TECHNICAL BULLETIN

CALIBRATION PROCEDURE

FOR

TEST FACILITY SET AN/GRM-95(V)2

(NSN 6625-01-104-8926)

HEADQUARTERS, DEPARTMENT OF THE ARMY
18 OCTOBER 1985

Change No 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *1 January1987*

Calibration Procedure
For
TEST FACILITY SET AN/GRW95(V)2
(NSN 6625-01-104-08926)

TB 11-6625-1696-45, 18 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

Remove Pages	Insert Pages
iii and iv	iii and iv
None	iv.1/(iv.2 blank)
vii/(viii blank)	vii/(viii blank)
1-1 and 1-2	1-1 and 1-2
None	1-6.1/(1-6.2 blank)
1-7 through 1-12	1-7 through 1-12
611	6-11/(6-12 blank)
None	7-1 through 7-8

2. File this change sheet in the front of the publications for reference purposes.

By Order of the Secretary of the Army:

JOHN A WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R.L DILWORTH
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The Adjutant General

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TECHNICAL BULLETIN
No 11-6625-1696-45

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 18 October 1985

CALIBRATION PROCEDURE FOR TEST FACILITY SET AN/GRM-95(V)2 (NSN 6625-01-104-8926)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS You can help improve this manual If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSELME-MP, Fort Monmouth, NJ 07703-5007. In either case, a reply will be furnished direct to you.

* This Technical Bulletin supersedes TB 11-6625-1696-45, 22 August 1983.

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LIST OF ILLUSTRATIONS-Continued

LIST OF ILLUSTRATIONS-Continued

LIST OF ILLUSTRATIONS-Continued

SECTION I

GENERAL

1. Purpose and Scope

a This bulletin provides information for the periodic calibration of Test Facility Set ANIGRM-95(V) GRM-95(V)2 (fig 1-1, 1-2, 1-3, 1-4, 1-5 and 1-5.1) This bulletin is to be used by calibration personnel who are trained in the use of calibration test and measuring equipment Detailed instructions concerning operation and use of the standards are not contained in this bulletin

b. This bulletin also contains illustrations showing the location of all controls and components utilized in this calibration procedure, as well as diagrams showing equipment setups. Equipment ground connections are not necessarily shown in the diagrams.

2. Reporting Equipment Recommendations (EIR)

If your Test Facility Set ANIGRM-95(V)2 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design. Put it on an SF 368 (Quality Deficiency Report) Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, NJ 07703. We'll send you a reply.

3. Description.

a. Test Facility Set AN/GRM-95(V)2 consists of major units:

(1) Transmitter Test Facility TS-2866(V)2/GRM-95(V)2 GRM-95(V), consisting of Receiver Test Panel SB-4048/GRM-95(V)

(2) Receiver Test Facility TS-2867(V)2/GRM-95(V), consisting of Receiver Test Panel 12 SB-4049/GRM-95(V) mounted in Case CY-7800/ GRM-95(V).

NOTE

The transmitter and receiver test facilities each consist of a front panel and a rear chassis on which are mounted plug-in subassemblies.

(3) Test Facilities Accessory Kit MK-1173(V)2 GRM-95(V), consisting of Power Supply PP-6304/ and various assemblies such as attenuator, bridges, loads, detectors, couplers, mixers, an RF switch, spare parts and associated components. The transmitter and receiver test facilities each consisting of a front panel and a rear chassis on which are mounted plug-in subassemblies.

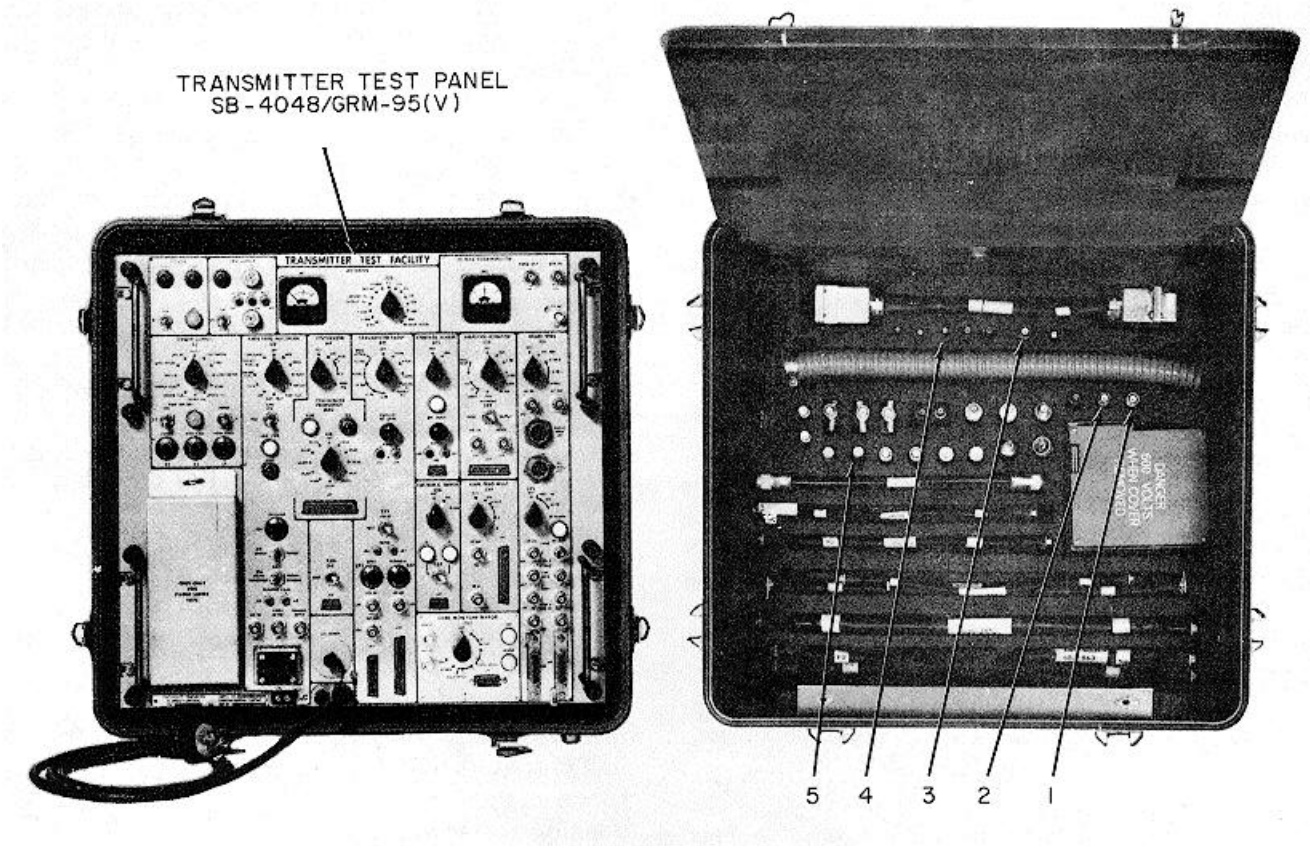
(4) Test Facility Radio Frequency ModulesTS-3837(V) 1GRM-95(V) consisting of Panel Test the Electrical Assembly TS-3832/GRM-95(V) mounted on Case CY-7802/GRM-95(V)The Panel Test Electrical Assembly consists of a front panel on which is mounted various plug-in subassemblies.

(5) Accessory Kit, Test Facility Set MK-1985(V)l/GRM-95(V) consisting of power divider, RF detector, VSWR bridge, trombone adjustable air line, double balanced mixer, VSWR detector, mixer, various attenuator and terminations, directional couplers, filters, circulators and various associated components.

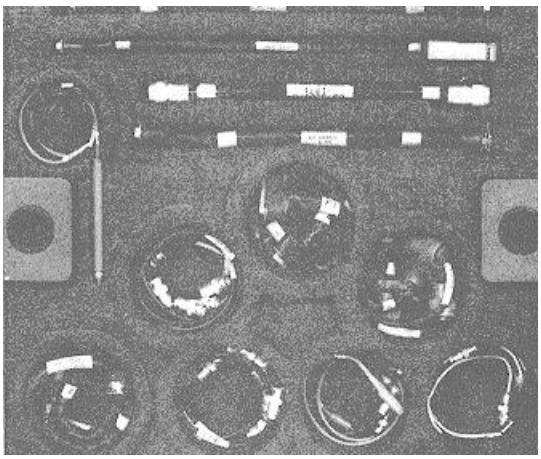
(6) Test Fixtures, Restorer Pulse Form TS-4116/grm-95(v) consisting of a front panel and rear chassis on which are mounted four pcb’s and two power supplies. The front panel/rear chassis is mounted in a two piece aluminum carrying cases. One half of the cases is the cover and contains the test fixture accessories stored in cutaway slots in the foam packing material

b Identification.

Nomenclature	Test Facility Set AN/GRM-95(V)2
Manufacturer	Canadian Marconi Company
Model Number	1000-801180-000
Dimensions	See table 1
Reference	TM 11-6625-1696-12

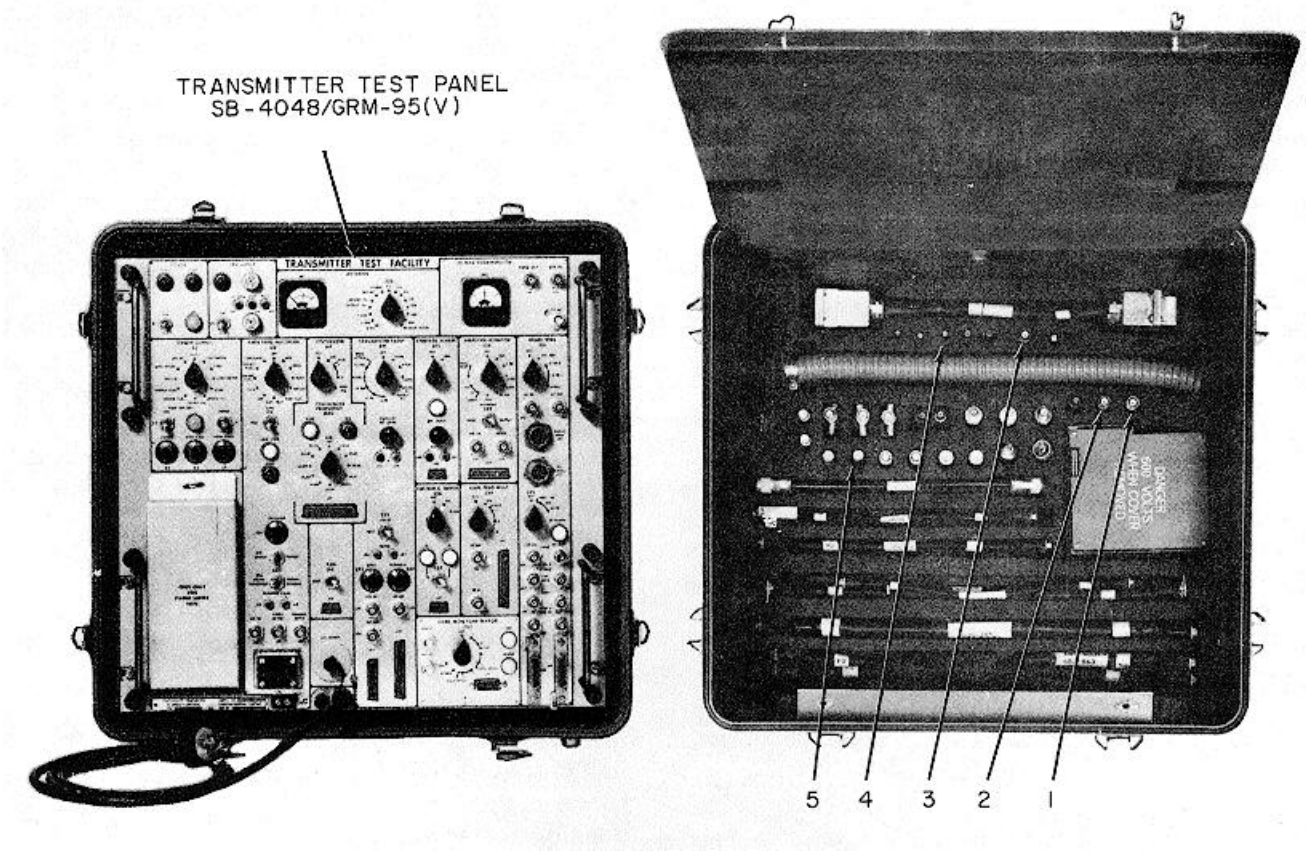


I- IMPEDANCE MATCHING NETWORK CU-1878/U
2- TEST ADAPTER MX-8413/U
3- IMPEDANCE MATCHING NETWORK CU-1877/U
4- ELECTRICAL DUMMY LOAD DA-530/U
5- ELECTRICAL DUMMY LOAD DA-528/U, DA-529/U



ELERB092

Figure 1-1. Transmitter Test Facility T.W2866(V)I/GRM-95



1- ELECTRICAL DUMMY LOAD DA-531/U, DA 532/U DA-534/U, DA 533/U
2- ELECTRICAL DUMMY LOAD DA 693/U

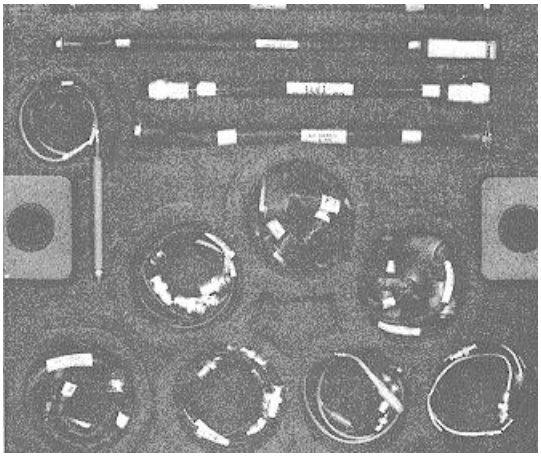


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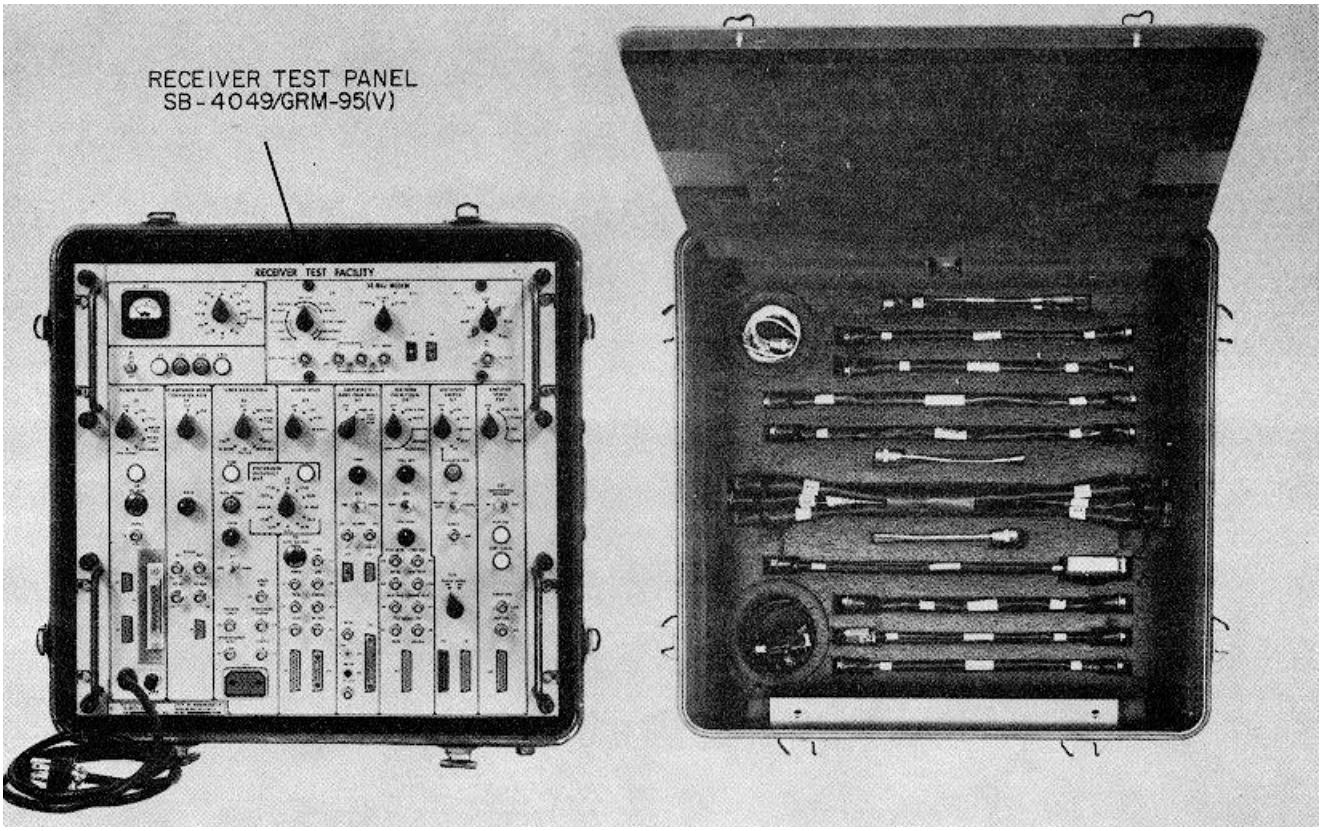
Figure 1-2. Receiver Test Facility TS-2867(V)2/GRM-95(V).



1- DIRECTIONAL COUPLER CU-I880/U
2- ELECTRICAL DUMMY LOAD DA-539/U
3- RETURN LOSS BRIDGE RF-238/GRM-95(V)
4- LOW PASS FILTER F-1270/U
5- BAND PASS FILTER F-1267/U,F-1268/U,F-1269/U
6- IMPEDANCE BRIDGE DUMMY LOAD MK-1174/U
7- DIRECTIONAL COUPLER CU-1879/UCN-1291/U
8- FREQUENCY MULTIPLIER TEST STAND MX-8437A
9- ELECTRICAL DUMMY LOAD DA-437/GRC-103(V)
10- VARIABLE ATTENUATOR CN-1292/U, CN-1293/U, CN-1294/U
11- TRANSMISSION LINE RADIO FREQUENCY SWITCH SA-1657/U
12- FIXED ATTENUATOR CN-1287/U
13- RADIO FREQUENCY DETECTOR RF-237/U
14- DOUBLE BALANCED MIXERCV-2343/U
15- ELECTRICAL DUMMY LOAD DA-531/U
16- FIXED ATTENUATOR CN-1285/U
17- FIXED ATTENUATOR CN-1288/U,CN-1290/U CN-1291/U
18- ELECTRICAL DUMMY LOAD DA-535/U, DA 536/U, DA-537/U, DA-538/U
19- FIXED ATTENUATOR CN-1284/U
20- POWER SUPPLY PP-6304/GRM-95(V)

EL5RB094

Figure 1-3. Accessory Kit, Test Facility Set MK-117372/1GRM-95(V).

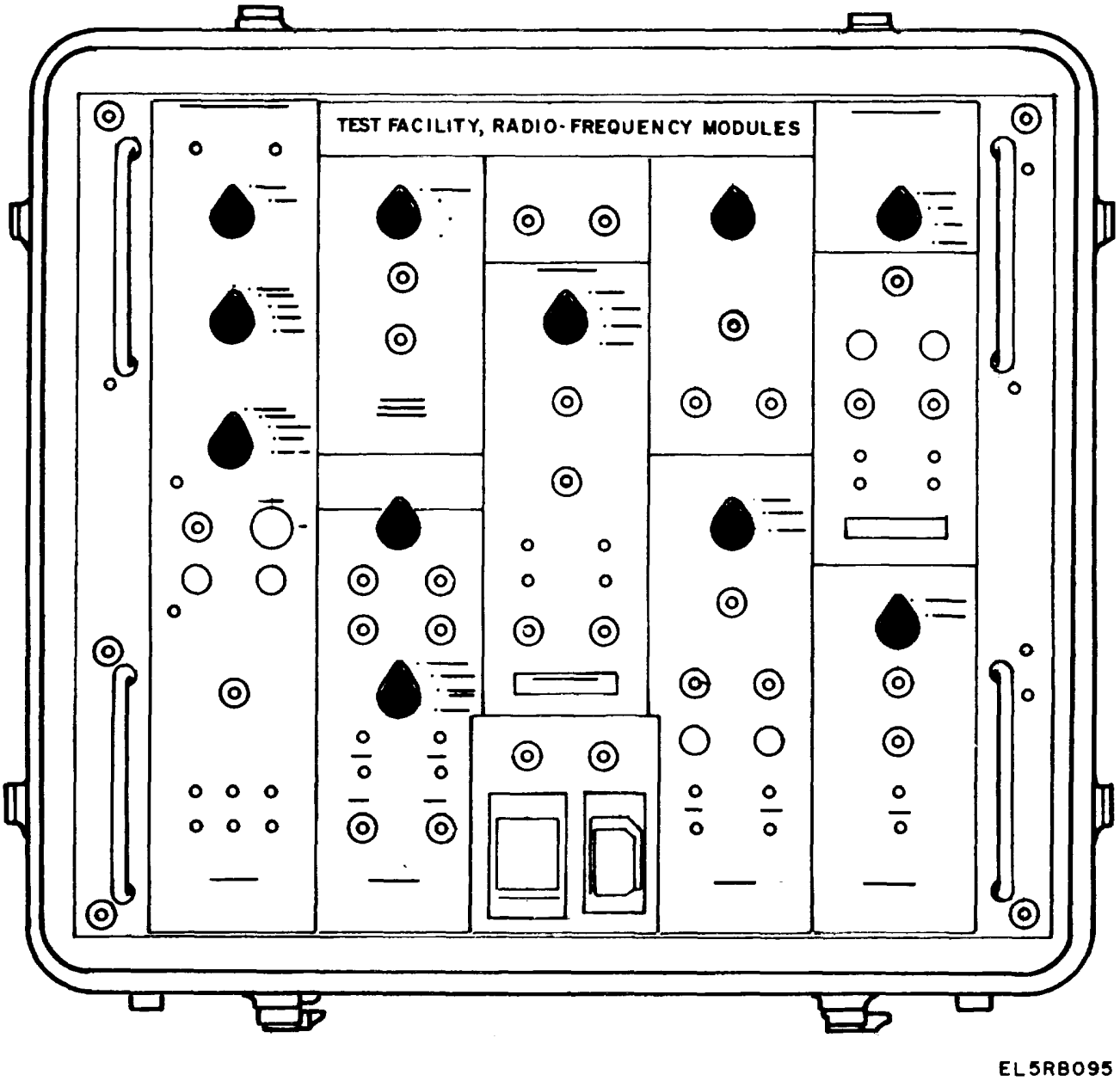


Figure 1-4. Test Facility Radio Frequency Modules TS-3837(V)2/GRM-95(V).

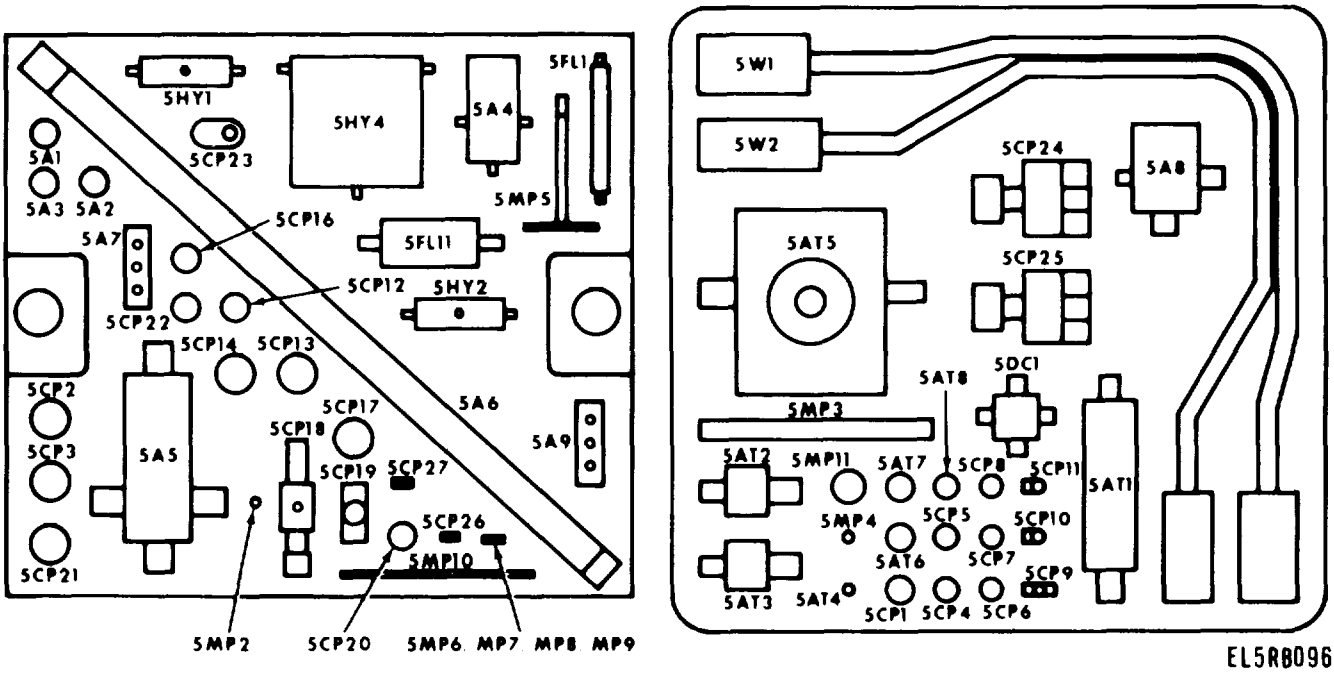
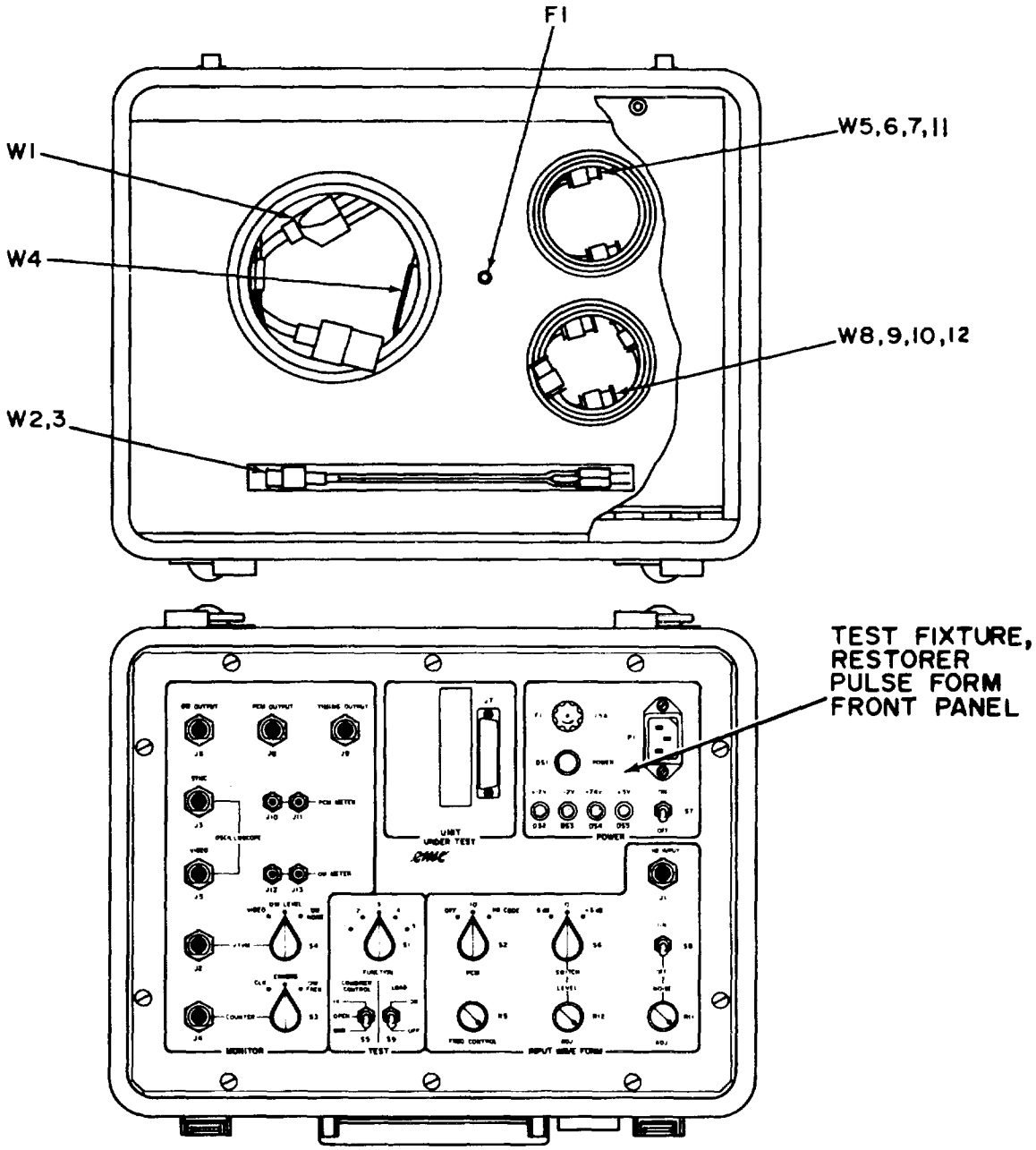


Figure 1-5. Accessory Kit, Test Facility Set MK-1985(V)1/GRM-95(V).



F1-FUSE,
CARTRIDGE (1/2A, 250V) (248-990019-673)
W1-CABLE ASSEMBLY (3-18 AWG, 71/2FT) (217-990033-127)
W2,3-LEAD, TEST CX-12046/U (8 IN)
W4- LEAD, TEST (267- 800020- 000)
W5,6, 7, 8-CABLE ASSEMBLY, RADIO FREQUENCY CG-409H/U (3 FT)
W9,10- CABLE ASSEMBLY, RADIO FREQUENCY CG-409H/U (IFT61N)
W11, W12 CABLE ASSEMBLY VIDEO, C-s 5I7 / U (S F)

EL5RB192

Figure 1-5.1. Test Fixture Restorer Pulse Form TS4116/GRM-95(P) and Stored Accessories

Table 1. Physical Dimensions Item

Item	Height (in)	Depth (in)	Width (in)	Weight (lbs)
Transmitter Test Facility TS-2866(V)2/GRM-95(V)	22 ¼	22	21	115
Receiver Test Facility TS-2867(V)2/GRM-95(V)	22 ¼	22	21	114
Test Facilities Set Accessory Kit MK-1173(V)2/GRM-95(V0	22 ¼	22	21	110
Test Facility, Radio Frequency Modules TS-3837(V)l/GRM-95(V)	22 ¼	22	21	87
Accessory Kit, Test Facility Set MK-1985(V)l/GRM-95(V)	22 ¼	22	21	84 ½
Test Fixture Restorer Pulse Form TS-4116/GRM-95(V)	13	12	15	25

c Specifications. Refer to TM 11-6625-1696 for complete specifications.

d Program Data

Interval of calibration	In accordance with TB 43-180
Time required for calibration	48 hours (approx.)
Calibration level	General maintenance level

4. General Instructions

a Calibration Data Card During the performance of these procedures annotate DA Form 2416 (Calibration Data) in accordance with TM 38-750.

b Unit Under Test The items listed in tables paragraph headings throughout the procedure part of Test Facilities Set AN/GRM-95(V)2 and each be referred to as the unit under test during following calibration procedures.

c Equipment Setup Disconnect instructions not contained in these procedures since it is understood that equipment in one setup must be disconnected in its entirety or in part, to arrange it for next setup.

d Removal Due to the large number of components and accessories contained within this facilities kit it is recommended that items by removed onl1 instructed or when being calibrated, and be immediately returned to their storage compartments upon completion of each component calibration.

e Familiarity It is recommended that the entire procedure be reviewed before performing calibration.

5. Difference Among Models

None.

6. Equipment Required.

a Equipment required for calibration performance checks and adjustments is listed in table 2.
When any of the specified items are not available an equivalent calibrated item may be used.

NOTE

The term "calibrated load" used in this procedure is intended to mean "of a known value" rather than containing a certification label.

b This procedure also requires two special loads and three leads in order to complete the calibration.
The following instructions show how to fabricate these additional accessories.

(1) Fabricate the Capacitive load as follows (fig. 1-6):

(a) Obtain one 1000 PF, 600-volt capacitor (1) and one BNC GU-625B/U connector (2).

(b) Make an open mouthed box (chassis) (3) 1 inch x 1 inch x 0.inch as shown.

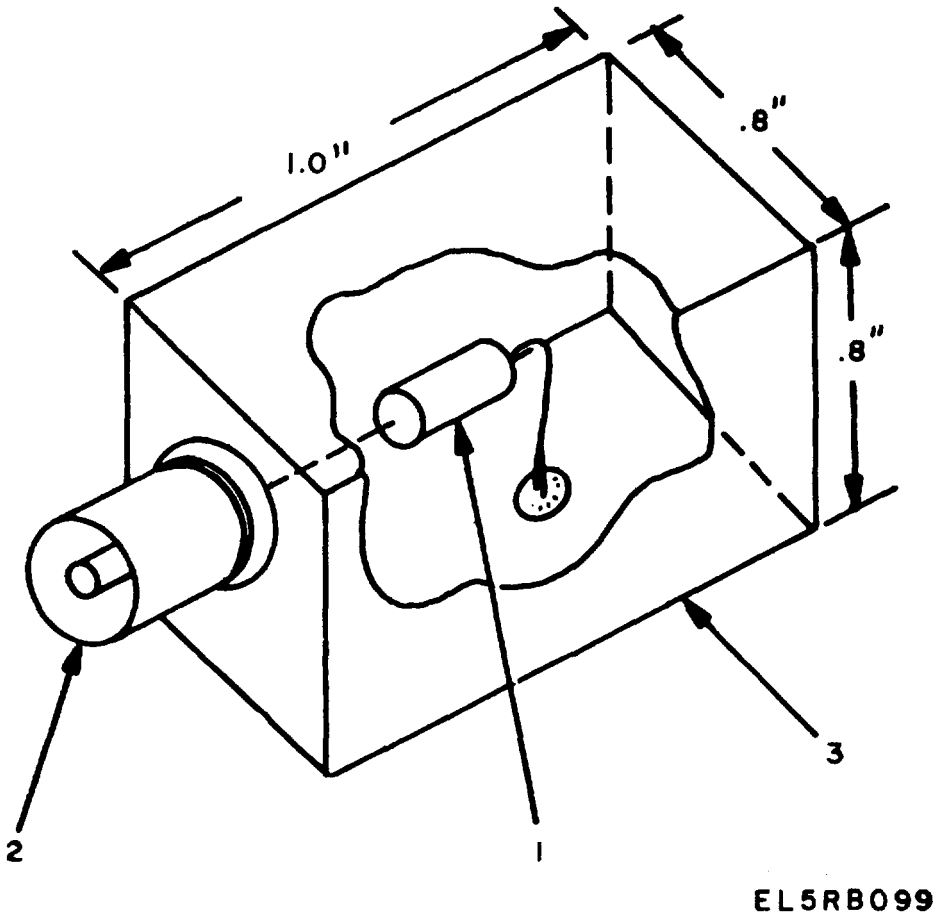


Figure 1-6. (c) Drill a hole at one end of the chassis to accept connector.

