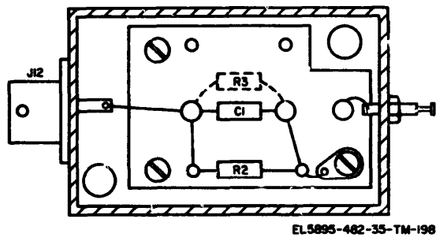


Figure 5-76. 9151 linear power amplifier grid attenuator assembly A3. parts location

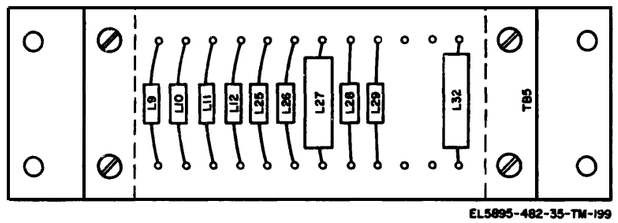


Figure 5-77 9151 linear power amplifier terminal board assembly TB5, parts location

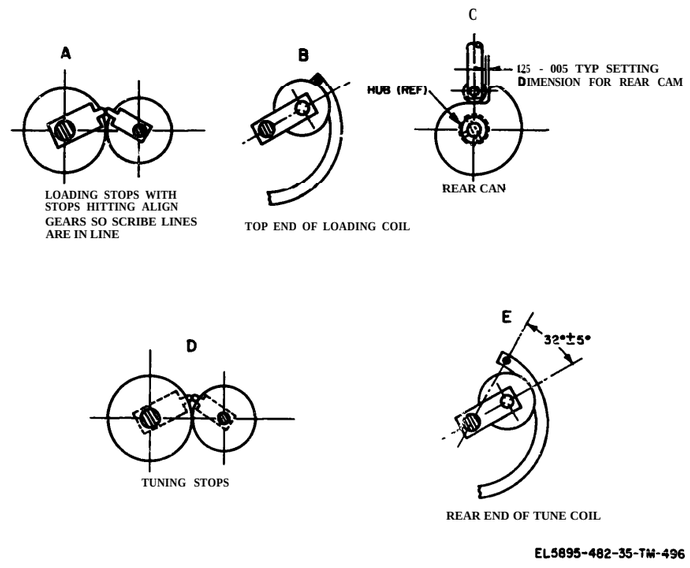


Figure 5-78. 9151 linear power amplifier gear train, location of adjustments

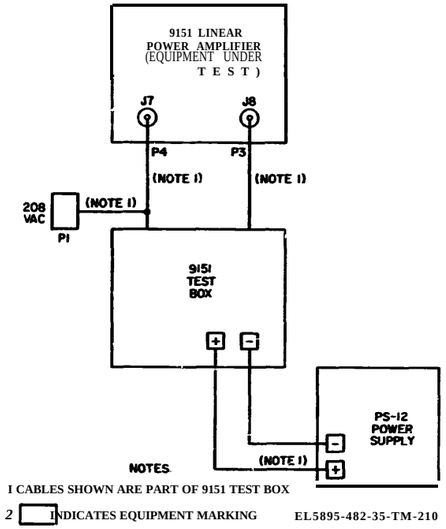


Figure 5-79. 9151 hear power amplifier power control and UC power distribution. test setup diagram

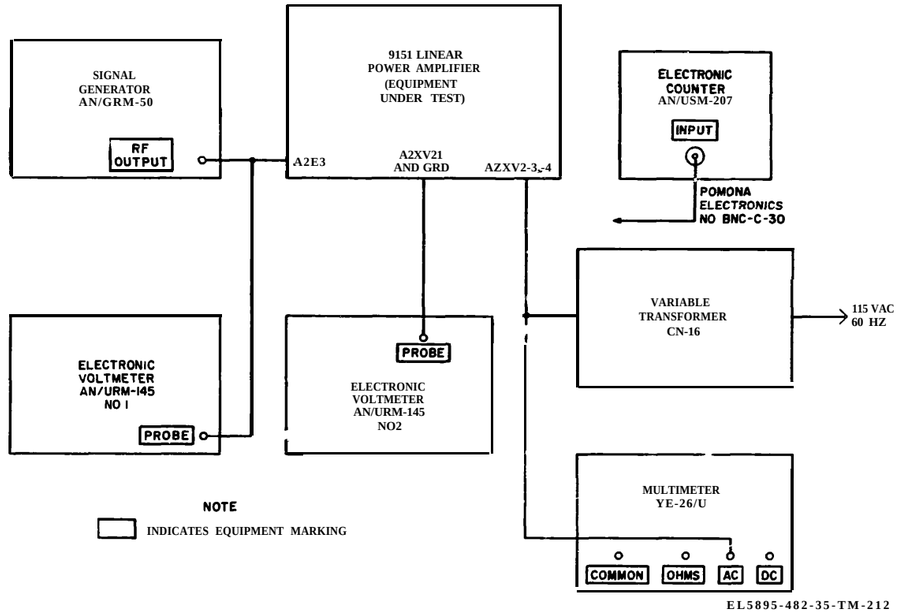


Figure 5-80 9151 hear power amplifier load detector, test setup diagram

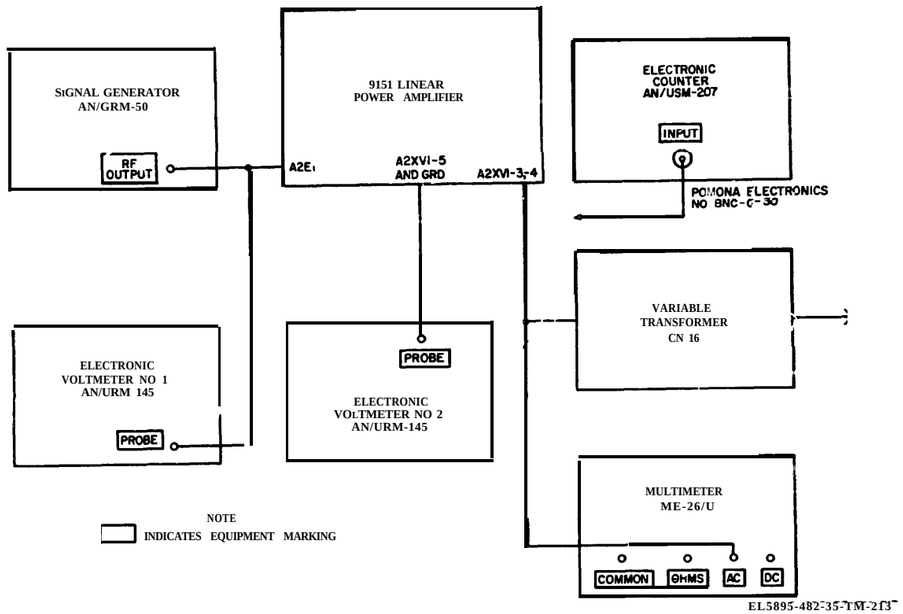


Figure 5-81 ***9151*** linear power amplifier ***tune detector, test setup diagram***

5-22. 9200B Driver **Test Procedure.**
(figs. 5-82 through 5-92)

a. Test Equipment and Materials Required.

(1) 9200B driver test box.
(2) Multimeter ME-26/U.

b. Test Connections and Conditions.

(1) Connect the equipment as shown in figure 5-92.

(2) Connect the equipment to the required power source.

(3) Turn on the equipment and allow a 10-minute warmup period before proceeding with the procedure.

Step No.	Teat equipment	Control settings: Equipment under test	Test procedure	Peformance standard
1	***9200B driver test box*** PWR REDUCED ADC CW	POWER OFF STBY/OPR STBY	Set 9200B driver POWER switch to ON	9200B driver test box PA FIL indicator lights Filaments of tube8 V1. Vz. and V3 in 9200B driver light. After a 60-second tune delay, 9200B driver STBY indicator lights.
2		POWER ON STBY/OPR STBY	Rotate 9200B driver BIAS control and observe range as indicated on ME-26/U	ME-26/U indicates a minimum of - 15 volts dc and maximum of -50 volts dc
3			***a*** Adjust 9200B driver BIAS control for a- 33-volt dc indication on ME-26/U	a None
			b Set 9200B driver METERING switch to DRIVER BIAS V2 3	b 9200B driver panel meter indicates within the green band
4		POWER OFF STBY/OPR STBY GAIN Maximum clockwise	***a*** Disconnect ME-26/U from 9200B driver V2-2 and connect between the grid of V1 and ground	a None
			b Set 9200B driver POWER switch to ON	***b*** ME-26/U indicates 0
4 (Cont)			c. Rotate 9200B driver GAIN control fully counterclockwise.	c. ME-26/U indicates at **least** -40 volts dc.
			d. Adjust 9200B driver GAIN control far an indication of -2 **volts dc on** ME-26/U.	***d. None.***
5			Check the operation of 9200B driver interlock switches S3 and S4 by tripping and resetting them one at a time.	***As*** each interlock switch is tripped. observe the following: 9200B driver chassis fan should stop operating. 9200B driver INTLK Indicator lights. Filaments of tubes V1, V2. and V3 in 9200B driver extinguish.
6	***9200B driver test box:*** PWR: NORMAL ADC: SSB ***ME-26/U*** Set up to measure negative dc voltage in the 0-100-volt dc range.	POWER ON STBY/OPR: OPR	a Observe 9200B driver and 9200B driver test box indicators.	a 9200B driver STBY indicator should extinguish and 9200B ***driver*** test box PA HV indicator lights
			b. Using ME-26/U. check voltage between HV and GND jacks on 9200B driver test box.	b. ME-26/U indicates between 85 and 95 volt8 dc.
7			a Set 9200B drive- METERING switch to DRIVER PL ***MA*** V1.	a None.
			b. Adjust 9200B driver GAIN control for an indication of 100 on 9200B driver panel meter.	***b*** Verify that 9200B driver panel meter indicates 100
			c. Set 9200B driver METERING switch to DRIVER PL MA V2-3.	c None.
			d. Adjust 9200B driver BIAS control for an indication of 50 on 9200B driver panel meter.	***d*** Verify that 9200B driver panel meter indicates 50.
			e. Set 9200B driver METERING switch to DRIVER HV	e 9200B driver panel meter indicates within the green band
8	***9200B driver test box*** PWR: NORMAL ADC SSB ***ME-26/U*** Set up to measure dc voltage in the 100-200-volt dc range		a. Connect ME-26/U between the ADC THRESHOLD jack and GND on the 9200B driver test box.	a None.
			b Vary the 9200B driver ADC SSB control from maximum clockwise to maximum counterclockwise.	***b*** ME-26/U indication vanes from 100 volts dc ± 10 % at maximum clockwise position to 170 volts ± 10% at maximum counterclockwise position
9	***9200B driver test box*** PWR NORMAL ADC CW		a. Vary 9200B driver ADC CW control from maximum clockwise to maximum counterclockwise	a ME -26/U indication vanes from 100 volts dc ± 10% at maximum clockwise postition. to 170 volts dc ± 10 % at maximum counterclockwise position
			b Set 9200B driver test box PWR switch to REDUCED and repeat steps ***8b*** and ***9a***	***b*** ME-26/U indication varies from 80 volts dc ± 10 % at maximum clockwise position to 105 volt8 dc ± 10 % at maximum counterclockwise position

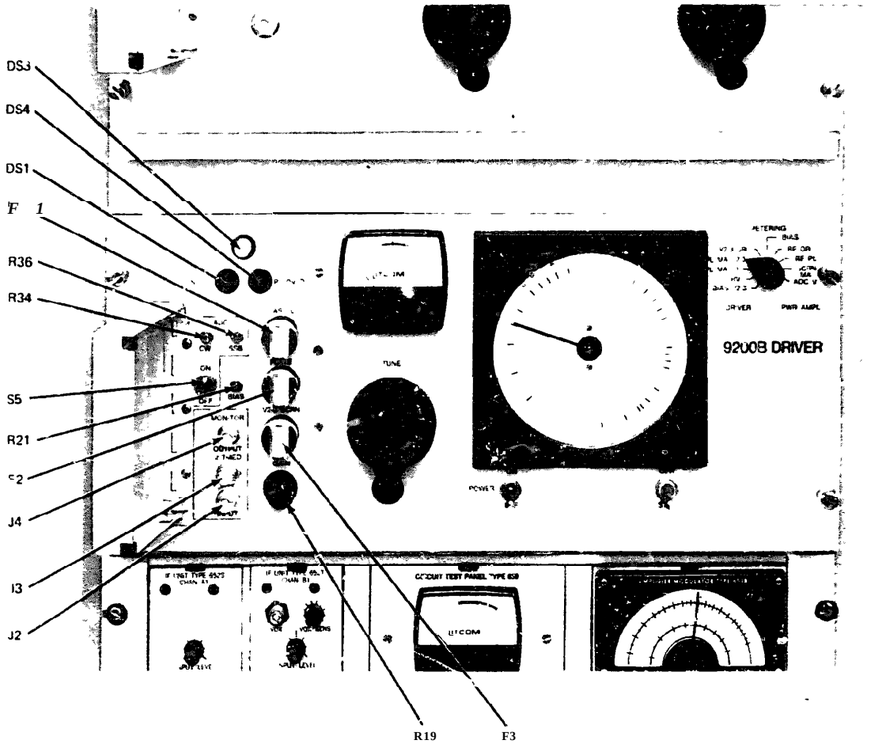


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Figure 5-82 9200B driver front panel, parts location

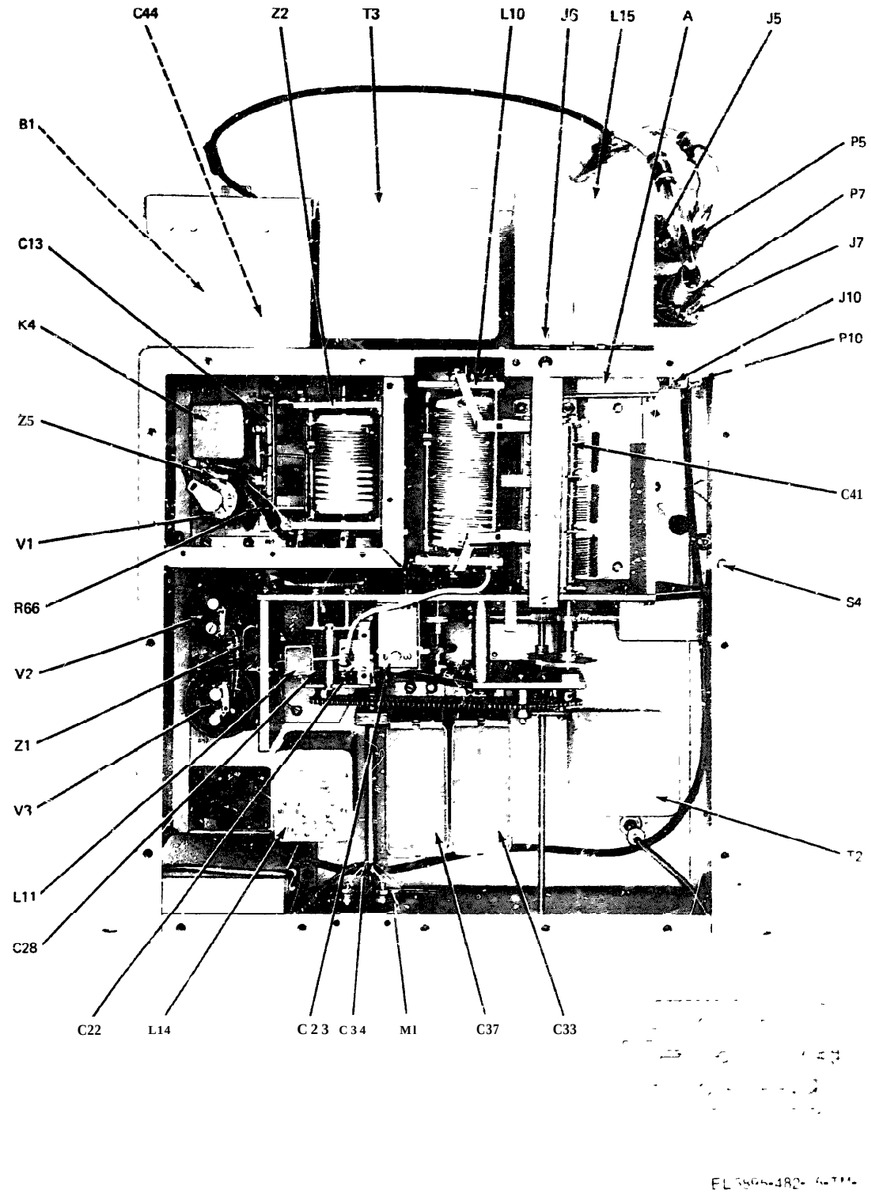
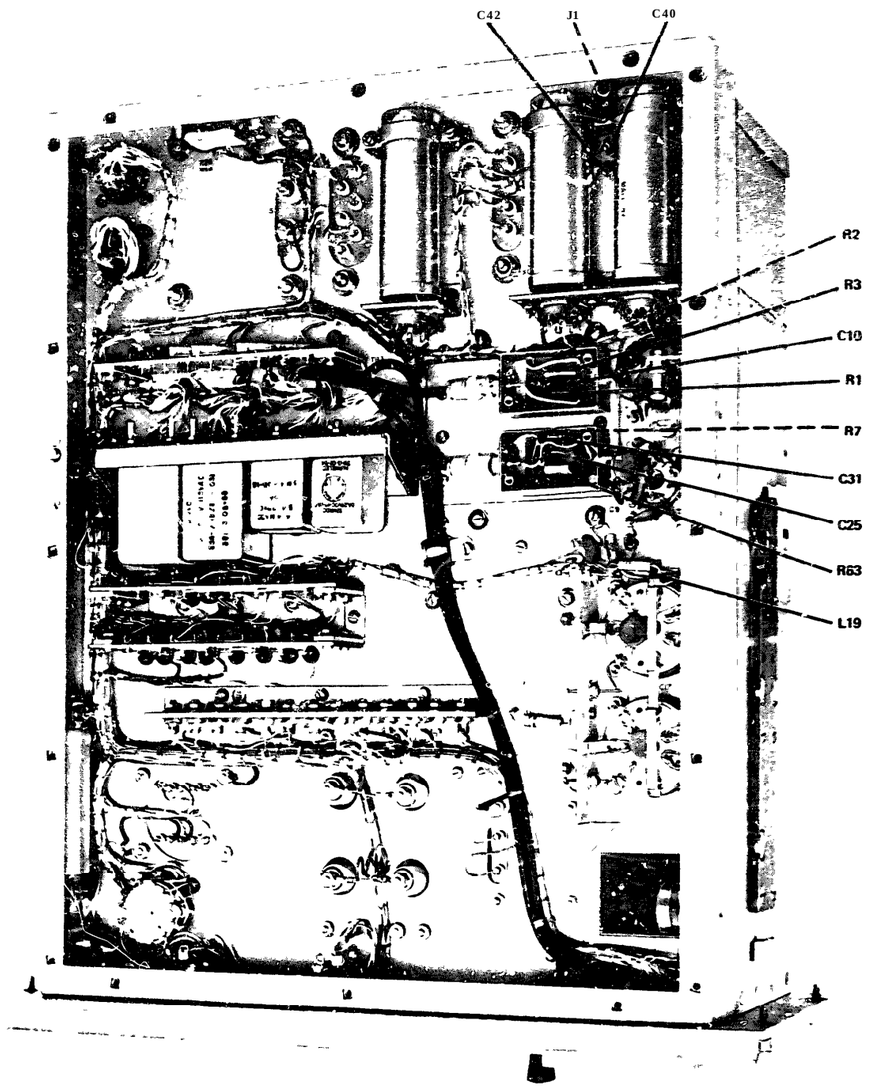
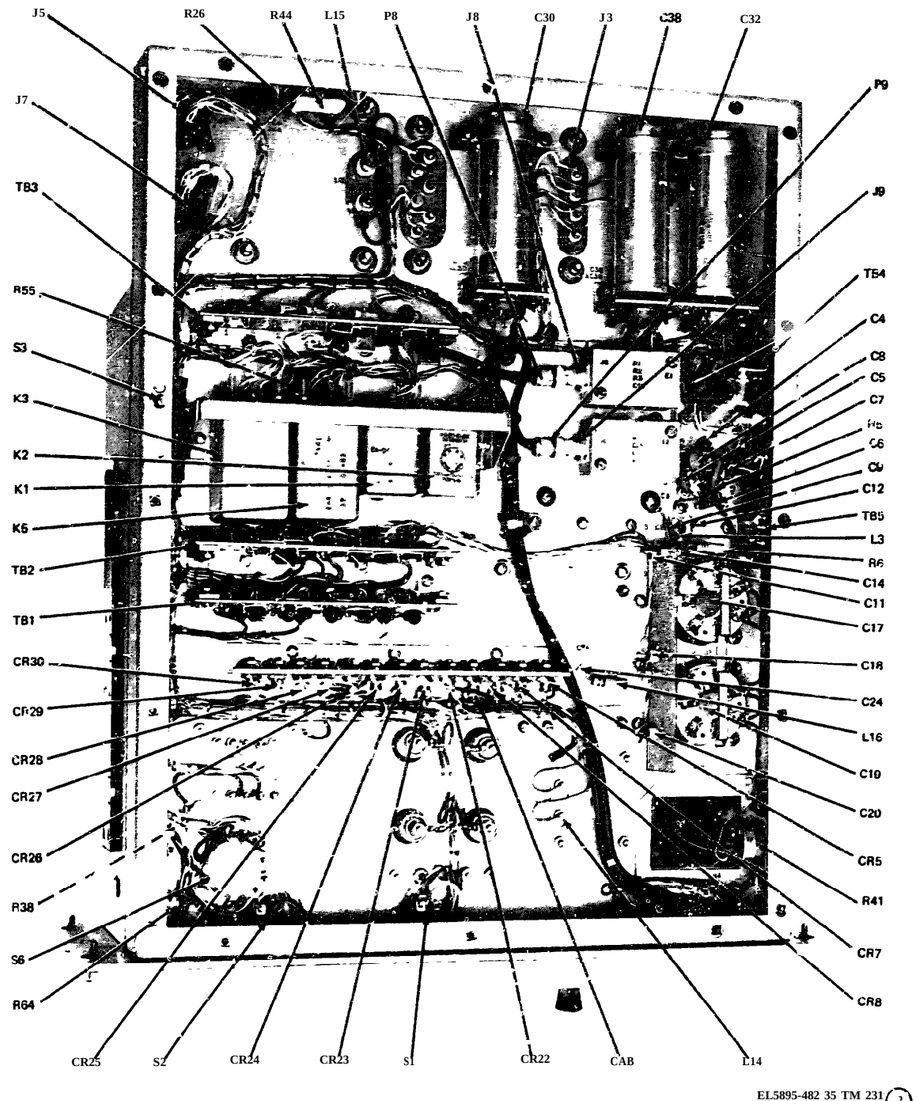


Figure 5-83 9200B driver top view. parts location



EL5895-482-35-TM 231 (1)

Figure 5-84 (1) 9200B driver bottom view parts location (part 1 of 2)



EL5895-482 35 TM 231 (2)

Figure 5-84 (2) 9200B driver bottom view parts location (part 2 of 2)

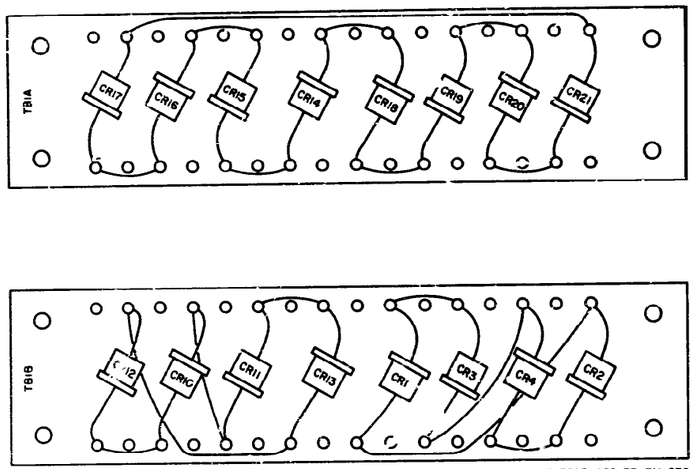
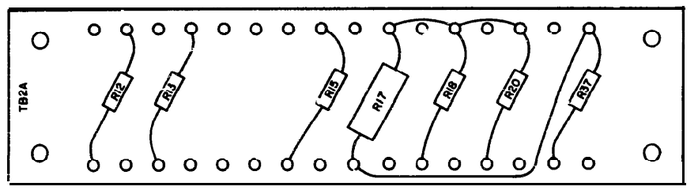


Figure 5-85. 9200B driver terminal board assemblies TB1A and TB1B. parts location



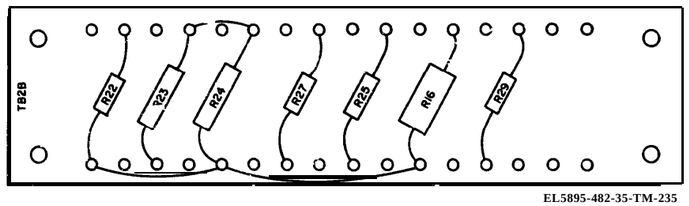


Figure 5-86 9200B driver terminal board assemblies TB2A and TB2B. parts location

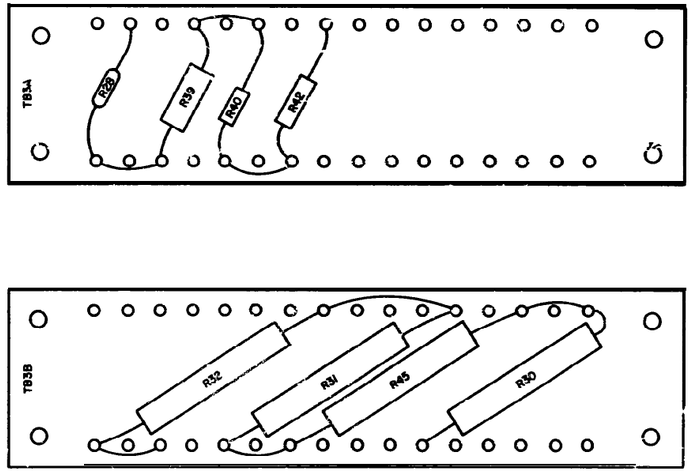


Figure 5-87 9200B driver terminal board **assemblies** *TB3A and TB3B. parts location*

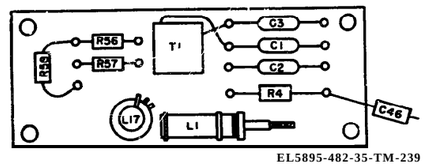


Figure 5-88 9200B driver terminal board assembly TB4. parts location

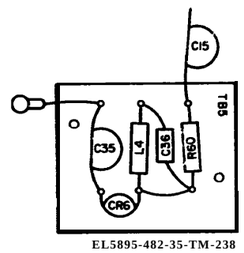


Figure 5-89. 9200B driver terminal board assembly TB5. parts location

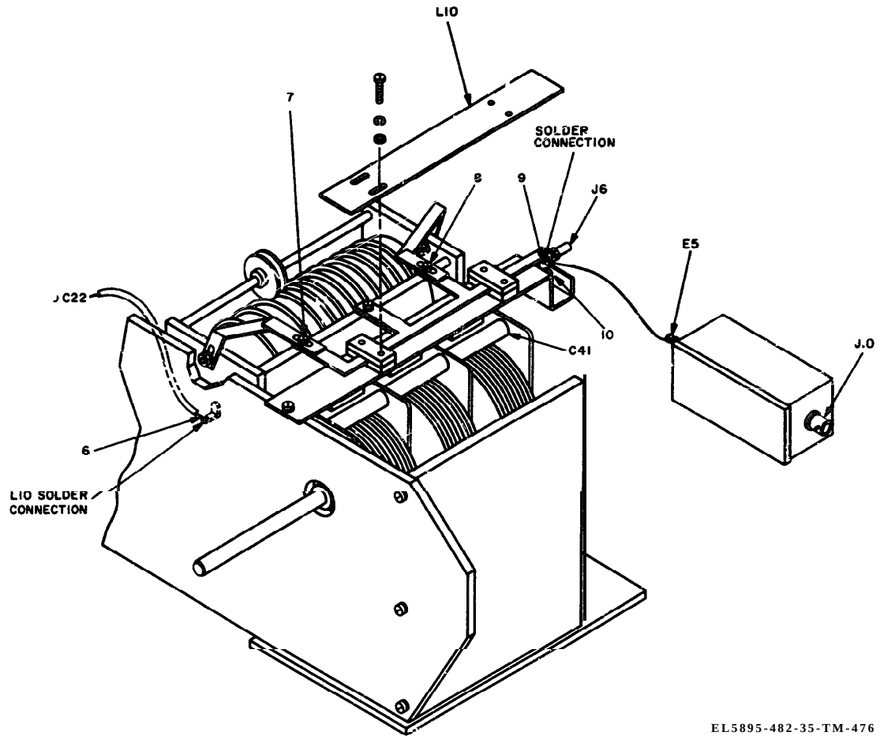


Figure 5-90 9200B driver inductor L10 and capacitor C41 assembly, parts location

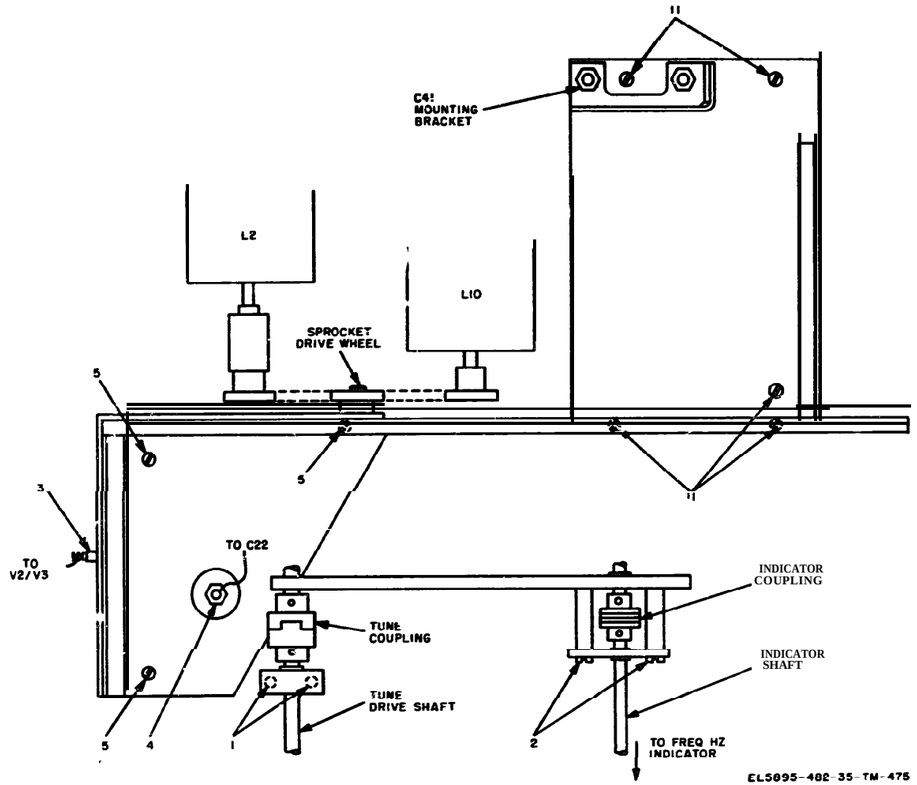


Figure 5-91 9200B driver removal of gear train *assembly, diagram.*

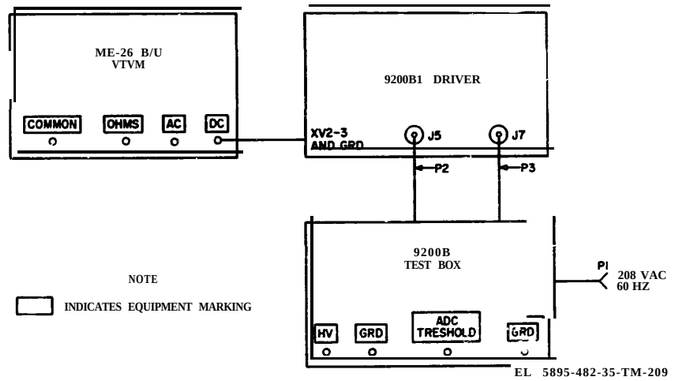


Figure 5-92 9200B driver operational test setup diagram

5-23. 9176 *Hv* Power Supply Test Procedure. (figs. *5-93* through 5-98)

a. ***Test Equipment and Materials Required.***

(1) Electronic Voltmeter ME-30/U.

(2) Voltage divider, Hewlett-Packard 11039A.

(3) Cable assembly. Pomona Electronics No. 1959-24.

(4) Cable assembly, Pomona Electronics *No. MG-B-24.*

b Test Connections am? Conditions.

(1) Connect the ME-30/U to the required power source.

(2) Turn OF the ME-30/U and allow a *lo-* minute warmup period before proceeding.

NOTE

This ***procedure*** must be performed with the transmitter in an operating condition.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Peformance standard
1	*ME-30/U* Set up to measure approximately 200 volts.		a Remove the transmitter side cover exposing the 9176 hv power supply	a None
			b. Turn on the transmitter and tune for full **power** output (TM 11 5895-482-12)	***b. None***
			c Using the panel meter of the 9151 linear power amplifier, measure the output voltage of the 9176 hv power supply	c 9151 linear power amplifier panel mater indicates 5000 volts ± 10%
			d. Turn off ***transmitter*** and properly ground all high voltage points with a grounding stick or other suitable means before proceeding.	d. None.
			e. Connect the equipment as shown in figure 5-98.	e. None.
			f Turn on the transmitter and tune for full power output (TM 11-5896-482-12)	f. ME-30/U indicates 210 volts rms.

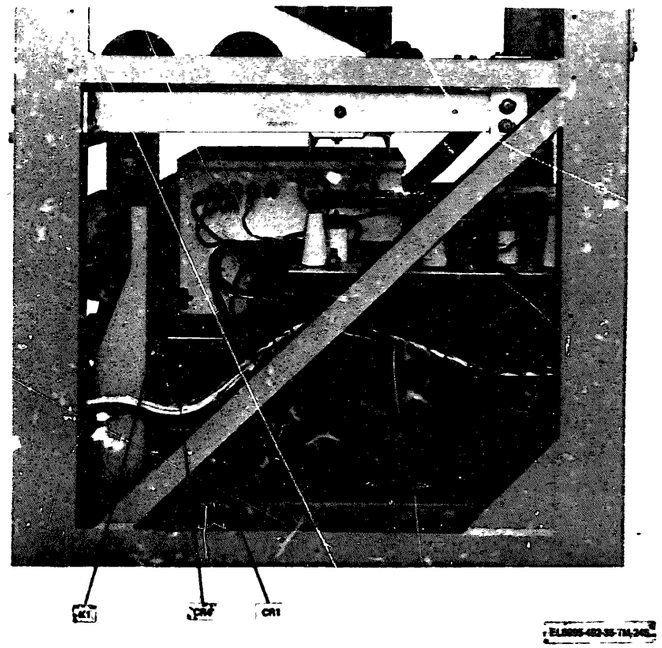


Figure 5-93. *9176 Hv* ***power supply right ride view, parts location.***

Figure 5-93. *9176 Hv* ***power supply right ride view, parts location.***

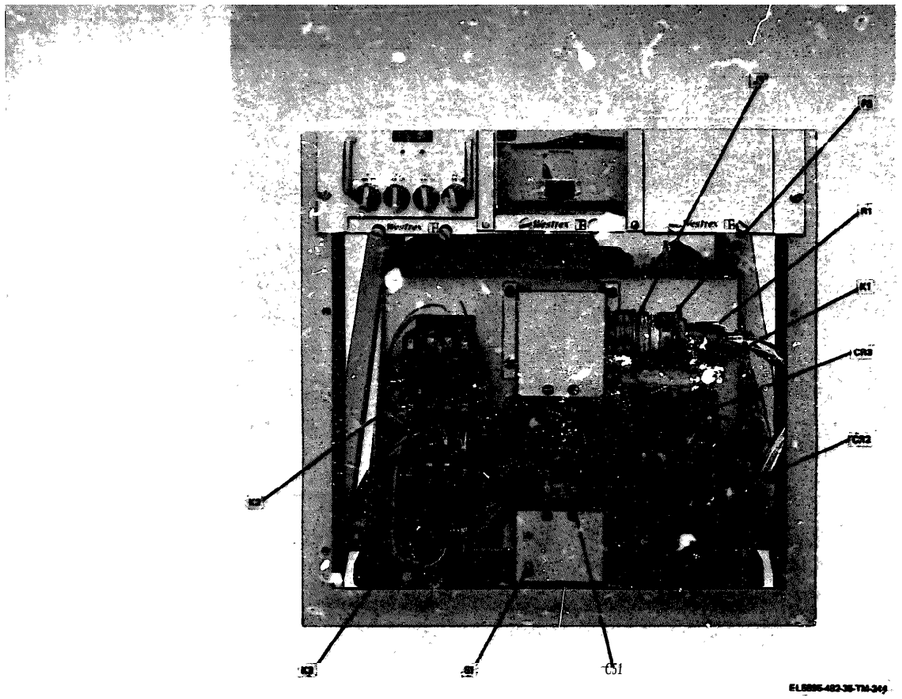


Figure 5-94. 9176 Hv power supply front view with **panel** *removed. parts location.*

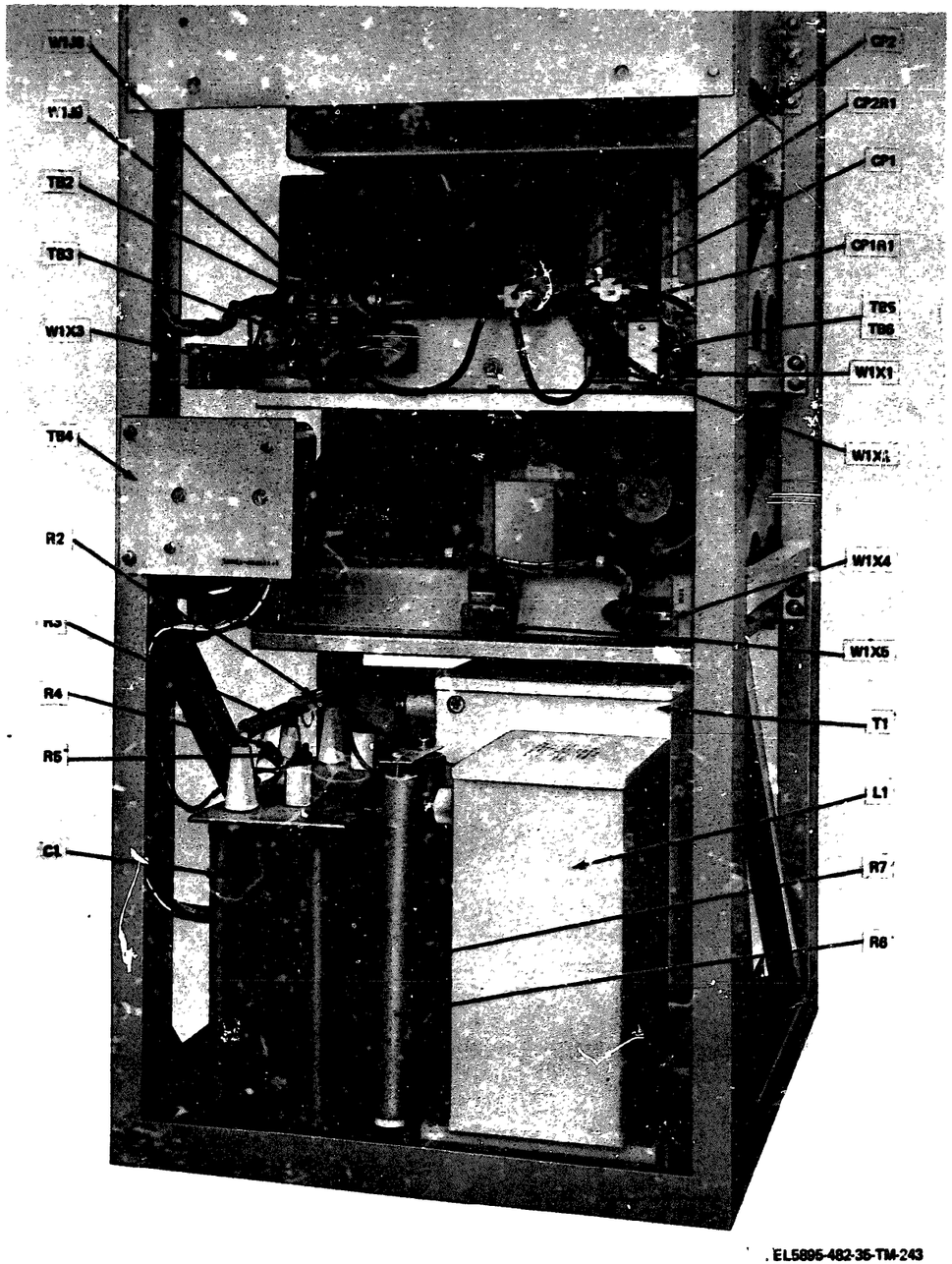


Figure 5-95 9176 Hv power supply and rack assembly, rear view, parts location

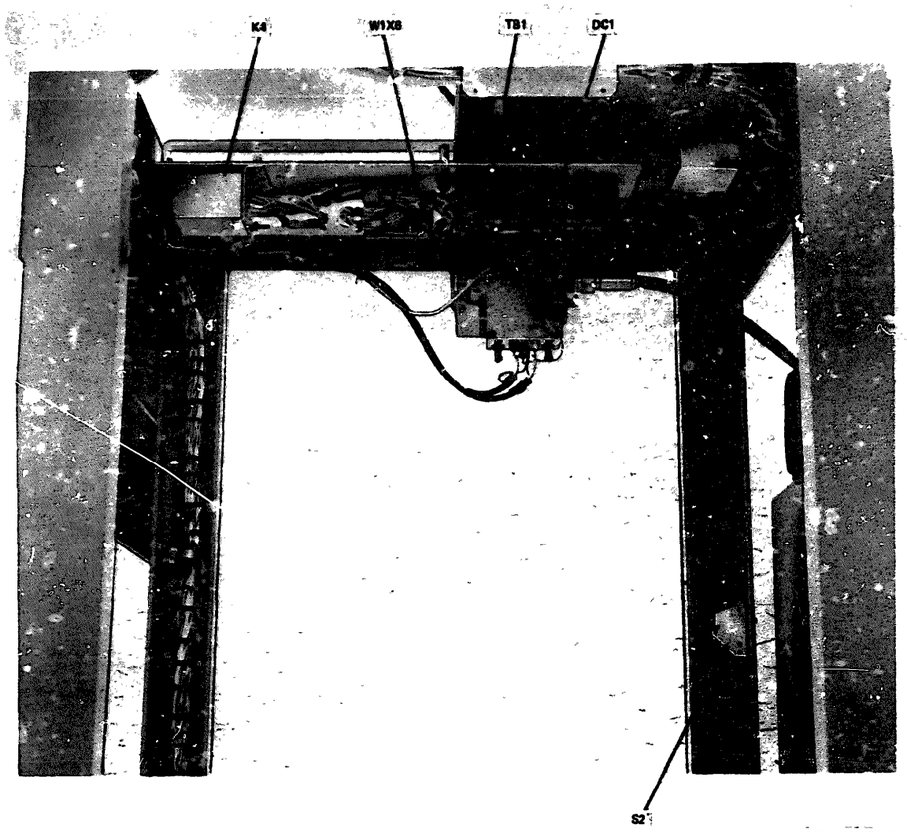


Figure 5-96. 9176 Hv power supply and rack, interior view, parts location

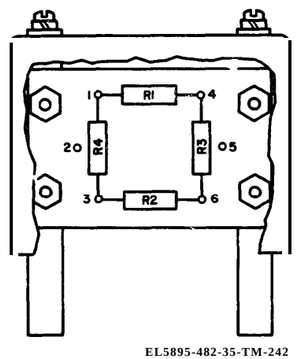


Figure 5-97. 9176 Hv power supply terminal board assemblies TB5 and TB6, parts location

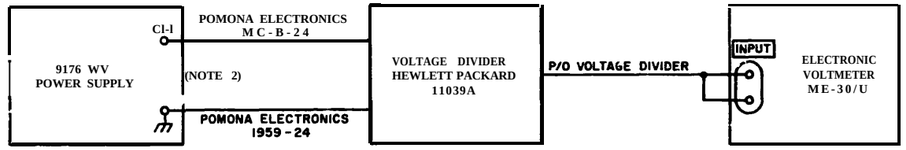


*Figure **5-98 9176 Hv power supply. test setup diagram***

5-24. Vhf Converter Test Procedure (figs. 5-99 and 5-100)

a. Test Equipment and Material.

(1) 1 Electronic Voltmeter AN/URM-145.
(2) 1 Power Supply PP-3940/G.
(3) 1 Radio Interference Measuring Set - AN/URM-85 W/T1/NE-105.
(4) 1 Frequency Meter AN/USM-207.
(5) 1 Variable Attenuator CN-796/U.
(6) 1 Sweep Signal Generator AN/URM-503 w/1-4M plug-in.
(7) 1 Logafier, Kay Electric 1025B.
(8) 1 Oscilloscope AN/USM-254.
(9) 1 Test cover.
(10) 1 Test fixture Litcom TEF 20006-909.

b. Test Connections and Conditions.

(1) Turn on power supply and adjust for +18 volts dc.

(2) ***Set*** +18V ON switch on TEF 20006-909 to ON.

(3) Set LEVEL CONTROL R1 on TEF 20006-909 for 100-mv output at 21-MHz RF OUT jack, using AN/URM-145 and MX-452/U.

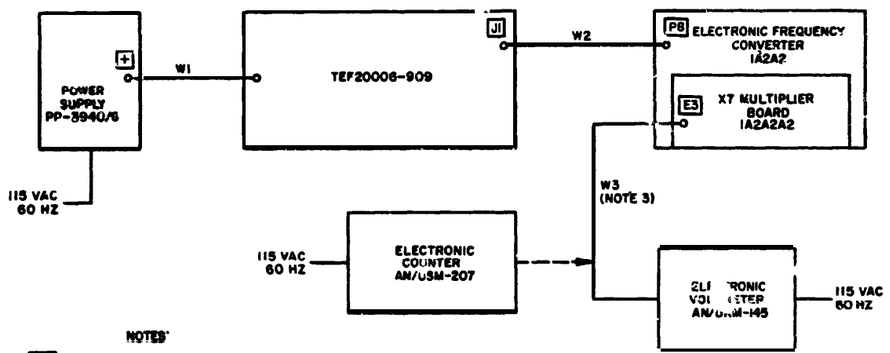
(4) Turn S3 on TEF 2006-909 to position No. 2 (27.25 MHz).

(5) Set LEVEL CONTROL R2 on TEF 20006-909 for 70-mv output at 75/27.25/27.75 MHz RF OUT jack, using AN/URM-145 and MX-452/U.

(6) Connect equipment as shown in figure 5-99.

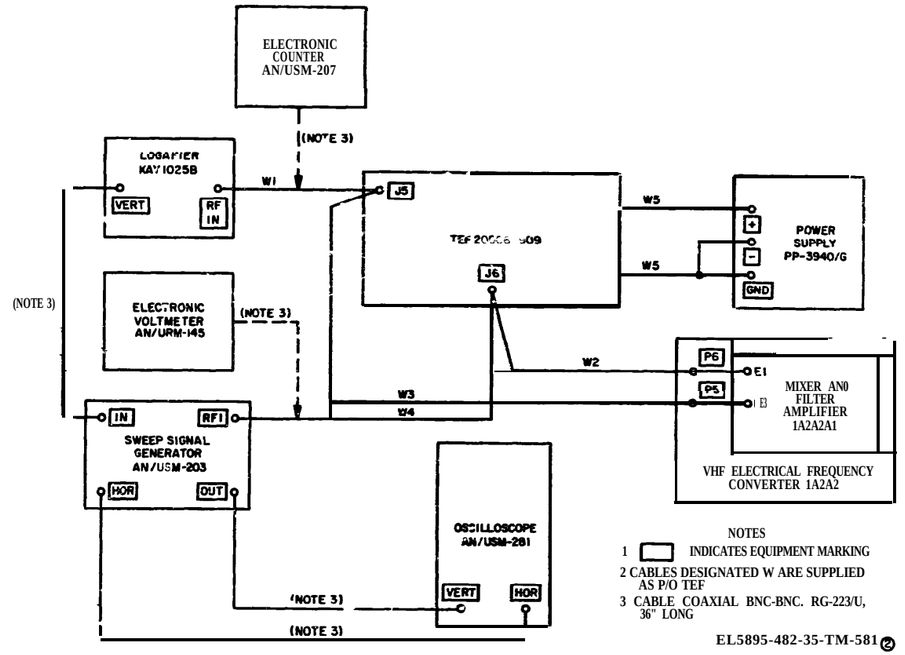
Step NO.	*Test equipment*	*Control settings Equipment under test*	*Test procedure*	Performance *standard*
1	N/A	N/A	Verify that output at terminal E3 (E6 as ground) of vhf X7 multiplier board is 500 mv minimum, using AN/URM-145.	AN/URM-145 shall indicate 500 mv minimum
2	N/A	N/A	Disconnect AN/URM-145 and connect AN/USM-207 to same terminals (step 1).	The frequency as read on AN/USM-*207* should be 147 MHz
3	N/A	N/A	Connect equipment as in figure 5-99 ②.	None.
4	On 1025B RANGE- LIN EXPAND ON- Down position. On AN/URM-503 MONITOR RF-1	N/A	Adjust RF ATTENUATORS on AN/URM-503 for 70-mv output at RF-1 on AN/URM-145	None.
5	N/A	N/A	Tune capacitors C16, C17, and C23 for a scope presentation	
6	*N/P*	N/A	***GAIN CHECK*** Be sum voltages at J1 (21 MHz) and J6 (27.25 MHz) on TEF 20006-909 are 100 mv and 70 mv, respectively Adjust R1 and R2. if necessary	

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
7	On TEF 20006-909 switch S3: position 2 (27.25 MHz)	**N/A**	Connect equipment as indicated in signal S-990.	The output voltage at TEF 20006-909 J5 as read on AN/URM-145 should be 500 mv minimum.
8	N/A	*N/A*	Disconnect AN/URM-145 from TEF 20006-909 J5 and connect AN/USM-207.	The frequency as read on AN/USM-207 should be 174.25 MHz.
9	**On TEF 20006-909 switch S3: position 1 (26.75 MHz)**	*N/A*	None.	The frequency as read on AN/USM-207 should be 173.75 MHz.
10	**N/A**	**N/A**	Disconnect AN/USM-207 from TEF 20006-909 J5 and connect AN/USM-145. Note AN/URM-145 reading in dB as reference. It must be a minimum **of 500 mv.**	The voltage as read on AN/URM-145 should be a minimum of 500 mv.
11	On TEF 20006-909 switch S3: position 3 (27.75 MHz)	*N/A*	**Observe** indication of AN/URM-145. It must be a minimum of 500 mv.	The output as read on AN/URM-145 should be less than the reference of step 10 by no more than 0.5 dB. It shall be a minimum of 500 **mv**
12	*N/A*	*N/A*	Disconnect AN/URM-145 from TEF 20006-909 J5 and connect AN/USM-207.	The frequency as read on *AN/USM-*207 should be 174.75 MHz.
			SPURIOUS EMISSIONS	
13	**N/A**	*N/A*	Connect AN/USM-85 in series with CN-796/U to TEF 20006-909 J5	**None.**
14	On TEF 20006-909 switch S3: position 2 (27.25 MHz)	*N/A*	a Adjust CN-796/U to 30 dB. b. Adjust AN/URM-85 INPUT ATTENUATOR to 80 dB. c. Tune AN/URM-85 to 174 25 **MHZ.**	a None. b. None. c. None.
15	*N/A*	N/A	a. Set AN/URM-85 IF GAIN control to a convenient reference level. b Tune AN/URM-85 to 147 MHz. c. Remove attenuation until reference level of step 15a is obtained	*a None* *b. None.* c. This should be a minimum of 70 dB below reference of step 14.



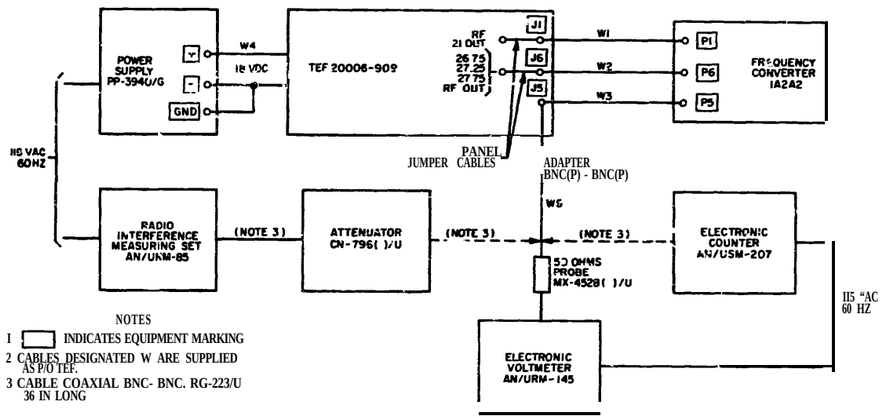
EL5895-482-35-TM-581 (1)

Figure 5-99. (1) Frequency converter A2, test setup diagram part 1 of 3)



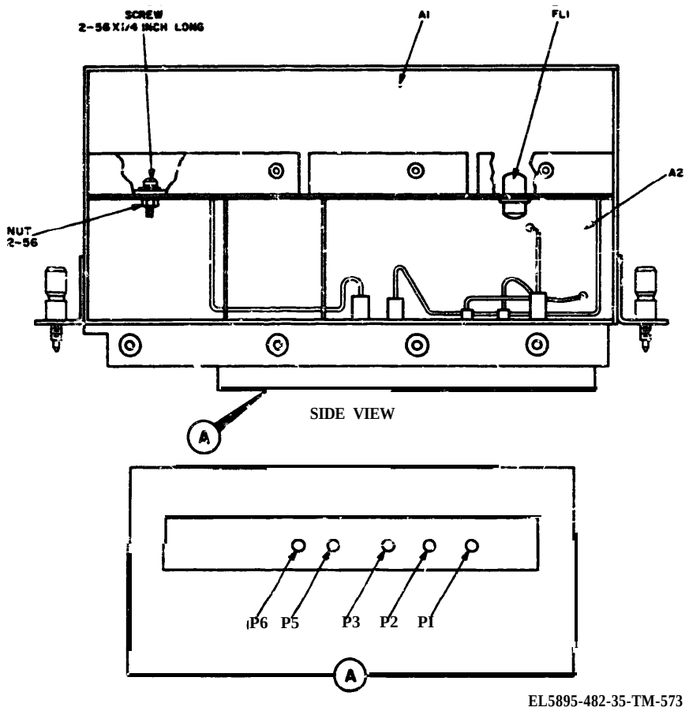
EL5895-482-35-TM-581 (2)

Figure 5-99 (2). Frequency converter A2, *test setup diagram (part 2 of 3)*



EL5895-482-35-TM-581 (3)

Figure 5-99 (3) Frequency converter A2, text setup diagram (part 3 of 3)



EL5895-482-35-TM-573

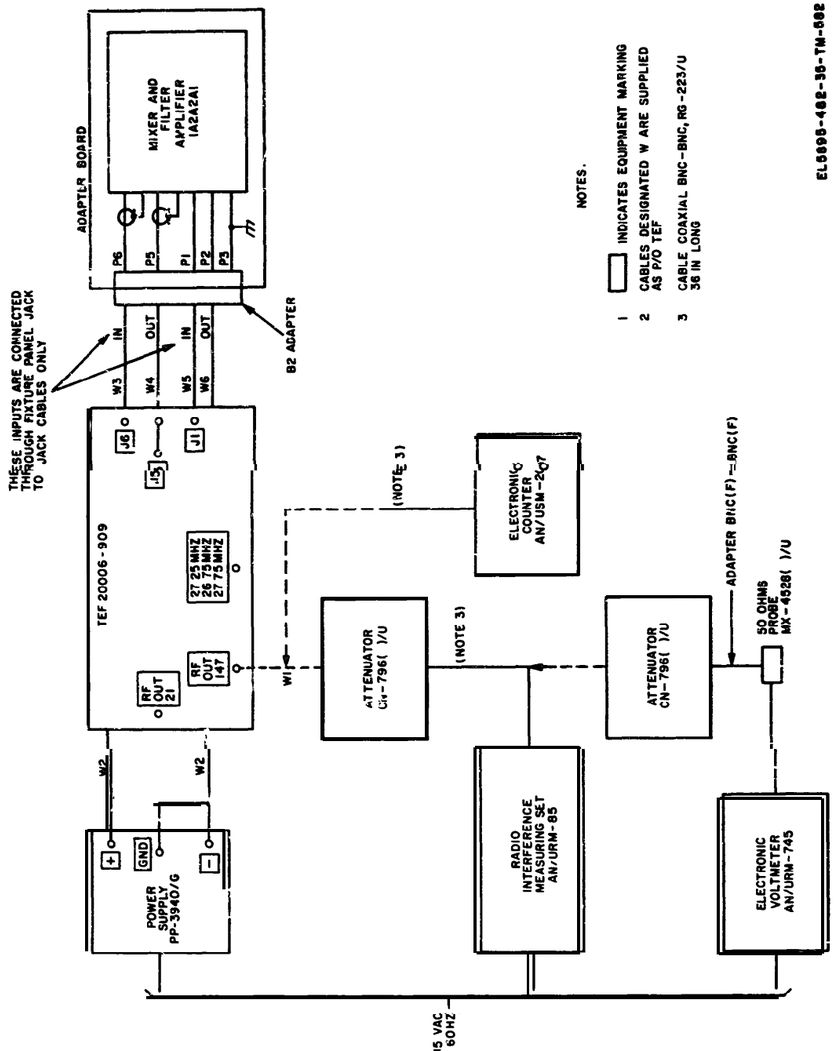
Figure 5-100. Vhf converter A2, parts location

5-25. Mixer and Fiber Amplifier Teat Procedure (figs. 5-101 and 5-102)

Test equipment and material are listed below:

a Power Supply PP-3940/G.
b. Electronic Voltmeter AN/URM-145.
c. 50-ohm Adapter MX-4528/U.
d. Variable Attenuator CN-796/U.
e. Radio Interference Measuring Set AN/URM-85.
f. Frequency Meter AN/USM-207. [a]
g. Test fixture Litcom TEF 20006-909 with B1, B2 adapter board.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
			PRELIMINARY	
1	On TEF 20006-909 OFF/147 ON SW: 147 ON position OFF/ +18V ON SW- +18V ON position	**N/A**	a. Connect AN/URM-145 and MX-4528/U in series with CN-796/U to 147 RF OUT jack on TEF 20006-909	**a** None.
			b. Adjust CN-796/U for a 500 mv indication on AN/URM-145.	b. None.
2	**On TEF** 20006-909 switch S3: 27.25 MHz position.	N/A	**a** Disconnect AN/URM-145 and MX-4528/U from 147 RF OUT jack on TEF 20006-909 and connect to 26.25-26 76-27.75 RF OUT jack.	a None
			b Adjust LEVEL CONTROL R2 ***on*** TEF 20006-909 for 70-mv indication on AN/URM-145	b None.
3	N	N/A	a Disconnect AN/URM-145 and ***MX-4528/U*** and connect to *J5* on TEF 20006-909.	**a** None
			b. Connect coax cable from 147 RF OUT jack on TEF 20006-909 to J1.	b. None
			c. Connect coax cable from 26.25- *26 75-27.75* ***RF*** GUT jack on TEF 20006-909 to J6	c None.
			d. Tune C9, C16, C17, and C23 on mixer and filter amplifier for maximum indication on *AN/URM-145*.	d None.
4	**N/A**	N/A	***a*** Disconnect AN/URM-145 and *MX-4528/U* from J5 on TEF *20006-909* and ***connect*** AN/USM-207.	a. None.
			b. Observe **frequency** indication ***on*** *AN/USM-207*	b Frequency as read on USM-*207* should be 174 25 M
			GAIN *CHECK*	
5	On TEF 20006-909 switch S3: 26.75 MHz position	***N/A***	***a.*** Check for 70 mv at J6 on TEF 20006-m.	a None
			b. Readjust TEF 20006-909 LEVEL CONTROL R2 if necessary.	b None
6	**N/A**	***N/A***	***a. Connect AN/URM-145 to J5 on*** TEF 20006-909	**a None-**
			b. Observe rf voltage indication on **AN/URM-145.**	b. AN/URM-145 should indicate 500 mv minimum.
7	N/A	N/A	a Disconnect AN/URM-145 from J5 on TEF 20006-909 and connect AN/USM-207.	a None-
			b. Observe frequency indication on **AN/USM-207**	b. Frequency as read on AN/USM-207 should be 173.75 MHz.
8	**On TEF 20006-909** switch S3: 27.75 MHz position	N/A	None.	None.
9	N / A	**N/A**	Repeat steps 5 through 7.	Repeat steps 5 through 7. AN/USM-207 indication should be 174 75 *MHZ*.
10	On TEF 20006-909 switch S3: 27.25 MHz position	N/A	***a.*** *Connect AN/URM-85 in* series with CN-796/U to J5 on TEF 20006-909.	a None.
			t. Set CN-796/U to 30 dB.	b. None.
			c. Turn AN/URM-85 SIGNAL INPUT ATTENUATOR to 80 dB.	c. None-
			d. Tune AN/URM-85 to 174.25 MHz. Adjust AN/URM-85 **IF** GAIN control for a convenient **reference**	d. None.
11	N/A	N/A	*Tune AN/URM-85* to 147 MHz.	Output as read on AN/URM-85 should be a minimum of 70 dB below the reference level of step 10d.



NOTES.

1. ☐ INDICATES EQUIPMENT MARKING
2. CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF
3. CABLE COAXIAL BNC-BNC, RG-223/U 36 IN LONG

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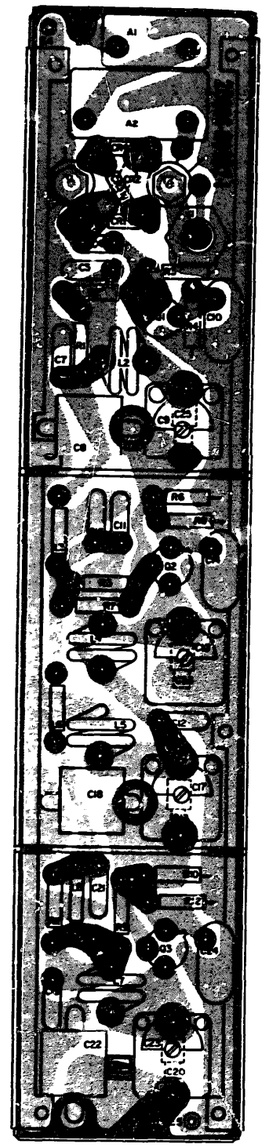
Figure 5-101. Mixer and filter amplifier A2A1, test setup diagram.



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-547

Figure 5-102 Mixer and filter amplifier A2A1, wiring diagram and parts location

5-26. ***Vhf*** X7 Multiplier Test Procedure (figs. 5-103 and 5-104)

a. Test Equipment and Material.

(19 Electronic Voltmeter AN/URM-145.
(2) 50-ohm Adapter MX-4528/U.
(3) Power Supply PP-3940/G.
(4) Variable Attenuator CN-796/U.
(5) Frequency Meter AN/USM-207.
(6) Counter Plug-in H/P5253B.
(7) Radio Interference Measuring Set AN/-URM-85.
(8) Test fixture TEF 20006-909 with B1, B2 adapter board.

b. Test Connections and ***Conditions.*** Connect equipment as shown in figure 5-103 with AN/-URM-85 and CN-796/U connected to J5 on TEF 20006-909.

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
			PRELIMINARY	
1	On TEF 20006-909 +18V switch S1: ON. OFF/147 ON switch: 147 ON	N/A	a Connect AN/URM-145 with MX-***4528/U*** in series with CN-796/U to 147 MHz REF OUT jack on TEF 20006-909.	a None
			b. Adjust CN-796/U for 100-mv indication on AN/URM-145.	I. None.
			c Connect AN/URM-85 to 147 MHz RF OUT jack on TEF 20006-909.	None.
			d. Tune AN/URM-85 to 147 MHz.	***d.*** None.
			e. Adjust AN/URM-85 IF GAIN for **a convenient** reference level.	e. None.
			VHF X7 ALIGNMENT	
2	On TEF 20006-909 switch S2 to position 2 (21 MHz)	N/A	a. Connect AN/URM-145 with MX-4528/U to 21-MHz RF OUT jack or TEF 20006-909.	a None.
			b. Adjust 21-MHz LEVEL CONTROL potentiometer on TEF 20006-909 for 100-mv output.	***b*** None.
			c. Disconnect voltmeter	c None.
3	N/A	N/A	a Connect 50-ohm cable from 21-MHz RF OUT jack to J1 on TEF 20006-909.	a. None.
			b. Tune inductor L1 and capacitors C13, C19, C20. and C21 for **maximum** indication on AN/URM-85.	***b.*** None
4	N/A	N/A	Disconnect AN/URM-85 and connect AN/USM-207 to J5 on TEF 20006-909.	AN/USM-207 should indicate 147 MHz.
5	N/A	N/A	Connect AN/URM-145 to J5 on TEF 20006-909	The rf output v&age as read on AN/URM-145 should be 500 mv minimum.
			SPURIOUS OUTPUTS	
6	N/A	N/A	a. Disconnect AN/URM-145 and connect AN/URM-85 in series with CN-796/U to J5 on TEF 20006-909.	
			b. Adjust CN-796/U to 30 dB	
			c. Turn AN/URM-85 SIGNAL INPUT ATTENUATOR to 80 dB position	
			d Tune AN/URM-85 to 147 MHz.	
			e Adjust IF GAIN control for a convenient reference	
7	***N/A***	N/A	Tune AN/URM-85 to 105 MHz	AN/URM-85 should indicate a minimum of 40 dB below the reference level established in step 6
8	N/A	N/A	Repeat step 7 for 126, 163, anti 189 MHz.	Repeat step 7 for 126, 168, and 189 MHz

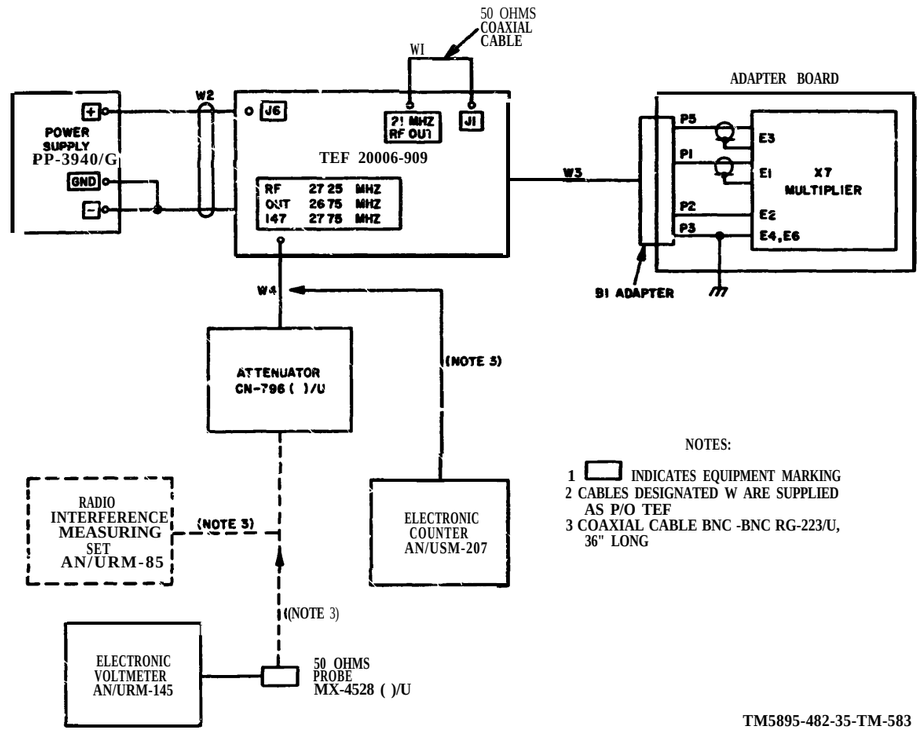
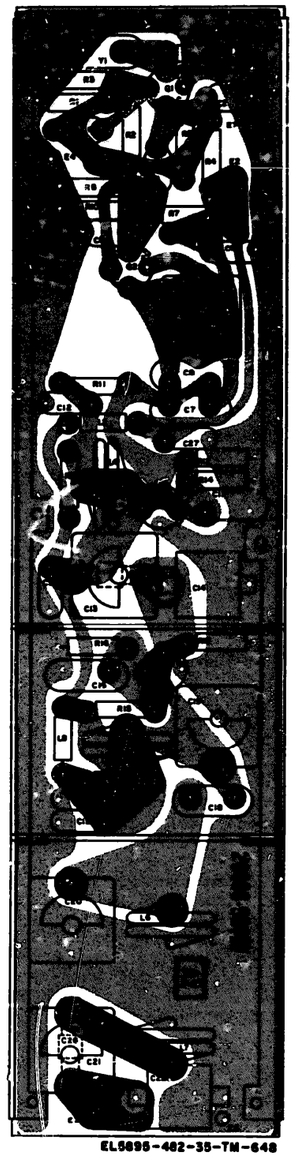


Figure 5.103 Tunes - 7 multiplier A2A2, test ***setup diagram***



NOTES.