(d) Mount connector (2) to chassis.

(e) Solder one end of the capacitor (1) to the center conductor of the connector.

(f) Solder the other end of the capacitor to the chassis.

(g) Close and seal the box.

(2) Fabricate test lead PEN-SK-006 as follows:

(a) Obtain 3 feet of Belden 8899 red electrical wire, two E.F Johnson 105-301 red electrical plugs and one Cannon 330-0144-001 pin connector.

(b) Connect the two plugs to the wire ends as shown in figure 1-7.

(c) Replace the pin of one plug with the Cannon connector pin.

(3) Fabricate test lead PEN-SK-004 as follows:

(a) Obtain one of each of the following; a UG-657/U adapter connector, an E.F Johnson 105-302 red plug, an E.F Johnson 105-303 black plug, an Ampehnol 31-759 electrical connector shield, 1 foot of Belden 8899 black electrical wire and 1 foot of Belden 8899 red electrical wire Also obtain two Cannon 330-0144-000 pin connectors.

(b) Solder one end of the red wire to the inner connector of the BNC connector as shown in figure 1-8.

(c) Solder one end of the black wire to the body of the BNC connector.

(d) Cover the BNC connector with the electrical connector shield.

(e) Connect the other end of the red wire to the red plug; connect the other end of the black wire to the black plug.

(f) Replace the original pins of the black and red connectors with the Cannon connector pins.

(4) Fabricate test lead PEN-SK-005 as follows:

(a) Obtain two 3-foot lengths of Belden 8899 electrical wire; one red, one black, two E.F Johnson 108-301 banana plugs; one red, one black, two E.E Johnson 105-301 electrical plugs; one red, one black, one Cannon 330-0144-000 pin connector, and one

6-foot length of insulation tubing.

(b) Cover the two wires with insulating tubing.

(c) Connect one end of the red wire to the banana plug and the other end to the red electrical plug as shown in figure 1-9.

(d) Connect one end of the black wire to banana plug and the other end to the black electrical plug.

(e) Replace the pins of the red and black ph with the Cannon connector pins 330-0144-000.

(5) Fabricate the resistive loads as follows:

(a) Obtain two BNC UG-88C/U connectors, one 50-ohm 0.5-watt resistor, and one 500-ohm (2%) 0.5-watt resistor.

(b) Solder one lead of the 50-ohm carbon resistor to the center contact of the BNC plug.

(c) Bend the other lead of the resistor 1800 and solder it to the shell of the BNC plug.

(d) Repeat the same procedure in making the other load with the 500-ohm resistor.

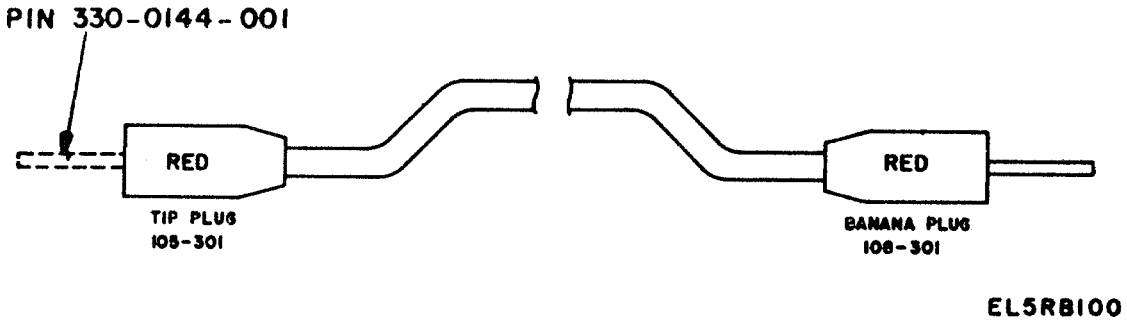


Figure 1-7. Test Lead PEN-SK-006, Assembly Drawing

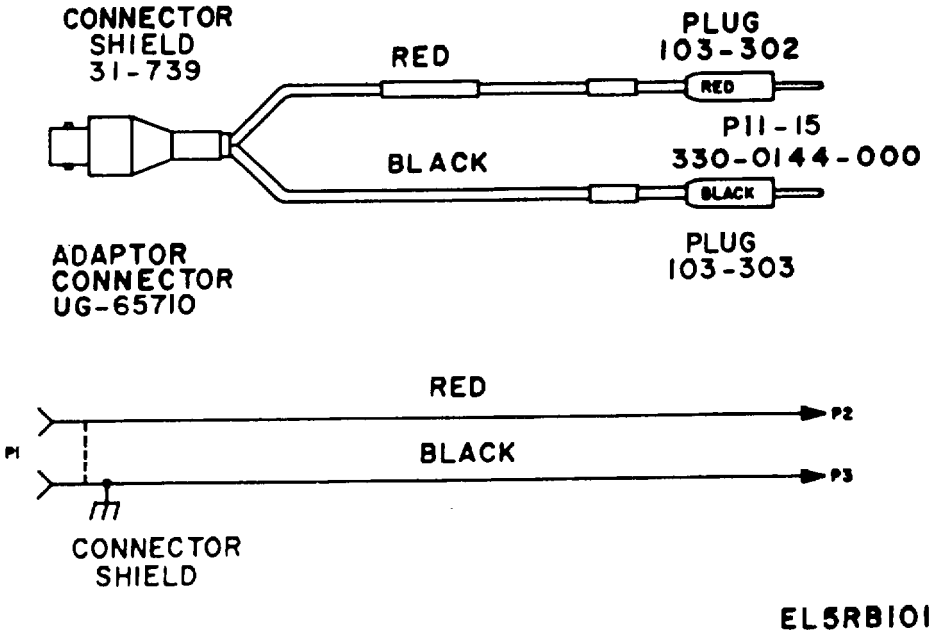


Figure 1-8. Test Lead PEN-SK-004, Assembly And Schematic Diagram.

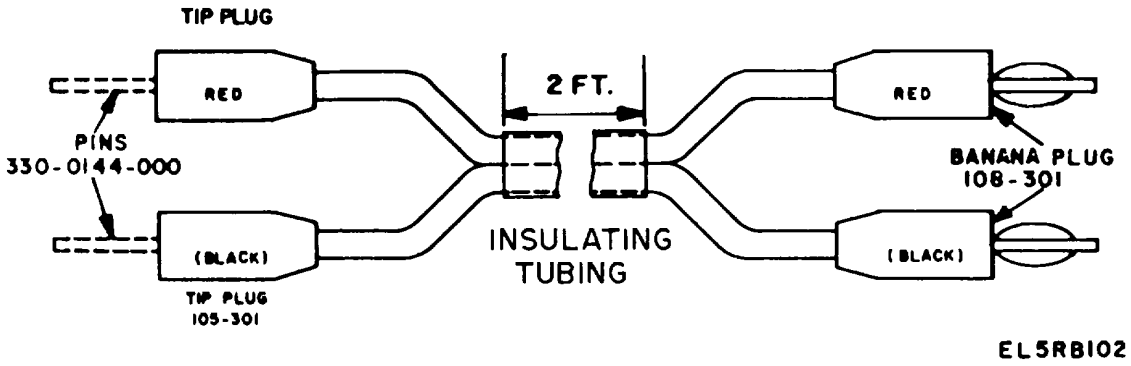


Figure 1-9. Test Lead PEN-SK-005, Assembly Drawing

Table 2. Calibration Equipment Required

A. Calibration Equipment

Common Name	Type No	Commercial No.
Digital Multimeter	ANIUSM-451	Ballentine 9632M
Frequency Counter	TD-1225(VM1-U	HP-5340A
Modulation Meter	ME-505[U	Marconi TF-2300A
Oscilloscope	AN/USM-281C	TEK 7603N-115 w/7A15ANll, 7B53ANll and HP 1725A,
Oscilloscope Probe	None	HP 10017A
Power Meter	None	HP-435A w/HP-8484A and HP-8481H
Power Supply	None	Lambda 342FM
Wide Range Oscillator	ANIUSM-205A	AUL-6205-1
Signal Generator	SG-11121V)1/U	HP-8640B, w/OPT001
Signal Generator	SG-340A/A	HP-612A
Signal Generator	AN/USM-213	HP-8614A
Signal Generator	SG-735/URM	HP-8616A
VoltMeter, Electronic	ME-459/U	HP-400EL
Vector VoltMeter	ME-512/U	HP-8405A w/HP-11570A
VSWR Indicator	AN/USM-261	HP-415E
Power Decade Resistor	ZM-58/U	Winslow 336 or Clarostat 130C
High Power Source	None	AIL M125
Frequency Converter	AM-4316/GRC-103	None
Sweep Generator	None	Wiltron 610D/W 61084DPlug-in
Thermal Noise Generator		HP-346B, w/Ext DC Power Supply
Attenuator Calibration		HP-355D with Certificate of at 30 MHz

B. Accessories

Nomenclature	Type No	Description.
Dummy Load, Electrical	DA-530/U	
Dummy Load, Electrical	DA-528/U	
Dummy Load, Electrical	DA-529/U	
Dummy Load, Electrical	DA-531/U (2 ea)	
Dummy Load, Electrical	DA-532/U (2 ea)	
Dummy Load, Electrical	DA-533/U (2 ea)	
Dummy Load, Electrical	DA-534/U (2 ea)	
Dummy Load, Electrical	DA-693/U	
Dummy Load, Electrical	DA-535/U	
Dummy Load, Electrical	DA-536/U	
Dummy Load, Electrical	DA-537/U	
Dummy Load, Electrical	DA-538/U	
Detector, RF	RF-237/U	
Coupler, Directional	CU-1879/U	
Coupler, Directional	CU-1880/U	
Return Loss Bridge	RF-238/GRM-95(V)	
Dummy Load, Electrical	DA-437/GRC-103(V]	
Mixer, Double Balance	CV-2343/1U	
Dummy Load, Electrical	DA-539/U	
Attenuator, Fixed	CN-1284/U	
Attenuator, Fixed	CN-1285/U	
Attenuator, Fixed	CN-1286/U	
Attenuator Fixed	CN-1287/U	
Attenuator, Variable	CN-1292/U	
Attenuator Variable	CN-1293/U	
Attenuator, Variable	CN-1294/U	
Attenuator, Fixed	CN-1288/U	
Attenuator, Fixed	CN-1289/U	
Attenuator, Fixed	CN-1290/U	
Attenuator, Fixed	CN-1291/U	
Filter, Bandpass	F1267/U	
Filter, Bandpass	F-12681U	
Filter, Bandpass	F-1269/U	
Filter, Low Pass	F-1270/U	
Coupler Directional	CU-2246/U	
Filter Low Pass	F-1484/U	
Filter, Low Pass	F-1485/U	
Filter, Low Pass	F-1486/U	
Filter, Bandpass	F-1487/U	
Filter, Bandpass	F1488/U	
Filter, Bandpass	F1489/U	
Filter, Bandpass	F-14901/U	
Filter, Bandpass	F-1491/U	
Filter, Low Pass	F-1492/U	
Circulator, Radio Frequency	TS-3842/U	
Circulator, Radio Frequency	TS-38441/U	
Circulator, Radio Frequency	TS-38431U	
Isolator, Coaxial		
Dummy Load, Electrical	DA-694/U	
Dummy Load, Electrical	DA-695/U	
Dummy Load, Electrical	DA-696/U	
Dummy Load, Electrical	DA-697/U	
Dummy Load, Electrical	DA-698/U	
Dummy Load, Electrical	DA-699/U	

Nomenclature	Type No	Description.
Dummy Load, Electrical	DA-700/U	
Dummy Load, Electrical	DA-701/U	
Dummy Load, Electrical	DA-7021U	
Coupler, Directional	CU-22471U	
Filter, Low Pass	F-1493/U	
Filter, Low Pass	F-1 494/U	
Coupling, Capacitor	CU-2254/U	
Attenuator, Fixed	CN-1286/U	
Attenuator, Fixed	CN-1287/U	
Nomenclature, Type No	Description	
Attenuator, Fixed	CN-1531/U	
Attenuator, Variable	CN-15321U	
Termination, Short Circuit	DA-7031U	
Termination, Short Circuit	DA-704/U	
Detector, Radio Frequency	IM-240/U	
Divider, Power	TS-38331U	
Bridge VSWR	IM-2411U	
Line Radio Frequency, Adjustable	CN-15381U	
Mixer-oupler, Radio Frequency	CU-22551U	
Detector VSWR	IM-2421U	
Mixer-Coupler, Radio Frequency	CU-22561U	
Attenuator, Fixed	CN-15331U	
Attenuator, Fixed	CN-15341U	
Attenuator, Fixed	CN-15351U	
Attenuator, Fixed	CN-15361U	
Attenuator, Variable	CN-15371U	
'ITrmination, Short Circuit	DA-7051U	
Termination, Short Circuit	DA-7061U	
Termination, Short Circuit	DA-7071U	
Adapter	POMONA 2631	
Adapter, Connector	US-2741U (2 ea)	
Adapter, Connector	UG-9141U (2 ea)	
Adapter, Connector	UG-2011U (2 ea)	
Adapter, Connector	UG-491/U (2 ea)	
Adapter, Connector	UG-18781U (2 ea)	
Adapter, Connector	UG- 18791U (2 ea)	
Adapter, Connector	UG-18801U	
Adapter, Connector	UG-1881/U	
Adapter, Connector	UB-18821U	
Adapter, Connector	UG-29/U (2 ea)	
Adapter, Connector	UG-349/U (2 ea)	
Cable Assy, Special Purpose, Electrical	CX- 20401U	
Cable Assy, Special Purpose, Electrical	CX-12041/U	
Cable Assy, RF	CG-409 HIU (3 ft)	
Cable Assy, RF	CG-409 HIU 1I ft-6 in)	
Cable Assy, RF	CG-409 HIU 11 ft)	
Cable Assy, RF	CG-409 HIU 16 in)	
Cable Assy, RF	CG-3567/U (6 in)	
Cable Assy, RF	CG-3568/U (1 ft)	
Cable Assy, RF	CG-35691U 11 ft)	
Cable Assy, RF	CG-3570/U (6 in)	
Cable Assy, RF	CG-3571/U (1 ft)	
Lead, Test	CX-12042/U 12 ft) (2 ea)	
Lead, Test	CX-12043/U (2 ft) (2 eal	
Lead, Test	CX-12044/U (2 ft)	
Lead, Test	CX-12045/U (2 ft)	
Lead, Test	CX-12046/U (8 in)	

Nomenclature	Type No	Description.
Lead, Test	CX-12045/U (2 ft)	
Lead, Test	CX-12046/U (8 in)	
Lead, Test	CX- 12047/U (2 ft	
Lead, Test	(267-800015-001)	
Cable Assembly Special Purpose, Electrical (182-367)		
Cable Assembly, Special Purpose, Electrical	CX- I 2028/U	
Cable Assembly, Special Purpose, Electrical	CX-12029/U	
Cable Assembly, Special Purpose, Electrical	CX-12030/U	
Cable Assembly, Special Purpose, Electrical	CX-12031/U	
Cable Assembly, Special Purpose, Electrical	CX-12032/U	
Cable Assembly, Special Purpose, Electrical	CX-12033/U	
Cable Assembly, Special Purpose, Electrical	CX-12034/U	
Cable Assembly, Special Purpose, Electrical	CX-12035/U	
Cable Assembly, Special Purpose, Electrical	CX-12036/U	
Cable Assembly, Special Purpose, Electrical	CX-12037/U	
Cable Assembly, Special Purpose, Electrical	CX-12038/U	
Cable Assembly, Special Purpose, Electrical	CX-12039/U	
Adapter, Connector	UG-1879/U	
Adapter, Connector	UG-565/U	
Adapter, Connector	UG-491/U	
Adapter, Connector (504-800054-000)		
Adapter, Connector (504-800055-000)		
Adapter, Connector (504-800056-000)		
Adapter, Connector (497-18111)		
Cable Assembly, Special Purpose, Electrical	CX-12052/U	
Cable Assembly, Special Purpose, Electrical	CX-12053/U	
Cable Assembly, Special Purpose, Electrical	CX-12054/U	
Cable Assembly, Special Purpose, Electrical	CX-12055/U	
Cable Assembly, Special Purpose, Electrical	CX-12056/U	
Cable Assembly, Special Purpose, Electrical	CX-12057/U	
Cable Assembly, Special Purpose, Electrical	CX-12058/U	
Cable Assembly, Special Purpose, Electrical	CX-12059/U	
Cable Assembly, Special Purpose, Electrical	CX-12060/U	
Cable Assembly, Special Purpose, Electrical	CX-12061/U	
Cable Assembly, Special Purpose, Electrical	CX-12062/U	
Cable Assembly, RF	CG-409 H/U (3 ft)	
Cable Assembly, RF	CG-409 H/U (1 ft-6 in)	
Cable Assembly, RF	CG-409 H/U (6 in)	
Cable Assembly, RF	CG-3567/U (6- in)	
Cable Assembly, RF	CG-3570/U (6 in)	
Cable Assembly, RF	CG-3568/U (2 ft)	
Cable Assembly, RF	CG-3569/U (2 ft)	
Cable Assembly, RF	CG-3567/U (2 ft)	
Cable Assembly, RF	CG-3573/U (4.8 in)	
Cable Assembly, RF	CG-3571/U (3 ft)	
Cable Assembly, Special Purpose, Electrical (504-800053-000)		
Adapter, Connector (504-800064-000)		
Adapter, Connector (504-800065-000)		
Adapter, Connector		

Nomenclature	Type No	Description.
Adapter, Connector (504-800065-000)		
Adapter, Connector (504-800059-000)		
Adapter, Connector (504-800066-000)		
Cable Assembly, Special Purpose, Electrical (217-803024-000)		
Cable Assembly, Special Purpose, Electrical (217-803025-000)		
Cable Assembly, Special Purpose, Electrical (217-803026-000)		
Cable Assembly, Special Purpose, Electrical (217-803028-000)		
Cable Assembly, Special Purpose, Electrical (217-803029-000)		
Cable Assembly, Special Purpose, Electrical (217-803030-000)		
Cable Assembly, Special Purpose, Electrical (217-803031-000)		
Cable Assembly, Special Purpose, Electrical (217-603027-000)		
Cable Assembly, Radio Frequency (217-803027-001)		
Cable Assembly, Radio Frequency (267-335284-000)		
Lead Test	CX- 12042/U (2 ft)	
Lead Test	CX-12043/U (2 ft)	
Lead Test	(267-800020-000)	
Lead Test	(504-800056-000)	
Adapter, Connector (504-800067-000)		
Adapter, Connector (504-990034-171)		
Adapter, Connector	UG-57BIU	
Adapter, Connector (504-800070-000)		
Adapter, Connector (504-990034-165)		
Adapter, Connector (504-800072-000)		
Adapter, Connector (504-800073-000)		
Adapter, Connector (504-335054-000)		
Adapter, Connector	UG-636A/U	
Adapter, Connector (504-800075-000)		
Adapter, Connector (504-800076-000)		
Adapter, Connector	UG-107B/U	
Adapter, Connector	UG-643/U	
Adapter, Connector (504-335065-000)		
Adapter, Connector	UG-564A/U	
Adapter, Connector	UG-1882/U	
Cable Assembly, Special Purpose, Electrical	CX-12028/U (3 ft)	
Cable Assembly, Special Purpose, Electrical	CX-12061/U (3 ft)	

SECTION II

CALIBRATION PROCEDURES FOR MISCELLANEOUS

ACCESSORIES PART OF TEST FACILITY SET AN/GRM-95(V)2

7. Preliminary Procedures

a. Remove the components in each test setup their storage locations only when required for use the procedure. Return the components to their age locations upon completion of each calibration

b, Remove only those cover plates require make necessary adjustments.

NOTE

The following paragraphs are divided into subparagraph a, performance check, and subparagraph b, adjustments. When the performance check is not within tolerance and no adjustments. is specified, the deficiency must be corrected before continuing with the procedure the deficiency cannot be corrected refer to instructions in paragraph 168, final procedure.

8. Impedance Bridge MK-1174/U Resistance Measurement

a. Performance Check.

(1) Connect each unit under test loading (fig. 2-1) to Digital Multimeter in the order as listed in table 3 using Connector-Adapter UG-349AIU and Test Lead (CMC 267-800020-000).

(2) The dc resistance for each load shall be as shown in table 3.

Table 3. Load Resistance Measurement

	Resistance ohm indications	
Unit under test	Minimum	Maximum
TRM 1-1.OOF	474.5	52.5
TRM 1-1.20F	57.0	63.0
TRM 1-1.25F	59.375	65.625
TRM 1-1.40F	66.5	73.5
TRM 1-1.50F	71.25	78.75
TRM 1-1.75F	83.125	91.875
TRM 1-2.00F	85.0	105.0
TRM 1-2.50F	19.0	21.0

b. Adjustments No adjustments can be made.

.

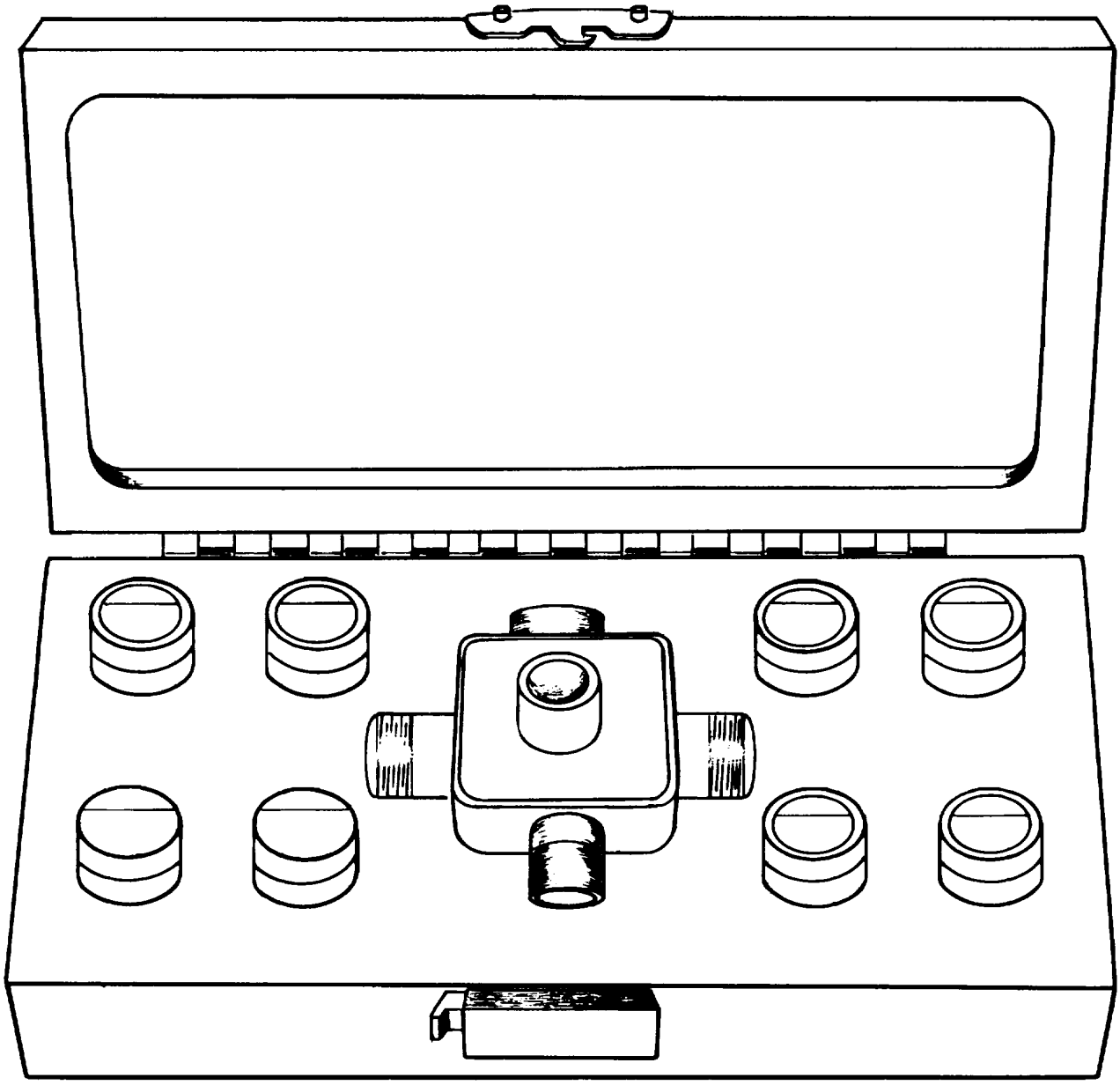


Figure 2-1. Impedance Bridge-Dummy Load MK-11 74/U.

9. VSWR Detector TRB-3 or TRB-53 Match Test

a. Performance Check.

(1) Connect test equipment as shown in A 2-2, using only one calibrated 50-ohm load (s, Para 6) connected at Z1 port.

(2) Set sweep generator controls to co) frequency range 50-400 MHz at +8 dbm level.

(3) Adjust oscilloscope controls to ob square display on oscilloscope as shown in C, 2-2.

(4) Connect another calibrated 50-ohm 1 Z2 port of unit under test (B, fig 2-2) Oscill display shall reduce to a straight line (D, fig 2-2)

b Adjustments No adjustments can be made.

10. Fixed Attenuator CN-1284/U Attenuation (fig2-3)

a Performance Check

(1) Connect test equipment as shown in A, figure 2-4.

(2) Set signal generator frequency dial to 200 MHz and adjust output level for +5 dbm as indicated on power meter.

(3) connect test equipment as shown in B, figure 2-4.

(4) Attenuation shall match the U.U.TCalibration Chart +0.3 db as indicated on power meter.

(5) Repeat (1) through (4) above with signal generator frequency set to 400 MHz.

b Adjustments. No adjustments can be made.

11. Fixed Attenuator CN-12851U Attenuation (fig 2-5)

NOTE

There are two CN-1285/U Attenuators in this set to be calibrated.

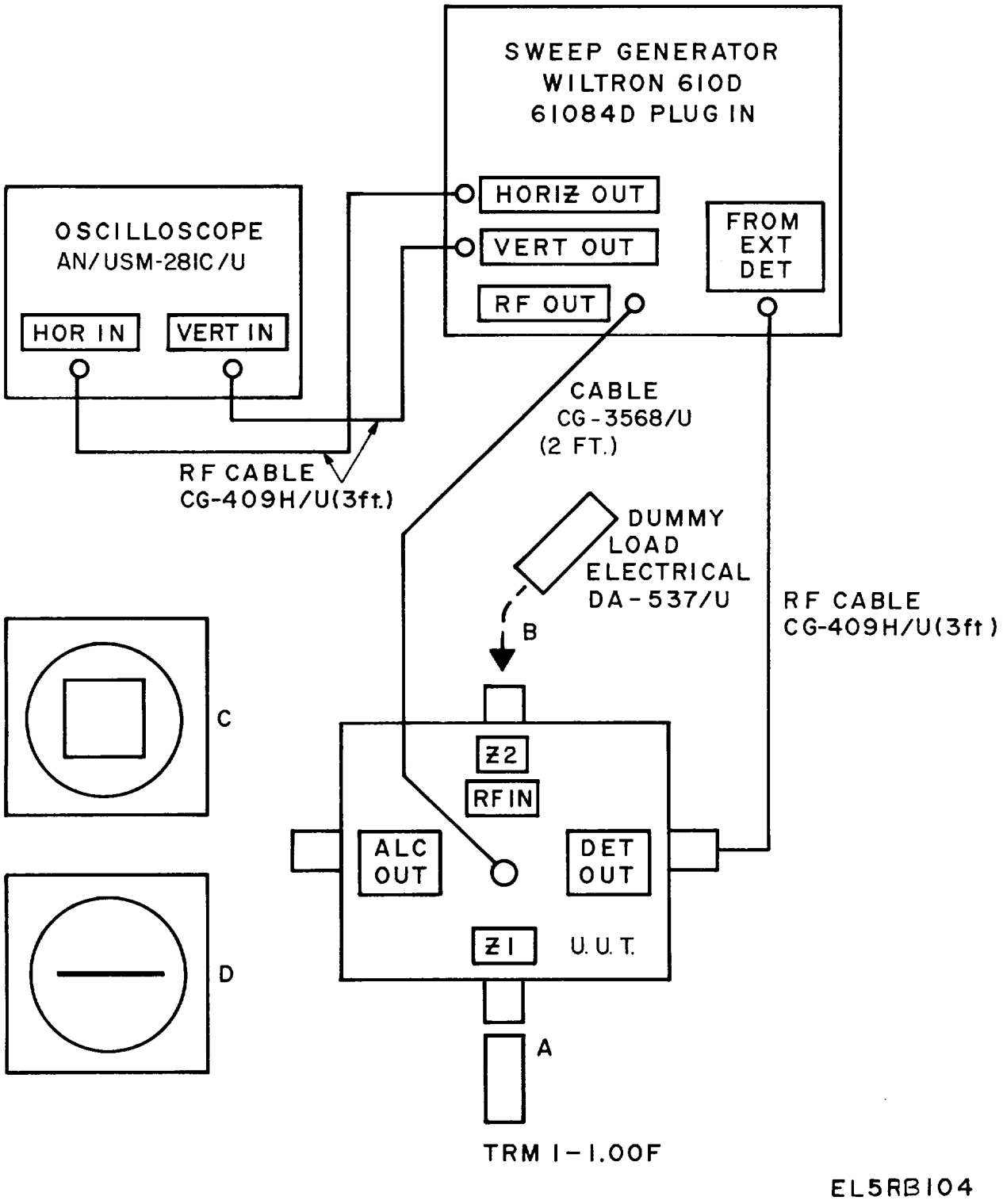


Figure 2-2. VSWR Detector TRB-3 or TRB-53 Matching Check Test Setup.

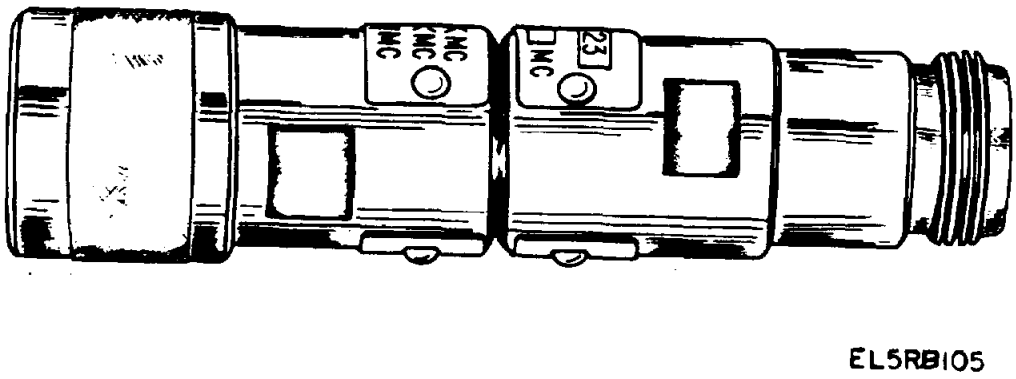


Figure 2-3. Fixed Attenuator CN-1284/U.

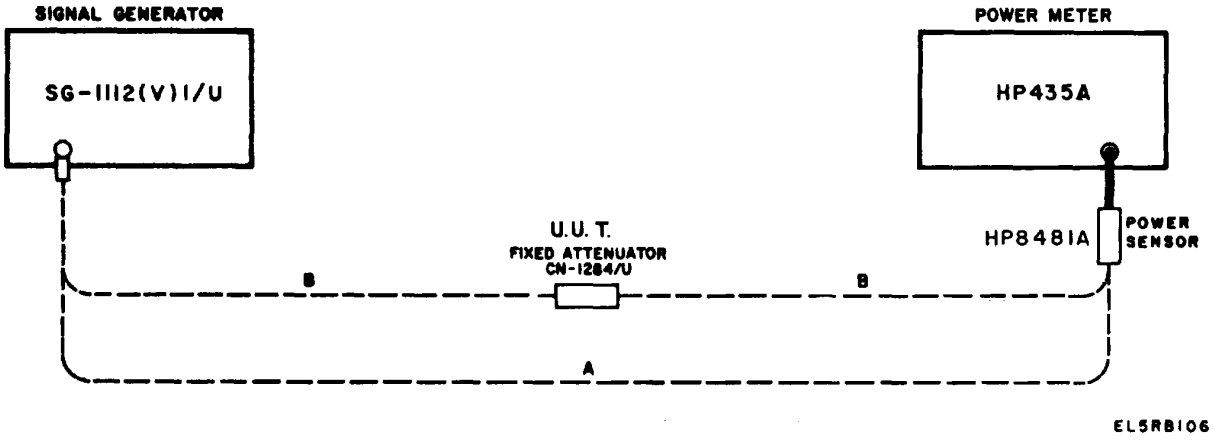


Figure 2-4. Fixed Attenuator CN-1284/U Attenuation Measurement Test Setup.