1 CIRCUIT VIEWED FROM COMPONENT SIDE.

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-104 Tunes - 7 multiplier A2A2, parts location and wiring diagram

5-27. High-Pass Filter Disposition Test

a. A disposition test is provided in the chart below for high-pass filter FL? which determines whether or not it is defective. Since the high-pass filter is a nonrepairable item, no troubleshooting procedures are provided. If the disposition test determines that the module is defective, it will be disposed of using the standard disposal procedures.

b. Test equipment and material required are as follows:

(1) Sweep Signal Generator AN/URM-503.
(2) Logafier Kay Electric 1025B.
(3) Electronic Voltmeter AN/URM-145.
(4) 50-ohm Adapter MX-452/U.
(5) High impedance probe 916C for AN/-URM-145.
(6) Power Supply PP-3940/G.
(7) Multimeter ME-26B/U.
(8) Signal Generator AN/GRM-50.
(9) Frequency Meter AN/USM-207.
(10) Oscilloscope, Tektronix 543B.
(11) Test fixture Litcom TEF 20006-909.

Step No.	*Test equipment*	*Control settings Equipment* **under test**	**Test procedure**	*Performance standard*
1	On AN/URM-503 sweep dial: approx. 20-MHZ Marker width:SCOPE MIN. Rf function: SWEEP sweep ratio: CCW Sweep width: MAX Sweep rate: LINE Monitor: RF1 On 543B vertical: DC INPUT Horizontal: EXT IN-PUT On 1025B range: LIN	N/A	a. Tune AN/URM-503 SWEEP dial to approximately .20 MHz. b. Adjust AN/URM-503 to ap-proximately 70 mv at jack RF-l. c. Calibrate AN/URM-503 width on screen of 643B for range of 12 to 30 MHz. d. Set AN/URM-503 MARKER dial to 14.8 MHz. l . Tune L1 for null indication on 543B by separating the coil windings. f. Set AN/URM-503 MARKER dial to 22 MHz. g. Tone L2 for null indication of 543B by separating the coil windings. A. Set AN/URM-503 MARKER dial to 24.4 MHz. i. Tune L3 for null indication on 543B by separating the coil windings.	a None. ***b. None.*** c. None. ***d. None.*** e. None. ***f.*** None. ***g.*** None. ***h.*** None. i. None.
2	N/A	**N/A**	***INSERTION LOSS*** Connect equipment as in figure 5-105 **.**	
3	N/A	N/A	a Disconnect 1A2A2A2 FL1 from TEF 20006-909. b Tune AN/GRM-50 to 26.75 MHz at an output of 70 mv c. Note AN/URM-145 Indication as reference level	a None. ***b.*** None. c None
4	N/A	***N/A***	a Connect 1A2A2A2FL1 to setup. b Connect AN/GRM-50 to J6 on TEF 20006-909. c. Connect AN/URM-145 and MX-452/U to J5 on TEF 20006-909 d. Observe indication on AN/URM-145.	a. None. ***b. None*** c None ***d*** AN/URM-145 indication should be no more than 3 dB below 70. mv reference of step 3c.
5	N/A	N/A	a Vary AN/GRM-50 frequency from 26 75 to 27 75 MHz. keeping output constant at 70 mv b Observe minimum indication on **AN/URM-145**	***a*** None. b Minimum indication should not be more than 3 dB below reference level of step 3c
6	N/A	N/A	***RIPPLE*** Repeat step 5. observing minimum and maximum indications on AN/URM-145	The difference between minimum and maximum indications on AN/URM-145 should be less than 1 dB

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			FLYBACK AND REJECTION	
7	N/A	N/A	o. Tune AN/GRM-50 to 26.75 MHz at an output of 70 mv. b. Note AN/URM-145 indication at J6 as reference level.	a. None. *b.* None.
8	*N/A*	*N/A*	Vary AN/GRM frequency from 24.4 to 14.8 MHz **at a** constant **output of 70** mv, noting AN/URM-145 indication *at* J6.	Indication on AN/URM-145 should be **a** minimum of 25 dB below the reference level of step 7 ***b across*** the band.
9	N / A	N/A	Tune AN/GRM-50 to 24.4, 22.0. and 14.8 MHz ***at* an output** of 70 mv.	Indication on AN/URM-145 should be a minimum of 25 dB below the reference level of **step 7** ***b at all*** frequencies.

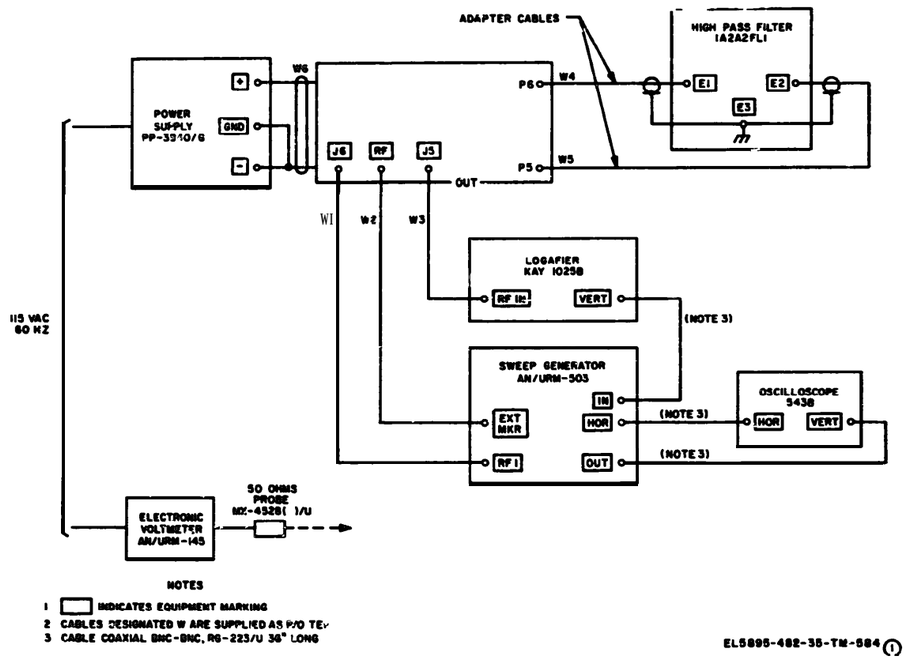


Figure 5-105(1). High-pass filter A2FL1, tent **setup** *diagram (port I of 2)*

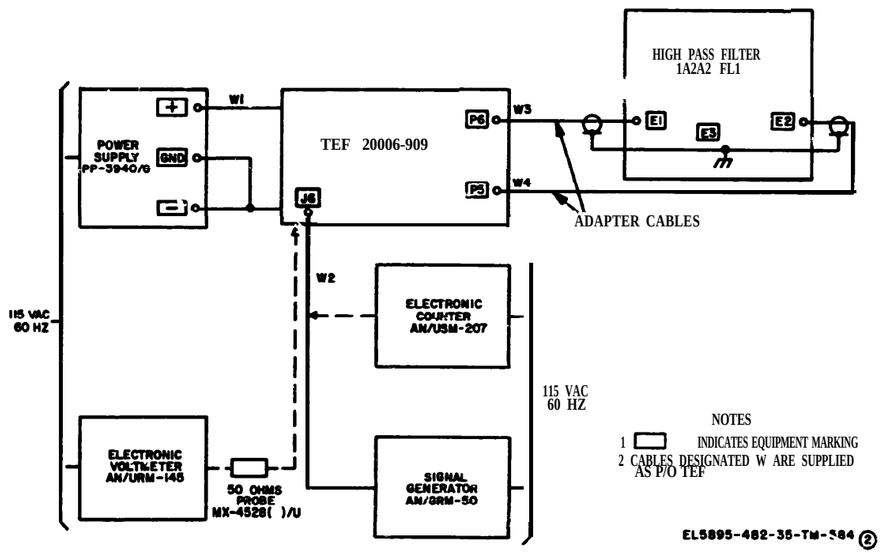


Figure 5-105(2). High-pass filter A2FL1, test setup *diagram (part 2of 2)*

5-28. 100-kHz Interpolation Mixer Test Procedure

a Test Equipment and Materials.
(1) Litcom test fixture TEF 20006-905A1.
(2) Electronic Voltmeter AN/URM-145.
(3) Adapter MX-4528/U.
(4) Frequency Meter AN/USM-207.
(6) Rohde and Schwartz USVH BN1521.
(6) Signal generator AN/GRM-50.
(7) Sweep generator, Telonic HD-7.
(8) Multimeter ME-26B/U.
(9) Oscilloscope AN/USM-281.
(10) Power Supply PP-3940/G.
(11) Logafier, Kay 1025B.

b. Test Connections and Conditions. Connect the equipment as shown in figure 5-106, but do not connect ***A3 to*** test ***setup.***

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	N/A	N/A	**a. Set TEF** 20006-905A1 switch S1 to 22 00 and switch S4 to HF.	a None.
			b. Connect AN/URM-145 with 50-ohm probe to TEF 20006-905A1 HF jack and adjust HF LEVEL SET CONTROL for an indication of 90 mv.	***b. None***
			c. Connect AN/URM-145 with 50. ohm probe to TEF 20006-905A1 4 75 jack and **adjust 4.75** LEVEL SET CONTROL for an indication of 95 ***mv***	c None.
			d Connect AN/URM 145 with 50. ohm probe to TEF 20006-905 2.35 jack and adjust 2 35 LEVEL SET CONTROL for an Indication of 150 mv.	***d*** None
			e Set TEF 20006-905A1 LF FREQUENCY switch S2 to 1.4 MHz position	e None

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1 (Cont)			f. Connect AN/URM-145 to TEF 20006-905A1 LF jack and l adjust LF LEVEL SET CONTROL for an indication of 70 mv.	f. None-
			g. Tune HD-7 to 2 MHz and adjust attenuator AN/URM-503 for a 70-mv indication on AN/URM-145.	g. None.
			h. Connect 100-kHz interpolation mixer to test equipment as shown on figure 5-106.	h. None.
			i. Set TEF 20006-905A1 POWER switch to ON.	i. None.
			j. Set 1025B range switch to LIN and adjust LIN GAIN control for a midscale indication on AN/USM-281.	j. None
			k. Observe indication on AN/USM-281.	k. AN/USM-281 should indicate a wave shape.
2	N/A	N/A	a Connect equipment as shown in figure 5-107. and repeat steps 1 a, lb, 1c, 1e, and 1f.	w. None.
			b. Check that output is 90 mv minimum.	b. AN/URM-145 should indicate 90 mv minimum.
			c. Replace AN/URM-146 with AN/USM-207.	c. AN/USM-207 should indicate 27.70 MHz ± 200 Ht.
			d. Set TEF 20006-905A1 LP FREQUENCY switch S2 to portion 1.8.	d. AN/USM-207 should indicate 27.30 MHz ± 200 Hr.
			e. Replace AN/USM-207 with AN/URM-145.	l . Same as step b.
			f. Set TEF 20006-905A1 LF FREQUENCY switch S2 to 2.3.	f. Same as step b.
			g. Replace AN/URM-145 with AN/USM-207.	g. AN/USM-207 should indicate 26.80 MHz ± 200 Hz
			h. Connect ME-26B/U to P4 and repeat steps 2a, 2d, and 2f.	h. ME-26B/U should indicate 10-15 mv dc.
3	N/A	N/A	a Adjust TEF 20006-90JA1 4.75. MHz LEVEL SET CONTROL for a 95-mv (4.75.MHz) output.	a. None.
			b. Adjust TEF 20006-905A1 22-MHz LEVEL SET CONTROL for a 90-mv (22-MHz) output.	b. None.
			c. Adjust TEF 20006-905A1 1.4 to 2.3 LEVEL SET CONTROLS for 70-mv output.	c. None.
			d. Tune AN/GRM-50 for a 150-mv output at 2.4 MHz	d. None.
			l . Tune USVH BN1521 to 27.75 MHz and establish a O-dB reference level, on 10-mv range, by adjusting CN-796/U.	a. None.
			f. Tune USVH BN1521 to 26.35 MHz and reduce attenuation until an indication is obtained on USVH 1521	f. USVH 1521 indication should occur at a minimum of 70 dB below 0-dB reference established in step a.
4	N/A	N/A	NOTE If any or tall the first 3 step Performance Standards cannot be obtained, proceed with following steps.	
			a Remove wraparound cover from module under test.	a None.
			b. Set TEF 2006-905A1 levels as follows:	b. None.
4 (Cont)			Teat procedure	
			4.75 MHz at95 mv HP (22 MHz) at 070 mv 2.3-2.4 MHz at 150 mv LF (1.4) at 70 mv.	
			c. Connect B + and ground to module P2 and P3.	c. None.
			d. Connect AN/URM-145 with high impedance probe to A1E4 and adjust A1L7 for maximum reading.	d. AN/URM-145 should indicates 500 mv minimum.
			e. Turn S1 and S2 of TEF 20006-905A1 to position 2.	e. None.
			f. Connect AN/URM-145 with high impedance probe to A1E8 and adjust A1L2, A1L6, and A1L5 for maximum reading.	f. None.
			g. Set TEF 20006-905A1 switch S1 to position 1. Sat TEF 20006-905A1 switch S4 to position 1.	g. None.
			h. Connect AN/URM-145 with high impedance probe to A1E8.	h. AN/URM-145 should indicate 500 mv minimum.
			i Replace wraparound cover and repent steps 1 through 3.	i. Same as steps 1 through 3.

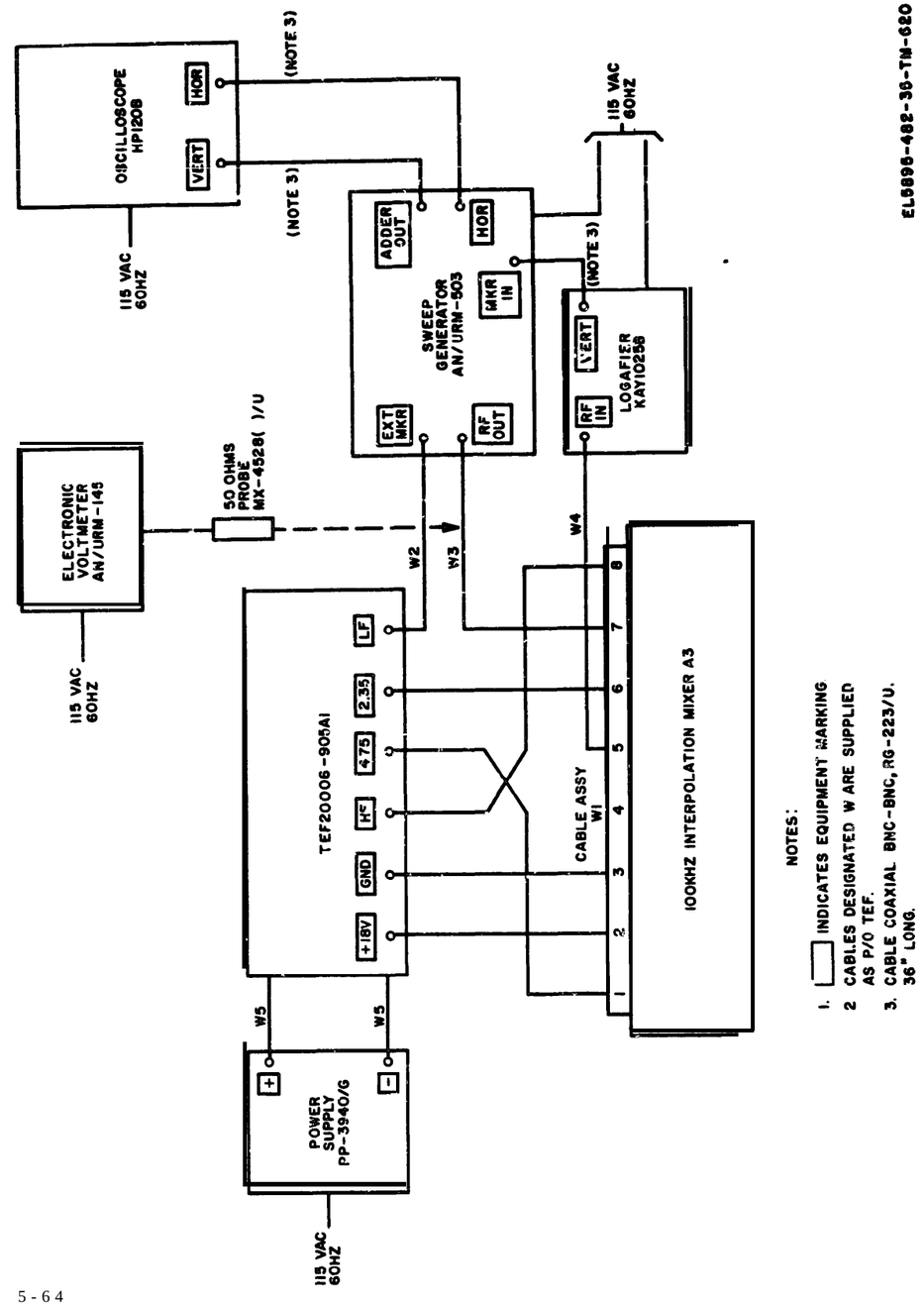


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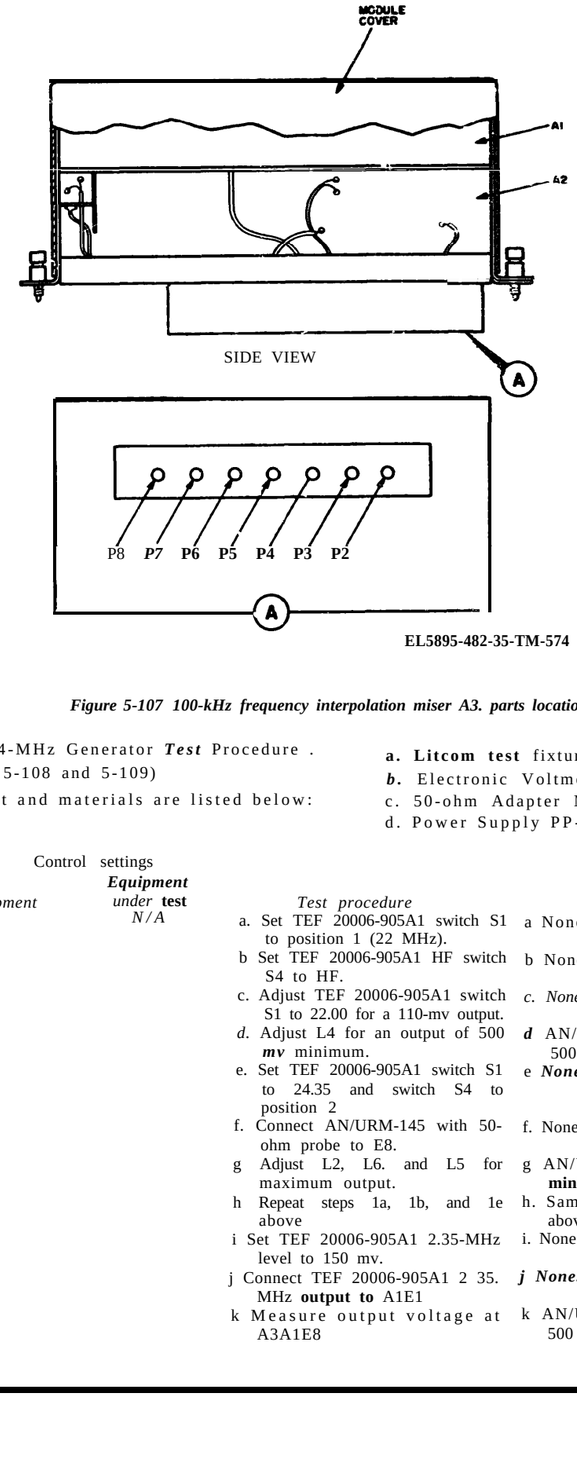
Figure 5-106. 100-kHz interpolation mixer A3, test setup diagram.



EL5895-482-35-TM-574

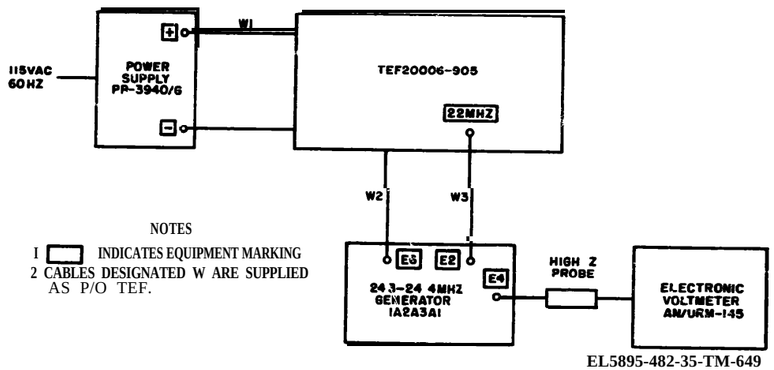
Figure 5-107 100-kHz frequency interpolation miser A3. parts location

5-29. 24.3-24.4-MHz Generator ***Test*** Procedure . (figs. 5-108 and 5-109)

Test equipment and materials are listed below:

a. Litcom test fixture TEF 20006-905A1.
b. Electronic Voltmeter AN/URM-145.
c. 50-ohm Adapter MX-4528/U.
d. Power Supply PP-3940/G.

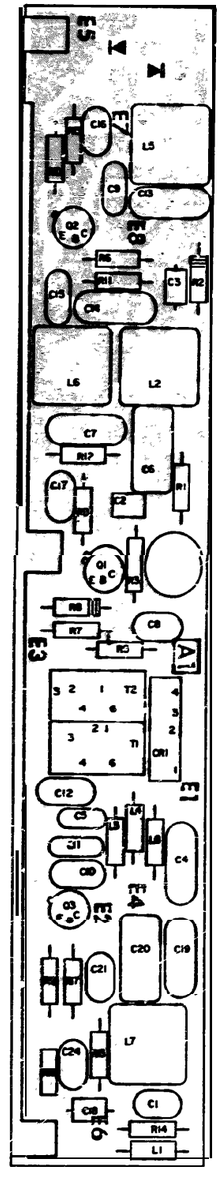
Step NO	*Test equipment*	Control settings *Equipment under* **test**	*Test procedure*	Performance standard
1	**N/A**	*N/A*	a. Set TEF 20006-905A1 switch S1 to position 1 (22 MHz).	a None
			b Set TEF 20006-905A1 HF switch S4 to HF.	b None
			c. Adjust TEF 20006-905A1 switch S1 to 22.00 for a 110-mv output.	*c. None.*
			d. Adjust L4 for an output of 500 ***mv*** minimum.	***d*** AN/URM-145 should indicate 500 mv minimum.
			e. Set TEF 20006-905A1 switch S1 to 24.35 and switch S4 to position 2	e ***None***
			f. Connect AN/URM-145 with 50-ohm probe to E8.	f. None.
			g Adjust L2, L6. and L5 for maximum output.	g AN/URM-145 should indicate **minimum.**
			h Repeat steps 1a, 1b, and 1e above	h. Same as steps 1a, lb, and 1c above.
			i Set TEF 20006-905A1 2.35-MHz level to 150 mv.	i. None
			j Connect TEF 20006-905A1 2 35. MHz **output to** A1E1	***j None.***
			k Measure output voltage at A3A1E8	k AN/URM-145 should indicate 500 mv minimum



NOTES

1 ▭ INDICATES EQUIPMENT MARKING
2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF.

Figure 5-108 24 3-24 4-MHz generator A3A1, test setup diagram



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE
2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-109 24 3- to 24 4-MHz generator A3A1, wiring diagram and parts location

5-30. 100 kHz Interpolation output **Amplifier** Test *Procedure*
(figs. 5-110 and 5-111)

Test equipment and materials are listed below:

a. Litcom test fixture TEF 20006-905A1.
b. Electronic Voltmeter AN/URM-145.
c. 50-ohm Adapter MX-4528/U.
d. High impedance probe Boonton 91-13B
e. Frequency Meter AN/USM-207.
f. Sweep generator, Telonic HD-7.
g. Oscilloscope AN/USM-254.
h. Logafier Kay 1025B.
i. Signal Generator AN/GRM-50.
j. Power Supply PP-3940/G.
k. Multimeter Simpson *260A.*

Step No.	*Control settings* Teat *equipment*	**Equipment** *under test*	***Test procedure***	*Performance* standard
1	TEF 20006-905 ***4 75 MHz-*** Adjust output for a level of 75 mv rms S1: Set to position 2 and adjust hf output ***(24 35*** MHz) to 0 5 v rms	N'A	a Connect AN/URM-145 with the high Impedance probe to the junction of Cl0 and C11	a. None
			b. Tune L2. L3, and L4 for maximum indication on the AN/URM-145	***b*** AN/URM-145 should indicate ***0 5*** v rms minimum.
			c. Set TEF 20006-905 L F switch S2 to 1 4 MHz position	c. None
			d Adjust TEF 20006-905 L F. control for 70 mv rms at the TEF 20006-905 L. F jack.	d. None.
			e. Connect the AN/URM-145 with its 50-ohm probe to output terminal E5 and read the indicated level.	e. AN/URM-145 should indicate 70 mv rms.
			f Turn TEF 20006-905 L. F. switch S2 to the 1 8 MHz position.	f None.
			g Adjust the TEF 20006-905 L. F control for 70 mv rms at the TEF 20006-905 L **F** jack	g. None.
			h. Connect the AN/URM-145 with 50-ohm probe to output terminal E5 and read the indicated level.	h. AN/URM-145 should indicate 70 mv rms minimum.
			i Set TEF 20006-905 L F switch S2 ***to 2.3*** MHz position.	i. None.
			j Adjust the TEF 20006-905 L F control for 70 mv rms at the TEF 20006-905 L F jack.	j. None
			k Connect AN/URM-145 with 50-ohm probe to output terminal E5 and read the indicated level.	k The AN/URM-145 should indicate 70 ***mv rms minimum.***
N/A	N/A		a If the parameters of step 1 are met, no further testing is required	a None.
			b Adjust the sweep generator for a sweep center frequency of approximately 1 8 MHz with a bandwidth of approximately ± 1 MHz	b. None.
			c Adjust capacitors Cl. C3, C5, and ***C7*** of Al, A3, and A4 to obtain the waveform (fig S-110, 5-111) and adjust the signal generator to obtain the marker frequencies.	c. AN/USM-254 should indicate a waveform
3 N/A	N/A		a Reconnect the A3A2	a None
			b Repeat step 1 c through 1 k	b Same as step 1 a through 1 k

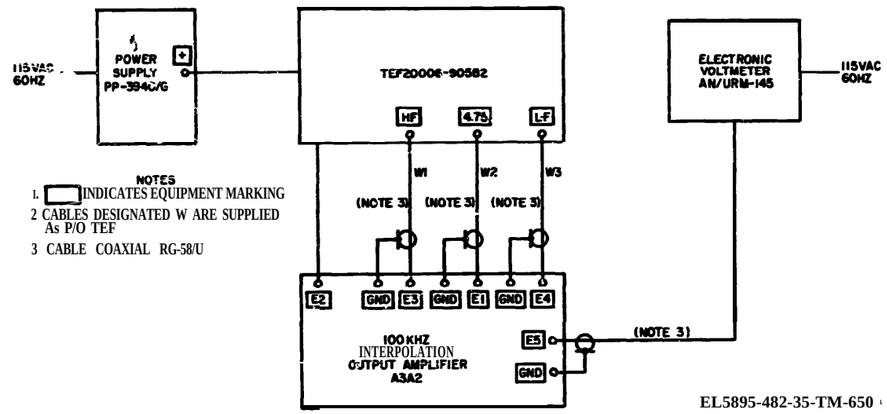
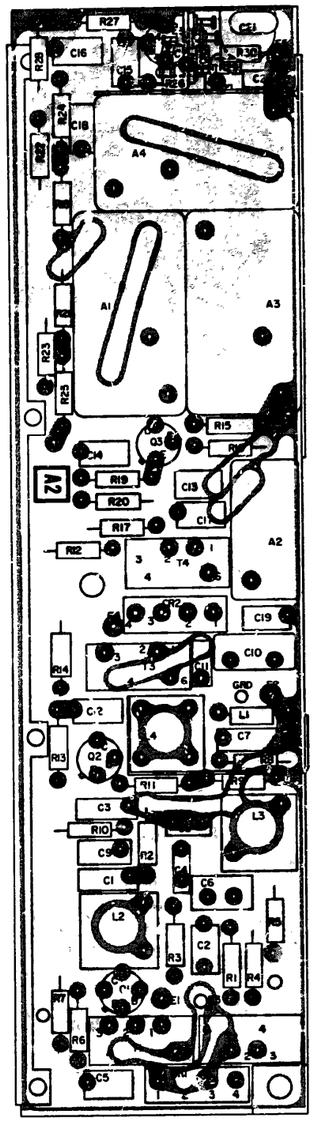


Figure 5-110. 100-kHz interpolation output amplifier A3A2 preliminary. test setup diagram



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-533

Figure 5-111 100-kHz interpolation output amplifier A3A2, wiring diagram and parts location

5-31. 10-kHz, 100-Hz Frequency Divider Mixer Test Procedure (figs. 6-112 and 5-113).

Test equipment and materials are listed below:

a. Litcom TEF 20006-904.
b. Power Supply PP-3940/G.
c. Electronic Voltmeter AN/URM-145.
d. Electronic Voltmeter AN/USM-98E.
e. Signal Generator AN/GRM-50 (three required).
f. Frequency Meter AN/USA&207.
g. Multimeter ME-26B/U.
A. Oscilloscope AN/USM-281.

Step No.	Teat equipment	Control settings Equipment under test	Test procedure	Performance standard
1	N/A	N/A	a. Tune AN/GRM-50 No.1 for an 80-mv output at 23 MHz.	a None.
			b. Tune AN/GRM-50 No.2 for a 150-mv output at 2.3 MHz.	b. None.
			c. Tune AN/GRM-50 No. 3 for a 50-mv output at 1.4 MHz.	c. None.
			d. Tune AN/GRM-50 No. 2 from 1.4 to 2.3 MHz.	d. AN/URM-145 should indicate 180 mv ±30 mv.
			e. Tune AN/GRM-50 No. 2 for a 150-mv output at 2.4 MHz.	l None
			f. Tune AN/GRM-50 No. 3 from 1.4 to 2.3 MHz. Connect scope J8 of TEF 20006-904A1 (adjust AN/USM-281 for an undistorted waveform).	f. AN/URM-145 should indicate 180 mv ±30 mv.
			g. Connect AN/USM-281 to TEF-20006-904A1 J3 and adjust for an undistorted waveform. Tune AN/GRM-50 No. 3 from 1.4 to 2.3 MHz.	g. Waveform on AN/USM-281 should not extinguish
			A. Disconnect AN/USM-281 and connect AN/USM-207	h. None
			i Adjust AN/GRM-50 No. 1 output level to 100 mv.	i. None
			j. Tune AN/GRM-50 No. 3 for a 50-mv output at 1.8 MHz.	j- None.
			A Tune AN/GRM-50 No. 2 for a 150-mv output at 2.3 MHz.	k. AN/USM-207 should indicate 2.35 MHz
			l. Tune AN/GRM-50 No. 2 for a 150-mv output at 2.35 MHz	1. AN/USM-207 should indicate 2.355 MHz.
			m. Tune AN/GRM-50 No. 2 for a 150-mv output at 2.4 MHz	m AN/USM-207 should indicate 2.360 MHz.
			n Tune AN/GRM-50 No 2 for a 150-mv output at 2.35 MHz and tune AN/GRM-50 No. 3 for a 50-mv output at 2.3 MHz.	n AN/USM-207 should indicate 2 305 MHz
			o Tune AN/GRM-50 No 2 for a 150-mv output at 2 35 MHz and AN/GRM-50 No. 3 for a 50-mv output at 1 4 MHZ	o AN/USM-207 should indicate 2 395 MHz
			p Tune AN/GRM-50 No 2 for a 150-mv output at 2 3 MHz and AN/GRM-50 No. 3 for a 50-mv output at 2 3 MHz	p AN/USM-207 should indicate 2 300 MHz
			q Tune AN/GRM-50 No 2 for a 150-mv output at 2 4 MHz and AN/GRM-50 No 3 for a 50-mv output at 1 4 MHz	q AN/USM-207 should indicate 2.400 MHz
			r Tune AN/GRM-50 No 2 for a 150-mv output at 2 35 MHz and AN/GRM-50 for a 50-mv output at 2 00) MHz	r AN/USM 207 should indicate 2 335 MHz
			s Connect ME-26B/U to TP3 and TP4 of TEF	s ME-26B/U **should indicate 14-21** mv

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
2	N/A	N/A	NOTE The following steps to be performed only if above Performance Standards cannot be obtained	
			a Remove wraparound cover from assembly	a None
			b. Connect AN/URM-145 with MX-4528/U to A2E1.	b AN/URM-145 should indicate 600 mv minimum.
			c Connect AN/USM-281 **to** junction of A4A2Z1 pin 12 and ***A2L6.***	c. AN/USM-281 should indicate a square wave
			d Connect AN/USM-281 to E2 of low-pass filter on A2	d. AN/USM-281 should indicate a sine wove.
			e. ***Connect*** AN/URM-145 with MX-4528/U to TEF 20006-904A1J7.	e AN/URM-145 should indicate 180 mv ±30 mv.
			NOTE Same adjustment of A2L7 and L8 standard of step No 2e	

Figure 5-112 10-kHz, 1-kHz, 100-Hz, frequency divider mixer A4 through A6, test setup diagram

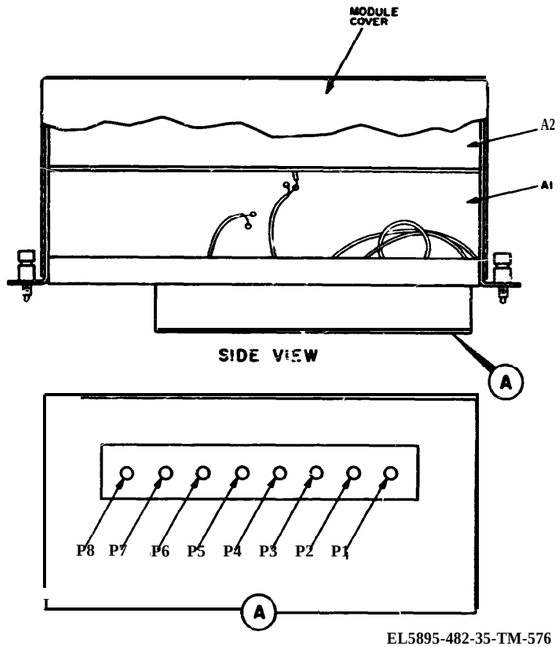


Figure 5-113 Frequency divider mixer A4, A5, and A6, parts location

5-32. High Frequency Miser Amplifier Test Procedure

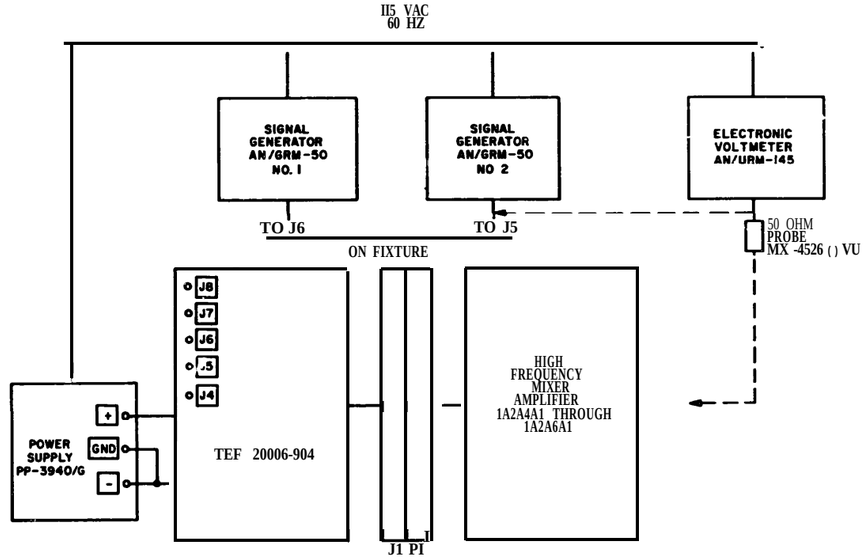
(figs. 5-114 and 5-115)

Test equipment and material required are as follows:

a. Litcom test fixture, TEF 20006-904.
b. Sweep Signal Generator AN/URM-503.
c. Plug-in AN/URM-503.
d. Logafier, Kay 1025B.
e. Electronic Voltmeter AN/URM-145.
f. Oscilloscope, Tektronix 543B.
g. Power supply, Harrison 520A.
h. Frequency Meter AN/USM-207.
i. Variable Attenuator CN-796/U.
j. Signal Generator AN/GRM-50 (three required).

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	***N/A***	N/A	NOTE 20006-904A1 are A4, A5, or ***A6*** in system: 'a this procedure. ***A4*** is designated as prime number.	
			a Turn all test equipment on. allow tune to warm up, set power supply to +18 volts dc, turn B + to module off.	a None
			b Connect test fixture cables as follows (tack-solder all connections to board). W5 from P8 of TEF 20006 to E5 and E6.	b. None

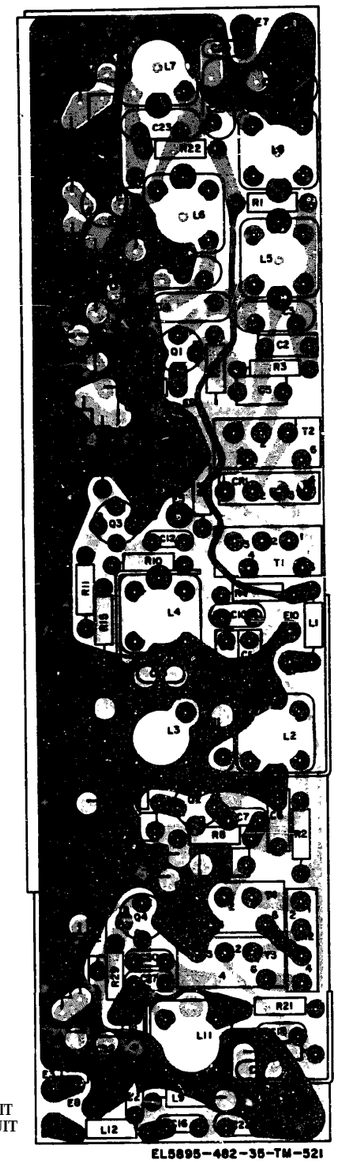
Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1 (Cont)			W6 from P6 of TEF 20006 to E2 and E8. W7 from P7 of TEF 20006 to E9. *W8* from P2 of TEF 20006 to ES and E10. W9 from P1 of TEF 20006 to E3 and E4. W10 from ES interconductor. Shield connected to ground plane of A4A1 to TEF ***20006-904W4.*** E6, E8. E10, and *E4 are ground* connections.	
			c. Turn on B + to module under test.	c. None.
2	*N/A*	N/A	a. Adjust **AN/GRM-50** No. 1 for a *23-MHz* output et 80 mv.	a. None.
			b. Connect AN/URM-145 with high impedance probe to junction of capacitors C27 and C30.	***b.*** None.
			b. *Tune* inductor L11 for maximum indication on AN/URM-145.	c. AN/URM-145 should indicate a minimum *of 500 mv.*
			d. Adjust AN/GRM-50 No. 2 for a 2.35 MHz output at 150 mv.	***d. None.***
			e. Connect AN/URM-145 with high impedance probe to junction of capacitors Cl0 and C12.	e. None.
			f. Tune L2. L3. and L4 for maximum indication on AN/URM-145.	f. AN/URM-145 should indicate 500 mv minimum
			g. Tune AN/GRM-50 from 2.3 to 2 4 MHz. (Some readjustments of L2, L3, or L4 may be required.)	g. AN/URM-145 should indicate ***500*** mv minimum.
3	AN/URM-503 ***Sweep*** dial: 2 MHz ***Marker*** dial 2 3 **MHz** Marker width As req'd Marker size As req'd. Sweep ratio (counterclockwise positron) Sweep width. As req'd. Sweep rate- Line Monitor RF1 AN/USM-281 AC/DC switch- DC INTERNAL/EXTERNAL switch- EXTERNAL ***1025B*** Range switch LIN LIN gain Adjust for 70 ***on*** meter	N/A	a Connect equipment as shown in figures 5-114 and 5-115.	a. None.
			b. Adjust AN/GRM-50 No. 1 for a 2 3-MHz output at 100 mv.	***b.*** None.
			c. Adjust AN/GRM-50 No. 2 for *a* 2 35-MHz output at 150 mv	c. None.
			d. Set AN/URM-503 sweep dial to 2 MHz.	***d.*** None.
			l . Adjust AN/GRM-50 No 3 for e 1 4-MHz (marker) output	l . None.
			f Tune inductors L5, L6, L7, and L8 for an Indication.	f AN/USM-281 should display a wave shape.



NOTES:
I ▭ INDICATES EQUIPMENT MARKING
2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF

EL5895-482-35-TM-601

Figure 5-114. High-frequency mixer amplifier A4A1 through *A6A1.* ***test setup diagram***



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATOR PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-115. High-frequency mixer amplifier A4A1, ***A5A1, and A6A1,*** wiring ***diagram and parts location.***

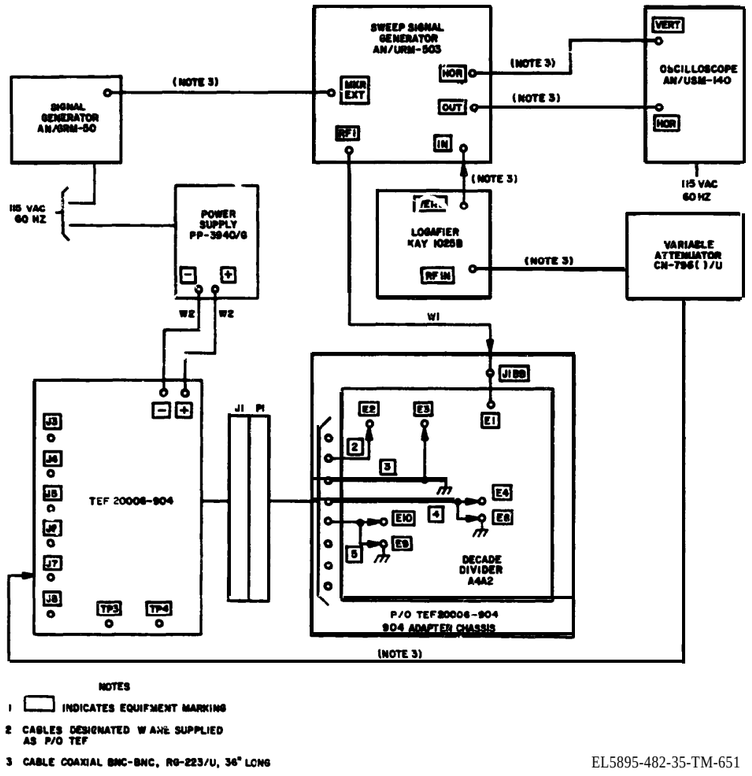
S-33. Decade Divider Disposition Test (fig. S-116)

a. **A** disposition test (c below) is provided for decade divider A4A2 (through A6A2 which determines whether or not it is defective. Since the decade divider is a non-repairable item no troubleshooting procedures are provided. If the disposition test determines that the module is defective, it will be disposed of using the standard disposal procedures for that module.

b. Test equipment and material required are as follows.

(1) Litcom teat fixture, TEF 20006-904 and 904 adapter.
(2) Sweep Signal Generator AN/URM-503.
(3) Sweep generator, plug-in Telonic L-2M.
(4) Oscilloscope, Tektronix 543B.
(5) Electronic Voltmeter AN/URM-145.
(6) Power supply, Harrison 520A.
(7) Frequency Meter AN/USM-207.
(8) Signal Generator AN/GRM-50.
(9) Variable Attenuator CN-796/U.
(10) Logafier, Kay 1025B.
(11) Multimeter ME-26B/U.

Step No.	Control settings Tat equipment	Equipment under test	Test procedure	Performance standard
1	AN/URM-503 Sweep dial: ±2.35 MH Marker dial: 2.4 MHz. Marker width. An required. Marker size: As required. **Rf** function: RF1. Sweep ratio: C.C.W. sweep width: As required. Sweep rate: LINE. Monitor: RF1 ***543B*** Vertical: Dc input. Horizontal: EXT input. ***1025B*** Range: LIN. LIN gain: Do not exceed 70 on **meter.**	N/A	a. Set TEF 20006 904 switch S1 to ON. b. Adjust CN-796/U for 10-dB attenuation. c. Tune AN/URM-503 for a 2.35-MHz output at 300 mv and check that 80 mv is at the base of Q1 d. Tune AN/GRM-50 to 2.3 MHz l . Adjust inductors L7 and L8 for a waveform. f. Tune AN/GRM-50 far a 23MHz output at 450mv. g. Tune AN/GRM-50 from 23 to 24MHz in 100KHz steps. h. Replace AN/USM-207 with 543B and repeat steps f and g. i Connect ME-26B/U to TEF 20006-904 TP3.	***a.*** **None.** ***b.*** None. e. AN/URM-145 should indicate 80 mv at base of Q1. ***d.*** None. l . 543B should indicate a waveform ***f. None.*** g. AN/USM-207 should indicate that each 100-kHz increment is divided by 10. h. AN/USM-207 should indicate an undistorted waveform. i. ME-26B/U should indicate 17 5 mv dc ±3.5 mv and 185 mv ± 15 m v
2	a Tune AN/GRM-50 for en output of 23 MHz at 300 mv. **b.** Increase **AN/GRM-50** output level until a stable sine wave appear8 oil AN/USM-254. c. Tune AN/GRM-50 from 23 to 24 MHz in 100-kHz increments and increase **AN/GRM-50 level (to** 450 mv) at any point that AN/USM-254 indicates an unstable sine wave.		a None. b. AN/USM-254 should indicate a stable sine wave before output of AN/GRM-50 reaches 450 mv c. AN/USM-254 should indicate a stable sine wave.	



EL5895-482-35-TM-651

Figure 5-116 Decade *divider A4A2 through A6A2 output circuit, teat setup diagram*

5-34. Fixed Frequency Generator A7 Test Pro- *cedure*

(figs. S-117 and 5-118)

Test equipment and material are listed below :

a. *Selective* microvoltmeter, Rohde and Schwartz, USVHBN1521.

b. Frequency Meter AN/USM-207.

c. Electronic Voltmeter AN/URM-145.

d. DC Power Supplies PP-3940/G (two required).

e. Variable Attenuators CN-796/U (two required).

f. O-100 u-amp meter Ideal Model 131.

g. 50 Ohm Adapter MX-452/U.

h. High impedance probe for AN/URM-145.

i. 1-MHz frequency standard, LITCOM *20006*-920A1.

j. Isolation amplifier, LITCOM 20006-925A1.

k. 50-ohm coaxial connectors.

l. 25K lo-turn potentiometer.

m. 10-µf capacitor.

n. 0.1-µf capacitor.

o. Choke 100 uh.

Step No.	Control settings T u t l equipment	*Equipment* under test	*Test procedure*	***Performance standard***
1			FILTER AMPLIFIER ALIGNMENT	
			a Connect AN/URM-145 with MX-452/U to A23E1.	*a* None.
			b. Adjust A24L1 for a peak indication on AN/URM-145.	b. AN/URM-145 should indicate 92 mv rms minimum.
			c. Connect AN/URM-145 with MX-452/U to A1J16.	c. None.
			d. Deenergize PP-3940/G power supplies.	d. None.
			e. Unsolder wires from A23E3 and A23E4.	e None.
			f. Connect USVHBN 1521 to A23E3 and A23E4.	f None.
			g. Energize PP-3940/G power supplies.	g. None.
			h. Tune USVHBN 1521 to 23 MHz.	h. None.
			i Adjust A23R13 for maximum output.	*i* USVHBN 1521 should indicate 10 mv rms minimum.
			j. Deenergize PP-3940/G power supplies.	j. None.
			k. Disconnect USVHBN 1521 and reconnect wires to A23E3 and *A23E4*.	k. None.
			l. Adjust A1L2, A1L3. A1L4. A1T1. end A1T2 for perk indication on AN/URM-145.	l AN/URM-145 should indicate 92 mv rms minimum.
			m. Adjust 1A2A7A1C16 for 102 mv or AN/URM-145	m. Indication on AN/URM-145 should be 102 mv ±10.
			a Replace AN/URM-145 at A1J16 and with AN/USM-207.	a AN/USM-207 should indicate 13 MHz ± 1 Ht.
			b. Disconnect AN/USM-207.	*b. None.*
			a Connect AN/URM-145 with *MX*-452/U to A2J15.	*a None*.
			b. Adjust A2L2, A2L3, A2L4, A2T1, and A2T2 for a peak indication on AN/URM-145.	' AN/URM-145 hould indicate 92 mv rms.
			c. Adjust A2C16 for 102 mv on AN/URM-145.	c AN/URM-145 should indicate 102 mv ±10.
			a. Replace AN/URM-145 at A2J15 with AN/USM-207.	a AN/USM-207 should indicate 19 MHz ±1 Hz
			b. Disconnect AN/USM-207.	b. None.
			a. Connect AN/URM-145 with MX-4522/U to A3J14.	a None.
			b. Connect a 50-ohm termination to A3J13.	*b.* None
			c Adjust L2, L3, L4, T1, and T2 for peak indication on AN/URM-145	C. AN/URM-145 should indicate 92 mv rms minimum
			d Adjust Cl6 for 102 mv on AN/URM-145	*d* AN/URM-145 should indicate 102 mv ± 10
			a Connect AN/USM-145 with MX-452/U to A3J13 and 50-ohm termination to A3J14	a None
			b Observe output voltage indication on AN/URM-145	*b* AN/URM-145 should indicate 102 mv ± 10
			a Replace AN/URM-145 with AN/USM-207 at A3J13	a AN/USM-207 should indicate 16 MHz ±1 Hz
			b Disconnect AN/USM-207	*b* None
			a Connect AN/URM-145 with MX-452/U to A4J12	a None
			b Adjust A4L2. A4L3. A4L4. A4T1, and A4T2 for a peek indication on AN/URM-145	*b* AN/URM-145 should indicate 92 mv rms minimum

Step No.	Control settings / Equipment under test	Test procedure	Performance standard
8 (Cont)		c Adjust A4C16 for 150 mv on AN/URM-145	c AN/URM-145 should indicate 150 mv minimum.
		d Disconnect AN URM-145.	d None.
9		a. Connect AN/USM-207 to A4J12	a AN/USM-207 should indicate 23 MHz ± 1 Hz
		b. Disconnect AN/USM-207.	b None
10		a Connect AN/URM-145 with MX-452/U to A5J10.	a. None
		b. Adjust A5L2. A5L3. A5L4. A5T1, and A5T2 for a peak indication on AN/URM-145	b AN/URM-145 should indicate 92 mv rms minimum.
		c Adjust A5C16 for 102 mv on AN/URM-145.	c Indication on AN/URM-145 should be 102 mv ± 10.
		d. Disconnect AN/URM-145	d None
11		a. Connect AN/USM-145.	a The frequency as read on AN/USM-207 should be 20 MHz ±1 Hz.
		b. Disconnect AN/USM-207	b. None
12		a. Connect AN/URM-145 -with MX-452/U to A6J9.	a None.
		b. Adjust A6L2, A6L3, A6L4, A6T1, and A6T2 for a peak indication on AN/URM-145	b. AN/URM-145 should **indicate** 92 mv rms minimum.
		c. Adjust A6C16 for 102 mv on AN/URM -146.	c. AN/URM-145 should indicate 102 mv ±10.
		d. Disconnect AN/URM-145.	d. None.
13		a. Connect AN/USM-207 to A6J9.	a AN/USM-207 should indicate 17 MHz ±1 Hz.
		b. Disconnect AN/USM-207.	b None.
14		a. Connect AN/URM-145 with MX-452/U to A7J8.	a None.
		b. Connect a 50-ohm termination to A7J7.	b. None.
		c. Adjust A7L2, A7L3, A7L4, A7T1, and A7T2 for peak indication on AN/URM-145.	c. AN/URM-145 should **indicate** 92 mv rms minimum.
		4 Adjust A7C16 for 102 mv on AN/URM-145.	d. AN/URM-145 should indicate 102 mv ± 10.
15		a Connect AN/URM-145 with MX-452/U to A7J7 and 50-ohm termination to A7J8.	a None
		b. Observe output voltage indication on AN/URM-145	b. AN/URM-145 should indicate 102 mv ± 10.
16		a Disconnect AN/URM-145 and connect AN/USM-207 to 1A2A7A7J7	a AN/USM-207 should indicate 14 MHz ± 1 Hz.
		b Disconnect AN/USM-207.	b. None
17		a Connect AN/URM-145 with MX-452/U to A8J6	a. None.
		b. Connect a 50-ohm termination to A8J5	b None.
		c Adjust A8L2, A8L3, A8L4, A8T1, and A8T2 for peak indication an AN/URM-145	c AN/URM-145 should **indicate 92** mv rms minimum
		d. Adjust A8C16 for 102 mv on AN/URM-145	d AN/URM-145 should indicate 102 mv ± 10
18		a Connect AN/URM-145 with MX-452/U to A8J5 and 50-ohm termination to A8J6	a None
		b Observe output voltage indication on AN/URM-145	b. AN/URM-145 should indicate 102 mv ± 10.
19		a Replace AN/URM-145 with AN/USM-207 at A8J5	a AN/USM-207 should indicate 21 MHz ±1 Hz.
		b Disconnect AN/USM-207	b None
20		a. Connect AN/URM-145 with MX-452/U to A9J4.	a None.
		b Adjust A9L2 A9L3. A9L4. A9T1, and A9T2 for a peak indication on AN/URM-145.	b AN/URM-145 should indicate 92 mv rms minimum
		c Adjust A9C16 for 102 mv on AN/URM-145.	c. AN/URM-145 should indicate 102 mv ±10
		d. Disconnect AN/URM-145.	d None
21		a Connect AN/USM-207 to A9J4.	a AN/USM-207 should indicate 18 MHz ±1 Hz
		b. Disconnect AN/USM-207	b None.
22		a Connect AN/URM-145 with MX-452/U to 1A2A7A10J3.	a None
		b Adjust A10L2, A10L3, A10L4, A10T1, and A10T2 for a peak indication on AN/URM-145.	b AN/URM-145 should indicate 92 mv rms minimum
		c. Adjust A10C16 for 102 mv on AN/URM-145.	c AN/URM-145 should indicate 102 mv ± 10
		d Disconnect AN/URM-145	d None.
23		a. Connect AN/USM-207 to A10J3.	a. AN/USM-207 should indicate 15 MHz ±1 Hz
		b. Disconnect AN/USM-207.	b. None
24		a Connect AN/URM-145 with MX-452/U to A11J2.	a None
		b. Connect a 50-ohm termination A11J1.	b None
		c. Adjust A11L32, A11L3, A11L4, A11T1, and A11T2 for peak indication on AN/URM-145.	c AN/URM-145 should indicate 92 mv rms minimum
		d Adjust A11C16 for 102 mv on AN/URM-145.	d. AN/URM-145 should indicate 102 mv ±10
25		a Connect AN/URM-145 to A11J1 and 5-ohm termination to A11J2.	a None
		b. Observe indication on AN/URM-145.	b. Indication on AN/URM-145 should be 102 mv ± 10
26		a Disconnect AN/URM-145 and connect AN/USM-207 to A11J1	a AN/USM-207 should indicate 22 MHz ± 1 Hz.
		b. Disconnect AN AN/USM-207.	b. None
		4.75-MHZ GENERATOR ALIGNMENT	
27		a Connect AN/URM-145 with MX-452/U to A12J31	a None
		b Adjust A12T2 for peak meter indication and A12L3 for an indication of 102 mv.	b indication on AN/URM-145 should be 102 mv ± 10
28		c. Replace AN/URM-145 with AN/USM-207 at A12J31.	c. The frequency as read on AN/USM-207 should be 4 75 MHz ± 1 Hz
29		a. Disconnect the l-MHz input to fixed frequency generator at J36.	a None
		b Adjust A12L2 for 4.74 MHz ±1 kHz.	b. AN/USM-207 should indicate 4.74 MHz ± 1 kHz
30		a Reconnect 1MHz input at J36	a. None
		b Observe reading of AN/USM-207	b AN/USM-207 should indicate 4 75 MHz ±1 Hz
31		a Remove +18-volt de connector to J33 for approximately 10 seconds	a None
		b. Reconnect + 18 volts dc at J33	b. None
		c Observe reading of AN/USM-207	c. AN/USM-207 should indicate 4 75 MHz ±1 Hz

Step No.	Test equipment	Control settings Equipment under stress	Test procedure	Performance standard
32			a. Replace AN/USM-207 with AN/URM-145 with MX-452/U to A12J31.	a hone.
			b. Observe voltage indication on AN/URM-145	b. AN/URM-145 should indicate 102 mv ± 10.
			c. Disconnect AN/URM-145.	c. None.
			FREQUENCY DIVIDER ALIGNMENT	
33			a. Connect AN/URM-145 with MX-452/U to A13J30.	a None.
			b. Adjust A13T2 for peak meter indication and A13L3 for an m&cation of 102 mv.	b. AN/URM-145 should indicate 102 mv ±10
34			c. Disconnect AN/URM-145 and connect AN/USM-207 to A13J30	c. AN/USM-207 should indicate 190 MHz ±1 HZ.
35			a. Disconnect l-MHz input to fixed frequency generator at J36.	a. None.
			b Adjust A13L2 for 1 89 MHz ±1 kHz.	b. AN/USM-207 should indicate 1 89 MHz ±1 kHz.
36			a Reconnect 1-MHz input at J36	a. None.
			b Observe reading of AN/USM-207	b. AN/USM-207 should indicate 1.90 MHz ±1 Hz.
37			a. Disconnect +18 volts dc from 1A2A7J33 for approximately 10 seconds	a. None.
			b Reconnect +18 volts dc at 1A2A7J33	b None.
			c Observe reading of AN/USM-207.	c. AN/USM-207 should indicate 1.90 MHz ± 1 Hz.
38			a Replace AN/USM-207 with AN/URM-145 and MX-452/U at A13J30	a. None.
			b Observe voltage indication on AN/URM-145	b AN/URM-145 should indicate 102 mv ± 10.
			c Disconnect AN/URM-145	c. None
39			a Connect AN/URM 145 with MX-452/U to A17J29	a. None
			b Adjust A14T2 for peak meter indication and A14L3 for an indication of 102 mv	b AN/URM-145 should indicate 102 mv ± 10.
40			c Disconnect AN/URM-145 and connect AN/USM-207 to A14J29	c The frequency as read on AN/USM-207 should indicate 169 MHz ±1 Hz.
41			a Disconnect the l-MHz input to fixed frequency generator at J36	a None
			b Adjust A14L2 to 1 59 MHz ±1 kHz	b AN/USM 207 should indicate 1 59 MHz ± 1 kHz
42			a Reconnect 1 MHz input at J36	a None
			b Observe reading of AN/USM-207	b AN/USM-207 should indicate 160 MHz ±1 Hz
43			a Remove +18 volts dc connector to J33 for approximately 10 seconds	a None
			b Reconnect +18 volts dc at J33	b None
			c Observe reading of AN/USM-207	c AN/USM-207 should read 1 60 MHz ± 1 Hz
44			a Replace AN/USM-207 with AN/URM-145 and MX-452/U to A14J29	a None
45			a. Connect AN/URM-145 with MX-462/U to A15J27.	a. None
			b. Connect a 50-ohm termination to A15J28.	b. None.
			c. Adjust A15T2 for peak meter indication of 102 mv.	c. AN/URM-145 should indicate 102 mv ±10.
46			a Connect 50-ohm termination on A15J27 and AN/URM-145 with MX-452/U to A15J28	a None.
			b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 150 mv minimum.
			c. Replace AN/URM-145 with AN/USM-207 to A15J28.	c. AN/USM-207 shall indicate 2.30 MHz ± 1 Hz.
47			a Disconnect the 1-MHz input to fixed frequency generator at J36.	a None.
			b. Adjust A15L2 to 2.29 MHz +1 kHz	b. AN/USM-207 should indicate 2.29 MHz ±1 Ha
48			a Reconnect l-MHz input at J36.	a None.
			b. Observe reading of AN/USM-207.	b AN/USM-207 should indicate 2.30 MHz ± 1 Hz
49			a Disconnect +18 volts de from J33 for approximately 10 seconds.	a None
			b. Reconnect +18 volts dc at J33.	b. None
			c. Observe reading of AN/USM-207	c AN/USM-207 should indicate 2 30 MHz ± 1 Hz.
50			a. Disconnect AN/USM-207 and connect AN/URM-145 with MX-452/U A15J28.	a None
			b. Observe voltage indication on AN/URM-145.	b AN/URM-145 should indicate 150 mv minimum
			c. Disconnect AN/URM-145.	c None
51			a. Disconnect SO-ohm termination from A15J27 and connect to A15J28.	a None
			b. Connect AN/USM-207 to A15J27	b None
			c Observe reading of AN/USM-207	c AN/USM-207 should indicate 230 MHz ±1 Hz
52			a Disconnect 1-MHz input from J36	a None
			b. Observe reading on AN/USM-207	b AN/USM-207 should indicate 2 29 MHz ± 1 kHz
53			a Reconnect 1-MHz input to J36	a None
			b Observe reading of AN/USM-207	b AN/USM-207 should indicate 2 30 MHz ± 1 Hz
54			a Disconnect +18 volts dc from J33 for approximately 10 seconds	a None
			b Heconnect +18 volts dc to 1A2A7J33	b None
			c Observe reading of AN/USM 207	c AN/USM-207 should indicate 2 30 MHz ±1 Hz

Step No.	Control settings: Equipment under test	Test procedure	Performance standard
55		a Replace AN/USM-207 with AN/URM-145 and MX-452/U at A15J27	a None
		b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ±10.
		c Disconnect AN/URM-145.	c. None.
56		a Connect AN/URM-145 with MX-452/U A16J26 Connect a SO-ohm termination to A16J25.	a. None
		b. Adjust A16T2 for peak meter indication end A16L3 for an indication of 102 mv.	b AN/URM-145 should indicate 102 mv ±10.
57		a Connect 50-ohm termination to A16J26 and AN/URM-145 with MX-452/U to A16J25.	a. None
		b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ± 10.
		c. Replace AN/URM-145 with AN/USM-207 at A16J25.	c. AN/USM 207 should indicate 2.00 MHz ± 1 Hz.
58		a Disconnect the 1-MHz input from J36.	a. None.
		b. Adjust A16L2 to 1.99 MHz±1 kHz.	b. AN/USM-207 should indicate 1.99 MHz ±1 kHz.
59		a. Reconnect l-MHz input to 1A2A7J36.	a. None.
		b. Observe reading of AN/USM-207.	b. AN/USM-207 should indicate 2.00 MHz ± 1 Hz.
60		a Disconnect +18 volts dc from J33 for approximately 10 seconds.	a. None.
		b. Reconnect +18 volts dc at J33.	b None.
		c. Observe reading of AN/USM-207.	- AN/USM-207 should indicate 2.00 MHz ± 1 Hz.
61		a. Replace AN/USM-207 with AN/URM-145 and MX-452/U at A16J25.	a. None.
		b. Observe voltage indication on AN/URM-145.	b AN/URM-145 should indicate 102 mv ± 10.
		c. Disconnect AN/URM-145.	c None.
62		a Disconnect 50-ohm termination from A16J26 and connect to A16J26.	a None.
		b. Connect AN/USM-207 to 1A2A7A16J26.	b. None.
		c. Observe reading of AN/USM-207.	c. AN/USM-207 should read 2.00 MHz ± 1 Hz.
63		a Disconnect the l-MHz input from J36.	a None.
		b. Observe reading of AN/USM-207	b AN/USM-207 should indicate 1.99 MHz' ±1 kHz.
64		a. Reconnect l-MHz input to J36	a. None.
		b. Observe reading of AN/USM-207	b. AN/USM-207 should indicate 2.00 MHz ± 1 Hz
65		a Disconnect +18 volts dc from 1A2A7J33 for approximately 10 seconds.	a None.
		b. Reconnect +18 volts dc to J33.	b. None.
		c. Observe reading of AN/USM-207.	c AN/USM-207 should indicate 2 00 MHz ±1 Hz

Step No.	Control settings: Equipment under test	Test procedure	Performance standard
66		a. Replace AN/USM-207 with AN/URM-145 and MX-452/U at 1A2A7A16J26.	a None
		b. Observe voltage indication on AS/URM-145.	b. AN/URM-145 should indicate 102 mv ± 10
		c. Disconnect AN/URM-145.	c None
67		o. Connect AN/URM-145 with MX-452/U to A17J24.	a. None.
		b. Adjust A17T2 for peak indication and A17L3 for an indication of 102 mv.	b. AN/URM 145 should indicate 102 mv ±10
		e. Replace AN/URM-145 with AN/USM-207 at 1A2A7A17J24	c The frequency a8 read on AN/USM-207 should be 1.70 MHz ±1 Hz
68		a. Disconnect the 1-MHz input from J36.	a None.
		b. Adjust A17L2 for 1.69 MHz±1 kHz.	b AN/USM-207 should indicate 1.69 MHz ±1 kHz
69		a. Reconnect l-MHz input to J36.	a. None.
		b. Observe reading of AN/USM-207.	b. AN/USM-207 should indicate 1.70 MHz ± 1 Hz.
70		a Disconnect +18 volts dc from J33 for approximately 10 seconds.	a None.
		b. Reconnect +18 volts dc to 1A2A7J33.	b. None.
		c. Observe reading of AN/USM-207.	c. AN/USM-207 should indicate 1.70 MHz ± 1 Hz
71		a. Replace AN/USM-207 with AN/URM-145 and MX-452/U at A17J24.	a. None.
		b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ± 10
		c. Disconnect AN/URM-145.	c. None
72		a Connect AN/URM-145 with MX-452/U to A18J23. Connect 50-ohm termination to A18J22	a None
		b. Adjust A18T2 for peak meter indication and A18L3 for an indication of 102 mv.	b AN/URM-145 should indicate 102 mv ± 10
73		a Connect SO-ohm termination to A18J23 and AN/URM-145 with MX-452/U to A19J22.	a None.
		b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ± 10.
		c Replace AN/URM-145 with AN/USM-207 at 1A2A7A18J22	c AN/USM-207 should indicate 140 MHz ±1 Hz
74		a Disconnect the l-MHz input to fixed frequency generator at J36.	a None
		b. Adjust A18L2 to 1.39 MHz ±1 kHz.	b AN/USM-207 should indicate 1 39 MHz ± 1 kHz
75		a. Reconnect l-MHz input at J36	a None.
		b. Observe reading of AN/USM-207.	b AN/USM-207 should indicate 1.40 MHz ± 1 Hr.
76		a Disconnect +18-volt dc connector from J33 for approximately 10 seconds.	a None.
		b Reconnect +18 volts dc at J33.	b None.
		c Observe reading of AN/USM-207	c AN/USM-207 should indicate 140 MHz ±1 Hz.