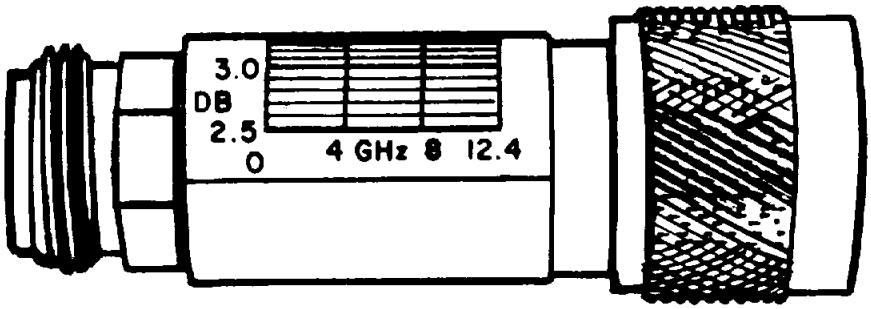


Figure 2-5. Fixed Attenuator CN-1285/U.

a. Performance Check.

(1) Connect test equipment as shown in A, figure 2-6.

(2) Set signal generator frequency dial to 200 MHz and adjust output level for +5 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 2-6.

(4) Attenuation shall match the U.U.T. Calibration chart +0.3 dbm as indicated on power meter.

(5) Repeat (1) through (4) above for signal generator frequency of 400 MHz.

b. Adjustments. No adjustments can be made.

12. Fixed Attenuator CN-12861U and CN-1287/U Attenuation (fig. 2-7)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 2-8.

(2) Set signal generator frequency dial to 95 MHz and adjust output level for a power meter indication of + 5 dbm.

(3) Connect test equipment as shown in B, figure 2-8.

(4) Attenuation for corresponding unit under test as indicated on power meter shall be as shown on unit under test calibration chart, ±+0.25 dbm.

(5) Repeat (1) through (4) above with signal generator frequency set to 145 MHz.

b. Adjustments. No adjustments can be made.

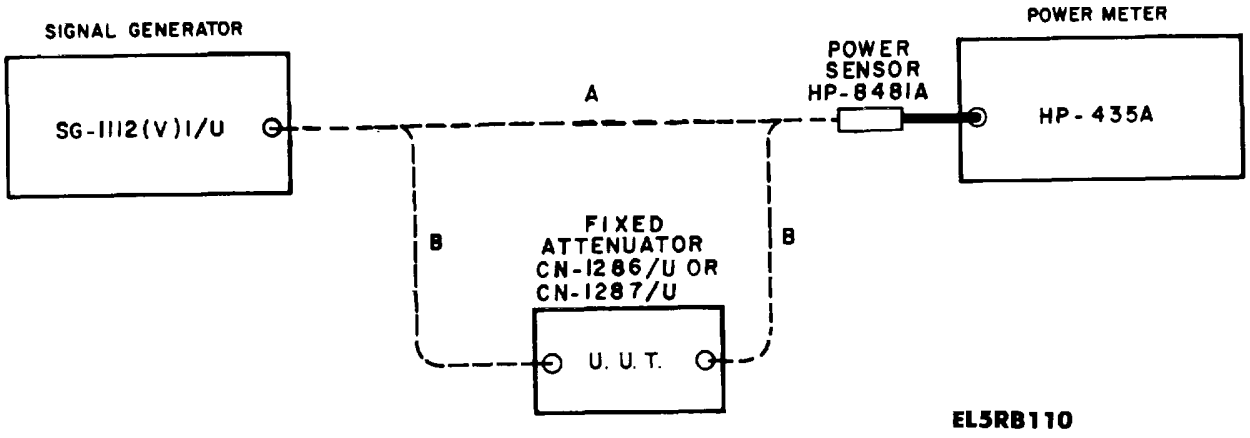
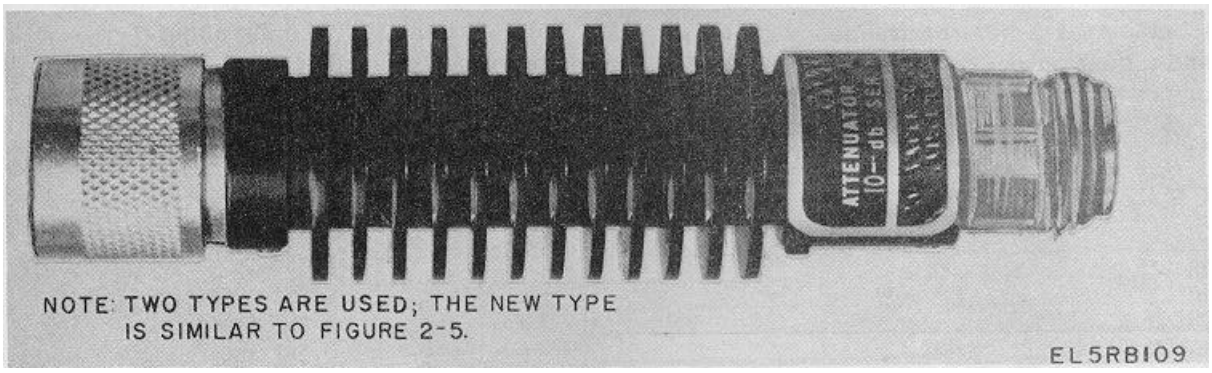


Figure 2-6. Fixed attenuator CN-1285/U Attenuation Measurement Test Setup



NOTE TWO TYPES ARE USED; THE NEW TYPE IS SIMILAR TO FIGURE 2-5.

Figure 2-7. Fixed Attenuators CN-1286/U and CN-1287/U.

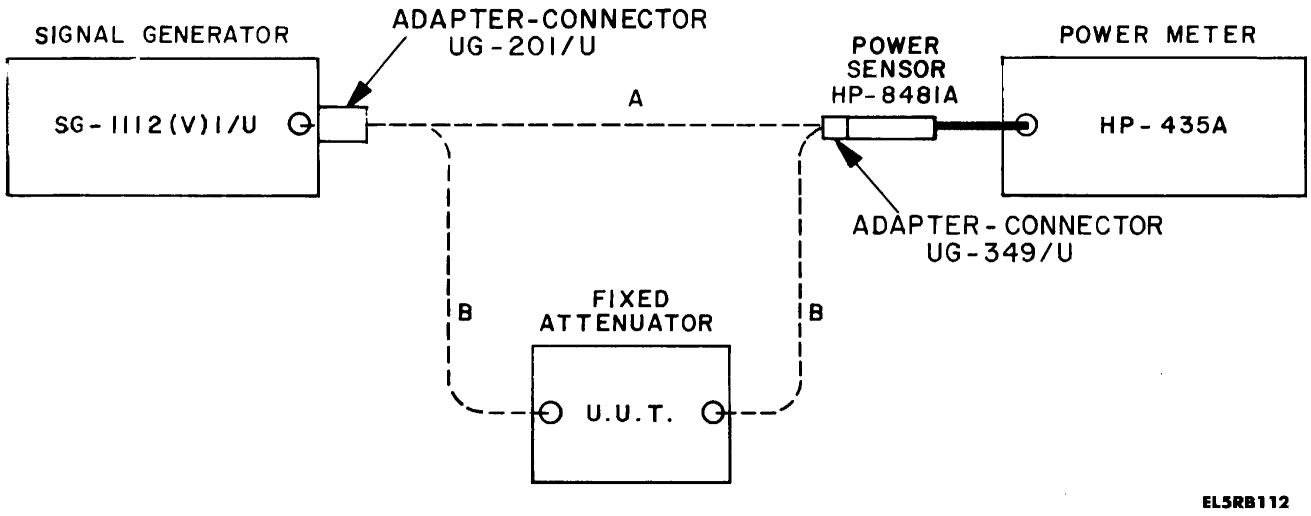


Figure 2-8. Fixed Attenuators CN-1286/U and CN-1287/U Attenuation Measurement Test Setup.

13. Fixed Attenuators CN-1288/U, CN-1289/U, CN-1290/U and CN-1291/U Attenuation (fig. 2-9)

a. Performance Check

(1) Connect test equipment as shown in A, figure 2-10

(2) Set signal generator frequency dial to 3C MHz and adjust output level for + 10 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 2-10 to test Fixed Attenuator CN-1288/U.

(4) Attenuation as indicated on power meter shall be as shown in table 4.

(5) Perform (1) through (4) above with Fixed Attenuator CN-1289/U, CN-1290/U, and CN-1291/U.

(6) Attenuation of units under test, as indicated on power meter, shall be as shown in table 4.

Table 4. Attenuator Measurement

Unit under test	Unit marking	Power Meter Indication (dbm)	
		Minimum	Maximum
CN-1288/U.....	FP50-3 db	6.5	7.5
CN- 1289/U.....	FP50-6 db	3.5	4.5
CN-1290/U.....	FP50-10 db	-0.5	+0.5
CN-12 91/U	FP50-20 db	-10.5	-9.5

b. Adjustments. No adjustments can be made.

14. Variable Attenuators CN-1292/U, CN-1293/U, and CN-12941U Insertion Loss and Attenuation (fig. 2-11)

a Performance Check.

(1) CN-1292/U or CN-1293/U.

(a) Connect test equipment as shown in A, figure 2-12.

(b) Adjust the power supply for a digital multimeter indication of 1,000 vdc (REF).

(c) Connect test equipment as shown in B, figure 2-12 and measure the 0 db step insertion loss. The digital multimeter indication shall be as shown in table 5A or B for the corresponding unit under test.

(d) Readjust the power supply for a digital multimeter indication of 1.000 vdc. The digital multimeter indication for each attenuator step should be as shown in Table 5A or B for the corresponding unit under test.

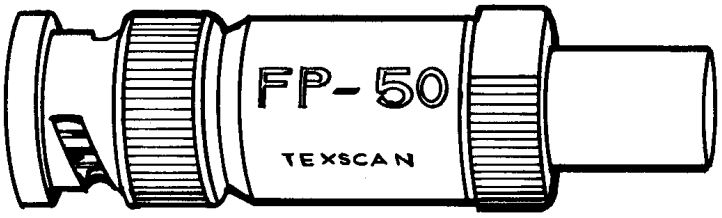
(2) CN-1294/U.

(a) Connect equipment as shown in C, Figure 2-12.

(b) Set the wide range oscillator frequency to 1 MHz level of + 20 dbm as indicated on the AC voltmeter.

(c) Connect test equipment as shown in D, figure 2-12 and measure the 0 db step insertion loss. It should be as indicated in table 5C.

(d) Change attenuator step setting and mea sure the attenuation between steps. It should be as indicated in table 5C.



NOTE:

THIS ILLUSTRATION IS TYPICAL OF FOUR ATTENUATORS.

IDENTIFY ITEM BY UNIT MARKINGS.

CN-1288/U	FP50-3DB
CN-1289/U	FP50-6DB
CN-1290/U	FP50-10DB
CN-1291/U	FB50-20DB

EL5RBIII

Figure 2-9. Fixed Attenuators, CN-1288/U, CN-1289/U, CN-1290/U and CN-1291/U.

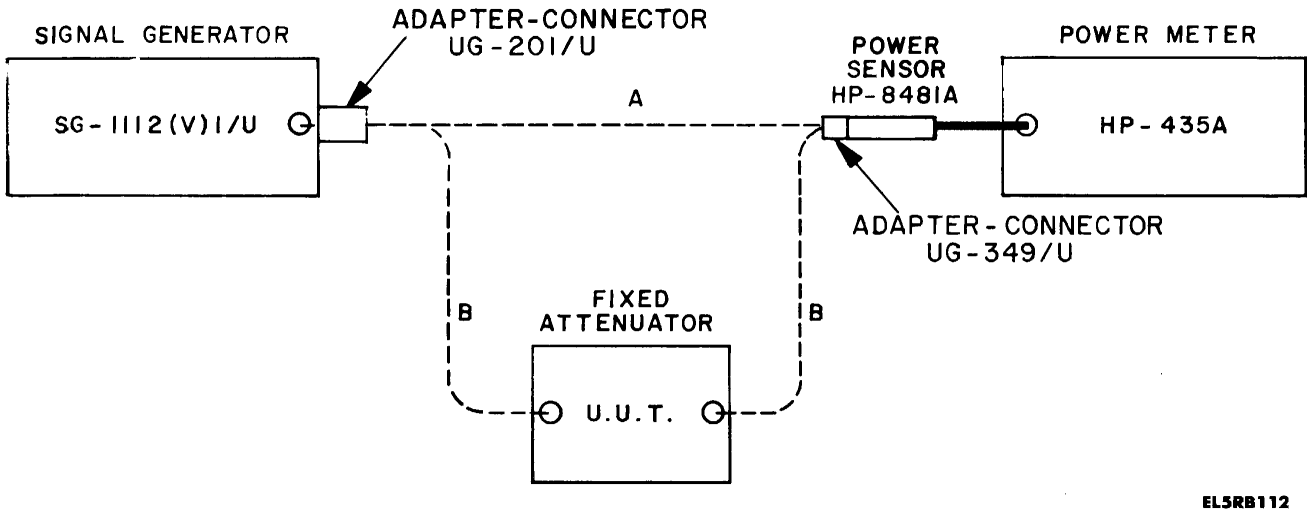
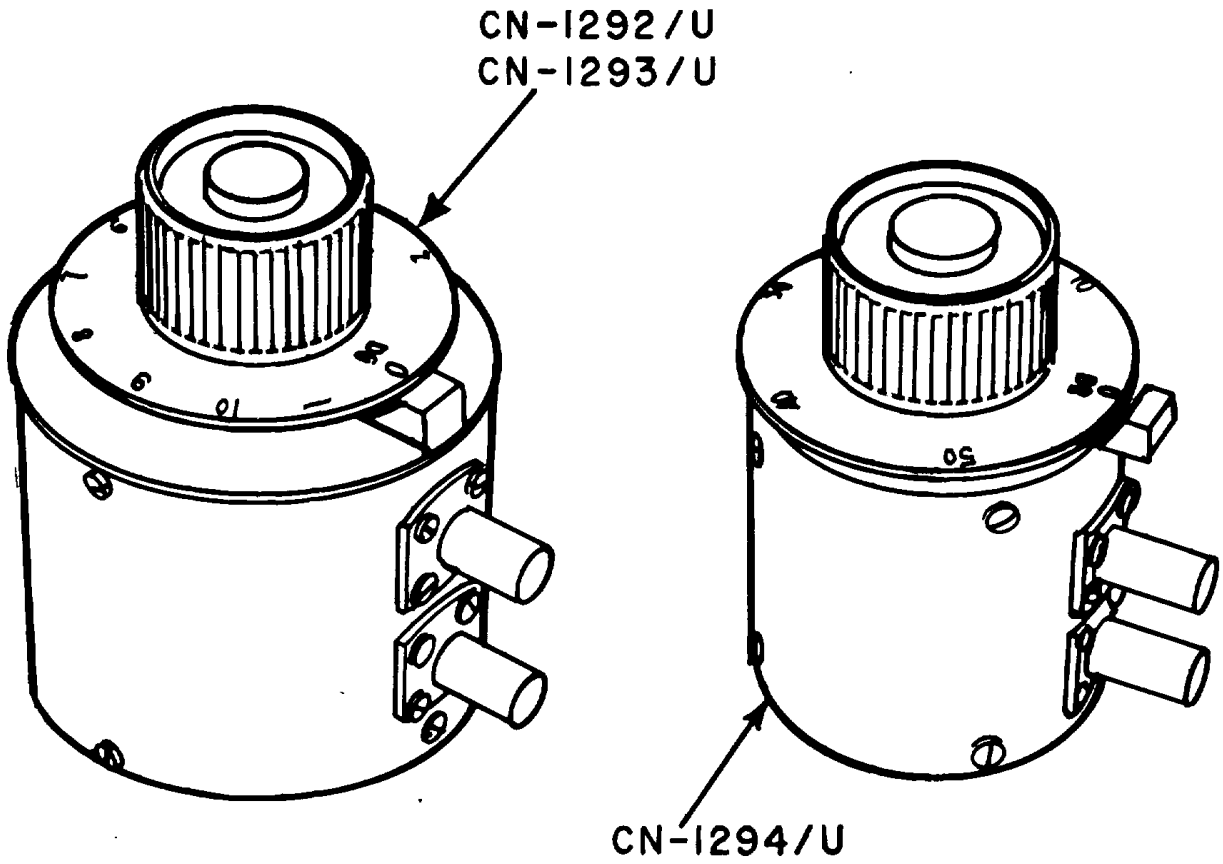


Figure 2-10. Fixed Attenuators CN-1288/U, CN-1289U, CN-1290/U and CN-1291/U Attenuation Measurement Test Setup.



NOTE: TYPICAL OF THREE VARIABLE ATTENUATORS, CN-1292/U, CN-1293/U, & CN-1294/U

EL5RB1 13

Figure 2-11. Variable Attenuators CN-1292/U, CN-1293/U and CN-1294/U.

Table 5. Attenuator Measurement

A. Variable Attenuator CN-1292/U(O-1 db)

Attenuator Step	Insertion Loss (Digital Multimeter Indication VDC)	+ Attenuation (db) (Digital Multimeter) Indication VDC
O	871 to .912	1.000 (REF)
1	986 to .991	
.2	-	975 to .979
.3	-	964 to .968
.4	-	953 to.957
.5	-	942 to.946
.6	-	931 to .935
.7	-	920 to.925
.8	-	910 to.914
.9	-	899 to.904
1.0	-	889 to.893

B. Variable Attenuator CN-1293U (0-10 db)

Insertion Loss (Digital Multimeter Attenuator Step	+ Attenuation (db) (Digital Multimeter) Indication VDC)	Indication VDC
0	NLT .997	1.000 (REF)
1	-871 to .912	
2	-776 to .813	
3	-692 to .724	
4	-617 to.646	
5	-549 to.575	
6	-490 to .513	
7	-436 to.457	
8	-389 to .407	
9	-347 to.363	
10	-309 to.324	

C. Variable Attenuator CN-129 U (0-60 db or 0-50 db)

Attenuator Step	Insertion Loss	+ Attenuation (db)
0	less than 0.2 db	O db (ref)
10	ref +	9.7 to 10.3
20	ref +	19.4 to 20.6
30	ref +	29.1 to 30.9
40	ref +	38.8 to 41.2
60	ref +	48.5 to 51.5
*60	ref +	58.2 to 61.8

* Telonic Model 8121A Only.

b. Adjustments. No adjustments can be made.

15. Directional Coupler CU-1879/U Insertion Loss (fig. 2-13)

a, Performance Check.

(1) Connect test equipment as shown in A to figure 2-14.

(2) Set signal generator frequency to 300 MHz at 0 dbm as indicated on power meter.

(3) Insert unit under test in circuit (A to C and to B), figure 2-14. The power meter indication should not be less than -0.1 dbm.

(4) Reverse the unit under test and connect as in figure 2-14, Connector UG-29/U is used between C and B. The power meter indications should not be less than -0.1 dbm.

b. Adjustments. No adjustments can be made.

16. Directional Coupler CU-1879/U Coupling Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 2-15

(2) Set signal generator frequency to 300 MHz at + 5 dbm as indicated on the power meter.

(3) Connect test equipment as indicated in B, figure 2-15. The power meter indication should be within +0.5 of the U.U.T. calibration chart at 300 MHz.

(4) Reverse unit under test as shown in B, figure 2-15 and check coupling in the other direction. The power meter should indicate within +0.5 db of the U.U.T. calibration chart at 300 MHz.

b. Adjustments. No adjustment can be made.

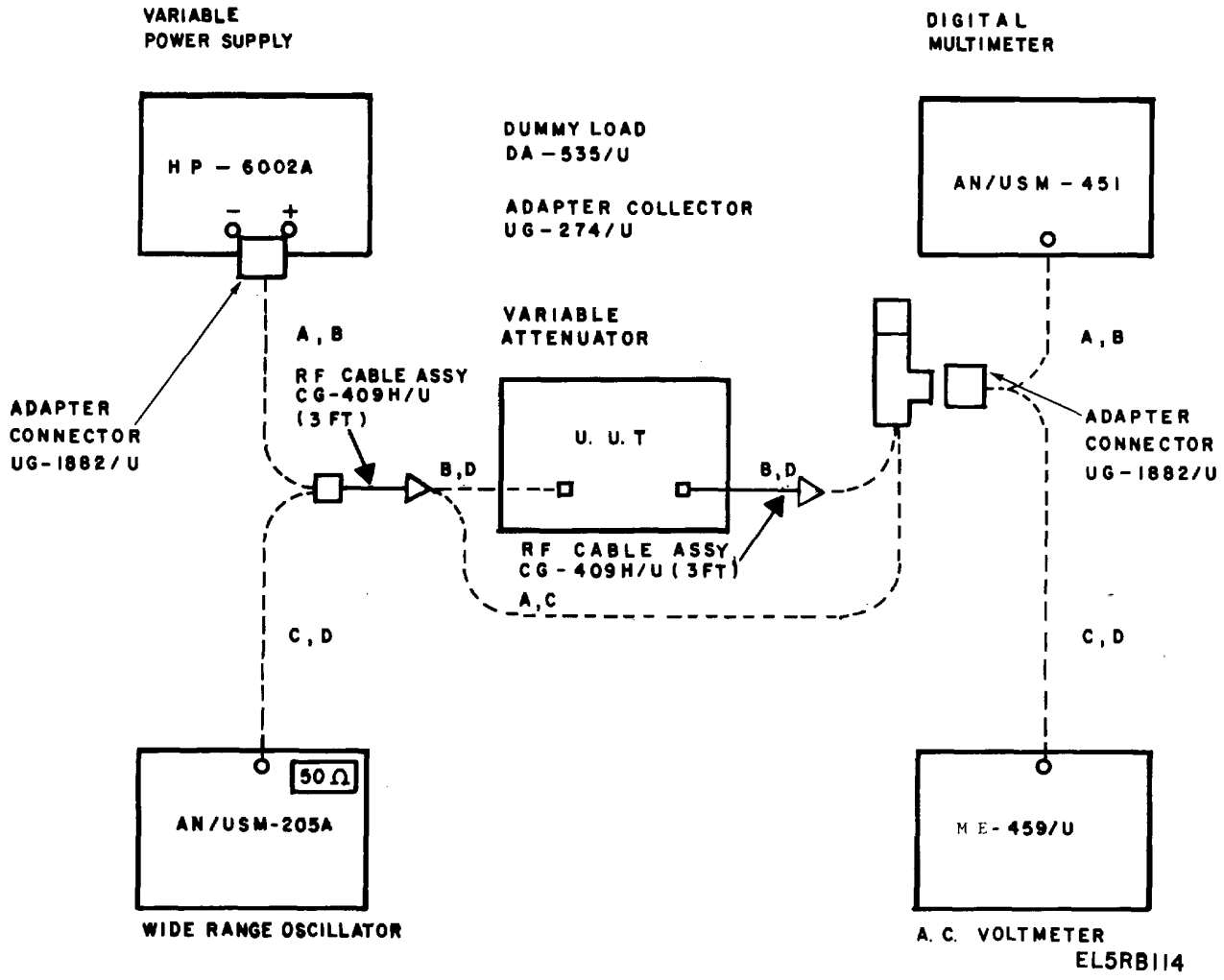
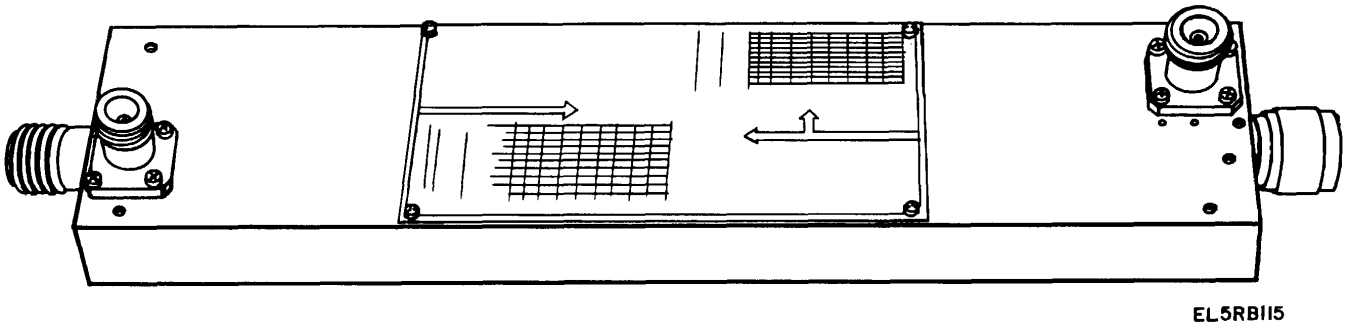


Figure 2-12. Variable Attenuators CN-1292/U, CN-1293/U or CN-1294/U, Insertion Loss and Attenuation Measurement Test Setup.



B 11-6625-1696-45

Figure 2-13. Directional Coupler CU-1879U.

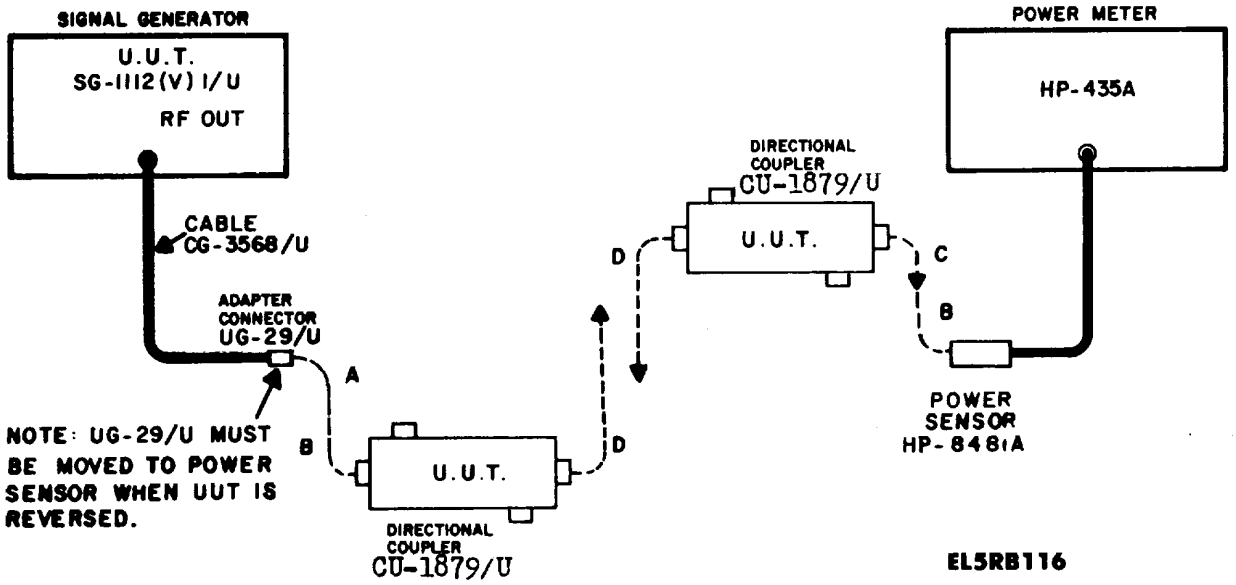


Figure 2-14. Directional Coupler CU-1879/U Insertion Loss Measurement Test Setup.

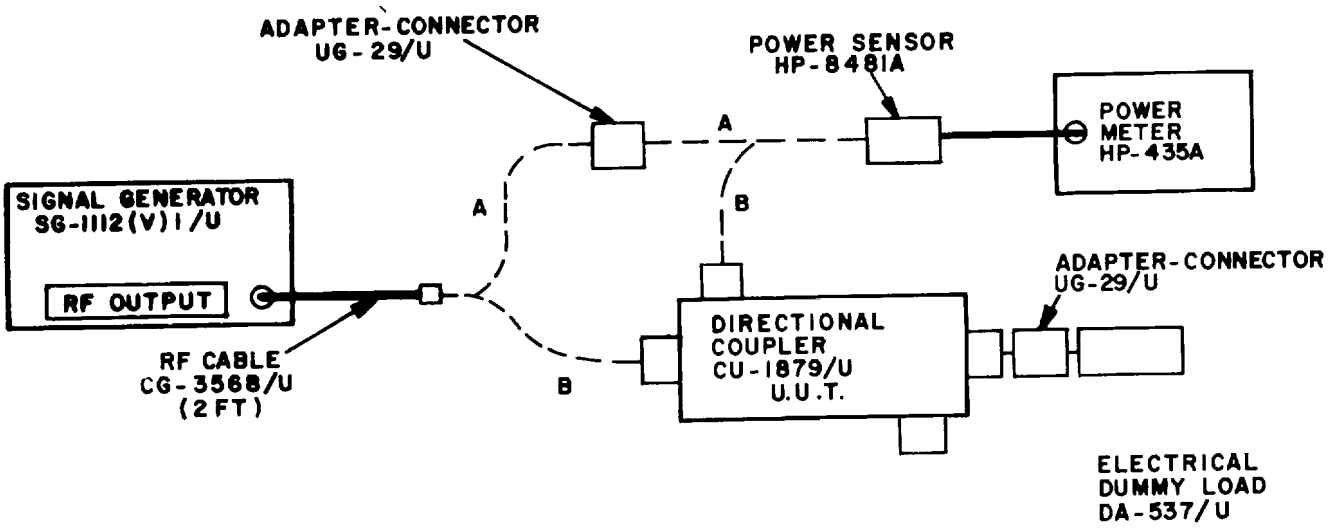


Figure 2-15. Directional Coupler CU-1879/UI Coupling Measurement Test Setup.

17. Directional Coupler CU-1879/U Directivity Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 2-16.

(2) Set signal generator frequency to 300 MHz, CW and adjust output level for -20 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 2-16. The power meter shall indicate not more than -50 dbm.

(4) Reverse the U.U.T. and connect test equipment as shown in C, figure 2-16. Adjust the signal generator output level for -20 dbm as indicated on the power meter.

(5) Connect test equipment as shown in D, figure 2-16. The power meter shall indicate not more than -50 dbm.

b. Adjustments. No adjustments can be made.

18. Directional Coupler CU-1880U Coupling Loss
(fig. 2-17)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 2-18.

(2) Set signal generator frequency dial to 300 MHz and adjust output level for 0 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 2-18. Power level at port C of unit under test shall be between -3 dbm and -3.4 dbm.

(4) Interchange power sensor and 50 ohm load at ports C and D. Power level at port D of unit under test shall be between -3 dbm and 3.4 dbm.

b. Adjustments. No adjustments can be made.

19. Isolation Measurements, CU-1880/U

a Performance Check

(1) Connect test equipment as shown in A, figure 2-19

(2) Set signal generator frequency dial to 300 MHz and adjust output level for +5 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 2-19. Power level at port B of unit under test shall be less than -20 dbm as indicated on power meter.

b. Adjustments. No adjustments can be made.

20. Return Loss Bridge RF-238/GRM-95(V) Return Loss Measurement (fig. 2-20)

a. Performance Procedure.

(1) Connect test equipment as shown in figure 2-21.

(2) Set wide range oscillator frequency to 1 kHz and adjust output level for - 10 dbm as indicated on VTVM.

(3) Connect calibrated 50 ohm load to UN- KNOWN port of unit under test. Level at VTVM port shall decrease by at least 45 db.

(4) Repeat (1), (2) and (3) above for frequencies of 10 kHz, 100 kHz, and 1 MHz.

b. Adjustments. No adjustments can be made.

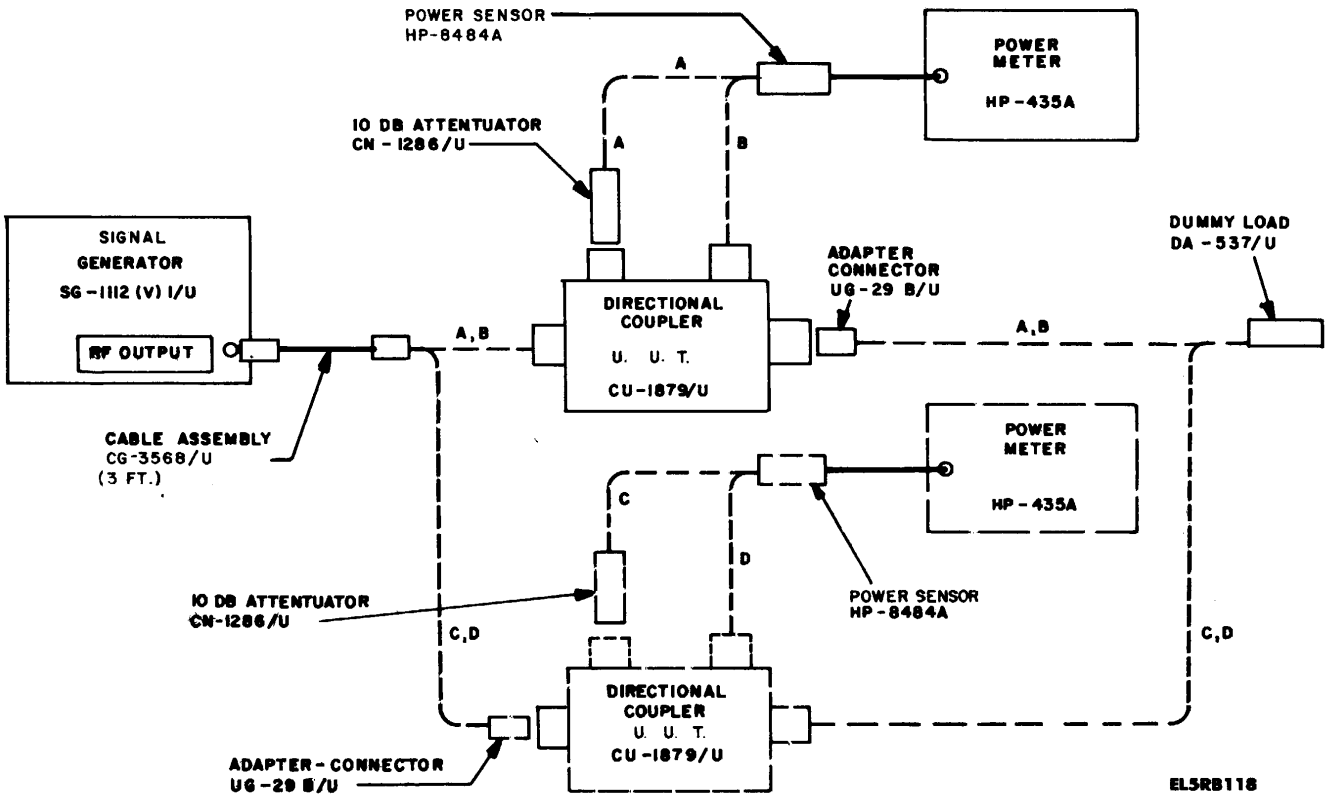


Figure 2-16. Directional Coupler CU-1879/U Directivity Measurement.

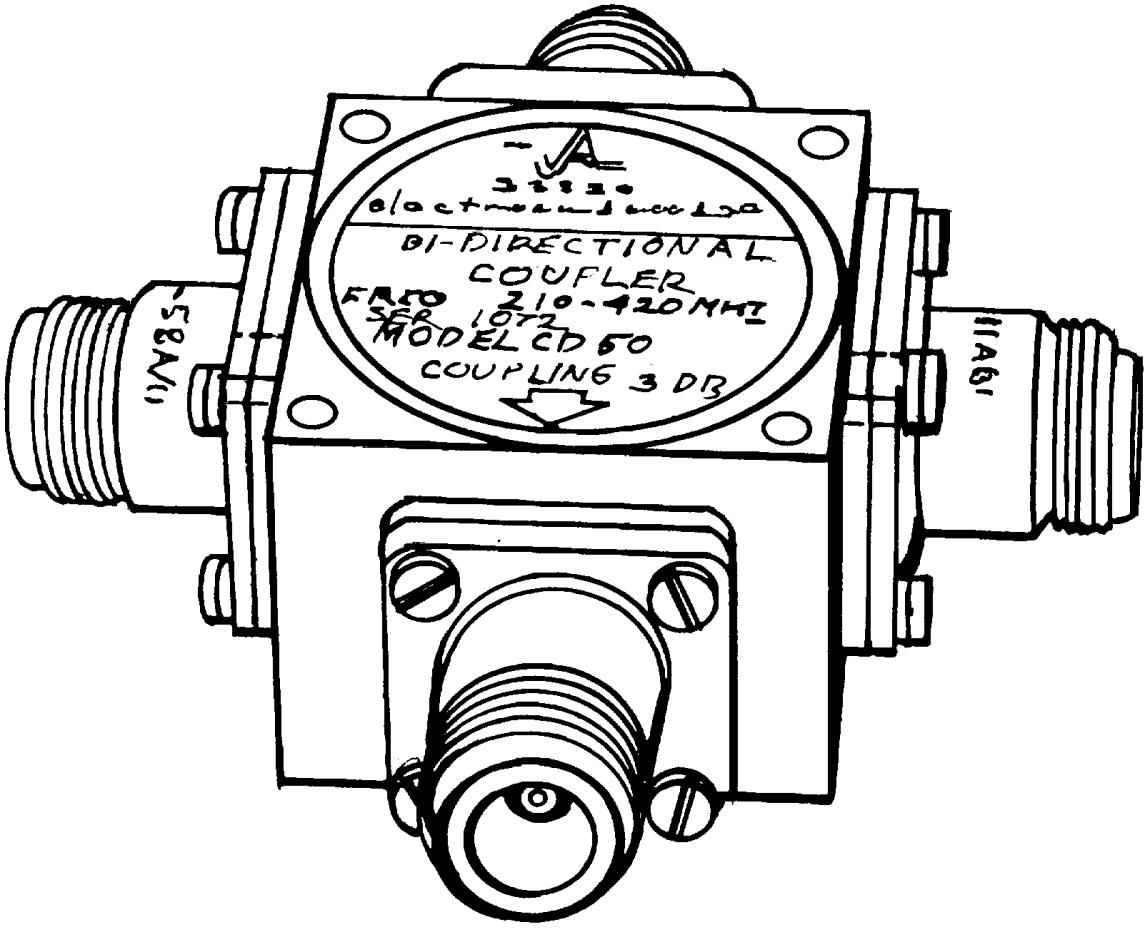


Figure 2-17. Directional Coupler CU-1880/.U.

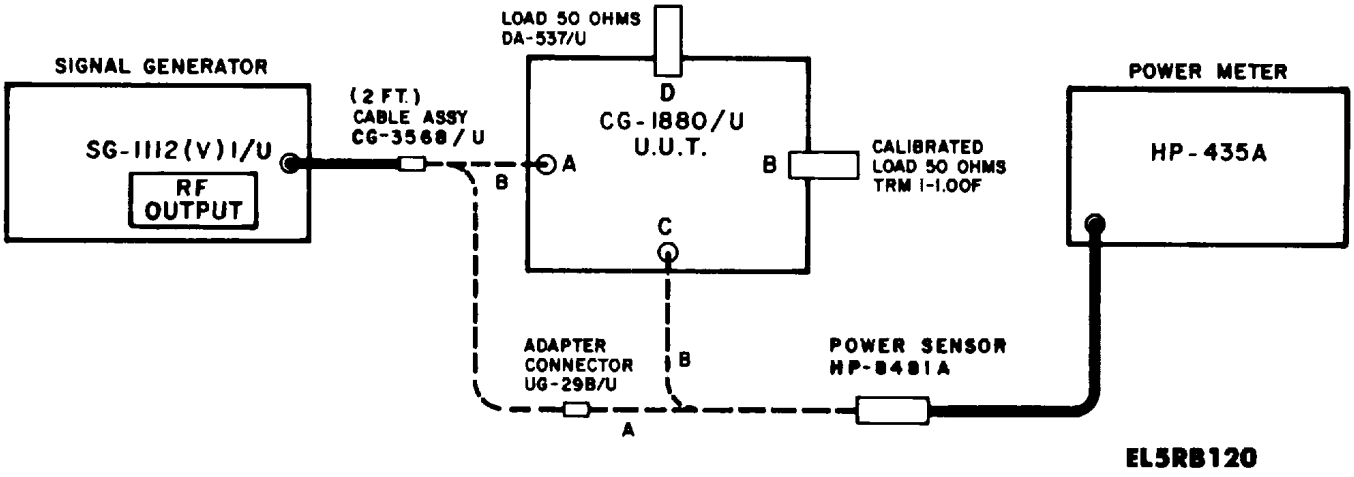


Figure 2-18. Directional Coupler CU-1880/U Coupling Measurement Test Setup.

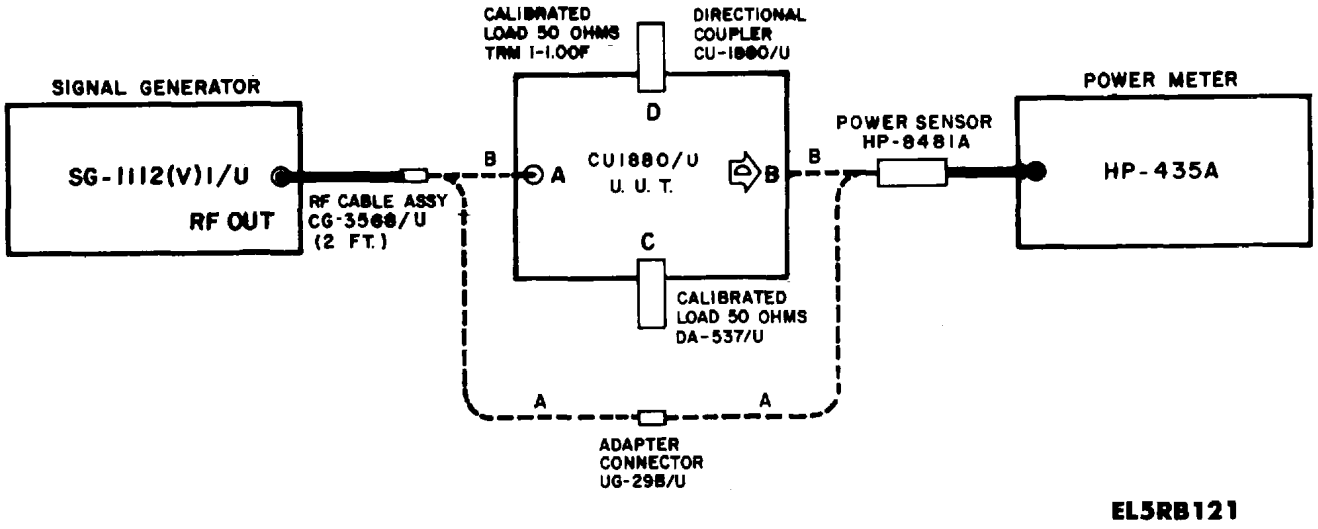


Figure 2-19. Directional Coupler CU-1880/U Isolation Measurement Test Setup.

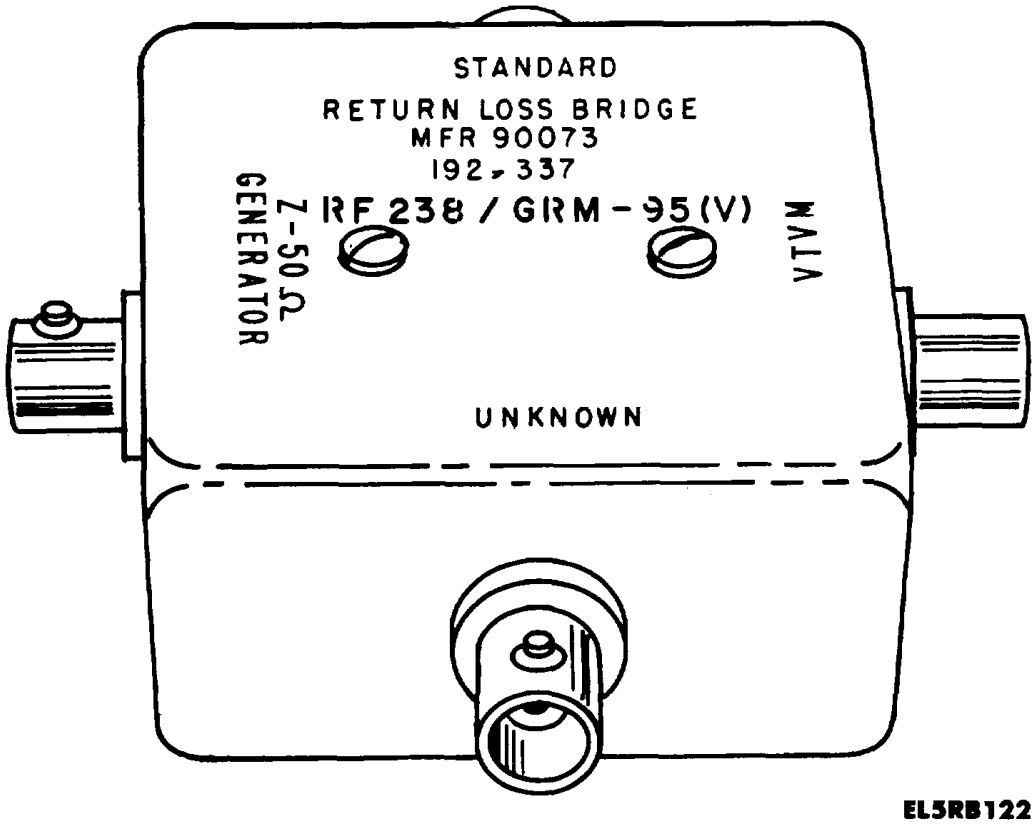


Figure 2-20. Return Los Bridge RF-238/GRM-95(V).

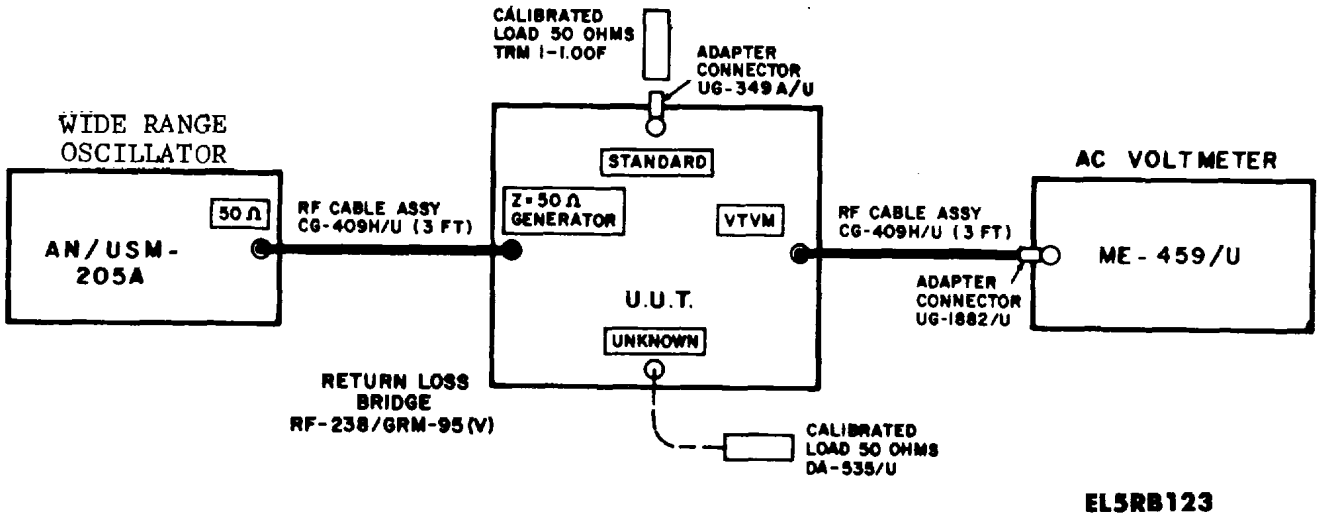


Figure 2-21. Return Loss Bridge RF-238/GRM-95(V) Return Loss Measurement Test Setup.

21. Double Balanced Mixer CV-2343/U Conversion Loss (fig. 2-22)

a Performance Check.

(1) Connect test equipment as shown in A, figure 2-23. Temporarily connect the power sensor using Adapter Connector UG-349/U to the output of the variable attenuators and adjust them as necessary to obtain a +7 dbm indication on the power meter. Reconnect the equipment as in A, figure 2-23.

(2) Position controls on receiver test facility as follows:

(a) Switch S1 to ON.

(b) Switch S8 to 72.50.

(c) Switch S6 to REFL PWR.

(3) Set signal generator frequency dial to 195 .MHz and output attenuator dial to -10 dbm.

(4) Set bandpass filter to 50 MHz.

(5) Fine tune signal generator frequency for maximum indication on power meter. Record power meter indication.

(6) Connect test equipment as shown in B, figure 2-23.

(7) Tune signal generator to 50 MHz then fine tune for maximum indication on power meter. Generator output level must remain at - 10 dbm.

(8) Set signal generator output attenuator dial for the same power meter indication as that recorded in (5) above. Conversion loss of unit under test is the difference between -10 dbm ((3) above) and the final setting of the signal generator output attenuator dial and should not exceed 9 db.

b. Adjustments. No adjustments can be made.

22. Bandpass Filters F-1267/U, F-1268/U and F-1269/U VSWR Tests (fig. 2-24)

a Performance Check.

(1) Connect test equipment as shown in A, figure 2-25.

(2) Set signal generator CW frequency as listed below for appropriate filter being tested. Set the signal generator output level to - 10 dbm.

F-1267/U (T'TF-72-5-3EE)-72 MHz
F-1268/U (TTF-125-5-3EE)-125 MHz
F-1269/U (TTF-312.5-5-3EE)-312.5 MHz

(3) Tune the U.U.T. frequency dial for appropriate frequency listed above.

(4) Connect test equipment as shown in B, figure 2-25. Adjust signal generator output level for a - 13 dbm indication on the power meter.

(5) Connect test equipment as shown in C, figure 2-25. The power meter shall indicate less than -27 dbm (equivalent to a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

23. Bandpass Filters F-1267/U, F-1268/U and F-1269/U Insertion Loss Measurement (fig. 2-24)

a. Performance Check

(1) Connect test equipment as shown in A, figure 2-26.

(2) Set signal generator and U.U.T. frequency dial as listed below for the appropriate filter being tested.

F-1267/U (TTF-72-5-3EE)-95 MHz
F- 1268/U (TTF- 125-5-3EE)- 190 MHz
F-1269/U (TTF-312.5-5-3EE)-410 MHz

(3) Set the signal generator for a CW output level of 0 dbm.

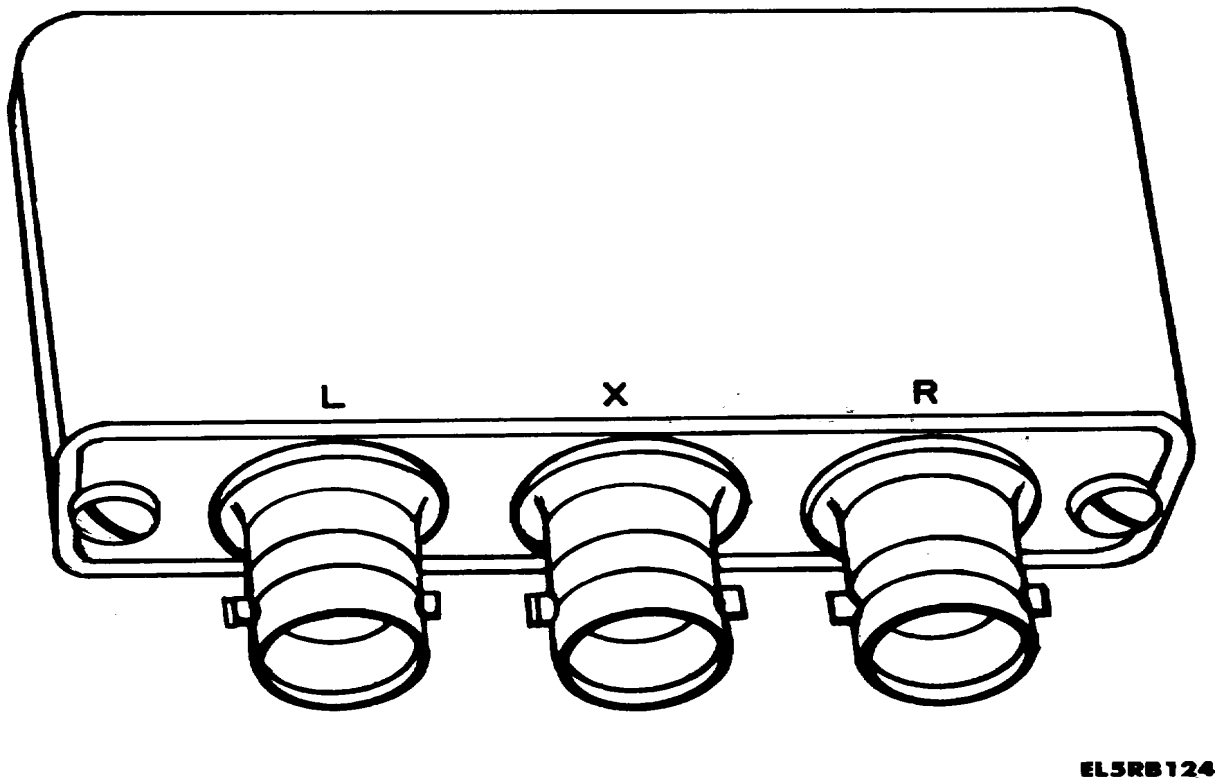


Figure 2-22. Double Balanced Mixer CV-2343/U.

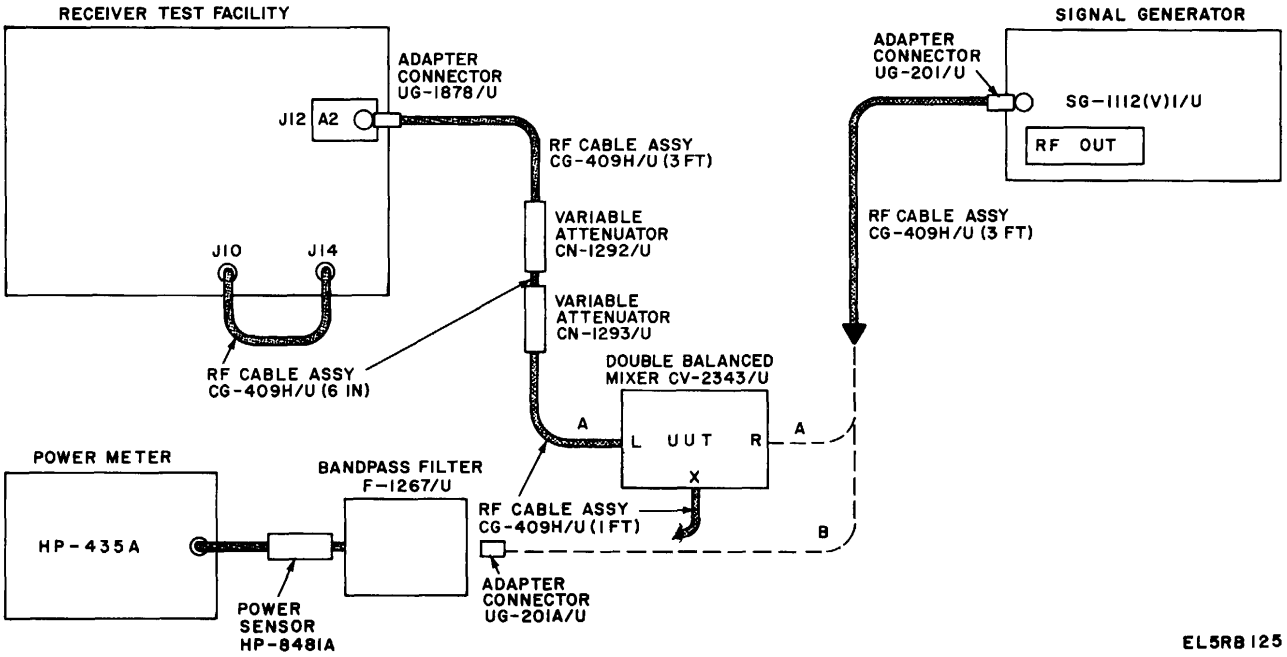
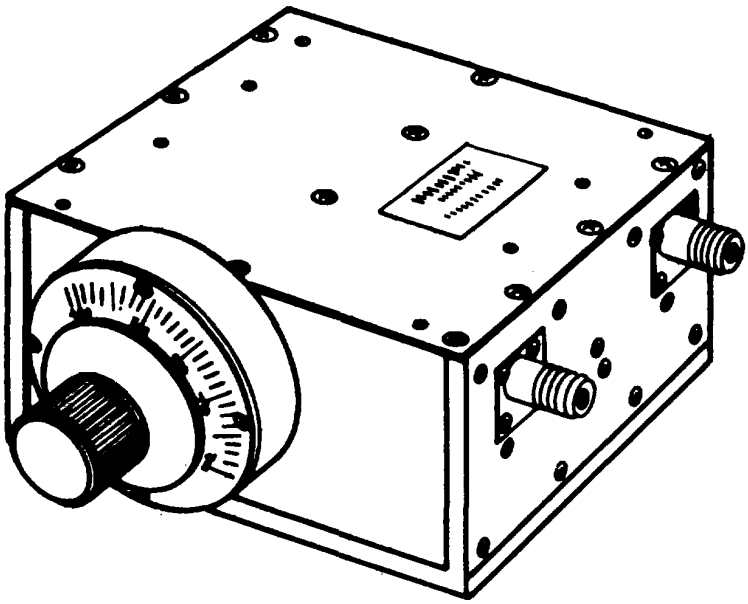


Figure 2-23. Double Balanced Mixer CV-2343/U Conversion Loss Test Setup



NOTE: THIS ILLUSTRATION IS TYPICAL OF THREE BAND PASS FILTERS.
IDENTIFY ITEM BY UNIT MARKINGS

F-1267/U	TTF72-5-3EE
F-1268/U	TTF125-5-3EE
F-1269/U	TTF312.5-5-3EE

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Figure 2-24. Bandpass Filters F-1267/U, F-1268/U and F-1269/U.

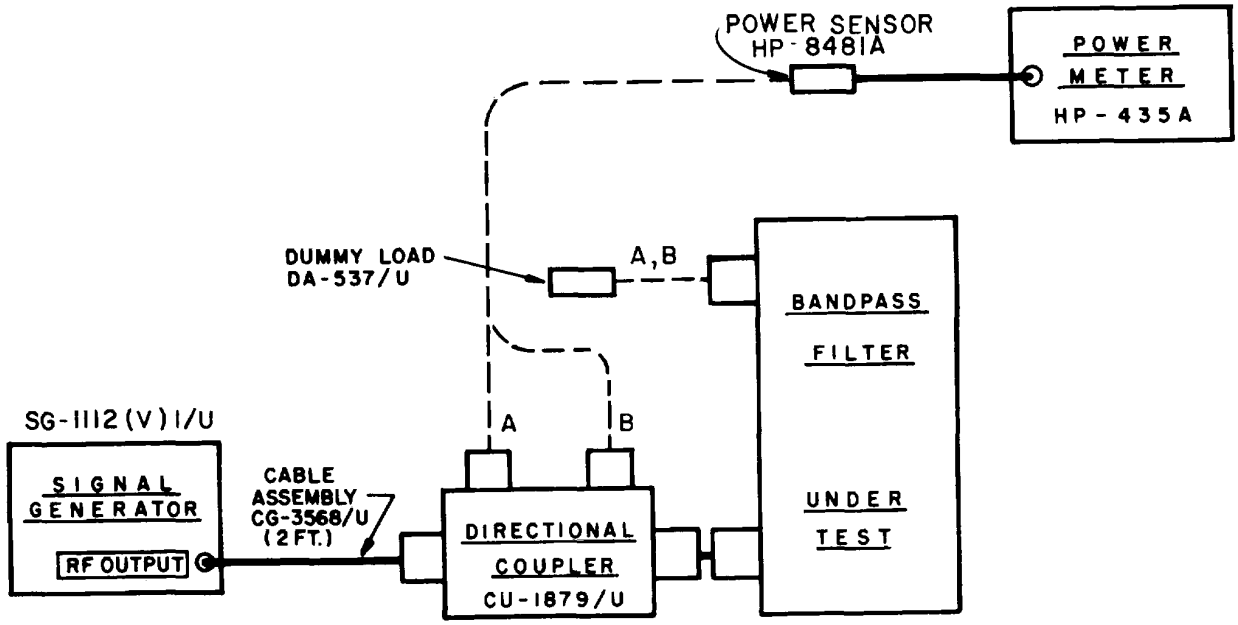

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Figure 2-25. Bandpass Filters F-1267/U, F-1268/U and F-1269/U VSWR Test.

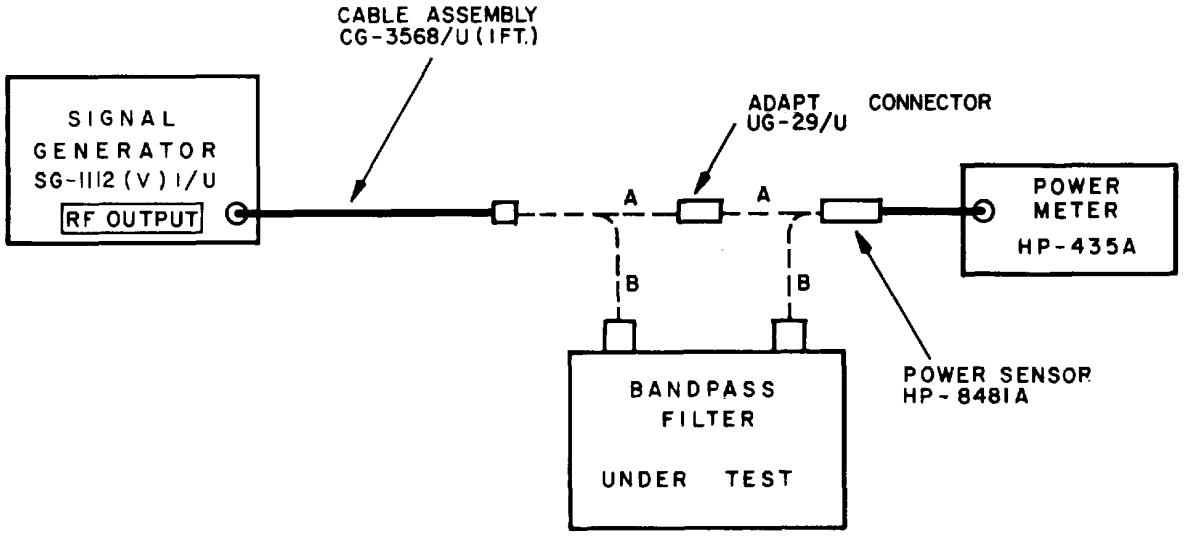

Figure 2-26. Bandpass Filters F-1267/U, F-1268/U, AND F-1269/U Insertion Loss Measurement Test Setup.

(4) Connect test equipment as shown in B, figure 2-26. Fine tune the U.U.T. frequency dial for a peak indication on the power meter.

(5) The power meter shall indicate not less than 1.0 dbm (equivalent to a maximum insertion loss 1.0 dbm.

b. Adjustments. No adjustments can be made

24. Bandpass Filters F-12671U, F-1268/U, and F-1269/U Bandwidth Measurement

a. Performance Check

(1) Connect test equipment as shown in B, figure 2-26.

(2) Adjust the signal generator and U.U.T. frequency dials to the first frequency listed in table 6 below for the appropriate filter being tested.

Table 6. Filter (U.U.T.)	Frequency	Bandwidth
F-1267	3MHz	1.9 to 2.9 MHz
F-1267	MHz	3.8 to 5.7 MHz
F-1268	MHz	3.8 to 5.7 MHz
F-1268	MHz	7.6 to 11.4 MHz
F-1269 MHz	8.8 to 13.2 MHz	
F-1269 MHz	16.4 to 24.6 MHz	

(3) Adjust the signal generator output level for a CW output level of 0 dbm as indicated on the power meter.

(4) Tune the signal generator frequency higher in frequency until the power meter indication drops by 3.0 db. Note the FREQ COUNTER indication.

(5) Tune the signal generator frequency lower in frequency until the power meter indication again drops by 3.0 db. Note the frequency counter indication, subtract this frequency from the one noted in (4) above. The difference or bandwidth shall be as indicated in table 6.

(6) Repeat (2) through (5) above for the 2nd frequency listed in table 6 for the appropriate filter being tested.

b. Adjustments. No adjustments can be made.

25. Low Pass Filter F-1270/U Insertion Loss (fig. 2-27)

NOTE

There are two Filters F-1270/U in this set to be calibrated.

a. Performance Check.

(1) Connect test equipment as shown in A, fig 2-28.

(2) Set signal generator frequency dial to MHz and adjust output level for +5 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 2-28. Insertion loss shall not exceed 0.6 db as indicated on power meter.

(4) Repeat (1), (2) and (3) above, at signal generator frequency of 450 MHz. Insertion loss shall exceed 25 db as indicated on power meter.

b. Adjustments. No adjustments can be made.

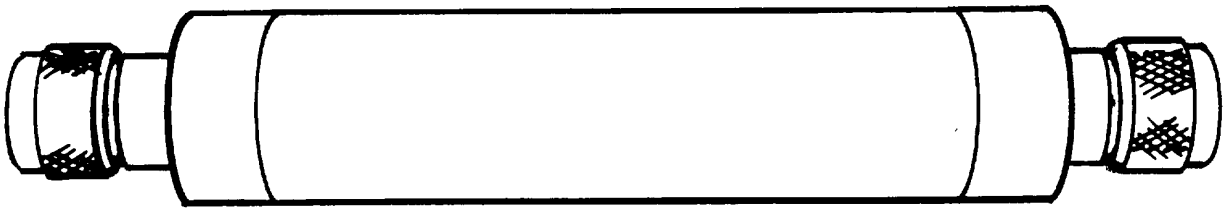

Figure 2-27. Low Pass Filter F-1270/U.

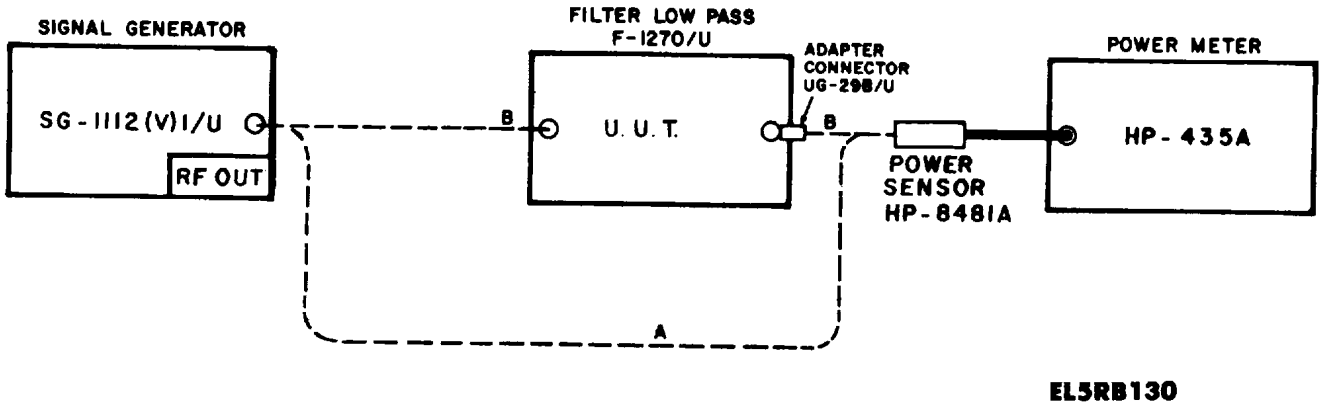

Figure 2-28. Low Pass Filter F-1270/U, Insertion Loss Measurement Test Setup.

26. Frequency Multiplier Test Stand MX-8437A/GRM-95(V)2 (fig. 2-29)

a. Performance Check.

(1) Connect test equipment as shown in A, fig 2-30.

(2) Set variable attenuator to 1.0 db.

(3) Set signal generator frequency to 120 M and output level to 0 dbm as indicated on pot meter.

(4) Connect test equipment as shown in B, fig 2-30.

(5) Position test facility controls as follows:

(a) Switch S1 to ON.

(b) Switch S26 to ON.

(c) Switch S27 to A.

(6) Adjust variable attenuator for 0 dbm indication on power meter. Insertion loss of section of unit under test is the difference between the variable attenuator setting in (2) above and the final setting of the variable attenuator and shall not exceed 0.75 db.

(7) Set test facility switch S27 to B. Power meter indication shall drop to zero.

(8) Interchange lead at J4 and load at J2 of unit under test.

(9) Repeat (6) above. Insertion loss shall not exceed 0.75 db.

(10) Set test facility switch S27 to A. Power meter indication shall drop to zero.

(11) Interchange lead at J5 and load at J6 of unit under test.