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
77			a. Replace AN/USM-207 with AN/URM-145 and MX-452/U to A18J23.	a. None.
			b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ± 10.
			c. Disconnect AN/URM-145.	c. None.
78			a Disconnect 50-ohm termination from A18J23 and connect to A18J22.	a None.
			b. Connect AN/USM-207 to A18J23.	b. None.
			c. Observe reading of AN/USM-20.	c. AN/USM-207 should indicate 1.40 MHz ±1 Hr.
79			a Disconnect the 1-MHz input from J36.	a None.
			b. Observe reading on AN/USM-207.	b. AN/USM-207 should read 1.39 MHz ± 1 kHz.
80			a. Reconnect 1-MHz input at J36.	a None.
			b. Observe reading of AN/USM-207.	b. AN/USM-207 should indicate 1.40 MHz ±1 Ht.
81			a. Disconnect +18 volts dc from J33 for approximately 10 seconds.	a None.
			b. Reconnect +18 volts dc at 1A2A7J33.	b. None.
			c. Observe reading of AN/USM-207.	c. AN/USM-207 should indicate 1.40 MHz ± 1 Hz.
82			a. Replace AN/USM-207 with AN/URM-145 and MX-452/U at A18J23.	a None.
			b. Observe voltage indication on AN/URM-145	b AN/URM-145 should indicate 102 mv ± 10
			c. Disconnect AN/URM-145	c. None.
83			a Connect AN/URM-145 with MX-452/U to A19J21	a None.
			b Adjust A19T2 for peak indication and A19L3 for an indication of 102 mv	b. AN/URM-145 should indicate 102 mv ± 10
			c Replace AN/URM-145 with AN/USM-207 to A19J21.	c The frequency as read on AN/USM-207 should be 2.10 MHz ± i Hz
84			a Disconnect the 1-MHz input from J36	a None
			b Tune A19L2 to 2.09 MHz ±1 kHz	b AN/USM-207 should indicate 2 09 MHz ±1 kHz.
A5			a Reconnect 1-MHz input at J36	a None
			b Observe reading of AN/USM-207	b AN/USM-207 should indicate 2 10 MHz ±1 Hz.
86			a Disconnect +18 volts dc from J33 for approximately 10 seconds	a None
			b Reconnect +18 volts dc at 1A2A7J33	b None
			c Observe reading of AN/USM-207	c AN/USM-207 should indicate 2 10 MHz ±1 Hz
87			a. Replace AN/USM- with AN/URM-145 and MX-452/U at A19J21.	a None.
			b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 mv ±10.
			c. Disconnect AN/URM-145.	c. None.
88			a Connect AN/URM-145 with MX-452/U to A20J20.	a None.
			b. Adjust A20T2 for peak meter indication and A20L3 for an indication of 102 mv.	b. AN/URM-145 should indicate 102 mv ± 10.
			c. Replace AN/URM-145 with AN/USM-207 at A20J20.	c. AN/USM-207 should indicate 1.80 MHz ±1 Ht.
89			a Disconnect the 1-MHz input from J36.	a None.
			b. Tune A20L2 to 1.79 MHz ±1 kHz.	b. AN/USM-207 should indicate 1.79 MHz ± 1 kHz
90			a Disconnect 1-MHz input at J36.	a. None.
			b. Observe reading of AN/USM-207.	b. AN/USM-207 should indicate 1 80 MHz ±1 Hz.
91			a Disconnect +18 volts dc from J33 for approximately 10 seconds.	a None
			b. Reconnect +18 volts dc at J33.	b None.
			c. Observe reading of AN/USM-207.	c AN/USM-207 should indicate 1 80 MHz ± 1 Hz
92			Replace AN/USM-207 with AN/URM-145 and MX-452/U et A20J20.	None
93			a Connect 50-ohm termination to A21J19 and AN/URM-145 to A21J18.	a None
			b. Observe voltage indication on AN/URM-145	b AN/URM-145 should indicate 102 mv ± 10
94			c Replace AN/URM-145 with AN/USM-207 at A21J18	c. AN/USM-207 should indicate 1.50 MHz ± 1 Hz
95			a. Disconnect 1-MHz input at J36.	a None.
			b. Adjust A21L2 to 4.74 MHz ±1 kHz.	b AN/USM-207 should indicate 1 49 MHz ± 1 kHz
96			a. Reconnect l-MHz input at J36.	a None
			b Observe reading of AN/USM-207.	b AN/USM-207 should Indicate 1.50 MHz ± 1 Hz
97			a Remove +18-volt dc connector to J33 for approximately 10 seconds	a None
			b Reconnect +I8 volts dc at J33	b None
			c Observe reading of AN/USM-207	c AN/USM-207 should indicate 1 50 MHz ±1 Hz
98			a Replace AN/USM-207 with AN/URM-145 and MX-452/U et A22J16	a None
			b Observe voltage indication on AN/URM-145	b AN/URM-145 should indicate 102 ± 10 mv
99			c Disconnect AN/URM-145	c None
			a Disconnect 50-ohm termination from A21J19 and connect to A21J18	a None

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
99 (Cont)			b Connect AN/USM-207 to A21J19	b None.
			c. Observe reading of AN/USM-207	c AN/USM-207 should indicate 1 50 MHz ± 1 Hz.
100			a Disconnect the 1 MHz input to fixed frequency generator at 1A2A7J36.	a. P-one.
			b. Observe reading on AN/USM-207	b AN/USM-207 should read I.49 MHz ± 1 kHz.
101			a Reconnect 1-MHz input at A1A2A7J36.	a. None.
			b. Observe reading of AN/USM-207	b AN/USM-207 should read 1.50 MHz ± 1 Hz
102			a Disconnect +18 volts dc from 1A2A7J33 for approximately 10 seconds.	a. None.
			b. Reconnect +18 volts dc at 1A2A7J33.	b None.
			c. Observe reading of AN/USM-207.	c. AN/USM-207 should indicate 1 50 MHz ±1 Hz.
103			a. Replace AN/USM-207 with AN/URM-145 and MX-452/U to 1A2A7A21J19.	a. None.
			b. Observe voltage indication on AN/URM-145.	b. AN/URM-145 should indicate 102 ± 10 mv.
			c. Disconnect AN/URM-145.	c None
104			a Connect AN/URM-145 with MX-462/U to 1A2A7A22J17.	a None.
			b Adjust A22T2 for peak meter indication and A22L3 for an indication of 102 mv	b. Indication on AN/URM-145 should indicate 102 mv ± 10.
105			a. Disconnect AN/URM-145 and connect AN/USM-207 to A22J17	a AN/USM-207 should indicate 2 20 MHz ±1 Hz.
106			a Disconnect the 1-MHz input from J36.	a None.
			b. Adjust A22L2 to 2.19 MHz ±1 kHz.	b. AN/USM-207 should indicate 2.19 MHz ± 1 kHz
107			a. Reconnect 1-MHz input at J36.	a None.
			b. Observe reading on AN/USM-207	b. AN/USM-207 should indicate 2 MHz ± 1 Hz.
108			a Disconnect +18 volts dc from J33 for approximately 10 seconds	a. None
			b. Reconnect +18 volts dc to J33.	b. None
			c. Observe reading of AN/USM-207.	c. AN/USM-207 should indicate 2 20 MHz ±1 Hz
109			a Disconnect AN/USM-207 and connect AN/URM-145 with MX-452/U to A22J17.	a None
			l Observe voltage indication on AN/URM-145.	b Indication on AN/URM-145 should indicate 102 ± 10 mv
			c Disconnect AN/URM-145	c. None.
110			a. Connect J13 to J32.	a None
			b. Connect J22 to J34.	b None.
			c. Connect AN/URM-145 with MX-462/U to J36.	c. None
110 (Cont)			d Adjust A25T2 for maximum indication on AN/URM-I45	d Indication on AN/URM-145 should be 100 mv minimum
111			a Disconnect AN/URM-145 from J35.	a None
			b. Connect AN/USM-207 to J35	b None
			c Observe reading on AN/USM-207	c AN/USM-207 (should indicatc 2 90 MHz ±1 Hz
			d. Disconnect AN/USM-207 from 1A2A7J35.	d None
112			SPURIOUS OUTPUTS FILTER AMPS 1A2A7A1 THROUGH 1A2A7A11	
			a Adjust USVH RN1521 controls as follows- BANDWIDTH- 500 Hz TUNING RANGE: 10-30 MHz. INPUT. 50 ohms. INDICATION 0 dB METER RANGE- 10 mv.	a None
			b. Connect CN-796/U to USVH BN1521 input. using 50-ohm cable Set CN-796/U to 20 dB	b None
			c. Connect CN-796/U output to J16.	c. None
			cf. Connect 50-ohm terminations to J15, J7 and J8	d None.
			e Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 13 MHz	e. None
			f. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	f None
113			a Tune Rohde and Schwartz USVH BN1521 to 12, 14, and 19 MHz	a. None
			b. Measure the dB difference between level observed at each frequency in step a and the reference level established in step 112f.	b Each frequency measured in step a should be a minimum of 95 dB below reference level
			c. Remove all connections 1A2A7 except for J33.	c None
114			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J15	a. None
			b. Connect 50-ohm termination to J16, J10, J4, J13, and J14	b None
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 19 MHz.	c None
			d. Adjust CN-796/U for zero reference level on Rohde and Schwartz USVH BN1521.	d None.
115			a Tune Rohde and Schwartz USVH BN1521 to lb. 16, 18 and 20 MI17	a None
			b Measure the dB difference between level observed at each frequency in step a and the reference level established in step 114d	b Each frequency measured in step a should be minimum of 95 dB below reference level established in step 114d
			c Remove all connections to 1A2A7 except for J33	c None

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
116			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J14.	a None.
			b. connect 50-0hm terminations to J15, J12, J9, J3, and J13.	b. None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 16 MHz.	c. None.
			d. Adjust CN-796/U for a zero reference level on Rohde and Schwartz USVH BN1521 except for J33.	d None.
117			a Tune Rohde and Schwartz USVH BN1521 to 15, 17, 19, and 23 MHz.	a. None.
			b Measure dB difference between level observed at each frequency in step a and reference level established in step 116d.	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level.
			c. Remove all connections to 1A2A7 except for J33.	c None.
118			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to 1A2A7J12	a. None.
			b. Connect SO-ohm terminations to 1A2A7J13, J14, J10, J1, J2, J5, and J6	b. None.
			C. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 23 MHz	c. None.
			d Adjust CN-796/U for a zero reference level on Rohde and Schwartz USVH BN1521.	d. None.
119			a Tune Rohde and Schwartz USVH BN1521 to 16, 20, 21, and 22 MHZ	a. None.
			b Measure dB difference between level observed at each frequency in step a and reference level established in step 118d.	b The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 118d.
			C Remove all connections to 1A2A7 except for J33.	c None.
120			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J10	a None
			b Connect 50-ohm terminations to J12, J9, J15, J5, and J6	b None
			c Tune Rohde and Schwartz USVH RN1521 for peak meter indication at 20 MHz	c None
			d Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521	d None
121			a Tune Rohde and Schwartz USVH BN1521 to 17, 19, 21, and 23 MHz	a None
			b Measure dB difference between level observed at each frequency in step a and reference level established in step 120d	b The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 120d
121 (Cont)			c. Remove all connections to A7 except for J33.	c. None
122			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J9	a None
			b. Connect SO-ohm terminations to 1A2A7J10, J7, J8, J13, J14, and J4.	b None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 17 MHz.	c. None.
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d. None.
123			a Tune Rohde and Schwartz USVH BN1521 to 14, 16, 18 and 20 MHZ.	a None
			b Measure dB difference between level observed at each frequency in step a and reference level established in stop 122d.	b The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 122d
			c. Remove all connections to A7 except for J33.	c None.
124			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J8.	a None.
			b. Connect 50-ohm terminations to J9, J5, J6, J16, J3, and J7.	b None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 14 MHz.	c None
			d Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d. None
125			a Tune Rohde and Schwartz USVH BN1521 to 13, 15, 17, and 21 MHZ	a None
			b Measure dB difference between level observed at each frequency in step a and reference level established in step 124d	b The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 124d
			c Remove all connections to A7 except for J33	c None
126			a Connect Rohde and Schwartz USVH RN1521 with CN-796W to J6	a None
			b Connect 50-ohm terminations to J7, J8, J4 J10, J1, J2 and J5	b hone
			c Tune Rohde and Schwartz USVH RN1521 for peak meter indication at 21 MHz	c None
			d Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521	d None
127			a Tune Rohde and Schwartz USVH BN1521 to 14, 18 20 and 22 MHz	a None

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
127 (Cont)			b. Measure dB difference between level observed at each frequency in step a and reference level established in step 126d.	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 126d.
			c. Remove all connections to A7 except for J33.	c. None.
128			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J4.	a None.
			b. Connect 50-ohm terminations to J5, J6, J8, J9, and J15.	b. None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 18 MHz.	c. None.
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d. None.
129			a Tune Rohde and Schwartz USVH BN1521 to 15, 17, 19, and 21 MHz	a None.
			b Measure dB difference between level observed at each frequency in stop a and reference level established in step 128d	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 128d.
			c. Remove ail connections to 1A2A7 except for J33.	c. None.
130			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J3.	a None.
			b. Connect SO-ohm terminations to J4, J1, J2, J7, J8, J13, and J14.	b. None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 15 MHz.	c. None.
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d. None.
131			a. Tune Rohde and Schwartz USVH BN1521 to 14, 16, 18, and 22 MHz.	a None.
			b. Measure dB difference between level observed at each frequency in step a and reference level established in step 130d	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 130d.
			c Remove ail connections to A7 except for J33	c. None
132			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J2	a None.
			b Connect 50-ohm terminations to J3, J5, J6, J12, and J1	b None
			c Tune Rohde and Schwartz USVH RN1521 for peak meter indication at 22 MHz	c None
			d Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521	d None
133			a Tune Rohde and Schwartz USVH BN1521 to 15, 21, and 23 MHz.	a None.
			b. Measure dB difference between level observed at each frequency in step a and reference level established in step 132d.	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 132d.
			c. Remove all connections to A7 except for J33.	c. None.
			SPURIOUS OUTPUTS FREQUENCY DIVIDERS Al2 THROUGH A22	
134			a. Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J31.	a None.
			b. Connect 50-ohm termination to J30.	b. None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 4.75 MHz.	c. None.
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d None.
135			a Tune Rohde and Schwartz USVH BN1521 to 1.9, 4.65, and 4.85 MHz.	a None.
			b. Measure dB difference between level observed at each frequency in step a and reference level established in step 134d.	b The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 134d
			c. Remove all connections to 1A2A7 except for J33.	c None
13€			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J30.	a None
			b. Connect SO-ohm terminations to J20, J25, J26, J29, and J31	b None
			c Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 1 9 MHz	c. None
			d Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d None
137			a Tune Rohde and Schwartz USVH BN1521 to 1 8, 2 0, 1 6, and 4 75 MHz	a None
			b Measure dB difference between level observed at each frequency in step a and reference level established in step 136d	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 136d
			c Remove all connections to A7 except for J33	c None
138			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J29	a None
			b Connect 50-ohm terminations to J27, J28, J30, J18, J19 and J24	b None
			c Tune Rohde and Schwartz USVH	c None

Step No.	Test equipment	Control *settings* *Equipment* under test	*Teat procedure*	*Performance* standard
138 (Cont)	\		BN1521 for peak meter indication at 1.6 MHz.	
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521.	d None.
139			*a* Tune Rohde and Schwartz USVH BN1521 to 1.5, 1.7, 1.9, and 2.3 MHz.	*a None.*
			b. Measure dB difference between level observed at *each* frequency in step a *and* reference level established in step 138d.	b. The level of each frequency measured in step should be a minimum of 95 dB below reference level established in step 138d.
			c. Remove all connections to 1A2A7 except for J33.	. c. None
140			*a* Connect Rohde and Schwartz USVN BN1521 with CN-796/U to J28.	a None.
			b. connect so-ohm *terminations* to J29, J25, J26, J21, J17, and J27.	*b.* None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 2.3 MHz.	c. None.
			d. Adjust CN-796/U for a convenient zero reference level on Rohde and Schwartz USVH BN1521 except for J33.	*d.* None.
141			a Tune Rohde and Schwartz USVH BN1521 to 1 6, 2.0., 2 1, and *2 2* MHZ.	a None.
			b. Measure dB difference between level observed at each frequency in step a and reference level established in step 140d.	b. The level of each frequency measured in step a should be a minimum of 95 dB below reference level established in step 140d.
			c. Remove all connections to A7.	c None
142			a Connect Rohde and Schwartz USVH BN1521 with CN-796/U to J26.	a. None.
			b. Connect 50-ohm terminations to J27, J28, J24, J30, J25, and J21	b. None.
			c. Tune Rohde and Schwartz USVH BN1521 for peak meter indication at 2.0 MHz	c None.
			d Adjust CN-796/U for a convenient zero reference level on Rohdc and Schwartz USVH BN1521.	*d.* None.

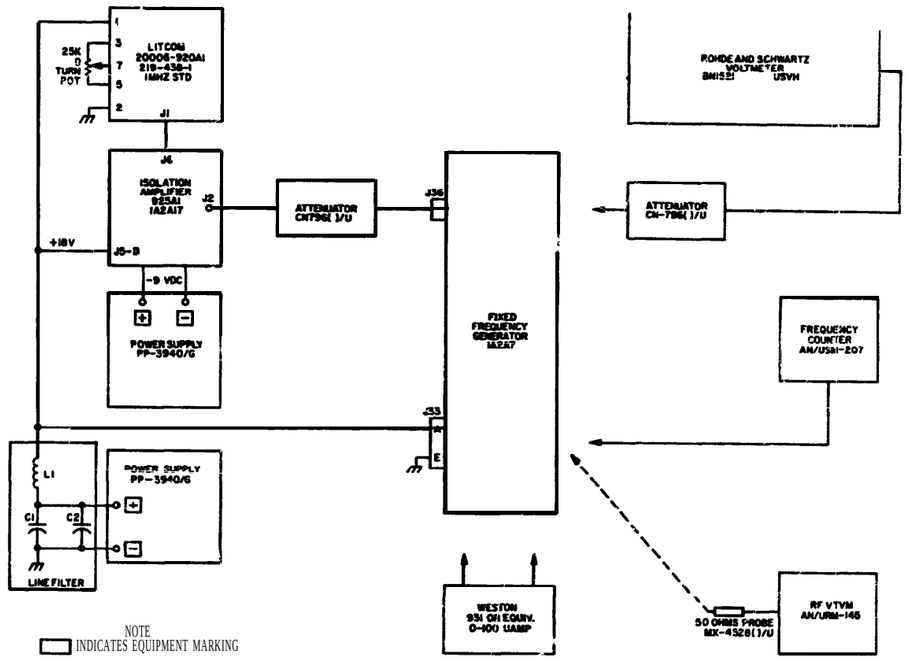


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Figure 5-117. Fixed frequency generator A7, *test setup diagram.*

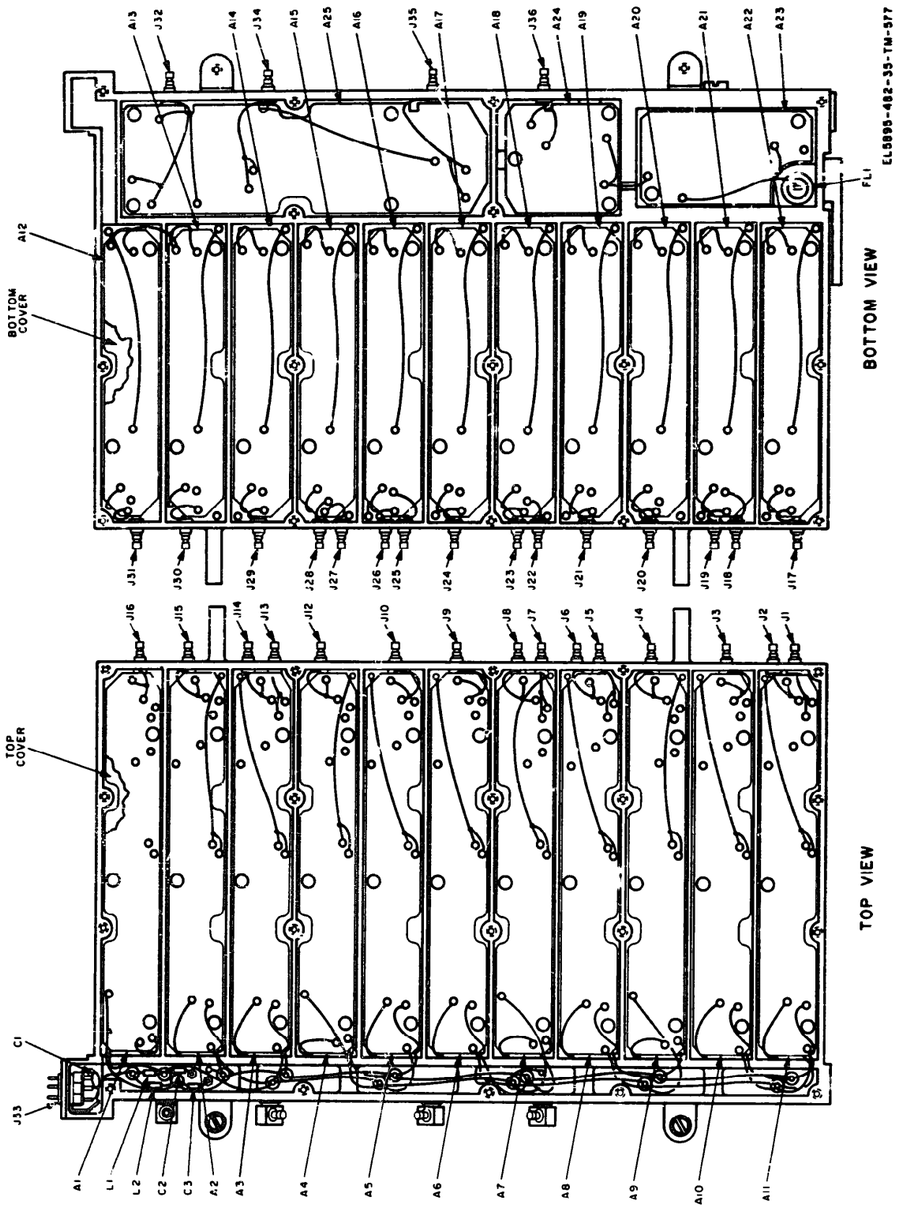


Figure 5-118. Fixed frequency generator A7, parts location

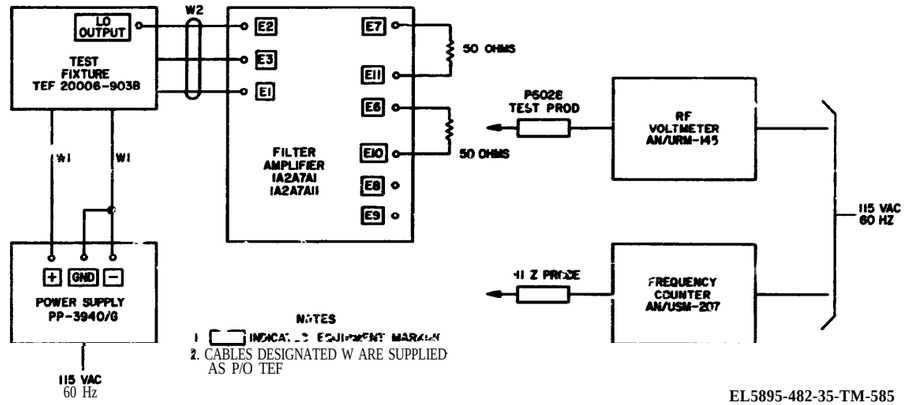


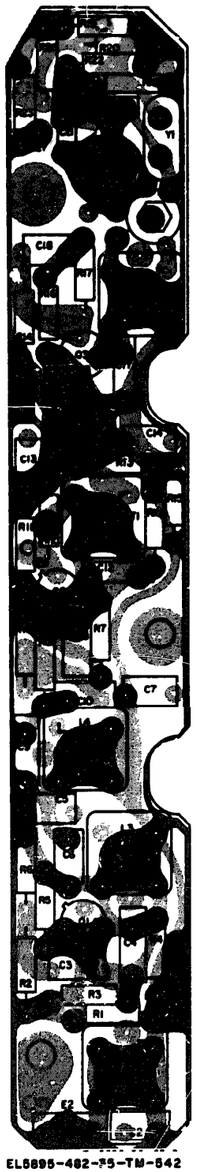
Figure 5-119 Filter amplifier A7A1 through A7A11, test setup diagram

5-35. 13-23-MHz Filter Amplifier Test Procedure.
(figs. 5-120 and 5-121)

Step No	*Test equipment*	*Control settings Equipment under test*	*Test procedure*	*Performance standard*
			FILTER AMPLIFIER ***A7A1***	
1	***LITCOM TEF 20006-903B:*** Power switch S1: ON. Frequency switch S2: Position 1 13 MHz. HI-LO output switch S3: LO position	*N/A*	a Set OUTPUT LEVEL CONTROL for reading of 50 ua on panel meter of TEF 20006-903B.	a None
			b. Connect module under test as **follows:** (1) Connect +18-volt terminal of test fixture to print El of module. (2) Connect - 18-volt terminal of test fixture to print E3 of module.	b. None.
			c. Connect test cable W1 from LO output of TEF to points E2 and E3 (ground) of module.	c. None
			d. Connect 50-ohm resistors across *E6* and E10 also across *E7* and E11 of module under test	***d*** None.
			NOTE Tack-solder all connections to module under test	
2	Set output level control for output meter reading of 50 ua. Set TEF module 18V switch S4 to ON	N/A	a Connect AN/URM-145 with high impedance probe to *E2* and E3 (ground) on filter amplifier.	a None
			b. Adjust L2 for minimum indication **on** AN/URM-145.	b. Input at E2 and E3 should be ±10 mv maximum
3	N/A	N/A	a Connect AN/URM-145 with high impedance probe to E8 and E9 of filter amplifier	a. None.
			b Adjust inductors J-3 and L4 and transformer T1 for maximum indication on AN/URM-145	b. AN/URM 145 should read 300 mv minimum.
4	N/A	N/A	a Disconnect AN/URM-145 from E8 and E9 (ground)	a. None
			b Connect AN/URM-145 to E6 and E10	***b*** None
			c. Adjust T2 for maximum indication on AN/URM-145	c None
			d Adjust Cl6 for an output level of 100 mv	***d*** Indication on AN/URM-145 should, be 100 mv
5	N/A	N/A	a Disconnect AN/URM-145 from E6 and El0	a None

Step NO	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
			b. Connect AN/USM-207 to E6 and El0 (ground).	b. None.
			e. Observe output frequency on AN/USM-207.	c. Frequency as read on AN/USM-207 should be 13 MHz ± 50 Hz.
			FILTER AMPLIFIER A4	
6	Repeat step S with frequency switch S2: position 7, 19 MHz.	N/A	Repeat step 1 for A2.	None
7	N/A	N/A	Repeat steps 2, 3, and 4 for A2.	Repeat steps 2, 3, and 4 for A2.
8	N/A	N/A	a Disconnect AN/URM-145 from E6 and E10.	a. None.
			b. Connect AN/USM-207 to Et3 and E10.	b. None.
			c. Observe output frequency on AN/USM-207.	c. Frequency as read on AN/USM-207 should be 19 MHz ±50 Hz.
			FILTER AMPLIFIER A4	
9	Repeat step 1 with frequency switch S2: position 11, 23 MHz.	N/A	Repeat step, 1 for Al.	None.
10	N/A	N/A	Repeat steps 2, 3, and 4 for A4.	Repeat steps 2, 3, and 4 for A4. Step 4d should read 120 mv minimum.
11	N/A	N/A	a. Disconnect AN/URM-145 from E6 and E10.	a. None.
			b. Connect AN/USM-207 to E6 and E10.	b. None.
			c. Observe frequency on AN/USM-207.	c. Frequency as read on AN/USM-207 should be 23 MHz ± 50 Hz.
			FILTER AMPLIFIER A6	
12	Repeat step 1 with frequency switch S2: position 8, 20 MHz.	N/A	Repeat step 1 for A5	None.
13	N/A	N/A	Repeat steps 2, 3, and 4 for AS.	Repeat steps 2, 3, and 4 for AS.
14	N/A	N/A	a. Disconnect AN/USM-145 from E6 and El0	a. None.
			b. Connect AN/USM-207 to E6 and E10.	b. None.
			c. Observe output frequency on AN/USM-207.	c. Frequency as read on AN/USM-207 should be 20 MHz ± 50.
			FILTER AMPLIFIER A6	
15	Repeat step 1 with frequency switch S2: position 5, 17 MHz-.	N/A	Repeat step 1 for A6.	None.
16	N/A	N/A	Repeat steps 2, 3, and 4 for A6.	Repeat steps 2, 3, and 4 for A6.
17	N/A	N/A	a. Disconnect AN/URM-145 from E6 and E10.	a None
			b. Connect AN/USM-207 to E6 and E10	b. None
			c Observe output frequency on AN/USM-207	c Frequency as read on AN/USM-207 should be 17 MHz ±50 Hz
			FILTER AMPLIFIER A9	
18	Repeat step 1 with frequency switch S2. **position 6, 19 MHz.**	N/A	Repeat step 1 for A9	None
19	N/A	N/A	Repeat steps 2, 3, and 4 for A9	Repeat steps 2, 3, and 4 for A9
20	N/A	N/A	a. Disconnect AN/URM-145 from E6 and El0	a None.

step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
20 (Cont)			b. Connect AN/USM-207 to E6 and E10.	b. None.
			c. Observe output frequency on AN/USM-207.	c. Frequency as read on AN/USM-207 should be 18 MHz ±50 Hz.
			FILTER AMPLIFIER A10	
21	Repeat step 1 with frequency switch S2: position 3, 15 MHz.	N/A	Repeat step 1 for filter amplifier A10.	None.
22	N/A	N/A	Repeat steps 2, 3, and 4 for A10.	Repeat steps 2, 3, and 4 for A10.
23	N/A	N/A	a Disconnect AN/URM-145 from E6 and El0	a Now.
			b. Connect AN/USM-207 to E6 and E10.	b Now.
			c. Observe output frequency on AN/USM-207.	c. Frequency am read on AN/USM-207 should be 15 MHz ± 50 Hz.
			FILTER AMPLIFIER AS	
24	Repeat step 1 with frequency switch 82: position 4, 16 MHz.	N/A	Repeat step 1 for filter amplifier A3.	None.
25	N/A	N/A	Repeat steps 2, 3, and 4 for A3.	Repeat steps 2, 3, and 4 for A3.
26	N/A	N/A	a. Disconnect AN/URM-145 from E6 aad E10.	a Now.
			b. Connect AN/URM-145 to E7 and E11.	b. None.
			c. Observe indication on AN/URM-145.	c. AN/URM-145 should indicate 100 mv ±1 dB
27	N/A	N/A	a. Disconnect AN/URM from E7 and E11.	a None.
			b. Connect AN/USM-207 to E6 and E10.	b. None.
			c. Observe output frequency on AN/USM-207.	c. Frequency as red on AN/USM-207 should be 16 MHz ± 50 Hr.
			FILTER AMPLIFIER A7	
28	Repeat step 1 with frequency switch S2: position 2, 14 MHz.	N/A	Repeat step S for filter amplifier A7.	None.
29	N/A	N/A	Repeat steps 2, 3, and 4 for A7.	Repent steps 2, 3, and 4 for A7.
30	N/A	N/A	Repeat step 26 for A7.	Repeat step 26 for A7.
31	N/A	N/A	Repeat step 27 for A7.	Repeat step 27 for A7.
			FILTER AMPLIFIER A8	
32	Repeat step 1 with frequency switch S2: position 9, 21 MHz.	N/A	Repeat step 1 for filter amplifier A8.	None.
33	N/A	N/A	Repeat steps 2, 3, and 4 for A8.	Repeat steps 2, 3, and 4 for A8.
34	N/A	N/A	Repeat step 26 for A8	Repeat step 26 for A8.
35	N/A	N/A	Repeat step 27 for A8.	Repeat step 27 for A8.
			FILTER AMPLIFIER A11	
36	Repeat step 1 with frequency switch S2: position 10, 22 MHz	N/A	Repeat step I for filter amplifier A11	None.
37	N/A	N/A	Repeat steps 2, 3, and 4 for A11.	Repeat steps 2, 3, and 4 for A11.
38	N/A	N/A	Repeat step 26 for All	Repeat step 26 for AS1
39	N/A	N/A	Repeat step 27 for A11	AN/USM-207 should indicate 22 MHz ± 50 Hz.

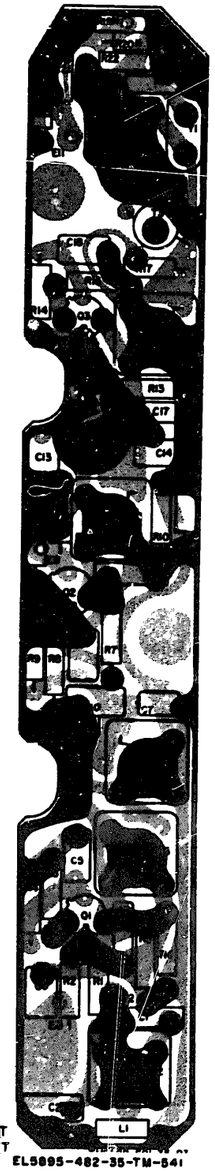


NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE.

2 DARK GREY AREAS INDICAVE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-120. 13- to 23-MHz filter amplifier A7A1, A7A4, A7A7 and A7A9, wiring diagram and parts location



* FOR MODULE A7A8, R18 IS L6, R19 IS L5, R20 IS C23 AND R21 IS C22

NOTES .

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-121. 13- to 23-MHz filter amplifiers A7A2, A7A3, A7A5, A7A6, A7A8, A7A10, and A7A11, wiring diagram and parts location.

5-36. 4.75-MHz Generator Test Procedure (figs. 5-122 and 5-123)

Step No	Test equipment	Control settings Equipment under test	Test procedure	*Performance standard*
1	TEF 20006-903B POWER switch S1: ON. 18V to MODULE switch 84: ON. HI/LO OUTPUT switch S3: HI. FREQUENCY SELECTOR 82: position 7, 19 MHz.	N/A	Adjust LEVEL SET control for 50-ua (midscale) reading on TEF.	**None.**
2	N/A	N/A	a Connect AN/URM-145 with high impedance probe to E3. b. Adjust AN-796/U to obtain 300-mv indication on AN/URM-145.	a None. b. None.
3	N/A	N/A	a Disconnect AN/URM-145 from E3. b. Connect AN AN/URM-145 with high impedance probe to base of transistor Q2. C. Adjust transformer T1 for maximum indication on AN/URM-145.	a None. b. None. c. None.
4	N/A	N/A	a. D&connect AN/URM-145 with high impedance probe from base of transistor Q2. b. Connect AN/URM-145 with MX-4528/U to E5. C. Adjust transformer T2 for maximum indication on AN/URM-145. d. Adjust inductor L3 for 100 mv on AN/URM-145.	a None. b. None. c. None. d. AN/URM-145 shall indicate a minimum of 100 mv.
5	N/A	N/A	a Disconnect AN/URM-145 with MX-4528/U from E5. b. Connect AN/USM-207 through P6028 probe E5. C. Disconnect cable from HI output on TEF 20006-903B at E3. d. Adjust inductor L2 for 4.74 MHz ±1 kHz.	a None. b. None. c. None. d!. None.
6	N/A	N/A	a Reconnect cable from HI output on TEF 20006-903B at E3. b. Observe frequency reading on AN/USM-207.	a. None. b. Frequency as read on AN/USM-207 should be 4.75 Hz ± 50.
7	N/A	N/A	a. Set 18V TO MODULE switch to OFF. I b. Observe frequency reading on AN/USM-207	a. None. b. There shall be no indication on AN/USM-207
8	N/A	N/A	a. Set 18V TO MODULE switch to ON b Observe frequency reading on AN/USM-207	a. None. b Frequency as read on AN/USM-207 should be 4 75 MHz ± 50 Hz

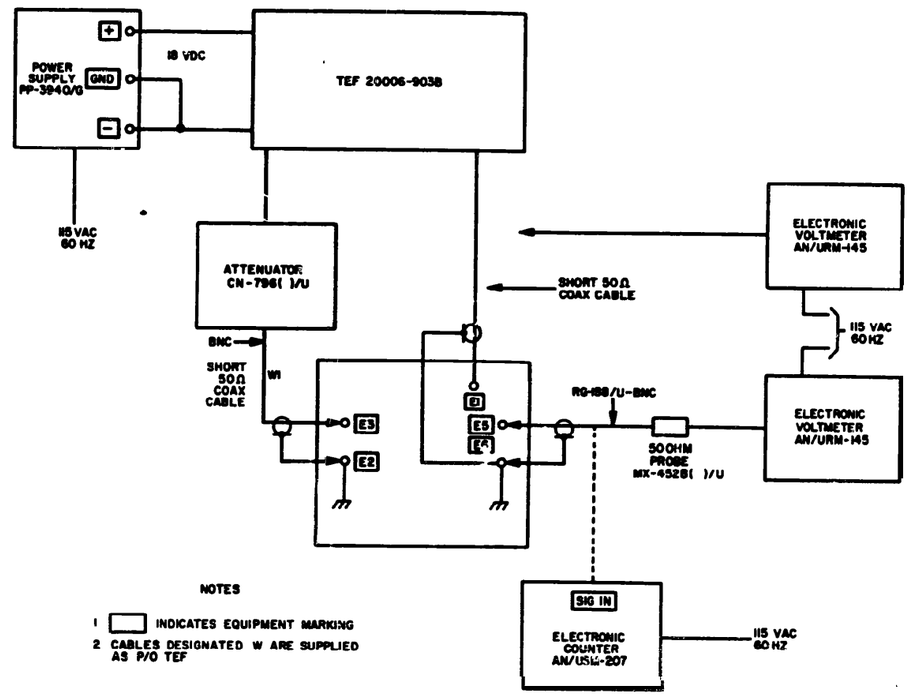
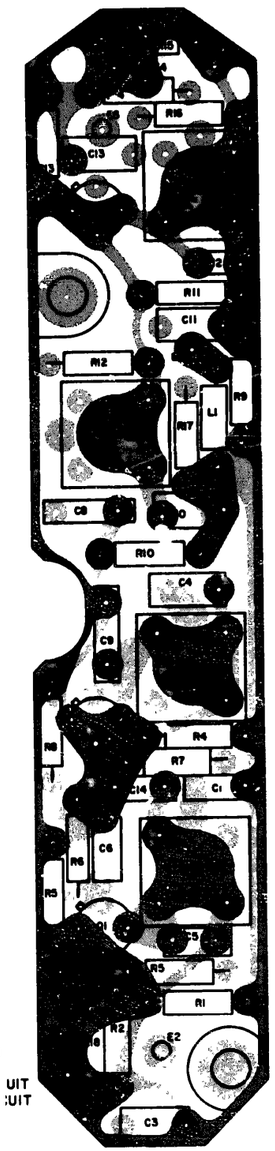


Figure 5-122. 4-75-MHz generator A7A12, test setup diagram



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRC UIT ON THE OPPOSITE SIDE OF THE CIRC UIT BOARD

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Figure 5-123. 4.75-MHz generator A7A12, wiring diagram and parts location

5-37. Divider/ Amplifier A7A13 through A7A22 Test Procedure
(figs. 5-124, 5-125, and 5-126)

The procedural steps in this test are identical for each assembly. Refer to the chart below for the input and output frequencies for each assembly being tested.

a. Test Equipment and Materials.
(1) TEF 20006-903B.
(2) Power Supply PP-3940/G.
(3) Electronic Voltmeter AN/URM-145 with MX-4528/U.
(4) Frequency Meter AN/USM-207.
(5) High impedance probe TEK P-6006 (BNC).

b. Test Connections and Conditions.
(1) Connect the equipment as shown in figure 5-124.
(2) Turn on equipment and allow it to warm-up for 1 hour.
(3) Terminate output jacks not being used in test with 50 ohms.
(4) The output frequency column in c below indicates which assemblies have dual outputs.

c. Input/Output Frequency Listing.

REF des	Input Frequency (MHz)	Input Level	output (MHz) E4	output (MHz) ES
A13	19	300 mv	19	
A14	16	300 mv	16	
A15	23	300 mv	23	23
A16	20	300 mv	2.0	20
A17	17	300 mv	17	
A16	14	300 mv	14	14
A19	21	300 mv	21	-
A20	18	300 mv	18	
A21	15	300 mv	15	15
A22	22	300 mv	22	

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TEF 20006-903B: POWER SWITCH: ON MODULE 18V: ON. HI-LO SWITCH: HI.	N/A	a. Adjust TEF 20006-903B output level for a center scale reading on test fixture meter (50 ua).	a None
			b Connect AN/URM-145 (with high impedance probe) to the base of Q2	b None
			c. Adjust T1 for maximum output.	c None
			d. Disconnect TEF 20006-903B cable W2 from E2 and E3.	d None
			e. Disconnect AN/URM-145 from the base of Q2.	e. None
			f Connect AN/URM-207 to the base of Q3.	f None
			g. Disconnect AN/URM-145 from the base of Q2	g None
			h Disconnect AN/URM-207 and connect AN/URM-145 (with high impedance probe) to E5 and E6.	h None
			i Adjust T2 for maximum output and adjust L3 for an output of 107.5 mv ±12.5.	i The AN/URM-145 should indicate 107 5 milli-volts ± 12 5
			NOTE For assemblies A15, A16, A18 and A21, a second output is provided for. therefore, the frequency level should be checked at E4 and E6 The second output of Al5 shall be approximately 180 mv ± 20	NOTE The output at E5 and E6 should remain at 100 mv ± 1 dB The Al5 output should be 180 mv ± 20
			j Connect AN/URM-207 to A13 output (both when applicable) and check frequency	j The AN/URM-207 should indicate 1 9 MHz ± 50 Hz
			k Turn off PP-3940/G for approximately 2 seconds and then turn on again	k Same as j

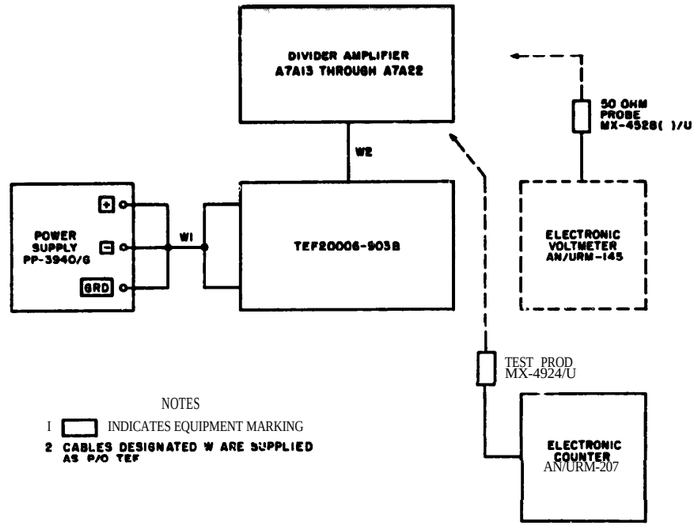

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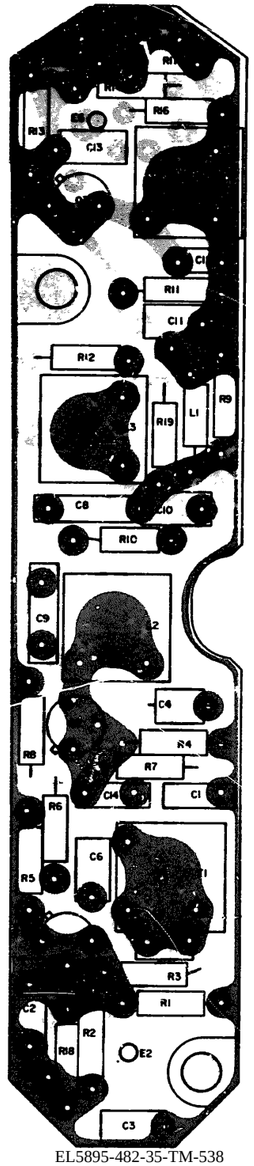
Figure 5-124 1.4-2 3-MHz divider/amplifier A7A13 through A7A22, test setup diagram



NOTES
1 CIRCUIT VIEWED FROM COMPONENT SIDE
2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

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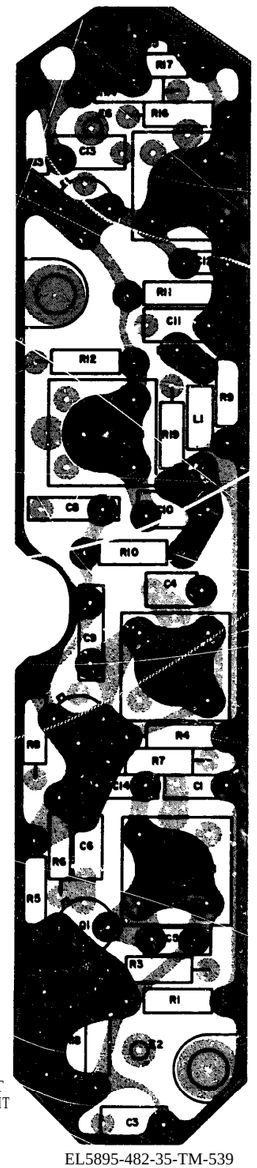
Figure 5-125 14- to 23-MHz divider amplifier A7A13 A7A14, A7A16 A7A19 A17A21 and A17A22, wiring diagram and parts location



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCIUIT BOARD

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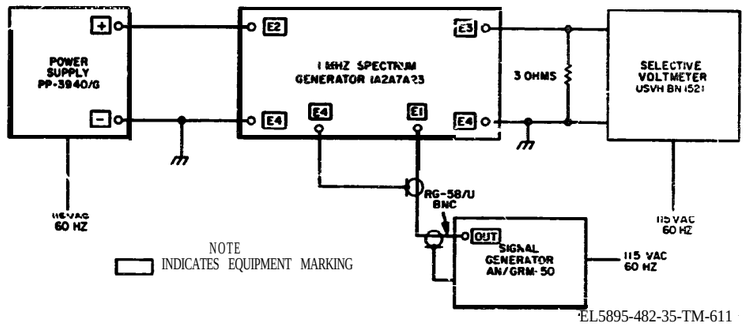
Figure 5-126. 1.4- to 2.3-MHz divider/amplifier A7A15, A7A18, and A7A20. wiring diagram and parts location.

5-38. 1-MHz Spectrum Generator Test Procedure
(figs. 5-127 and 5-128)

Test equipment and material are listed below:

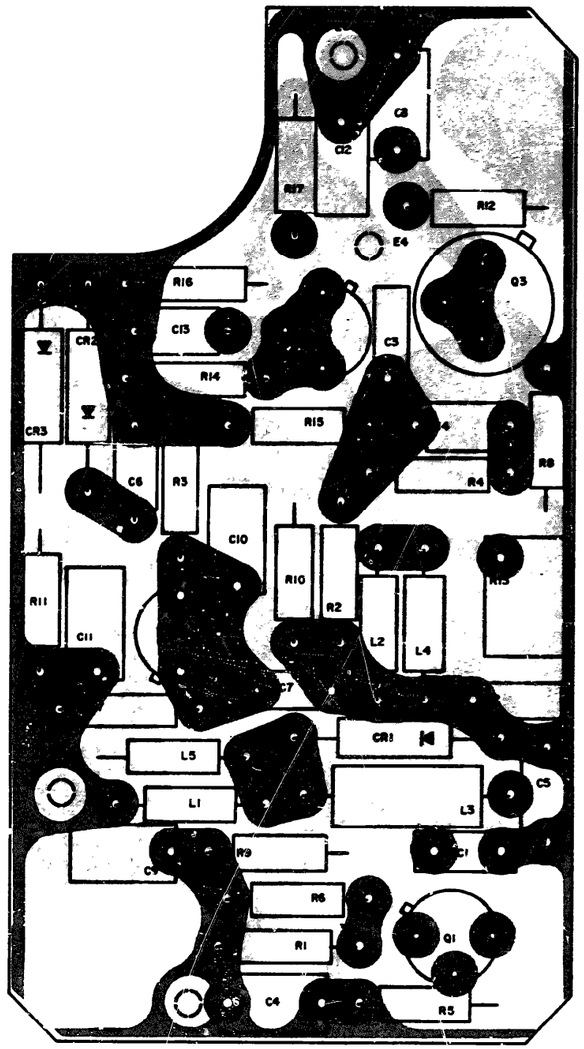
a. Signal Generator AN/GRM-50.
b. Power Supply PP-3940/G.
c. Voltmeter, Rohde and Schwartz BN-1521 USVH.
d. Resistor, 3 ohms carbon.

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	N/A	N/A	a. Set AN/GRM-50 for output of 2.8 volts at 1.0 MHz±50 Hz	a. None
			b. Tune Rohde and Schwartz selective voltmeter BN-1521 USVH to 23 MHz	b. None
			c. Adjust output for maximum indication of 10 mv on selective voltmeter.	c. Output at selective VM should be IO mv minimum
2	N/A	N/A	Tune Rohde and Schwartz selective voltmeter BN-1521 USVH to 22, 21, 20, 19, 18, 17, 16, 15, 14, and 13 MHz. observing voltage indication at each frequency.	Output of each frequency should be 10 mv minimum



EL5895-482-35-TM-611

Figure 5-127. 1-MHz spectrum generator A7A23, zest setup diagram.



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

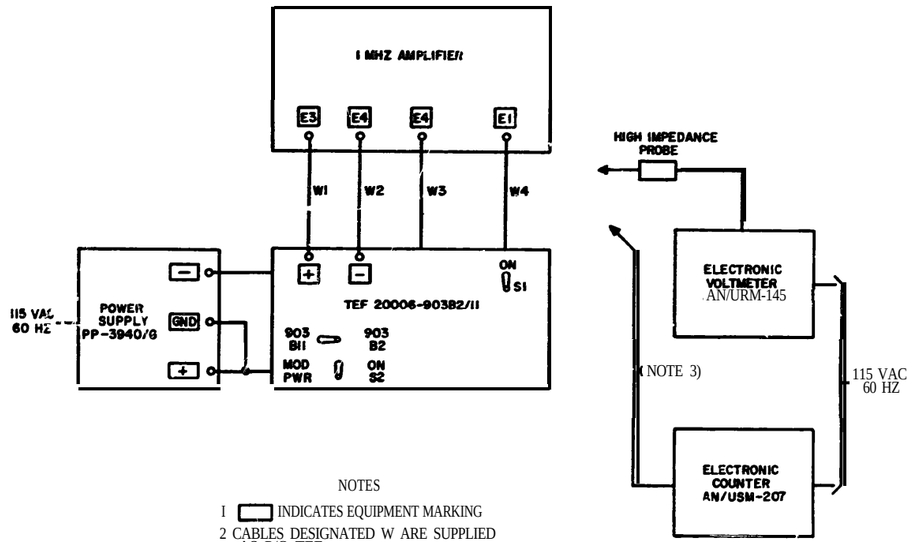
2 DARK GREY AREAS INDI'CITE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-525

Figure 5-128 1-MHz spectrum generator A7A23, wiring diagram and parts location

5-39. 1-MHz Amplifier Test Procedure (figs. 5-129 and 5-130)

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TEF 20006-903B B2/11 SWITCH S3: 903B11	N/A	Adjust CAL control (located underneath chassis) for an output of 265 mv as shown on AN/URM-145.	Nom.
2	N/A	N/A	a Disconnect AN/URM-145 and high impedance probe from E1 and E4.	a None.
			b. Connect AN/URM-145 with high impedance probe to E2 and E4.	b None.
			c. Adjust L1 for maximum reading on AN/URM-145.	c. Output as shown on AN/URM-145 should be 3 volts minimum.
3	N/A	N/A	a Disconnect AN/URM-145 and high impedance probe from E2 and E1.	a None.
			b. Connect AN/USM-207 with high impedance probe to E2 and E1.	b. None.
			c. Observe frequency indication on AN/USM-207.	c. AN/USM-207 should indicate 1 MHz ±50 Hz.



NOTES

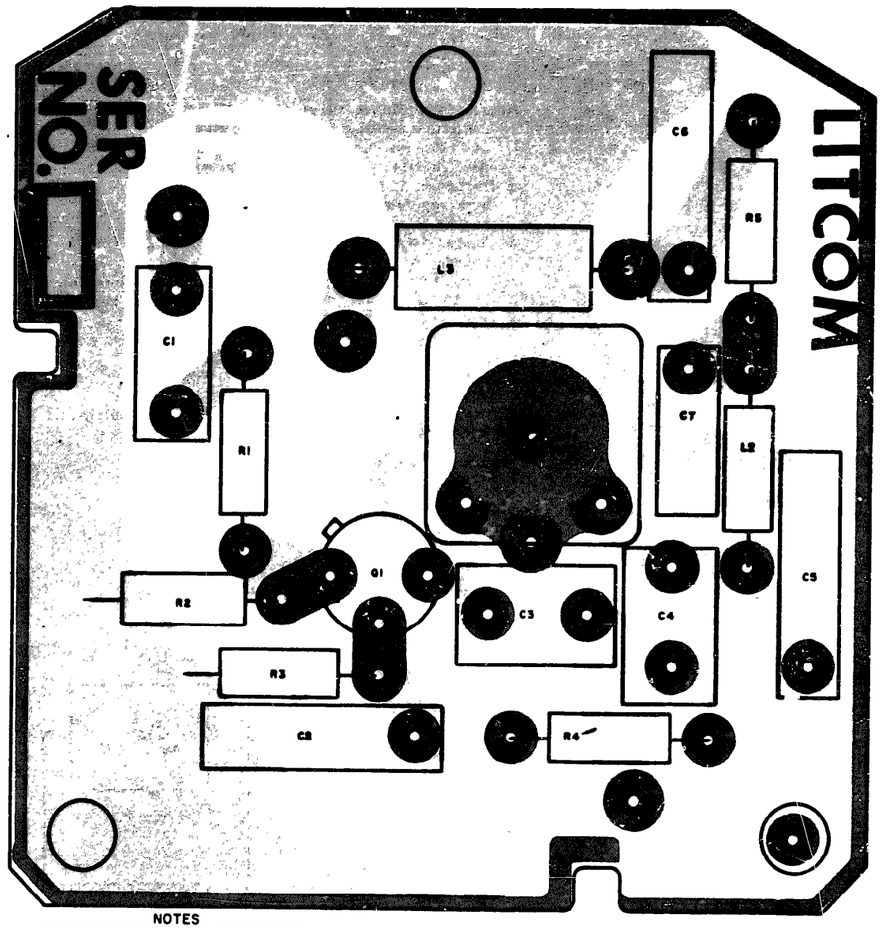
1 ▭ INDICATES EQUIPMENT MARKING

2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF

3 CABLE COAXIAL BNC-BNC, R6-223/U, 36 INCHES LONG

EL5895-482-35-TM-654

Figure 5-129. 1-MHz amplifier A7A24, test setup diagram.



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-528

Figure 5-130 1-MHz amplifier A7A24, wiring diagram and parts location

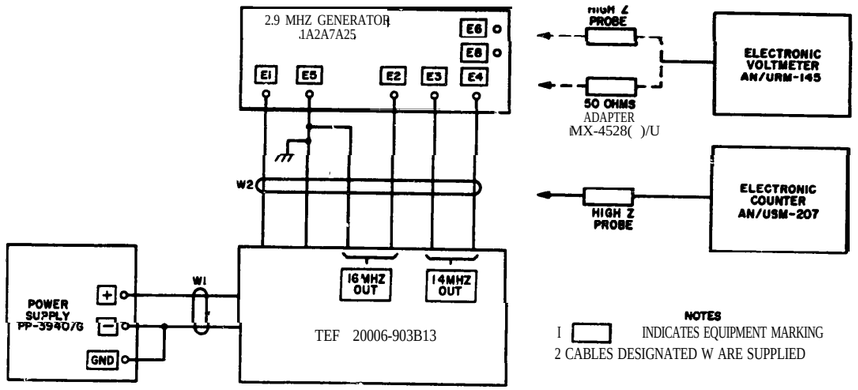
MO. 2.9-MHz Generator Test Procedure

(figs. S-131 and 5-132)

step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TEF 20006-903 B13 POWER SWITCH S1: ON	N/A	Adjust 16-MHz LEVEL SET control for center scale reading on level meter on TEF 20006-903 B13	None

Step No	Test equipment	Control settings Equipment under test	Tent procedure	Performance standard
1 (Cont)	MODULE POWER switch S2: ON 1.4-MHz/16-MHz EXT switch S3: 16-MHZ position.			
2	TEF 20006-903 B13 1-4MHz/16-MHz EXT switch S3: 1.4-MHz position.	N/A	Adjust 1.4-MHz LEVEL SET control for center scale reading on level meter TEF 20006-903 B13.	None.
3	N/A	N/A	a Connect AN/URM-145 with high impedance probe to pin 2 of transformer T3.	a None.
			b. Adjust inductor L4 far maximum reading on AN/URM-145:	b. None.
4	N/A	N/A	a. Disconnect AN/URM-145 with high impedance probe from pin 2 of transformer T3.	a None.
			b. Connect AN/URM-145 with high impedance probe to pin 4 of transformer T3.	b. None.
			c. Adjust inductor L2 for maximum reading on AN/URM-145.	c. None.
5	N/A	N/A	a Disconnect AN/URM-145 with high impedance probe from pin 4 of transformer T3.	a None.
			b. Connect AN/URM-145 with high impedance probe to base of transistor Q3.	b. None.
			c. Adjust transformer T1 for maximum reading.	c. None.
6	N/A	N/A	a Disconnect AN/URM-145 with high impedance probe from base of transistor Q3.	a None
			b. Connect AN/USM-207 with Test Prod MX-4924/U to base of transistor Q3	b None
			c. Observe frequency indication on AN/USM-207.	c AN/USM-207 should indicate 17.4 MHz ± 50 Hz.
7	N/A	N/A	a Disconnect AN/USM-207 with Test Prod MX-4924/U from base of transistor Q3	a None
			b. Connect AN/USM-207 with Test Prod MX-4924/U base of transistor Q4.	b. None.
			c. Adjust inductor L3 for a frequency, as read on AN/USM-207, of 2 9-MHz.	c None
8	N/A	N/A	a Disconnect 1.4-MHz and 16-MHz inputs to 1A2A7A25 at TEF 20006-903B 13 outputs	a None
			b Observe frequency Indication on AN/USM-207	b AN/USM-207 should indicate 2 9 MHz ± 1 kHz
9	TEF 20006-903 B13 1 4-MHz/16-MHz EXT switch S3 EXT position	N/A	a Reconnect 1 4-MHz and 16-MHz inputs to 1A2A7A25 at respective TEF 20006-903-B13 outputs	a None
			b Connect AN/URM-145 with MX-4528/U to points E6 and E8	b None
			c Adjust T2 for maximum output as read on AN/URM-145	c The output level as mad on AN/URM-145 should be 100 mv minimum

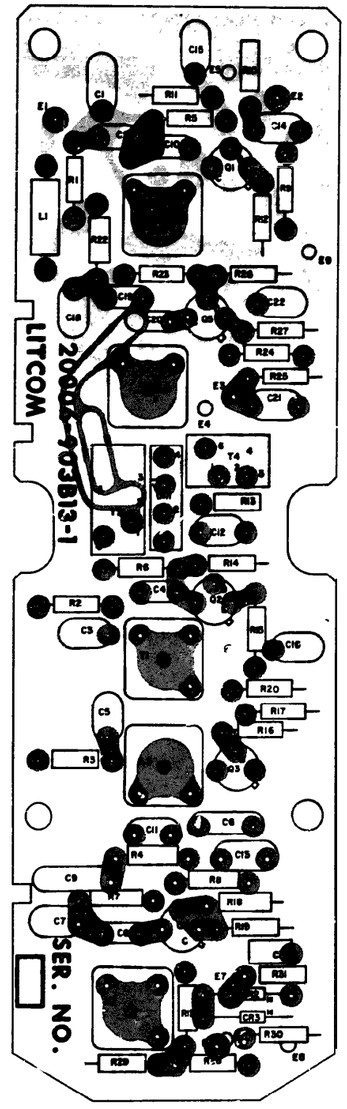
Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
9 (Cont)			**d. Observe reading on TEF 20006-903B13 microammeter.**	d. TEF 20006-903B13 microammeter shall read between 20 and 40 microamperes.
10	N/A	N/A	a. Disconnect AN/URM-145 with MX-4528/U from points E6 and E8.	a None.
			b. Connect AN/USM-207 to points E6 and E8.	b. None.
			c. Observe frequency indication on AN/URM-207.	c. AN/USM-207 should indicate 2.9 MHz ± 50 Hz



NOTES
1 ▭ INDICATES EQUIPMENT MARKING
2 CABLES DESIGNATED W ARE SUPPLIED

EL5895-482-35-TM-612

Figure 5-131. 2.9-MHz frequency generator A7A25, tent setup diagram.



NOTES
1 CIRCUIT VIEWED FROM COMPONENT SIDE
2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-519

Figure 5-132 2.9-MHz frequency generator A7A25, wiring diagram and parts location

5-41. Fault Indicator Test Procedure (figs. 5-133 and 5-134)

a. Test Equipment and Material.
(1) Power supply PP-3940/G.
(2) Test fixture, Litcom TEF 20006-917A1.

b. Teat Conditions and Connections.
(1) Connect equipment a8 shown in figure 5-133.
(2) Set TEF 20006-917A1 power switch S1 to OFF.
(8) Energize power supplies and set for +18 volts and -9 volts dc.
(4) Set TEF 20006-917A1 switch S2 to OFF.

Step NO	Control settings: Test equipment	Equipment under test	Test procedure	Performance standard
1	TEF 20006-917 A1 power switch S1: ON.	N/A	NOM	TEF 20006-917A1 ready indicator illuminates.
2	TEF 20006-917 A1 switch S2: LAMP TEST position.	N/A	None	All TEF 20006-917A1 indications should illuminate
3	TEF 20006-917 A1 switch 82: PC BOARD TEST position.	N/A	None	TEF 20006-917A1 INT and EXT and ready lamps should remain illuminated. All other shall extinguish.
4	N / A	N/A	Adjust potentiometer R31 for a reading on TEF 20006-917A1.	M1 should read zero.
5	Rotate TEF 20006-917A1 selector S3 to M1 position.	N/A	a Rotate potentiometer TEF 20006-917 A1R1 fully counterclockwise. b. Rotate potentiometer TEF 20006-917 A1R1 fully clockwise.	a. TEF 20006-917A1 should indicate ±10. b. TEF 20006-917A1M1 should indicate ±5 100.
6	Rotate TEF 20006-917A1 selector S3 to 906 position.	N/A	None.	Both TEF 20006-917A1 FAULT indicators should illuminate.
7	Rotate TEF 20006-917A1 selector S3 to 908 position.	N/A	None.	Both TEF 20006-917A1 FAULT indicators should illuminate.
8	Rotate TEF 20006-917A1 selector S3 to 911 position.	N/A	None.	Both TEF 20006-917A1 FAULT indicators should illuminate.
9	Rotate TEF 20006-917A1 selector S3 to 9151 position.	N/A	None	Both TEF 20006-917A1 FAULT indication should illuminate
10	Rotate TEF 20006-917A1 selector S3 to 915 II position.	N/A	None	Both TEF 20006-917A1 FAULT indicators should Illuminate.
11	Rotate S3 to position M1.	N/A	None.	Ready 1 EXT and INT lamp shall illuminate and both FAULT indicators should extinguish

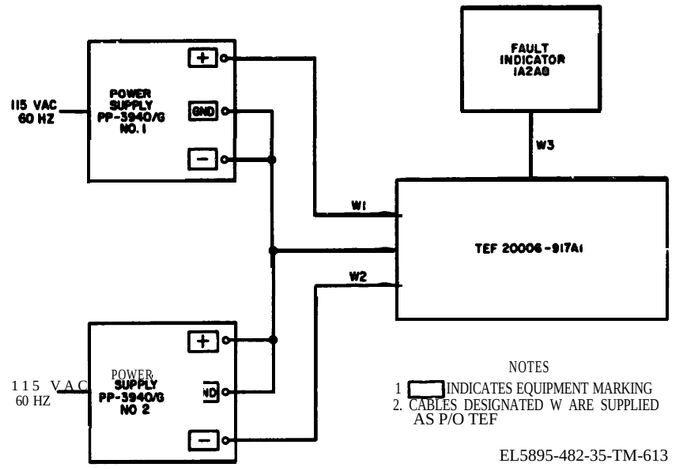
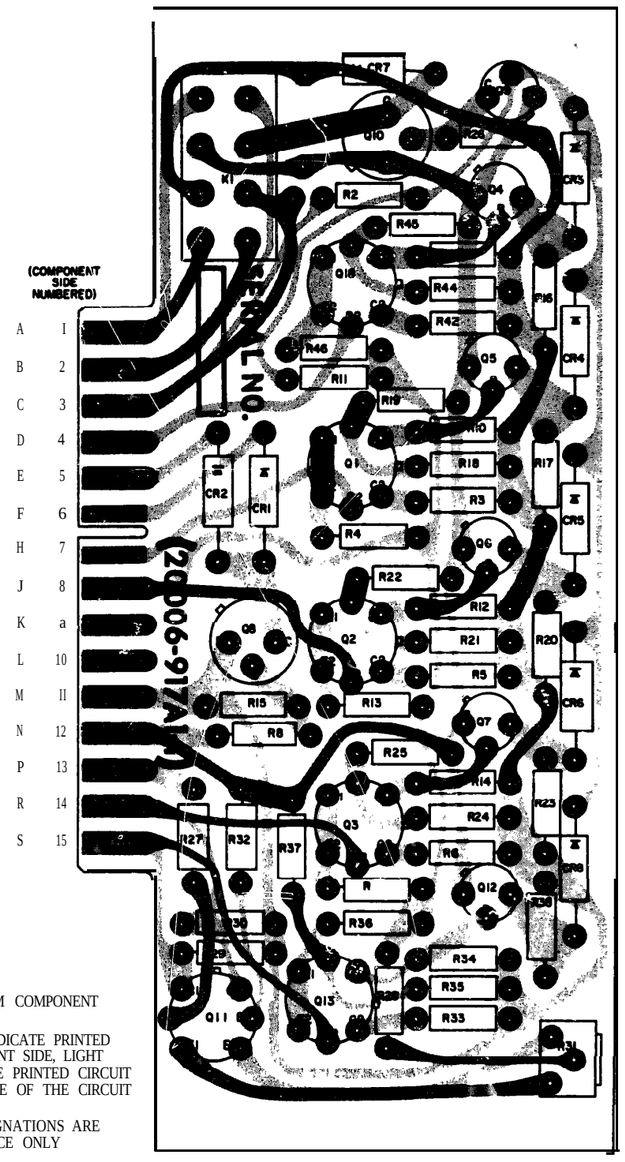


Figure 5-133. Fault indicator A8, test setup diagram.



MOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

3 CONNECTOR PIN DESIGNATIONS ARE SHOWN FOR REFERENCE ONLY

EL5895-482-35-TM-53

Figure 5-134. Fault indicator A8, wiring diagram and parts location

5-42. Remote Control Switching Assemblies A9 Through Al2 Test Procedure
(figs. 5-135, 5-136, and 5-157)

a. Test Equipment and Materials.
(1) Power Supply PP-3940/G.
(2) Litcom TEF 20006-916A1.

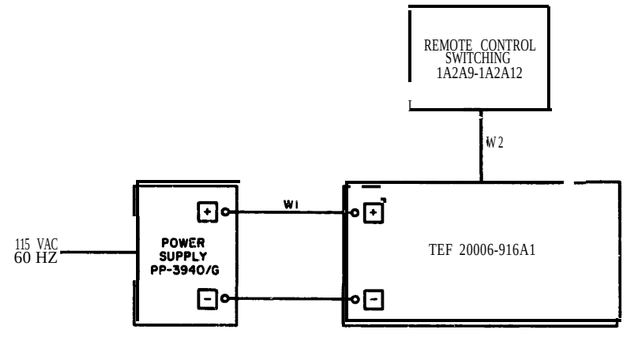
b. Test Connections and Conditions.

(1) Connect the equipment as shown in figure S-135 and energize power supply,

(2) This test procedure applies to assemblies A9 through Al2 and, when testing these assemblies, refer to the applicable parts location diagram.

.

Step No	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	TEF 20006-916A1: LOCAL-REMOTE switch: REMOTE +18V switch: ON	N/A	a Rotate switch S1 from position 1 through 13 one step at a time.	a TEF 20006-916A1 indicators 1 through 13 should illuminate as switch S1 is rotated Each illuminated indicator should correspond to switch S1 position
			b. Set LOCAL-REMOTE switch to LOCAL and rotate switch S1 from position 1 through 13 one step at a time.	b Same as a above
			c. Replace control remote switching assembly A9 with control remote switching assembly A10 and repeat a and b above	c. Same as a above
			d. Replace control remote switching assembly A10 with control remote switching assembly All and repeat a and b above	d Same as a above
			e. Replace control remote switching assembly All with control switching assembly A12 and repeat a and b above for positions 1 through 13 of switch S1.	e Same as a above



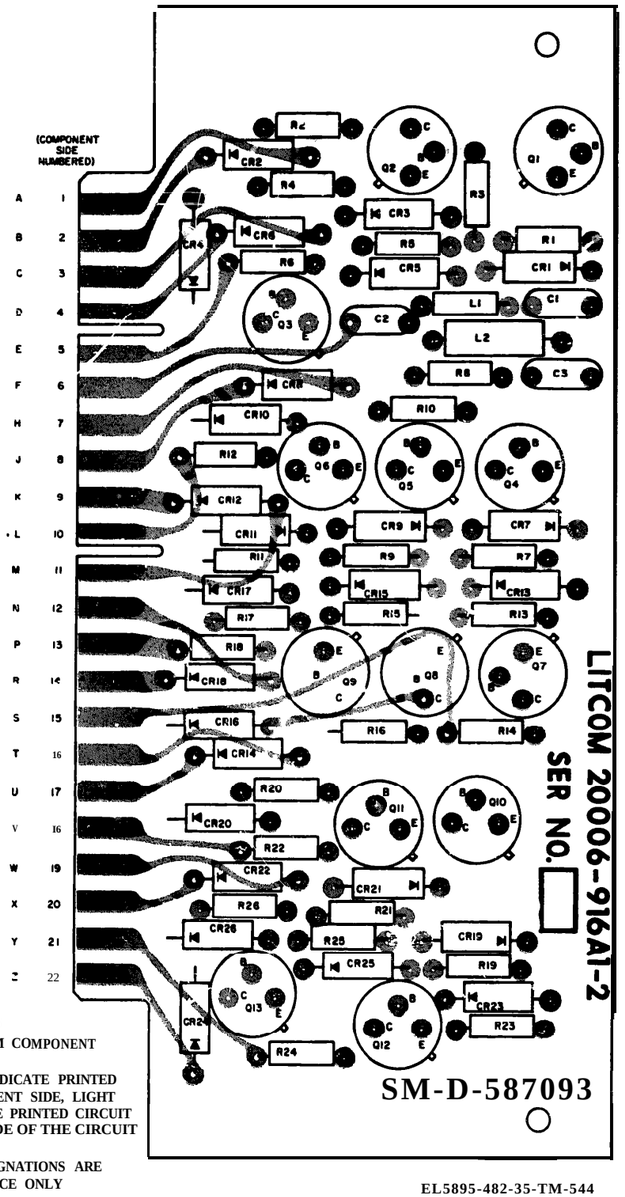
NOTES

1 ☐ INDICATES EQUIPMENT MARKING

2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF

EL5895-482-35-TM-614

Figure 5-135. Remote control switching A9 through A12, test setup diagram



NO i-ES

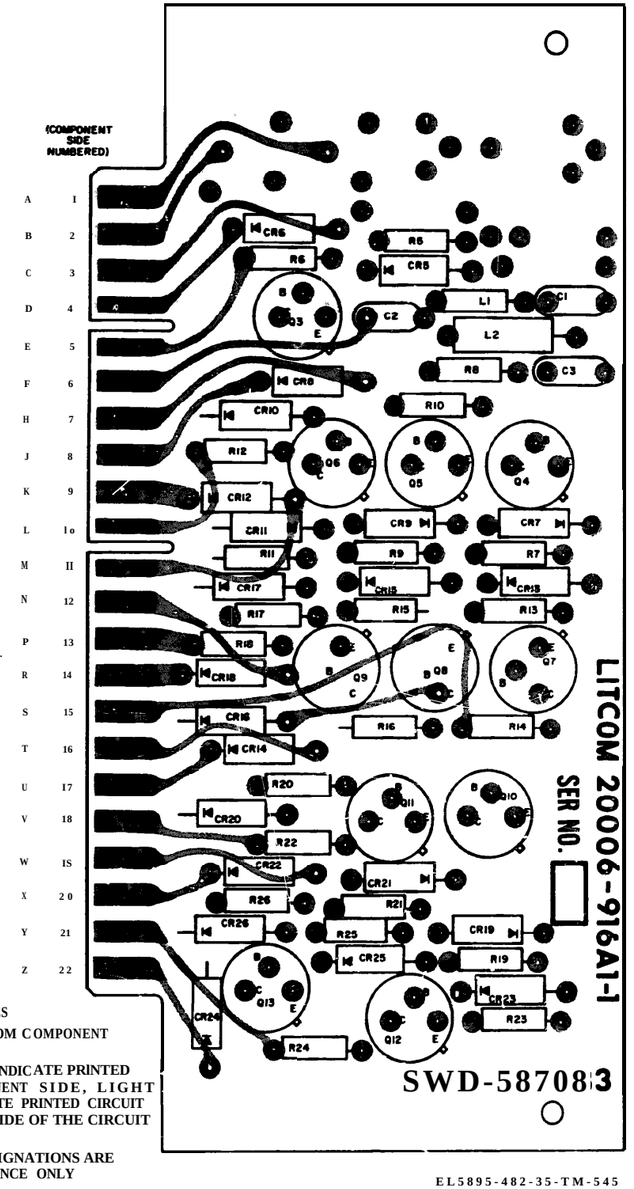
I CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

3 CONNECTOR PIN DESIGNATIONS ARE SHOWN FOR REFERENCE ONLY

EL5895-482-35-TM-544

Figure 5-136 Remote control switching A9, A10, and Al I, wiring diagram and parts location



NOTES

1 CIRCUIT VIE WED FROM C OMPONENT SIDE

2 DARK GREY AREAS INDIC ATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

3 CONNECTOR PIN DESIGNATIONS ARE SHOWN FOP REFERENCE ONLY

EL5895-482-35-TM-545

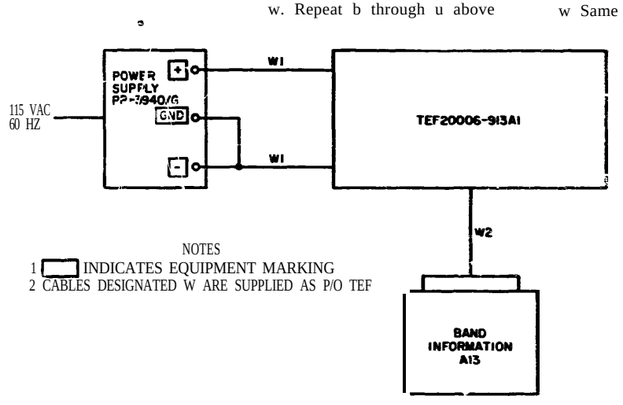
Figure 5-137 Remote control switching A12 wiring diagram and parts location

5-43. **Band** Information A13 Te**st Procedure**
(figs. 5-138 and 5-139)

Test equipment and materials are listed below:

a. Litcom TEF 20006-913A1.
b. Power Supply PP-3940/G.

Step No	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
1	LOCAL-REMOTE switch S1 REMOTE 1MHz STEP switch S3: 1 10MHz STEP switch S2 1 GROUND switch S4 GROUND	N/A	a None	a TEF 20006-913A1 10-MHz indicator 1 and 1-MHz indicator 4 should illuminate.
			b Set 1MHz STEP switch S3 to position 2.	b Same as a above.
			c. Set 1MHz STEP switch S3 to position 3	c TEF 20006-913A1 10-MHz indicator 1 and 1-MHz indicator 1 should illuminate.
			d. Set 1MHz STEP switch S3 to position 4	d TEF 20006-913A1 10-MHz indicator 1 and 1-MHz indicator 2 should illuminate
			e Set 1MHz STEP switch S3 to position 5	e Same as d above.
			f Set 1MHz STEP switch S3 to position 6.	f. TEF 20006-913A1 10-MHz indicator 1 and 1-MHz indicator 3 should illuminate
			g Set 1MHz STEP switch S3 to position 7.	g. Same as f above.
			h Set 1MHz STEP switch S3 to position 8	A. Same as f above.
			i. Set 1MHz STEP switch S3 to position 9.	ı. TEF 20006-913A1 IO-MHz indicator 1 and 1-MHz indicator 4 should illuminate.
			j Set 1MHz STEP switch S3 to position 10.	l. Same as a above.
			NOTE Set 10MHz STEP switch S2 to position 2 during k through r below	
			k Set 1MHz STEP switch S3 to position 1	k. TEF 20006-913A1 10-MHz indicator 2 and 1-MHz indicator 4 should illuminate
			l Set 1MHz STEP switch S3 to position 2	l TEF 20006-913A1 IO-MHz indicator 2 and I-MHz indicator 4 should illuminate.
			m Set 1MHz STEP switch S3 to position 3	m. TEF 20006-913A1 10-MHz indicator 2 and I-MHz indicator 5 should illuminate.
			n. Set 1MHz STEP switch S3 to position 4	n. Same as m above
			o Set 1MHz STEP switch S3 to position 5	o Same as m above
			p Set 1MHz STEP switch S3 to position 6	p Same as m above
			q Set 1MHz STEP switch S3 to position 7	q Same as m above
			r Set 1MHz STEP switch S3 to position 8	r Same as m above
			s Set 1MHz STEP switch S3 to position 9	s Same as m above
			t Set 1MHz STEP switch S3 to position 10	t TEF 20006-913A1 10-MHz indicator 2 and 1-MHz indicator 6 should illuminate
			NOTE Set 10MHz STEP switch S2 to position 8 during u through w below	
1 (Cont)			u. Rotate 1MHz STEP switch S3 from position 1 to position 10 one step at a time	u TEF 20006-913A1 10-MHz indicator 3 and 1 MHz indicator 6 should illuminate after each step
			v set TEF 20006-913A1 LOCAL-REMOTE switch S1 to REMOTE. 1MHz STEP switch S3 and 10MHz STEP switch S2 to position 1. and GND switch S4 to GND	v. Same as l above
			w. Repeat b through u above	w Same as b through u above-



NOTES
1 ☐ INDICATES EQUIPMENT MARKING
2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF

EL5895-482-35-TM-603

Figure 5-138 Band information A13, test setup diagram

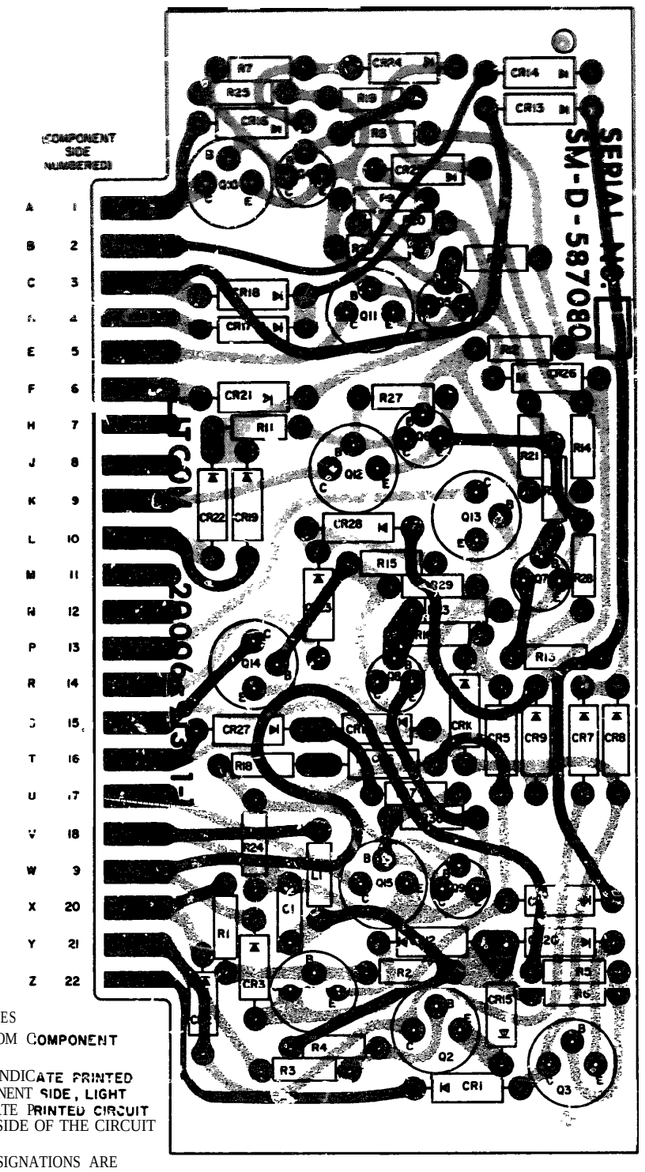


Figure 5-139 Band information A13, wiring diagram and parts location

5-44. Offset Carrier Dummy Load Test Procedure

a. Disconnect all power to the frequency synthesizer and remove offset carrier dummy load A14.

b. Perform the testing procedures outlined in the following chart.

Step No.	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	***Multimeter Simpson 260:*** **Set up to measure resistance of unit.**	***Offset carrier dummy load:*** **N/A**	**a. Using the Simpson 260, measure the resistance from jacks J3, J4, and J5 to unit ground.**	**a. The Simpson 260 indicator should be 51 ohms.**
			b. Using the Simpson 260, measure the resistance from:	
			(1) Pin A of jack J6 to pin D.	**(1) The Simpson 260 should indicate 18K ohms**
			(2) Pin B of jack J6 to pin D.	**(2) The Simpson 260 should indicate 75 ohms.**
			(3) Pin E of jack J6 to pin D.	**(3) The Simpson should** indicate 0 ohm.

5-45. Diode Switchbox Test Procedure (fig. 5-140)

1		Connect **AN/URM-145** with **MX**-4521/U to AN/GRM-50 and adjust for 90 mv at a **frequency** of 2.3 MHz.	None.
2		Disconnect AN/URM-145 with MX-452/U from signal generator.	None.
3		Connect AN/GRM-50 to A15J1.	None.
4		Connect AN/URM-145 with MX-452/U to J24	None.
5	TEF 20006-910A1: S1 and S2: ON S5, S6, S7, and S8: position 2		AN/URM-145 should indicate 66 mv minimum.
6	TEF 20006-910A1 S5, S6, S7, and S8: position 3	Connect AN/GRM-50 to J2	Same as step 5
7	TEF 20006-910A1 S5, S6, S7, and S8: position 4	Connect AN/GRM-50 to J3.	Same as step 5
8	TEF 20006-910A1 S5, S6, S7, and S8. position 5	Connect AN/GRM-50 to J4.	Same step 5
9	TEF 20006-910A1 S5, S6, S7. and S8 position 6	Connect AN/GRM-50 to J5	Same as step 5
10	TEF 20006-910A1 S5, S6, S7, and S8 position 7	Connect AN/GRM-50 to J6	Same as step 5
11	TEF 20006-910A1 S5, S6, S7, and S8: position 8	Connect AN/GRM-50 to J7	Same as step 5

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
12	TEF 20006-910A1: S5, S6, S7, and S8: position 9.		Connect AN/GRM-50 to J8.	Same as step 5.
13	TEF 20006-910A1: S5, S6, S7, and S8: position 10.		Connect AN/GRM-50 to J9.	Same as step 5.
14	TEF 20006-910A1: S5, S6, S7, and S8: position 11		Connect AN/GRM-50 to J10.	Same as step 5.
15			a Connect AN/URM-145 with MX-452/U to J22. b. Connect AN/GRM-50 to J1. c. Set AN/GRM-50 for output level of 90 mv.	a. None. b. None. c. None.
16			Repeat steps 5 though 14.	Same as step 5.
17			a Connect AN/URM-145 with MX 452/U to J23. b. Connect AN/URM-50 to J1. c. Maintain AN/URM-50 output level of 90 mv.	a. None. b. None. c None.
18			Repeat steps 5 through 14.	Same as step 5.
19			a. Connect AN/URM-145 with MX-452/U to J25. b. Connect AN/URM-50 to J1. c. Maintain AN/URM-50 output level of 90 mv	a None. b. None. c. None.
20			Repeat steps 5 through 14	Same a8 step 5.
21			a. Connect AN/URM 145 with MX-452/U to J24. b. Connect AN/GRM-50 to J1. c Maintain AN/GRM-50 output of 90 mv.	a. None. b. None. c. None.
22	TEF 20006-910A1: S5, S6, S7, and S8: position 2.		Vary AN/GRM-50 output frequency from 1 4 to 2.3 MHz, maintaining output level of 90 mv.	AN/URM-145 should indicate 66 mv minimum throughout the band
23			Tune AN/GRM-50 to 4 5 MHz.	AN/URM-145 should indicate a minimum of 13 dB below the minimum indication observed in step 22
24			Tune AN/GRM-50 to 7 SO MHz.	AN/URM-145 should indicate a minimum of 32 dB below the minimum indication observed in step 22
25			Tune AN/GRM-50 to 12 0 MHz.	AN/URM-145 should indicate a minimum of 42 dB below the minimum indication observed in step 22.
26			Tune AN/GRM-50 to 20.0 MHz.	AN/URM-145 should indicate a minimum of 42 dB below the minimum indication observed in step 22.
27	TEF 20006-910A: S5, S6 S7, and S8: position 2.		a Connect AN/URM-145 to J22. b. Maintain AN/GRM-50 output level of 90 mv.	a. None b. None.
28			Repeat steps 22 through 26.	Same as steps 22 through 26.
29			a. Connect AN/URM-145 to J23. b. Maintain AN/GRM-50 output level of 90 mv.	a. None. b. None.
30			Repeat steps 22 through 26.	Same as steps 22 through 26.
31			a. Connect AN/URM-145 to J25. b. Maintain AN/GRM-50 output level of 90 mv.	a. None. b. None.
32			Repeat steps 22 through 26.	Same steps 22 through 26.
33			Connect AN/URM-145 with MX-452/U to AN/GRM-50 and adjust for output level of 100 mv at a frequency of 22 MHz.	None.
34			Connect AN/GRM-50 to J11.	None.
35	TEF 20006-910A1: S3: position 2.		Connect AN/GRM-145 with MX-452/U to J21.	AN/URM-145 should indicate 70 mv minimum.
36	TEF 20006-910A1: S3: position 3.		Connect AN/GRM-50 to J12.	AN/URM-145 should indicate 70 mv minimum
37	TEF 20006-910A1: S3: position 4.		Connect AN/GRM-50 to J13.	Same as step 36.
38	TEF 20006-910A1: S3 : position 5.		Connect AN/GRM-50 to J14.	Same as step 36.
39	TEF 20006-910A1: S3 : position 6.		Connect AN/GRM-50 to J15.	Same as step 36.
40	TEF 20006-910A1: S3: position 7.		Connect AN/GRM-50 to J16.	Same as step 36.
41	TEF 20006-910A1: S3: position 8		Connect AN/GRM-50 to J17.	Same as step 36.
42	TEF 20006-910A1. S3: position 9		Connect AN/GRM-50 to J18.	Same as step 36.
43	TEF 20006-910A1. S3 : position 10.		Connect AN/GRM-50 to J19.	Same as step 36.
44	TEF 20006-910A1 S3: position 11		Connect AN/GRM-50 to J20.	Same as step 36.
45	TEF 20006-910A1: S3: position 2.		Connect AN/GRM-50 to J11 and tune to 26 MHz at an output level of 100 mv	None
46			Connect AN/URM-145 with MX-452/U to J21	None.
47			Adjust A5L1 for a minimum indication on AN/URM-145.	AN/URM-145 should indicate less than 1 mv.
48			Tune AN/GRM-50 to 34.7 MHz, maintaining output level at 100 mv	

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
49			**Adjust A5L2 for a minimum indication on AN/URM-145.**	**AN/ URM-145 should indicate less than 1 mv.**
50	***TEF 20006-910A1:*** **S3: position 2.**		a Connect AN/GRM-50 with output set at 100 mv to J11.	***a. None.***
			b. Connect AN/URM-145 with MX-452/U to J21.	b. None.
51			Vary AN/GRM-50 output frequency from 13 to 22 MHz. maintaining output level of 100 mv.	AN/URM-145 **should indicate 70** mv minimum **throughout the** band.
52			Tune AN/GRM-50 to 26.0 MHz.	AN/URM-145 should **indicate** a minimum of 30 dB below the minimum indication of step 51.
53			Tune the generator to 34.7 MHz.	AN/URM-145 should indicate a minimum of 30 dB below the minimum indication of step 51.
54			Vary AN/GRM-50 output frequency from 26 to 34.7 MHz. maintaining output level of 100 mv	AN/URM-145 should indicate a minimum of 25 dB below the minimum indication of step 51.
55			Vary AN/GRM-50 output frequency from 34.7 to 44.0 MHz, maintaining output level of 100 mv.	AN/URM-145 should indicate a minimum of 20 dB below the level of step 51.
56			Adjust AN/GRM-50 for an output level of 100 mv at a frequency of 13 MHz.	None.
57			Connect AN/GRM-50 to J11	None
58	TEF 20006-910A1: S4: position 2.		Connect AN/URM-145 with MX-452/U to W1P1	AN/URM-145 should indicate 200 mv minimum.
59	TEF 20006-910A1 S4: OFF		None	AN/URM-145 should indicate a minimum of 40 dB below the level of step 58.
60			Tune AN/GRM-50 to 14 MHz at an output level of 100 mv	None
61	TEF 20006-910A1: S4, position 3		Connect AN/GRM-50 to J12 and AN/GRM-145 with MX-452/U to W2-P2	AN/URM-145 should indicate 200 mv minimum.
62	TEF 20006-910A1: S4: OFF		None	AN/URM-145 should indicate a minimum of 40 dB below the level of step 61
63			Tune AN/GRM-50 to 15 MHz maintaining output level of 100	None
64	TEF 20006-910A1. S4: positron 4.		Connect AN/GRM-50 to J3 and AN/URM-145 with MX-452/U to W3-P3	AN/URM-145 should indicate 200 mv minimum
65	TEF 20006-910A1 S4: OFF		None	AN/URM-145 should indicate a minimum of 40 dB below the level of step 64
66			Disconnect AN/URM-145 with MX-452/u from W3-P3	None
67			a Tune AN/GRM-50 to 2 3 MHz at an output level of 90 mv	a None
			b. Connect AN/GRM-50 to J1.	b None
			c. Connect AN/URM-85 in series with CN-796/U to J24	c None
68	TEF 20006-910A1: S5, S6, S7, and S8: position 2		Tune AN/URM-85 to 2 3 MHz a Adjust signal attenuator on AN/URM-85 to 80 dB. b. insert 20 dB of attenuation in CN-796/U. c. Adjust if. gain control on AN/URM-85 - for a convenient reference level.	None
69	***TEF 20006-910A1:*** **S5, S6, S7, and S8: position 3.**		**None.**	AN/URM-85 **should** indicate a minimum of 100 dB below the reference level of step 68
70			Disconnect attenuator from J24 and connect J22.	AN/URM-85 should indicate a minimum of 100 dB below the reference level of step 68
71			Disconnect attenuator from J22 and connect J23.	AMP URM-85 should indicate a minimum of 100 dB below the reference level of step 68
72			Disconnect attenuator **from** J23 and connect to J25.	AN/URM-85 should indicate a minimum of 100 dB below the reference level of step 68
73			Connect AN/GRM-50 to J2.	None.
74	TEF 20006-910A1: S5, S6, S7, and S8. position 3 (reference level establishment) position 4 (isolation measurement)		Repeat steps 68 through 72.	Same as steps 68 through 72
75			Connect AN/GRM-50 to J3	None
76	TEF 20006-910A1 S5, S6, S7, and S8 position 4 (reference level establishment) position 5 (isolation measurement)		Repeat steps 68 through 72	Same as steps 68 through 72
77			Connect AN/GRM-50 to J4	None
78	TEF 20006-910A1 S5, S6, S7, and S8 position 5 (reference level establishment) position 6 (isolation measurement)		Repeat steps 68 through 72	Same as steps 68 through 72
79			Connect AN/GRM-50 to J5	None
80	TEF 20006-910A1 S5, S6, S7, and S8- position 6 (reference level establishment) position 7 (isolation measurement]		Repeat steps 68 through 72	Same as steps 68 through 72
81			Connect AN/GRM-50 to J6	None

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
82	**TEF 20006-910A1: S5, S6, S7, and S8: position 7 (reference level establishment) position 8 (isolation measurement)**		**Repeat steps 68 through 72.**	**Same as steps 68 through 72.**
83			Connect AN/GRM-50 to J7.	None.
84	**TEF 20006-910A1: S5, S6, S7, and S8: position 8 (reference level establishment) position 9 (isolation measurement)**		Repeat steps 68 through 72	Same as steps 68 through 72.
85			Connect AN/GRM-50 to J8.	None.
86	**TEF 20006-910A1: S5, S6, S7, and S8: position 9** (reference level establishment) position 10 (isolation measurement)		Repeat steps 68 through 72.	Same as steps 68 through 72.
87			Connect AN/GRM-50 to J9.	None
88	TEF 20006-910A1: S5, S6, S7, S 8 : position 10 (reference level establishment) position 11 (isolation measurement)		Repeat steps 68 through 72	Same as steps 68 through 72
89			Connect AN/GRM-50 to J10	None
90	TEF 20006-910A1: S5, S6, S7, and S8: Position 11 **(reference** level **establish**ment) position 12 (isolation measurement)		Repeat steps 68 through 72.	Same as steps 68 through 72
91			a Tune AN/GRM-50 to 22 MHz at an output level of 100 mv. b. Connect AN/GRM-50 to J11. c. Connect AN/GRM-85 is series with CN-796/U to J21.	a. None. b. None. c. None

Step NO	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
92	TEF 20006-910A1: S3: position 2		**a. Tune AN/URM-85 to 22 MHz** **b. Adjust signal attenuator on AN/URM-85 to 80 dB.** **c. Insert 10 dB of attenuation in** CN-796/U. **d. Adjust if. gain control for a convenient reference level.**	**a. None.** **b. None.** **c. None.** d. None.
93	TEF 20006-910A1: S3: position 3		**None.**	AN/URM-85 should indicate a minimum of 80 dB below the reference level of step 92.
94			Connect AN/GRM-50 to J12 maintaining output level of 100 mv at 22 MHz.	None.
95	TEF 20006-910A1: S3: position 3 (reference level establishment) position 4 (isolation measurement)		**Repeat steps 92 and 93.**	Same as step 98.
96			Connect AN/GRM-50 to J13 maintaining output level of 100 mv at 22 MHz.	None.
97	TEF 20006-910A1: S3: position 4 (reference level establishment) positron 5 (isolation measurement)		Repeat steps 92 and 93	Same a8 step 93.
98			Connect AN/GRM-50 to J14 maintaining output level of 100 mv at 22 MHz.	None.
99	TEF 20006-910A1: S3: position 5 (reference level establishment) position 6 (isolation measurement)		Repeat steps 92 and 93.	Same as step 93.
100			Connect AN/GRM-50 to J15 maintaining output level of 100 mv at 22 MHz.	None.
101	TEF 20006-910A1: S3: position 6 (reference level establishment) position 7 (isolation measurement)		Repeat steps 92 and 93.	Same as step 93.
102			**Connect AN/GRM-50 to J16 maintaining output level of 100 mv at 22 MHz**	**None.**

Step No.	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
103	TEF 20006-910A1: S3: position 7 (reference level establishment) position 8 (isolation measurement)		Repeat steps 92 an 93.	Same as step 93.
104			Connect AN/GRM-50 to J17 maintaining output level of 100 mv at 22 MHz.	None.
105	TEF 20006-910A1: S3: position 8 (reference level establishment) position 9 (isolation measurement)		Repeat steps 92 and 93	Same as step 93.
106			Connect AN/GRM-50 to J18 maintaining output level of 100 mv at 22 MHz.	None.
107	TEF 20006-910A1: S3: position 9 (reference level establishment) position 10 (isolation measurement)		Repeat steps 92 and 93	Same as step 93.
108			Connect AN/GRM-50 to J19 maintaining output level of 100 mv at 22 MHz.	None.
109	TEF 20006-910A1: S3: position 10 (reference level establishment) position 11 (isolation measurement)		Repeat steps 92 and 93.	Same as step 93.
110			Connect AN/GRM-50 to J20 maintaining output level of 100 mv at 22 MHz.	None
111	TEF 20006-910A1: S3: position 11 (reference level establishment) position 12 (isolation measurement)		Repeat steps 92 and 93.	Same as step 93.
112			Turn all switches to OFF. Remove module under test	None

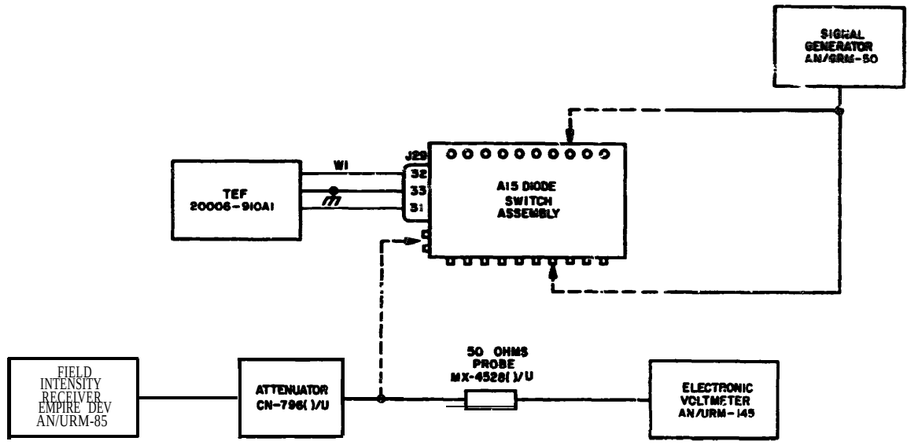


Figure 5-140. Diode switchbox A15, test setup diagram.

5-46. Matrix Output Circuit 1A2A15A1 through 1A2A15A4 Test Procedure (figs. 6-141 and 6-142)

Step No	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
			FREQUENCY RESPONSE	
1	N/A	N/A	Tune AN/GRM-50 to 1.4MHz cat an output of 70 mv. Connect equipment as shown in reference drawing.	None.
2	On TEF 20006-910-B14 S2: B14	N/A	Vary AN/GRM-50 frequency from 1.4 to 2.2 MHz, observing output on AN/URM-145	AN/URM-145 should indicate a minimum of 65 mv.
			REJECTION FREQUENCIES	
3	N/A	N/A	Repeat step 2, noting the lowest AN/URM-145 indication within. the 1.4- to 2 3-MHz band This will be the reference level	None.
4	N/A	N/A	Tune AN/GRM-50 to 4.5 MHz at an output of 70 mv.	AN/URM-145 should indicate a minimum of 13 dB below the reference level of step 3
5	N/A	N/A	Repeat step 4 for 7 5 MHz	AN/URM-145 should indicate a minimum of 32 dB below the reference level of step 3.
6	N/A	N/A	Repeat step 4 for 12 0 MHz.	AN/URM-146 should indicate a minimum of 42 dB below the reference level of step 3.
7	N/A	N/A	a. Repent step 4 for 20.0 MHz	a AN/URM-145 should indicate a minimum of 48 dB below the reference level of step 3
			b Turn S1 to OFF Remove module under test.	b None

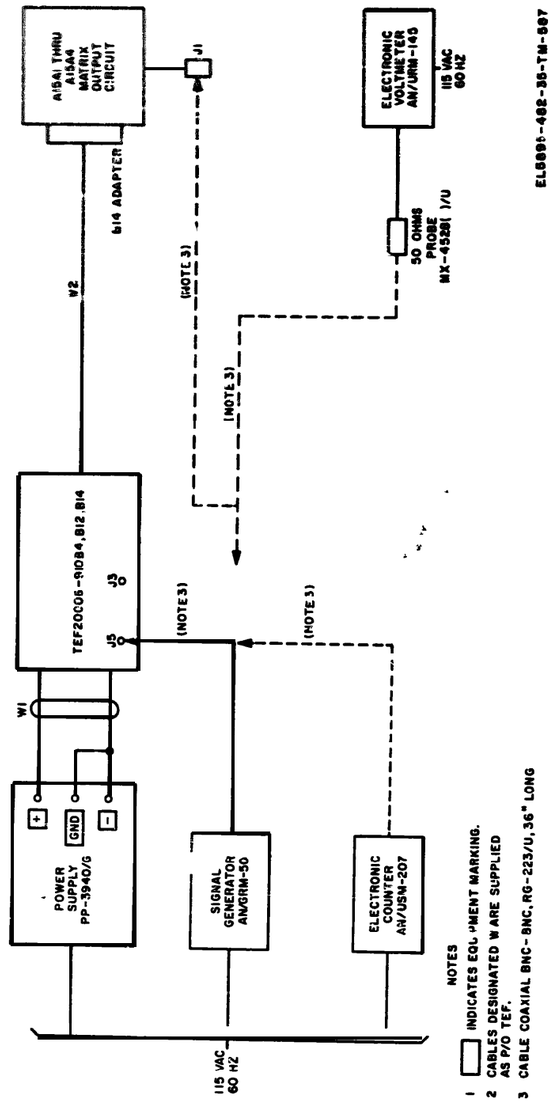


Figure 5-141 Matrix output circuit A15A1 through A15A4, test setup diagram

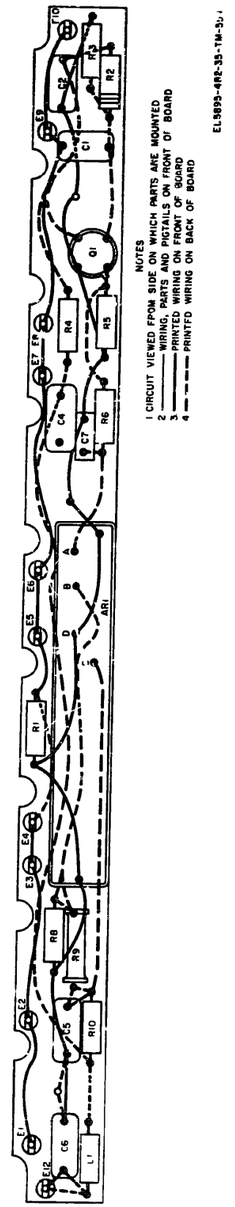


Figure 5-142. Matrix output circuit A15A1 and A15A4, wiring diagram and parts location

5-47. Isolation Amplifier and Filer A15A1R1 Through A15A4AR1 Test Procedure

a. A disposition test is provided for the isolation amplifier and filter A15A1R1 through A15A4AR1 which determines whether or not it is defective. Since the isolation amplifier and filter A15A1R1 through A15A4AR1 is a non-repairable item no troubleshooting procedures are provided. If the disposition test determines that the module is defective, it will be disposed of using the standard disposal procedures for that module.

b. Test equipment and material required are as follows:

(1) Signal Generator AN/GRM-50.
(2) Electronic Voltmeter AN/URM-145 (2 required).
(3) 50-ohm Adapter MX-4528/U.
(4) High impedance probe for AN/URM-145.
(6) Power Supply PP-3940/G.
(6) Variable Attenuator CN-796/U.
(7) Frequency Meter AN/URM-207.
(8 Frequency selective voltmeter, Rohde **and Schwartz (#62 on MAC) BN-1521** USVH **(requires 910-B12 B14 adapter).**
(9) Litcom test fixture TEF 20006-910-B12-B14B16.

c. Test conditions and connections are as follows:

(1) Install A15A1AR1/A15A4AR1 in cover.
(2) Turn all switches to OFF.
(3) Tack solder module leads to fixture adapter board cables.
(4) Connect equipment as indicated in figure 5-143.
(5) Energize power supply and adjust for +18 volts dc.
(6) Turn S2 on fixture to B12 position.

Step No	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	N/A	N/A	RF OUTPUT AND RIPPLE connect AN/URM-50 and AN/USM-207 to J2 on test fixture.	None.
2	Tune AN/GRM-50 to 1 4 MHz.	N/A	NOM.	None.
3	N/A	N/A	Disconnect meter and connect AN/URM-145 No. 1 with high impedance probe to J2 on test fixture.	None.
4	Turn S1 on test fixture to ON.	N/A	None.	None.
5	Adjust AN/GRM-50 to 50 mv.		None.	None
6	N/A	N/A	Connect AN/URM-145 No. 2 with MX-4528/U to E1. Vary AN/GRM-50 frequency from 1 4 to 2 3 MHz, keeping output constant at 50 mv.	The output voltage should be minimum 60 mv across the band.
7	N/A	N/A	Vary AN/GRM-50 frequency from 1.4 to 2.3 MHz, maintaining 50-mv level. Note the minimum and maximum indications in dB on AN/URM-145 No. 2.	The difference between the maximum and minimum levels shall be 1.0 dB maximum
8	Set up selective voltmeter as follows: If. bandwidth: 5 kHz. Attenuator: -40 dB. Indication: 0 dB Input: 50 ohms	N/A	a None. b Allow a warmup of 1 hour minimum.	a. None. b. None
8 (Cont)	Frequency range: As required Power switch: ON.			
9	N/A	N/A	Vary AN/GRM-50 frequency from 1.4 to 2.3 MHz. keeping output connect at 50 mv. Record the lowest AN/URM-145 indication within this range.	None.
10	N/A	N/A	Disconnect AN/URM-145 No. 2 and CN-796/U from J1 on TEF 20005-910812.	None.
11	N/A	N/A	Connect selective voltmeter to J1 on TEF 20006-910B12 and tune to frequency recorded in step 9 Note selective voltmeter indication as the reference level.	None.
12	N/A	N/A	Tune AN/GRM-50 to 4 5 MHz at 50-mv output.	None.
13	N/A	N/A	Tune selectivevoltmeter to 4.5 MHz and remove attenuation until the reference level of step 11 is obtained. The amount of attenuation removed should be the frequency rejection level. FREQUENCY REJECTION	The rejection level should be a minimum of 13 dB below the reference level of step 11.
14	N/A	N/A	Tune AN/GRM-50 to 7 5 MHz Repeat step 13 for 7 5 MHz.	The rejection level should be a minimum of 32 dB below reference level of step 11.
15	N/A	N/A	Tune AN/GRM-50 to 12.0 MHz Repeat step 13 for 12.0 MHz.	The rejection level should be a minimum of 42 dB below the reference level of step 11.
16	N/A	N/A	Tune AN/GRM-50 to 20 0 MHz. **Repeat step 13 for 20.0 MHz**	The reference level should be a **minimum of 48 dB below the reference level of step 11**
17	N/A	N/A	**Turn all switches to OFF. Remove module under test**	**None**

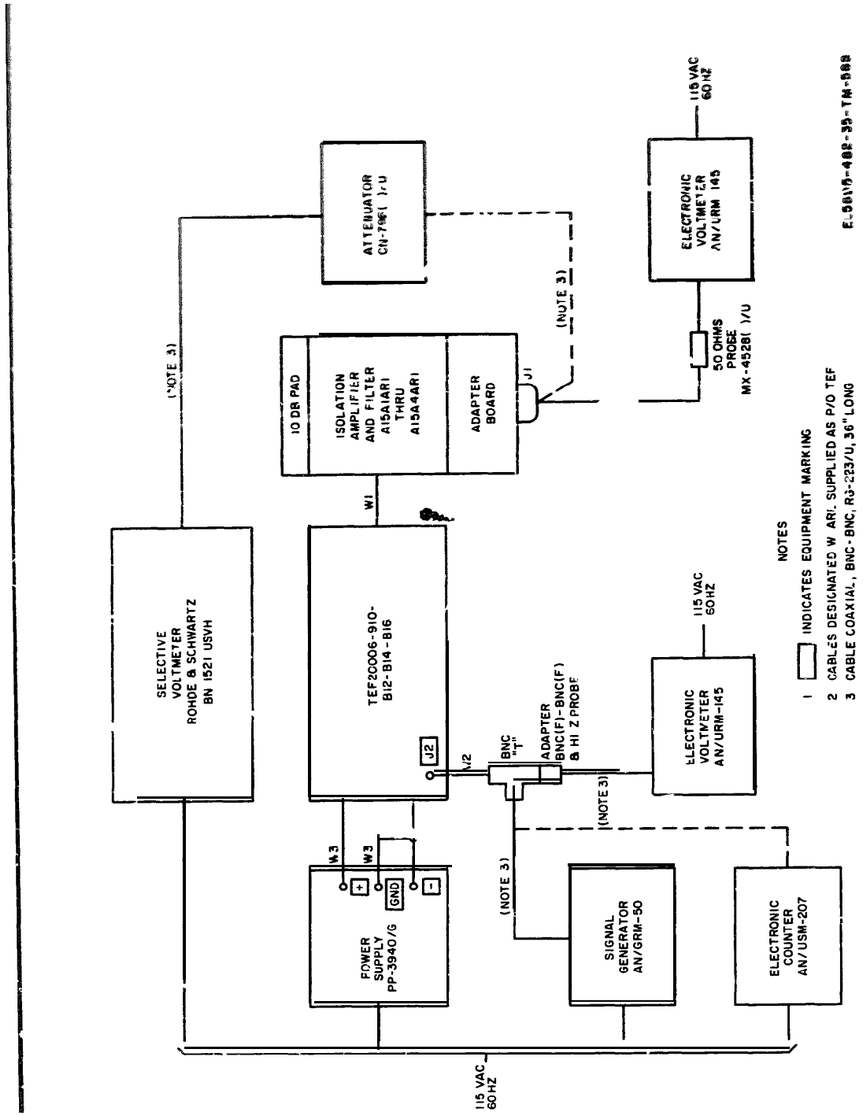


Figure 5-143 Isolation amplifier and filter A15A1R1 through A15A4AR1, test setup diagram

5-48. Matrix Output Circuit 1A2A15A5 Test Procedure

(figs. 5-144 and 5-145)

Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			ALIGNMENT	
1	N/A	N/A	**Connect AN/URM-145 with high impedance probe to J2 on test fixture.**	**None.**
2	N/A	N/A	**Connect AN/GRM-50 to J1 on test fixture and tune to 26 MHz at an output of 100 mv. Check frequency with AN/USM-207.**	**None.**
3	N/A	Adjust L1 **for** minimum (less) than 1.0 mv) on AN/URM-145 at J4.	**None.**	AN/URM-145 should indicate less than 1.0 mv at J4.
4	N/A		Tune AN/GRM-50 to 34.7 **MHz at** au output of 100 mv. Check frequency with AN/USM-207.	**None.**
5	N/A	Adjust L2 for minimum (less than 1.0 mv) on AN/URM-145 at J4	None.	AN/URM-145 should indicate less than 1.0 mv at J4.
			RIPPLE AND OUTPUT	
6	N/A	N/A	Vary AN/URM-50 frequency over the range from 13 to 22 MHz. keeping AN/GRM-50 output constant at 100 mv. Use AN/USM-207 to monitor frequency. Note the minimum and maximum indications in dB on AN/URM-145 at J4.	The difference between minimum and maximum readings on AN/URM-145 should be 1.5 dB maximum. Rf output should be 70 mv minimum over the baud.
			FREQUENCY REJECTION AND FLYBACK	
7	N/A	N/A	Tune AN/GRM-50 to 22 MHz at an output of ±100 mv. Note the reference level in dB of the output at J4	None.
8	N/A	N/A	Tune AN/GRM-50 to 26 MHz. Rejection is the difference in dB from the 22-MHz reference level	Rejection should be a minimum of 40 dB
9	N/A	N/A	Repeat step 7 at 34.7 MHz.	Rejection should be a minimum of 30 dB.
10	N/A	N/A	Vary AN/GRM-50 over the range from 28 to 34 7 MHz at 100-mv output.	The maximum flyback (minimum rejection) shall be -25 dB within this range.
11	N/A	N/A	Repeat step 9 for 34 7 to 44.0 MHz.	The maximum flyback should be -20 dB within this range.

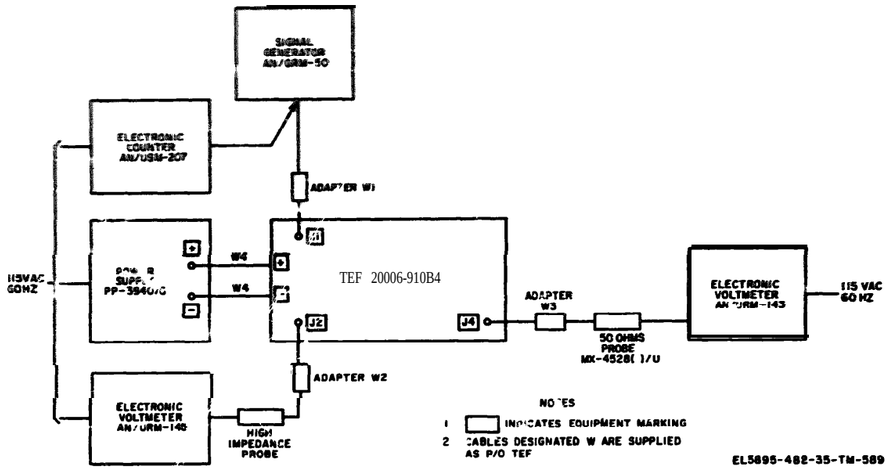


Figure 5-144. Matrix output circuit A15A5, test setup diagram.

NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

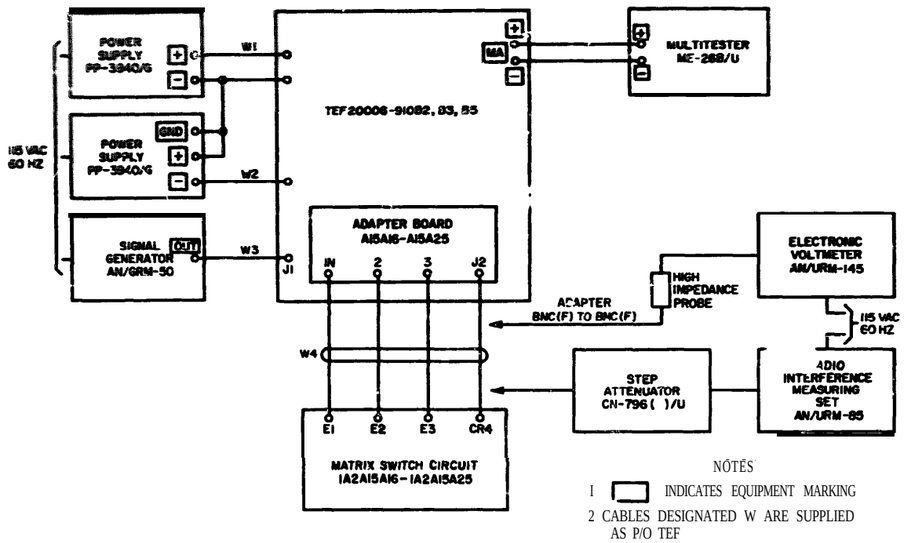
3 CONNECTOR PIN DESIGNATIONS ARE SHOWN FOR REFERENCE ONLY

EL5895-482-35-TM-532

Figure 5-145. Matrix output circuit A15A5, wiring diagram and parts location

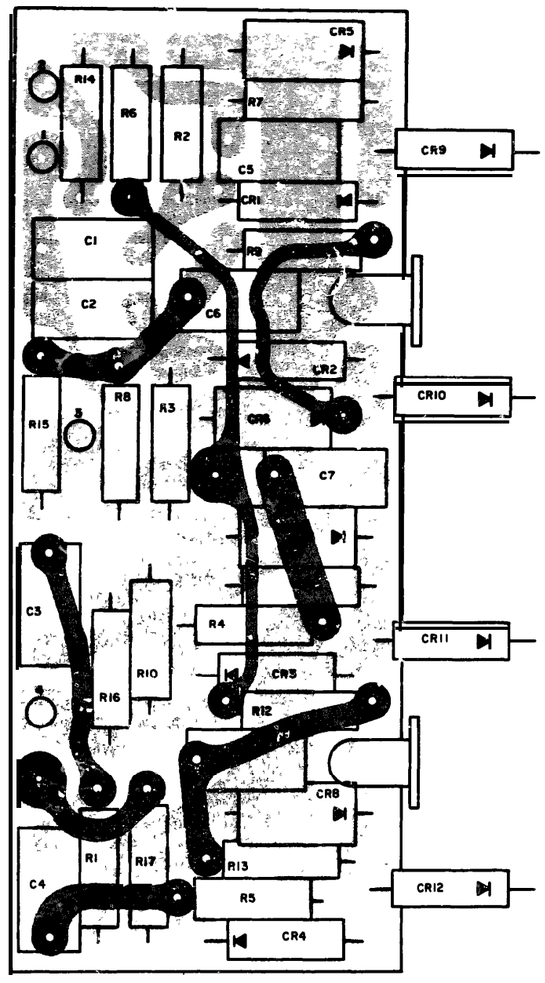
5-48. Matrix Switches 1, 2, 3, and 4 1A2A15A6 through 1A2A15A15 Test Procedure (figs. 5-146 and 5-147)

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			PRELIMINARY	
1	**N/A**	**N/A**	**a. Connect AN/URM-145 with MX-452/U probe to AN/GRM-50.**	**a. None.**
			b. Tune AN/GRM-50 to 1.4 MHz at an output of ±100 mv.	**b. None.**
			c. **Disconnect AN/URM-1**45 from AN/GRM-50 and connect it to J4 on fixture, suing high impedance probe.	c. None.
			a Connect AN/GRM-50 to J2 on fixture. Adjust power supplies for +18 volts dc and -9 volts dc.	d. None.
			DIODE CURRENT -9VKC	
2	N/A	N/A	Connect ME-26B/U to the METER jack on test fixture. Set ME-26B/U switch to +DCA and range switch to 5 ma. Set S1 to ON.	None.
3	On test fixture, turn S2 to 9 volts dc, turn S3 to B2, turn S7 to SINGLE. turn S6 to ON.	N/A	Measure the -9-volt dc current (through ES).	The -9-volt dc current be 2.8 ma ± 0.3 ma.
			OPERATIONAL, LEAKAGE AND ISOLATION	
4	N/A	N/A	Turn RANGE switch on ME-26B/U to 15 ma.	None.
5	On TEF 20006-910B2, B3 & B5: Turn S2 to +18V and S4 to E2, S5 to position 1		Turn off -9-volt dc power supply.	None.
6	N/A	N/A	Observe the +18 volts dc.	The +18 volt dc current should be 6.5 ma ±1.0 ma.
7	N/A	N/A	Turn on -9-volt power supply.	The rf output indication on AN/URM-145 should be 90 mv minimum.
8	N/A	N/A	Turn ME-26B/U RANGE switch to 50 ma.	None.
9	Turn S7 on TEF 20006-910B2, B3 and B5 to "FULL".	N/A	None.	The rf output indication on AN/URM-145 should be 82 mv minimum
10	Turn S7 on TEF 20006-910-B2, B3 and B5 to "SINGLE"	N/A	None.	None.
11	N/A	N/A	Keeping its output constant at 100 mv, vary AN/GRM-50 frequency over the range from 1.4 to 2.3 MHz.	The rf output as mad on AN/URM-145 should be 82 mv minimum over this range.
12	N/A	N/A	Disconnect AN/URM-145 from J4 on test fixture and connect AN/URM-85. in series with CN-796/U. to J4.	None.
13	N/A	N/A	Adjust CN-796/U to 10 dB and AN/URM-85 signal input attenuator to 80 dB	None.
14	**N/A**	N/A	**Tune AN/GRM-50 to approximately 2.3 MHz and adjust the IF. GAIN control for an indication of 10 dB on the meter. This shall be the reference level.**	**None.**
15	Rotate S5 on test fixture to CR10, CR11, CR12 positions	N/A	**Observe leakage level** on AN/URM-85 meter.	The leakage should be a minimum of 50 dB below the reference level.
16	Turn S6 on test fixture to OFF	N/A	Adjust CN-796/U to 0, and AN/URM-85 signal input attenuator until the meter indication is a minimum of 80 dB below reference.	None.
17	Turn S6 to ON.	N/A	None.	None.
18	Turn S4 to E3 position, S5 to position 2 (CR10).	N/A	**Connect AN/URM-145 with high impedance probe to J4 on fixture and repeat steps 4 to 14.**	As specified in steps 4 through 14.
19	Rotate S5 on test fixture to CR9, CR11 and CR12 positions.	N/A	Repeat steps 12, 13, and 14. Observe leakage on AN/URM-85.	The leakage should be a minimum of 50 dB below the reference level.
20	N/A	N/A	Repeat steps 16 and 17.	Nope.
21	Turn S4 to E4 position, S5 to position 3 (CR11).	N/A	Connect AN/URM-145 with high impedance probe to J4 on fixture and repeat steps 4 to 14.	As specified in steps 4 through 14.
22	Rotate S5 on test fixture to CR9, CR10, and CR12 positions.	N/A	Repeat steps 12, 13, and 14. Observe leakage on AN/URM-85.	The leakage should be a minimum of 50 dB below the reference level.
23	N/A	N/A	Repeat steps 16 and 17.	None.
24	Turn S4 to E6 position, SC to position 4 (CR12).	N/A	Connect AN/URM-145 with high impedance probe to J4 on fixture and repeat steps 4 through 14.	As specified in steps 4 through 14.
25	Rotate S5 on teat fixture to CR9, CR10	N/A	Repeat steps 12, 13, and 14. Observe leakage on AN/URM-85.	The leakage should be a minimum of 50 dB below the reference level.
26	N/A	N/A	Turn all switches to OFF and remove module under test.	None.



EL5895-482-35-TM-655

Figure 5-146. Matrix switches 1 2, 3, and 4 and A15A6 through A15A15, test setup diagram.



NOTES

1 CIRCUIT 'VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF 'HE CIRCUIT BOARD

EL5895-482-35-TM-513

Figure S-147. Matrix switches 1 through 4, A15A6 through A15A15, wiring diagram and parts location

5-50. Matrix Switch No. 5 1A2A15A16 through 1A2A15A25 Test Procedure (figs. 5-148 and 5-149)

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
1	**ME-26B/U:** **Function switch: —DCA** **Range switch: 1.5 ma.** **TEF 20006-910B3:** **—9V/+18vdc switch S1:** +18V - 9V. +18V/ -9vdc Switch S2: -9vdc. Switch S3: B3.	N/A	Check ME-26B/U indication.	ME-26B/U should indicate 0.7 ma ± 0.1 ma.
2	ME-26B/U- Range switch: 15 ma. TEF 20006--910B3 -9V/ +18vdc switch S2: +18vdc +18 vdc switch S6: ON Deenergize -9-volt dc power supply	N/A	Check ME-26B/U indication.	ME-26B/U should indicate 10 ma ± 0.8 ma.
3	Same as step 2	N/A	a Energize -9-volt dc power supply b Tune AN/GRM-50 to 22 MHz at 100 mv	a. None b. AN/URM-145 should indicate 80 mv minimum
4	N/A	N/A	a Disconnect AN/URM-145 from TEF 20006-910B3 J2 b Connect AN/URM-85 m series with CN-796/U to J2 c Tune AN/GRM-85 to 22 MHz and adjust AN/URM-85 IF GAIN control for reading of 10 dB on meter This shall be reference level d Set TEF 20006-910B3 +18 volts dc switch S6 to OFF.	a None b None c None d AN/URM-85 should indicate maximum leakage is a minimum of 80 dB below reference level of c above

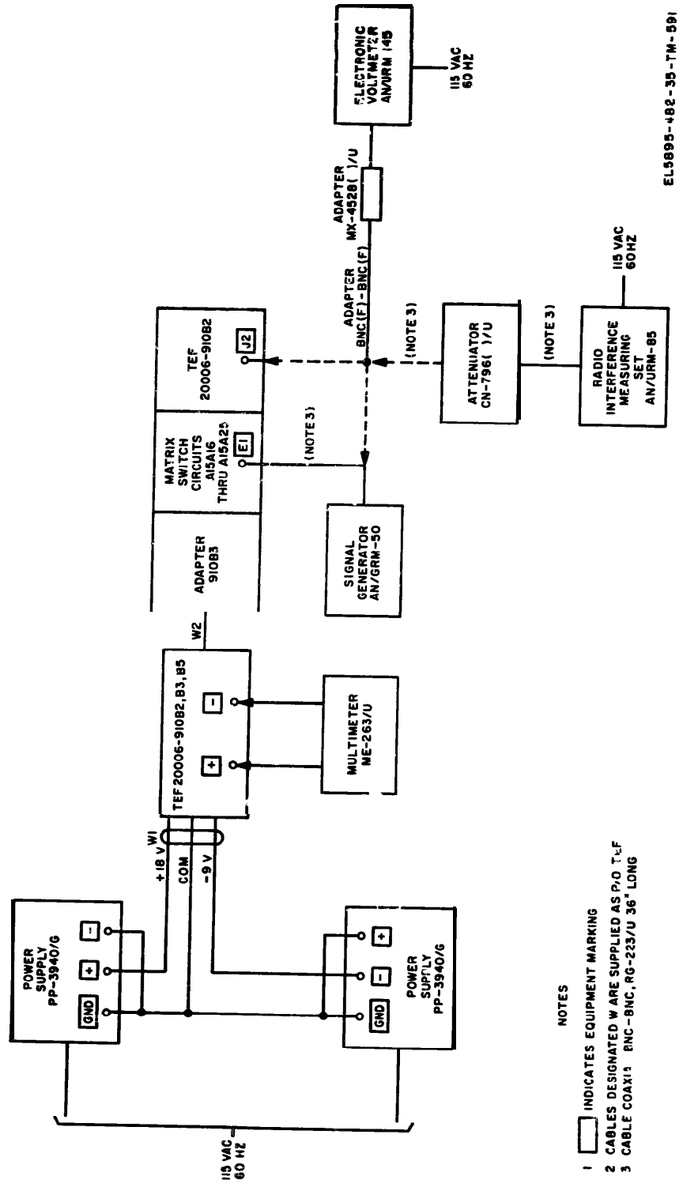
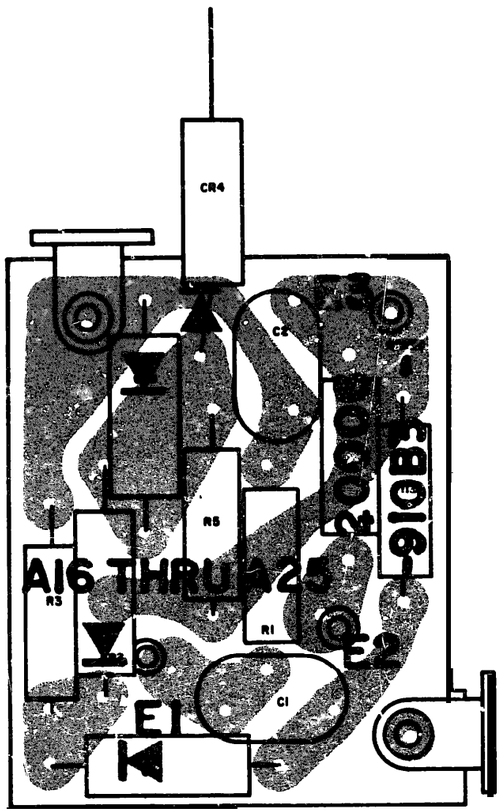


Figure 5-148 Matrix switch No 5 and A15A16 through A15A25, test setup diagram

Figure 5-148 Matrix switch No 5 and A15A16 through A15A25, test setup diagram



NOTES
1 CIRCUIT VIEWED FROM COMPONENT SIDE
2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD.

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Figure 5-149. Matrix switch No. 5 and A14A16 through A15A25, wiring diagram and parts location

5-51. Switch Amplifier A15A26 through A15A28 Test Procedure

(figs. 5-150 and 5-151)

a. Test Equipment and Material.

(1) Electronic Voltmeter AN/URM-145.

(2) MX-4528/U probe for AN/URM-145.

(3) High impedance probe for AN/URM-145.

(4) Signal Generator AN/GRM-50.

(5) 2 Power Supplies PP-3940/G.

(6) Radio Interference Measuring Set AN/URM-85.

(7) Tuning head for AN/URM-85.

(8) Variable Attenuator CN-796/U.

(9) Multimeter ME-26B/U.

(10) Litcom test fixture TEF 20006-910B2, B3 and B5.

b. Test Conditions and Connections.

(1) Set all test fixture switches to OFF.

(2) Connect AN/URM-145 with MX-4528/U to AN/GRM-50.

(3) Tune AN/GRM-50 to 13 MHz at an output of 100 mv.

(4) Connect equipment as indicated in figure 5-150.

(5) Adjust power supplies PP-3940/G to +18 volts dc and -9 volts dc.

(6) Set S3 to B5.

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	N/A	N/A	a Set all test fixture switches to off position.	a None.
			b. Connect Power Supplies PP-3949/G: +18-volt dc power supply to +18-volt dc terminals on test fixture, turn on and set for +18 volts dc; -9-volt dc power supply to -9-volt dc terminals on test fixture, turn on and set fur -9 volts dc.	b. None.
			c Mount board under test in fixture Connect all "E" terminals to appropriate connections.	c None.
			d. Tune AN/GRM-50 to 13 MHz with 100-mv output level and connect to J6 of test fixture TEF 20006-910B2, B3, B5.	d None
			e. Connect AN/URM-145 with MX-4528/U to TEF 20006-910B2, B3, B5 J3.	e None
			OPERATIONAL TESTS	
2	V/A	N/Aq	Connect ME-26B/U to "MA" jacks on test fixture	None
3	On ME-26B/U, set FUNCTION switch to +DC AMPS and RANGE switch to 0.5 MA.	N/A	None.	None
4	On TEF 20006-910B2, B3 and B5: Set +18-volt dc, -9-volt dc switch S1 to up (ON) position. Turn S2 to -9-volt dc position	N/A	Measure the -9 volts dc on ME-26B/ U.	The -9 volts dc as read on ME-26B/ U should be 02 ma maximum
5	On ME-26B/U, set RANGE switch to 5MA.	N/A	None	
6	On TEF 20006-910B2, B3, and B5: Turn S2 to +18-volt dc position. +18-volt dc ON-OFF switch S6 to ON.	N/A	Measure the +18 volts dc on ME-26B /U	The +18 volts dc as read on ME-26B/ U should be 4.0 ma maximum
7	N/X	N/A	Measure the rf output on AN/URM-145.	AN/ URM-145 should indicate 200 mv minimum
8	N/A	N/A	Vary AN /GRM-50 frequency across the range from 13 to 15 MHz, keeping its output constant at 100 mv	AN/ URM-145 should maintain a minimum reading of 200 mv throughout this range
			LEAKAGE TEST	
9	N/A	N/A	a. Disconnect AN/URM-145 from J3 on TEF 20006-910B2, B3, B5	a None

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
9 (Cont)			b Connect AN/URM-85 in series with CN-796/U to J3 on TEF 20006-910-B2, B3, B5.	b. None.
			c. Set CN-796/U to and AN/URM-85 signal input attenuator to 80 dB.	c. None.
			d. Tune AN/GRM-50 to 14 MHz at an output of 100 mv.	d. None.
			e. Tune AN/URM-85 to 14 MHz, and adjust the IF GAIN control for full-scale meter deflection This will be the 0-dB reference level	e. None
10	On TEF 20006-910B2, B3, and B5: +18-volt dc switch S6: OFF.	N/A	Measure the leakage voltage as indicated on AN/URM-85.	The maximum leakage as read or AN/URM-85 should be a minimum of 40 dB below the reference level.