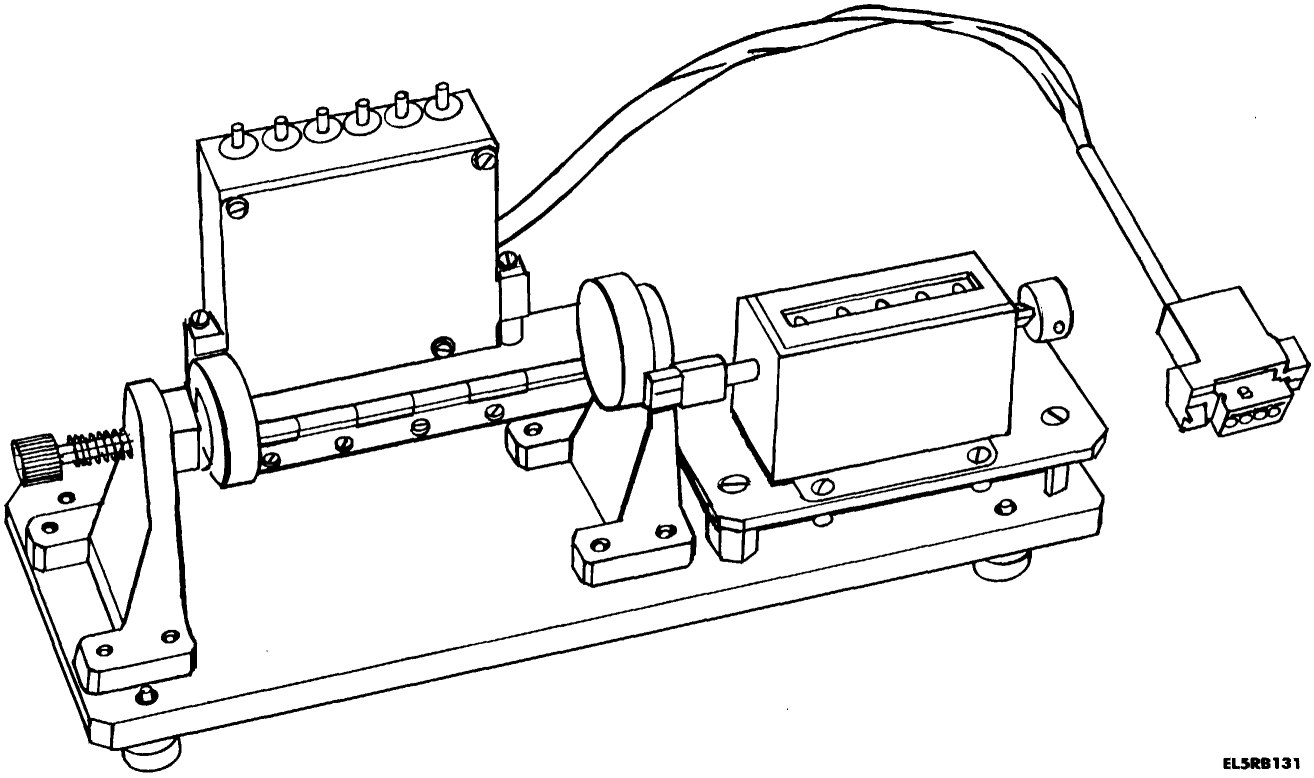

Figure 2-29. Frequency Multiplier Test Stand MX-8437A/GRM-95(V)2.

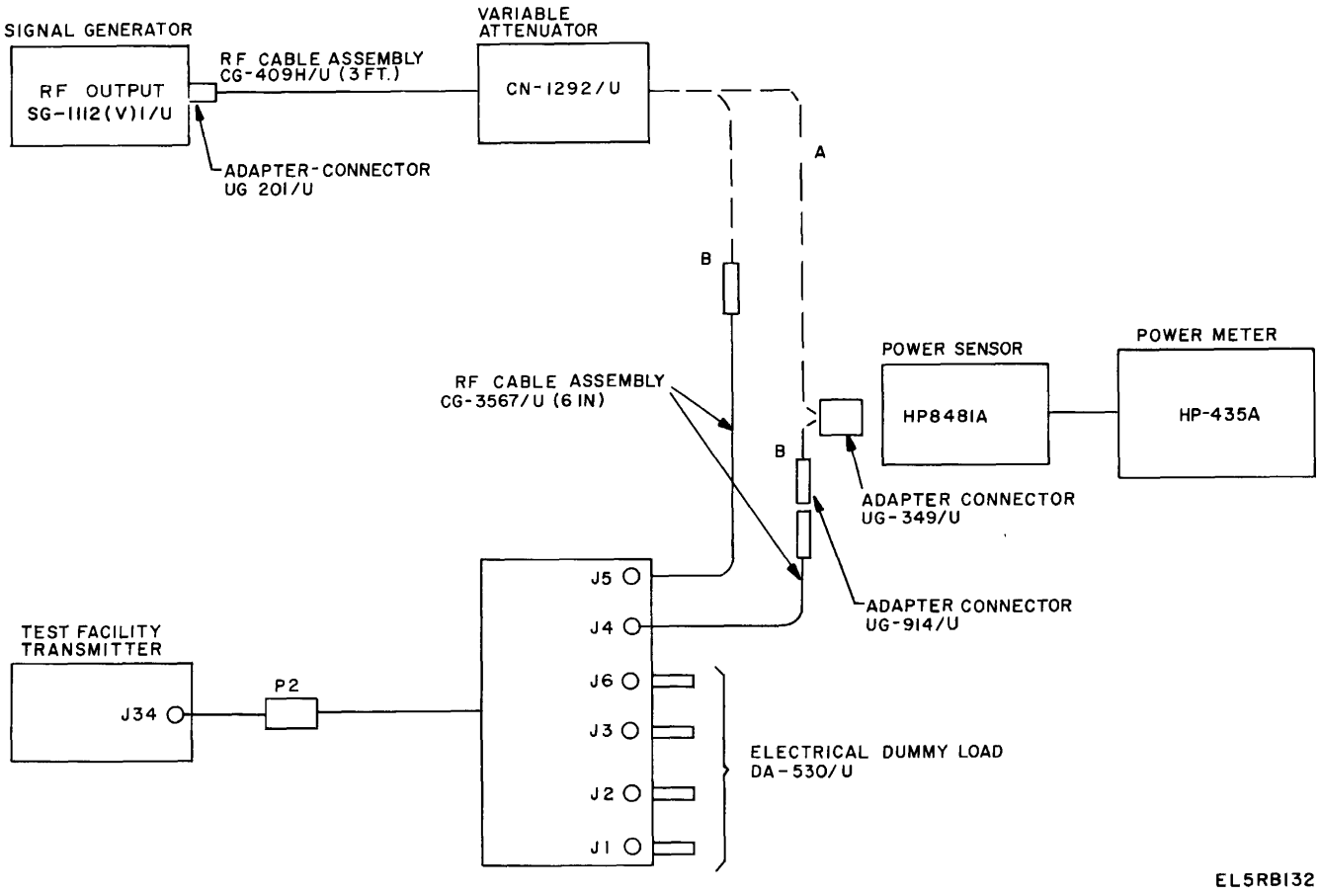

Figure 2-30. Frequency Multiplier Test Stand MX-8437A/GRM-95(v)2 Electronic Switch Check Test Setup.

(12) Interchange lead at J2 and load at J3 of unit under test.

(13) Repeat (1), (2) and (3) above at a signal generator frequency of 350 MHZ. Reconnect equipment as previously connected in (11) and (12) above.

(14) Repeat 6 above, insertion loss should nor exceed 0.75 dB.

(15) Set test facility switch S27 to B. Power meter indication shall drop to zero.

(16) Interchange lead at J3 and load at J1 of unit under test.

(17) Insertion loss shall not exceed 0.75 db.

(18) Set test facility switch S27 to A. Power meter indication shall drop to zero.

b. Adjustments. No adjustments can be made.

27. AC Power Supply PP-63041GRM-95(V), AC VOLT Meter Test (fig. 1-3)

a. Performance Check.

NOTE

Mechanically zero U.U.T. AC VOLT meter by turning adjustment screw below meter face to aline pointer with 105 vac mark.

(1) Connect the equipment as shown in A, figure 2-31.

(2) Set the digital multimeter to read 200 vac and turn the U.U.T. MAIN POWER switch to ON.

(3) Adjust the voltage control for a U.U.T. AC VOLT meter indication of 105.0 volts. The digital multimeter shall indicate 105 vac +2%.

(4) Readjust the voltage control for a U.U.T. AC VOLT meter indication of 115.0 volts. The digital multimeter shall indicate 115 vac + 2%.

(5) Readjust the voltage control for a U.U.T. AC VOLT meter indication of 125.0 volts. The digital multimeter shall indicate 125 vac +2%.

(6) Turn the U.U.T. MAIN POWER switch OFF

b. Adjustments. No adjustments can be made.

28. Ac Power Supply PP-6304/GRM-95(V) Ammeter Test (fig. 1-3)

NOTE

Mechanically zero U.U.T. AMMETER by turning adjustment screw below meter face to aline pointer at 0 mark on left end of scale.

a. Performance Check.

(1) Connect the equipment as shown in B, figure 2-31.

(2) Adjust the U.U.T. voltage control fully CCW. Set the digital multimeter to read 10 amps ac. Adjust the power decade resistor 1 ohm/step control to 9 and all other controls to 0.

(3) Turn the U.U.T MAIN POWER switch to ON and adjust the U.U.T. voltage control for an indication of 5.0 amps on U.U.T AMMETER. The digital multimeter shall indicate between 4.9 and 5.1 amps ac.

(4) Repeat (3) above for U.U.T. and digital multimeter indications listed below.

U.U.T. AMMETER Indications (Amps)	Digital Multimeter Indication (Amps)
4.0	3.9 to 4.1
3.0	2.9 to 3.1
2.0	1.9 to 2.1
1.0	0.9 to 1.1

b. Adjustments. No adjustments can be made.

29. Power Supply Subassembly MX-8415/GRM-95(V) Preliminary Test (fig. 2-32)

WARNING

The outer cases of the transistors mounted on the subassembly are connected to high voltage.

NOTE

\

For all subsequent tests of MX-8415 GRM-95(V) perform the following:

a. Performance Check.

(1) Open Test Facility, Transmitter TS-2866(V)2/GRM-95(V) power supply door (fig. 1-1) and remove the jumpers connected between J4 and J5 and J10 and J11.

(2) Remove the red plastic cover from the U.U.T. and remove the elapsed time indicator (DS1).

(3) Place the U.U.T. in front of the test facility air outlet so that air flow is directed across the heat sink.

(4) Observe and maintain the input voltage at 115 vac as shown on Power Supply PP-6304/ GRM-95(V) AC VOLT meter.

(5) Connect test equipment as shown in figure 2-32.

(6) Set test facility controls as follows:

S1 to ON
S2 to ON
S20 to S4

(7) Test facility meter M1 shall indicate as shown in table 7 below:

Table 7. Preliminary Test

S-4 Switch Position	Secondary Action	Meter M1 Indication
+ 12V	Press switch S5. S7	Green band
+ 12V METER	Press switch S5, S7	50% + needle width
+ 28V	Press switch S5, S7	45% to 55%
+ 28V METER	Press switch S5, S7	50% + needle width
+26	Press switch S3, S5, S7	45% to 55%
DRIVER FIL	Press switch S3, S5, S7	45% to 60%
OUTPUT FIL	Press switch S3. S5, S7	45% to 60%
DRIVER CUR		Green band
OUTPUT CUR		Green band
600V	S2 to OFF Press and hold switch 53 then set switch S2 to ON.	Green band
600V METER	S2 to OFF Press and hold switch 53 then set switch S2	Green band
26V AC	to ON	Green band

b. Adjustments. No adjustment can be made.

30. Power Supply Subassembly MX-8415/GRM-95(V) Input Rectifier Check

a. Performance Check.

(1) Connect test equipment as shown in fig 2-32. Connect the digital multimeter across C18 the U.U.T., observe polarity.

(2) Set test facility switches as follows:

S1 to ON.
S2 to ON.
S20 to S4.

(3) The digital multimeter should indicate 1 ±5 vdc.

b. Adjustments. No adjustments can be made.

31. Power Supply Subassembly MX-8415/GRM-95(V) Regulation Check

a Performance Check.

(1) Connect test equipment as shown in fig 2-32.

(2) Set test facility switches as follows:

S1 to ON.
S2 to ON.

(3) Connect the digital multimeter to J2(-) and J6(+) on the transmitter test facility.

(4) The digital multimeter shall indicate not more than 12.5 vdc. Press S5 and S7 on test facility, the digital multimeter shall indicate 12 +0.2 vdc.

(5) Connect the digital multimeter to J2(-) and J12(+) on the transmitter test facility.

(6) The digital multimeter shall read not more than 29.0 vdc. Press switch S5 and S7 on test facility, the digital multimeter shall read 28 +0.2 vdc.

b. Adjustments. No adjustments can be made.

32. Power Supply Subassembly MX-84151GRM-95(V) 400 Hz Inverter Frequency Check

a. Performance Check.

(1) Connect test equipment as shown in figure 2-32 using one oscilloscope 1OX probe and the frequency counter. Connect the 10OX probe between E4 and E7 on the U.U.T.

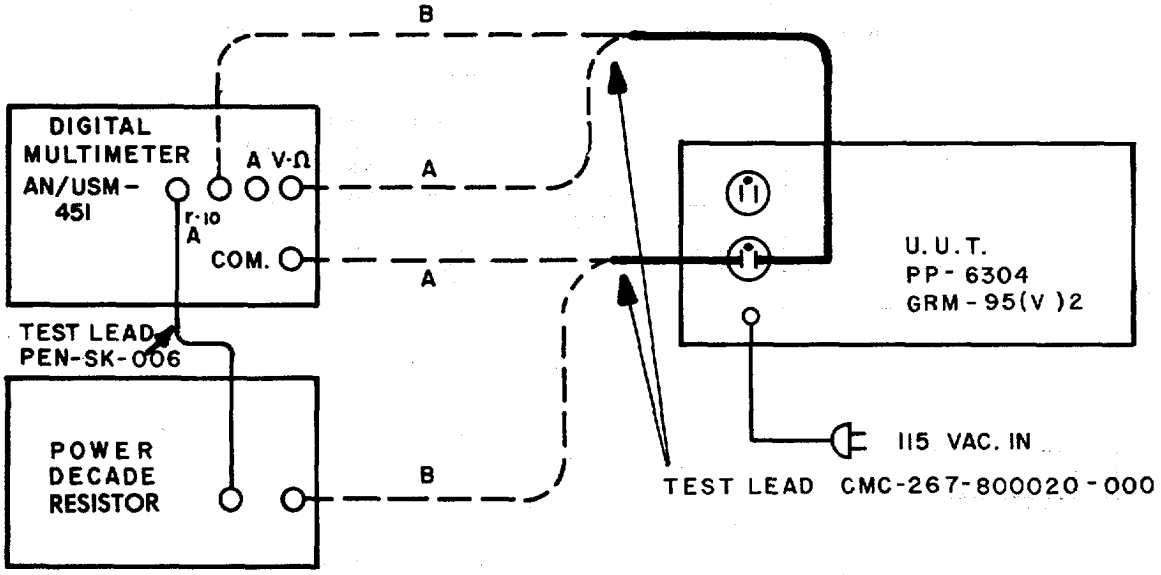

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Figure 2-31. Power Supply PP-6304/GRM-95(V) Ac Voltmeter Test.

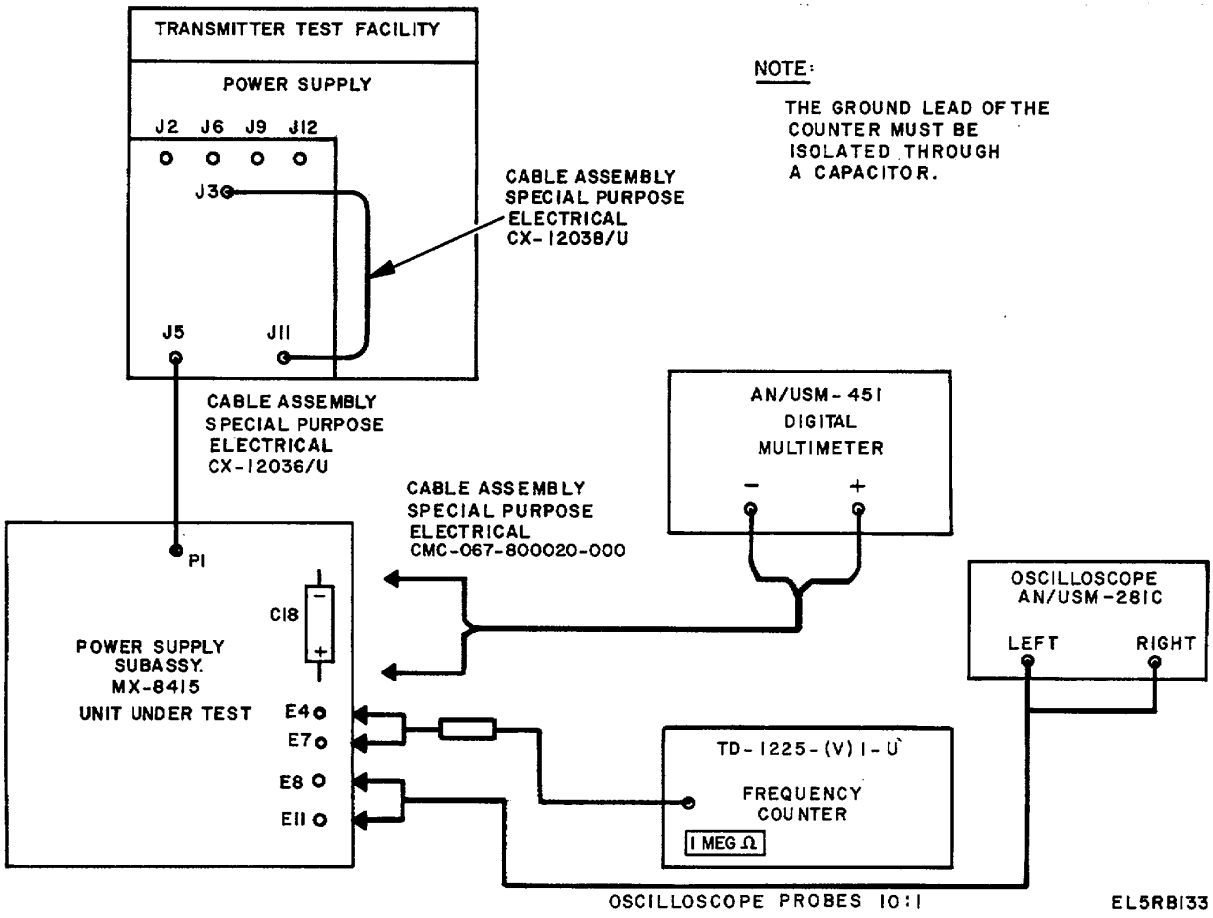

Figure 2-32. Power Supply Subassembly MX-8415/GRM-95(V) Preliminary Test

(2) Set test facility switches as follows:
S1 to ON.
S2 to ON.
Press S3, S5 and S7.
(3) The frequency counter shall indicate 400 Hz ±40 Hz.

b. Adjustments. No adjustments can be made.

33. Power Supply Subassembly MX-84151 GRM-95(V) 5 KHz Inverter Frequency Check

a. Performance Check.

(1) Connect test equipment as shown in figure 2-32 using the oscilloscope and two 10X probes. Connect the 10X probes between E8 and Ell on the U.U.T.

(2) On the oscilloscope select A + B DISPLAY, CH B INVT, and both channels VOLTS/DIV to 10.

NOTE

Both probes are 10:1 dividers, thus the vertical sensitivity of the display is effectively 100 V/cm.

(3) Set test facility switches as follows:
S1 to ON.
S2 to ON.
Press S3, S5 and S7.
(4) The frequency counter shall indicate 5 kHz ±1 kHz.

b. Adjustments. No adjustments can be made.

NOTE

Reinstall elapsed time indicator (DS1) and red plastic cover on U.U.T.

34. Converter, Frequency, Electronic CV-25001GR Crystal Oscillator Frequency and Power Output Check

(fig. 2-33)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 2-34.

(2) Adjust the variable power supply for 28 vdc.

(3) The power meter shall indicate not less than -7 dbm.

(4) Connect test equipment as shown in B, figure 2-34.

(5) The frequency counter shall indicate 25 MHz ±250 Hz.

b. Adjustments. Adjust L1 on U.U.T. for 25 MHz ±250 Hz (fig. 2-33).

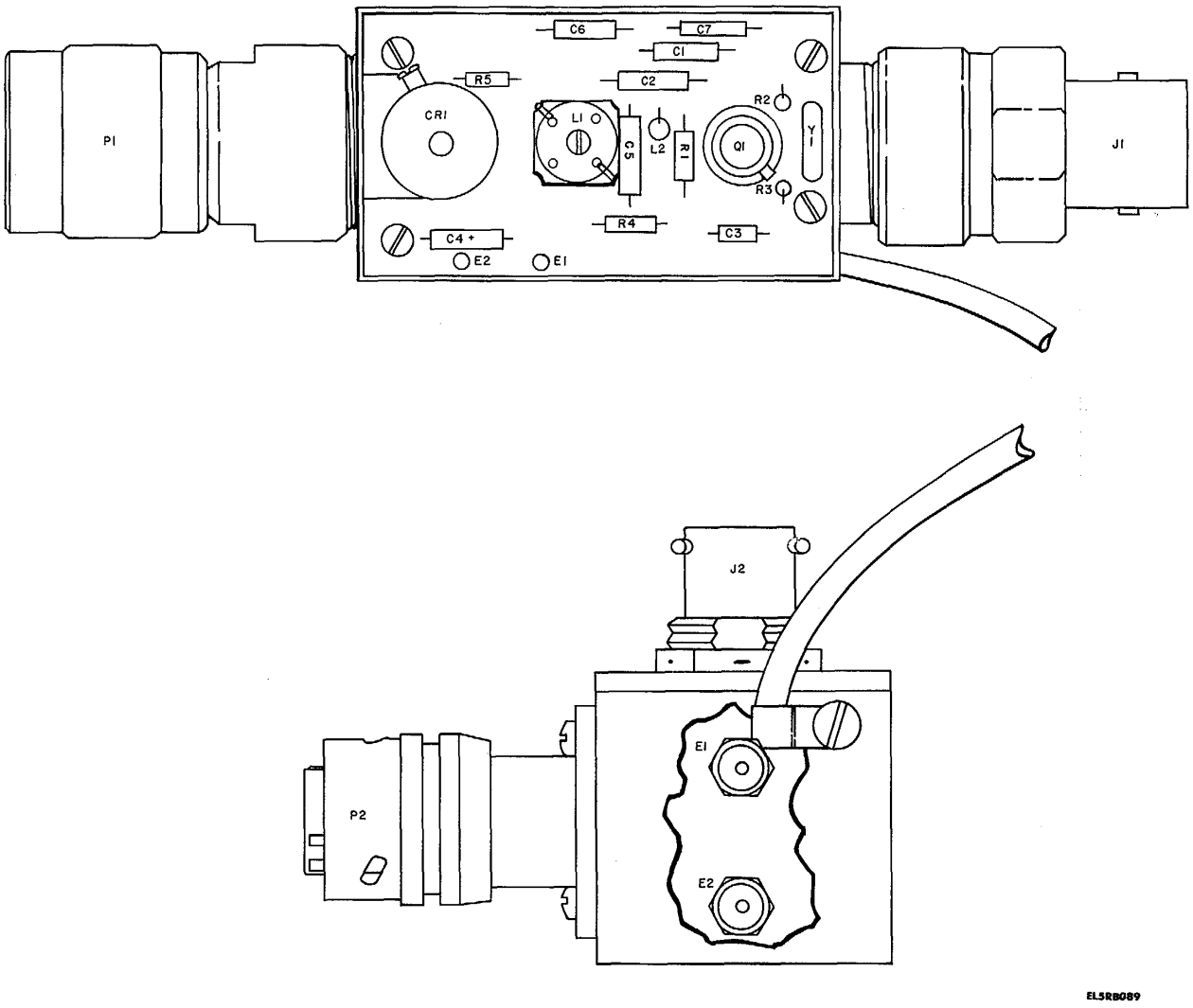

Figure 2-33. Converter, Frequency CV-2500/GR Parts Location.

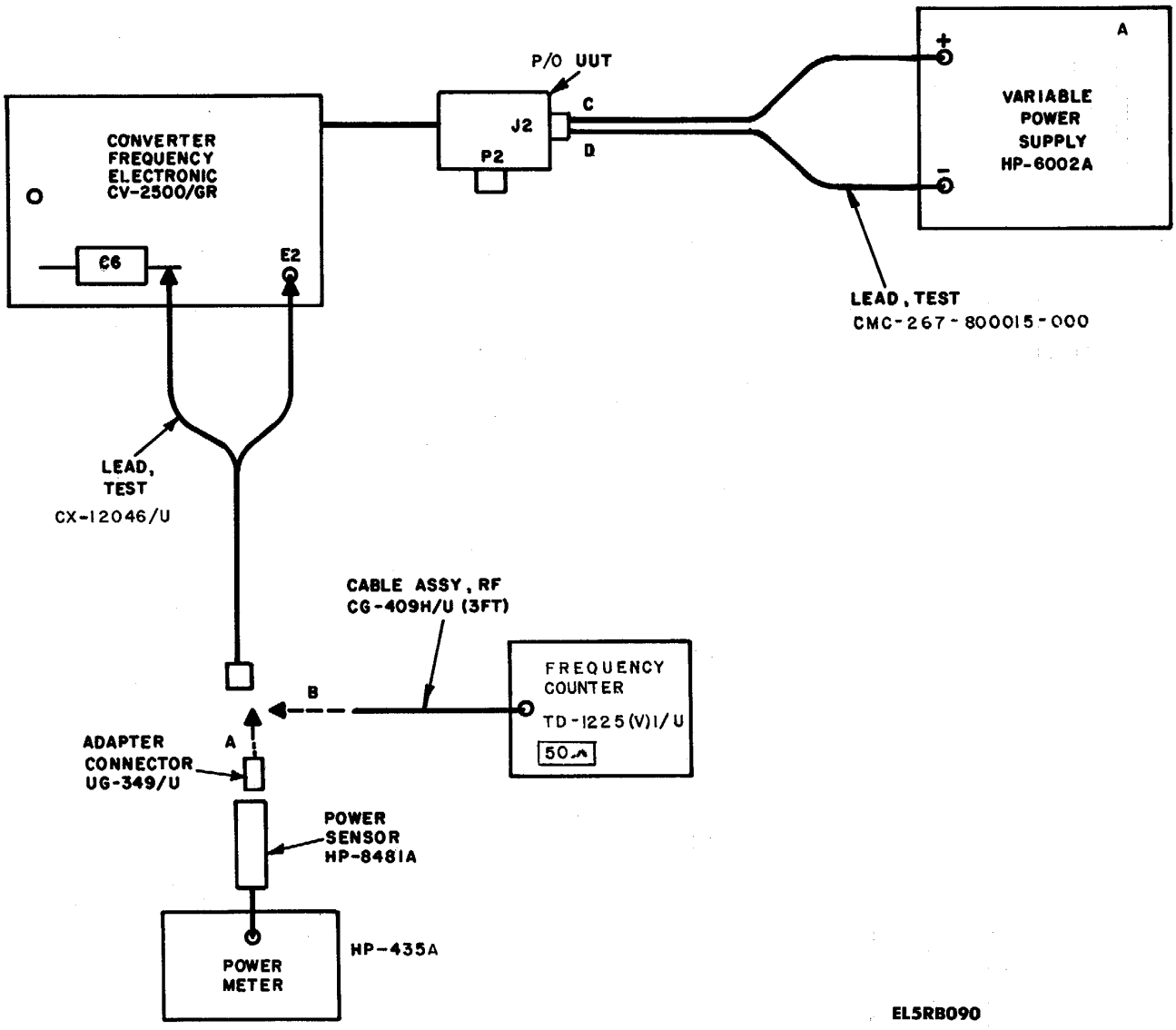

Figure 2-34. Converter, Frequency CV-2500/GR, Oscillator and Power Output Test

35. Converter, Frequency, Electronic CV-2500/GR VSWR Checks

a. Performance Check

(1) Connect test equipment as shown in A, fig 2-35.

(2) Adjust the signal generator to 220 M] CW, at a level of -5 dbm as indicated on the pot meter.

(3) Connect test equipment as shown in B, fig 2-35. Power meter indication should not exceed dbm (equivalent to a VSWR, better than 1.2:1.

(4) Repeat (1), (2) and (3) above at signal generator frequencies of 300 MHz and 405 MHz.

b. Adjustments. No adjustments can be made.

36. Converter, Frequency, Electronic CV-25001GR Mixer Output Level Check

a Performance Check.

(1) Connect test equipment as shown in fig 2-36.

(2) Set receiver test facility switches as follows:

S1 to ON.
S5 to S6.
S6 to MULTIPLIER.
S7 to AGC.

(3) Set the signal generator to 257.5 MHz, CW, at a level of -84 dbm.

(4) Set the AM-4316/GRC-103(V)1 controls as follows: RCVR SIG, and RCVR CHANNEL controls to channel 115. XMTR DUPL to channel 65. Tune the MULT PEAK control for a maximum indication on receiver test facility meter M1.

(5) Set receiver test facility switch S6 to REC SIG position and adjust the AM-4316/ GRC-103(V)1 RCVR SIG control for a minimum indiction on the VRVM. Record the VTVM indication.

(6) Connect test equipment as shown in figure 2-37.

(7) Adjust the high power source controls for a frequency counter indication of 232.5 MHz and an output level of +4 dbm as indicated on the power meter (equivalent to +44 dbm at U.U.T.).

(8) The VTVM indication should be the same as in (5) above, +2 db.

b. Adjustments. Adjust coupling probe CR1, figure 2-33, for a VTVM indication as recorded in (5) above.

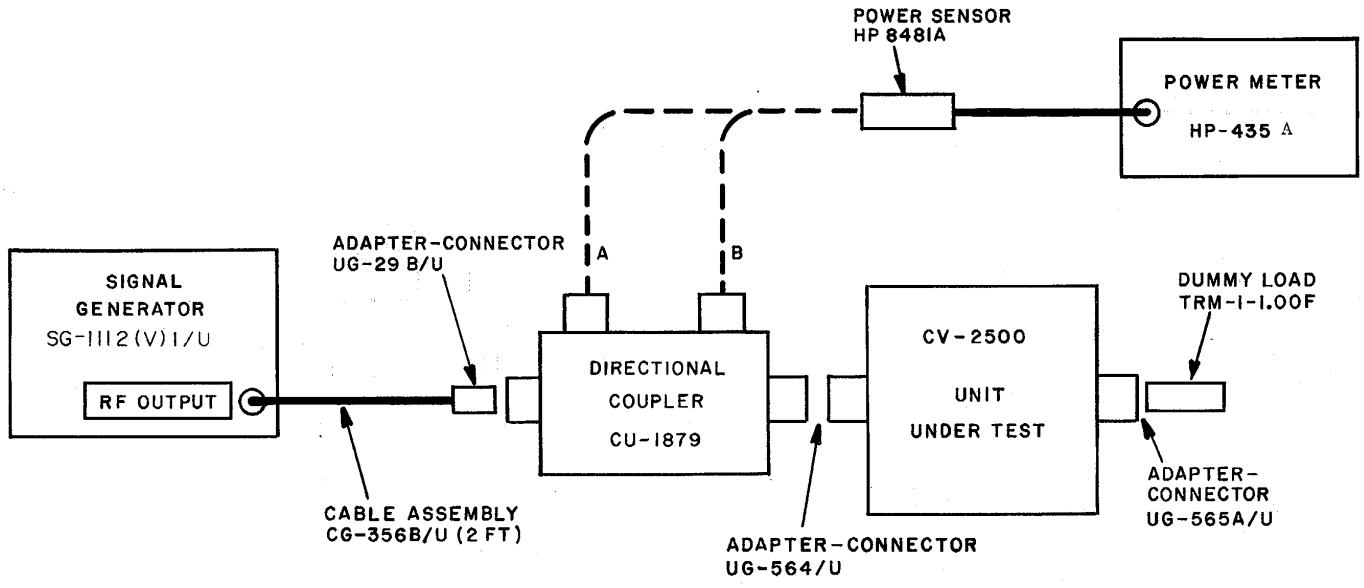

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Figure 2-35. Converter, Frequency CV-2500GR VSWR Tests.

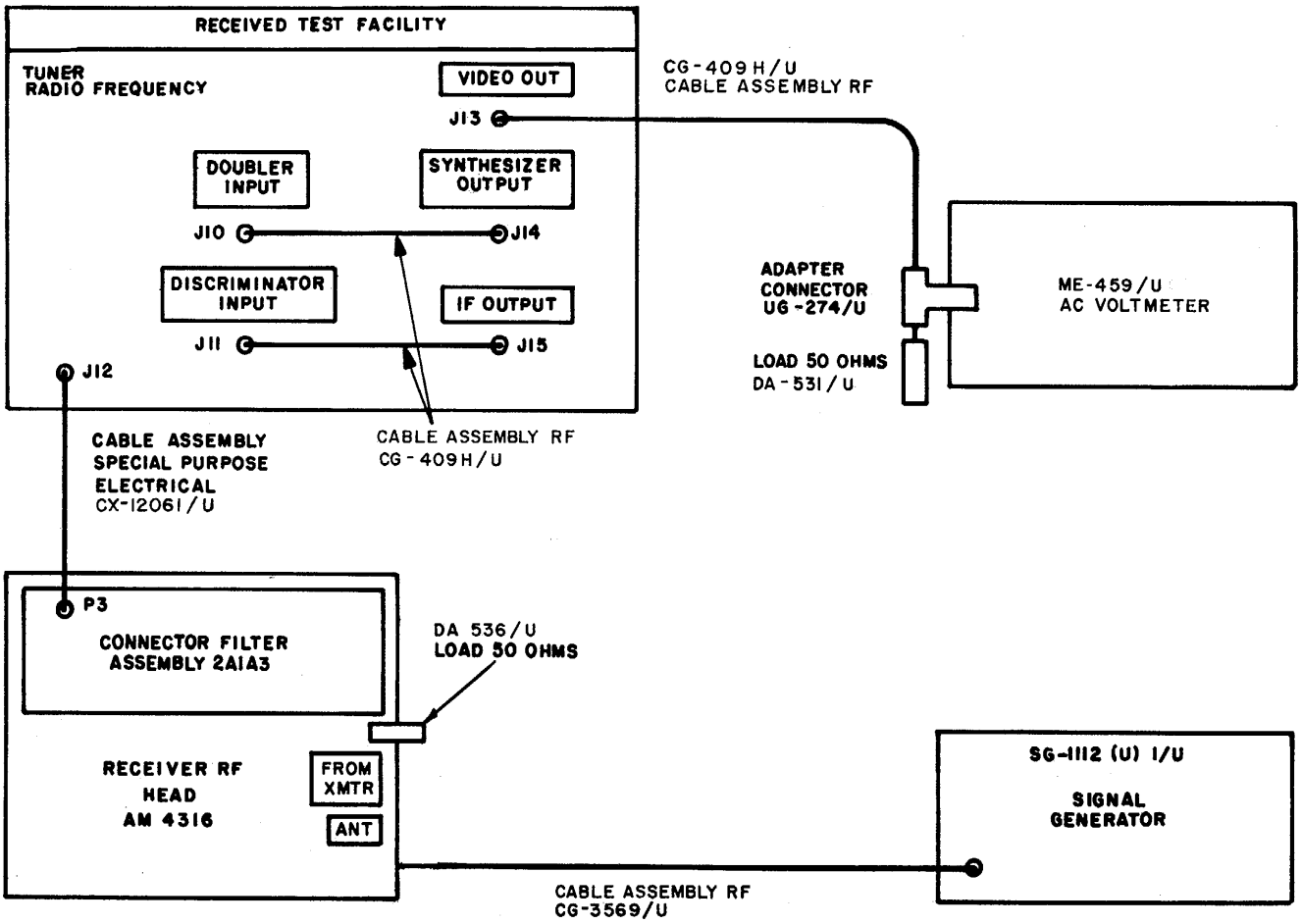


Figure 2-36. Converter, Frequency CV-265OR Mixer Output Level Test

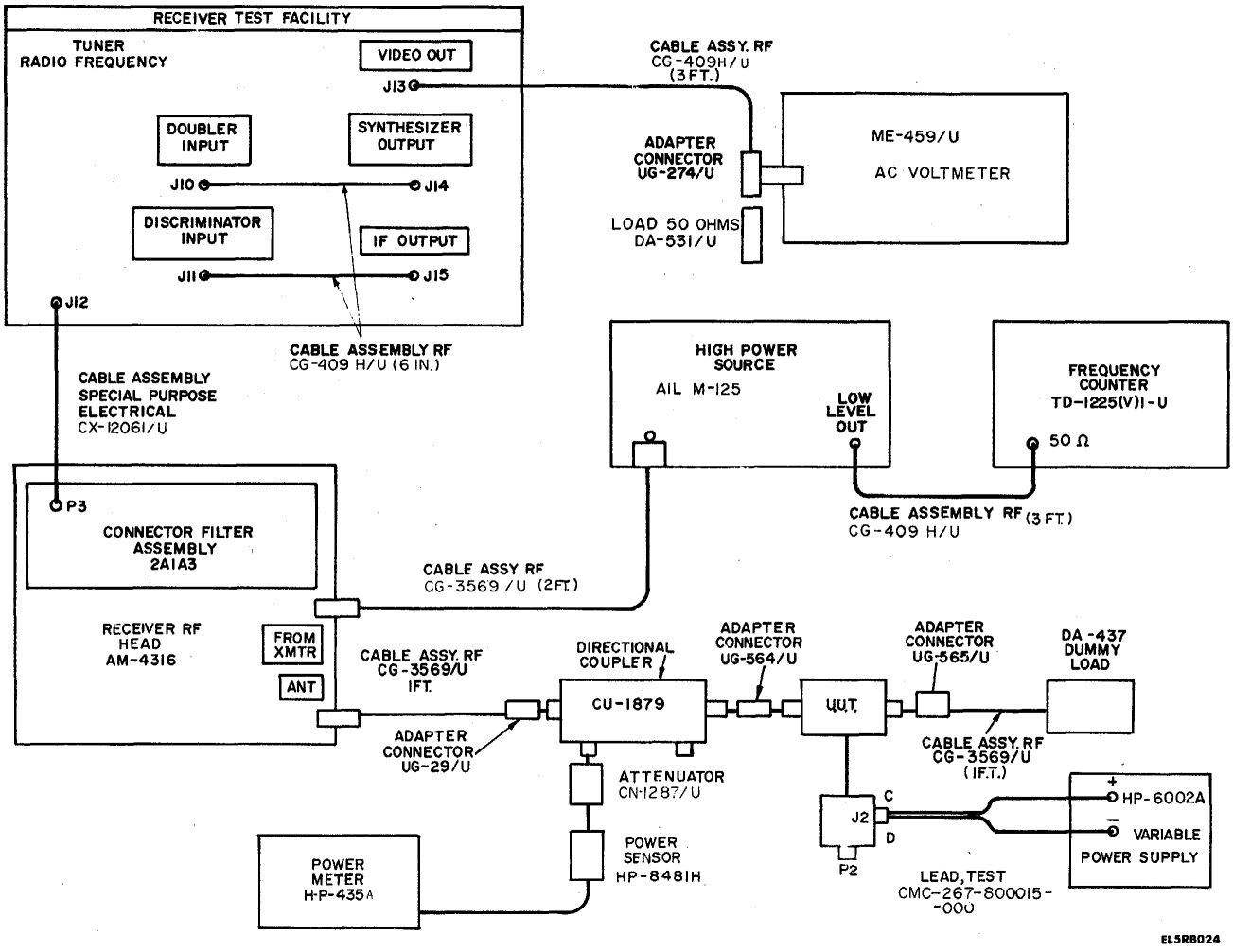


Figure 2-37. Converter, Frequency CV-2500/GR Mixer Output Level Test.

SECTION III
CALIBRATION PROCEDURES FOR ELECTRICAL TEST PANEL, SB-4049/GRM-95(V) PART OF RECEIVER TEST FACILITY TS-2867(V)2/GRM-95(V)

37. Preliminary Procedures

The following preliminary procedure is applicable when calibrating Electrical Test Panel SB-4049/ GRM-95(V) (fig. 1-2) (receiver test facility). a. Set Power Supply PP-6304/GRM-95(V) (fig. 1-3) AC POWER switch to OFF and turn the voltage control fully counterclockwise.

b. Set receiver test facility switches as follows:

(1) Switch S1 to OFF
(2) Switch S7, S13 to MAN.
(3) Switch S18 to NORM.
(4) Switch S21 to OUT.
(5) Switch S5 to --12V.
(6) Switch S9 to 180 kHz.
(7) Switch S14 to 30 MHz.
(8) Switch S19 to EXT.
(9) Switch AT1 to 0 DB.
(10) Switches S2, S4, S6, S8, S10, S12, S15, S17 and S20 to OFF

c. Connect the unit under test ac power cable to one ac connector on power supply.

d. Connect power supply ac power cable to a 115-volt ac power source.

e. Set power supply AC POWER switch to ON; the AC POWER indicator glows.

f Turn power supply voltage control until the VOLTS meter indicates 115V.

NOTE

The front panels are supported and guided by slides during removal and replacement. During following calibration procedures, the VOLTS meter indication may vary as the load varies. Periodically check the VOLTS meter and adjust the voltage control for a 115-volt indication, if necessary.

NOTE

The following paragraphs are divided into subparagraph a performance check, and subparagraph b adjustments. When the performance check is not within tolerance and no adjustment is specified, the deficiency must be corrected before continuing with the procedure.

38. Receiver Test Facility Meter M1 Calibration

a Performance Check

CAUTION

Turn Power Supply HP-6002A output voltage to minimum before switching on.

(1) Connect test equipment as shown in figure 3-1.
(2) Position controls on unit under test as follows:
(a) Set switch S5 to S6.
(b) Set switch S6 to REFL PWR.
(3) Adjust power supply output voltage for 50% as indicated on meter M1 of unit under test. Voltmeter shall indicate between 240 and 260 millivolts.

b. Adjustments. No adjustments can be made.

NOTE

For all subsequent tests, remove the receiver test facility from the transit case, as required, to gain access to the rear panel (fig. 3-4). Separate the front panel (fig. 3-2) from the rear chassis (fig. 3-3) only as necessary to make adjustments within the unit under test.

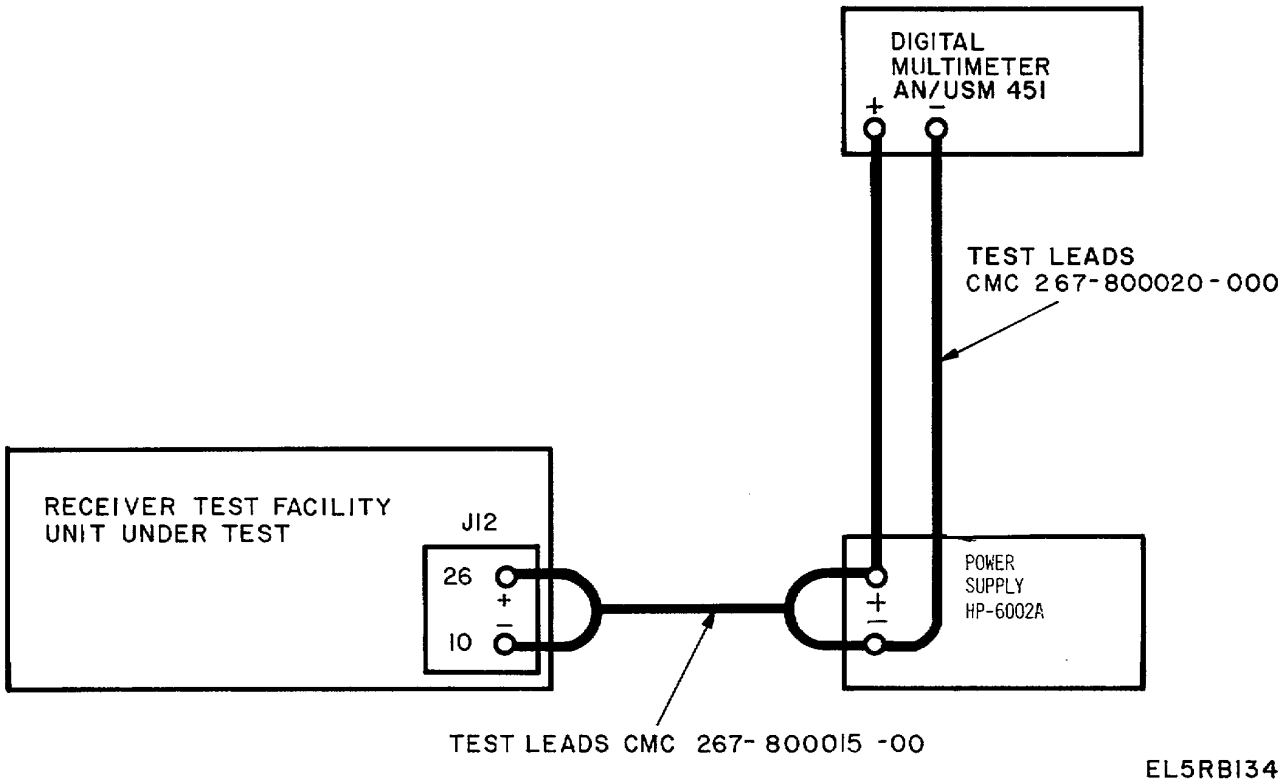


Figure 3-1. Meter M1 Calibration Test Setup

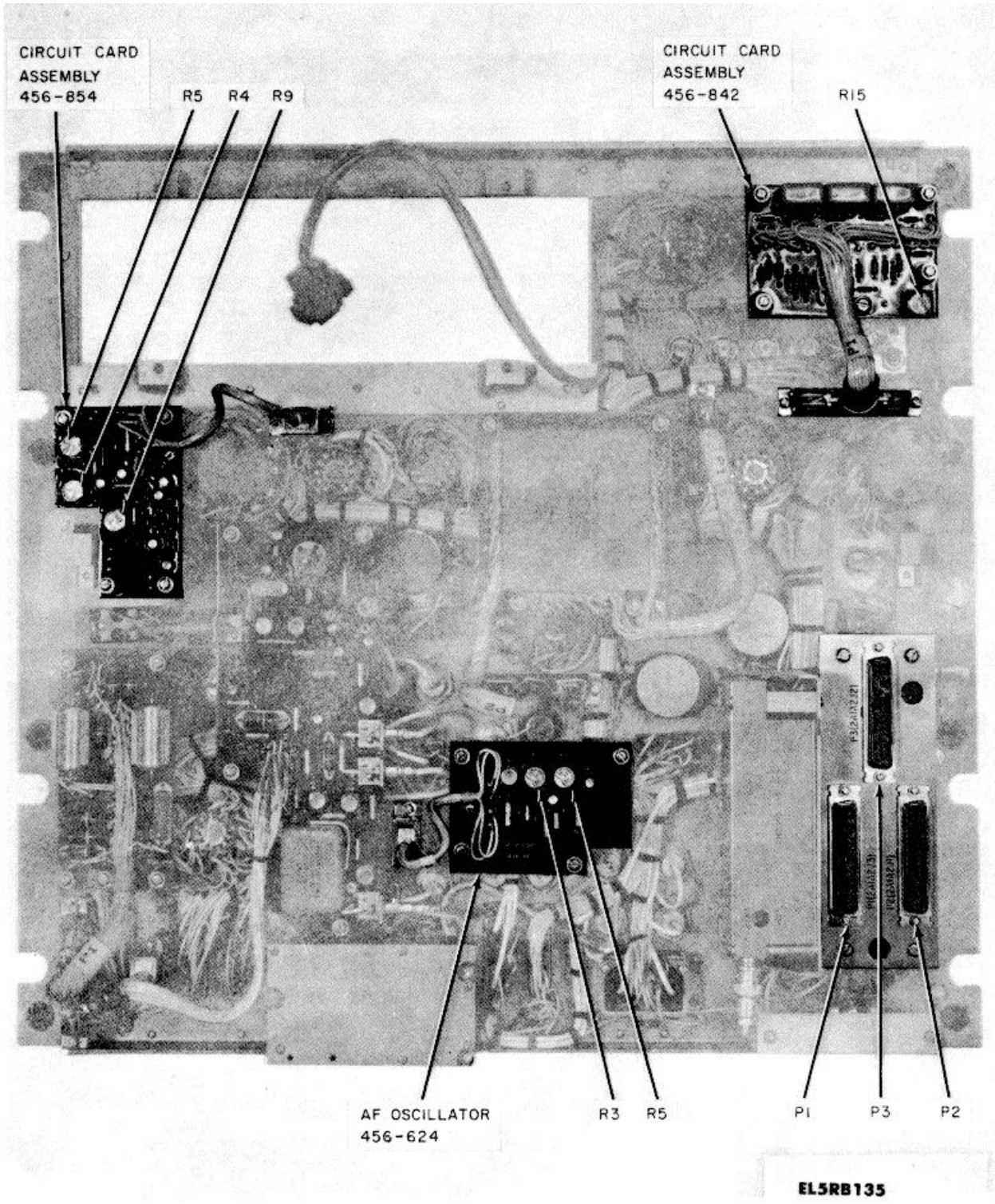


Figure 3-2. Receiver Test Facility Front Panel, Rear View.

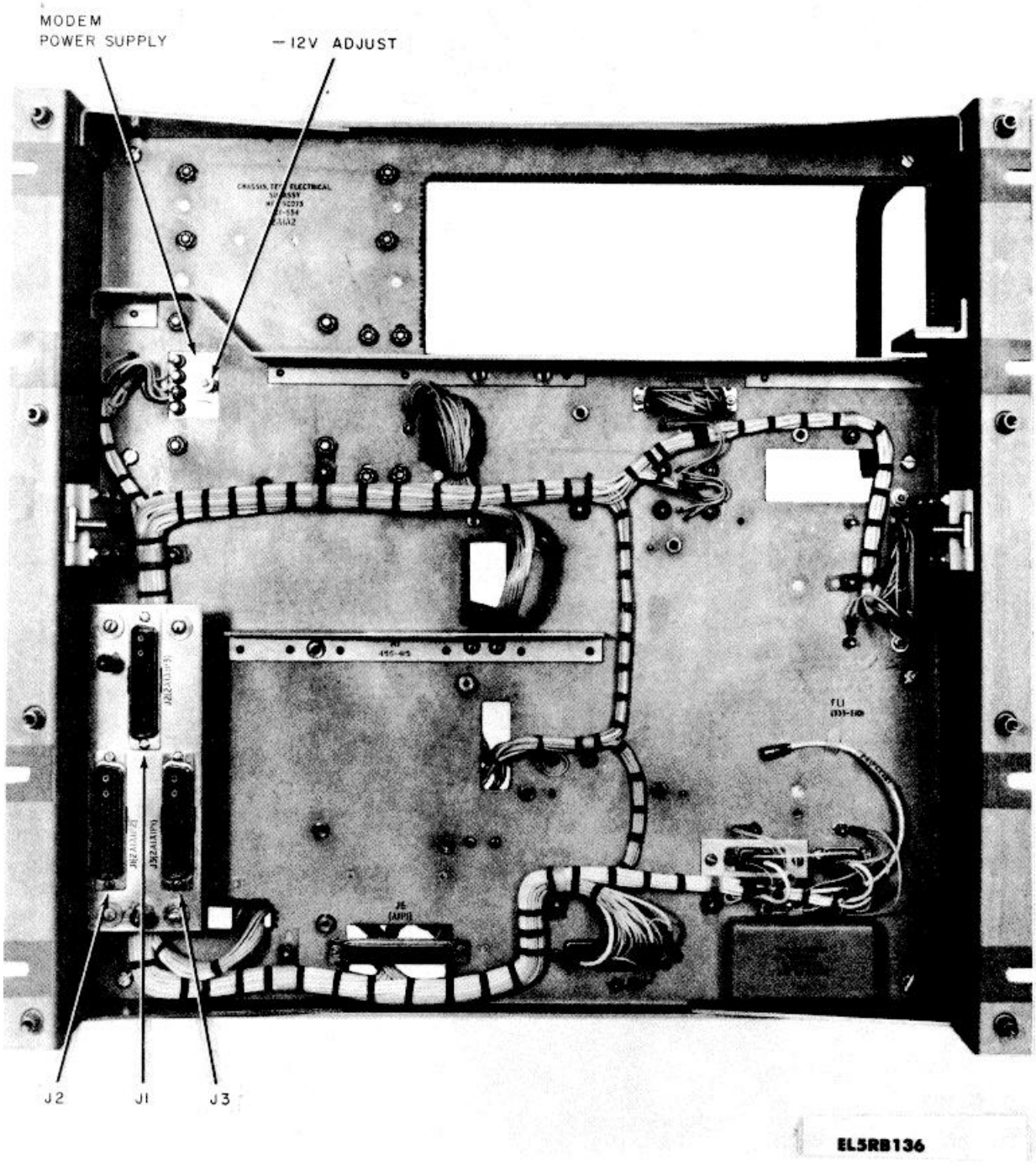


Figure 3-3. Receiver Test Facility Rear Chassis Front View.

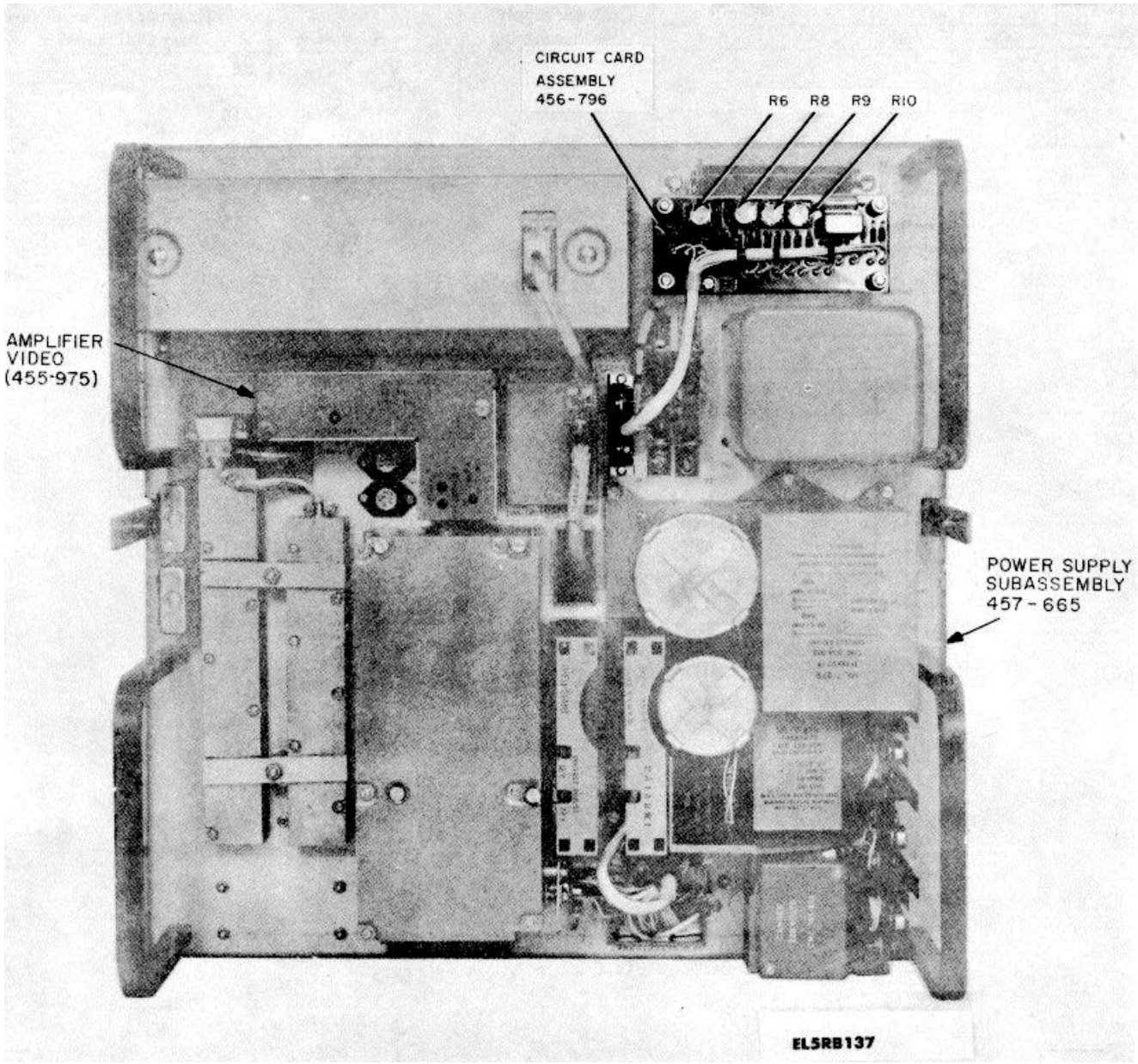


Figure 3-4. Receiver Test Facility Rear Chassis, Rear View.

39. Power Supply Metering Circuits

a Performance Check

(1) Connect test equipment as shown in figure 3-5.

(2) Position controls on unit under test as follows:

(a) Set switch to S5 to S2.

(b) Set switch to S2 to 24V.

(3) Perform tests 1 through 4 shown in table Meter M1 shall indicate 50 percent + the point width for each test.

NOTE

Meter M1 may indicate off scale (positive or negative) if power supply voltage is other than that specified in table 8.

b. Adjustments. Adjust corresponding potentiometer on circuit card assembly CMC 456-796 (fig. 3-4) for each test in table 8 before continuing with test procedure.

Table 8. Metering Circuits Calibration

Test No.	J2 pins		J3 pins		Power supply voltage setting	S2 position	Adjustment on circuit card assy CMC 456-967
	Pos	neg	pos	neg			
1	-	-	1	3	24	24V	R6
2	-	-	1	2	12	+12V	R6
3	-	-	4	5	26	26V UNREG	R10
4	1	2			32	24V UNREG	R9

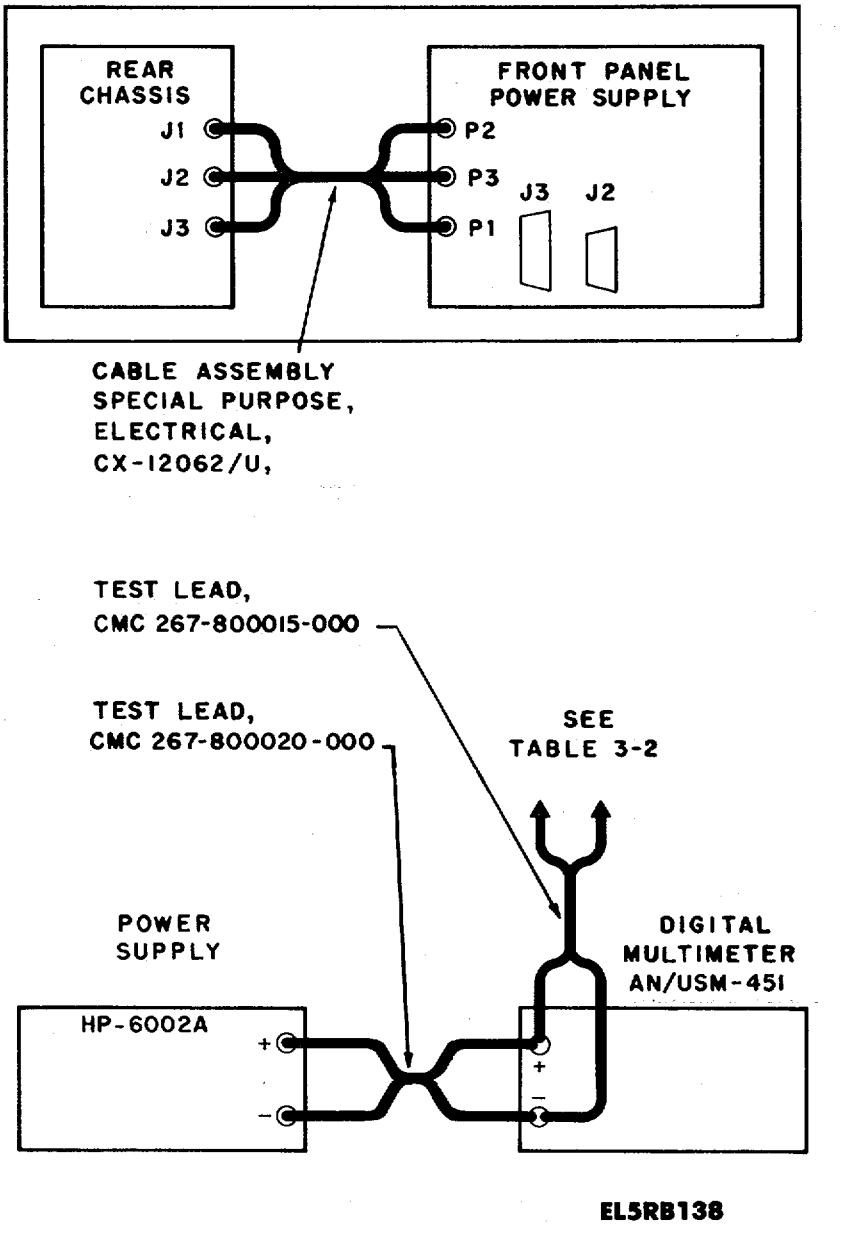


Figure 3-5. Power Supply Section Metering Circuit Check Test Setup.

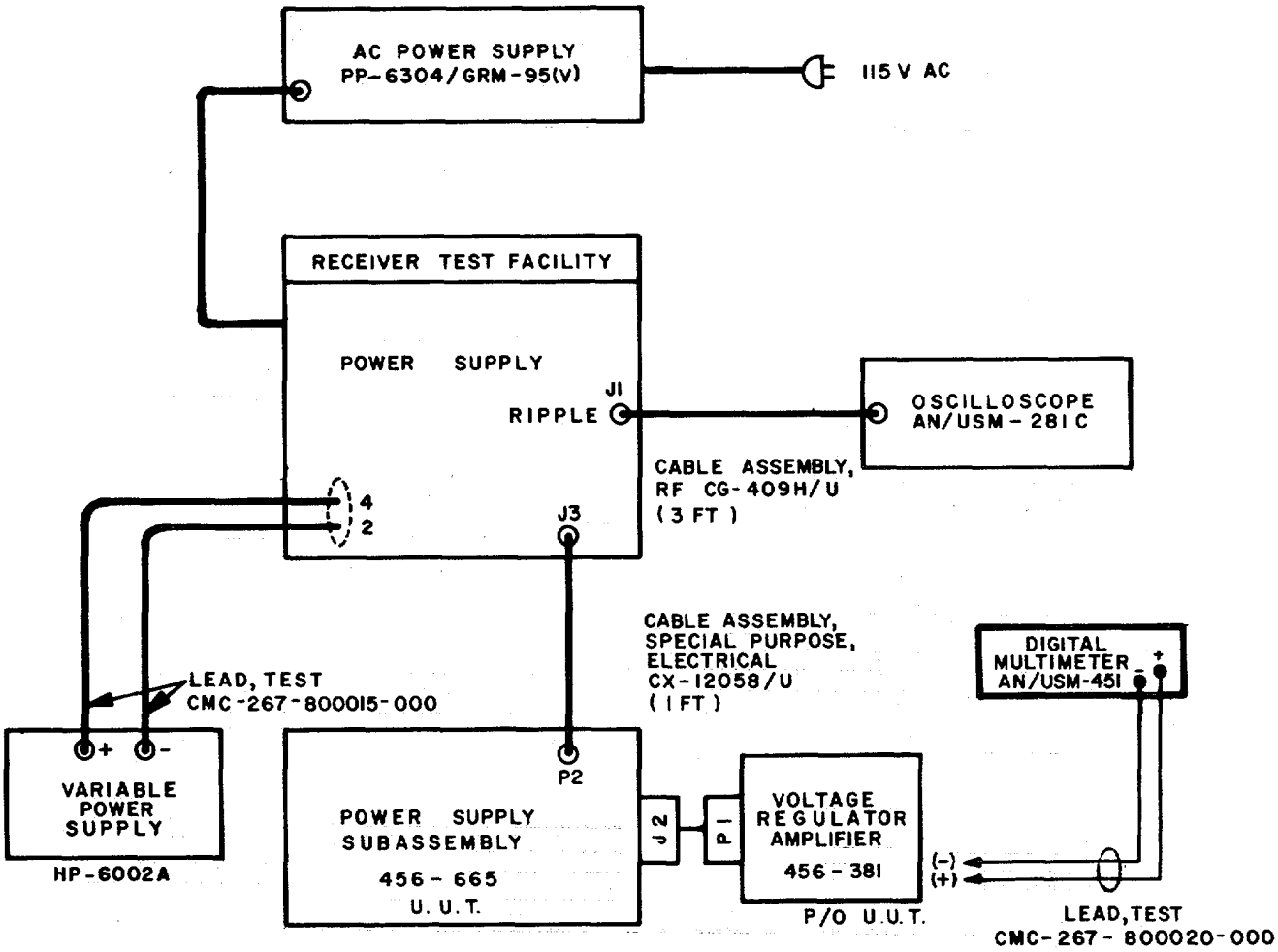


Figure 3-6. Receiver Test Facility, Power Supply Output and Regulation Test

40. Receiver Test Facility Power Supply Voltage and Regulation Output Checks

40.

a. Performance Checks.

NOTE

For subsequent tests of internal power supply, remove power supply subassembly 457-665 and voltage regulator amplifier 456-381 from the rear panel of the receiver test facility (fig. 3-4).

(1) Connect test equipment as shown in figure 3-6. Connect the digital multimeter to voltage regulator amplifier TP6(+) and TP4(-) (fig. 3-7).

(2) Adjust the variable power supply for +26 vdc output.

(3) Adjust the PP-6304/GRM-95(V) voltage control to 115 vac.

(4) Set the test facility switches as follows: S1 to ON S2 to S24V

(5) Press S-3 on the test facility. The digital multimeter shall indicate +24 +0.1 vdc, note the digital multimeter indication.

(6) Adjust the PP-6304/GRM-95(V) voltage control to 105 vac and 125 vac in turn. Press S-3 on the test facility. The digital multimeter shall indicate the same as recorded in (5) above +0.1 vdc.

(7) Connect the digital multimeter to voltage regulator amplifier TP4(+) and TP5(-) (fig. 3-7).

(8) Repeat (3) above.

(9) Press S-3 on the test facility. The digital Multimeter shall indicate -12V ±0.1 vdc. Note the digital multimeter indication.

(10) Adjust the PP-6304/GRM-95 voltage control to 105 vac and 125 vac in turn. Press S-3 on the test facility. The digital multimeter shall indicate the same as recorded in (9) above ±0.1 vdc.

(11) Repeat (3) above.

(12) Connect the digital multimeter between capacitor C-1 (+) and (M) terminals on the power supply subassembly 456-665 (fig. 3-7). Observe polarity.

(13) The digital multimeter shall indicate 26 ± 2 vdc.

b. Adjustments.

(1) Adjust R7 on circuit card assembly CMC 456-381 (fig. 3-7) for a digital multimeter reading of 24.OV as specified in (5) above.

(2) Adjust R11 on circuit card assembly CMC 456-381 (fig. 3-7) for a digital multimeter reading of - 12.OV as specified in (9) above.