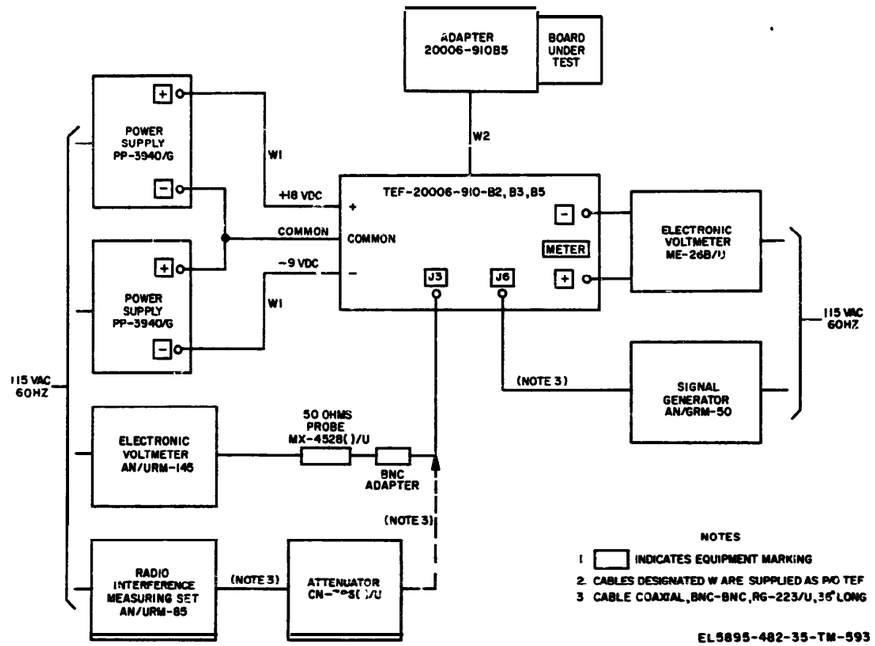
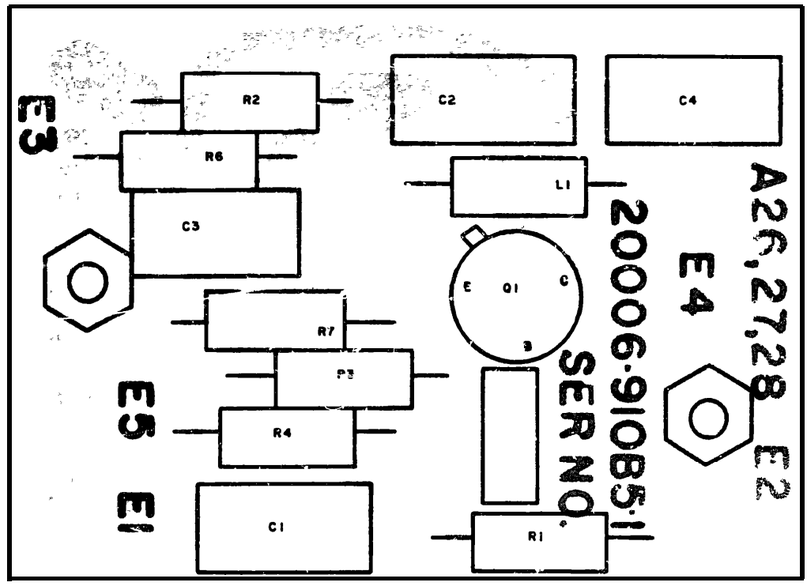


Figure 5-150 Switch amplifier A15A26 through A15A28 test setup diagram.



NOTES
1 CIRCUIT VIEWED FROM COMPONENT SIDE
2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

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Figure 5-151. Switch data A15A26 through A15A28, wiring diagram and parts location

5-52. Receiver Function Bypass A16 Troubleshooting

The receiver function bypass is simply a jumper unit which contains no active or passive components. Testing and troubleshooting of the unit consists of continuity measurements, using an ohmmeter.

5-53. 1-MHz Isolation Amplifier Test Procedure.
(figs 5-152 through 5-158)

Step No.	Test equipment	Equipment under test	Control settings	Test procedure	Performance standard
1	TEF 20006-925D1-1: POWER switch. OFF TEF 20006-925A1-2: S1:1 S2: 1 PP-3940/G NO 1 Output: +18 volts dc PP-3940/G NO 2 output -18 volts de	N/A		a. Set TEF 20006-925A1-1 POWER switch to ON.	a. None.
				b. Adjust power supply input to TEF 20006-925A1 1 +18V jack to +18 volts dc ± .1 volt and to −9 volts ± .1 volt.	b. None.
				c Set TEF 20006-925A1-1 switch S1 to position 2	c. None
				d. Adjust TEF 20006-925A1-1 OUTPUT LEVEL control for a reading of 10 on 925A1 meter and 10 vrms on AN/URM-145 (adjust OUTPUT LEVEL control for I 0 vrms on AN/URM-145 if necessary)	d. None.
				e Connect AN/URM-145 to jack J2 and terminate J4 with 50 ohms	e AN/ URM-145 should indicate a 382 5 mv ±67.5 mv and microammeter shall indicate 50 ua ±15
				f Sat TEF 20006-925A1-1 switch S1 to position 1. (Check that 1 MHz output level of TEF 20006-925A1-1 is 1.5 volts rms into 50 ohms)	f. Same as e above
				g Set TEF 20006-925A1-1 switch S1 to position 3 (Check that 1-MHz output level of TEF 20006-925A1 is 05 volt rms into 50 ohms)	g Same as e above
				h Set TEF 20006-925A1-1 POWER switch to OFF	h None
				i Replace 50-ohm termination on J4 with AN /URM -145 Terminate J2 with 50 ohms	i None
				j Set TEF 20006-925A1-1 POWER switch to ON	l AN/ URM-145 should indicate 0 9 volt rms minimum
				k Set TEF 20006-925A1-2 switches S1 and S2 to position 2	k Same as j above
				1 Repeat h above	l None
				m Replace 50-ohm termination on J2 with AN/URM-145 and terminate J4 with 50 ohms	m None
				n Repeat j above	n None
				o Repeat c above	o Same as c above
				p Repeat f and g above	p Same as f and g above
2	N/A	N/A		a Connect equipment as shown in figure 5-158	a None
				b Adjust CN-796/U for 20-dB attenuation	b None
				c Set AN/URM-85 signal input attenuator for 80-dB attenuation.	c None
				d Set TEF 20006-925A1-1 POWER switch to ON and switch S1 to position 1	d None
				e Set TEF 20006-925A1-2 switches S1 and S2 to position 1 Disconnect cable from TEF 20006-925A1-253 at J3 until further notice	e None
2 (Cont)				f. Tune AN/URM-85 to 1 MHz and adjust IF GAIN control for a convenient reference level on AN/URM-85.	f. None.
				g. Set TEF 20006-925A1-2 switch S2 to position 2.	g. AN/ URM-85 should indicate that noise level is 110 dB below reference established in f above.
				h. Disconnect cable from J6.	h. None.
				i. Connect TEF 20006-925A1-2J3 to J3.	i. None.
				j. Set TEF 20006-925A1-2 switch S1 to position 2.	j. None.
				k. Repeat b, c, and f above.	k. Same as b, c, and f above.
				l Set TEF 20006-925A1-2 switch S2 to position 1.	l Same as g above.
				NOTE If performance standards in steps 1 and 2 cannot be obtained. perform step 3.	
3	N/A	N/A		a. Disconnect module from test setup.	a None
				b Remove top and bottom covers	b None.
				c Connect equipment as in 1 c, 1 d, and 1 e	c None
				d. Connect AN/URM-145 with high impedance probe to A3E8	d AN/ URM-145 should indicate 150 mv minimum
				NOTE If parameters of e and f below cannot be obtained, adjustments of A3L2 may be necessary	
				e Connect AN/URM-145 with high impedance probe to A3E4	e AN/ URM-145 should indicate 310 mv ±1l dB
				f Connect AN/URM-145 with high impedance probe to A3E6	f AN/ URM-145 should indicate 3 volts ± 1 dB

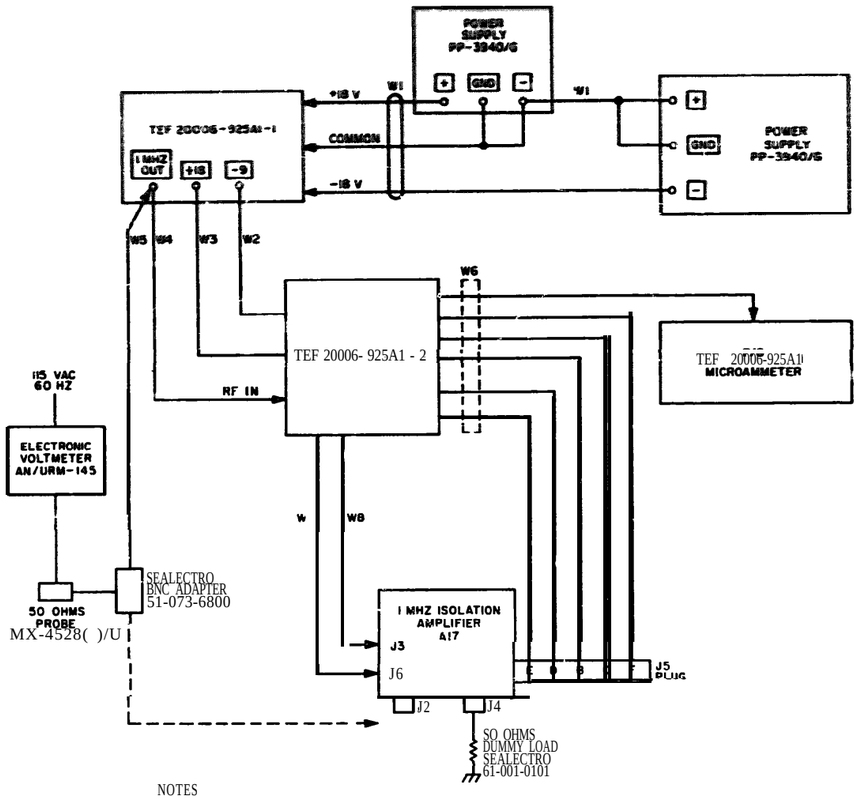
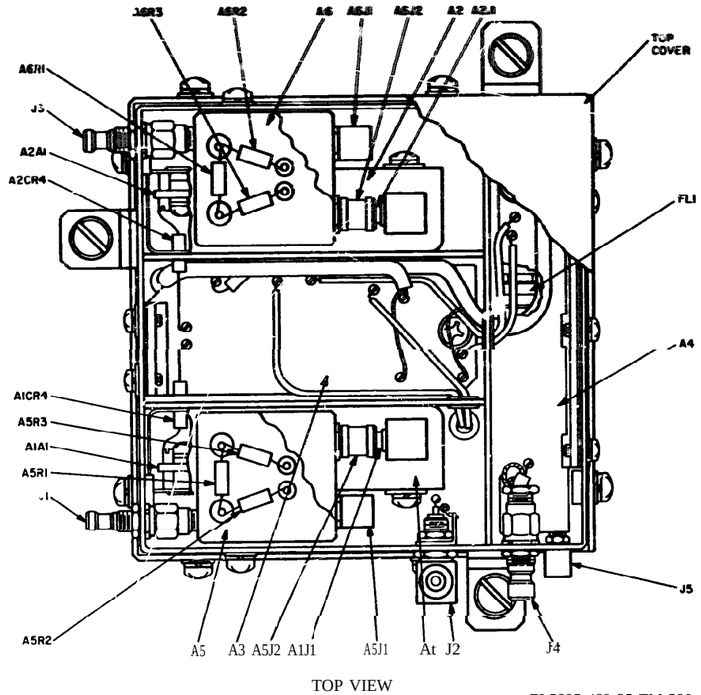


Figure 5-152. 1-MHz isolation amplifier A17, test setup diagram.



TOP VIEW

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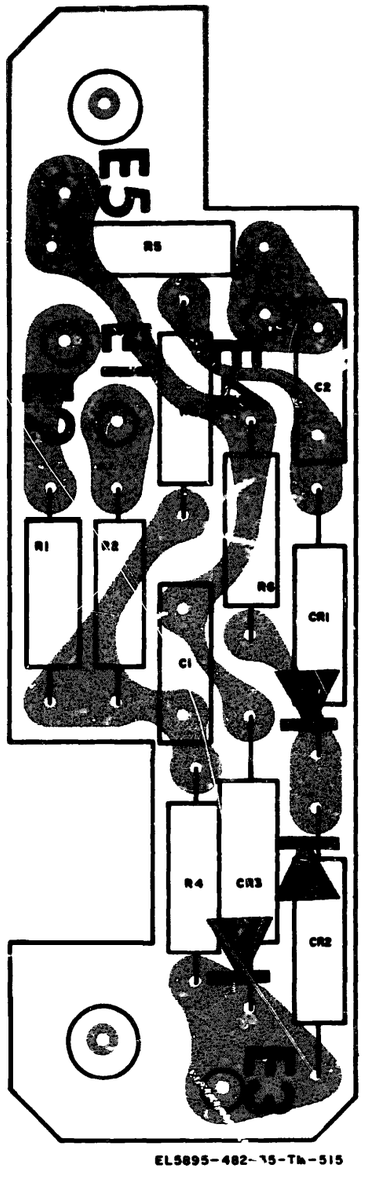
Figure 5-153 1-MHz isolation amplifier A17, parts locution

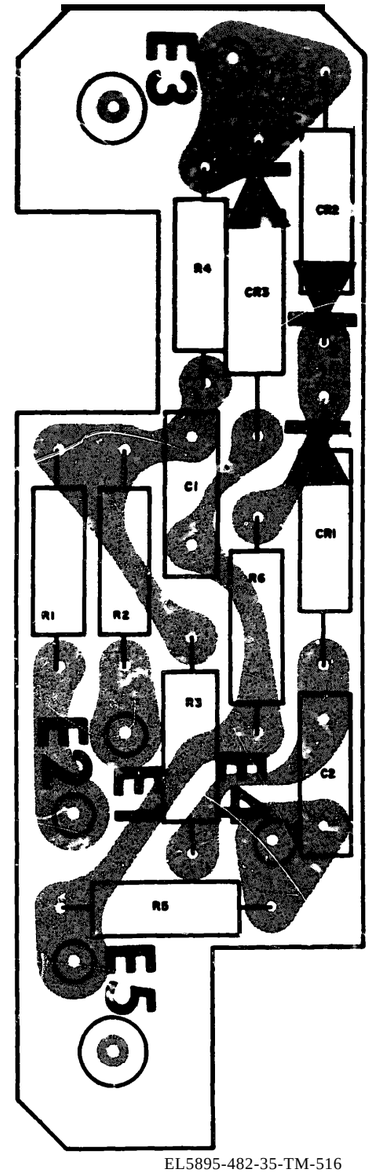


NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE.

2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT OR THE OPPOSITE SIDE OF THE CIRCUIT BOAR0

Figure 5-154. Diode switch A17A1. wiring diagram and parts location

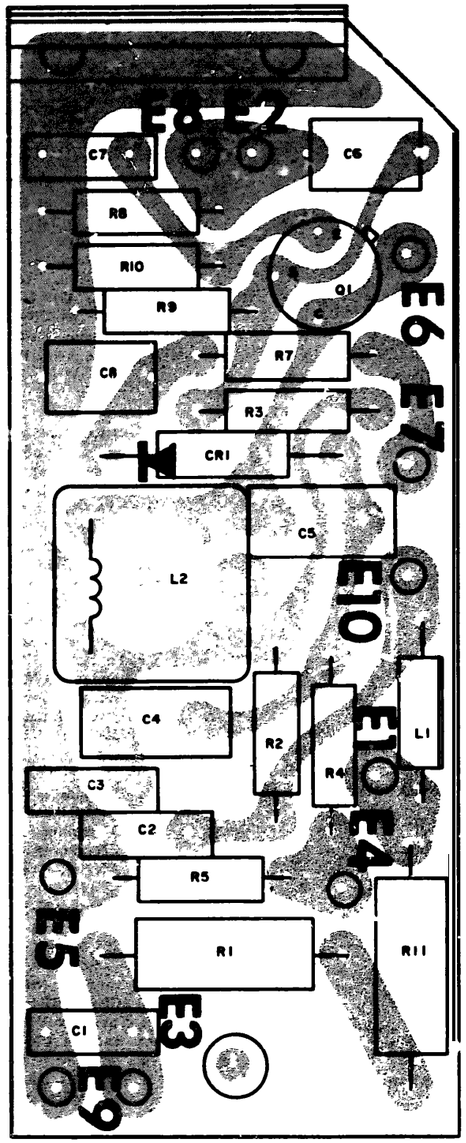


NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE.

2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

Figure 5-155 Diode witch A17A2, wiring diagram and parts location



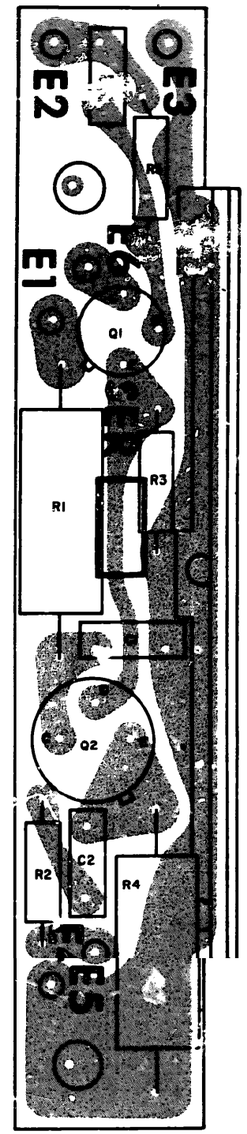
NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD.

EL5895-482-35-TM-517

Figure 5-156. Isolation output amplifier A17A3, wiring diagram and parts location



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE.

2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD.

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Figure 5-157. 1-MHz isolation monitor amplifier A17A4, wiring diagram and parts location.

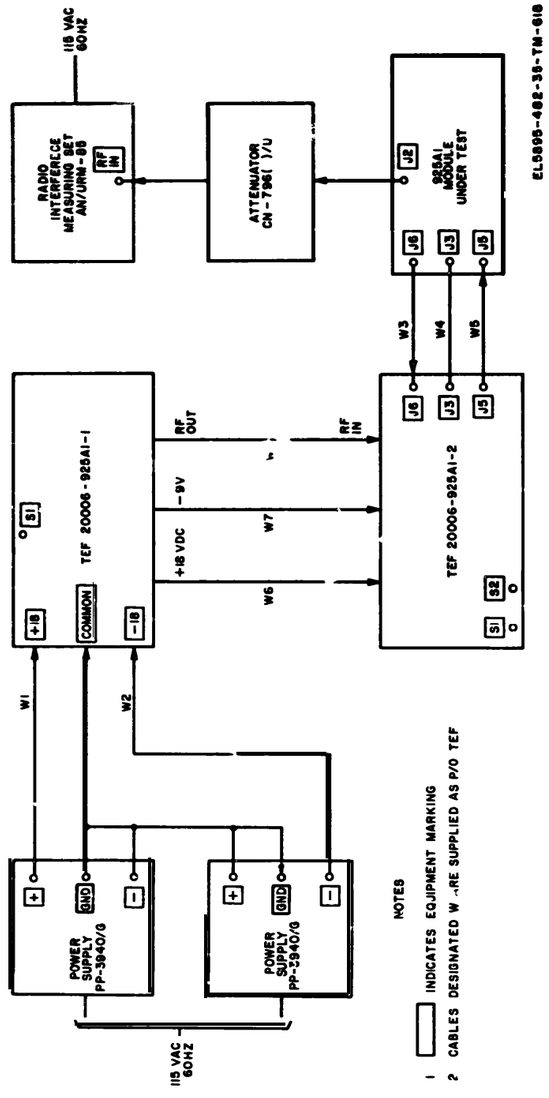


Figure 5-158. 1-MHz isolation amplifier A17 signal to noise, test setup diagram.

5-54. Frequency Multiplier 1A2A18 Test Procedure

(figs. 5-159 through 5-162)

Stop No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TEF 20006-908 A1: 81: ON S2: 13MHz S4: 13MHz S5: 130MHz	N/A	a Connect AN/URM-145 with MX-4528/U to J4.	a AN/ URM-145 should indicate 800 mv minimum.
			b. Remove AN/URM-145 with MX-4528/U and connect AN/USM-207 to J4.	b. AN/ USM-207 should indicate 130-MHz.
			c. Remove AN/USM-207 and connect AN/URM-85 through CN-796/U to J4.	c. Now.
			d Tune AN/ URM-85 to 130 MHz and set CN-796/U for l o- dB reference level.	d. Now.
			e Tune AN/URM-85 to 104 MHz. 117 MHz, 143 MHz, and 156 MHz.	e. For each frequency, AN/ URM-85 should indicate a minimum of 80 dB below the reference level of above.
2	TEF 20006-908 A1: 81: ON S2: 14MHz S4: 14MHz S5: 140MHz	n / n	a Disconnect TEF 20006-908A1 from J1 and connect to J2.	a None.
			b. Disconnect AN/URM-85 and CN-796/U and connect AN/URM-145 with MX-4528/U to J4.	b. AN/ URM-145 should indicate 800 mv minimum.
			c. Remove AN/URM-145 with MX-4628/U and connect AN/USM-207 to J4.	c. AN/ USM-207 should indicate 140 MHz.
			d. Remove AN /USM-207 and connect AN/URM-85 through CN-796/U to J4.	d. None.
			l . Tune AN/URM-85 to 140 MHz and set CN-796/U for a 0-dB reference level.	l . None.
			f Tune AN/URM-85 to 112 MHz, 126 MHz, 154 MHz, and 168 MHZ.	f. For each frequency. AN/ URM-85 should indicate a minimum of 80 dB below the reference level of l above.
3	TEF *20006-908* A1: 81: ON S2: 15MHz S4: 15MHz S5: 150MHz	N/A	a Disconnect TEF 20006-908A1 from J2 and connect to J3.	a None.
			b. Disconnect AN /URM-85 and CN-796/U and connect AN/URM-145 with MX-4528/U to J4.	b. AN/ URM-145 should indicate 800 mv minimum.
			c. Remove AN/URM-145 with MX-4528/U and connect AN/USM-207 to J4.	c. AN/ USM-207 should indicate 150 MHz.
			d. Remove AN/USM-207 and connect AN/URM-85 through CN-796/U to J4.	d. None.
			l . Tune AN/URM-85 to 150 MHz and set CN-796/U for a 0-dB reference level.	l . None.
			f. Tune AN/URM-85 to 120 MHz, 135 MHz, 165 MHz, and 180 MHz.	f. For each frequency, AN/ URM-85 should indicate a minimum of 80 dB below the reference level of e above.
			g Connect ME-26B/U between TEF 20006-908A1 TP1 and TP2	g ME-26B/ U should indicate 130 mv dc.

Step No.	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
4	**TEF 20006-908 A1:** **S1: ON** **S3: B1, B6** **S4: 13MHz** **Power supply: Adjust for** +18 volts dc.	N/A	a Connect AN/ URM-145 with MX-4528/U to TEF 20006-908 A1J2, and adjust 13 MHz output for 200 mv on AN/URM-145. b. Disconnect AN/URM-145 with MX-4528/U from TEF 20006-908A1 and connect J1. c. Connect AN/URM-145 with MX-4528/U to base of A1Q1 d. Disconnect AN/URM-145 with MX-4528/U from base of A1Q1 and connect AN/URM-85 through W2 to base of A1Q1. e. Connect AN/URM-145 to TEF 20006-908 A1J2, switch S4 to 14-MHz position, and adjust 14-MHz output for 200 mv on AN/URM-145. f. Tune AN/URM-85 to 14 MHz and adjust output for a convenient reference level. g. Tune capacitor A1C69 for a null on AN/URM-85. h. Connect TEF 20006-908A1J2 to J2. i. Connect AN/URM-145 with MX-4628/U to base of A1Q2. j. Connect AN/ URM-145 to TEF 20006-908 A1J2, S4 to 15 MHz, and adjust 15-MHz output for 200 mv on AN/URM-145. k. Tune AN/URM-85 to 15 MHz and adjust output for a convenient reference level. l. Connect AN/URM-85 through W2 to base of A1Q2. m. Tune capacitor A1C72 for a null on AN/URM-85 n Connect TEF 20006-908A1J2 to J3 o. Connect AN/ URM-145 with MX-4528/U to base of A1Q3. p. Connect AN/URM-145 to TEF 20006-908 A1J2, set TEF 20006-908A1 switch S4 to 14 MHz position. and adjust 14-MHz output for 200 mv on AN/URM-145. q. Tune AN/URM-85 to 14 MHz and adjust output for a convenient reference level. r. Disconnect AN/URM-85 from base of A1Q2 an3 connect to base of A1Q3. s Tune capacitor A1C75 for a null on AN/URM-85.	a None b. None. c. AN/ URM-145 should indicate 200 mv minimum. d None e. None. f. None g AN/ URM-85 should indicate a null h None. i. AN/ URM-145 should indicate 200 mv minimum j. None. k None. l. None m. AN/ URM-85 should indicate a null A. AN/ URM-145 should indicate 200 mv minimum o. None p None q. None. r. None. s AN/ URM-85 should indicate a null.
6	TEF 20006-908 A1: S1: ON **S5: 130MHz** ***CN-756/U*** **10 dB**	N/A	Tune capacitors A2C7, A2C4, A2C8, and A2C5 for a waveform. If **proper waveform can not** be **achieved, proceed as follows:** a. **Turn all adjustable caps on** A2 **fully cw**	AN/ USM-254 should indicate a waveform.

Step No	Test equipment	Control settings / Equipment under test	Test procedure	Performance standard
5 (Cont)	AN/URM-503: Sweep DIAL: Approx 140MHz Marker dial: 150MHz Marker width: As required Rf function: sweep Sweep width- As required Sweep rate: Line Level Limit. See Manual Monitor: RF1 Level: As required Rf attenuator. Set for 50 mv on AN/URM-145 Logafier Kay 10258: Lin Gain. Do not overdrive Range- LIN AN/USM-254 Input: dc Horizontal: EXT.		b Adjust A2C7 and C8 4 full turns ccw. c. Adjust A2C4 and C5 2 full turns ccw . d. These settings should bring alignment very close to desired waveform. Slight readjustment may be required.	
6	TEF 20006-908 A1: S1- ON S2:13MHz S4- 13MHz	N/A	NOTE Before proceeding, mount test covers supplied with TEF 20006-908A1 a. Connect AN/URM-145 with MX-4628/U to TEF 20006-908 A1J2 and adjust 13-MHz output for 200 mv on AN/URM-145 b Connect TEF 20006-908A1J2 to J1. Connect AN/URM-145 with MX-4528/U to J4 c Tune capacitors A1C26, A1C44, A1C52, A1C55, and inductor A1L3 for maximum output. d Connect AN/USM -207 to J4 e Connect AN/URM-85 to J4 f Adjust CN-796/U for 20 dB attenuation and the AN/URM-85 attenuator for 80-dB attenuation g. Tune AN/URM-85 to 130 MHz and adjust output for a convenient reference level. h. Tune AN/URM-85 to 143 MHz. and adjust A1L7 for minimum **indication** **i. Tune AN/URM-85 to 104 MHz. 117 MHz, and 156 MH-**	a None b None c. AN/ URM-145 should indicate 800 mv minimum d AN/ USM-207 should indicate 130 MHz e. None f. None g None h None **i AN/ URM-85 should indicate at least 80 dB below reference level of h above for all selected frequencies**

Step No.	Control settings: Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
6 (Cont)			j. Set TEF 20006-908A1 switch S4 to 14 MHz and S2 to position 2.	j. None.
			k. Connect AN/GRM-145 with MX-4528/U to TEF 20006-908 A1J2 and adjust 14-MHz output for 200 mv on AN/URM-145.	k. None.
			l Connect AN/URM-145 with MX-4528/U to J4. Connect TEF 20006-908A1J2 to J2.	l. None.
			m. Tune capacitors A1C30, A1C46, A1C53, A1C57, and inductor A1L4 for maximum output.	m. AN/ URM-145 should indicate 800 mv minimum.
			n. Connect AN/USM-207 to J4.	n. AN/ USM-207 should indicate 140 MHz.
			o. Repeat e above.	o. None.
			p. Repeat f above.	p. None.
			q Tune AN/URM-85 to 140 MHz and adjust output for a convenient reference level	q. None.
			r Tune AN/URM-85 to 154 MHz and adjust A1L8 for minimum indication	r None
			s. Tune AN/URM-85 to 112 MHz, 126 MHz, and 168 MHz	s. AN/ URM-85 should indicate at least 80 dB below reference level of r above for ail selected frequencies
			t On TEF 20006-908A1, set S4 to 15 MHz and S2 to position 3	t None.
			u. Connect AN/URM-145 with MX-4528/U to TEF 20006-908 A1J2 and adjust 15-MHz output for 200 mv on AN/URM-145	u None
			v Connect AN/URM-145 with MX-4528/U to J4. Connect TEF 20006-908A1J2 output to J3.	v None
			w. Tune capacitors A1C34, A1C47, A1C54, A1C59, and inductor A1L5 for maximum output	w AN/ URM-145 should indicate 800 mv minimum
			x Connect AN/USM-207 to J4	x AN/ USM-207 should indicate 150 MHz.
			y Repeat e above.	y None
			z. Repeat f above.	z None
			aa Tune AN/URM-85 to 150 MHz and adjust output for a convenient reference level	aa. None
			ab. Tune AN/URM-85 to 165 MHz and adjust A1L9 for minimum indication.	ab None
			ac Tune AN/URM-85 to 120 MHz. 135 MHz, and 180 MHz	ac AN/ URM-85 should indicate at least 80 dB below reference level of aa above for all selected frequencies
			ad. Connect ME-26B/U across TEF 20006-908A1 test points TP1 and TP2.	ad. None
			ae. Adjust output at TEF 20006-908A1J2 for 14 MHz at 200 mv.	ae. ME-26B/ U should indicate 130 mv dc.

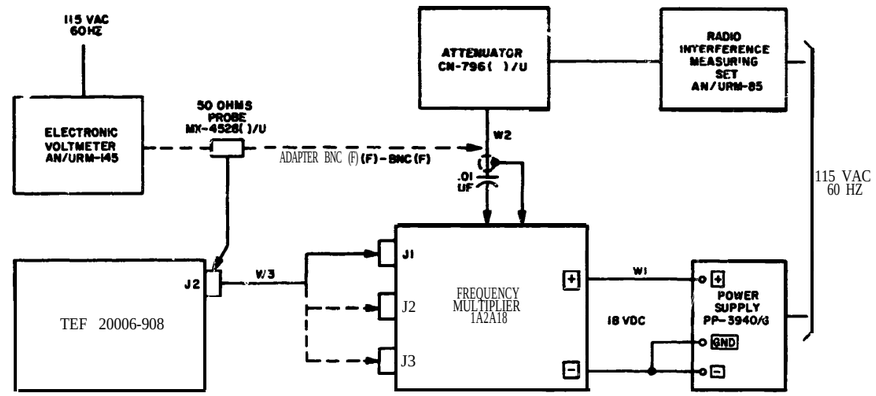
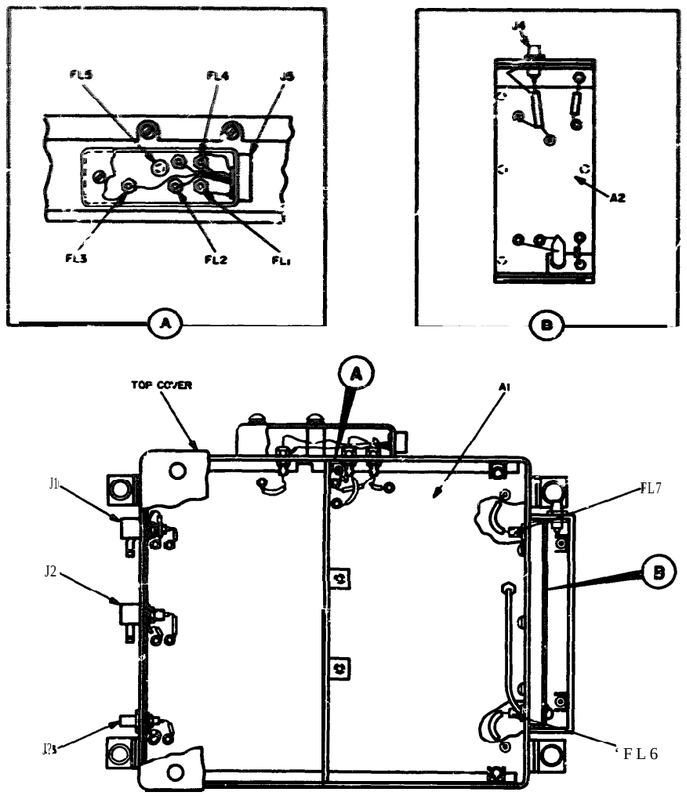
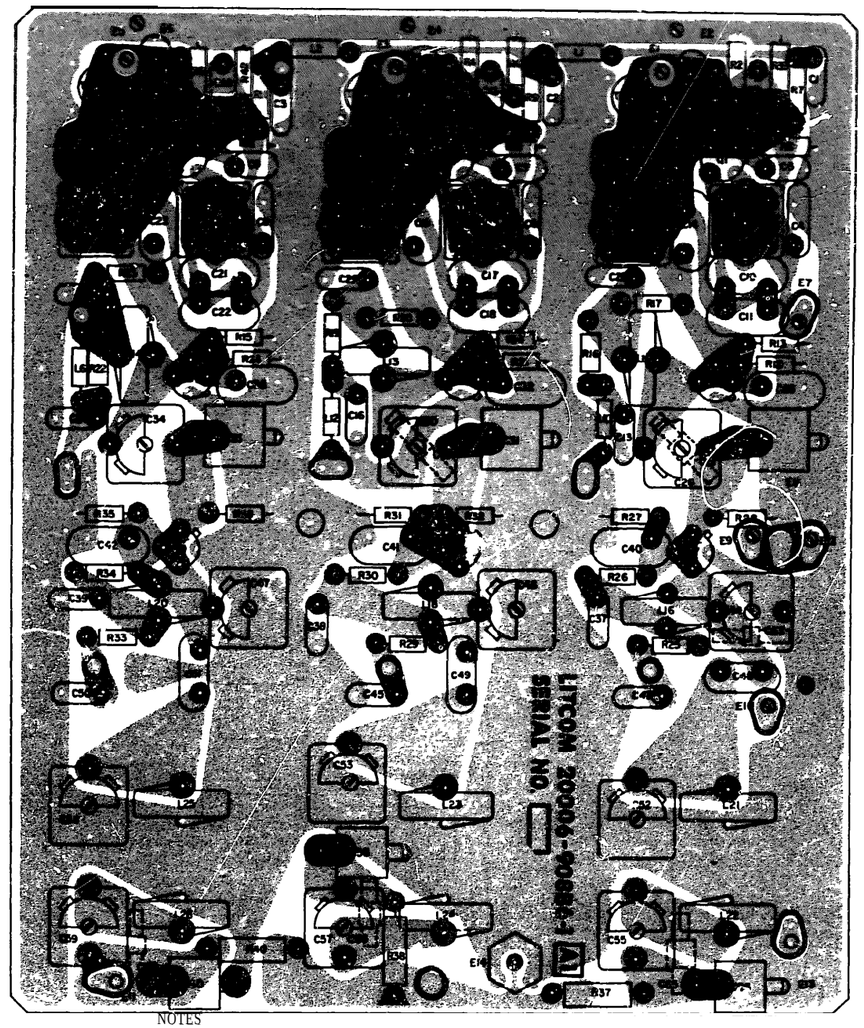


Figure 5-159 Frequency multiplier A18 13-MHz, 14-MHz, and 15-MHz crystal filter, test setup diagram



TOP VIEW EL5859-482-35-TM-579

Figure 5-160 Frequency multiplier A18 parts location



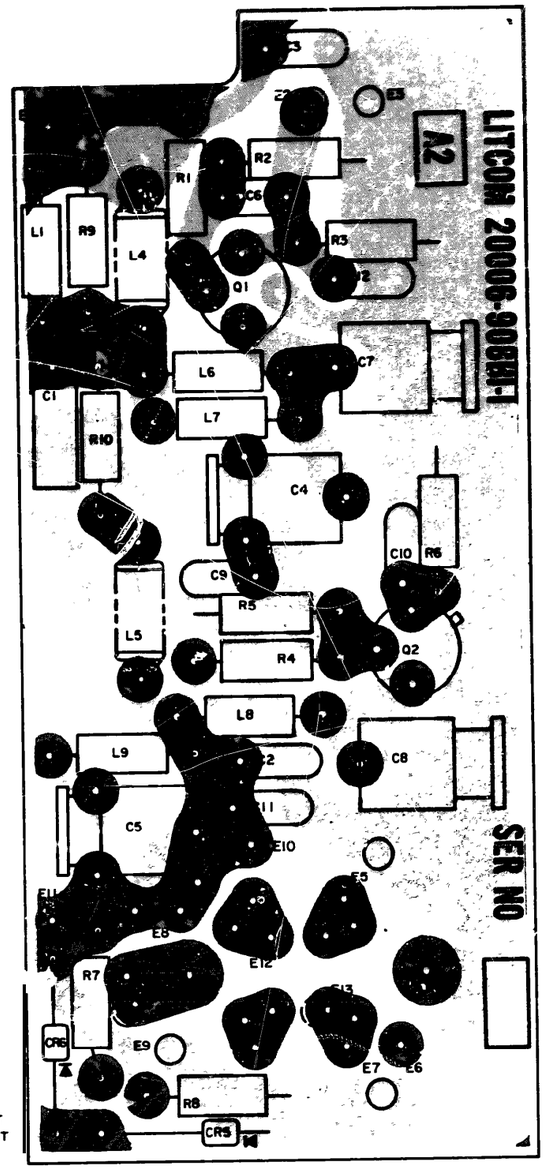
NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD.

EL5895-482-35-TM-551

Figure 5-161. Frequency multiplier A18A1, wiring diagram and pans location



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-548

Figure 5-162. 10-MHz interpolation amplifier A18A2, wiring diagram and parts location

5-55. Rf Amplifier and Mixer A19 Test Procedure

(figs. 5-162 through 5-169)

Step NO	Test equipment	Control settings Equipment undo- test	Test procedure	Performance standard
1	Power supply No. 1: Set to +18 volts dc 1% Power supply No. 2: set to -9 volts dc 1% AN/URM-145 Set to measure 2.25 volts rms Radio Interference Measuring Set AN/URM-85 (selective voltmeter) Variable Attenuator CN-796/U: Set to 46 dB Multimeter Simpson 260 Set to measure -0 15 volt dc	Rf and mixer amplifier: N/A	a. Adjust the level synthesizer frequency to 2.000.0 MHz as indicated on the frequency readouts. NOTE The actual frequency is always 1.75 MHz higher than the displayed frequency (3.75 MHz in this case).	a. None.
			b. Connect the AN/URM-145 through the 50-ohm probe to J3 on rf and mixer amplifier.	b None.
			c. On test fixture, set BAND INFO switch to position 1.	c. None
			d Adjust potentiometer R2 for an indication of 2.25 volts rms on the AN/URM-145	d None
			e. Disconnect the AN/URM-145 and connect the selective voltmeter through the attenuator to J3. Set attenuator to 46 dB.	e None.
			f Tune the 3 75-MHz signal and note zero reference level. Tune the second harmonic of the zero reference signal (7 5 MHz) and note level	f. The difference between the fundamental frequency and second harmonic should be 55 dB mm
			g Repeat a thru f above for the following frequencies and BAND INFO switch positrons Synthesizer freq (MHz) Displayed — Actual 3 000 0 — 4 75 5 000 0 — 6 75 8.000 0 — 9 75 12 000.0 — 13 75 19 000 0 — 20 75 RAND INFO sw position — 2d Harmonic (MHz) 2(4 75-6 75 MHz) — 9 50 3 (6 75-9 75 MHz) — 13 50 4(9.75-13 75 MHz) — 19.50 5(13 75-20 75 MH-) — 27 50 6(20 75-31 75 MHz) — 41.50	g The difference between the fundamental frequency and second harmonic should be 55 dB mm
			A. Disconnect the selective voltmeter and connect the AN/URM-145 thru 50-ohm probe to J3 on rf and mixer amplifier	h None
			I Adjust synthesizer frequency to 2.000 0 MHz (output frequency 3.75 MHz)	i None

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1 (Cont)			**j. Set band info switch on test fixture to position 1 and observe that the voltage as indicated on the AN/URM-145 can be varied** by R2 from less than 1 volt rms to more than 2.25 volts rms. Set R2 for an indication of 2.25 volts rms and do not readjust after this test.	j. None.
			k. Adjust synthesizer frequency to 2.500.0 MHz (output frequency 4.25 MHz) and note the output level on the AN/URM-145.	k. Now.
			l. Adjust synthesizer frequency to 3.000.0 MHz (output frequency 4.75 MHz), and nob the output level on the AN/URM-145.	l. None.
			A. Compare level obtained in j, A, and l above and record band 1 frequency response.	m. None.
			n. Repeat i thru m above, substituting the following frequencies and BAND INFO switch positions.	n. Compare all levels measured in m and n Variation should be less than ±0.5 dB overall.

Synthesizer freq 9(MHz)

Displayed	Actual	BAND INFO switch position
3.000.0	4.75	2
4.000.0	5.75	2
MOO.0	6.75	2
5.000.0	6.75	**3**
6.500.0	8.25	**3**
8.000.0	9.75	**3**
8.000.0	9.75	**4**
10.000.0	11 75	4
12.000.0	13.75	4
15.500.0	17.25	5
19.000.0	20.75	5
19.000.0	20.75	5
24.500.0	26.25	6
30.000.0	31.75	6
		6

			Band Info Metering.	
			a On teat fixture. set BAND INFO switch to 1 and. if necessary, adjust potentiometer R2 for an indication of 2 25 volts rms on the AN/URM-145.	a None
			b. Connect ME-26B/ U to J2 on teat fixture and set meter switch to position 1	b The multimeter indication should be -0 15 volt dc ± 10%
			Output Level Metering	
3			**a. On test fixture, set BAND INFO switch to 1 and, if necessary, adjust potentiometer R2 for an indication of 2.25 volts rms on the AN/URM-145.**	a. None.
			b. Connect ME-26B/U to J2 on test fixture and set meter switch to position 2.	b. The multimeter indication should be -0.15 volt dc ± 10 %.
			Fault Metering.	
			a On test fixture, set BAND INFO switch to 1 and, if necessary, adjust potentiometer R2 for an indication of 2.25 volts rms on the AN/URM-145.	a. Now.
			b. Connect ME-26B/U to J2 on test fixture and set meter switch to position 3.	b. The multimeter indication should be -0.15 volt dc ±10%.

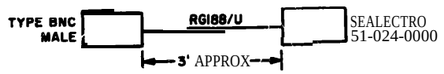


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Figure 5-163 Rf amplifier and mixer A22A19 cable fabrication diagram

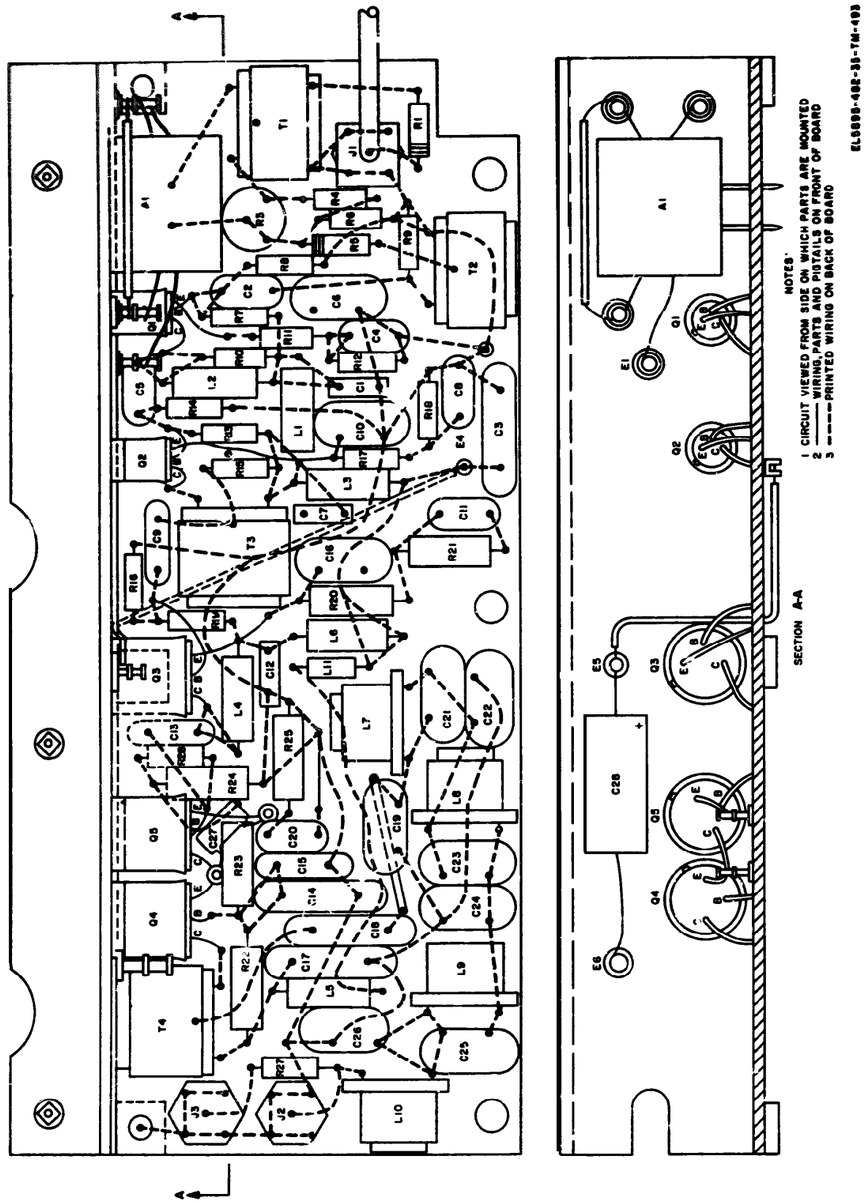


Figure 5-164. Output amplifier A22A19A1, wiring diagram and parts location

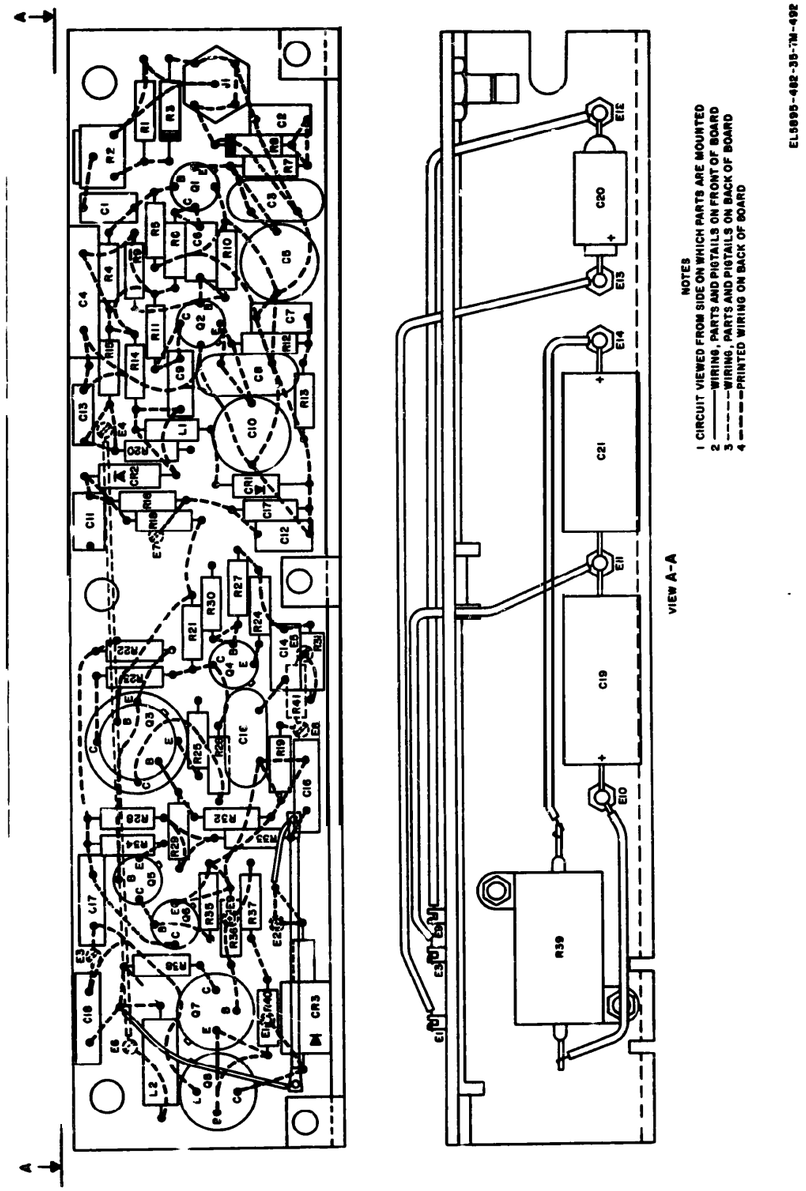


Figure 5-165. Agc amplifier, detector, dc amplifier and agc bridge A22A19A2, wiring diagram and parts location

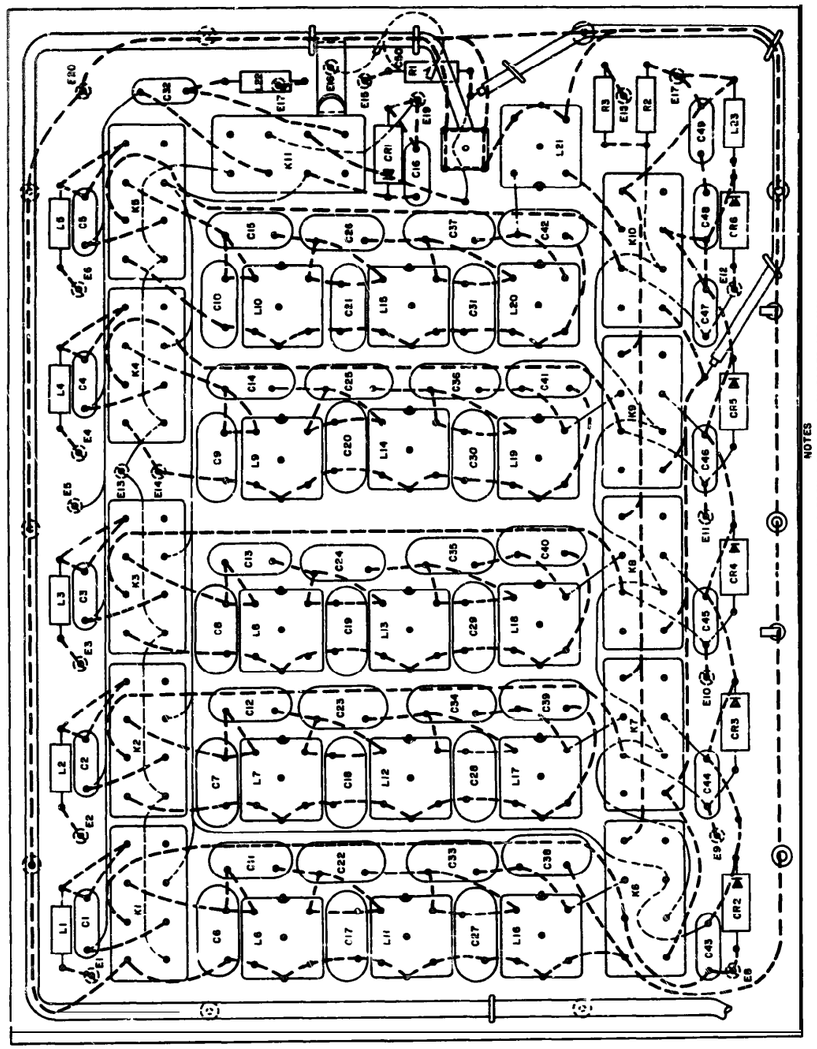


Figure 5-166. Switch filter and output amplifier A2219A3, wiring diagram and parts location

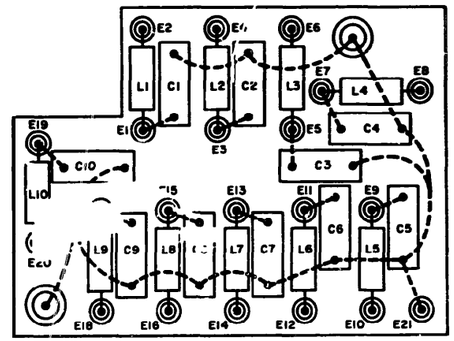


Figure 5-167 Line filter A22A19A4, wiring diagram and parts location

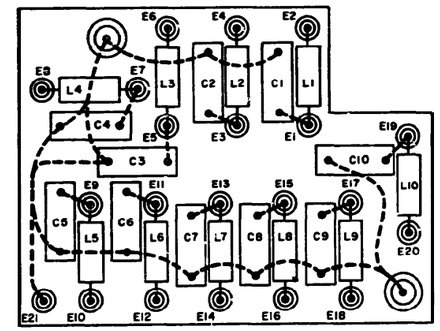
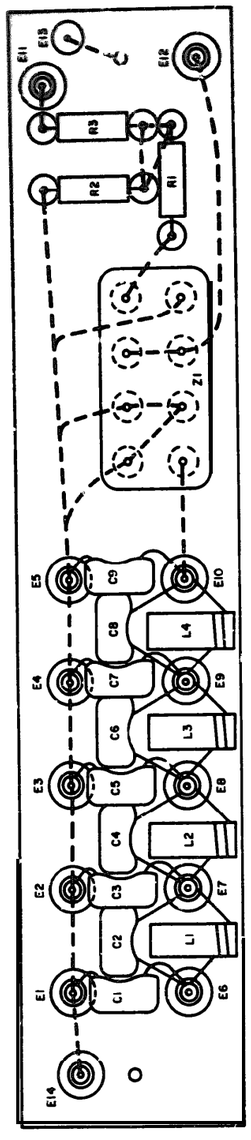
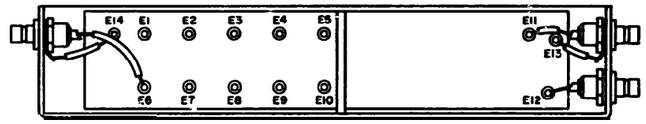


Figure 5-168 Line filter **A22A19A5,** *wiring diagram and parts location*



NOTES:
1 CIRCUIT VIEWED FROM SIDE ON WHICH PARTS ARE MOUNTED.
2 ——— WIRING, PARTS AND PIGTAILS ON FRONT OF BOARD.
3 — — — PRINTED WIRING ON BACK OF BOARD.
FI 5895-482-35-TM-489

Figure 5-169. Down converter A22A19FL1 printed circuit board assembly, wiring diagram and parts location

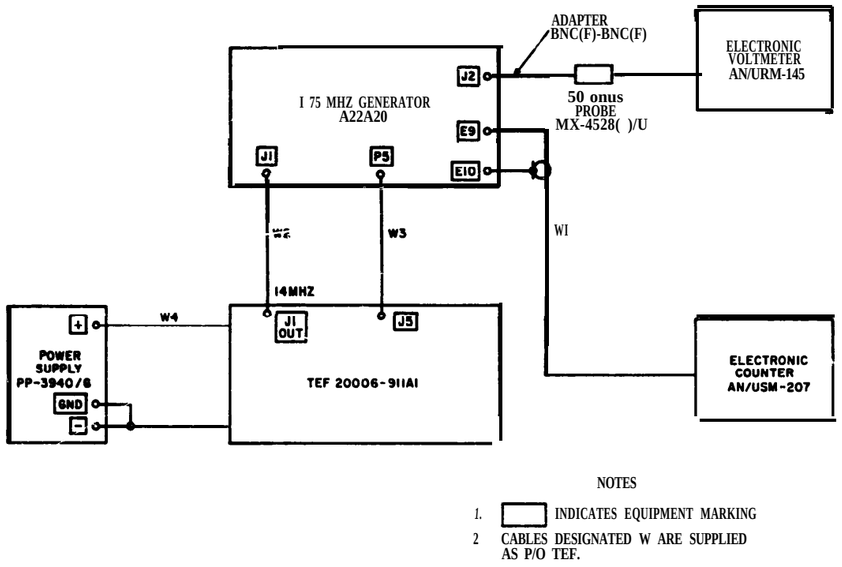


EL5895-482-35-TM-487

Figure 5-170 Down converter A22A19FL1, wiring diagram.

5-56. 1.75-MHz Generator Test Procedure
(figs. 5-171, 5-172, and 5-173)

Test equipment	Control settings Equipment under test	Test procedure	*Performance standard*
N/A	N/A	a Set TEF 20006-911A1 switches S1 and S2 to ON	a None
		b Set TEF 20006-911A1 switch S3 to OSC	b None
		c Adjust TEF 20006-911A1 LEVEL control for an indication of 50 on M1 meter	c None
		d Set TEF 20006-911A1 switch S3 to MOD.	d None
		e Adjust potentiometer A1R27 for maximum indication on AN/URM-145	e AN/ URM-145 should indicate 2 5 volts rms minimum and TEF 20006-911A1 meter Ml should indicate 80 ua minimum
		f Adjust potentiometer A1R27 for 1 volt rms	f AN/ URM-145 should indicate 1 volt rms and TEF 20006-911A1 should indicate 10 ua minimum
		g Same as e above	g Same as e above
		h Replace AN/URM-145 with AN/USM-207	h AN/ USM-207 should indicate 1 75 MHz ±50 Hz
		i Disconnect cable from J1	I AN/USM-207 indication shall remain within -10 kHz of 1 75 MHz ± 50 Hz
		J Reconnect cable to J1	J Same as h above
		k Momentarily deenergize power supply (for approximately 2 seconds)	k Same as h above

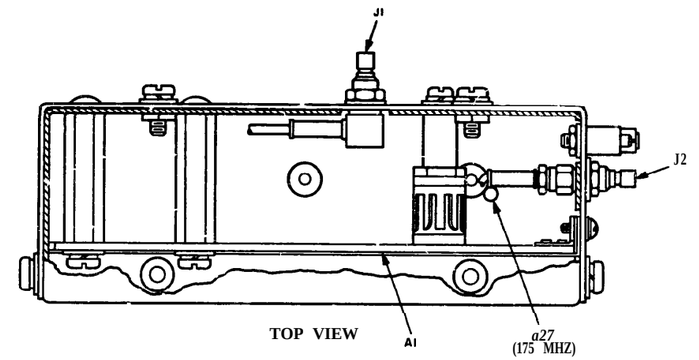


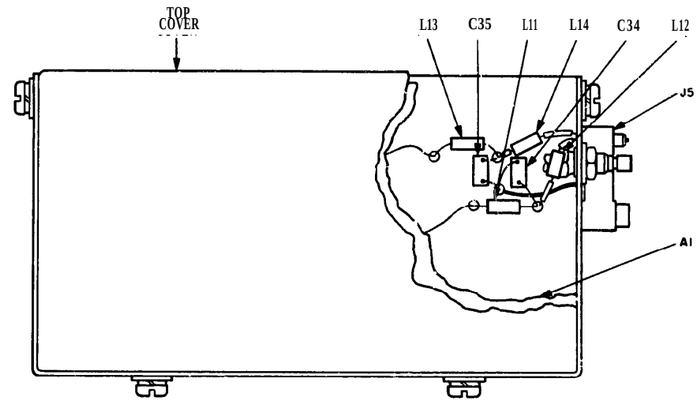
NOTES

1. ▭ INDICATES EQUIPMENT MARKING
2. CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF.

EL5895-482-35-TM-656

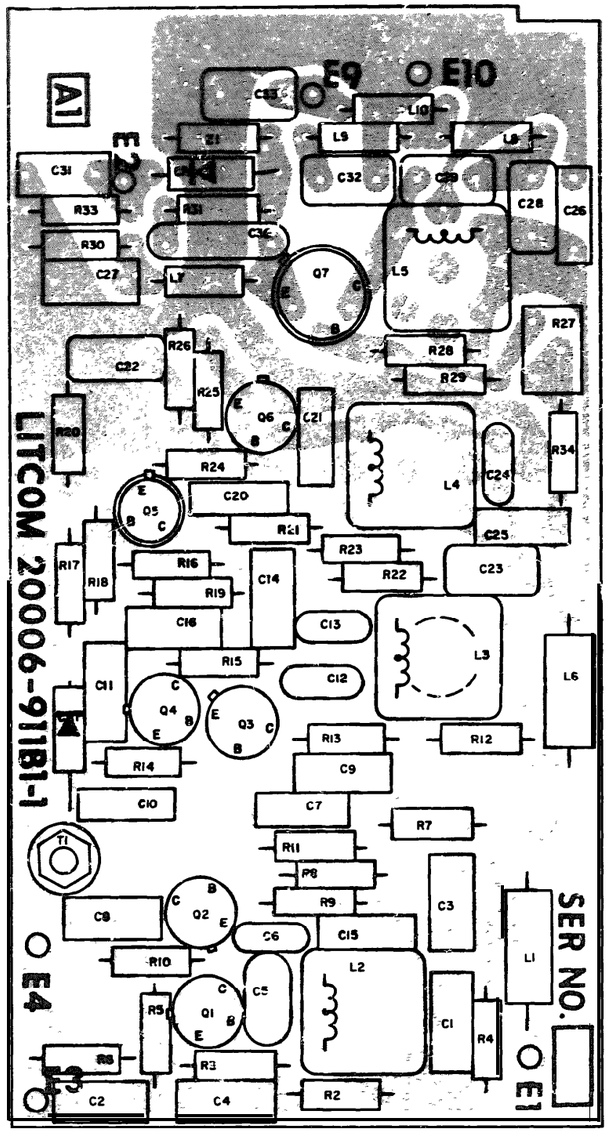
Figure 5-171 1-MHz generator A22A20, test setup diagram





EL5895-482-35-TM-567

Figure S-172 1 75-MHz generator A22A20, ports location



NOTES
I CIRCUIT VIEWED FROM COMPONENT SIDE
2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

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Figure 5-173 I 75-MHz generator A22A20A1. wiring diagram and parts location

5-57. Power Supply A22A21 Test Procedure
(figs. 5-174 and 5-175)

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	TEF 20006-924A1: S5: OFF. CB1: ON. S3: OFF. S1: OFF. S2: OFF. R1: Maximum counter-clockwise. R2: Maximum counter-clockwise.		a. Remove **A22A1 and A22A2 from** A22A21.	a None.
			b. Set TEF 20006-924A1 switch S4 **to +18, using Sim**pson 260.	b. None.
			c. Measure resistance across TEF 20006-924A1 jack J1.	c. Simpson 260 should indicate 10K ohm6 minimum.
			d. Set TEF 20006-924A1 stitch S4 t o -9.	d None.
			e. Using Simpson 260, measure resistance across TEF 20006-924A1 jack J1.	e. Same a9 c above.
			f. Set TEF 20006-924A1 switch S4 to +120.	f None.
			g. using Simpson 260, measure resistance across TEF 20006-924A1	g Same as c above.
			A. Using Simpson 260, measure resistance between E3 and one side of S1 and then the other side of S1 and ground	h. Simpson 260 should indicate less than 2 ohms for each measurement
			i Set TEF 20006-924A1 switch S5 to ON.	i Blower motor B1 operates.
			j. Using Simpson 260, measure voltage across capacitor Cl.	j. Simpson 260 should indicate 35 volts de i-6 volts.
			k. Using Simpson 260, measure voltage across A2-E and A2-F.	k Simpson 260 should indicate 15 volts ac ± 3
			l Set TEF 20006-924A1 switch S5 to OFF.	l None.
			m Plug Al and A2 into A22A21	m None
			n Connect AN/USM-98E to El and E2 (ground)	n None
			o Same as i above	o None.
			p Adjust A1R10 for 18 volts dc ±0 1 volt	p AN/ USM-98E should indicate 18 volts dc ± 0 1 volt
			q Connect AN/USM-98E to E2 (+) and E3 (-).	q None
			r Adjust A2R4 for -9 volts dc ±0 1 volt	r. AN/USM-98E should indicate -9 volts dc ± 0.1 volt
			s Connect Simpson 260 TEF 20006-924A1 Jack J1 and set switch S4 to +120	s Simpson 260 should indicate 130 volts dc ±20.
			t Set TEF 20006-924A1 switch to OFF and quckly remove A1 from A22A21 and feed oven assembly A1A1	t Over assembly A1A1 should feel mildly warm
			u Plug Al into A22A21	u None
			v Set TEF 20006-924A1 switch S5 to ON	v None
			w Rotate TEF 20006-924A1 switch S1 to ON and adjust potentiometer R1 clockwise until TEF 20006-924A1 meter M1 indicates 18 ADC	w TEF 20006-924A1 meter Ml should indicate 1 8 Adc
			x Set TEF 20006-924A1 switch S2 to ON and adjust potentiometer R2 clockwise until meter M2 indicates 0 1 ADC	x TEF 20006-924A1 meter M2 should indicate 0 1 ADC
			y Connect AN/USM-98E to E2 (-) and El (+) and record indication as a reference voltage	v AN/ USM-98E should indicate 18 volts dc ± 0 2 volt dc

Step No	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1 (Cont)			z. Set TEF 20006-924A1 switch S1 to OFF.	z. AN/ USM-98E voltage should not vary more thaw 10 mv dc.
			aa. Set TEF 20006-924A1 switch S1 to ON	aa. Same as v above.
			ab. Connect AN/ USM-98E to E3 (-) and E2 (-) and record indication as a reference voltage.	ab. AN/ USM-98E should indicate −9 volts dc ± 0.2.
			ac. Set TEF 20006-924A1 switch S2 to OFF.	ac. Same as z above.
			ad. Set TEF 20006-924A1 switch S2 to ON.	ad. Same as y above.
			ae. Connect AN/ USM-98E to E2 (-) and El (+) and record indication as a reference voltage.	ae. AN/ USM-98E should indicate 18 volts de i-O.1 volt dc.
			af Vary CN-16A/U output voltage from 103.5 volts ac to 126.5 volts ac	af. AN/ USM-98E indication should not vary more than ±2 mv dc from reference obtained in ae above.
			ag. Adjust CN-16A/ U output voltage to 115 volts ac.	ag. None.
			ah. Connect AN/ USM-98E to E3 (-) and ES (+) and record indication as a reference voltage.	ah. AN/ USM-98 should indicate 9 volts dc ± 0.1.
			ai Repeat step ae above	ai. AN/ USM-98E indication should not vary more than 2 mv dc from reference obtained in oh above
			aj Connect TS-1830/U across TEF 20006-924A1 jack J1	aj. None
			ak Set TEF 20006-924A1 switch S4 to +18 position and set CN-16A/U to 103 5 volts ac.	ah None
			al. Tune TS-1830/U from 60 to 900 Hz m 60-Hz increments and measure the level of each increment	al TS-1830/ U should indicate 35 uv maximum for any increment
			cm Set TEF 20006-924A1 switch S4 t o -9	am None
			an Same as al above	an TS-1830/ U should indicate 170 uv maximum for any increment
			OVERVOLTAGE PROTECTION POWER SUPPLY A22A21	
			a Adjust CN-16A/U to 115 volts a c	a None
			b Connect Simpson 260 to TEF 20006-924A1 jack J1	b. None
			c. Set TEF 20006-924A1 switch S4 to +18.	c None
			d. Adjust potentiometer R10 clockwise until TEF 20006-924A1 circuit breaker trips	d. Simpson 270 should indicate 21 volts dc ± 2 when circuit breaker trips.
			e Adjust potentiometer R10 counterclockwise and reset TEF 20006-924A1 circuit breaker.	e. None
			f. Connect AN/USM-98E to E2 (-) and El (+).	
			g Adjust A1R10 cw for an output of 18 volts dc ±0 1 volt	g AN/ USM-98E should indicate 18 volts dc ±0 1

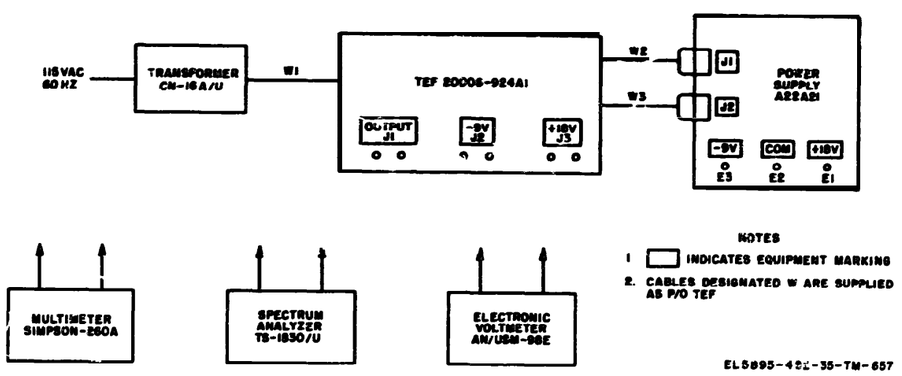


Figure 5-174 Power supply A22A21, test setup diagram

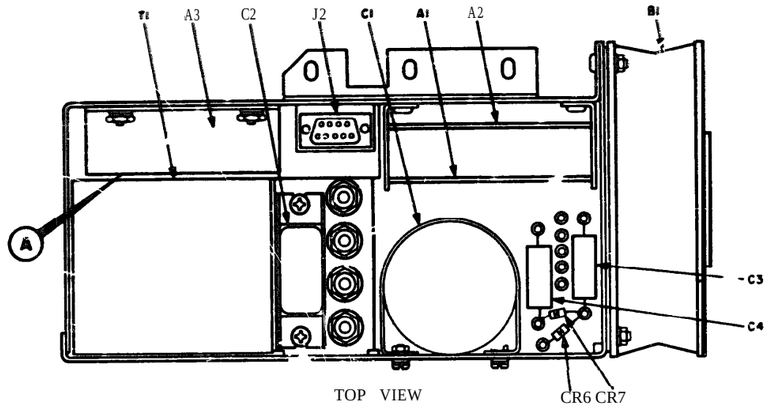


Figure 5-175. Power supply A22A21, parts location.