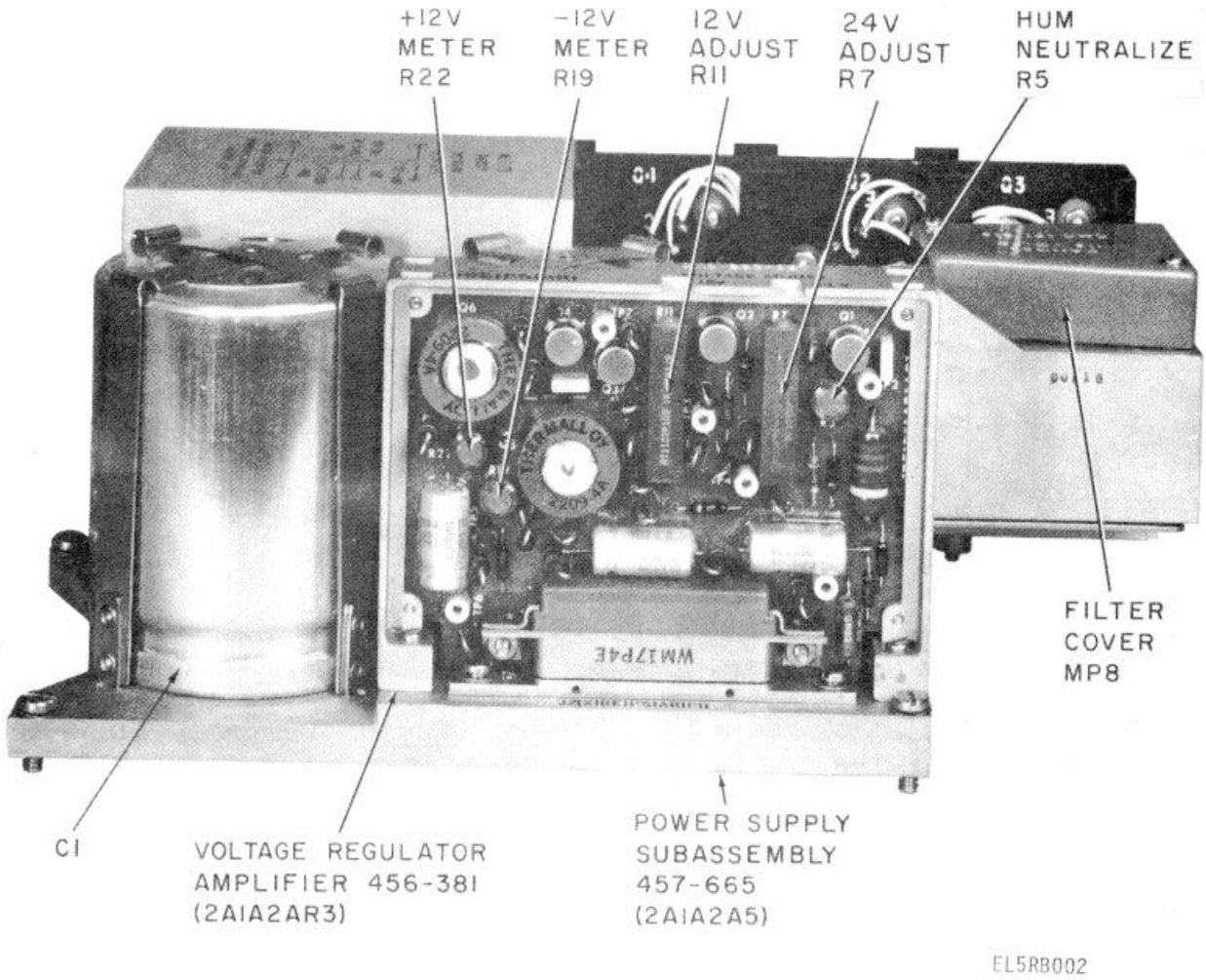


Figure 3-7. Power Subassembly 457-665 (2A1A2A5) with Voltage Regulator Amplifier 456-381 (2A1A2AR3) Mounted, Side View

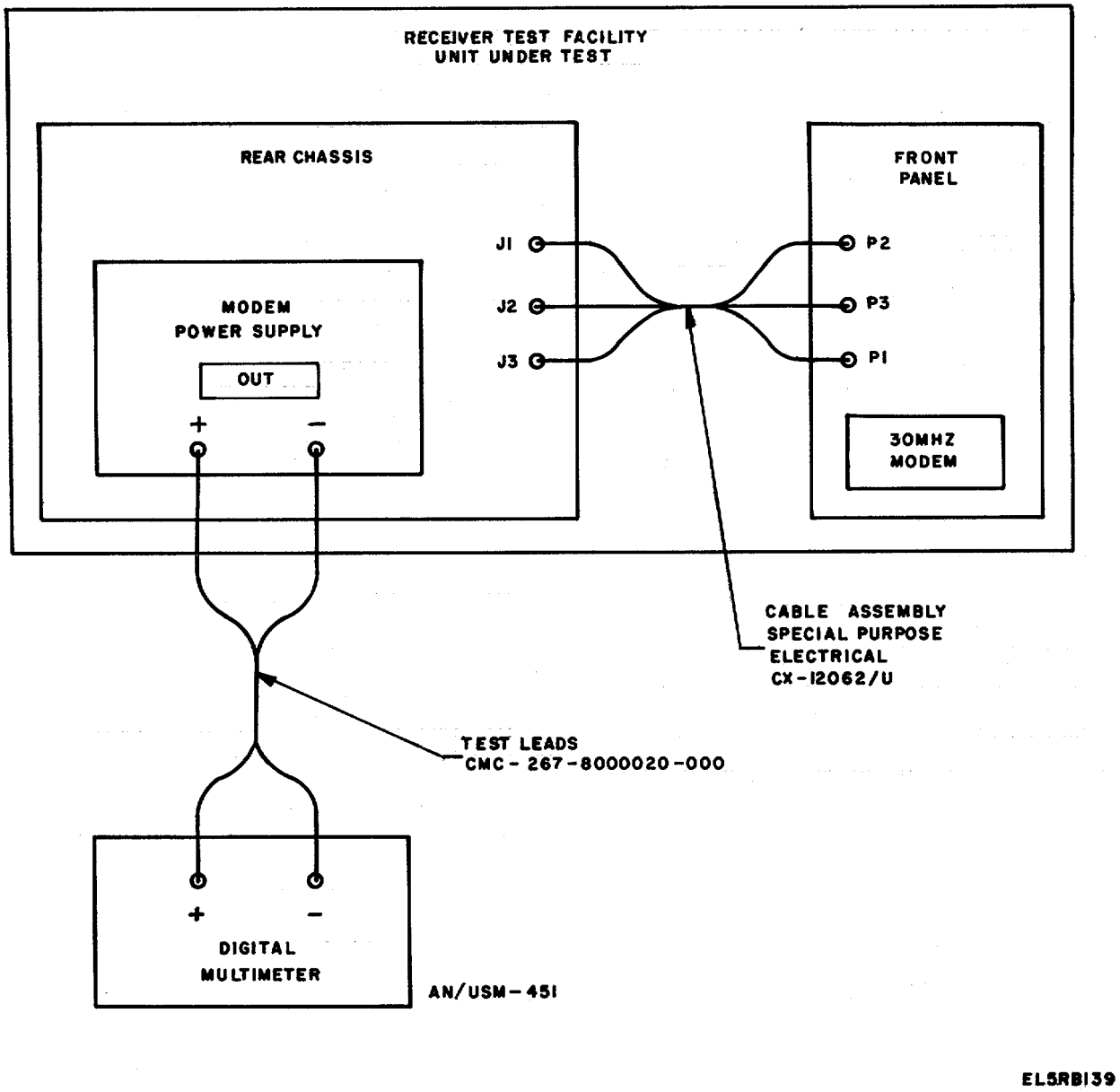


Figure 3-8. Input Voltage 30 MHz Modem Section Test

41. Receiver Test Facility Power Supply Meter Circuit and Ripple Check

a Performance Checks.

(1) Connect test equipment as shown in figure 3-6.
(2) Adjust the variable power supply for +2 vdc.
(3) Adjust the PP-6304/GRM-95(V) voltage control to 115 vac.
(4) Set test facility switches as follows:
S1 to ON
S5 to S2
S2 to METER +12V
S9 to 100 Hz
(5) Press S-3 on test facility. Test facility meter M-1 shall indicate 50% FSD + the pointer width. The ripple voltage observed on the oscilloscope shall be less than 2 MV peak to peak.

(6) Set test facility switch S-2 to METER -12V.

(7) Press S-3 on test facility. Test facility meter M-1 shall indicate 50% FSD + the pointer width. The ripple voltage observed on the oscilloscope shall be less than 2 MV peak to peak.

(8) Set test facility switch S-2 to 26V UNREG.

(9) Test facility meter M-1 shall indicate within the green band. The ripple voltage observed on the oscilloscope shall be less than 750 MV peak to peak.

(10) Set switch S-2 to OFF.

b. Adjustments.

(1) Adjust R22, circuit card 456-381 (fig. 3-7) for a 50% FSD indication on test facility meter M-1, (5) above.

(2) Adjust R5, circuit card 456-381 (fig. 3-7) for minimum ripple voltage as indicated on the oscilloscope, (5) above.

(3) Adjust R19, circuit card 456-381 (fig. 3-7) for a 50% FSD indication on test facility meter M-1, (7) above.

42. Input Voltage 30 MHz MODEM Section

a. Performance Check.

NOTE

When removing or replacing dust cover on MODEM unit, always set test facility switch S1 to OFF before disconnecting P7 and set switch S1 to ON after reconnecting P7.

(1) Connect test equipment as shown in figure 3-8.

(2) Position controls on unit under test as follows:

(a) Set switch S1 to ON.

(b) Set switch S5 to - 12V MODEM.

(3) Voltmeter shall indicate between -11.9 and -12.1 volts dc and meter M1 shall indicate 50 percent ± the width of the pointer.

b. Adjustments. Adjust potentiometer on power supply 2AlA2PS2 (fig. 3-3) for 50 percent on meter M1. Voltmeter shall indicate between -11.9 and - 12.1 volts dc.

43. Frequency Switching Check

a. Performance Check.

(1) Connect test equipment as shown in figure 3-9.

(2) Set AT1 to 0 dbm, turn switch S9 to EXT VIDEO.

(3) Turn switch S14 to 29 MHz.

(4) Observe that the indication on the frequency counter is between 29.059 and 29.065 MHz.

(5) Turn switch S14 to 31 MHz.

(6) Observe that the indication on the frequency counter is between 30.997 and 31.003 MHz. *b. Adjustments*. No adjustment can be made.

44. A 30 MHz Open Loop Frequency and Power Output

a. Performance Check.

(1) Connect test equipment as shown in figure 3-10.

(2) Turn unit under test switches S14 to 30 MHz, S9 to 50 kHz LEVEL and ATI to 0 db.

(3) Set coaxial switch to position 1.

(4) Frequency at J52 shall be between 30.010 MHz and 29.990 MHz as indicated on frequency counter.

(5) Set coaxial switch to position 2.

(6) Power level at J52 shall be 0 ± 0.3 dbm as indicated on power meter.

(7) Meter M1 shall indicate in the green band.

b. Adjustments.

(1) Remove dust cover from MODEM unit.

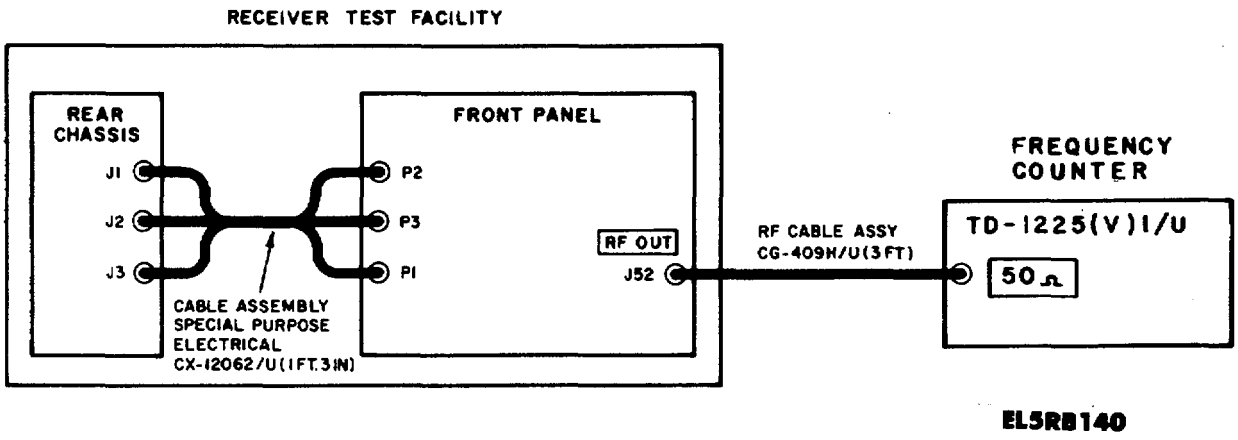


Figure 3-9. 30 MHz Modem Section Frequency Switching Check Test Setup

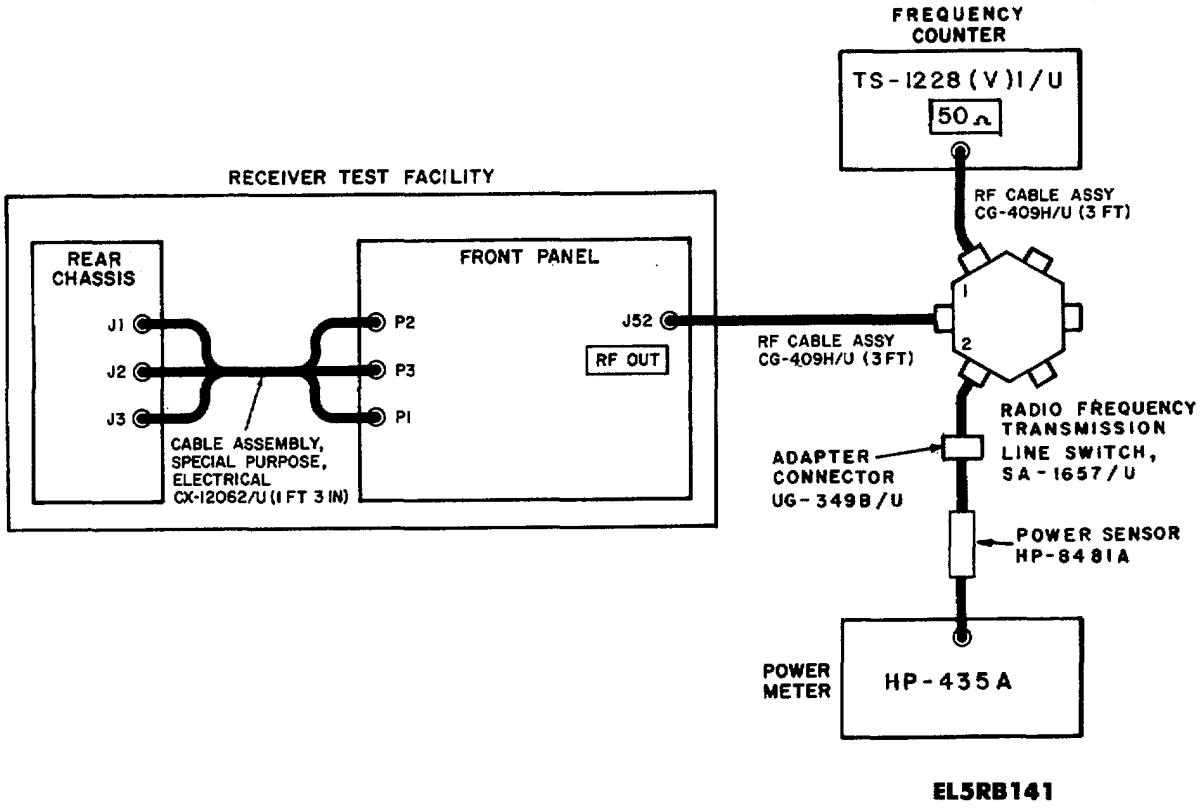


Figure 3-10. 30 MHz Modem Section Frequency Switching Check Test Setup.

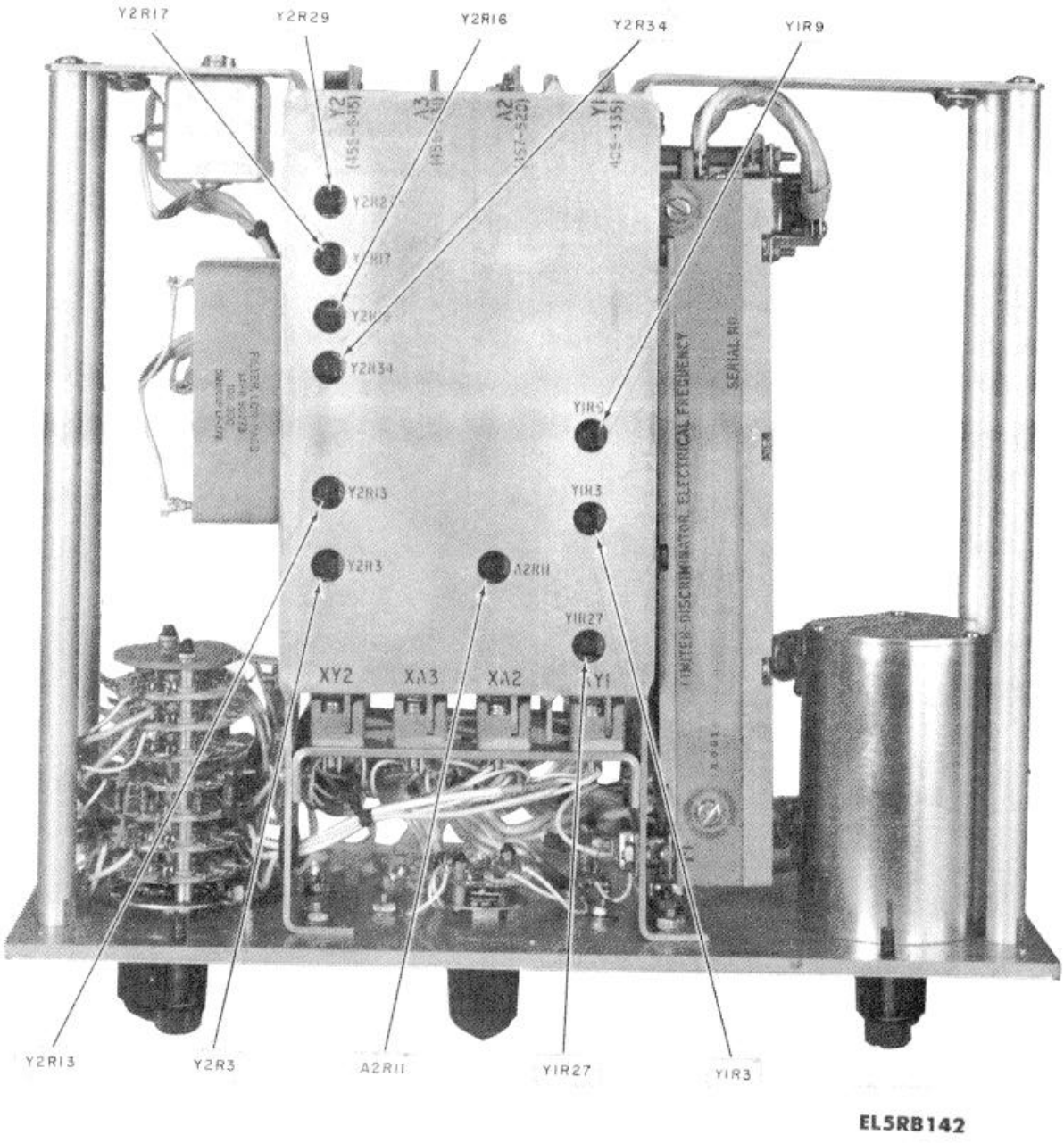


Figure 3-11. 30 MHz Modem, Top View

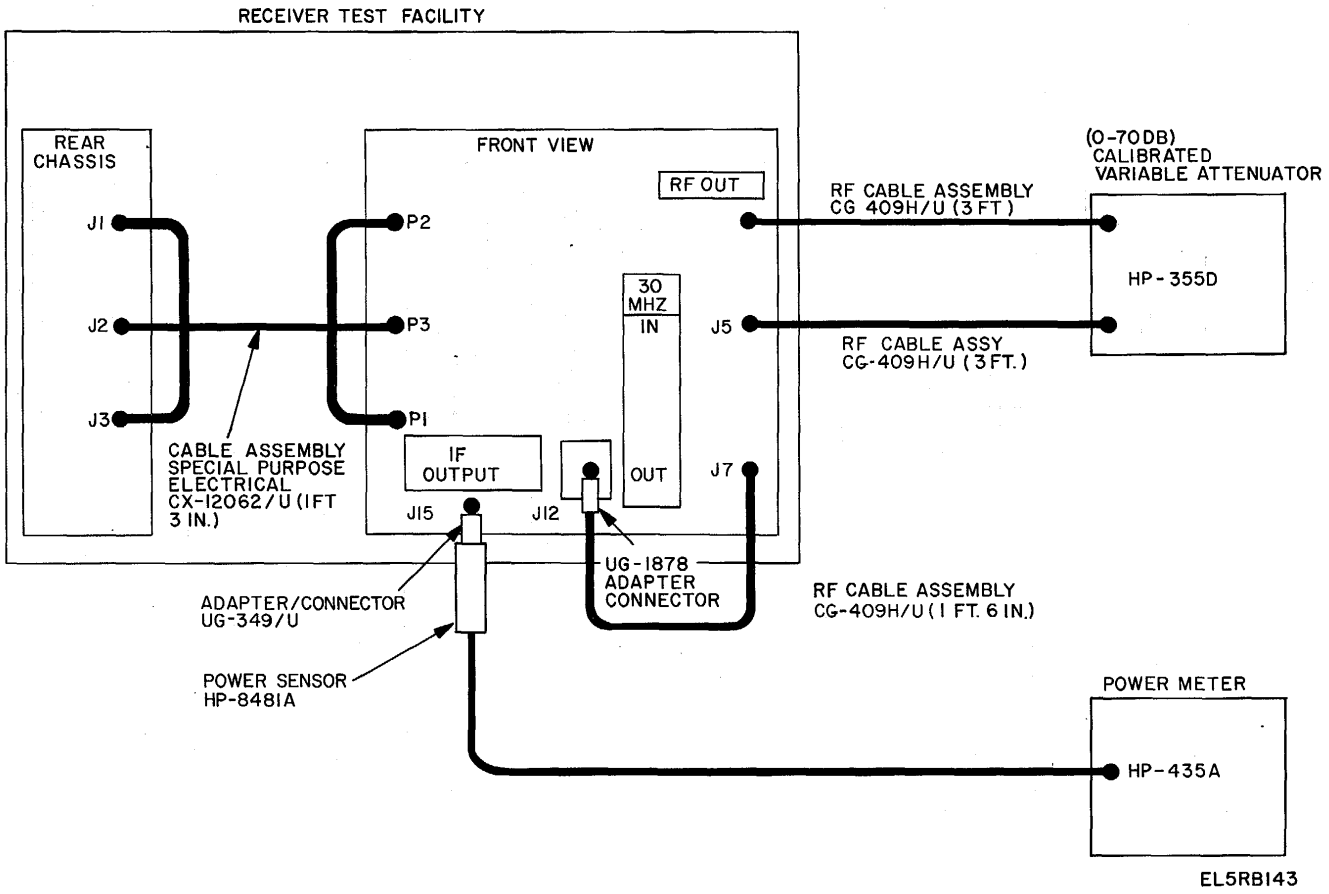


Figure 3-12. 30 MHz Modem Section Attenuator Calibration Test Setup.

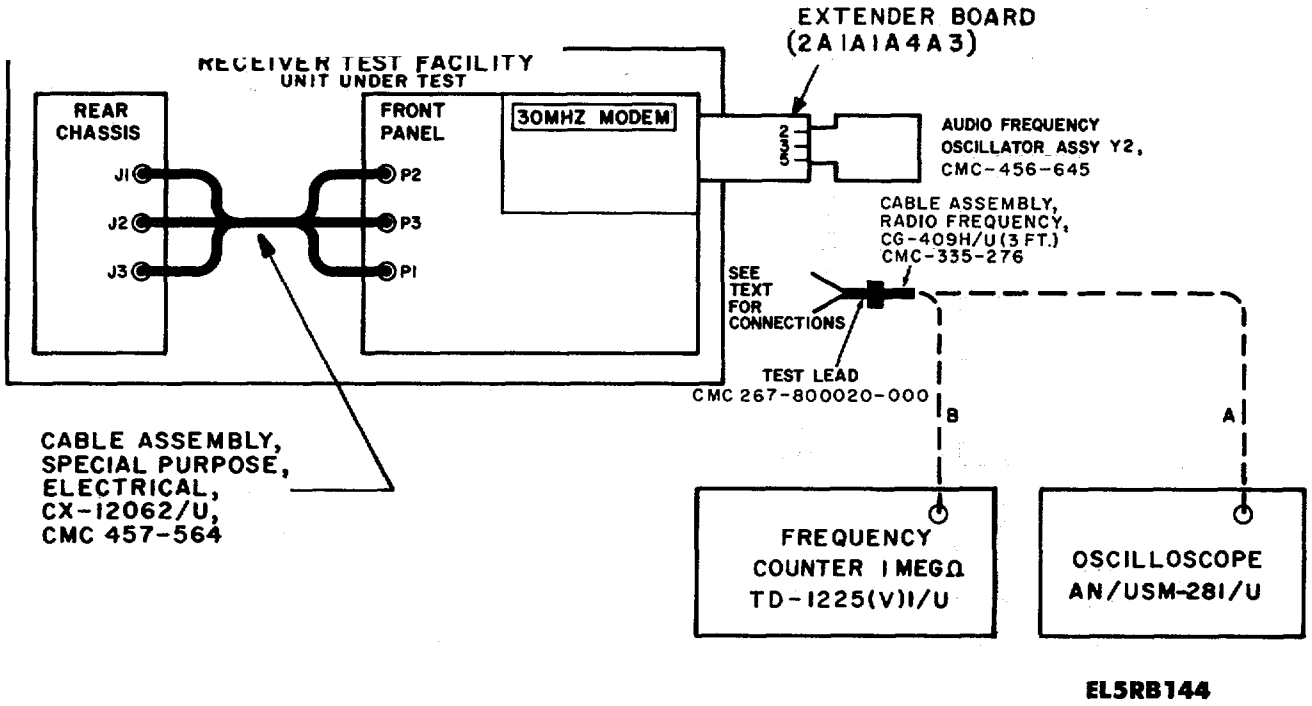


Figure 3-13. 30 MHz Modem Section, 1000 Hz Waveform Calibration Test Setup

(2) Adjust Y1R3 (fig. 3-11) on circuit card assembly CMC 406-335 to bring the frequency within limits specified in a (4) above.

(3) Adjust Y1R9 on circuit card assembly CMC 406-335 for a 0-dbm power level at J52.

(4) Adjust Y1R27 for 50 percent indication on M1.

(5) Replace dust cover on MODEM unit and repeat performance check.

45. Attenuator Calibration

a, Performance Check.

(1) Connect test equipment as shown in figure 3-12.

(2) Position controls on unit under test as follows:

(a) Set switch S9 to 30 MHz.

(b) Set switch S4 to ON.

(c) Set switch S6 to REFL PWR.

(d) Set switch AT1 to 70.

(e) Set switch S7 to MAN.

(3) Set variable attenuator to O db.

(4) Turn GAIN control on RF AMPLIFIER--MIXER CONVERTER ASSY section fully clockwise.

(5) Adjust GAIN control on TUNER RADIO FREQUENCY section for - 10dbm as indicated on power meter.

(6) Adjust GAIN control on RF AMPLIFIER- MIXER CONVERTER ASSY section for --13 dbm as indicated on power meter.

(7) Adjust GAIN control on TUNER RADIO FREQUENCY section for - 10 dbm as indicated on power meter.

(8) Increase variable attenuator by 10 db, decrease switch ATI by 10 db.

(9) Power meter shall indicate between -9 and -11 db.

(10) Repeat (8) and (9) above for all positions of AT1.

b. Adjustments. No adjustments can be made.

46. A 1,000 Hz Waveform Calibration

a. Performance Check.

(1) Set unit under test switch S1 to OFF

(2) Connect test equipment as shown in A, figure 3-13.

(3) Set unit under test switch S1 to ON.

(4) Waveform at extender board pins 3 (signal input) and 5 (ground) shall be near sinusoidal at]1 kHz as indicated on oscilloscope (1 ms/cm). *b. Adjustments*. Adjust Y2R17 on circuit card assembly CMC 456-645 (fig. 3-11) for an undistorted sine wave of maximum amplitude as indicated on oscilloscope.

47. Deviation Calibration

a. Performance Check.

(1) Connect test equipment as shown in figure 3-14.

(2) Position controls on unit under test as follows:

(a) Switch AT1 to O db.

(b) Switch S9 to 300 kHz.

Deviation meter shall measure a peak deviation of 300 kHz at 30 MHz.

(3) Turn switch S9 to position 180 kHz, 75 kHz and 45 kHz in turn. Deviation meter shall indicate a peak deviation of 180 kHz + 10%, 75 kHz + 10%, and 45 kHz + 10% respectively.

(4) Turn switch S9 to 1KHz LEVEL position. Meter M1 shall indicate in the green band.

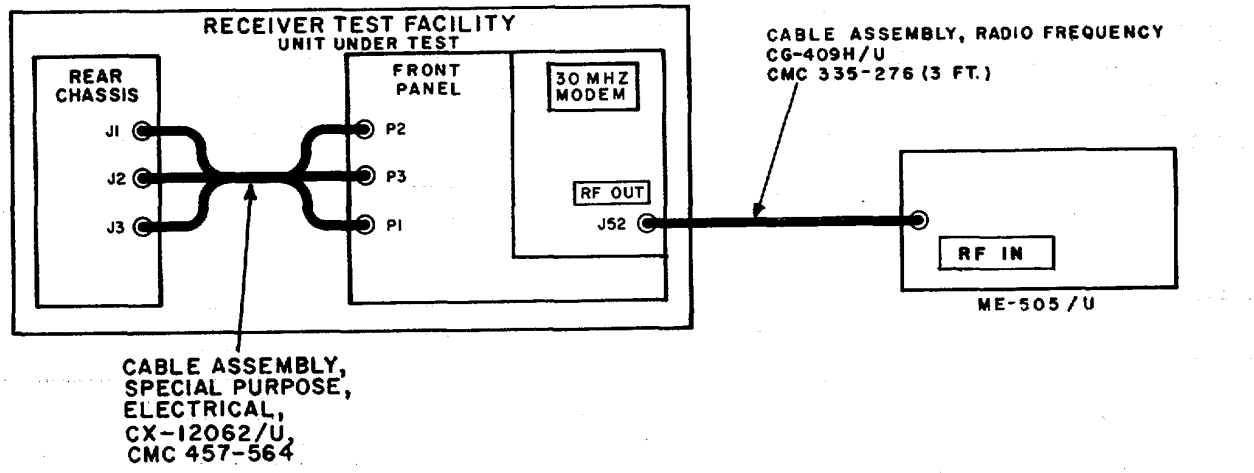


Figure 3-14. MHz Modem Section Deviation Calibration Test Setup.

b. Adjustments.

(1) Adjust potentiometer Y2R16 (fig. 3-11) on circuit card assembly CMC 406-335 for 300 kHz deviation.

(2) Repeat a (3) above.

(3) No further adjustment can be made.

48. A 30 MHz and 100 Mz Level Calibration

a. Performance Check.

(1) Turn switch S9 to 30 MHz LEVEL position. Meter M1 shall indicate in the green band.

(2) Turn switch S9 to 100 Hz LEVEL position. Meter M1 shall indicate in the green band.

(3) Connect the oscilloscope to J37. Turn S9 to DISCR RESPONSE position. The oscilloscope should display a waveform as in A, figure 3-16.

b. Adjustments.

(1) Adjust Y1R27 for 50 percent meter indication in a(1l) above.

(2) Adjust Y2R29 for 50 percent meter indication in a(2) above.

49. Discriminator Calibration

a. Performance Check.

(1) Replace dust cover on MODEM unit.

(2) Connect test equipment as shown in A, figure 3-15.

(3) Set test facility switches as follows:

Switch	Position
AT1	70
S1	ON
S5	S9
S14	30 MHz
S9	DISCR RESPONSE

(4) Adjust signal generator output level and test facility AT1 as necessary to display a 30 MHz marker on the CHAN A S-shaped curve.

(5) The CHAN A waveform displayed on the oscilloscope should be an S-shaped curve with frequency peak to peak excursion, linearity and amplitude between peaks as shown in B, figure 3-16.

(6) Connect test equipment as shown in B, figure 3-15.

(7) Set test facility switch S9 to EXT VIDEO.

(8) Set the WRO frequency to 50 kHz and adjust its output level for 100 kHz deviation as measured on the deviation meter. Note and record the VTVM indication.

(9) Repeat (8) above with test facility switch S14 set to 29 and 31 MHz in turn.

(10) Calculate the maximum difference between VTVM indications obtained in (8) and (9) above. The difference should not exceed 5% of the maximum indication recorded.

b. Adjustments. No adjustments can be made. Return to prime depot for repair or replacement.

50. Modulation Frequency Response

a Performance Check.

(1) Connect test equipment as shown in figure 3-17.

(2) Set U.U.T test switch S9 to EXT VIDEO and S14 to 30 MHz.

(3) Set wide range oscillator to 10 kHz. Adjust the 0-10 db attenuator and wide range oscillator amplitude control as required to establish a 0 db reference on the VTVM -60 db range, with a wide range oscillator panel meter indication in the upper 10% of its range.

(4) Set the wide range oscillator to EXPAND scale and adjust the reference control to center scale. This level is to be maintained at all test frequencies listed in table 9.

(5) Set wide range oscillator to 125 Hz, maintaining output level as in (4) above. The VTVM shall be within ±1.5 db of reference established in (3) above.

(6) Repeat (5) above for all other frequencies listed in table 9.

Table 9. Modulation Frequency Response

Wide Range Oscillator Freq kHz	Level dbm
0.2	Reference ±1.5 db
0.5	Reference ±1.5 db
1.0	Reference ±1.0 db
10.0	Reference
100.0	Reference ±0.3 db
200.0	Reference ±0.3 db
500.0	Reference ±0.6 db
800.0	Reference ±0.5 db
900.0	Reference ±0.5 db
960.0	Reference ±0.5 db
1000.0	Reference ±0.5 db

b. Adjustments. No adjustments can be made. Return to prime depot for repair or replacement.