5-58. + 18-Volt Regulator Test Procedure
(figs. 5-176 and 5-177)

Step No	Test equipment	Control settings: Equipment under test	Test procedure	Performance standard
			OPERATIONAL TEST	
1	N/A	N/A	Connect equipment as shown in figure 5-176.	None.
2	Set test fixture power switch to OFF.	N/A	Plug the 924B2-1 card into +18-volt connector J3 on test fixture.	None.
3	N/A	N/A	Connect AN/USM-98E to the black (—) and red (+) jacks on the test fixture	None.
4	Set the power switch on the test fixture to ON and adjust CN-16A/U for 115 volts ac:	N/A		
5	N/A	Adjust R10 on regulator card A22A21A1 for a voltage of +18 volts dc.	None.	Differential voltmeter AN/USM-98E should read +18 volts dc ± 0.01 volt
			LINE REGULATION	
6	Vary CN-16A/U from 103.5 volts ac to 126.5 volts ac.	N/A	None.	The output shall not change by more than 5.0 mv.
			OVEN CHECK	
7	N/A	check for operation of parts oven on the card by touching it to see that it is hot.	a None. b. Turn off power and remove regulator card.	a. The oven shall be hot. b. None.

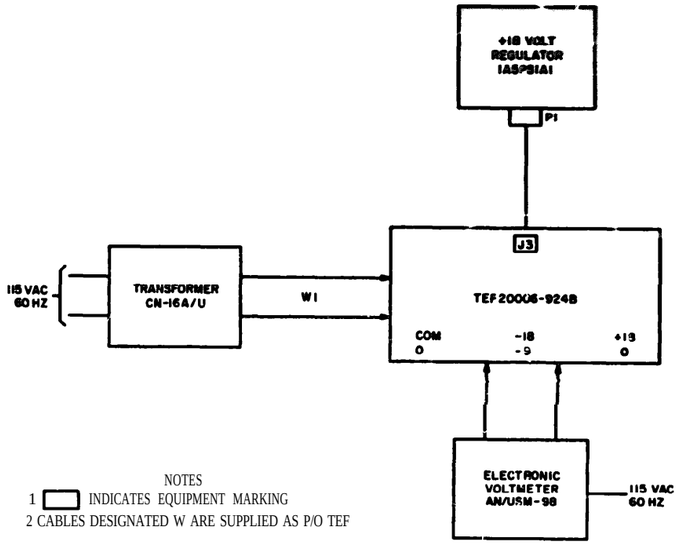


Figure 5-176. +18-volt regulator A22A21A1, test setup diagram.

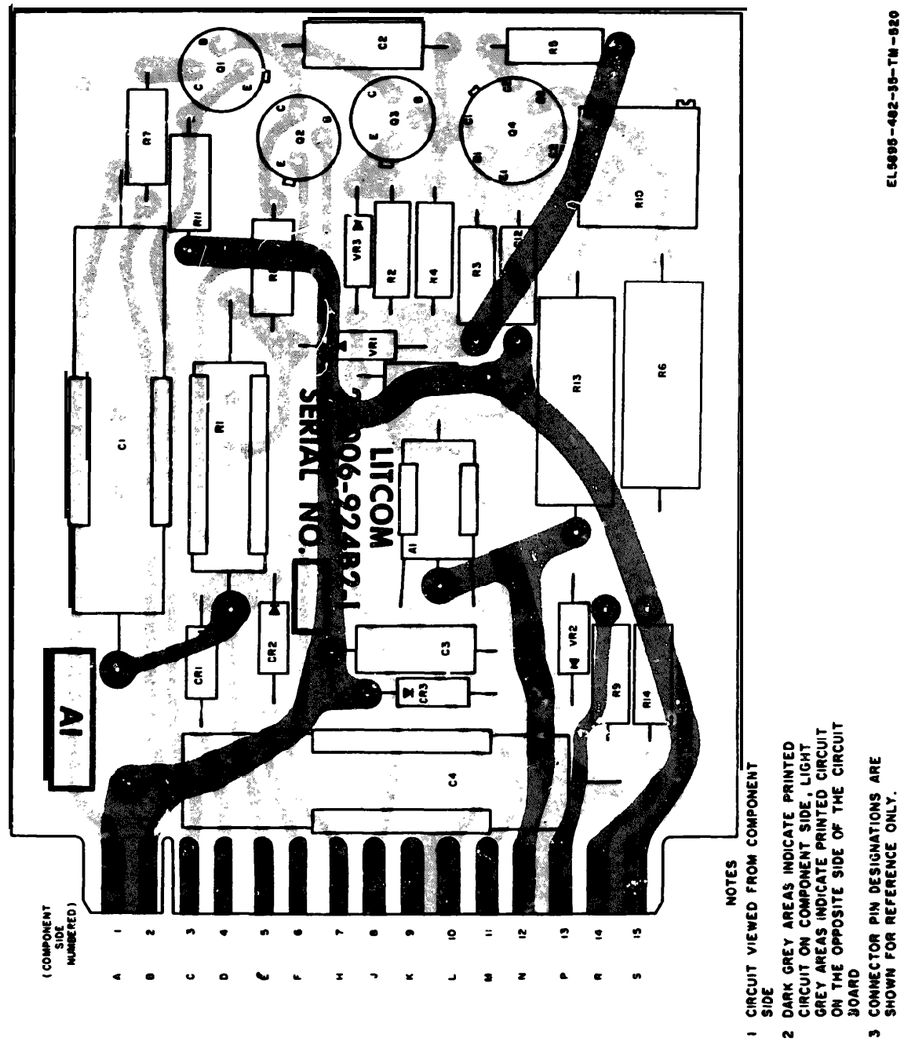


Figure 5-177. +18-volt regulator A22A21A1, wiring diagram and parts location.

5-59. -9-Volt Regulator Test Procedure
(figs. 5-178 and 5-179)

Step No.	Test equipment	Control settings Equipment under test	Test procedure	Performance standard
1	N/A	N/A	Connect equipment as shown in figure 5-178.	None.
2	Set test fixture power switch S1 to OFF.	N/A	Plug the card under test into —9-volt connector J1 on the test fixture.	Now.
3	Set S2 on test fixture to position 1 (—9 volts).	N/A	None.	None.
4	Set the power switch on the fixture to ON and adjust the varisc for 115 volts ac.	Adjust R4 on the regulator card for an output voltage of —9 volts dc.	NOW.	AN/ USM-98E should read -9 volts dc ±0.2 volt.
5	Adjust the varisc over the range of 103 5 volts ac to 126.5.	N/A	a Now. b. Turn off all power switches. Remove card.	a The change in output voltage shall not be greater than 50 mv. b. None.

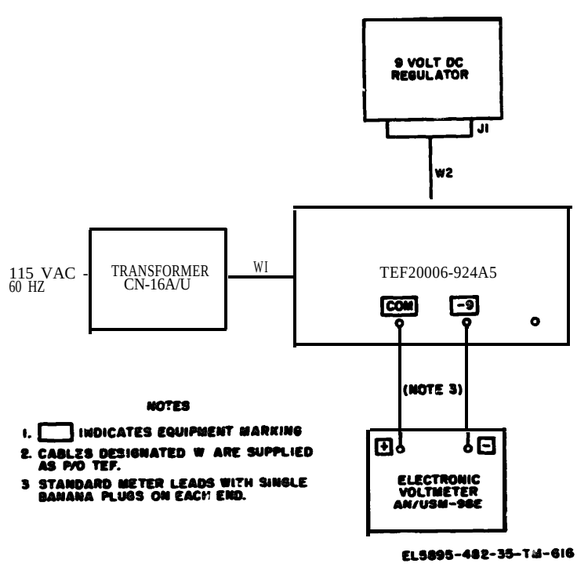


Figure 5-178. -9-volt regulator A22A21A2, test setup diagram.

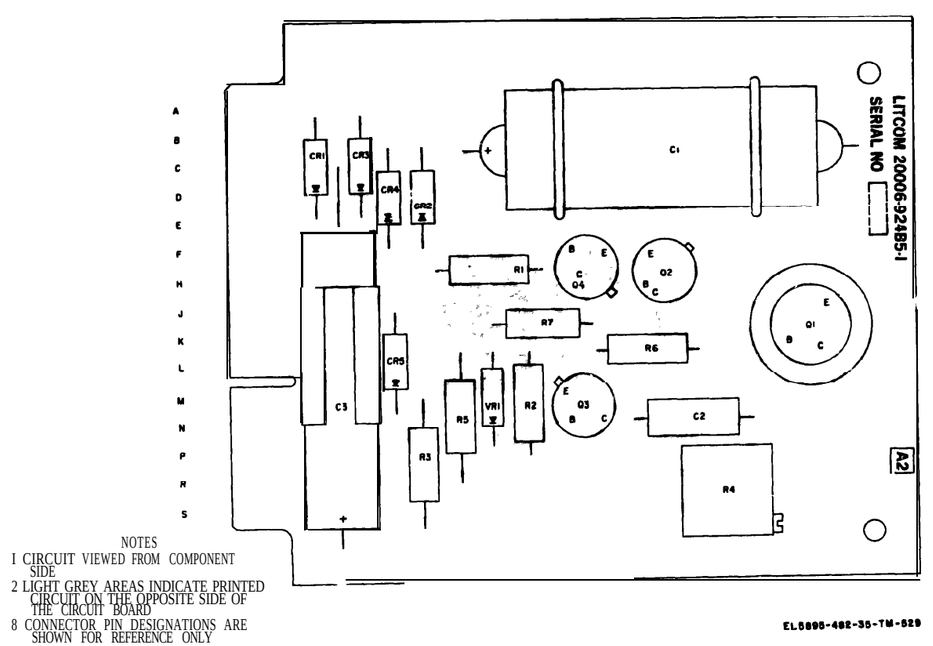


Figure 5-179. -9-volt regulator A22A21A2, wiring diagram and parts location.

5-60. 2.5-MHz Low-Pam Filter Test Procedure

This filter is a nonrepairable item; therefore, no test procedure is provided. However, A22FL3 is checked during the overall teat of the frequency synthesizer.

5-61. 151.75-to 161.75-MHz Bandpass Filter Test Procedure

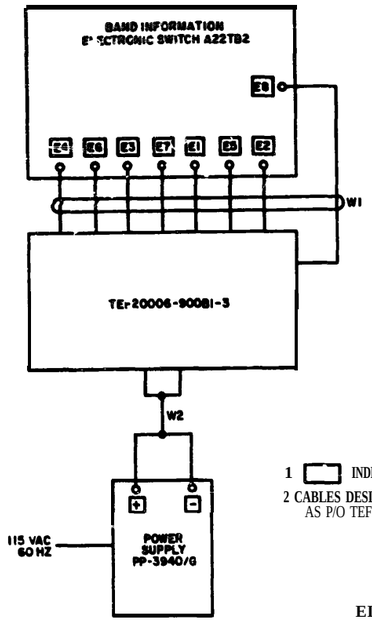
This filter is a nonrepairable item: therefore, no test procedure is provided. However, A22FL4 is checked during the overall test of the frequency synthesizer.

5-62. 14MHz Crystal Filter A22FL5 Test Procedure

This filter is a nonrepairable item: therefore, no test procedure is provided. However, A22FL5 is checked during the overall test of the frequency synthesizer.

5-63. Band Information Electronic Switch 1A2A22TB2 Test Procedure
(figs. 5-180 and 5-181)

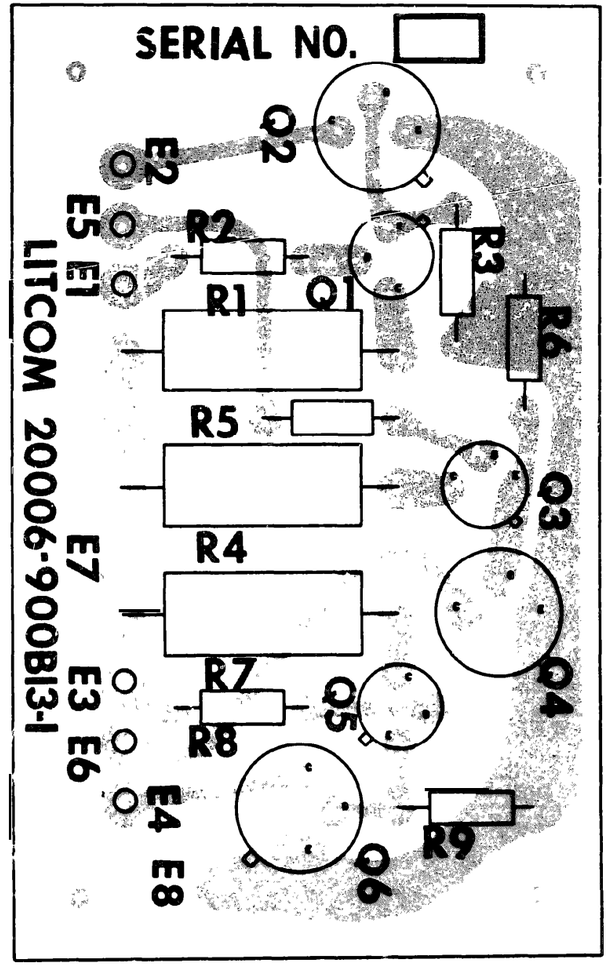
Test equipment	Control settings Equipment under test	Test procedure	Performance standard
N/A	N/A	a. Set TEF 20006-900B13 BAND SWITCH to 0-10 MHz. b. Set TEF 20006-900B13 BAND SWITCH to 10-20 MHz c. Set TEF 20006-900B13 BAND SWITCH to 20-30 MHz	a. TEF 20006-900B13 BAND A indicator shall light. b. TEF 20006-900B13 BAND B indicator shall light c. TEF 20006-900B13 BAND C indicator shall light.



NOTES
1 ▭ INDICATES EQUIPMENT MARKING
2 CABLES DESIGNATED W ARE SUPPLIED AS P/O TEF

EL5895-482-35-TM-659

Figure 5-180 Band information electronic switch A22TB2, test setup diagram



NOTES
1 CIRCUIT VIEWED FROM COMPONENT SIDE.
2 LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

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Figure 5-181. Band information electronic switch *A22TB2*, wiring *diagram and parts location*

Section III. TROUBLESHOOTING DATA

5-64. Speaker and Amplifier Assembly Troubleshooting Chart

Item No.	Symptom	Probable trouble	Corrective Action
1	Speaker amplifier: Gain leas than 43 dB; output less than 2 watts; frequency response not within 3 dB 300 to 3000 Hz; output distortion more than 5 percent at low Hz: output distortion more than 5 percent at 300 Hz:		
2	output distortion more than 5 percent at 3000 Hz.	a. Voltage amplifier Q401 or push-pull amplifiers Q402 and Q403 circuits have defective part.	a. Make voltage and resistance checks at amplifiers Q401, Q402, and Q403 circuit component9 until defective part is isolated Replace defective part
		b. Transistor Q401, Q402, or Q403 is defective.	b Remove transistor 2N301 by loosening two No 6 screws and pulling straight up from socket Take care not to damage mica washer insulator Check transistor. using TS-1836/U and replace defective transistors When replacing transistor, take care not to crush the mica washer Following replacement, check for damaged mica washer by making resistance check for short between transistor collector (body) and the chassis Replace mica washer if damaged

5-65. Tone Reciever Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	ME-30/U doe9 not indicate -35 dBm or lower when ME-26/U indicate9 zero or low resistance.	a. Defective fuse F1	a Visually inspect fuse and replace if defective
		b Defective keying relay K1	b Check winding resistance of relay coil and replace relay if defective
		c Defective de amplifier	c. (1) Check transistor Q3. using TS-1836/U and replace if defective (2) Using voltage and resistance data. isolate and rep lace defective part in circuit
		d. Diode CR1 or CR2 defective	d Replace defective diode
		e Transformer T2 defective.	e Check winding resistance of transformer T2 and repalce if defective
		f Second amplifier defective	f. (1) Check transistor Q2. using TS-1836/U and replace if defective (2) Using voltage and resistance data. Isolate and replace defective part in circuit
		g Transformer T1 defective.	g. Check winding resistance of transformer and replace if defective
		h First amplifier defective	h Check transistor Q1, using TS-1836/U and replace if defective

Item No	Symptom	Probable trouble	Corrective Action
1 (Cont)		i ADJ potentiometer not adjusted properly.	i. Adjust potentiometer R5
		j. Filter QF-10-XXX defective.	j. Replace defective filter
2	ME-26/U does not indicate a maximum resistance whenever AN/USM-205 frequency exceeds 100 Hz in either the plus (+) or minus (-) direction.	Filter QF-10-XXX defective.	Replace defective filter

5-66. 652S 1%. Unit Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	639 test panel doe9 not indicate between 40 and 60.	a Diode A1CR1 defective	a Check forward and reverse resistance of diode A1CR1 end replace if defective
		b TEST switch S1 defective	b With TEST switch S1 in the 4 position and the power off, check for continuity between S1-4 and S1-6 and between S1-10 and S1-12 Replace S1 if defective
		c Carrier isolation amplifier Al defective	c Replace amplifier
		d Resistor A1R1 or A1R2 defective	d Check resistor A1R1 for 2 2K ohm9 and A1R2 for 60 4K ohms Replace resistors if defective
2	Distortion products are not below 55 dB	a 652S if. unit is not aligned properly	a Perform the procedures to eliminate excessive distortion
		b. Modulator circuit in audio amplifier-modulator defective or if output amplifier defective	b If alignment cannot eliminate excessive distortion then modulator circuit or if Output amplifier is defective
	Amplitude of unwanted carrier is not 55 dB below two-tone signal	652S if unit is not properly aligned	Perform the procedures to reduce the amplitude of the earner signal
3	Amplitude of two-tone signal is not 0.	a Defective coil A5L10	a. Check dc coil resistance of A5L10 and replace if defective
		b ADC potentiometer R2 defective	b Check ADC potentiometer R2 R2 should vary uniformly from 0-25K ohms Replace R2 if defective
		c Defective blocking diode A4CR2 or A4CR3	c Check forward and reverse resistance of diodes A4CR2 and A4CR3 and replace if defective
		d Coil A4L2 defective.	d Check dc coil resistance of A4L2 and replace if defective
4	Two tones are not displayed up to 0 dB reference within 3 dB)	0 ADC potentiometer R2 defective	Refer to corrective action b above
5	Bandpass ripple exceeds 2 5 dB	a Filter matching network requires alignment	a Verify circuit is aligned properly
		b Cod A4L1 defective	b Check dc coil resistance of A4L1 and replace if defective
		c Bandpass filter A3FL1 defective	c If filter matching network is aligned properly and A4L1 is not defective then bandpass filter A3FL1 is defective Replace defective filter

5-67. 652T If. Unit Troubleshooting Chart

Item No.	Symptom	Probable trouble	Corrective Action
1	Distortion products are not below 55 dB.	a. 652T if. unit is mot aligned properly.	a Perform the procedures to eliminate excessive distortion.
		b. Modulator circuit in audio amplifier-modulator defective or if. output amplifier defective.	b. If alignment cannot eliminate excessive distortion. then modulator circuit or if. output amplifier is defective.
2	Amplitude of unwanted carrier is not 55 dB below two-tone signal.	652T if. unit is properly aligned.	Perform the procedures to reduce the amplitude of the carrier signal.
3	Amplitude of two-tow signal is not 0.	a Defective coil A5L10.	a Check dc coil resistance of A5L10 and replace if defective.
		b. ADC potentiometer R2 defective.	b. Check ADC potentiometer R2. R2 should vary uniformly from 0-25K ohms. Replace if defective.
		c. Defective blocking diode A4CR2 or A4CR3.	c. Check forward and reverse resistance of diodes A4CR2 and A4CR3 and replace if defective.
		d. Coil A4L2 defective.	d Check de coil resistance of A4L2 rod replace if defective.
4	Two tones are not displayed up to dB reference (within 3 dB).	0- ADC potentiometer R2 defective.	Check ADC potentiometer R2. R2 should vary uniformly from 0-25K ohms. Replace R2 if defective.
5	Bandpass ripple exceeds 2.5 dB.	a. Filter matching network requires alignment.	a. Refer to 652T if. unit filter impedance matching alignment and verify circuit is aligned properly.
		b. Coil A4L1 defective.	b. Check dc cod resistance of A4L1 and replace if defective.
		C. Bandpass filter A3FL1 defective.	c. If filter matching network is aligned properly and A4L1 is not defective. then bandpass filter A3FL1 is defective. Replace filter.
6	Total attenuation required to display tone up to 0-dB reference is not 3 dB ± 3.	Carrier insertion switch circuit A7 defective.	Check resistors A1R1 through A1R22 for opens and replace if defective. If resistors A1R1 through A1R22 are not defective, perform continuity checks on CARRIER switch A7S2 for each switch position. Replace A7S2 if defective.
7	VOX indicator does not light.	a VOX indicator DS1 defective.	a. Check VOX indicator DS1 and replace if defective
		b. VOX SENS control R5 or switch S3 defective.	b. Switch S3 should be closed With the power off, check for continuity between S3-1 and S3-2. If S3 is open, then either S3 or VOX SENS control R5 is defective. Check R5, R5 should vary uniformly from 0 to 25K ohms. Replace R5 if defective or S3 if contacts are open and R5 is not defective.
		c. VOX relay A6K1 defective.	c. Check dc coil resistance of A6K1 and replace if defective.
		d. VOX circuit A6 not aligned properly-	d. Refer to 652T if. unit VOX and ANTI VOX alignment procedure and varify circuit is aligned properly
		e. Twin triode A6V2 defective.	e. (1) Check tube A6V2, using TV-7/U electronic tube test set and replace A6V2 if defective.
7 (Cont)			(2) Using voltage and resistance data, isolate defective twin triode A6V2 circuit part and replace.
		f. Zener diode A6T1 defective	f. Check forward and reverse resistance of Zener diode A6CR10 and replace if defective.
			g. Check dc resistance of winding on A6T1 and replace if defective.
		h. Full bridge rectifier A6CR5 through A6CR8 defective.	h Check forward and reverse resistance of each die and replace if defective
		i. Defective zener diode A6CR4 or blocking diode A6CR3	i. Check forward and reverse resistance of diodes A6CR3 and A6CR4 and replace if defective.
		j. Input transformer A6T2 defective	j Check dc resistance of winding on A6T2 and replace if defective
		k. Coil A6L1 defective.	k Check de coil resistance of A6L1 and replace if defective.
		l. Amplifier circuit defective	I (1) Check tube A6V3, using TV-7/U electronic tube test set and replace A6V3 if defective.
			(21 Using voltage and resistance data. isolate defective amplifier circuit part and replace.
8	VOX indicator does not extinguish after a 100-millisecond hold time.	a. VOX HOLD potentiometer R4 defective.	a Check VOX HOLD potentiometer R4. R4 should vary uniformly from 0 to 5 Mohms Replace R4 if defective.
		b. Capacitor C2 defective.	b. Check C2 and replace if defective.

56%. 653B Modulator Troubleshooting Chart

Item No	Symptom			Probable trouble	Corrective Action
1	ME-30/U does not indicate 2.3 volts ac for the following BAND SEL, TUNE control, and frequency synthesizer settings:			The following probable troubles correspond to the BAND SEL. TUNE control, and frequency synthesizer settings given in the "Symptom" column.	
	BAND SEL	FREQUENCY SYNTHESIZER (MHz)	TUNE		
	1	4.75	3	Defective capacitor C2, C3, or C4.	Check capacitors and replace if defective.
	1	5 75	4	Defective capacitor C2, C3, or C4.	Check capacitors and replace if defective.
	2	5.75	4	Defective inductor L2, L6, or L10.	Perform dc coil resistance measurements and replace defective inductor.
	2	7.75	6	Defective capacitor C2, C3, or C4	Check capacitors and replace if defective.
	2	9 75	8	Defective capacitor C2, C3. or C4.	Check capacitors and replace if defective.
	3	9.75	8	Defective inductor L3, L7. or L11.	Perform dc coil resistance measurements and replace defective inductor.
	3	13.75	12	Defective capacitor C2, C3, or C4	Check capacitors and replace if defective.
	3	17.75	16	Defective capacitor C2, C3, or C4.	Check capacitors and replace if defective.

Item No	Symptom		Probable trouble	Corrective Action
1 (Cont) BAND SEL	FREQUENCY SYNTHE-SIZER (MHz)	TUNE		
4	17.75	16	Defective inductor L4, L8, or L12.	Perform de coil resistance measurements and replace defective inductor.
4	21.75	20	Defective capacitor C2, C3, a C4.	Check capacitors and replace if defective.
4	25.75	24	Defective capacitor C2, C3, a C4.	Check capacitors and replace defective.
4	27.75	26	Defective capacitor C2, C3, a C4.	Check capacitors and replace defective.
4	31.75	30	Defective capacitor C2, C3, a C4.	Check capacitors and replace defective.
2	Bandwidth it less than 16 kHz.		a. Defective transformer A1T1.	a. Perform A1T1 winding dc resistance measurements and replace transformer if defective.
			b. Defective capacitor A1C2.	b. Check capacitor and replace if defective.
			e. Defective transformer T3.	c. Perform T3 winding dc resistance measurements and replace transformer if defective.
			d. Defective capacitor Cl2 or C13.	d. Check capacitors and replace if defective.
	The peak of the third-order distortion signal is greater than 55 dB		a Defective tubs V1, V2, or V3.	a Check tubes by substitution method or TV-t/U tube checker and replace defective tube.
			b Defective modulator CR6.	b. Replace modulator CR6.
			c Defective inductor L20 or L22.	c. Perform dc coil resistance measurements l and replace defective inductor.
			d. Defective inductors L1 through L12.	d. Perform de coil resistance measurements and replace defective inductor.
			l Defective capacitor C2, C3, or C4.	e. Check capacitors and replace if defective

5-69. 686A Power Supply Troubleshooting Chart

Item NO	Symptom	Probable trouble	Corrective Action
1	ME-26/U doss not indicate between 24 and 27 volts de.	a. Defective transformer T1	a. Perform dc winding resistance measurements and replace T1 if defective
		b Defective diode CR5, CR6, CR7, or CR8.	b Perform voltage and resistance measurements and replace defective diode
		c Defective fuse F4	c Inspect and check continuity of fuse F4 and replace ıl defective
2	ME-30/U Indicates greater than 2.5 volts rms	Defective capacitor C13	Check capacitor C13 and replace if defective
3	ME-26/U does not indicate between -85 and -88 volts de	J Defective voltage regulator V3	a (1) Check tube V3 by substitution method or by TV-7/U tube checker and replace if defective (2) Perform voltage and resistance measurements on V3 circuit and replace defective part
		b Defective voltage reference V4	b (1) Check tube V4 by substitution method or by TV-?/U tubs checker and replace if defective (2) Perform voltage and resistance measurements on V4 circuit and replace defective part

Item No	Symptom	Probable trouble	Corrective Action
3 (Cont)		c. Defective diode CR9. CR10, CR11 or CR12.	c. Perform voltage and resistance measurements and replace defective diode.
		d Defective transformer T1.	d. Perform de winding resistance measurements on T1 and replace T1 if defective.
		e. 686A power supply improperly aligned.	e. Align the 686A power supply.
4	ME-30/U indicates greater than 15 milli-volts rms.	a Defective capacitor C7, C8, C9, C12, or A2C4.	a Check capacitors and replace if defective.
		b. Defective inductor L1B.	b. Perform dc coil resistance measurement and replace L1B if defective
5	ME-26/U does not indicate between 280 and 300 volts de.	a Defective transformer T1.	a. Perform de winding resistance measurements on transformer T1 and replace T1 if defective.
		b. Defective diode CR1, CR2, CR3, or CR4.	b Perform voltage and resistance measurements and replace defective diode
6	ME -30/U indicates greater than 0.5 volt nos.	a Defective capacitors Cl0 and C11.	a Check capacitors and replace if defective
		b. Defective inductor L1A.	b. Perform dc coil resistance measurements and replace L1A if defective.
7	ME-30/U does not indicate 6.18 to 6.83 volts when placed between P1-30 and P1-31.	a Defective transformer T1	a. Perform dc winding resistance measurements and replace T1 if defective
		b Defective fuss F2	b. Inspect and check continuity of fuse F2 and replace if defective
8	ME-36/U does not indicate 6 18 to 6.83 volts when placed between P1-31 and P1-32	a Defective transformer T1	a Perform dc winding resistance measurement and replace T1 if defectwe.
		b. Defective fuse F1	b. Inspect and check continuity fuse F1 and replace if defective

S-70. 645C VSWR Alarm Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	50012-TEF-7100341 test fixture RESET indicator does not light when ALARM RESET switch is released or extinguish when ALARM RESET switch is depressed.	Defective ALARM RESET switch S1	Check continuity and replace switch if defective
2	645C VSWR alarm ALARM indicator does not light	a Defective alarm lamp DS1	a Check continuity of lamp and replace lamp if defective
		b Defective power supply A2	b Test power supply A2
		c Defective VSWR monitor and disable circuit Al	c Test VSWR monitor and disable circuit Al
		d Defective regulator Q1 or Q2	d Perform voltage and resistance measurements on Q1 and Q2 circuits and replace the defective part
		e Defective transformer T1	e Perform dc winding resistance measurements on T1 and replace T1 if defective
		f Defective fuse F1	f Inspect and check continuity of tune F1 and replace if defective
3	645C VSWR alarm ALARM indicator does not extinguish	Defective VSWR monitor and disable circuit Al	Test vswr monitor and disable circuit

Item No.	Symptom	Probable trouble	Corrective Action
4	NORMAL indicator on 21008-TEP-311A1-1 test fixture does not extinguish and ALARM indicator does not light.	a. Defective sine wave oscillator Q1 through Q4.	a. Perform voltage and resistance measurements on Q1 through Q4 circuits and replace defective part.
		b. Defective forward power gate Q5.	b. Perform voltage and resistance measurements on Q5 circuit and replace defective part.
		c. Defective reflected power gate Q6.	c. Perform voltage and resistance measurements on Q6 circuit and replace defective part.
		d. Defective vswr gate Q6.	d. Perform voltage and resistance measurements on Q6 vswr gate circuit and replace defective part.
		l . Defective feedback gate Q10.	l . Perform voltage and resistance measurements on Q10 circuit and replace defective part.
		f Defective differential amplifier Q13 and Q14.	f. Perform voltage and resistance measurements on Q13 and Q14 circuits and replace defective part.
		g. Defective differential amplifier Q11 and Q12.	g. Perform voltage and resistance measurements on Q11 and Q12 circuits and replace defective part.
		h. Defective amplifier Q7.	h. Perform voltage and resistance measurements on Q7 circuit and replace defective part.
		i. Defective operational amplifier AR1.	i. check amplifier and replace if defective.
		j. Defective photocell Al.	j. Replaces A1.
		k. Defective amplifier Q8.	k. Perform voltage and resistance measurements on Q8 circuit l and replace defective part.
		l Defective amplifier Q15.	l Perform voltage and resistance measurements on Q15 circuit l and replace defective part
		m. Defective relay K1.	m. Perform dc winding resistance measurements and replace K1 if defective.
		n. Vswr monitor and disable circuit improperly aligned.	n. Align circuit

5-71. 9151 Linear Power Amplifier Troubleshooting Chart

Item No.	Symptom	Probable trouble	Corrective Action
1	INTLK indicator does not light.	a Lamp DS1 defective.	a. Check continuity of lamp DS1 and replace if defective.
		b. Resistor R29 defective.	b. Check reisitor R29 for 150K ± 5% and replace if defective.
2	BLO indicator remains lighted.	Blower B1 defective or switch S3 defective.	Check continuity of fuse F3. If fuse is goal and blower B1 does not operate, B1 is defective. Replace B1. If blower B1 is operating and the BLO indicator is lighted, either the air vane is clogged or switch S3 is defective. Clean out air vane or replace S3.
3	FIL indicator does not light.	Fuse F2 defective or FIL lamp DS3 defective.	Check fuse F2 and replace if defective. Check for 208 volts ac across FIL lamp DS3. If 208 volts ac is present, lamp DS3 is defective. Replace DS3
4	DISABLE indicator does not light.	a. DISABLE lamp DS7C defective.	a. Press the DISABLE button. If DS7C lights. either relay K8, relay K9, or transformer T2 is defective. If DS7C does not light. then DS7C is defective. Replace lamp DS7C.
		b. Filament transformer T2 defective.	b. Check dc resistance of the windings on filament transformer T2 and replace T2 if defective.
		c. Indicator control relay K8 defective.	c. Check for ac voltage between ground and contact 1 of indicator control relay K8. If voltage is not present. K8 is defective and must be replaced.
		d. Disable relay K9 defective.	d. Check for ac voltage between ground and contact 13 of disable relay K9. If voltage b not present, K9 is defective and must be replaced.
5	Filament of power amplifier tube V1 is not glowing.	a Power amplifier V1 defective.	a Check power amplifier tube V1 using TV-7/U electronic tuber test set and replace V1 if defective.
		b. Filament transformer T2 defective.	b. Check dc resistance of the windings on filament transformer T2 and replace T2 if defective.
6	BIAS indicator and 9151 test box indicator DS5 do not light.	a. ALM switch S5 defective.	a Check the l c voltage between ground and the DISABLE contact of S5. If voltage b not present, S5 is defective. Replace S5.
		b. Vswr relay K7 defective.	b. Check the l c voltage between ground l d contact 5 of vswr relay K7. If voltage is not present, K7 b defective. Replace K7.
		c. Bias relay K4 defective.	c. Cheek the ac voltage between ground and contact 8 of K4.

5-72. 9200B Driver Troubleshooting Chart

Item No.	Symptom	Probable trouble	Corrective Action
1	9200B driver test box PA FIL indicator does not light.	POWER switch S1 defective	Remove power from 9200B driver and check for continuity between terminal 3 and terminal 4 on POWER switch S1. Replace POWER switch S1 if defective
2	Filaments on tubes V1, V2, and V3 are not glowing.	a. Filament and bias supply transformer T2 defective.	a Check 6 3-volt rms filament voltage between terminals 7 and 8 on filament and bias supply transformer T2. If voltage is not present, check the dc resistance of the windings on transformer T2 Replace filament transformer T2 if defective

Item No.	Symptom	Probable trouble	Corrective Action
2 (Cont)		b. POWER switch S1 defective.	b. Remove power from 9200B driver and check for continuity between terminals 1 end 2 and between 3 end 4 on POWER SWITCH S1. Replace POWER switch S1 if defective.
		c. Fuse F1 defective.	c. Check fuse F1 and replace if defective.
		d. Interlock switch S3 or S4 defective.	d. Verify interlock switches S3 and S4 em defeated. With S3 and S4 defeated and the power removed from 9200B driver. check for continuity between the NO terminal and c.
3	9200B driver panel meter does not indicate within green bend.	a Resistor R23 or R24 defective.	a Check resistor R23 for 35.7K ohms ± 1 % and resistor R24 for 56 2 ohms ±17 and replace if defective.
		b. METERING switch S6 defective	b With power removed from 9200B driver end METERING switch S6 et DRIVER BIAS V2-3, check for continuity between S6. 1 and wiper Replace METERING switch S6 if defective.
4	9200B driver panel mater does not indicate 100.	a. First rf amplifier defective	a (1) Check tube V1 using TV-7/ U electronic tube test set and replace if defective. (2) Using voltage and resistance data, isolate defective first rf amplifier circuit pert and replace
		b. Coil L3 defective.	b. Check dc coil resistance of L3 and replace if defective.
		c Capacitor C11 defective	c Check capacitor Cl1 and replace if defective.
		d. V1 plate regulator defective	d Check voltage across zener string consisting of CR27 through CR30. If voltage is not +172 volts dc, check forward and reverse resistance of each diode and replace if defective.
		e. Resistor R25 or R26 defective.	e. Check resistor R25 for 0.5-ohm±1 %. esistor R26 for 1200 ohms±5 %. Replace if defective.
		f. Plate and grid power supply defective.	f. (1) With power removed from 9200B driver, check forward and reverse resistance of diodes CR10 through CR13 and replace if defective. (2) Check dc coil resistance of choke L14 end replace if defective (3) Check filtering capacitors C38A and C38B and replace if defective (4) Check resistors R31 and R32 for 1.5K ohms ± 3 % and replace if defective (5) Check for 100 volts dc across ziner diode CR32. If proper voltage is not present. remove power from 9200B driver and check forward end reverse resistance Replace zener diode CR22 if defective.
4 (Cont)		g. Plate supply transformer T3 defective.	g. Check dc resistance of windings on plate supply transformer T3 and replace if defective
		h. METERING switch S6 defective.	h With power removed from 9200B driver and METERING switch S6 at DRIVER PL MAVI, check for continuity between S6-3 and S6 wiper Replace METERING switch S6 if defective
5	9200B driver panel meter does not indicate within the green band	a. High voltage (+800 volts dc) power supply defective	a Check resistor R39 for 680K ohms ± 5% and R40 for 47 ohms ± 5% Replace if defective
		b. Resistor R42 defective	b Check resistor R42 for 2 7 ohms ±5% end replace if defective
		c. Potentiometer R41 defective.	c Check potentiometer R41 R41 should vary uniformly from 0 ohm to 10 ohms Replace if defective.

5-73. 9176 Hv Power Supply Troubleshooting Chart

Item No	Symptom	Probably trouble	Corrective Action
1	Panel meter does not indicate 5,000 volts ± 10 %.	a Defective resistor R2 or R3	a Using an ME-26/ U as an ohm-meter. measure resistance between the Junction of R2 and Cl (+) and R3 and R4 (-) If ME-26/U does not indicate 500Kohms. resistor R2 or R3 is defective and must be replaced
		b. Defective resistor R4.	b Using ME-26/U as an ohmmeter. measure resistance across resistor R4 If ME-26/U does not indicate 5 2 ohms R4 is defective and must be replaced
		c. Defective resistor R6.	c Disconnect one end of resistor R5 and, using an ME-26/U es an ohmmeter. measure resistance across R5 If ME-26/U does not indicate 1K ohms. R5 is defective and must be replaced.
		d. Defective transformer T1	d Using resistance data, check dc winding resistance of trans-former T1 end replace if defective
		e. Defective diodes CR1 through CR4.	l Check diodes and replace if defective
		f. Defective relay K2, K3, or K4	f Using resistance data. check dc winding resistance of relay coils and replace if defective
2	ME-30/U does not indicate 210 volts rms.	a. Defective capacitor Cl	a Check capacitor and replace if defective
		b Defective coil L1	b Using resistance data check de resistance ad coil and replace if defective

5-74. Fixed Frequency Generator A7 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	A1 output cannot be adjusted to 102 mv ± 10 mv on AN/URM-145 or for 13 MHz ± 1 Ha on AN/USM-207.	a. Detective filter amplifier Al. b. Defective 1-MHz spectrum generator A23. c. Defective 1.0-MHz amplifier A24 Same as above.	a. Perform voltage and reference measurements and replace if defective. b. Replace generator. c. Replace amplifier Same as above.
2	A2 output cannot be adjusted to 102 mv ± SO mv on AN/URM-145	Defective A2.	Replace A2.
3	A4 output cannot be adjusted for 150 mv minimum or for 23 kHz ±1 Ha on AN/URM-145.	Defective A4.	Replace Al.
4	A5 output cannot be adjusted for 92 mv rms minimum on AN/URM-145 at A5J10.	Detective A5.	Replace A5.
5	A5 output cannot be adjusted for 102 mv ± 10 mv on AN/URM-145 at A5J10 or for 20 MHz ± 1 Hz on AN/USM-207 U A5J10.	Detective A5.	Replace A5.
6	A6 output cannot be l adjusted for 92 mv rms minimum on AN/URM-145 at A6J9.	Defective A6.	Replace A6.
7	AN/USM-207 does not indicate 18 MHz ± 1 Hz at A9J4.	Defective A9.	Replace A9.
8	A10 output cannot be adjusted for 92 mv rms or for 102 mv ± 10 mv on AN/URM-145 u A10J3.	Defective A10.	Replace A10.
9	AN/USM-207 does not indicate 15 MHz ± 1 Hz at A10J3.	Defective A10.	Replace A10.
10	A11 output cannot be adjusted for 92 mv rms minimum or for 102 mv ± 10 mv on AN/URM-145 at A11J2.	Defective All.	Replace A11.
11	AN/URM-145 does not indicate 102 mv ± 10 mv at A11J1 or AN/USM-207 does not indicate 22.0 MHz ±1 Hz at A11J1.	Defective All.	Replace All.
12	Al2 output cannot be adjusted for 102 mv ± 10 mv on AN/URM-145 at A12J31.	Defective A12.	Replace A12.
13	AN/USM-207 does not indicate 4.75 MHz ± 1 Hz at A12J31 or 4.74 MHz ± 1 kHz when 1-MHz input is disconnected at J36.	Defective A12.	Replace A12.
14	AN/USM-207 does not indicate 4.75 MHz ± 1 Hz when 1-MHz input is reconnected at J36.	Defective 4.75-MHz generator.	Replace defective 4.75-MHz generator 1A2A7A12.
15	The output level of 16, 20, 21, or 22 MHz as determined by Rohde and Schwartz USVHBN-1521 is not 95 dB below 23-MHz reference level.	Defective A4.	Replace A4.
16	The output level of 17, 19, 21, or 23 MHz as determined by Rohde and Schwartz USVHBN-1521 is not 95 dB below 13-MHz reference level.	Detective X5.	Replace A5.
17	The output level of 14, 16, 18, or 20 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 19-MHz reference level.	Detective A6.	Replace A6.
18	The output level of 13, 17, 19, or 21 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 16-MHz reference level	Defective A7.	Replace A7.
19	The output level of 14, 18, 20, or 22 MHz l e determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 13-MHz reference level.	Defective A8.	Replace A8.
20	The output level of 15, 17, 19, or 21 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 19-MHz reference level.	Defective A9.	Replace A9.
21	The output level of 14, 16, 18, or 22 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 16-MHz reference level	Defective A10.	Replace A10.
22	The output level of 15, 21, or 23 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 13-MHz reference level.	Defective A11.	Replace A11
23	The output level of 1 9, 4.65, or 4.85 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 4.75-MHz reference level.	Defective A12	Replace A12
24	The output level of 1.8, 2.0, 1.6, or 4.76 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.9-MHz reference level.	Defective A13.	Replace A13.
25	The output level of 1.5, 1.7, 1.9, and 2.3 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.6-MHz reference level.	Defective A14.	Replace A14.
26	The output level of 1.6, 2.0, 2.1, or 2.2 MHz as determined by Rohde and Schwartz USVHBN1521 is not 9 dB below 2.3-MHz reference level.	Defective A15.	Replace A15.
27	The output level of 1.7, 1.9, 2.1, and 2.3 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 2.0-MHz reference level.	Defective A16.	Replace A16.
28	The output level of 1.4, 1.6, 2.0, or 1.8 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.7.MHz reference level.	Defective A17.	Replace A17.
29	The output level of 1.5, 1.7, or 2.1 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.4-MHz reference level.	Defective A18.	Replace A18.
30	The output level of 1.4, 1.8, 2.2. or 2.0 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB b&w 2.1-MHz reference level.	Defective A19	Replace A19.
31	The output level of 1.5, 1.7, 1.9, or 2.1 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.8-MHz reference level.	Defective A20.	Replace A20
32	The output level of 1.4, 1.6, 1.8, or 2.2 MHz as determined by Rohde and Schwartz USVHBN1521 is not 95 dB below 1.5-MHz reference level.	Defective A21.	Replace A21

5-75. 13-23-MHz Filter Amplifier 1A2A7A1 through 1A2A7A11 Troubleshooting Chart

Symptom	Probable trouble	Corrective Action
Input voltage at A1E2 and E3 cannot be brought to ± 10 mv.	Defective part in input stage of filter amplifier Al.	Isolate defective part, using voltage and resistance data and replace.
Voltage at A1E8 and E9 cannot be brought to 300 mv.	Defective part in filter amplifier Al.	Isolate defective part, using voltage and resistance data.
Unable to obtain 100 mv on AN/URM-145 at 1A2A7A1 E6 and E10.	Defective part in filter amplifier Al.	Isolate defective part, using voltage and resistance data.
Frequency as read on AN/USM-207 **is not 13 MHz ± 50 Hz.**	Defective part in filter amplifier Al. (Check input freq.)	Isolate and replace defective part, using voltage and resistance data. Refer to parts selection table on schematic diagram.
Input voltage at E2 and E3 cannot be brought to ± 10 mv.	Defective part in input stage of filter amplifier A2.	Isolate defective put, using voltage and resistance data.
Voltage at E8 and E9 cannot be n brought to 300 mv.	Defective part in filter amplifier A2.	Isolate defective part, using voltage and resistance data.
Unable to obtain 100 mv on AN/URM-145 at A2 E6 and E10.	Defective part in filter amplifier A2.	Isolate defective part, using voltage and resistance data.
Frequency as read on AN/USM-207 is not 19 MHz ± 50 Ht.	Defective part in filter amplifier A2. (Check input freq.)	Isolate and replace part, using voltage and resistance data. Refer to parts selection table on schematic diagram.
Input voltage at A3-E2 and E3 cannot be brought to ± 10 mv.	Defective part in input stage of filter amplifier A3.	Isolate defective part, using voltage and resistance data.
Voltage at A3 E8 and E9 cannot be brought to 300 mv.	Defective part in filter amplifier A3.	Isolate defective part, using voltage and resistance data.
Unable to obtain 100 mv on AN/URM-145 at A3 E6 and E10.	Defective part in filter amplifier A3.	Isolate defective part, using voltage and resistance data

5-76. High-Frequency Amplifier 1A2A4A1 through 1A2A6A1 Troubleshooting Chart

Item No	Symptom	Probable trouble	Correcttoe Action
1	Inductor L11 cannot be adjusted for 500 mv minimum.	a. Defective stage Q4.	o. Perform voltage and resistance measurements and replace defective parts.
		b. Defective transformer T1.	b. Replace transformer.
2	Inductors L2, L3, and L4 cannot be adjusted for 500 mv minimum.	a. Defective input filter stage L9. L10, L12, C16, C21, and C17.	a. Perform voltage and resistance measurements and replace defective parts.
		b. Defective mixer stage CR2.	b. Replace mixer.
		c. Defective amplifier stage Q2.	c. Perform voltage and resistance measurements and replace defective parts
		d Defective transistor stage A4A1Q3	d. Perform voltage and resistance measurements and replace defective parts

5-77. 10 kHz, 100 kHz, 100-Hz Frequency Divider Mixer 1A2A4 Through 1A2A6 Troubleshooting Chart

Symptom	*Probable trouble*	*Corrective Action*
AN/URM-145 does not indicate 600 mv minimum	**Defective mixer board** A1	**Replace defective board**
AN/USM-281 does not display a square wave	**Digital divider A2Z1 or related circuit is defective**	**Perform voltage and resistance measurements and replace defective part.**

Symptom	Probable trouble	Corrective Action
AN/USM-281 **does** not display a sine wave.	Defective low-pass filter A2FL1	Replace filter assembly.
AN/URM-145 does not indicate a reading of 180 mv ± 30 mv.	Defective tuned amplifier circuit A2Q1.	**Replace amplifier circuit.**

5-78. 24.3-24.4-MHz Generator Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
	AN/URM-145 does not indicate 500 mv minimum.	a Defective Q1, Q2, or Q3. b. Defective mixer circuitry.	a Replace transistor. b. Replace transformer T1, diode CR1, or transformer T2

5-79 100 kHz Interpolation Mixer Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	AN/USM-281 does not indicate a waveform similar to that shown in figure 5-110.	a. Defective 100-kHz interpolation output amplifier A2. b. Defective 24.3-24.4-MHz generator A1.	a Check A2 by substitution and replace if defective. b. Replace generator.
2	AN/URM-145 does not indicate 90 mv minimum.	dame as above.	game as above.
3	AN/USM-207 does not indicate 27 70 MHz ± 200 Ht.	Same as above.	Same as above
4	AN/USM-207 does not indicate 27.30 MHz ±200 Hz.	Same as above.	Same as above.
5	AN/URM-145 does not indicate 90 mv minimum.	Same as above.	Same as above
6	ME-26B/U does not indicate 10-15 mv dc.	Same as above.	Use voltage and resistance data to isolate end repair defective part

5-80. Vhf X7 Multiplier Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	AN/USM-207 does not indicate 147 MHz.	a Transistor is defective. b. Tank circuit C7 misaligned. c. Multiplier bias resistor R8 is defective	a Replace defective transistor b. Retune inductor 2L1 C. Replace defective resistor
2	The rf output voltage as read on AN/URM-145 is less then 500 mv	a Capacitors C13, C19, C20, need retuning b. Transistor Q1, Q3, or Q4 is defective. c. Inductor or one of capacitors C13, C19, C20, or C21 is defective	a Retune capacitors b Replace defective translator c Replace defective part

5-81. Mixer and Filter Amplifier 1A2A2A1 Troubleshooting Chart

Item NO	*Symptom*	Probable trouble	*Corrective Action*
1	**Frequency as read on AN/USM-207 at TEF 20006-909 J5 is not 174 25) MHz**	**a. Capacitors C9, C16, C17, and C23 are out of tune Filter A2 is defective** **b Transformers T1 and/or T2 defective** **c One of diodes CR1 through CR4 is defective**	**a Retune capacitors C9 C16 C17 and C23 and replace defective filter** **b Replace defective transformer** **c Replace defective diode**

Item No.	Symptom	Probable trouble	Corrective Action
2	output voltage as read on AN/URM-145 is less than 500 mv	a Transistor Q1, Q2, or Q3 is defective. b. Same as item above. c Capacitor C7, C15, or C21 is defective.	a. Replace defective transistor. b. Same as item above. c. Replace defective capacitor

5-82. Vhf Converter Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	Output at A2E3 as read on AN/URM-145 is lees than 500 mv	a Capacitors A2C13, C19, C20. and C21 require alignment b. Defective component on A2 board.	a. Retune capacitors C13, C19, C20, and C21. b. Using voltage and resistance date, isolate and replace defective part
2	The frequency as mad on AN/USM-207 is not 147 MHz.	a. A2L1 requires alignment b. Defective multiplier transistor A2Q2. c Same as item 1 b above	a. Retune A2L1 b Replace defective transistor c. Same as item lb above.
3	The output voltage at J5 is less than 500 mv.	a. Capacitors A1C9, C16, C17, and C23 need retuning. b. Defective transistor A1Q1, Q2, or Q3.	a. Retune capacitors. b. Replace defective transistor.
4	The frequency at TEF 20006-909 J5 is not- 174.25 MHz.	a Defective diode A1CR1 through A1CR4. b. Defective filter A1A1 or A1A2.	a Replace defective diode. b. Replace defective filter.
5	The output as mad on AN/URM-145 is not within ± 0.5 dB of desired reading.	Capacitors A1C9, C16, C17, and C23 are out of tune.	Retune capacitors
6	Output on AN/URM-85 is not 70 dB below 174.25-MHz reference level	a. Defective filter A1A1 or A1A2 b. Transformer A1T2 is defective.	a. Replace defective filter. b Replace defective transformer.

5-83. 4.75-MHz Generator Troubleshooting Chart

Item NO	Symptom	Probable trouble	Corrective Action
1	The voltage at ES cannot be brought to a minimum of 100 mv.	a Transformer T1 not adjusted properly. b. Defectivecomponent in 4 75-MHz generator.	a Repeat performance standard b Isolate and replace defective part, using voltage and resistance data.
2	Frequency as read on AN/USM-207 cannot be brought to 4.75 MHz ± 50 Hz.	a. Inductor L2 is defective. b. Defective second stage put in 4.75-MHz generator 1A2A7A12.	a Replace defective inductor L2. b. Isolate and replace defective part. using voltage and resistance data.
3	Frequency as read on AN/USM-207 is not 4.75-MHz ± 50 Hr.	a Free-run frequency of transistor Q2 is too high. b. Transformers T1 and T2 and inductors L2 and L3 not adjusted properly. c. Defective part in output circuit of 4.75-MHz frequency generator 1A2A7A12.	a Repeat performance standard b. Repeat alignment c. Isolate and replace defective component, using voltage and resistance data.

5-84. Divider/ Amplifier A7A13 Through A7A22 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	AN/URM-145 does not indicate 1.9 MHz minus approximately 10 kHz	a. Defective transistor Q2.	a. Perform voltage and resistance measurements and replace defective parts.
2	AN/URM-145 does not indicate 107 5 mv ± 12.5 mv	b Defective transistor Q1 Defective transistor Q1	b Replace transistor. Replace transistor.

5-85. 1-MHz Spectrum Generator Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	One or more of test frequencies in performance standard are at output level of less than 10 mv	a R13 not adjusted correctly b Defective part in 1-MHz generator	a Repeat performance standard. b Use voltage and resistance data to isolate defective part

5-86. 1-MHz Amplifier Troubleshooting Chart

Symptom	Probable trouble	Corrective Action
Output as shown on AN/URM-145 is less than 3 volts. Frequency as read on AN/USM -207 is not 1 MHz ± 50 Hz	Defective part in l-MHz amplifier 1A2A7A24 Defective part in 1-MHz amplifier 1A2A7A24	Use voltage and resistance data to isolate defective part Use voltage and resistance data to isolate defective part NOTE Check input frequency (Output frequency should be same es input frequency)

5-87. 2.9-MHz Generator Troubleshooting Chart

Item NO	Symptom	Probable trouble	Corrective Action
1	AN/USM-207 fails to indicate 17 4 MHz ± 50 Hz.	Defective part in circuits of transistor Q1, Q2, or Q3.	Use voltage and resistance data to isolate defective part.
2	AN/USM-207 fails to indicate 2.9 MHz ±1 kHz.	a. Inductor L3 not adjusted correctly b Defective part in Q3 oscillator circuit.	a Repeat performance standard. b. Use voltage and resistance data to isolate defective part.
3	AN/URM-145 indicatea less than 100 mv.	a. Inductors not tuned properly. b Defective part in output circuit of 2.9-MHz generator 1A2A7A25	a Repeat performance standard b Use voltage and resistance data to isolate defective part
4	TEF 20006-903B13 microammeter fails to read between 20 and 40 microamperes.	Defective part in output resistive circuit of 2.9-MHz generator 1A2A7A25.	Use voltage and resistance data to isolate defective part
5	AN/URM-207 fails to indicate 2.9 MHz ± 50 Ha.	Defective part in output circuit of 2.9-MHz generator	Use voltage and resistance data to isolate defective part

5-88. Fault Indicator 1A2A8 Troubleshooting Chart

Item NO	Symptom.	Probable trouble	Corrective Action
1	TEF 20006-917A1 indicator fails to illuminate, but FAULT lamps do illuminate rhea TEF 20006-917A151 is set to ON.	a Relay K1 is defective b. Other component in fault lamp control circuit of fault indicator 1A2A8 is defective	a. Replace defective relay b. Use voltage and resistance data to isolate defective part
2	Either EXT or INT indicator on TEF 20006-917A1 illuminates or both lamps light when TEF 20006-917A1S1 is set to ON.	a Transistor Q8 is defective b Other component in INT, EXT control portion of fault indicator 1A2A8 is defective	a Replace defective transistor b Use voltage and resistance data to isolate defective part
3	TEF 20006-917A1 EXT or INT lamp extinguishes when TEF 20006-917A1S2 is set to PC BOARD TEST	a. Relay K1 is defective b. Q9 or and Q10 and associated parts in fault lamp control circuit or INT, EXT control circuit is defective	a Replace defective relay b Use voltage and resistance data to isolate defective part
4	TEF 20006-917A1M1 fails to respond as required to adjustment of potentiometer TEF 20006-917A1R1	Defective part in circuit of transistor Q11	Use voltage and resistance data to isolate defective part

Item No	Symptom	Probable trouble	Corrective Action
5	One or both FAULT indicatora in TEF 20006-917A1 fad to illuminate when TEF 20006-917A1 switch S3 is set to 906.	Defective part in circuit of transistor Q18	Use voltage and resistance data to isolate defective part.

5-89. Remote Control Switching 1A2A9 through 1A2A12 Troubleshooting Chart

Symptom	Probable trouble	Corrective Action
TEF 20006-916A1 indicator 1 does not illuminate when switch S1 is set to position 1 and LOCAL-REMOTE snitch IS set to REMOTE.	Defective switching circuit Q1.	Perform voltage and resistance measurements for switching circuit Q1 and replace defective parts
TEF 20006-916A1 indicator 2 does not illuminate when switch S1 is set to position 2 and LOCAL-REMOTE switch IS set to REMOTE.	Defective switching circuit Q2.	Perform voltage and resistance measurements for switching circuit Q2 and replace defective parts.
TEF 20006-916A1 indicator 3 does not illuminate when snitch S1 is set to position 3 and LOCAL-REMOTE switch IS set to REMOTE.	Defective switching circuit Q3	Perform voltage and resistance measurements for switching circuit Q3 and replace defective parts.
TEF 20006-916A1 indicator 4 does not illuminate when switch S1 ES set to position 4 and LOCAL-REMOTE switch is set to REMOTE	Defective switching circuit Q4.	Perform voltage and resistance measurements for switching circuit Q4 and replace defective parts
TEF 20006-916A1 indicator 5 does not illuminate when switch S1 is set to position 5 and LOCAL-REMOTE switch is set to REMOTE	Defective switch circuit Q5	Perform voltage and resistance measurements for switching circuit Q5 and replace defective parts
TEF 20006-916A1 indicator 6 does not illuminate when switch S1 is set to position 6 and LOCAL-REMOTE switch IS set to REMOTE	Defective switching circuit Q6	Perform voltage and resistance measurements for switching circuit Q6 and replace defective parts
TEF 20006-916A1 indicator 7 does not illuminate when switch S1 is set to position 7 and LOCAL-REMOTE switch is set to REMOTE	Defective switching circuit Q7	Perform voltage and realstance measurements for switching circuit Q7 and replace defective parts
TEF 20006-916A1 indicator 8 does not illuminate when switch S1 is set to position 8 and LOCAL-REMOTE switch IS set to REMOTE	Defective switching circuit Q8	Perform voltage and resistance measurements for switching circuit Q8 and replace defective parts
TEF 20006-916A1 indicator 9 does not illuminate when switch S1 IS set to position 9 and LOCAL-REMOTE switch IS set to REMOTE	Defective switching circuit Q9	Perform voltage and resistance measurements for switching circuit Q9 and replace defective parts
TEF 20006-916A1 indicator 10 does not illuminate when switch S1 is set to position 10 and LOCAL-REMOTE switch IS set to REMOTE	Defective switching circuit Q10	Perform voltage and resistance measurements far switching circuit Q10 and replace defective parts
TEF 20006-916A1 indicator 11 does not illuminate when switch S1 IS set to position 11 and LOCAL REMOTE switch is set to REMOTE	Defective switching circuit Q11	Perform voltage and resistance measurements for switching circuit Q11 and replace defective parts
TEF 20006-916A1 indicator 12 does not illuminate when switch S1 is set to position 12 and LOCAL-REMOTE switch is set to REMOTE	Defective switching circuit Q12.	Perform voltage and resistance measurements for switching circuit Q12 and replace defective parts
TEF 20006-916A1 indicator 13 does not illuminate when switch S1 is set to position 13 and LOCAL-REMOTE switch is set to REMOTE	Defective switching circuit Q13	Perform voltage and resistance measurements for switching circuit Q13 and replace defective parts
TEF 20006-916A1 indicator 1 does not illuminate when switch S1 is set to position 1 and LOCAL-REMOTE switch is set to LOCAL	Defective switching circuit diode CR2	Replace defective diode CR2
TEF 20006-916A1 indicator 2 does not illuminate when switch S1 is set to position 2 and LOCAL-REMOTE switch is set to LOCAL	Defective switching circuit diode CR4	Replace defective diode CR4

5-90. Band Information 1A2A13 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
	TEF 20006-913A1 10-MHz indicator 1 and l-MHz indicator 4 do not illuminate	a Defective Q1 circuit	**a Perform voltage and resistance measurements and replace defective parts**
		b Defective Q7 or Q13 circuit	**b Same as a above**
		c Defective CR13	**c Check CR13 and replace if defective**
2	TEF 20006-913A1 10-MHz indicator 1 end l-MHz indicator 1 do not illuminate	a Defective Q4 or Q10 circuit b Defective CR16	a Replace transistor b. Check CR16 and replace if defective

5-91. Offset Carrier Dummy Load Troubleshooting Chart

Symptom	Probable trouble	Corrective Action
Simpson 260 does not indicate correct resistance	Defective part in dummy bed	Use Simpson 260 and perform voltage and resistance measurements to isolate defective part Replace defective part

5-92. Diode Switchbox A15 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	AN/URM-145 does not indicate 66 mv minimum at J24	a Defective Al	a Perform voltage and resistance measurements and replace if defective
		b. Defective A6 (switch 1)	b Replace A6
2	AN/URM-145 does not indicate 66 mv minimum at J24	Defective A8 (switch 1)	Replace A8
3	AN /URM 85 indicates a decrease of less than 100 dB below the reference level	a Poor grounding of A? module in case	a Tighten A7 mounting screws
		b Poor grounding of AA	b Tighten A8 mounting screws
		c Defective AR	c Replace AR

5-93. Matrix Output Circuit 1A2A15A1 through 1A2A15A4 Troubleshooting Chart

Item SO	Symptom	Probable trouble	Corrective Action
1	AN /URM-145 indicates less than 65-mv output	a Transistor A1Q1 IS defective	a Replace defective transistor A1Q1
		b Part on board defective	b Replace defective part
		c Al-A4 AR1 defective	c Replace defective AR 1 assembly
2	Output fails to drop specified amount below reference level	Amplifier assembly A1AR1 not functioning properly	Replace defective amplifier assembly

5-94. Matrix Output Circuit 1A2A15A5 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	Inductor L1 cannot be tuned to bring indication on AN/URM-145 to less than 10 mv on 14	a Inductor L1 IS defective	a Replace inductor L1
		b Capacitor C3, C4, C5, C6, C7, or C8 IS defective	b Replace defective part
		c Inductor L2 not aligned properly	c Realign L2
2	Inductor L2 cannot be tuned to bring indication on AN/URM-145 to less than 10 mv on J4, or ripple voltage IS greater than 1.5 dB	a Inductor L2 is defective	a. Replace L2
		b Capacitor C6, C7, or C8 is defective	b Replace defective part
		c Inductor L1 not aligned properly	c Realign L1
		d Inductors L1 and L2 not aligned properly	d Retune L1 and L2

5-95. Matrix Switches 1, 2, 3, and 4, 1A2A15A6 Through 1A2A15A15 Troubleshooting Chart

The -9 volts dc as read on ME-26. R/U is not 28 ma ±0 3 ma	Defective part	By means of voltage and resistance data, isolate and replace faulty part
The +18 volts dc as read on ME-26-B/U IS not 6 5 ma ± 10 ma	Defective part	By means of voltage and resistance data, isolate and replace faulty part
The rf output indication on AN/URM-145 is below 90 mv	Defective part	By means of voltage and resistance data, isolate and replace faulty part
The rf output indication on AN/URM-145 is below 82 mv	Defective part	By means of voltage and resistance data, isolate and replace faulty part
The rf output indication on AN/URM-145 is below 82 mv	Defective pan	By means of voltage and resistance data, isolate and replace faulty part

5-96. Matrix Switch No. 5. 1A2A15A16 Through 1A2A15A25 Troubleshooting Chart

Item NO	Symptom	Probable trouble	Corrective Action
1	ME 26B/U does not indicate 0 7 ma ±08 ma	a Diode A16CR3 to A25CR3 is defective.	a Perform voltage and resistance measurements and replace defective component
		b Resistor A16R4 to A25R4 or A16R5 to A25R5 IS defective	b Replace defective component
2	AN/URM-145 indicates a decrease of less than 80 dB below reference level	a Poor grounding connections in test setup	a. Inspect and secure ground connections
		b Defective part in matrix switch A16 through A25	b Replace Matrix switch

5-97. Switch Amplifier 1A2A15A26 Through 1A2A15A28 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	ME-26B/U reading exceeds 0 2-ma limit	47K resistor A26-A28R1 is defective	Replace 47K resistor R1
2	ME-26B/U reading exceeds 4 0-ma limit	a Transistor A26-A28Q1 is defective	a Replace defective transistor A26-A28Q1
		b Defective part	b Use voltage and resistance data to find defective part and replace
3	AN/URM-145 reads less than 200 mv	a High-frequency gain of transistor A26Q1 is low	a Replace defective transistor A26-A2SQ1
		b Capacitor A26-A28 Cl or C4 defective	b Replace defective part
4	Output as monitored on AN/URM-145 drops below 200 mv within range of 13 to 15 MHz	a Capacitor A26-A28C4 IS defective	a Replace defective capacitor
		b Defective part	b Replace defective part
5	Leakage output voltage as read on AN/URM-85 IS above 40 dB from reference level	a Excessive leakage in transistor A26-A28Q1	a Replace defective transistor A26. A28Q1
		b Defective resistor A26-A28R4,	b Replace defective resistor

5-98. 1-MHZ Isolation Amplifier Troubleshooting Chart

Item NO	Symptom	Probable trouble	Correction Action
1	AN/URM-145 does not indicate 382 5 mv ± 67 5 mv and microammeter does not indicate 50 ma when TEF 20006-925A1 switch S1 is set to position 2 and TEF 20006-925A1-2 switches are set to position 1	a Defective I-MHz filter FL1	a Check by substitution
		b Defective Q1 and metering circuit diode CR1	b Perform voltage and resistance measurements and replace defective parts
		c Defective diode switch A1	c Same as b above
		d Defective signal attenuator A5	d Check and replace if defective
2	AN/URM-145 does not indicate 382 5 mv ± 67 5 mv and microammeter does not indicate 50 ma ± 15 ma when TEF 20006-925A1- switch S1 is set to position 2 and TEF 20006-925A1 switches S1 and S2 are set to position 2	a Defective 1-MHz filter FL1	a Check by substitution
		b Defective A3Q1 and metering circuit diode A3CR1	b Perform voltage and resistance measurements and replace defective parts
		c Defective signal attenuator A6	c Check and replace if defective
3	AN/URM-145 does not indicate a minimum of 150 mv at A3E8	a Defective diode switch Al	a Check and replace if defective.
		b Defective signal attenuator A5	b Check and replace if defective
4	AN/URM-145 does not indicate 3 volts ± 1 dB when connected to A3E6	Defective isolation amplifier A4	Perform voltage and resistance measurements and rep lace defective parts

5-99. Frequency Multiplier A12A18 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	AN/URM-145 does not indicate 800 mv minimum	a Defective stage A1Q1	a Perform voltage and resistance measurements and replace defective part
		b Defective stage A1Q4,	b Same as a above
		c Defective stage A1Q7	c Same as a above
		d Amplifier board A2 not tuned correctly	d Retune amplifier board A2
2	AN/USM-207 does not indicate 130 MHz.	Defective 13-MHz crystal filter A1Y1	Check 13-MHz crystal filter and replace if defective
3	AN/URM-85 does not indicate a minimum of 80 dB below the reference level	a A1L7 not tuned properly	a Retune A1L7
		b Covers not mounted properly	b Secure all covers
		c Poor ground connections to Al	c Check all grounds and secure mounting screws properly
4	AN/USM-207 does not indicate 140 MHz	Defective 14-MHz crystal filter A1Y2	Check 14-MHz crystal filter and replace if defective

Item No	Symptom	Probable trouble	Corrective Action
5	AN/URM-85 does not indicate a minimum of 80 dB below the reference level.	A1L8 not tuned properly.	Retune A1L8.
6	AN/USM-207 does not indicate 150 MHZ.	Defective 15-MHz crystal filter A1Y3.	Check 14-MHz crystal filter and replace if defective.
7	AN/URM-85 does not indicate a minimum of 80 dB below the reference level.	A1L9 not tuned properly.	Retune A1L9.

5-100. Rf Amplifier and Mixer A19 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	The difference between the fundamental frequency end the second harmonic is less then 55 dB	Defective low-pars fundamental frequency bends listed	Check end replace defective filter parts on the switched filter output amplifier A19A3
		a 3.75-4 75 MHz	a L6, L11, L16, end associated capacitors.
		b 4 75-6 75 MHz.	b L7, L12, L17, end associated capacitors .
		c 6 75-9 75 MHz	c. L8, L13, L18, and associated capacitors.
		d 9 75-13 75 MHz	d. L9, L14, L19, end associated capacitors.
		e. 13.75-20 75 MHz	e L10, L15, L20, end associated capacitors.
2	Variations in output levels measured are greater then 0 5 dB	Defective pert in output amplifier A19A1	Perform voltage end resistance measurements on assembly A19A2 to locate defective part Replace defective part
	Simpson 260 indication not within specified limits	Defective part in switched filter output amplifier A19A3	Perform voltage and resistance measurements on assembly A19A3 to locate defective componenta Replace defective part
4	Simpson 260 indication not within specified limits	Defective pert in agc amplifier. detector. dc amplifier. end agc bridge assembly A19A2	Perform voltage end resistance measurements on assembly A19A2 to locate defective pert Replace defective part
5	Simpson 260 indication not within specified limits	Defective part in age amplifier detector dc amplifier. and agc bridge assembly A19A2	Perform voltage and resistance measurements on assembly A19A2 to locate defective part Replace defective pert

5-101. 1.75-MHz Generator Troubleshooting Chart

Item NO	Symptom	Probable trouble	Corrective Action
1	AN/URM 145 does not indicate 2 5 volts rms minimum and TEF 20006-911A1 meter M1 does not indicate 80 ua minimum	a Defective 1 75-MHz generator A1Q7 and associated circuitry	a Perform voltage and resistance measurements and replace defective Q7 and/or defective parts
		b A1R27 Improperly adjusted	b Adjust R27 for 2 5 volt rms minimum output level
		c A1Q6 and associated circuitry	c Perform voltage and resistance measurements and rep lace defective Q6 and/or defective parts
2	AN/USM-207 does not indicate 1 75 MHz ± 50 Hz.	A1 (Q1 through Q6) and/or associated circuitry	Perform voltage and resistance measurements and replace defective part

5-102. Power Supply A22A21 Troubleshooting Chart

Item No.	Symptom	Probable trouble	Corrective Action
1	The resistance across test fixture jack J1 with S4 in the +18 position is less then 10,000 ohms.	SCR Q3 is defective	Replace SCR Q3.
2	The resistance across test fixture jack J1 with S4 in the -9-volt position is leas then 10,000 ohms	Defective thermoswitch S1.	Check end replace if defective.
3	Simpson 260 indicates resistance greeter then 2 ohms.	Defective wiring.	Check wiring and repair if defective
4	Blower motor fails to operate.	a. Defective blower motor	a. Check end replace blower motor if defective.
		b Defective transformer	b. Replace transformer
5	Capacitor Cl is less then 35 volts dc ± 6.	a Defective 18-volt bridge circuit	a. Check 18-volt bridge circuit end replace defective components
		b. Defective voltage doubler circuit	b. Check voltage doubler circuit and replace defective components
		c. Defective capacitor Cl	c Check capacitor Cl and replace if defective
6	Simpson 260 does not indicate 15 volts ac ± 3 when connectad to A2-E and A2-F.	Transformer T1 defective	Check end replace transformer T1 if defective
7	A1 output cannot be adjusted for 18. volt dc ± 0.1-volt dc output	Defective A1	Replace Al
8	TS-1830/U indicates that Al output contains 60-Hz harmonic levels exceeding 35 uvolts	a. Defective transformer T1 shield	a Replace transformer T1
		b Defective blower motor B1 shield	b Replace blower motor B1
9	TS-1830/U indicates that A2 output contains 60-Hz harmonic levels exceeding 170 uvolts	a Defective transformer T1 shield	a Replace transformer T1
		b Defective blower motor B1 shield	b Replace blower motor B1

5-103. +18-Volt Regulator Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	Regulator output as read on AN/USM98-E is not within limits of 18 volts dc ± 0 01 volt	a Transistor Q1, Q2, or Q4 is defective	a Check transistor, using voltage and resistance data and replace defective pert
		b Zener diode VR1, Q2, or VR3 or VR4 is defective	b Check Zener diode, using voltage and resistance data and replace defective part
		c Defective part on board	c Use voltage and resistance data to isolate
2	Regulator output change of more than 5 0 mv is observed when CN-16A/U is varied between 103 5 and 126 5 volts	a Transistor Q1, Q2 Q3, or Q4 IS defective	a Check transistors, using voltage and resistance data and replace defective part
		b Oven assembly Al is defective	b Replace defective oven assembly Al
		c Defective diode CR1, CR2	c Use voltage and resistance data to Isolate and replace
		d Defective Cl	d Use voltage and resistance data to Isolate and replace

5-104. -9-Volt Regulator Troubleshooting Chart

Item No	Symptom	Probable Trouble	Corrective Action
	Regulator output as reed on AN USM 98-E is not within limits of 9 volts dc ± 0 2 volt	a One of diodes CR1 through CR5 is defective	a Check diodes, using voltage and resistance data and replace defective part
		b Zener diode VR1 is defective	b (‘heck zener diode, using voltage and resistance data and replace defective part

Item No	Symptom	Probable trouble	Corrective Action
1 (Cont)		c One a! transistors Q1 through Q4 is defective and/or associated circuitry.	c. Check transistors. using voltage and resistance data and replace defective part.
a	Regulator output change of more than 5.0 mv is observed when variac is varied between 103.5 and 126.5 volts.	a. One of transistors Q1 through Q4 is defective.	a Check transistors, using voltage and resistance data and replace defective part.
		b Voltage regulator VR1 is defective and/or associated circuitry.	b Check voltage regulator. using voltage and resistance data and replace defective part

5-105. Band Information Electronic Switch A22TB2 Troubleshooting Chart

Item No	Symptom	Probable trouble	Corrective Action
1	TEF HAND A indicator does not light when TEF 20006-900B13	a Defective A1 circuit	a Perform voltage and resistance measurements and replace defective component.
	RANDSWITCH is set to 0-10-MHz position	b. Defective Q2 circuit	b. Same as a above
2	TEF 20006-900-B13 BAND B m-dicator does not light when TEF 20006-900B13 BANDSWITCH is set to 10-20-MHz position	a Defective Q5 circuit.	a. Perform voltage and resistance measurements and replace defective component.
3	TEF 20006-900B13 BAND C in-dicator does not light when TEF 20006-900B13 BANDSWITCH is set to 20-30-MHz position	b Defective Q6 circuit. Defective Q3 or Q4 circuit.	b. Same as a above. Perform voltage and resistance measurements and replace defective component.

5-106. Ground Return Module A22TB5 Troubleshooting

The ground return module is simply a ground terminal which contain8 no active or passive devices. If the ground return module is suspected of being defective, visually inspect the module for cracked lands, broken connector pins, or other mechanical defects

Section IV. VOLTAGE AND RESISTANCE INFORMATION

5-107. 686A Power Supply

Voltage and resistance data for the 686A power **supply i**s contained in a and b below.

a. Tube Voltage and Resistance Chart.

Reference designation	Tube rocket pin	Voltage (volts dc unless other-wise specified)	Resistance (ohms)
V1	1	76	120K
	2	318	2K
	3	170	750
	4	80	120K
	5	318	2K
	6	**170**	**750**
			0
	8		**0 2**
	9	N/A	N/A
V2	1	88	130K
	2	0	0
	3	0 75	140K (min)
	4	0	0
	5	0	0
	6	170	400
	7	-0.95	120K
	8	0 75	140K
	9	0	0
V3	1	0	0
	2	- 1.5	203K
	3	78	120K
	4	0	1 0
	5	0	0 2
	6	-8 5	100K (Min)
	7	-8 5	65K
	8	-0.5	100
	9	0	0
V4	1	0	0
	2	- 150	80K
	3	N/A	N/A
	4	N/A	N/A
	5	0	0
	6	N/A	N/A
	7	- 150	80K
	8	N/A	N/A
	9	N/A	N/A
V5	**1**	0	0
	2	-8 5	80K
	3	N/A	N/A
	4	N/A	N/A
	5	0	0
	6	N/A	N/A
	7	-8 5	80K (min)
	8	N/A	N/A
	9	N/A	N/A

b. Transformer T1 Resistance Chart.

Terminals	Resistance (ohms)
1-2	9.8
3-4	1.12
7-8	4.4
11-15	42.5

a. Tube and Transistor Voltage and Resistance Chart.

Reference designation	Point measurement	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
A1V1	1	0	200K
	2	3 6 (mm), 6 5 (max)	5 68K (max), 680 (min)
	3	6.3 ac	0
	4	3.6 (min) 6 5 (max)	5 68K (max), 680 (min)
	5	165	40K
	6	6 3 ac	1 5
	7	130 (min), 160 (max)	72K
	8	3 6 (min), 6.5 (max)	5 68 (max), 680 (min)
A4V1		0	1 Meg
	2	0 9	68
	3	6 3 ac	0
	4	0 9	68

5-108. 6525 If. Unit

Voltage and resistance data for the 6525 if. unit i**s** contained in a and b below.

Reference designation	Point measurement	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
	5	100	45
	6	6.3 ac	1.5
	7	95	27K
	8	0.9	68
A2Q1	Base	- 6	200
	Emitter	0	0
	Collector	-3.5	50K
A2Q2	Base	-3.5	150K
	Emitter	-3.4	150K
	Collector	-11	150K
A6Q1	Base	-1.2	1.2K
	Emitter	0	1.5K
	Collector	-1.8	5K

b. Transformer Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
A5L1	Across coil	52 (max)
A5L2	Across coil	Lees than 10
A5L3	Across coil	52 (mar)
A5L4	Across coil	52 (max)
A5L6	Across cod	52 (max)
A5L7	Across cod	52 (max)
A5L8	Across coil	52 (mar)
A5L9	Across cod	52 (max)
A5L10	Across coil	Less than 10
A5L11	Across coil	52 (max)
A5L12	Across coil	Less than 10
A5L13	Across coil	52 (max)
A5L14	Across cod	52 (max)
A5L16	Across cod	52 (max)
A5L17	Across coil	Less than 10
A2L1	Across coil	Less than 10
A2L2	Across coil	Less than 10
A2L3	Across cod	52 (max)
A2L4	Across cod	52 (max)
A2L5	Across coil	Less than 10
A2L6	Across cod	Less than 10
A4L1	Across cod	Leas than 10
A4L2	Across cod	Less than 10
A4L3	Across cod	52 (max)
A2T1	5-7	270
A2T1	1-4	370
A2T2	5-a	280
A2T2	2-3	70
A2T3	1-2	Less than 10
A2T3	2-3	Less than 10
A1T1	3-4	Less than 10
A1T1	1-6	Less than 10
A4T1	3-4	Less than 10
A4T1	1-6	Less than 10
K1	1-5	552

5-109. 652T If. Unit

Voltage and resistance data for the 652T if. unit is contained in a and b below.

a. Tube and Transistor Voltage and Resistance -Chart.

Reference designation	Point of measurement	Voltage (volts dc unless otherwise specified	Resistance (ohms)
A1V1	1	0	200K
	2	3.6 (min), 6.5 (max)	680 (min) 5680 (max)
	3	6.3 ac	0
	4	3.6 (min), 6.5 (max)	680 (mid), 5680 (max)
	5	165	40K
	6	6.3 ac	1.5
	7	130 (mid, 160 (max)	72K
	8	3.6 (min), 6.5 (max)	680 (min), 5680 (max)
A4V1	1	0	1 Meg
	2	0.9	68
	3	6.3 ac	0
	4	0.9	68
	5	100	45
	6	6.3 ac	1.5
	7	95	27K
	8	0 9	68
A6V1	1	0	10K
	2	- 8 5	500K
	3	6 3 ac	0
	4	0	33K
	5	0	0
	6	6 3 ac	1 5
	7	- 56 {ANTI-VOX OFF), 0 (ANTI-VOX max cw)	750K (ANTI-VOX OFF) 470K (ANTI-VOX max cw)
	8	170 (ANTI-VOX OFF). 34 (ANTI VOX max cw)	140K
A6V2	1	0	40K
	2	- 8 5	800K
	3	6 3 ac	0
	4	6 4	5 5K
	5	3 8	1K
	6	6 3 ac	1 5
	7	0	470K
	8	165	38K
A6V3	1	- 11 (VOX sense OFF), 0 (VOX sense max cw)	25K (VOX sense OFF). 0 (VOX sense max cw)
	2	0 (VOX sense OFF), 1 5 (VOX sense max cw)	220
	3	6 3 ac	0
	4	0 (VOX sense OFF). 1 5 (VOX sense max cw)	220
	5	170 (VOX sense OFF), 130 (VOX sense max cw)	40K
	6	6 3 ac	1 5
	7	170 (VOX sense OFF) 100 {VOX sense max cw)	8K
	8	170 (ANTI VOX OFF). 34 (ANTI-VOX max cw)	220
A2Q1	Base	-0 8	200
	Emitter	0	0
	Collector	-3 5	150K
A2Q2	Base	-3 5	150K
	Emitter	-3 4	150K
	Collector	- 11	150K

b. Transformer Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
A1T	3-4	Less than 1
A2T1	7-5	27
	1-4	37
A2T2	5-8	280
	2-3	70
A2T3	1-3	Leas than 1
A4T1	3-4	Less than 1
	1-2	Less than 1
A6T1	3-4	Less than 1
	1-6	Less than 1
A6T2	3-4	Less than 1
	1-6	Less than 1
A2L1	Across coil	Less than 1
A2L2	Across coil	Less than 1
A2L3	Across coil	52 (max)
A2L4	Across coil	52 (max)
A2L5	Across coil	Less than 1
A2L6	Across coil	Less than 1
A4L1	Across cod	Less than 1
A4L2	Across coil	100 (max)
A4L3	Across coil	52 (max)
A5L1	Across coil	52 (max)
A5L2	Across coil	Leas than 1
A5L3	Across coil	52 (max)
A5L4	Across coil	52 (max)
A5L5	Across coil	Less than 1
A5L6	Across coil	52 (max)
A5L7	Across coil	52 (max)
A5L8	Across coil	52 (max)
A5L9	Across coil	52 (max)
A5L10	Across coil	52 (max)
A5L11	Across coil	Less than 1
A5L12	Across coil	Less than 1
A5L13	Across coil	52 (max)
A5L14	Across coil	52 (max)
A5L15	Across coil	52 (max)
A5L16	Across cod	52 (max)
A5L17	Across coil	52 (max)
A6K1	Across coil	400
K1	1 - 5	552

5-110. 653B Modulator

Voltage and resistance data for the 653B modulator is contained in a and b below.

a. Tube Voltage and Resistance Chart.

Reference designation	Point of measurement	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
A1V1	1	0	10
	2	11	70
	3	0	0
	4	11	70
	5	110	28K
	6	63 ac	0
	7	98	18K
	8	118	70
	9	N/A	N/A
V1	1	0 02	120K
	2	11	120
	3	0	0
	4	6 3 ac	4
	5	170	17K
	6	110	20K
	7	4 5	120
	8	N/A	N/A
	9	N/A	N/A
V2	1	0.02	120K
	2	1.8	120
	3	0	0
	4	6 3 ac	0 8
	5	170	17K
	6	10 5	20K
	7	4 5	120
	8	N/A	N/A
	9	N/A	N/A
V3	1	0 09	3.9
	2	- 18 5 (mm) -60 (max)	50K
	3	260	70K
	4	0	0
	5	6.3 ac	1
	6	240	80K
	7	0	0
	8	260	17K
	9	0	

b. Transformer Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
A1T1	1 6	1 87
	3-4	Less than 1
A1T2	1-6	1 87
	3-4	Leas than 1
A1T3	1-2	Less than 1
	3-4	Less than 1
	5-6	Less than 1
A1T4	1-2	Less than 1
	3-4	Less than 1
	5-6	Less than 1
T1	1-3	Less than 1
	2-4	Less than 1
A1L1	Across coil	21
A1L2	Across cod	21
A1L3	Across coil	21
L1	Across cod	Lees than 1
L2	Across coil	Less than 1
L3	Across coil	Less than 1
L4	Across coil	Less than 1
L5	Across coil	Less than 1
L6		**Less than 1**
L7		**Less than 1**
L8		**Less than 1**
L9		**Less than 1**
L10		Less than 1
L11		Less than 1
L12		Less than 1
L13		21
L14		21
L15		21
L16		21
L17		21
L18		21
L19		21
L20		21

Reference designation	Terminals	Resistance (ohms)
L21		21
L22		21
L23		21
L24		21
L25		21

S-111. 9200B Driver

Voltage and resistance data for the 9200B driver is contained in a and b below.

a Tube Voltage and Resistance Chart.

Reference designation	Tube socket pin	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
V1	1	11	82
	2	0	0
	3	160	Infinite
	4	11	82
	5	- 2	60K
	6	11	82
	7	6 3 ac	0
	8	0	0
	Plate cap	170	Infinite
V2	1	6.3 ac	0
	2	- 3 2	6K
	3	256	Infinite
	4	0	0
	5	0	0
	6	- 3 2	6K
	7	6.3 ac	0
	a	N/A	N/A
	Plate cap	800	25K
V3	1	6 3 ac	0
	2	- 3 2	6K
	3	256	Infinite
	4	0	0
	5	0	0
	6	- 3 2	6K
	7	6 3 ac	0
	8	N/A	X/A
	Plate cap	800	25K

b. Transformer Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
TB4T1	l-3	Less than 1
T2	l-2	Less than 1
	3-5	Less than 1
	7-8	26
	9-10	70
T3	1-2	15
	3-b	19
	7-8	Less than 1
	9-10	50
TB4L1	Across coil	Less than 1
L2	Across coil	Less than 1
L3	Across coil	6
TB5L4	Across coil	56
L5	Across coil	Less than 1
L6	Across coil	Less than I

Reference designation	Terminals	Resistance (ohms)
L7	Across coil	Less than 1
L8	Across coil	Lees than 1
L8	Across coil	Less than 1
L9	Across coil	Less than 1
L10	Across coil	Less than 1
L11	Across coil	Leas than 1
L12	Across coil	3.2
L13	Across coil	3.2
L14	Across coil	78
L15	Across coil	75
L16	Across coil	Less than 1
TB4L17	Across coil	Less than 1
L18	Across coil	67
L19	Across coil	56
K1	3-6	10K
K2	S-6	125
K3	3-6	980
K4	3-6	980

5-112. 9151 Linear Power Amplifier

Voltage and resistance data for the 9151 linear power amplifier is contained in a and b below.

a. Tube Voltage and Resistance Chart.

Reference designation	Tube socket pin	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
A1V1	1	0	-
	2	0	
	3	From 3 to 4	
	4	6 3 ac	
	5	75 (mm) 160 max	
	Grid 1	- 105 (min) - 160 (max)	40K
	Grid 2	600	Infinite
	Heaters	Between heaters	8
		10 ac	
A2V1	1		-
	(Not accessible)		
	2	—	—
	(Not accessible)		
	3	From 3 to 4	—
	4	5 ac	
	5	-	—
	(Not accessible)		
	6	N/A	N/A
	7		—
	(Not accessible)		
A2V2	1	—	-
	(Not accessible)		
	2		-
	(Not. accessible)		
	3		
	4	from 3 to 4	-
	5	-	-
	(Not accessible)		
	6	N /A	N 'A
	7	-	-
	(Not accessible)		

b. Transistor Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
Q1	1-3	120
	3-1	100
Q2	1-2	Less than 1
	2-1	Less than 1
Q3,Q9	1-2	Less than 1
	1-3	Less than 1
L1	Across coil	2150
L2	Across coil	21
L3	Across coil	12
L4	Across coil	Less than 1
L5	Across coil	Less than 1
L6	Across coil	Less than 1
L7	Across coil	Less than 1
L8	Across coil	12
L9	Across coil	17
TB6L10	Across coil	17
TB6L11	Across coil	17
TB6L12	Across coil	17
L14	Across coil	Less than 1
L15	Across coil	Less than 1
L16	Across coil	Less than 1
TB6L17	Across coil	21
TB6L18	Across coil	21
TB6L19	Across coil	21
TB6L20	Across coil	21
L21	Across coil	21
L22	Across coil	Less than 1
L23	Across coil	Less than 1
L25	Across coil	17
L26	Across coil	17
L27	Across coil	Less than 1
L28	Across coil	17
L29	Across coil	17
L32	Across coil	Less than 1
K1	N/A	N/A
K2	3-6	3.9K
K3	3-6	3.9K
K4	3-6	10K
K5	3-6	125
K6	3-6	125
K7	3-6	39K
K8	3-6	39K
K9	1-14	500

5-113. 9176 Hv Power Supply

Overall resistance data for the 9176 hv power supply is contained in the overall resistance chart below:

Reference designation	Point of Measurement	Resistance (ohms)
T1	1-2	Less than 1
	3-4	Less than 1
	5-6	Less than 1
L1	Across coil	24
K2	3-7	730
K3	3-7	730
K4	3-6	730

5-114. 9176C VSWR Alarm.

Voltage and resistance data for the 9176C VSWR alarm is contained in *a* and *b* below.

a. Transistor Voltage Chart.

Reference designation	Transistor Voltage Measurement: Base	Emitter	Collector
Q1	5.4	0	5.4
Q2	5	9.3	5.4
Q3	0.4	0	15
Q4	0.4	0	15
Q5	5.4	0	0
Q6	5.8	- 25	0
Q7	22	23	5
Q8	23	23	0
Q9	5.4	0	0
Q10	6.2	0	0
Q11	0	5	22
Q12	5.7	5	5.2
Q13	-0.2	2.5	23
Q14	3	2.6	23
Q15	0	0	22

b. Transistor Resistance Chart.

Ref des	From (-)	To (+)	Res (ohms)	Meter range
Q1	Emitter	Base	875	R x 100
		Collector	3.5K	R x 100
		Ground	0	R x 1
	Base	Emitter	10K	R x 10K
		Collector	20K	R x 10K
		Ground	10K	R x 10K
	Collector	Emitter	10K	R x 10K
		Base	10K	R x 10K
		Ground	10K	R x 10K
	Ground	Emitter	0	R x 1
		Base	875	R x 100
		Collector	3.5K	R x 100
		Base	225	R x 100
	Emitter	Collector	10K	R x 10K
		Ground	0	R x 1
		Emitter	10K	R x 10K
	Base	Collector	20K	R x 10K
		Ground	10K	R x 10K
		Emitter	10K	R x 10K
	Collector	Base	9.5K	R x 10K
		Ground	9.5K	R x 10K
		Emitter	0	R x 1
	Ground	Base	9K	R x 10K
		Collector	9K	R x 10K
		Base	10K	Rx 10K
Q2	Emitter	Collector	1.4K	Rx 100
		Ground	0	Rx 1
		Emitter	20K	Rx 10K
	Base	Collector	10K	Rx 10K
		Ground	20K	Rx 10K
		Emitter	10K	Rx 10X
Q3	Collector	Base	10K	Rx 10K
		Ground	10K	Rx 10K
		Emitter	0	Rx 1
	Ground	Base	850	Rx 100
		Collector	1.2K	Rx 100
		Base	850	Rx 100

Refdes	From (+)	To (-)	Resistance	Meter range
Q4	Emitter	Collector	1.1K	R x 100
		Ground	0	R x 1
	Base	Emitter	22K	R x 10,000
		Collector	10K	R x 10,000
		Ground	22K	R x 10,000
	Collector	Emitter	10K	R x 10,000
		Base	10K	R x 10,000
		Ground	10K	R x 10,000
	Ground	Emitter	0	R x 1
		Base	10K	R x 10,000
		Collector	10K	R x 10,000
	Emitter	Base	Inf	R x 10,000
		Collector	Inf	R x 10,000
		Ground	Inf	R x 10,000
Q5	Base	Emitter	10K	R x 10,000
		Collector	10K	R x 10,000
		Ground	400K	R x 10,000
	Collector	Emitter	10K	R x 10,000
		Base	12K	R x 10,000
		Ground	400K	R x 10,000
	Ground	Emitter	30K	R x 10,000
		Base	56K	R x 10,000
		Collector	40K	R x 10,000
	Emitter	Base	500K	R x 10,000
		Collector	500K	R x 10,000
		Ground	50K	R x 10,000
	Base	Emitter	14K	R x 10,000
		Collector	44K	R x 10,000
Q6		Ground	34K	R x 10,000
	Collector	Emitter	1K	R x 100
		Base	2.2K	R x 100
		Ground	60K	R x 10,000
	Ground	Emitter	Inf	R x 10,000
		Base	375K	R x 10,000
		Collector	375K	R x 10,000
	Emitter	Base	10K	R x 10,000
		Collector	1.7K	R x 100
		Ground	1K	R x 100
	Base	Emitter	1.1K	R x 10
		Collector	1K	R x 100
Q7		Ground	1.7K	R x 100
	Collector	Emitter	2K	R x 100
		Base	14K	R x 10,000
		Ground	1.9K	R x 100
	Ground	Emitter	1.2K	R x 100
		Base	11K	R x 10,000
	Emitter	Collector	7.5K	R x 10,000
		Base	12K	Rx 10,000
		Collector	12K	R x 10,000
		Ground	1K	R x 100
	Base	Emitter	1K	R x 100
		Collector	1K	R x 100
Q8		Ground	2.8K	R x 100
	Collector	Emitter	20K	R x 10,000
		Base	30K	R x 10,000
		Ground	20K	R x 10,000
	Ground	Emitter	1.2K	Rx 100
		Base	10K	R x 10,000
		Collector	10K	R x 10,000
	Emitter	Base	Inf	R x 10,000
		Collector	Inf	R x 10,000
		Ground	Inf	R x 10,000
	Base	Emitter	10K	R x 10,000
		Collector	10K	R x 10,000
		Ground	300K	R x 10,000

Refdes	From (+)	To (-)	Resistance	Meter range
Q9	Collector	Emitter	40K	R x 10,000
		Base	1.4K	R x 10,000
		Ground	200K	R x 10,000
	Ground	Emitter	50K	R x 10,000
		Base	50K	R x 10,000
		Collector	46K	R x 10,000
	Emitter	Base	1.3K	R x 10,000
		Collector	1.3K	R x 10,000
		Ground	200K	R x 10,000
	Base	Emitter	10K	R x 10,000
		Collector	1K	R x 100
Q10		Ground	56K	R x 10,000
	Collector	Emitter	10K	R x 10,000
		Base	2K	R x 100
		Ground	56K	R x 10,000
	Ground	Emitter	10K	R x 10,000
		Base	375K	R x 10,000
		Collector	375K	R x 10,000
	Emitter	Base	10K	R x 10,000
		Collector	12K	R x 10,000
		Ground	220	R x 100
Q11	Base	Emitter	300K	R x 10,000
		Collector	350K	R x 10,000
		Ground	350K	R x 10,000
	Collector	Emitter	10K	R x 10,000
		Base	10K	R x 10,000
		Ground	4K	R x 100
	Ground	Emitter	220	R x 100
		Base	10K	R x 10 000
		Collector	10K	R x 10 000
	Emitter	Base	650	R x 100
		Collector	200K	R x 10,000
		Ground	220	R x 100
Q12	Base	Emitter	650	R x 100
		Collector	2.2K	R x 100
		Ground	440	R x 100
	Collector	Emitter	1.6K	R x 100
		Base	750	R x 100
		Ground	1.3K	R x 100
	Ground	Emitter	200	R x 100
		Base	450	R x 100
	Emitter	Collector	2.6K	R x 100
		Base	850	R x 100
		Collector	75K	R x 10,000
Q13		Ground	700	Rx 100
	Base	Emitter	30K	R x 10,000
		Collector	140K	R x 10,000
		Ground	30K	R x 10,000
	Collector	Emitter	40x	R x 10,000
		Base	10K	R x 10,000
		Ground	26K	R x 10,000
	Ground	Emitter	1K	Rx 100
		Base	20K	R x 10,000
		Collector	55K	R x 10,000
	Emitter	Base	850	Rx100
		Collector	2K	Rx100
		Ground	700	Rx100
Q14		Emitter	2K	Rx100
	Base	Collector	1.7K	Rx100
		Ground	1K	Rx100
		Emitter	2K	Rx100
	Collector	Base	750	RX100
		Ground	1K	R x 100
		Emitter	1K	R x 100

Reference	From (+)	To (−)	Resistance	Meter range
Q15	Ground	Base	14k	R x 100
		Collector	1.2k	R x 100
		Base	650	R x 100
	Emitter	Collector	2.5k	R x 100
		Ground	0	R x 1
		Emitter	10k	R x 10,000
	Base	Collector	20k	R x 10,000
		Ground	10k	R x 10,000
		Emitter	10k	R x 10,000
	Collector	Base	10k	R x 10,000
		Ground	10k	R x 10,000
		Emitter	0	R x 1
	Ground	Base	10k	R x 10,000
		Collector	10k	R x 10,000

5-115. **Tone Receiver Transistor Voltage and Resistance Data**

Listed in the voltage and resistance charts (*a* and *b* below) are voltage and resistance measurements taken between the designated points and chassis ground. The measurements were made using an AN/USM-210 multimeter with the transistor connected in the circuit.

a. Transistor Voltage and Resistance Chart.

Reference designation	Point of measurement	Voltage (volts dc unless otherwise specified)	Resistance (ohms)
Q1	Base	−1.05	500
	Emitter	−0.88	200
	Collector	−12	200
Q2	Base	−0.8	350
	Emitter	−0.62	30
	Collector	−11.8	400
Q3	Base	−0.6	1K
	Emitter	−0.2	30
	Collector	−0.92	250

b. Transformer Resistance Chart.

Reference designation	Terminals	Resistance (ohms)
T1	1-3	55
	4-5	35
T2	1-3	100
	4-5	250
	5-6	250
	4-6	500
K1	Across coil	230

Section V. REPAIRS

5-116. **General Parts Replacement Techniques.** **Most parts are easily accessible and can be replaced without any special procedures. However, the gear drive assembly must be removed and replaced using the procedures given in paragraphs 5-117 and 5-118, respectively. Removal of the gear drive assembly includes** removal of capacitors C22, C23, and C41 from the 9200B driver chassis. These capacitors, in addition to inductors **L2 and L1** can then be **entirely removed from the equipment by observing the mounting of each component and performing the necessary replacement procedures. Most gears and sprocket wheels of the gear drive** assembly are mounted in shafts with split tube pins. When a gear or sprocket wheel must be replaced, support the associated shaft on a rigid surface and lightly tat, the pin out of its hole. Line up the new part in the same position as the part previously removed and replace the pin; use light taps and be sure the shaft is not bent. After replacement, perform the specified alignment procedure for the particular component or assembly.

5-117. **Removal of Gear Train Assembly (figs. 5-80 and 5-81)**

Before starting this procedure, try to adjust the TUNE control to 2 MHz. This meshes the plates of capacitor C41 to prevent possible damage to the capacitor plates. Mark the position relationship of the various gears with the position of inductor L2 and L10 wiper arms. This facilitates replacement and subsequent alignment. Next, read the alignment procedure before removal to note any conditions which may be required for proper alignment.

a. **Remove two screws ((1)) fig 5-81), holding the tune drive shaft in place.**

b. **Push back the tune drive shaft to disengage the tune coupling.**

c. **Remove two screws (2) retaining the indicator shaft and disengage the indicator coupling.**

d. **Unsolder connections (3)) and (4))**

e. **Unsolder L10 connection ((6)) fig 5-80))**

f. **Remove screws (7)) and (8)).**

g. **Unsolder J6 connection (9)) and remove connector J6 from the rear wall of the 9200B driver.**

h. **Remove screw (10)).**

i. **Remove screws ((5)) and ((11)) fig. 5-81)).**

j. **Carefully raise drive train assembly until sprocket drive wheel (12)) is free from inductor drive chain.**

k. **Lift gear drive assembly out of 9200B driver chassis.**

5-118. **Replacement of Gear Train Assembly**

When replacing the gear train assembly, be sure that sprocket drive wheel is properly meshed with the sprocket chain before fully seating the gear drive assembly against the 9200B drive chassis. Replacement of the gear train assembly is performed in reverse sequence to the order of removal.

5-119. Disassembly of Gear Train Assembly (fig. 5-81)

The following procedure assumes that the gear train assembly has been removed from the 9200B driver chassis.

a. Remove screw (1) and eccentric sprocket idler wheel (2) and remove sprocket chain (3)

b. **Remove four screws ((4)) holding the cam follower spring return box ((5)).**

c. **Remove two screws ((6)) holding cam follower alignment block ((7)), remove the cam follower assembly ((8)) from the gear drive assembly.**

d. **Using a punch and hammer, tap out split pin ((9)) holding gear ((10)) on the capacitor shaft.**

e. **Remove four screws ((11)) holding capacitor C22 to main frame wall ((12)) and remove capacitor C22.**

f. **Using a punch and hammer, carefully tap out split pins ((13)) and ((14)) holding couplers ((15)) and ((16)) to their respective shafts.**

g. **Tap out split pin ((13)) holding the C41 sprocket wheel ((15)) to the C41 stator, and remove the sprocket wheel.**

h. **Remove three screws ((19)) and pull off gear train sideplate ((20)). Shafts ((21)), ((22)), ((23)), and ((24)) will be released from the gear train.**

NOTE

For replacement of gears or cams on the shafts, use a V-block to support each end of the shaft and tap out the split pin. Replace the new part in the same position on the shaft as the part removed.

5-120. Assembly of Gear Train Assembly (fig. 5-81)

The gear train assembly is assembled with the gears meshed at the 2-MHz position. When assembling, make sure the idler stop gear (25) is removed from stud (26) by removing split ring ((27)). *Do not install idler stop gear until instructed.*

a. **Place shafts (21), (22), (23) and (24) in their proper positions between plates (20) and (12).**

b. **Insert three screws (19) into the spaces mounted on plate (12) but do not tighten.**

c. **Rotate shaft (23) and, if necessary, completely remove sideplate (20) until cam makes an angle of 59° 15' ± 0° 30'.**

d. **Snap split ring (27) onto stud (26) to retain idler stop gear (25).**

e. **Tighten three screws (19) and check that all gears rotate freely.**

f. Turn shaft (28) until the plates of C41 are approximately 1/16 inch from full mesh.

g. With shaft (28) held in this position, install cam follower spring return box (5) with four screws (4) and cam follower alignment block (7), using two screws (6)

A. Mount capacitor C22 with four mounting screws (11) and four spacers (29)

i. Slip gear (10) onto the C22 drive shaft and pin.

j. Loosely drape the sprocket chain (8) over sprocket wheels (10) and (60).

k. Install eccentric sprocket idler wheel (2) with screw (1).

l. With capacitors C22 and C41 1/16 inch from full mesh, engage the eccentric sprocket idler wheel (2) and lock in position.

NOTE

Rotating shaft coupler should cause capacitors C22 and C41 to track.

5-121. Removal of Tune Inductor L4 (fig. 5-71)

a. Remove both side plates of the 9151 linear power amplifier.

b. Loosen nuts (1) and (2) and loosen strap connections (3), (4), and (5) at the base of capacitors C22, C23, and C24.

c. Remove strap connections to capacitors C22, C23, and C24, and disconnect strap (6) leading to inductor L5.

d. Using an Allen-head socket head wrench, loosen inductor drive shaft coupling (7) and disengage coupling.

e. Remove four nuts and bolts (8) and carefully draw inductor L4 out of the chassis housing.

5-122. Replacement of Tune Inductor L4

Replacement of inductor L4 is performed in reverse sequence to the order of removal. When replacing L4, be careful not to hit the capacitor glass enclosures. Refer to the alignment procedures to position the coil wiper arm with relation to the TUNE control.

5-123. Removal of Load Inductor L5 (fig. 5-71)

a. Disconnect strap joint to C27.

NOTE

Access to retaining nut may be obtained from a hole in the top of the chassis adjacent to box (1).

b. Disconnect strap (2) connected to tune inducter L4.

c. Remove connection (3) extending from inductor L7.

d. Remove two screws (4) from the base of the load inductor L5 housing.

e. Hold L5 housing to prevent damage to other components and remove the supporting screw extending down from the chassis tap and carefully remove L5.

S-124. Replacement of Load Inductor L5

Replacement of inductor L5 is performed in reverse sequence to the order of removal. When replacing L5, be careful not to hit the adjacent capacitor glass enclosure. Refer to the alignment procedure to position the coil wiper arm with relation to the LOAD control.

5-125. Removal of Final Amplifier V1 (fig. 5-71)

a. Remove two screws (1) and retaining ring (6).

b. Dislodge protective cover (7) and remove it from V1.

c. Using both hands, slowly twist V1 ccw until the tube is free of the socket, then remove.

5-126. Replacement of Final Amplifier V1 (fig. 5-71)

a. Insert the tube in the tube socket and twist the tube cw until it locks in place.

b. Replace the protective cover (7) making sure the air switch interlock lever is deflected allowing the air switch to operate.

c. Replace retaining ring (6) and tighten screws (3) and (4).

5-127. Removal and Disassembly of Gear Train Assembly (fig. 5-73)

a. Disconnect all wiring connections to meters and controls on the top of the front panel.

b. Tag each wire to show its destination for reassembly.

c. Remove eight screws (A) and the protective cover (B) from the indicator lamp connection box.

d. Disconnect all wires and tag each wire to show destinations.

e. Remove two screws (C) holding the forward cam follower shaft in place.

f. Remove two screws (D) holding the rear cam follower shaft in place.

g. Loosen the three locknuts (E) holding the capacitor plungers on the camshaft follower.

h. Slip the metal blocks off the cam follower studs.

i. Remove nut (F), bolt (G), and roller (H), and pull each cam follower (I) out of the top chassis.

j. On the bottom of the lower chassis, remove five screws (J) holding the front handle to the front panel.

k. Remove camshaft drive gear (K) and insure camshaft (L) is free by slightly rotating the camshaft.

l. On the bottom of the lower chassis, remove four mounting screws (M) from the gear train faceplate (N).

m. Remove two screws (0) on each side of the 9151 linear power amplifier and gently draw the front panel assembly (P) away from the remainder of the chassis. Be careful that all parts disengage without binding.

n. On the face of the gear train assembly, remove hex nut (Q) and washer (R).

o. Remove gear train faceplates (S) and (T) by removing six screws (U).

p. Each gear can be removed from the gear train backplate by removing the associated spring clip (V) from the mounting shaft.

5-128. Assembly and Replacement of Gear Train Assembly

a. Mount gears (W) through (AC) on their respective mounting shafts.

b. Mount gears (AD) and (AE) on their mounting shafts; be careful to keep the scribed lines in alignment as shown in A, figure 5-72.

c. Insure that all spring clips (V) are properly placed in the groove on the mounting shafts.

d. Apply a light film of grease to all gear teeth.

e. Replace faceplates (S) and (T), using six screws (U) and spacers (AF).

f. Replace hex nut (Q) and three washers (R), but do not tighten the hex nut at this time.

g. Lift the front panel assembly (P) up to the main frame of the 9151 linear power amplifier and secure it with two screws (O) on each side. Make sure camshaft (L) turns freely in its bushing.

h. Rotate the gear train to the 2 MC position as shown on the FREQ MC indicator.

i. On the load coil (L5), position the wiper arm wheel as shown in B, figure 5-78.

j. Lock the setscrews of the associated helical gears (AG).

k. On the tune coil drive shaft extending out from the front panel, loosen the drive shaft coupling (AH).

l. On the tune coil, position the wiper arm wheel as shown in E, figure 5-78.

m. Tighten the coupling setscrews on the tune coil drive shaft (AH).

n. Insert the front and rear cam followers (I) through the bushing holes in the top chassis.

o. Slip the camshaft drive gear (K) on the camshaft but do not tighten.

p. With the TUNE control set to 2 MC. position the camshaft as shown in c. figure S-76 and lock the camshaft drive gear (K) on the camshaft (L).

q. Slip the metal blocks (AI) attached to the capacitor plugers onto the camshaft follower studs.

r. Replace the four screws (C) and (D) holding the camshaft followers in place.

s. On the bottom of the lower chassis, replace five screws (J) holding the handle to the front panel.

t. On the bottom of the lower chassis, replace four mounting screws (M) holding the gear train faceplate.

u. Reconnect all wiring in the lamp connection box, and replace the protective cover (B) with eight screws (A). Make sure grounding straps at top and bottom are connected.

v. Reconnect all wiring to meters and controls on the top of the front panel (P).

w. Perform the alignment procedure for the 9151 linear power amplifier.

5-129. Removal of 9176 Hv Power Supply Parts

Due to the size and weight of the components within the 9176 power supply, the following procedures should be followed for parts removal.

a. Remove the ac line voltage to the transmitter.

b. Remove the front panel of the 9176 hv power supply section.

c. Be sure rectifier diodes CR2 and CR3, contactors K2 and K3, plug P8 POWER circuit breaker CB1, and the pins of time delay relay K1 are accessible.

d. Remove these components as follows:

(1) Remove six bottom mounting screws ((1) fig. 5-94), one on each side of the mounting plate.

(2) Remove plug P8 and remove screw (2) from the cathode of CR2 and from the cathode and anode of CR2.

(3) Pull the mounting plate slowly outward and reach behind the plate and remove the red wires from the front terminal of C1 ((3) fig. 5-95).

(4) Carefully pull the red high-voltage wires through the holes in the plate and pull the plate completely out.

(5) To remove filter capacitor C1. remove the blank panel, 645/C VSWR alarm, and the 686A power supply.

(6) Unsolder connection (4).

(7) Using a 3/8-inch wrench, remove the ground wires and resistors R4 and R5 from terminal ((5) fig. 5-94).

(8) Using a stubby screwdriver, remove the screw holding the mounting bracket for resistor R6 and R7 and loosen the remaining mounting screw holding the mounting plate for C1.

(9) Lift the wiring harness to clear the capacitor and slide the capacitor and its mounting plate through the front of the equipment rack.

(10) To remove power transformer T1. tag and remove the wiring of the primary and secondary terminals.

(111 Using a 1/2-inch socket wrench with a fine ratchet, remove the four mounting bolts and slide the transformer forward. Use a dolly or sling to transport the transformer and its replacement.

(12) To remove power resistors R6 and R7, unsolder the wiring to resistors and remove the mounting screws which pass through the center of each resistor.

NOTE

When installing the replacement resistor, do not overtighten the mounting screw as this may crack the resistor.

(13) To remove filter choke L1, remove the wiring from the choke and remove four mounting bolts. Slide the choke forward through the front of the equipment rack.

5-130. **Replacement of 9170 Hv Power Supply Parts**

Replacement of parts may be accomplished in reverse sequence to the removal procedures given in paragraph 5-129

5-131. **Frequency Synthesizer Repair**

Repair of the synthesizer assemblies at depot category consists of repairing the hard wired parts on the assembly chassis or the printed circuit boards contained in the assembly. Where the removal, disassembly, or replacement of a hard wired part or a printed circuit board is obvious, the procedure is not given. Included, where applicable, is the reference to alignment procedures for the assemblies

5-132. **Vhf Converter A2**

Disassembly of vhf converter A2 is obvious. However, during reassembly, handle the vhf converter with extreme care.

CAUTION

Capacitors at the rear of mixer and filter amplifier assembly A2A1 and vhf X7 multiplier assembly A2A2 may be damaged by attaching hardware if assemblies are not properly seated in subassembly chassis.

NOTE

Perform the following steps to mechanically align assemblies A2A1 and A2A2 in the subassembly chassis.

a. **Attach mixer and filter amplifier assembly A2A1 and vhf X7 multiplier assembly A2A2 to the subassembly mounting bracket with four 2-56 x 1/4 inch long screws, four No. 2 lockwashers, four No. 2 flat washers, and four 2-56 nuts. Do not tighten the four screws at this time.**

b. **Place the** subassembly mounting bracket **with loosly attached** assemblies A2A1 and A2A2 into the subassembly chassis and carefully secure with attaching hardware. Do not tighten the screws at this time.

c. With all attaching hardware secured in place, assemblies A2A1 and A2A2 are now properly positioned with respect to the subassembly chassis.

d. Tighten all screws on subassembly chassis and mounting bracket.

5-133. **Repair of Feedthrough Connector and Filter Module A22FL2.**

Feedthrough connector and filter module A22FL2 contains 92 feedthrough capacitors. To remove a defective feedthrough capacitor, use a spanner wrench with an I.D. of 0.245 inch and an O.D. of 0.312 inch.

5-134. **Repair of Band Information Electronic Switches A22TB2**

Band information electronic switches A22TB2 are essentially a printed circuit board; that is, hard wired to the synthesizer chassis. This printed circuit board is located underneath frequency multiplier A18. To obtain access to band information electronic switches A22TB2, first remove frequency multiplier A18.

5-135 **Removal and Disassembly of Frequency kHz Indicators A22A2A22 through A22A2A27**

Perform the following procedure to remove and disassemble frequency kHz indicators A22A2A22 through A22A2A27.

a. **Remove synthesizer front panel from chassis by removing six 6-32 x 3/8 inch long screws, six No. 6 lockwashers, and six No. 6 flat washers.**

b. **Remove bracket securing frequency kHz indicators from front panel by removing two 6-32 x 3/8 inch long screws, two No 6 lockwashers, and two No. 6 flat washers from each end of the bracket.**

c. **Remove printed circuit card from top or bottom of frequency kHz indicator by removing two screws.**

d. **Unsolder bulb leads from printed circuit card and remove bulb.**

5-136. Reassembly and Replacement of Frequency Indicators A22A2A22 through A22A2A27

Perform the following procedure to reassemble and replace frequency kHz indicators A22A2A22 through A22A2A27.

a. Place bulb leads through holes on printed circuit card and solder.

b. Attach printed circuit card to frequency kHz indicator with two screws.

c. Secure frequency kHz indicator to synthesizer front panel with bracket, four 6-32 x 3/8 inch long screws, four No. 6 lockwashers, and four No. 6 flat washers.

d. Attach synthesizer front panel to chassis with six 6-32 x 3/8 inch long screws, six No. 6 lockwashers, and six No. 6 flat washers.

5-137. **Removal of Distribution Box A22A1**

Perform the following procedure to remove the distribution box from the synthesizer chassis.

a. **Remove six assemblies, A1 through A6, that are plugged into the underside of the distribution box.**

b. **Separate the distribution box from the synthesizer chassis by removing four 6-32 x 3/8 inch long screws, four No. 6 lockwashers, and four No. 6 flat washers.**

NOTE

The distribution box remains connected to the synthesizer chassis due to the many feedthrough-type cables that are internally hard wired to the distribution box. The distribution box may be removed by unsoldering these cables; however, the following steps provides an alternate method which facilitates removal.

c. **Disconnect connectors at the opposite end of each hard wired cable that is connected to the distribution box.**

d. **Remove the lacing from the harnesses that secure the disconnected cables.**

e. **Tag all cables with respect to their appropriate harnesses.**

f. **Remove the distribution box with all the internally wired cables intact.**

5-138. **Replacement of Distribution Box A22A1**

The following procedure provides information for replacing the distribution box.

a. **Place the distribution box with all the internally wired connectors into the synthesizer.**

b. Secure the distribution box to the synthesizer chassis with four 6-32 x 3/8 inch long screws, four No. 6 lockwashers, and four No. 6 flat washers.

c. Connect the opposite ends of all cables to their appropriate destinations.

d. Lace all cables into appropriate harnesses.

e. Plug six assemblies, A1 through A6, into the underside of the distribution box.

5-139. Repair of Fixed Frequency Generator A7

The fixed frequency generator can be swung into an extended position to provide access to the underside of the fixed frequency generator chassis. To place the fixed frequency generator in the extended position, loosen two captive fasteners and swing the assembly to the extended position.

5-140. **Repair of Reference Signal Generator A22A6A1**

The reference signal generator is fastened to the synthesizer chassis with four 6-32 x 3/8 inch long screws, four No. 6 lockwashers, and four No. 6 flat washers. Two of the screws are hidden by fixed frequency generator A7 To obtain access to these two screws, swing fixed frequency generator A7 to the extended position.

5-141. **Maintenance of Electronic Shielding Filter**

The electronic shielding filter requires cleaning periodically To clean the electronic shielding filter, wash it in a solution of warm water and a mild detergent. After the electronic shielding filter is clean, rinse it in clear water and allow to dry

5-142. Repair of Diode Switchbox A15

Diode switchbox A15 contains 28 hard wired, printed circuit boards. Printed circuit boards A15A1 through A15A5 are located in the top section of the diode switchbox, and printed circuit boards A15A6 through A15A28 are located in the bottom section of the diode switchbox. Removal of the printed circuit boards in the top section is obvious. However, access to the printed circuit boards in the bottom section is obtained by removing the diode switchbox from the synthesizer chassis. To remove the diode switchbox, loosen four captive screws and disconnect the various connectors that are attached to the casing. Removal of the bottom cover and the printed circuit cards contained in the bottom section is obvious.

5-143. **Repair of Power Supply A22A21**

Repair of power supply A22A21 consists of replacing printed circuit boards A1 and A2 and repairing all hard wired circuit elements on the power supply chassis, including fan B1 . Transistors Q1 and Q2, mounted on the heat sink assembly, are also repaired at this level. To facilitate removal of the hard wired circuit elements, first remove the power supply from the synthesizer chassis. Removal of the power supply is accomplished by removing six 6-32 x 5/10 inch long screws.

5-144. Dummy Load Resistor Assembly Replacement Procedure

a. Set unit on its back end (connector up).

b. Loosen the clamping band screw and remove clamping band

c. Lift load resistor assembly out of the tank. Allow coolant to drip back into the tank.

d. Remove load resistor element.

NOTE

Before replacing load resistor, inspect the O-ring seal for proper positioning and condition.

e. Replace load resistor element and reassemble the dummy load.

5-145. Shelter Enclosure Repairs

Repair procedures for the shelter enclosure include replacement of maintenance parts and repair of the aluminum covered skin foam-core construction. For repair and maintenance procedures of the shelter, enclosure refer to TB 746-10.

Section VI. ALIGNMENT

5-146. Test Equipment and Special Tools Required for Alignment

The following test equipment is required for depot alignment of the components of the transmitter group. No special tools are required.

a. Electronic Voltmeter ME-30/U.
b. Multimeter ME-26/U.
c. Frequency Meter AN/USM-207.
d. Signal Generator AN/USM-205.
e. Signal Generator AN/GRM-50.
f. Variable Oscillator RF-7A.
g. Signal Generator SG-71/FCC.
h. Spectrum Analyzer TS-1827/U.
i. Signal Generator AN/URM-127.
j. Electronic Voltmeter AN/URM-145.
k. Rx resistance bridge, Boonton Radio 250A.

5-147. 653B Modulator Alignment Procedures

To align the modulator, proceed as follows:

a. Connect test equipment as shown in figure 5-182.

b. Set RF-7A to 30.0 MHz; set output level to red line (300 mv).

c. Set AN/GRM-50 output attenuator for 15 mv and adjust input attenuators for full-scale deflection, as observed on spectrum analyzer.

d. This is the 0-dB reference level. Do not change any controls on the spectrum analyzer.

e. Adjust AN/GRM-50 No. 2 to 1.752000 MHz (± 200 Hz) using the AN/USM-207 (minimum input 100 mv).

f. Adjust AN/GRM-50 No. 1 to 1.758000 MHz (± 200 Hz) using the AN/USM-207 (minimum input 100 mv).

g. Set AN/GRM-50 No. 1 attenuator switch to -30-dB scale and AN/GRM-50 No. 2 attenuator switch to -110-dBm scale.

h Adjust AN/GRM-50 No. 1 vernier control until 5 mv is measured on AN/URM-145 connected to MON IN jack J7 on 653B modulator.

i. Without disturbing vernier control, set AN/GRM-50 No. 1 attenuator switch to -110-dBm scale.

j. Set AN/GRM-50 No. 2 attenuator switch to -30-dBm scale and adjust AN/GRM-50 No. 2 vernier control until 5 mv is measured on AN/URM-145 connected to MON IN jack J7 653B modulator.

k. Without disturbing vernier control, set AN/GRM-50 No. 1 attenuator switch to -30-dBm scale.

l. Adjust frequency synthesizer to 31.75 MHz at an amplitude of 1.0 volt rms.

m. Adjust potentiometer R6 on the 653B modulator to its midrange.

n. Set 686A power supply POWER switch to ON.

o Alternately adjust transformers T1 and T2 on 653B modulator to obtain a peak indication on spectrum analyzer.

p. Readjust potentiometer R6 to obtain a full-scale deflection on spectrum analyzer.

NOTE

This is the 0-dB reference level.

q. Set RF-7A to 31.75 MHz and adjust output level to red line (300 mv); observe that waveform is displayed on spectrum analyzer.

r. Adjust potentiometer R14 in the 653B modulator for minimum signal display on spectrum analyzer.

s. Peak of waveform displayed on the spectrum analyzer should be a minimum of 8 dB below the 0-dB reference level observed in d above.

t. Set RF-7A to 30.0 MHz and adjust output level to red line (300 mv), observe that waveform is displayed on spectrum analyzer.

u. Alternately readjust transformers T1 and T2 for a peak indication on spectrum analyzer.

v. Readjust potentiometer R6 to obtain full-scale deflection on spectrum analyzer.

w. Set 20-dB if. attenuator switch on spectrum analyzer to 0-dB position. Locate third-order distortion peak on spectrum analyzer.

x. The peak of the third-order distortion should be observed in p above.

y. Adjust frequency synthesizer for a frequency of 3.75 MHz at an amplitude of 1 volt rms.

z. Set RF-7A to a frequency of 2 MHz and adjust output level to red line (300 mv).

aa. Adjust RF-7A frequency until waveform is displayed on center of spectrum analyzer.

ab. Set if. attenuator switch on spectrum analyzer to 20-dB position.

ac. Readjust potentiometer R6 on amplifier-modulator to obtain a 0-dB level (0.5 mv rms). This is the reference level.

ad. Set if. attenuator switch on spectrum analyzer. The third-order distortion should be a minimum of 50 dB below the 0-dB reference level in *ac* above.

NOTE

Alternate readjustment of transformer T1 and potentiometer R6 may be necessary to obtain a minimum of 50-dB distortion at 2.0 and 30.0 MHz.

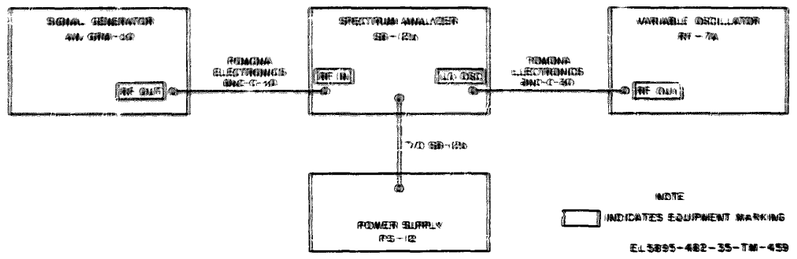

Figure 5-182. 653B modulator, alignment reference level, test setup diagram.

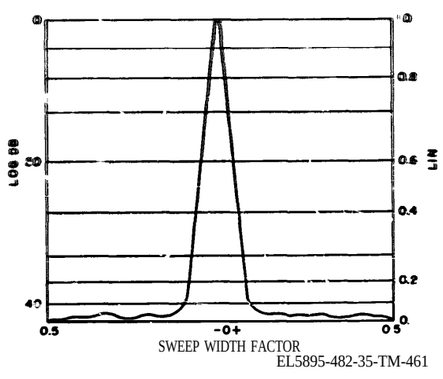

Figure 5-183 653B modulator, alignment reference level test waveform

5-148. Rf Amplifier Alignment Procedures

To align the rf amplifier, proceed as follows:

a. Connect test setup as shown in figure 5-184 Set POWER circuit breaker to OFF.

b. Remove dust cover from 653B modulator and rotate potentiometer R2 fully clockwise

c Set TUNE control to extreme counterclockwise position (maximum capacity).

d. Loosen two setscrews on drive shaft coupling and mechanically align MCS indicator to coincide with horizontal line below 2-MHz mark.

e. Rotate TUNE control to extreme clockwise position and observe dial pointer.

NOTE

The dial pointer should coincide with horizontal line below 32-MHz mark.

f. Repeat *d* and *e* above, if necessary, to obtain symmetrical indication on both horizontal lines.

g. Tighten setscrews and check alignment in counterclockwise and clockwise positions.

A. Set coils L1 through L12 to the extreme counterclockwise position; then rotate the coils clockwise approximately 4 turns.

i. Set 686A power supply POWER circuit breaker to ON.

j. Set BAND SEL switch to 4, 653B modulator TEST switch to 6, OUTPUT LEVEL control fully counterclockwise, and potentiometer R15 to -10 volts, as measured at pin 2 of tube V3

k Rotate neutralization capacitor C6 to its extreme counterclockwise position; then rotate 4-1/2 turns clockwise.

l Using the 640A circuit test set, check reading at TEST jack.

m. Depress PUSH TO TEST switch on circuit test set and note meter indication, release switch.

NOTE

The circuit test set should indicate within green area (40 to 60 microamperes).

n. Set TEST switch to positions 3 and 4, the 686A circuit test set should indicate within green area for position 3 and the range or green area for position 4.

o. Set ME-30/U to 1 volt.

p. Set AN/GRM-50 output frequency to 16 MHz at 11 millivolts (lower end of band 4). Calibrate AN/GRM-50, using its internal oscillator and a headset.

q. Set MCS indicator to 16 MHz, using TUNE control.

r. Adjust tuning coils L4, L8, and L12 by turning slugs successively clockwise to obtain peak indication on ME-30/U.

s. Decrease AN/GRM-50 output amplitude, if necessary, to maintain indication on ME-30/U below 1 volt.

t. Repeat *r* and *s* above to obtain a peak indication on ME-30/U.

u. Set AN/CRM-50 output frequency to 30 MHz at 11 millivolts (upper end of band 4).

v. Calibrate AN/GRM-50, using its internal oscillator and a headset.

w. Set MCS indicator to 30 MHz, using TUNE control.

x. Adjust trimmer capacitor (located in cans L4, L8, L12) corresponding to the upper end of band 4.

y. Observe indication on ME-30/U.

z. Repeat *s* and *x* above to obtain peak indication on ME-30/U.

NOTE

It may be necessary to readjust several times until overall peak is obtained.

aa. Repeat *p* through *z* above for fine adjustments.

ab. Carefully turn the slug of tuning coils L4, L8, and L12 (one-at-a-time) one-quarter turn clockwise, then one-half turn counterclockwise; then one-quarter turn clockwise, and observe indication.

NOTE

The ME-30/U indication should decrease as slug of the tuning coil is turned either clockwise or counterclockwise from its original (center) setting.

ac. Repeat ab above for all tuning coils with TUNE control set to lower end of band 4 as described in p and q above.

ad. Decrease AN/GRM-50 output amplitude, if necessary, to maintain indication on ME-30/U below 1 volt.

ae. Adjust tuning coils L4, L8, and L12 by turning slugs successively clockwise to obtain a peak indication on ME-30/U.

af. Set AN/GRM-50 output frequency to 28MHz at 35 millivolts.

ag. Set MCS indicator to 28 MHz, using TUNE control.

ah. Adjust TUNE control to obtain a peak indication on ME-30/U.

ai. Set POWER 686A power supply circuit breaker to OFF.

aj. Unsolder red wire from terminal E6.

CAUTION

Insulate the end of the unsoldered wire to prevent an electrical short.

ak. Connect neutralizing test setup as shown in figure 5-185.

al. Set AN/GRM-50 to a frequency of 28 MHz at 11 millivolts.

am. Set 686A power supply POWER circuit breaker to ON

an. Set AN/URM-145 attenuator to observe a meter indication.

ao. Adjust neutralization capacitor C6 to obtain a minimum voltmeter indication.

ap Set 686A power supply POWER circuit breaker to OFF.

aq. Reconnect test setup as show in figure 5-184.

ar. Resolder red wire removed in *aj* above to terminal E6.

as. Set 686A power supply POWER circuit breaker to ON.

NOTE

OUTPUT LEVEL potentiometer R4 can be adjusted to keep the vtvm indication within 1.9 to 2.0 volts

at. Vary AN/GRM-50 output frequency at an 11-millivolt amplitude, and adjust 653B modulator TUNE control simultaneously from upper end to lower end of band 4. The ME-30/U should indicate I.9 volts throughout the band.

NOTE

Do not change setting of neutralization capacitor C6 when performing the following steps.

au Repeat a through ah and at above, for bands 3, 2, and 1 in that order. Refer to the following chart for applicable frequencies, TUNE control settings, tuning coils, and trimmer capacitors.

BAND SEL switch position	Signal generator frequency (MHz)	TUNE control setting	Tuning coils (lower end)	*Tuning trimmer capacitors (upper end)	End of band aligned
4	4	4	L4, L8, L12		Lower
4	4	4		L4, L8, L12	Upper
3	4	4	L3, L7, L11		Lower
3	8	8		L3, L7, L11	Upper
3	8	8	L3, L7, L11		Lower
3	16	16		L3, L7, L11	Upper
2	8	8	L2, L6, L10		Lower
2	16	16		L2, L6, L10	Upper
2	16	16	L2, L6, L10		Lower
2	30	30		L2, L6, L10	Upper
1	4	2	L1, L5, L9		Lower
1	4	4		L1, L5, L9	Upper

* Trimmer capacitors are located in cans of indicated tuning coils

au. On the 686A power supply, set POWER circuit breaker to OFF.

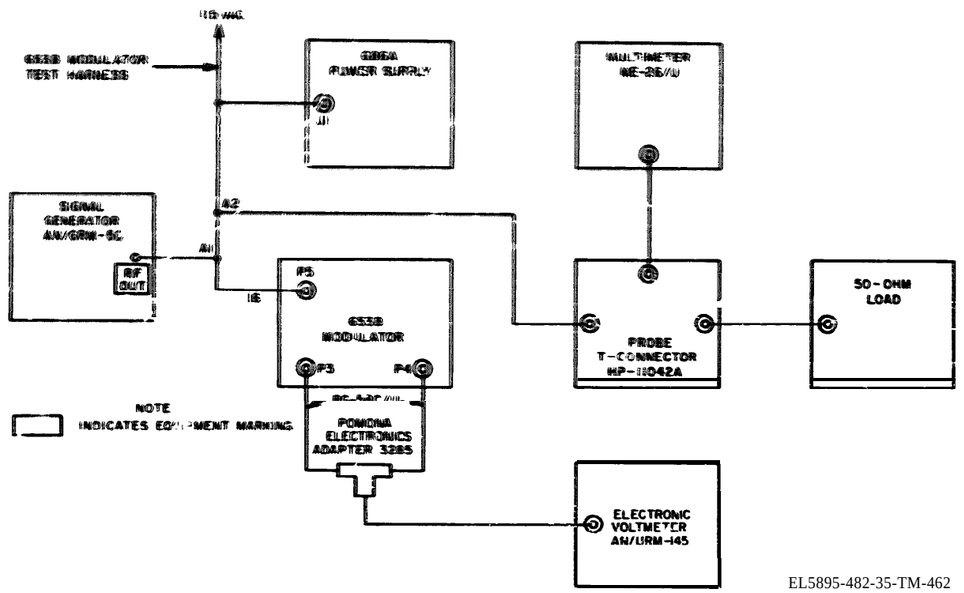

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Figure 5-184. 653B modulator rf amplifier alignment test setup diagram

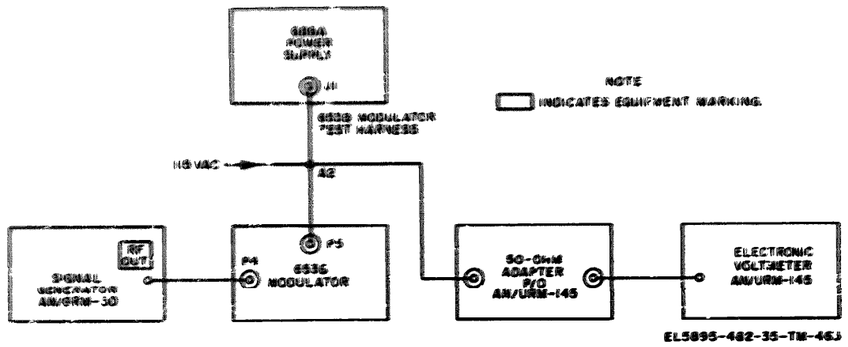

Figure 5-185. 653B modulator neutralizing test setup diagram.

5-149. 652T If. Unit Carrier Isolation Amplifier Alignment Procedure

To align the carrier isolation amplifier of the 652 T if. unit, proceed as follows:

***a.* Connect 652T if. unit test setup as shown in figure 5-38.**

***b.* Set potentiometer** R8 to extreme clockwise **position.**

c. Set frequency synthesizer to 1.75 MHz ± 10 Hz.

d. Set frequency synthesizer output level to 1 volt.

e. Connect AN/URM-145 wit5 high-impedance probe between terminals Al-8 (ground) and A1-9.

f. Adjust transformer T1 for maximum indication on AN/URM-145.

g Adjust potentiometer R8 for a 1 -volt indication on AN/URM-145.

h. Set TEST switch to position 2, and connect type 640A circuit test set to TEST jack J3.

NOTE

The circuit test set meter should read in the green area.

i. Set TEST switch to position 4: the type 640A circuit test set meter should read in the green area.

j. Connect jumper between terminal 14 (-85 volts dc) on TB1 of test harness and terminal 3

NOTE

Indications on both AN/URM-145 and type 640A circuit test set should drop to 0.

k. Remove jumper from TB1 and disconnect AN/URM-145.

5-150. 652S If. Unit Carrier Isolation Amplifier Alignment Procedures

To align the carrier isolation amplifier of the 652S if. unit, proceed as follows:

a. Connect 652S if. unit test setup as shown in figure 5-38.

b. Set potentiometer R8 to extreme clockwise position.

c. Set signal generator to 1.75 MHz ± 10 Hz, using AN/USM-207.

a. Set frequency synthesizer output level to 1 volt.

e. Connect AN/URM-145 with high-impedance probe between terminals Al-8 (ground) and A1-9.

f. Adjust transformer T1 for maximum indication on AN/URM-145.

g. Adjust potentiometer R8 for a l-volt indication on AN/URM-145.

h. Set TEST switch to position 2, and connect type 640A circuit test set to TEST jack J3.

NOTE

The circuit test set meter should read in the green area.

i. Set TEST switch to position 4: the type 640A circuit test set meter should read in the green area.

j. Set MODE SEL switch to SSB.

k Set MODE SEL switch to CW.

NOTE

Indications on both the AN/URM-145 and 640A circuit test set meter should be zero.

***l.* Disconnect AN/URM-145 from terminals A1-8 and A1-9.**

5-151. **652T If. Unit Audio Amplifier and Modulator Alignment Procedures**

To align the 652T if. unit audio amplifier and modulator, proceed as follows:

***a.* Connect 652T if. unit in test setup as shown** in figure 5-186.

***b.* Set CARRIER switch and VOX SENS control to OFF.**

***c.* Adjust AN/GRM-50 for a 1-volt, 1.75-MHz signal and SG-71/FCC for a -50-dBm, 400-Hz signal.**

***d.* Set** INPUT LEVEL control **to midrange. Tune TS-**1827/U for a maximum **indication.**

e. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

f. Adjust SG-71/FCC for a -5-dBm output signal level.

g. Tune TS-1827/U for a maximum indication on it3 meter.

A. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

i. Adjust SG-71/FCC for a -15-dBm output signal level.

j. Tune TS-1827/U for a maximum indication.

k. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

***l.* Adjust SG-71/FCC to 1700 Hz.**

***m.* Tune TS-1827/U for a maximum indication.**

***n.* Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.**

***o.* With carrier isolation amplifier aligned and operating, adjust potentiometer R19 to midrange.**

***p.* Adjust potenticmeter R2, transformer T1, and coil L6 for a maximum indication on AN/URM-145.**

***q.* Adjust potentiometer R2 for a 5-millivolt indication on AN/URM-145.**

***r.* Connect type 640A circuit test set to TEST jack, and set TEST switch to position 1.**

NOTE

The circuit test meter should indicate in the green area.

***s.* Check continuity** between tie point A2E7 and terminal 1 of TB1 (test harness), using ME-26/U. Reading should be 0 ohm.

t. Connect a jumper from terminal to terminal 12 (8 volts dc) on TB1.

NOTE

AN/URM-145 should indicate zero.

u. Disconnect jumper. AN/URM-145 should indicate 5 millivolts.

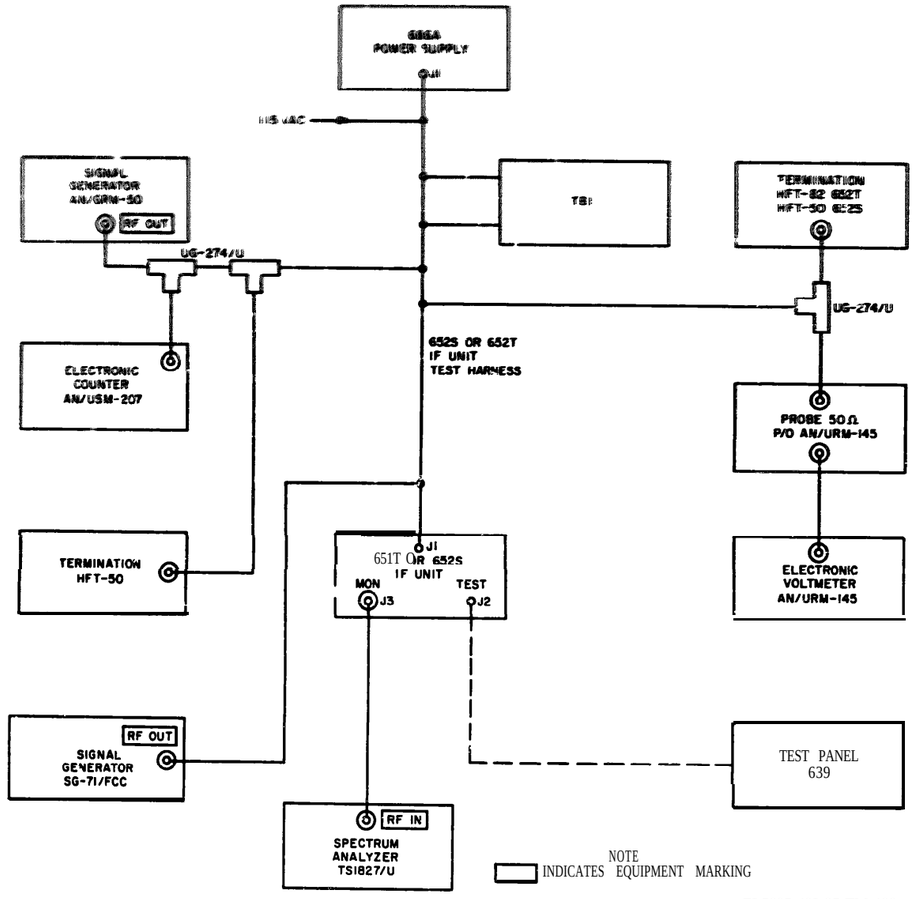

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Figure 5-186. 652s and 652T if unit audio amplifier and modulator alignment. test setup diagram

5-152. 652S If. Unit Audio Amplifier and Modulator Alignment Procedures

To align the 652S if. unit audio amplifier and modulator, proceed as follows:

a. Connect the equipment as shown in figure 5-186.

b. Adjust AN/GRM-50 for a l-volt, 1.75MHz signal and SG-71/FCC for a -50-dBm, 400-Hz signal.

c. Set INPUT LEVEL control to midrange. Tune TS-1827/U for a maximum indication.

d. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

e. Adjust SG-71/FCC for a -5-dBm output signal level.

f. Tune TS-1827/U for a maximum indication.

g. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

h. Adjust SG-71/FCC for a -15-dBm output signal level.

i. Tune TS-1827/U for a maximum indication.

j. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

k. Adjust SG-71/FCC to 1700 Hz.

l. Tune TS-1827/U for a maximum indication.

m. Adjust INPUT LEVEL control for a 340-millivolt indication on TS-1827/U.

n. Adjust INPUT LEVEL control for a 0-dB indication on TS-1827/U.

o. Set MODE SEL switch to AME. The TS-1827/U should indicate −6 dB.

p. Set MODE SEL switch to SSB.

q. With carrier isolation amplifier aligned and operating, adjust potentiometer A2R19 to midrange.

r. Adjust potentiometer R2, transformer T1, and coil L6 for a maximum indication on AN/URM-145.

s. Adjust potentiometer R2 for a 5-millivolt **indication on AN/URM-145.**

t. Connect type 640A circuit test set to TEST jack, and set TEST switch to position 1.

NOTE

The circuit test set meter indication should read in the green area.

u. Adjust SG-71/FCC for a -15-dBm, 600-Hz signal at audio input.

v. Tune TS-1827/U for a maximum indication.

w. Set MODE SEL switch to TUNE.

x. Tune TS-1827/U for a maximum indication.

NOTE

The TS-1827/U should indicate a peak corresponding to the internal audio oscillator frequency of the 652S if. unit.

5-153. 652T and 652S If. Unit Filter Impedance Matching Alignment Procedures

To align the filter matching network of the if. units, proceed as follows:

a. Connect the 652T or 652S if. unit in test setup as shown in figure 5-187.

b. Unsolder twisted pair of leads from A3-7 and A3-5.

c. Adjust Rx meter (Boonton 250A) frequency, depending on the 652 unit to be aligned, to the following frequency, using AN/USM-207.

6528: 1.748305 MHz (± 10 Hz)

652T: 1.751695 MHz (± 10 Hz)

d. Balance Rx meter at required frequency and set RP dial for 3 kilohms.

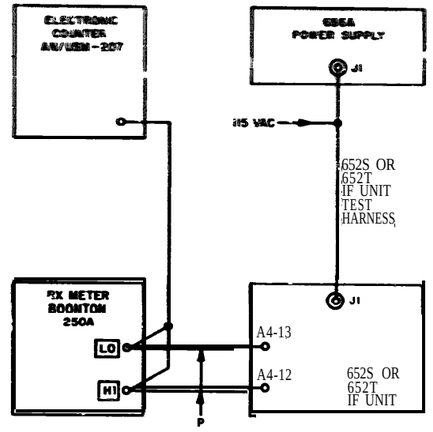
e. Connect lead removed from A3-7 to HI terminal of Rx meter, and connect lead removed from A3-5 to LO terminal of Rx meter. Make this connection as short as possible.

f. Set 686A power supply POWER circuit breaker to ON.

g. Adjust coil L1 for a null on Rx meter.

h. Set 686A power supply POWER circuit breaker to OFF

i. Resolder leads disconnected in b above.



NOTES

1 ▭ INDICATES EQUIPMENT MARKING

2 P INDICATES TWISTED PAIR, DISCONNECTED FROM A3-7 AND A3-5

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Figure 5-187. 652S and 652T if. unit impedance matching alignment test setup diagram.

5-154. 652T If. Unit. If. Output Amplifier Alignmeat Procedure

To align the 652T if. unit if. output amplifier, proceed as follows:

a. Connect test setup as shown in figure 5-26.

b. Adjust AN/URM-127 No. 1 for l-volt rms output at a frequency of 1.750 MHz ± 10 Hz (set frequency with AN/USM-207).

c. Set AN/URM-127 No. 1 for a 400-Hz signal at -15 dBm.

d. Set AN/URM-127 No. 2 to -100 dBm.

e. Adjust INPUT LEVEL control on if. unit under test for 5-mv output, as observed on AN/URM-145.

f. Set AN/URM-127 No. 2 for a 2500-Hz signal at -15 dBm. Set AN/URM-127 No. 1 for -100 dBm.

g. Adjust AN/URM-122 No. 2 output level until a 5-mv output is observed on AN/URM-145.

h. Disconnect AN/URM-145 from MON IN jack on 653B modulator.

i. Set AN/URM-127 No. 1 for a 400-Hz **signal** at -15 dBm.

j. Connect spectrum analyzer to **653B** modulator MON IN jack and obtain full-**scale**

deflection with if. attenuator switch in 20-dB position.

k. Remove 20-dB if. attenuation from the spectrum analyzer.

NOTE

Waveform displayed on spectrum analyzer is as show in B, figure 5-27

l. Adjust potentiometer A2R19 and transformer T1 for minimum inband distortion.

NOTE

A1 inband distortion should be below 60 dB, as show in B, figure 5-27.

m. Set both AN/URM-127 No. 1 and AN/URM-127 No. 2 to -100 dB. The amplitude of unwanted carrier should be 55 dB below the two-tone level.

n. Set output of each AN/URM-127 to −5 dBm.

o. Set ADC control fully clockwise.

p. Connect jumper between pin 15 on TB1 (adc output) and pin 6 (adc input) on TB1.

q. Observe that two-tone display, as shown on spectrum analyzer, returns within ± 3 dB to the display, as obse:ved in *k* above.

r. Disconnect jumper on TB1.

s. On TB1, connect jumper between terminal 9 (channel B1 shutoff control) and terminal 14 (-85 volts dc).

NOTE

The AN/URM-145 indication at J7 on the 653B modulator should drop to zero.

t. Connect jumper between terminal 4 and terminal 5 on TB1 (ground).

NOTE

The AN/URM-145 should return to its former rf voltage indication.

u. Disconnect jumpers.

v. Connect type 640A circuit test set to TEST jack on the 652T if. unit.

w. Set TEST switch to 3.

NOTE

The type 640A circuit test set meter should indicate in the green area.

5-155. 652S If. Unit If. Output Amplifier Alignment Procedures

To align the 652S if. unit if. output amplifier, proceed as follows:

a. Connect test setup as shown in figure 5-26

b. Adjust AN/URM-127 No. 1 for l-volt rms output at a frequency of 1.750 MHz + 10 Hz (set frequency with AN/USM-207).

c. Set AN/URM-127 No. 1 for a 400-Hz signal at -15 dBm. Set AN/URM-127 No. 2 to - 100 dBm.

d. Adjust INPUT LEVEL control on if. unit under test for 5-mv output, as observed on AN/URM-145.

e. Set AN/URM-127 No. 2 for a 2500-Hz signal at -15 dBm. Set AN/URM-127 No. 1 for −100 dBm.

f. Adjust AN/URM-127 No. 2 output level until a 5-mv output is observed on AN/URM-145.

g. Disconnect AN/URM-145 from MON IN jack on 653B modulator.

h. Set AN/URM-145 No. 1 for a 400-Hz signal t −15 dBm.

i. Connect spectrum analyzer to 653B modulator MON IN jack and obtain full-scale deflection with if. attenuator switch in 20 dB position.

j. Remove 20-dB if. attenuation from the spectrum analyzer.

NOTE

Waveform displayed on spectrum analyzer is as shown in C, figure 5-27.

k. Adjust potentiometer R19 and transformer T1 for minimum inband distortion.

NOTE

Al inband distortion should be below 60 dB, as shown in C, figure 5-27.

l. Set both AN/URM-127 No. 1 and AN/URM-127 No. 2 to -100 dB.

NOTE

The amplitude of unwanted carrier should be 55 dB below the two-tone level.

m. Set output of each AN/URM-127 to -5 dBm.

n. Set ADC control fully clockwise.

o. Connect jumper between pin 15 on TB1 (adc output) and pin 6 (ads input) on TB1.

p. Observe that two-tone display, as shown on spectrum analyzer, returns within ± 3 dB to the display, as observed in j above.

q. Disconnect jumper on TB1.

r. Set MODE SEL switch to SSB.

s. Connect jumper between terminal 9 (channel Al shutoff in) and terminal 14 (-85 volts dc) on TB1.

NOTE

The AN/URM-145 indication at jack J7 on the 653G amplifier-modulator should drop to zero.

t. Disconnect jumper connected in s above.

u. Connect type 640A circuit test set to TEST jack on the 652S if. unit.

v. Set TEST switch to 3.

NOTE

The type 640A circuit test set meter should indicate in the green area.

5-156. 652T If. Unit Vox and Anti-Vox Alignment Procedures

To align the vox and anti-vox circuits of the 652T if. unit, proceed as follows:

a. Connect test setup as show in figure 5-41.

b. Set CARRIER switch to OFF.

c. Adjust frequency synthesizer for a 1-volt rms output at a frequency of 1.750 MHz ± 25 Hz.

d. Set AN/URM-127 No. 1 for a 2-kHz tone at −15-dBm output level.

e. Adjust INPUT LEVEL control for a 2.0-m&volt output, as indicated on AN/URM-145.

f. Set VOX SENS control fully clockwise.

g. Connect AN/URM-145, with high-impedance probe, between A6V2, pin 7 (grid), and ground; tune transformer T2 and coil L1 for peak indication on AN/URM-145.

A. Disconnect AN/URM-145 and set TEST switch to 6.

i. connect type 640A circuit test set to TEST jack and tune transformer T1 for peak reading on circuit test set meter

NOTE

It may be necessary to decrease VOX SENS control slightly to obtain a peak indication.

j. Observe that VOX indicator lamp is illuminated and that 640A circuit test set meter indication is in the green area.

k. Using ME-26/U, measure -85 volts dc between terminal 11 of TB1 and ground.

l. Set AN/URM-127 No. 1 to - 100 dBm. The VOX indicator lamp should extinguish.

m. Vary VOX HOLD control and notice that VOX hold times varies when audio signal from AN/URM-127 A is removed from if. unit.

n. With audio generator set to -100-dBm level, measure -85 volts dc at terminal 10 of TB1.

o. Set ANTI VOX control to OFF, TEST switch to 6, and CARRIER switch to -3 dB.

p. Adjust potentiometer R18 for a minimum indication on type 640A circuit test set meter, and note that VOX indicator lamp does not illuminate.

q. Set AN/URM-127 No. 2 to 400 Hz at an output level of 80 millivolts.

r. Set ANTI VOX control fully clockwise.

s. Set AN/URM-227 No. 1 to -5 dBm.

t. VOX indicator lamp should not illuminate, indicating proper antivox operation.

u. Set AN/URM-127 No. 2 to -100 dBm. VOX indicator lamp should illuminate.

5-157. 9200B Driver Alignment Procedures (fig. 5-83)

The ganged tank circuit elements of the 9200B driver are fastened through their respective shaft couplings by pins inserted after factory alignment. Parts replacement requires removal of these pins and repinning upon completion of the alignment procedure. Setscrews are provided for maintaining a firm hold on the component shafts during alignment. It is recommended that component replacement be done at the high-frequency stop end of the TUNE control to facilitate alignment checking and component adjustment. After the component replacement has been accomplished, perform the alignment procedures in a and b below:

a. To perform the preliminary alignment procedures, proceed as follows:

(1) Set the 9176 hv power supply POWER circuit breaker to OFF.

(2) Extend the 9200B driver out of the equipment rack and connect the J5 and J7 cabling to the unit.

(3) Rotate the 9200B driver TUNE control to the high frequency stop above the 30 MHz dial reading. The ganged tank circuit elements should beapproximately in the positions indicated in the following chart:

Circuit element	Position
Tank coil L2	0 2 turn from the front end of the coil
Tuning capacitor Cl3	Fully open
Tank coil L10	0 6 turn from the front end of the coil
Tank capacitor C41	Fully open
Tank capacitor C22	Approximately 1/16 inch from fully open

(4) Rotate the 9200B TUNE control to the 30-MHz frequency dial indication. The ganged tuning elements should be approximately in the positions indicated in the following chart:

Circuit element	Position
Tank coil L2	0.8 turn from the front end of the coil
Tuning capacitor Cl3	1/4 inch from fully open
Tuning coil L10	1 6 turns from the front end of the coil
Tuning capacitor C22	3/16 inch from fully open
Load capacitor C41	1/4 inch from fully open

(5) Rotate the 9200B driver TUNE control to the low-frequency stop below the 2-MHz dial reading. The ganged circuit elements should rotate smoothly to approximately the positions indicated in the following chart.

Circuit element	Position
Tuning coil L2	14.6 turns
Tuning capacitor C13	1.4 inch (approximately) from fully closed
Tuning coil L10	25.5 turns
Tank capacitor C21	1.4 inch (approximately) from fully closed
Tank capacitor C22	Fully closed

b. Electrical alignment is performed as follows:

(1) Connect the dummy load to the 9200B driver output rf connector J6 and fasten in place, using the screws provided.

(2) Connect the ME-26/U between the grid strap of tubes V2-3 and chassis ground. Set ME-26/U SELECTOR switch to AC and RANGE switch to 10V.

(3) Set the TUNE control for a frequency dial indication of 30 MHz.

(4) Loosen the coupling to V1 tuning coil L2.

(5) Connect the AN/GRM-50 signal generator to J1.

(6) Perform the turn-on procedure for the 9200B driver.

WARNING

When the transmitter is in the OPERATE condition, high voltage is present within the 9200B driver. Be very careful when making measurements and adjustments within the equipment.

(7) Set the AN/GRM-50 to 30 MHz and an output voltage of 1 volt. The ME-26/U at the grid of V2-3 should indicate the presence of an 1 signal.

(8) Using an INSULATED tuning tool, adjust tank coil L2 for a peak meter reading at the grid of V2-3. Reduce the output of the AN/GRM-50 to zero. Set the transmitter to the offcondition and disconnect the ME-26/U.

(9) Tighten the shaft coupling to L2. Replace the cover over the V1 tank circuit compartment.

Freq (MHz)	Minimum rf output voltage
30	45
20	40
14	40
10	40
6	40
4	40
2	40

(21) Set the transmitter to the offcondition. Pin the shaft couplings in position and repeat (20) above.

(22) Set the transmitter to the standby condition and disconnect the test equipment. Return the 9200B driver to its normal operating position. Be sure the rack cabling is installed at J1.

(10) Connect the ME-26/U between the dummy load OUTPUT terminal and chassis ground.

(11) Set the 9200B METERING switch to PLMA V2-3.

(12) Set the AN/GRM-50 at 1-volt output.

(13) Adjust trimmer capacitor C23 for a dip in the PLMA V2-3 meter reading. A dip in PLMA V2-3 meter reading should coincide with a rise in output voltage at the dummy load. Increase the output of the AN/GRM-50 if required to obtain a good dip in PLMA V2-3. Adjust C23 for a peak output voltage of the dummy load.

(14) Set the transmitter to the *off* condition.

(15) Connect the Rx resistance bridge (Boonton Radio 250A) between the plate caps of V2 or V3 and ground. Measure the plate load resistance. If the plate load is between 1200 and 1400 ohms, disconnect the bridge.

(16) if the plate load is below 1200 ohms. loosen the coupling for V2-3 tank coil L10 and rotate the coil drum so as to add approximately 0.1 turn. Remove the bridge and repeat (6) and (11) through (15) above

(17) If the plate load is above 1400 ohms, loosen the coupling for V2-3 tank coil L10 and rotate the coil drum so as to remove approximately 0 1 turn. Remove the bridge and repeat (6) and (11) through (15) above.

(18) Be sure the coupling to the shaft of V2-3 tank coil L10 is tightened.

(19) Repeat (6) above.

(20) Perform the alignment check provided in the following chart. When performing this check, adjust the output signal level of the AN/GRM-50 to 1.75 volts at each frequency specified and adjust the TUNE control for a peak rf output at each frequency.

9200B driver, typical meter readings

PLMA V2-3	V2-3 DR
65-80	80-125
65-80	80-125
65-80	80-125
65-85	80-125
65-85	80-125
65-85	80-125
65-85	80-125

5-158. 9151 Linear Power Amplifier

The 9151 linear power amplifier must be realigned when pi-network inductor L4 and capacitor C22, C23, or C24 is replaced. Parts replacement is recommended at the low-frequency stop end of the TUNE control to reduce the pressure on the cams, which are used to drive the capacitor pistons. Before replacing coil L4, a careful note should be made of the contact roller wheel position on coil L4 at both 30-MHz and 2-MHz reading of the frequency dial. The coil contact position at 30 MHz will vary between equipments. After replacement of parts, perform the procedures in paragraphs 5 159 through 5-164 below.

5-159. Alignment After Replacement of L4

Coil L4 should be removed at the 2-MHz position of the frequency dial after the position of the contact wheel has been noted. A new coil should be installed and its contact wheel set at precisely the same position as the removed coil. To replace L4, proceed as follows:

a. Tighten the shaft coupling between the gear train and L4 shaft.

b. Rotate the TUNE control to the 30-MHz frequency dial indication.

c. See that the position of the contact wheel is exactly as was noted for the original coil.

d. Install the 9151 linear power amplifier into the transmitter and check for normal operation, using the 50-ohm dummy load.

e. If the contact wheel position of L4 cannot be determined prior to replacement, an alternate alignment must be performed as follows:

(1) Install the replacement L4 coil at the 2-MHz position of the frequency dial and set the contact wheel at 14 turns from the tapered end.

(2) Tighten the shaft coupling between the gear train and L4 shaft.

(3) Rotate the TUNE control to the 30-MHz frequency dial indication. The rear support bar for the contact wheel center shaft should fall between two black lines on the rear coil endplate.

(4) Loosen the shaft coupling on L4 and adjust the contact wheel assembly to place the shaft support bar exactly between the two lines. The contact wheel should be 1.42 turns from the tapered end of the coil at this point.

(5) Tighten the shaft coupling.

(6) Replace all internal connections, tighten securely, and replace the sideplates.

(7) Perform the transmitter performance tests at 30 MHz, using the 50-ohm dummy load.

(8) If the transmitter operates properly, repeat the performance test at 14 MHz and 2 MHz. If the transmitter does not appear to be optimized at 30 MHz, as indicated by excessive distortion, difficult tuning, excessive PA cathode and screen grid currents, improper grid driving voltage, or instability, a trail and error method must be used to optimize the contact wheel location. The transmitter must be shut down and the contact wheel moved in clockwise or counterclockwise rotational increments of ¼ inch to obtain correct operation. Clockwise rotation will usually yield the desired results.

5-160. Alignment after Replacement of Capacitors C22, C23, and/or C24

The replacement of either of the tank capacitors requires adjustment of the new capacitor to yield the proper value of capacitance at 30 MHz. The *capacitors should be replaced* at the low-frequency stop end of the TUNE control because of the reduced pressure applied to the cams by the capacitor pistons. To adjust the replacement capacitor. proceed as follows:

a. Remove all strap connections to tank capacitors C22, C23, and C24.

b. Rotate the TUNE control for a frequency dial indication of 30 MHz.

c. Using the capacitance bridge, measure the value of the new capacitor. Do not forget to include the test lead capacitance of the bridge in the measurement.

d. Compare the value for the capacitor with the following values:

C22 - 20 µµf
C23 - 20 µµf
C24 - 80 µµf

e. Set the proper value for the new capacitor, using the adjustment screw at the top of the capacitor piston.

f. Disconnect the bridge and replace the internal connecting straps to the capacitors.

g. Be certain the connections are securely tightened and replace the sideplates.

h. Perform the transmitter performance tests at 30 MHz, using the 50-ohm dummy load.

i. If the transmitter operates properly, repeat the performance tests at 20 MHz, 14 MHz, and 2 MHz. If the transmitter does not appear to be optimized at 30 MHz, as indicated by excessive distortion, difficult tuning, excessive PA cathode and screen grid currents, improper grid driving voltage, or instability, all three tank circuit capacitor values must be checked and adjusted at the 30-MHz dial setting. If all the capacitors are correctly set, the tank coil must be adjusted by the trial and error method.

5-161. Metering Circuit Adjustments

Adjustment of the rf metering circuits must be accomplished with the 7300B transmitter operating at full output power into a Bird 8890 dummy load connected to the 9151 linear power amplifier rf output.

WARNING

Adjustment of the TUNE and LOAD detectors requires working in close

proximity to lethal transmitter voltages. Be extremely cautious when making these adjustments

5-162, Adjustment of 9151 Linear Power Amplifier Tune Phase Detector Circuits

The TUNE phase detector circuits may require adjustment after replacement of diode A2V1 or components of the detector. Adjust the TUNE phase detector circuits as follows:

a. Connect the dummy load to the 9151 linear power amplifier rf output.

b. Tune the transmitter for optimum performance at 4 MHz and 2.5 kw pep.

c. Note the direction of the TUNE meter deflection.

NOTE

Optimum performance is defined as minimum distortion, proper adc action, and minimum cathode current at the 9151 linear power amplifier load dial setting.

d. Set the transmitter to the standby condition.

e. Extend both the 9151 linear power amplifier and 9200B driver modules fully outward on their slides.

f. Maintain a good mating connection between the connectors.

g. Defeat the 9176 hv power supply rack interlock.

h. Set the transmitter to the operate condition and repeat c above. Note the direction of the TUNE meter deflection.

i. Set the transmitter to the standby condition and remove the left sideplate of the 9151 linear power amplifier.

NOTE

If capacitor C20 has been replaced, rotate C20 3 full turns clockwise from the fully counterclockwise (open) position.

j. Locate the TUNE-LOAD module (left of V1) and rotate the shaft of variable resistor R3 approximately 1/10 turn in the direction opposite to the TUNE meter deflection noted in h above.

k. Replace the sideplate, using only four or five screws, and repeat A, i, and j above until the resultant TUNE meter deflection is ZERO (optimum transmitter operation).

l. Perform b above at 30 MHz and note the direction of the TUNE meter deflection.

m. Remove the 9151 linear power amplifier left sideplate and rotate capacitor C20 1 full turn clockwise if the TUNE meter deflected to the right in l above, or 1 full turn counterclockwise if the TUNE meter deflected to the left.

n. Replace the sideplate and repeat *l* and *m* above until the TUNE meter indication is zero (optimum transmitter operation at 30 MHz).

o. Replace all the sideplate mounting hardware and return the transmitter to the normal operating condition.

5-163. Adjustment of 9151 Linear Power Amplifier Load Detector and 9200 B Driver PA RF DR Metering Circuits

The LOAD detector and/or RF DR metering circuits may require readjustment after replacement of diode A2V2 or components of the LOAD detector and metering circuits. Adjust these circuits as follows:

a. Connect the dummy bad to the 9151 linear power amplifier rf output.

b. Tune the transmitter for optimum performance at 4 MHz and 2.5 kw pep.

c. Note the direction of the LOAD meter deflection.

NOTE

Optimum performance is defined as minimum distortion, proper adc action, and minimum cathode current at the required 9151 linear power amplifier load dial setting.

d. Set the transmitter to the standby condition.

e. Extend both the 9151 linear power amplifier and 9200B driver modules fully outward on their slides.

f. Maintain a good mating connection between the connectors.

g. Defeat the 9176 hv power supply rack interlock.

h. Set the transmitter to the operate condition and repeat b above.

i. Note the direction of the LOAD meter deflection and PA RF DR meter indication.

NOTE

RF DR meter should indicate approximately 80.

j. Set the transmitter to the standby condition and remove the left sideplate of the 9151 linear power amplifier.

NOTE

If capacitor C21 has been replaced, rotate C21 3 full turns clockwise from fully counterclockwise (open)

k. Locate the TUNE /LOAD module (left of V1) and rotate the shaft of variable resistor R4 approximately 1/10 turn in the direction opposite that of the LOAD meter deflection noted in h above.

l Replace the sideplate, using only four or five screws, and repeat h, i, j, and k above until the resultant TUNE meter deflection is ZERO (optimum transmitter operation).

m. If required. adjust variable resistor R8 to obtain on RF DR meter indication of 80.

n. Perform b above at 30 MHz and note the direction of the TUNE meter deflection.

o. Remove the 9151 linear power amplifier left sideplate and rotate capacitor C21 1 full turn clockwise if the LOAD meter deflected to the right in n above or 1 full turn counterclockwise if the TUNE meter deflected to the left.

p. Replace the sideplate and repeat the procedure until the LOAD meter indication is zero (optimum transmitter operation at 30 MHz).

q. Replace all the sideplate mounting hardware and return the transmitter to the normal operating condition.

5-164. Adjustment of Adc Voltage Divider and RF PL Metering Circuit

Adjust the adc voltage divider and the RF PL metering circuit as follows:

a. Connect the dummy load to the 9151 output.

b. Extend both the 9151 linear power amplifier and 9200B driver fully outward on their slides. Maintain a good mating connection between the connectors.

c. Defeat the 9176 hv power supply rack interlock.

d. Set the transmitter to the operate condition and the 9151 linear power amplifier PWR switch to NORM.

e. Adjust the 9200B driver ADC SSB control to obtain +125 volts dc between the terminal of 9151 linear power amplifier capacitor C7 and ground.

f. Tune the transmitter to 4 MHz. Do not attempt to check the adc operation.

g. Set the 9200B driver ADC switch to ON and adjust 9151 linear power amplifier capacitor C6 to obtain an output power of 1.1 kw on the output power panel meter.

h. Reset 9200B driver ADC switch to OFF.

i. Set the 9200B driver METERING switch to RF PL.

NOTE

The meter should indicate between 90 and 100.

j. Adjust 9200B driver resistor R64 to obtain the desired indication.

k. Adjust resistor R64 through the right sideplate of the 9200B driver.

l. Replace all the 9151 linear power amplifier sideplate hardware and return the equipment to the normal operating condition.

5-165. 645C VSWR Alarm Alignment

Connect the equipment as shown in figure 5-188 and perform the alignment as follows:

a. Adjust the power supply for - 15 volts dc±3 percent.

b. Adjust the variac for 115-volt ac output.

c. Turn test fixture AC and DC power switches to ON.

d. Observe that the reset light illuminates.

e. Depress reset switch.

f. Light shall extinguish and light again when switch is released.

g. Adjust R35 for a zero reading on the VSWR meter.

h. Connect multimeter between TP1 and ground on test fixture.

i. Adjust forward control for a -1.6-volt dc indication on the multimeter.

j. Disconnect the multimeter from TP1 and connect it to TP2.

k. Adjust reflected control for -0.8 volt dc as indicated on the multimeter.

l. Adjust R18 for a VSWR meter reading of 4:1.

m. Adjust R34 until alarm on both the assembly and test fixture illuminate.

n. Adjust reflected control for -0.4 volt dc on the multimeter.

o. Adjust R31 for a VSWR meter reading of 2:1.

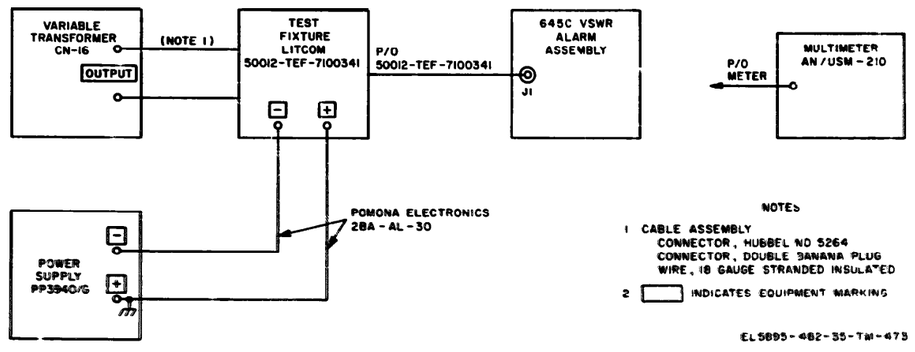

Figure 5-188 645C VSWR alarm alignment test setup diagram

5-166. 686A Power Supply Alignment

Connect the equipment as show in figure 5-189. Turn on the equ.pmeat and allow a 15-minute warmup period and proceed as follows:

a. Set swnitches S1 through S7 on the resistive load to on.

b. Connect the vtvm across resistor R1 and adjust SET +170V potentiometer R19 for 170 volts dc.

c. Connect the vtvm across resistor R4 and adjust SET −85V potentiometer R20 for −85 volts dc.

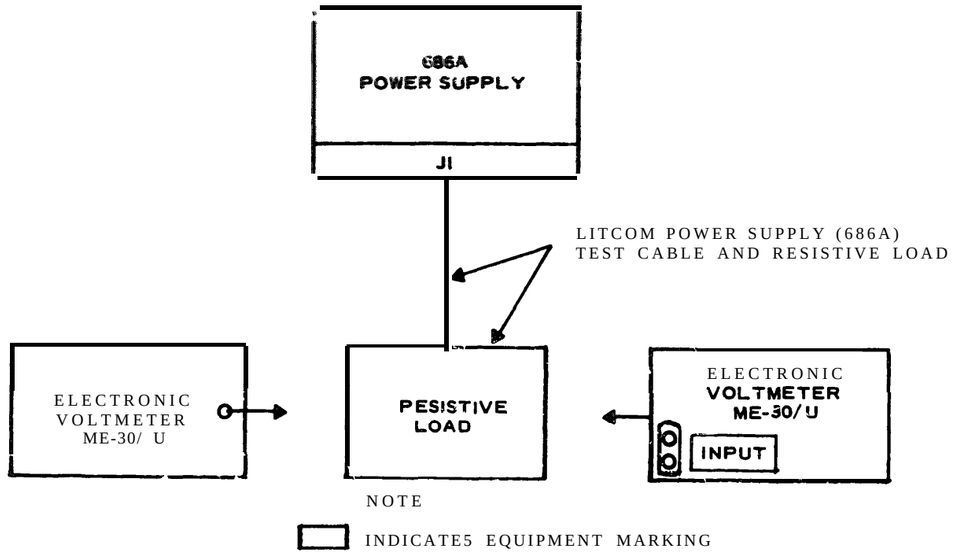

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Figure 5-189. 686A power supply adjustment test setup diagram.

5-167. Voice Frequency Tone Facility Alignment

a. 12-Volt Dc Power Supply Alignment. This alignment is identical with that of 12-volt dc power supply 6A7 in Receiver Group OA-3984/75C-26 (TM 5895-482-35/1).

b. 2-kHz Oscillator Alignment.

(1) Connect ME-30/U to J10 on communication patch panel 3A3.

(2) Key and lock CW key on desk adjacent to rack 8.

(3) Adjust ADJ potentiometer on 2-kHz oscillator for an indication of - 10 dBm on ME-30/U.

(4) Release CW key.

c. Tone Receivers, Alignment.

(1) Set up circuit as shown in figure b-14.

(2) Set AN/USM-205 for a frequency of 365 Hz at an output level of -35 dBm as indicated on ME-30/U.

(3) Adjust ADJ potentiometer until ME-26/U indicates zero or very low resistance.

(4) Repeat (2) and (3) above at 465 Hz, 565 Hz, 665 Hz, 765 Hz, or 865 Hz depending on tone receiver to be aligned.

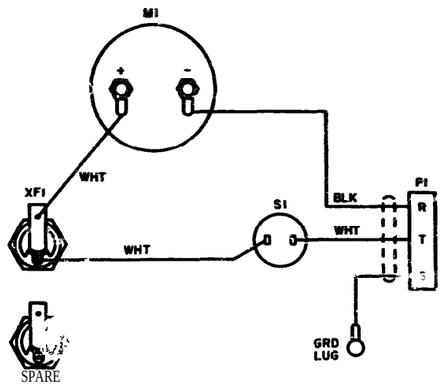

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Figure 5-190 639 test panel, wiring diagram.

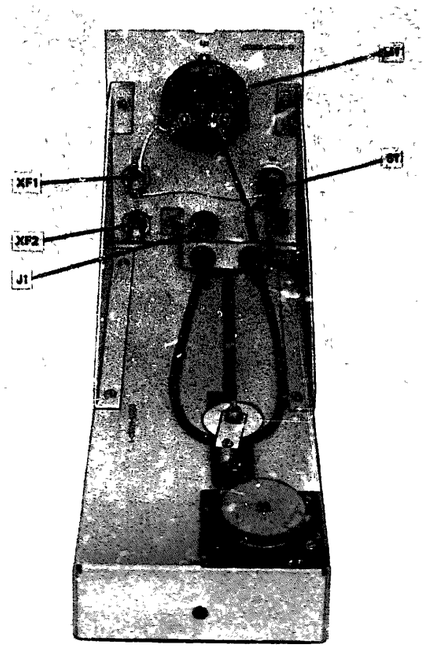

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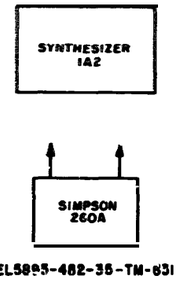
Figure 5-191. 639 test panel, parts location.



EL5895-482-35-TM-831

Figure 5-192. Frequency synthesizer continuity, test setup diagram

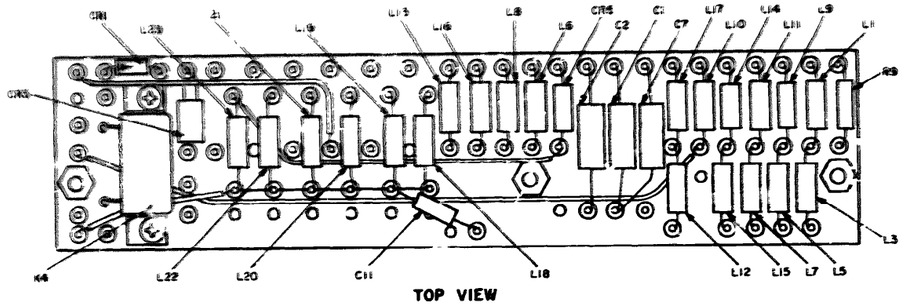


Figure 5-193 Falter and relay network A22TB1, parts location

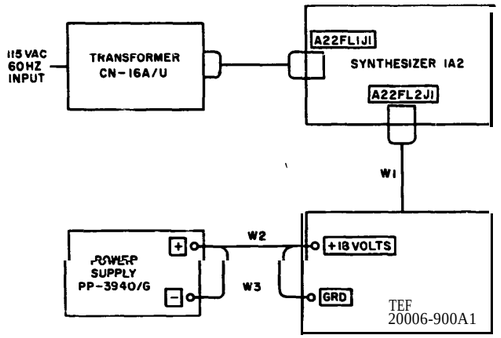


Figure 5-194. Frequency synthesizer local and remote, test setup diagram.

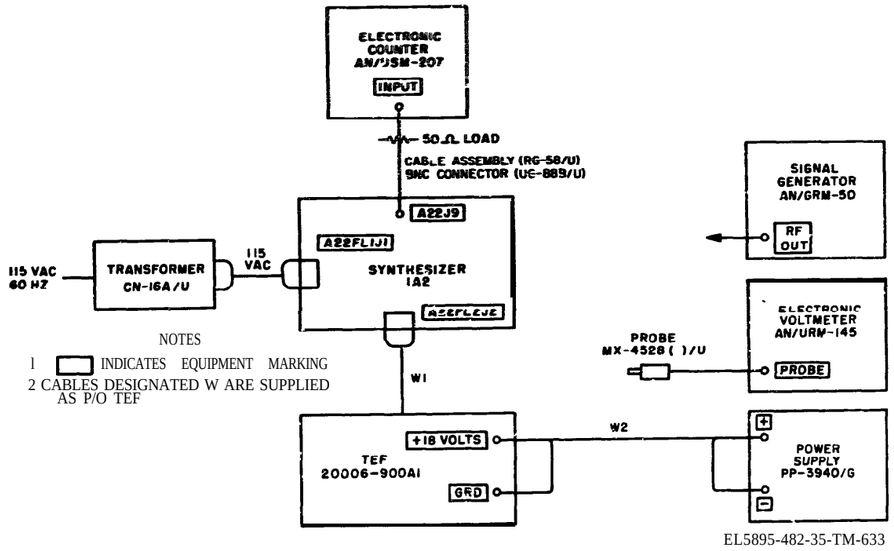


Figure 5-195 Frequency synthesizer interval frequency, test setup diagram

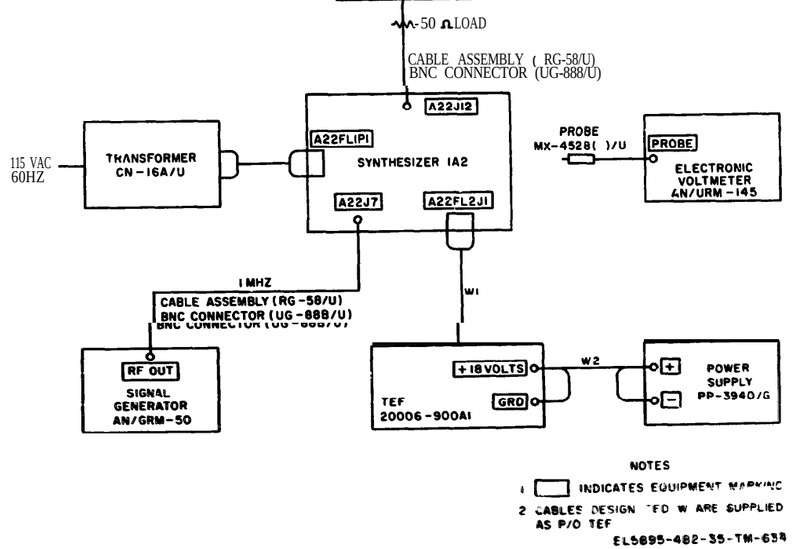


Figure 5-196. Frequency synthesizer output frequency, test setup diagram

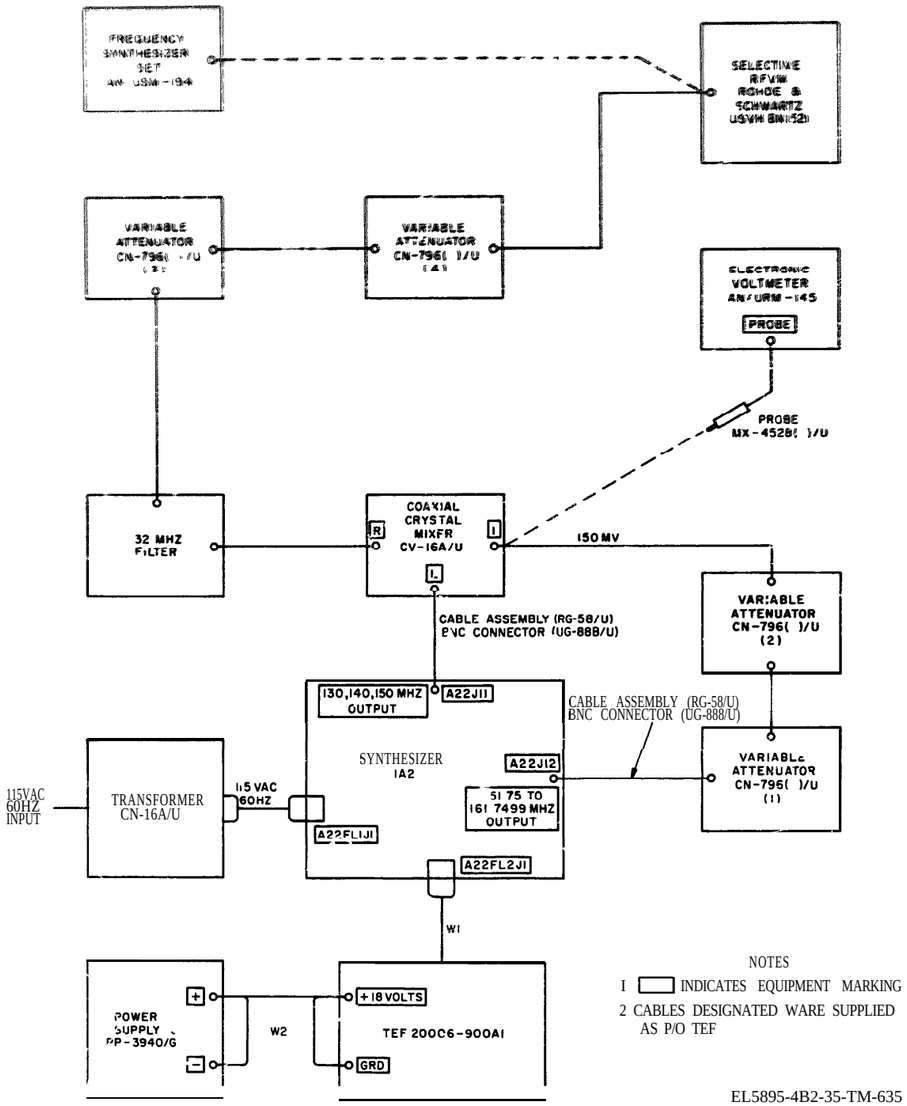


Figure 5-197 Frequency synthesizer spurious signal, test setup diagram

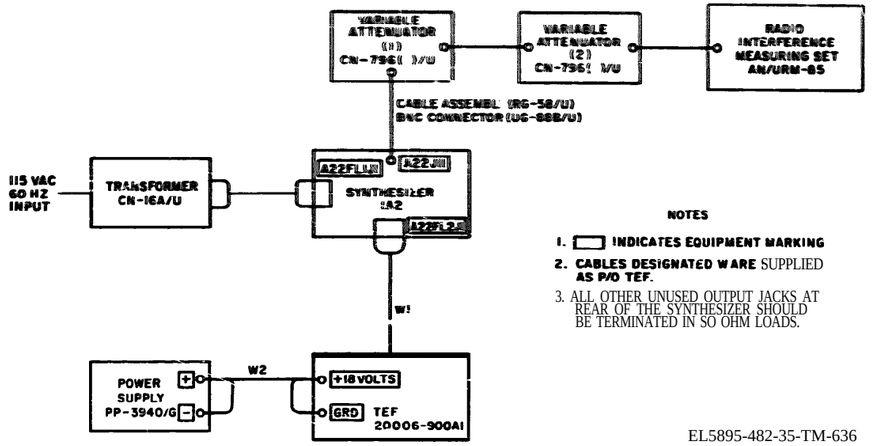


Figure 5-198. Frequency synthesizer spurious signal measurements, test setup diagram

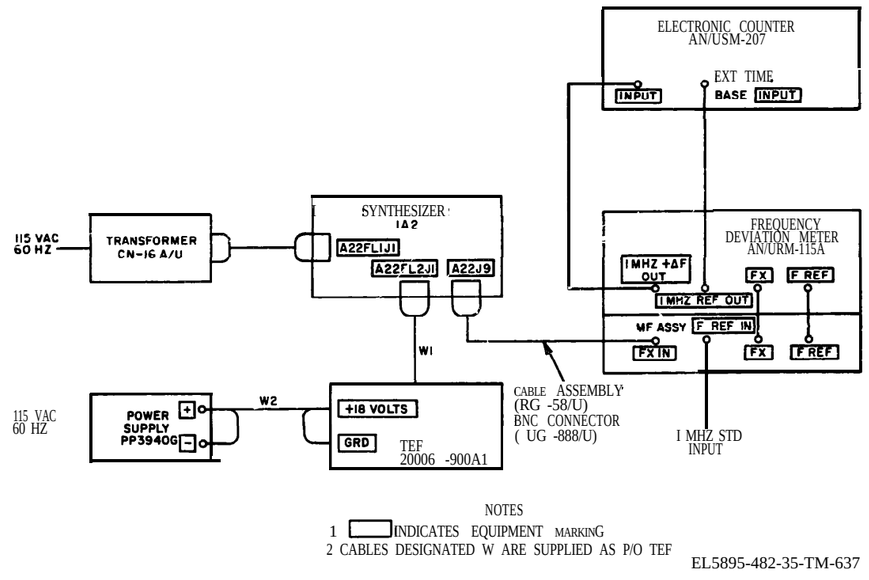
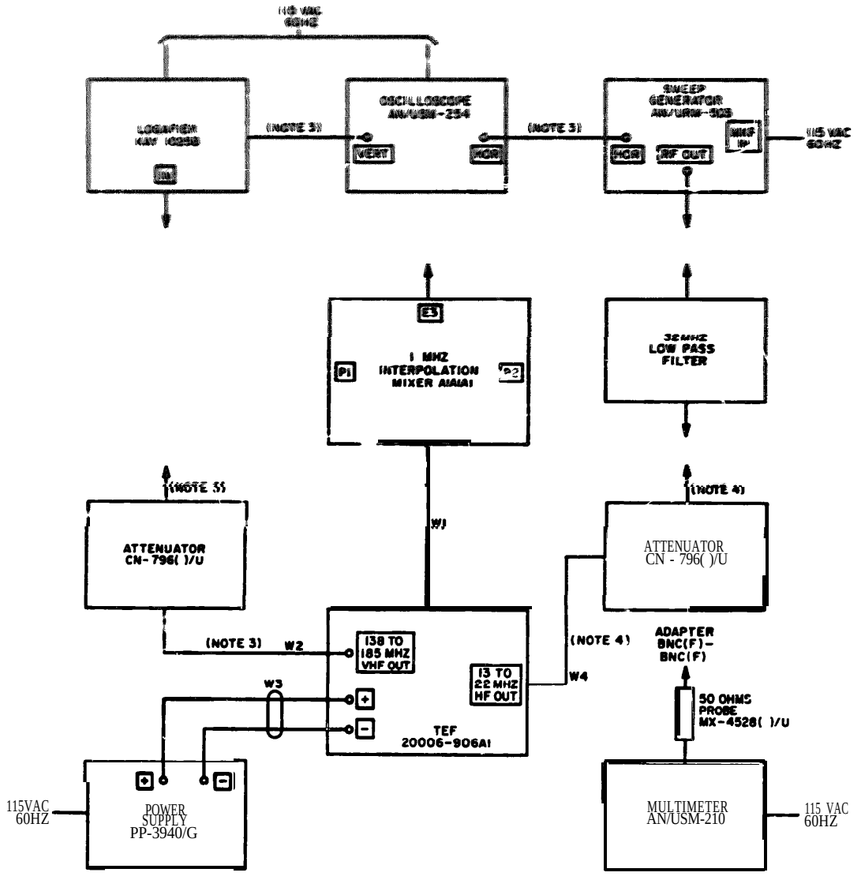


Figure 5-199 1-MHz standard frequency stability, test setup diagram



NOTES

1 ▭ INDICATE S EQUIPMENT MARKING
2 CABLES DESIGNATED W APE SUPPLIED AS P/O TEF
3 CABLE COAXIAL BNC-BNC, RG-223/U 36" LONG
4 CABLE COAXIAL BNC- BNC, RG-223/U 12" LONG

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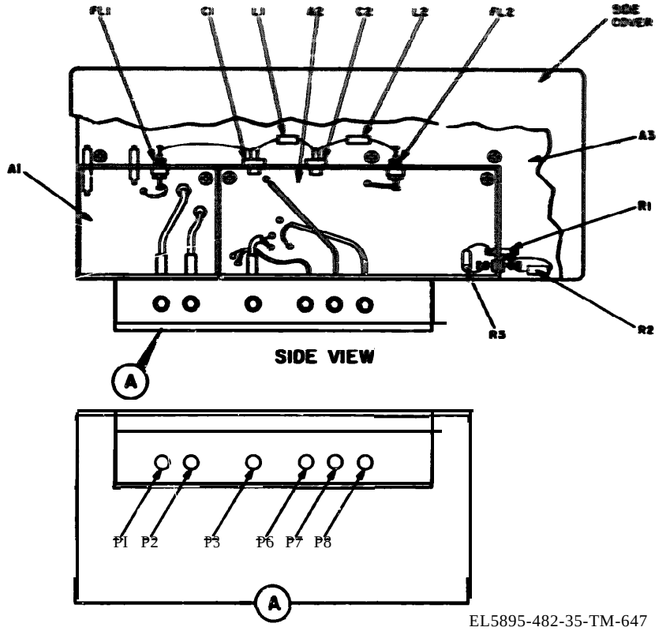
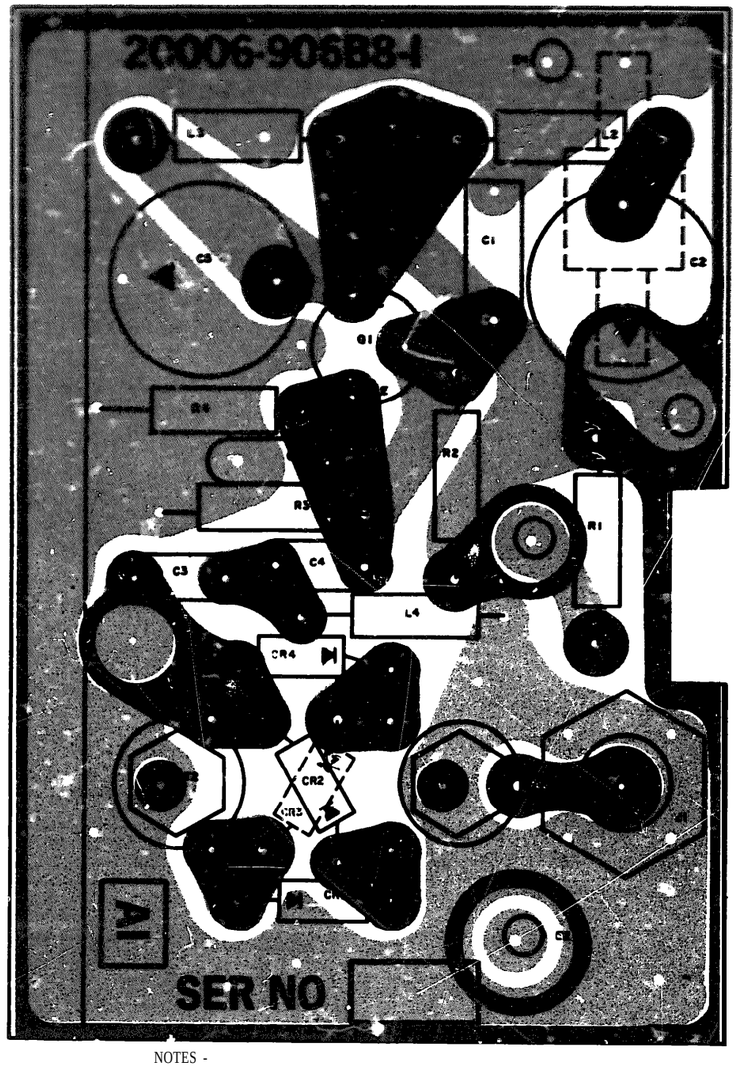
Figure 5-200 1-MHz mixer and rf amplifier A1A1, test setup diagram



EL5895-482-35-TM-647

Figure 5-201 Spurious frequency, test setup diagram



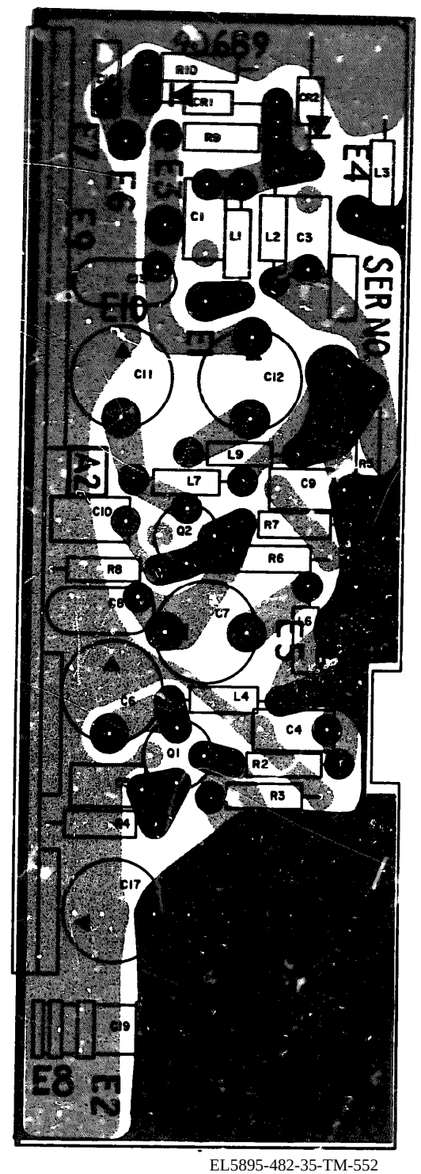
NOTES -

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE. LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TN-524

Figure 5-202. l-MHz miter and rf amplifier A1A1, wiring diagram and parts location



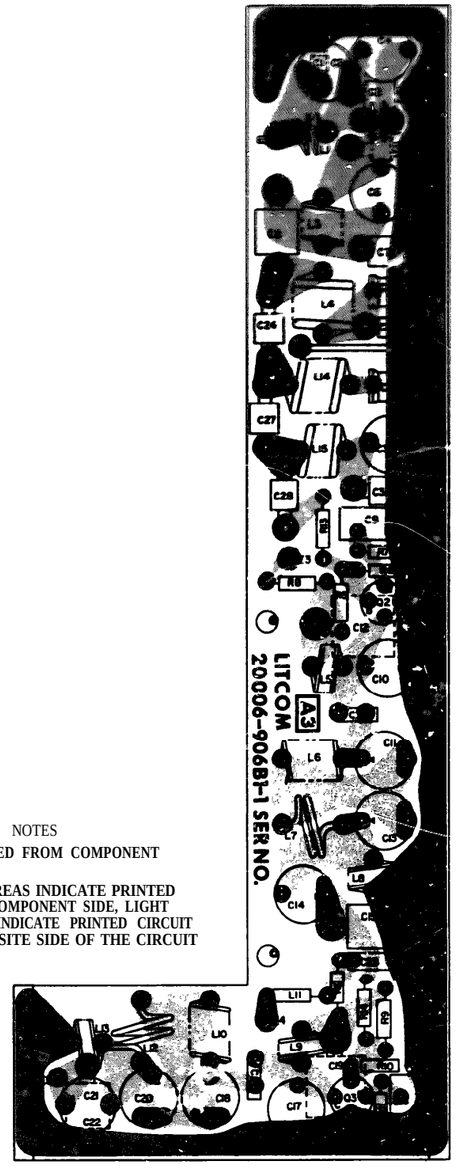
NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-552

Figure 5-203. Mixer and filter amplifier A2A1, wiring diagram and parts location.



NOTES

1 CIRCUIT VIEWED FROM COMPONENT SIDE

2 DARK GREY AREAS INDICATE PRINTED CIRCUIT ON COMPONENT SIDE, LIGHT GREY AREAS INDICATE PRINTED CIRCUIT ON THE OPPOSITE SIDE OF THE CIRCUIT BOARD

EL5895-482-35-TM-534

Figure 5-204 151 75- to 161 75-MHz filter A1A3, wiring diagram and parts location

APPENDIX A

REFERENCES

The following is a list of applicable publications available to maintenance personnel of Communication Central AN/TSC-26.

AR 380-5	**Department of the Army Information Security Program.**
DA Pam 310-4	**Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.**
DA Pam 310-7	**U. S. Army Equipment Index of Modification Work Orders.**
FM 5-25	**Explosives and Demolition.**
SB38-100	**Preservation, Packaging, Packing and Marking Materials. supplies, and Equipment Used by the Army.**
TB746-10	**Field Instructions for Painting and Preserving Electronics Command Equipment.**
TB SIG 222	Solder and Soldering.
TM 11-5895-482-12	Operator's and Organizational Maintenance Manual: Communications Central AN/TSC-26.
TM 11-5895-482-35/1	DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL FOR RECEIVER GROUP OA-3984/TSC-26.
TM 11-5895-482-35-3/2	DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL FOR MESSAGE CENTER OA 3986A/TSC-26.
TM 38-750	The Army Maintenance Management Systems (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.

INDEX

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS,
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Units org under fol TOE:- 1 ea.
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29-134
29-136
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31-106
31-107

ARNG & USAR: None.

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

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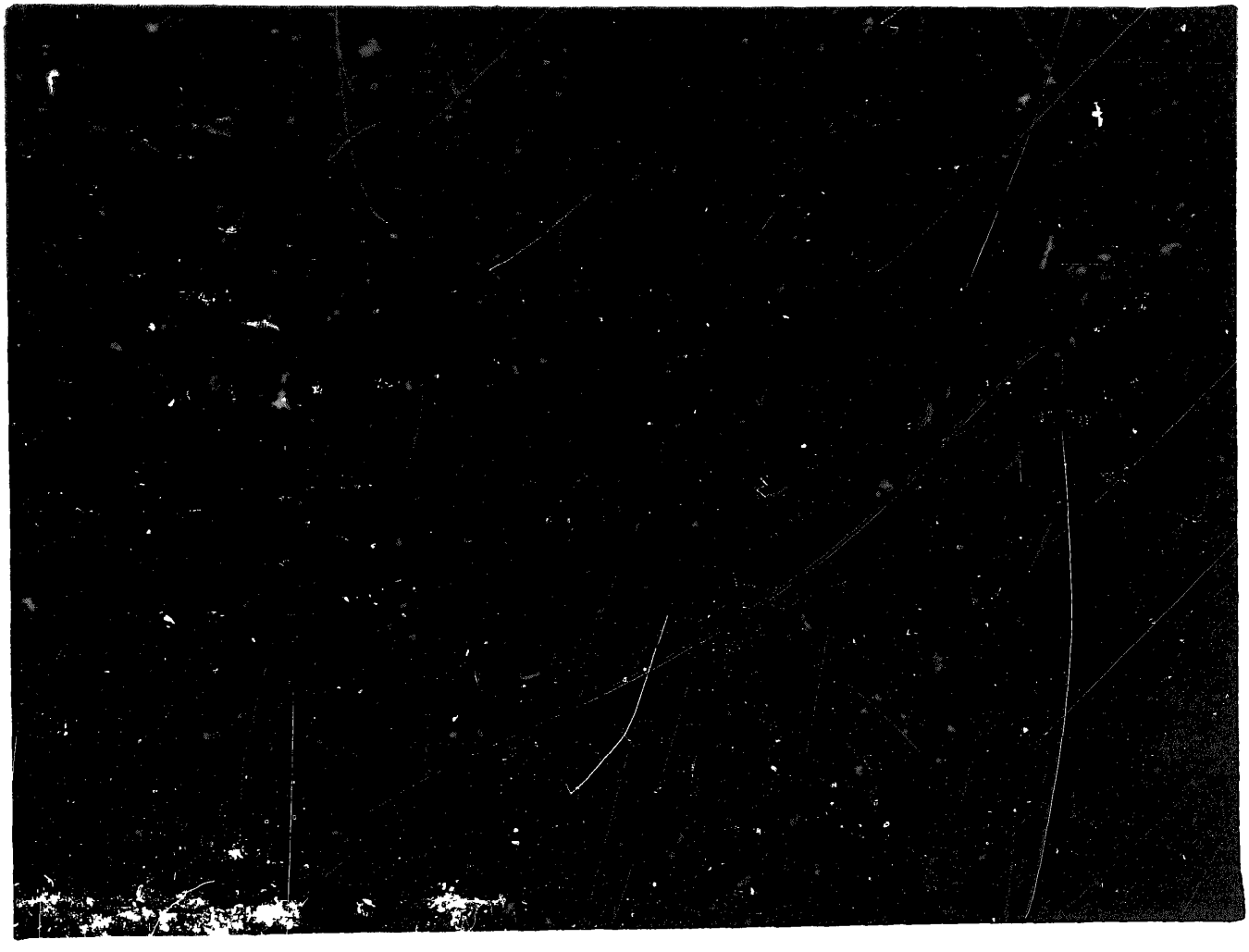

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