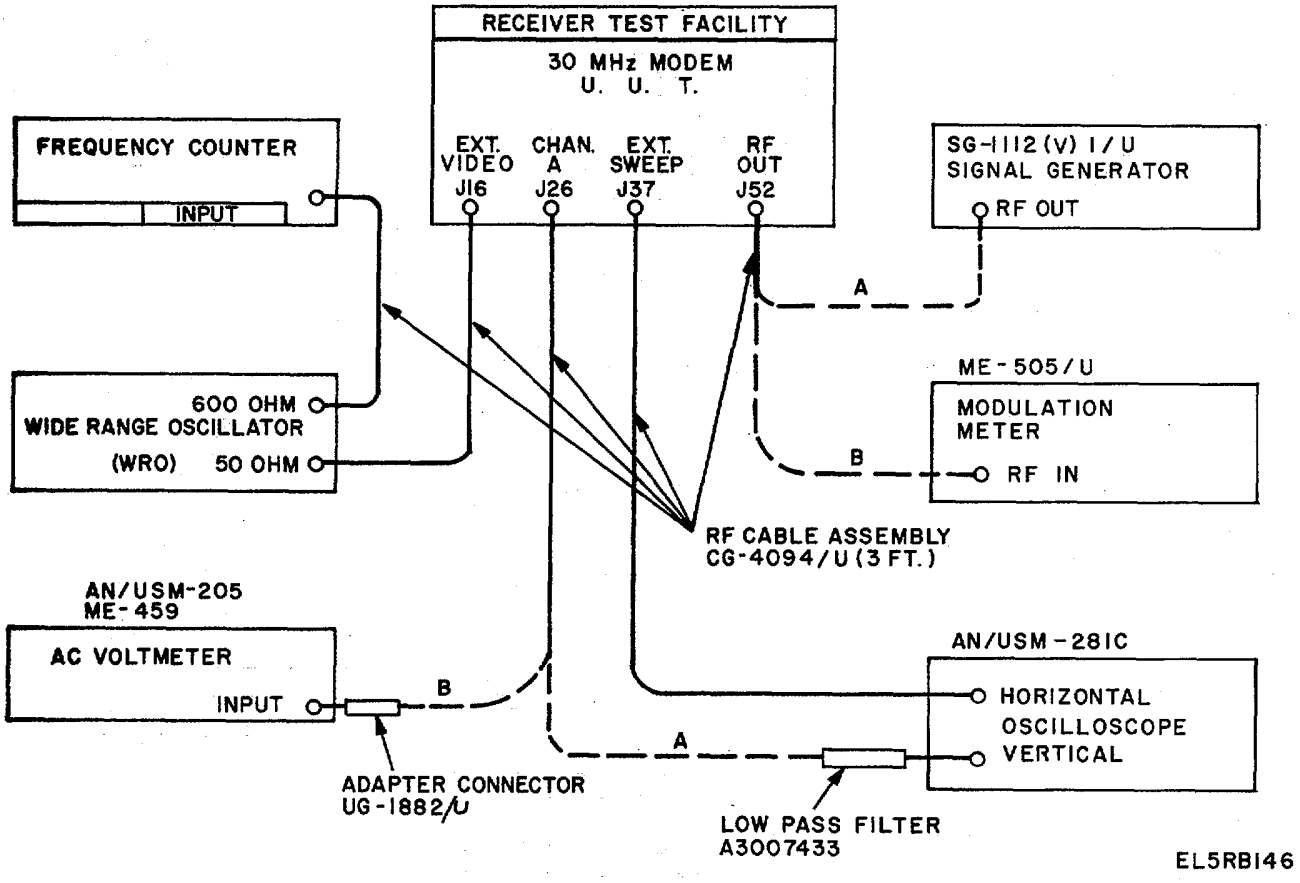


Figure 3-15. 30 MHz Modem Section Discriminator Calibration Test Setup.

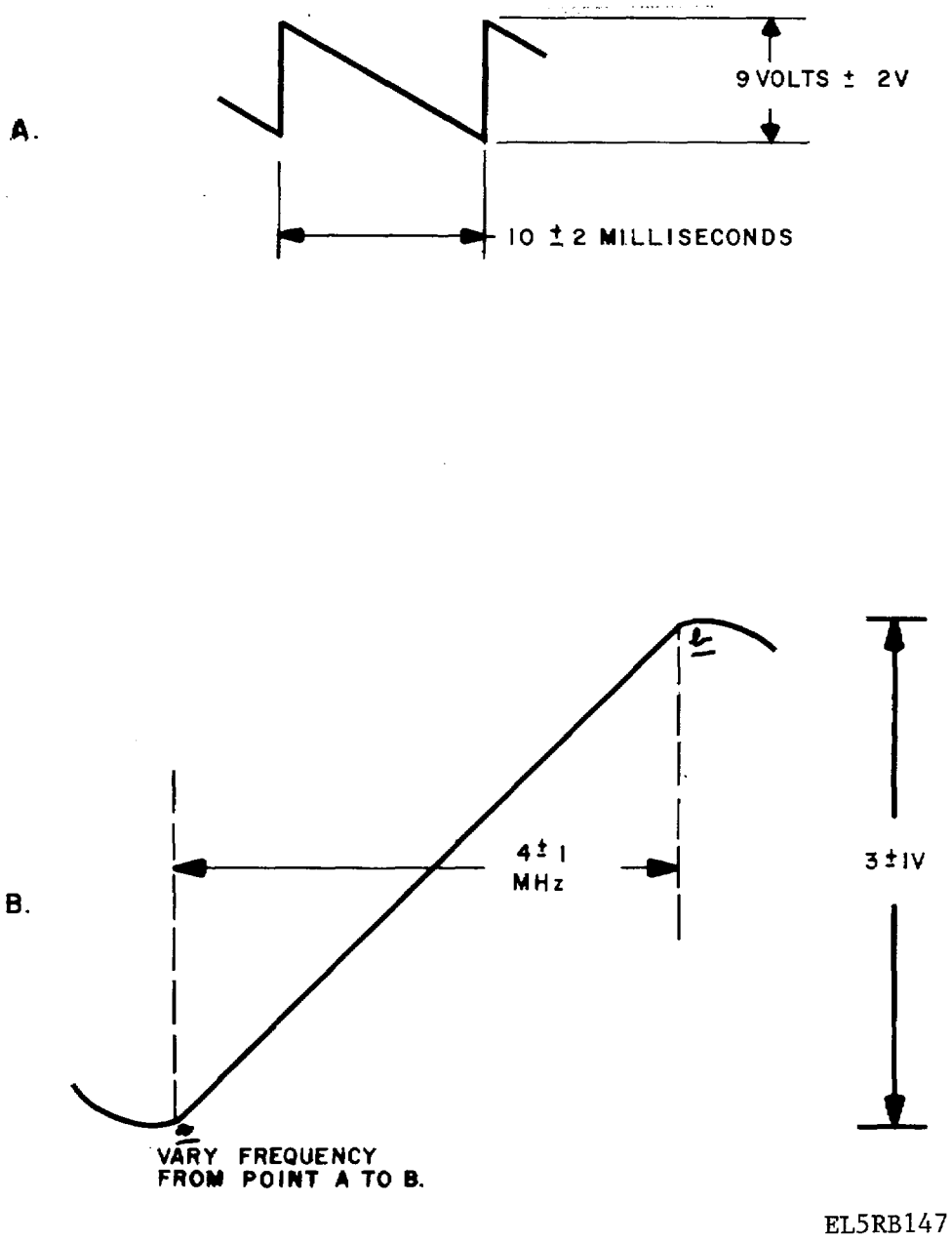


Figure 3-16. 30 MHz Modem Section Discriminator Waveforms.

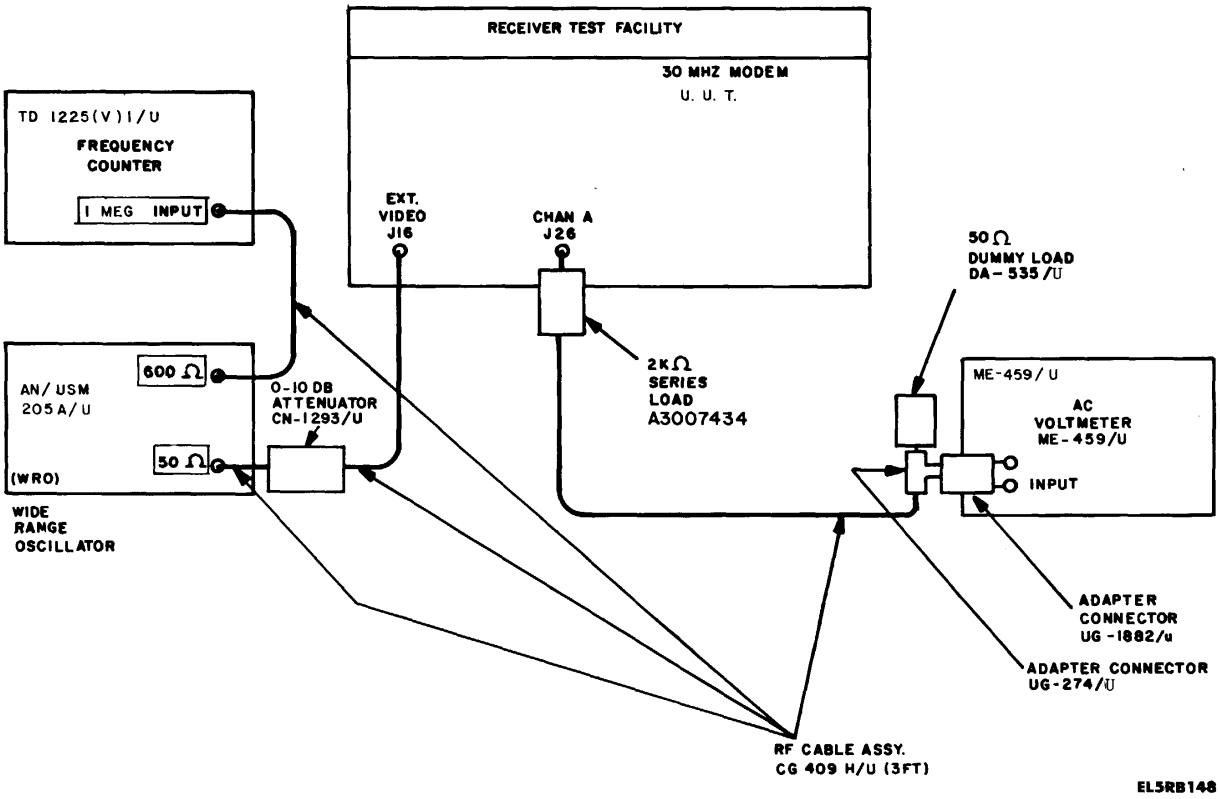


Figure 3-17. 30 MHz Modem Section, Modulation Frequency Response Test Setup.

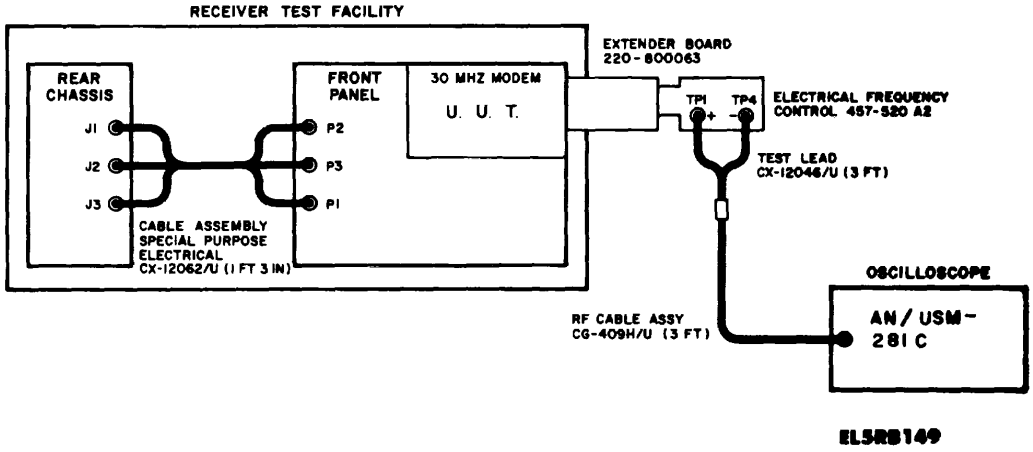


Figure 3-18. 30 MHz Modem Section, Mark- to- Space Calibration Test Setup

51. Mark-to-Space Ratio Calibration

a. Performance Check.
(1) Remove dust cover from modem unit.
(2) Turn switch S9 to EXT VIDEO.
(3) Connect test equipment as shown in figure 3-18.
(4) Set unit under test switch S1 to ON.
(5) Waveform at extender board test points T (signal) and TP4 (ground) shall be a square wave 1:1 mark-to-space ratio (symmetrical square wave).

NOTE

Replace dust cover on MODEM after adjustments.

b. Adjustments. Adjust A2Rll on MODEM unit (fig. 3-11) for 1:1 mark-to-space ratio.

52. Rf Amplifier-Mixer Converter Assy Section Calibration

a. Performance Check.

NOTE

Before starting calibration, insure that 30 MHz MODEM is calibrated (para 42 through 51).

(1) Connect test equipment as shown in figure 3-19.
(2) Position controls on unit under test as follows:
(a) Set switch S4 to ON.
(b) Set switch S9 to 30 MHz.
(c) Set switch S14 to 30 MHz.
(d) Set switch AT1 to 60.
(e) Set switch S1 to ON.
(3) Observing power meter adjust GAIN control fully clockwise. Power level at J7 should be -24 +6 dbm as indicated on power meter.
b. Adjustments. No adjustments can be made.

53. RF Amplifier Gain

a. Performance Check.
(1) Connect test equipment as shown in A, 3-20.
(2) Set signal generator frequency to 220 MHz at a level of - 50 dbm.
(3) Connect test equipment as shown in B, figure 3-20.
(4) Power meter shall indicate between -20 dbm and -25 dbm.
(5) Repeat (1) through (4) above at signal generator frequencies of 300 MHz and 400 MHz.
b. Adjustments. No adjustments can be made.

54. Rf Amplifier Noise Figure

a. Performance Check.

(1) Connect the test equipment as shown in figure 3-21.

(2) Set the test facilities switches as follows:

Switch	Position
S4	On
Gain (Rf Amplifier-Mixer Converter Assy)	Midrange
S6	Refl Pwr
Gain (Turner Radio Freq)	Mid Range
S7	Man.
S8	47.50 (To Cancel Sync Alarm)

(3) Set the tunable filter to 220 MHz.

(4) Set the signal generator to 250 MHz (on the frequency dial) at a level of +10 dbm.

(5) Turn on the noise source power supply and adjust it to +28 vdc.

(6) Carefully peak the tunable filter and the signal generator frequency for a maximum indication on the power meter.

(7) On the test facility, set the GAIN control on the RF AMPLIFIER MIXER CONVERTER ASSY section fully clockwise and adjust the GAIN control on the TUNER RADIO FREQ for an indication of - 15 dbm on the power meter.

(8) Reduce the GAIN control on the RF AMPLI-FIER MIXER CONVERTER ASSY by 3 db until the power meter indicates - 18 dbm.

(9) Turn the noise source power supply off and observe the power meter reduction.

(10) Refer to the ENR-DB chart on the noise source and note the ENR output at the frequency being tested. Refer the power meter reduction to the Y factor chart (fig. 3-22) that most closely corresponds to the ENR noted and determine the noise figure of the RF amplifier under test. The noise figure should not exceed 6 db.

(11) Repeat (3) through (10) for signal generator frequencies of 330 MHz and 435 MHz and bandpass filter settings of 300 MHz and 405 MHz respectively.

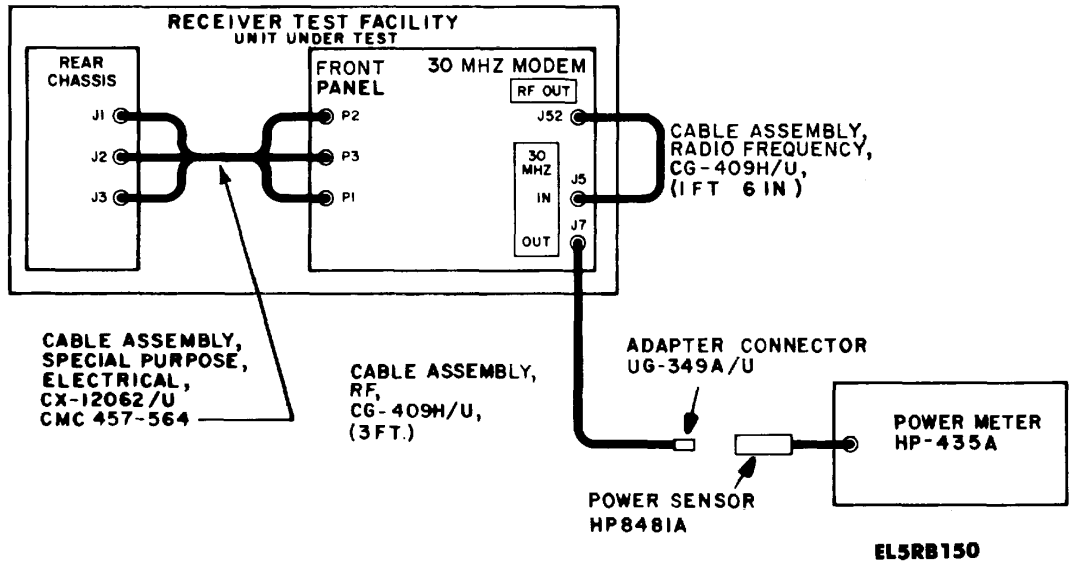


Figure 3-19. Rf Amplifier- Mixer Converter Assy Section, IF Amplifier Gain Check Test Setup.

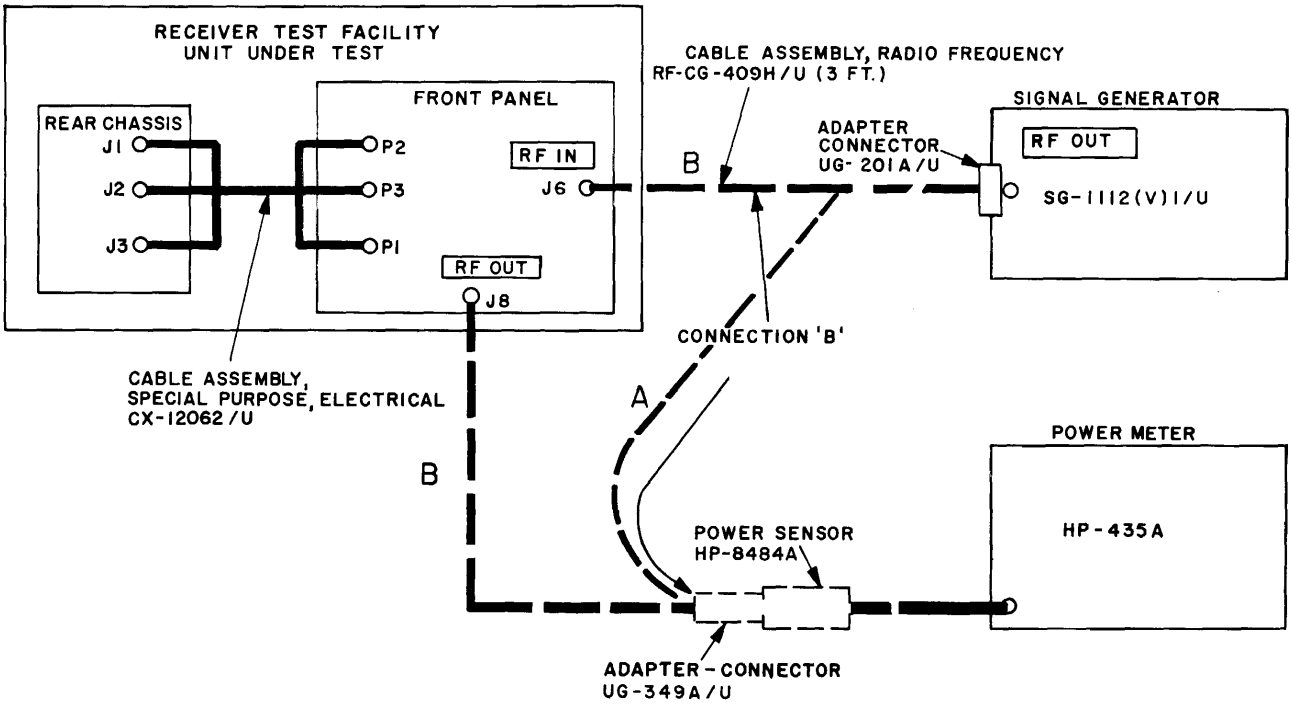


Figure 3-20. Rf Amplifier-Mixer Converter Assy Section, Rf Amplifier Gain Check Test Setup.

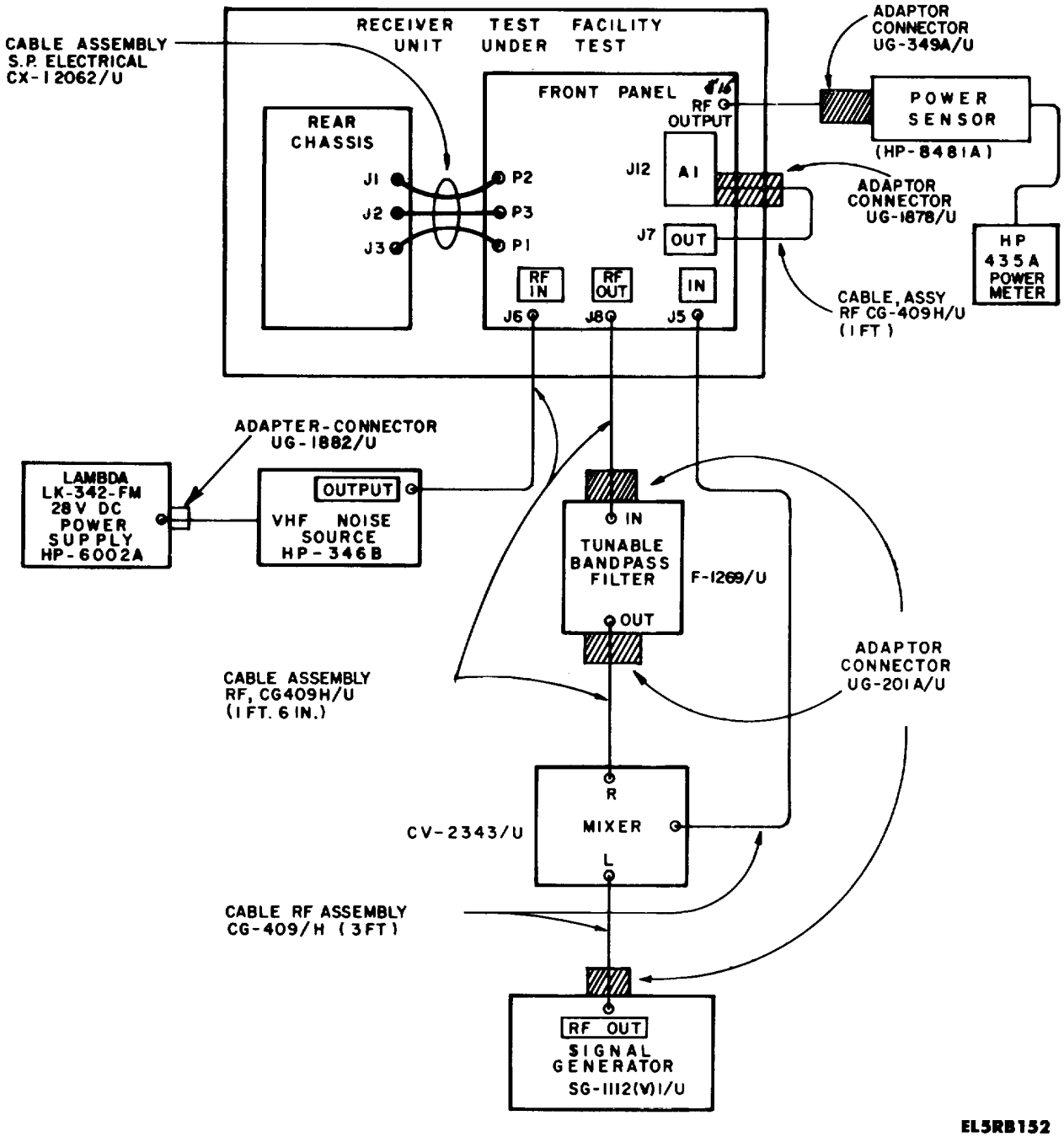


Figure 3-21. Rf Amplifier-Mixer Converter Assy Section, Rf Amplifier Noise Figure Check Test Setup.

b. Adjustments. No adjustments can be made.

55. Tuner Radio Freq Section Synthesizer Output

a. Performance Check.

(1) Connect test equipment as shown in A, figure 3-23.

(2) Set the switches on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S5 to S6.

(c) Switch S6 to OSC.

(d) Switch S8 to 47.5.

(3) Meter M1 shall indicate between 20 and 90 percent. Frequency counter shall indicate between 47.499650 MHz and 47.500350 MHz.

(4) Repeat (2) above for remaining positions of S8. Frequencies and tolerances shall be as shown in table 10.

Table 10. Synthesizer Output

S8 Positions	Counter Indications (MHz)	Tolerance (Hz)
48.33	48.343750	± 350
50.65	50.656250	± 400
52.31	52.328125	± 400
54.98	54.979166	± 400
58.25	58.265625	± 450
61.66	61.666666	± 450
63.46	63.484375	± 450
66.00	66.000000	± 500
67.50	67.510417	± 500
72.50	72.500000	± 500

(5) Connect test equipment as shown in B, figure 3-23.

(6) Power level indicated on the power meter with S8 in the 47.50 position is between + 12.5 and +15.5.

(7) Repeat (6) above for all remaining positions of switch S8.

b. Adjustments. No adjustments can be made.

56. Doubler Power

a. Performance Check.

(1) Connect test equipment as shown in figure 3-24.

(2) Set switch S6 to DBLR.

(3) Meter M1 shall indicate between 20 and 90 percent, and power meter shall indicate between -3 dbm and -6 dbm for all positions of switch S8.

b. Adjustments. No adjustments can be made.

57. IF Gain

a. Performance Check.

(1) Connect test equipment as shown in figure 3-25.

(2) Position controls on unit under test as follows:

(a) Switch S6 to REC SIG.

(b) Switch S7 to AGC.

(c) Switch S8 to 47.50.

(d) Switch S9 to 30 MHz.

(e) Switch S14 to 30 MHz.

(f) Switch AT1 to 40.

(g) Switch S5 to S6.

(3) Power level at J15 shall be between -2 dbm and -6 dbm.

(4) Set AT1 to 20, meter M1 shall indicate between 50 and 70 percent.

(5) Set ATI to 40, set switch S7 to MAN. Turn GAIN control on TUNER RADIO FREQ from maximum clockwise to maximum counterclockwise.

(6) Power level at J15 shall be greater than -5 dbm and decrease to at least - 22 dbm.

b. Adjustments. Adjust RCVR SIG METER ZERO control on amplifier, video CMC 455-975 (rear panel) (fig. 3-4) for 60 percent indication on meter MI.

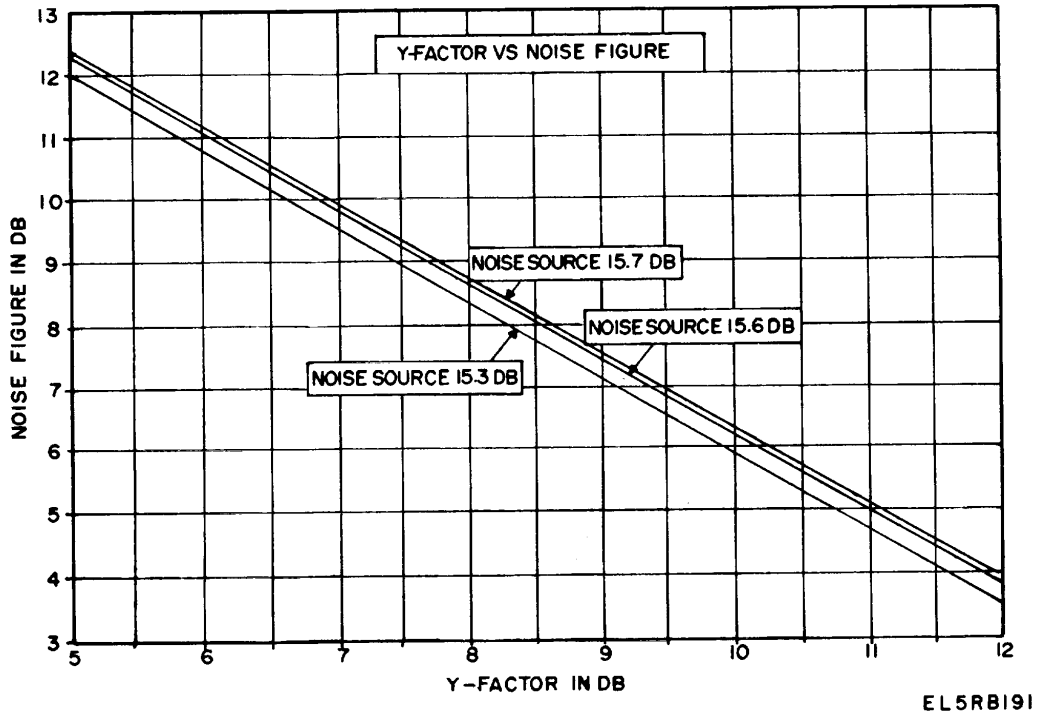


Figure 3-22. "Y" Factor Chart.

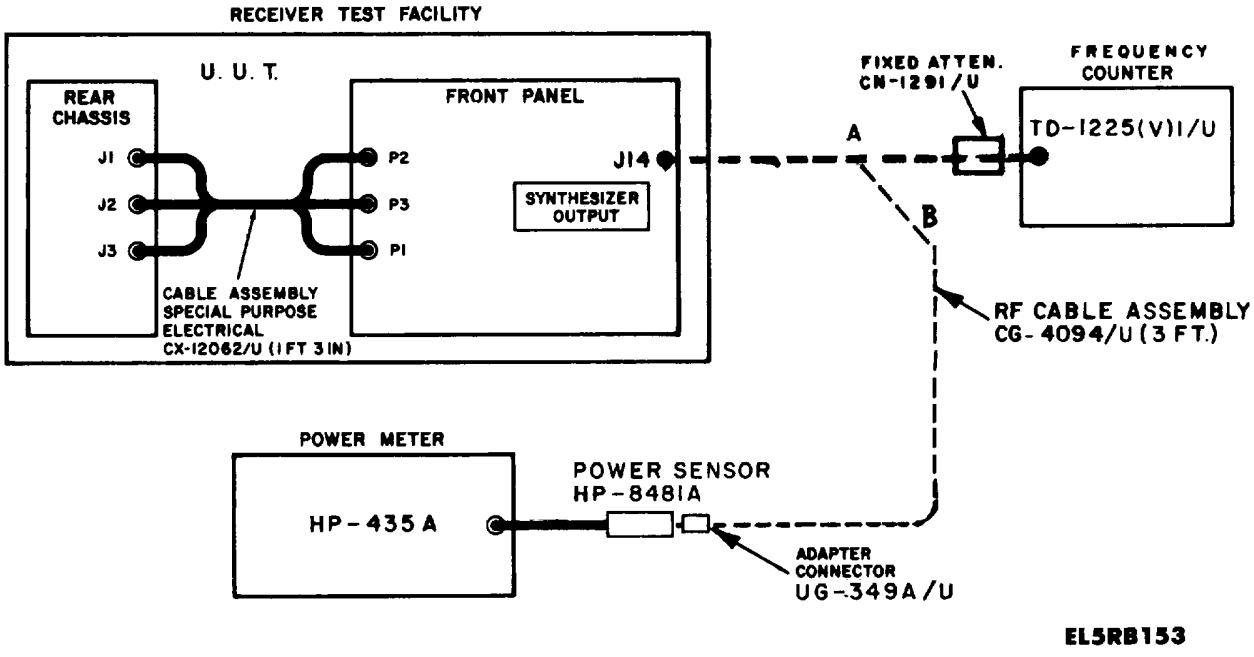


Figure 3-23. Turner Radio Frequency Section Synthesizer Output Check Test Setup

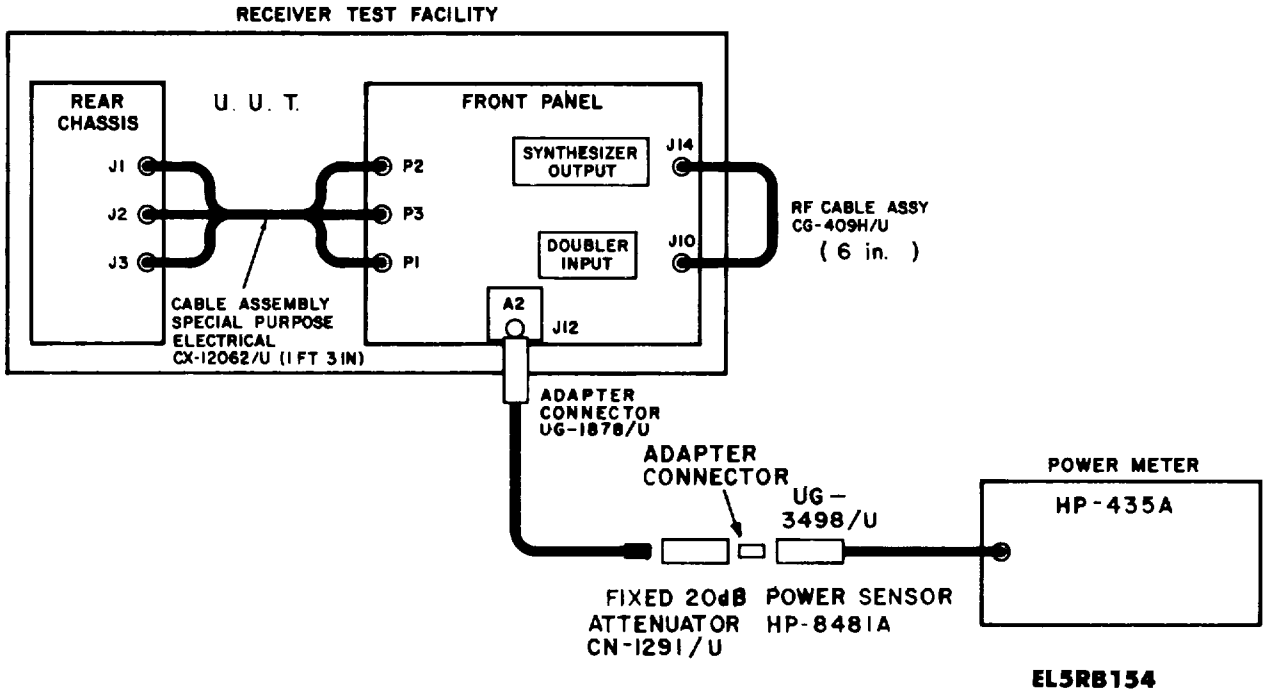


Figure 3-24. Turner Radio Frequency Section, Double Power Measurement Test Setup

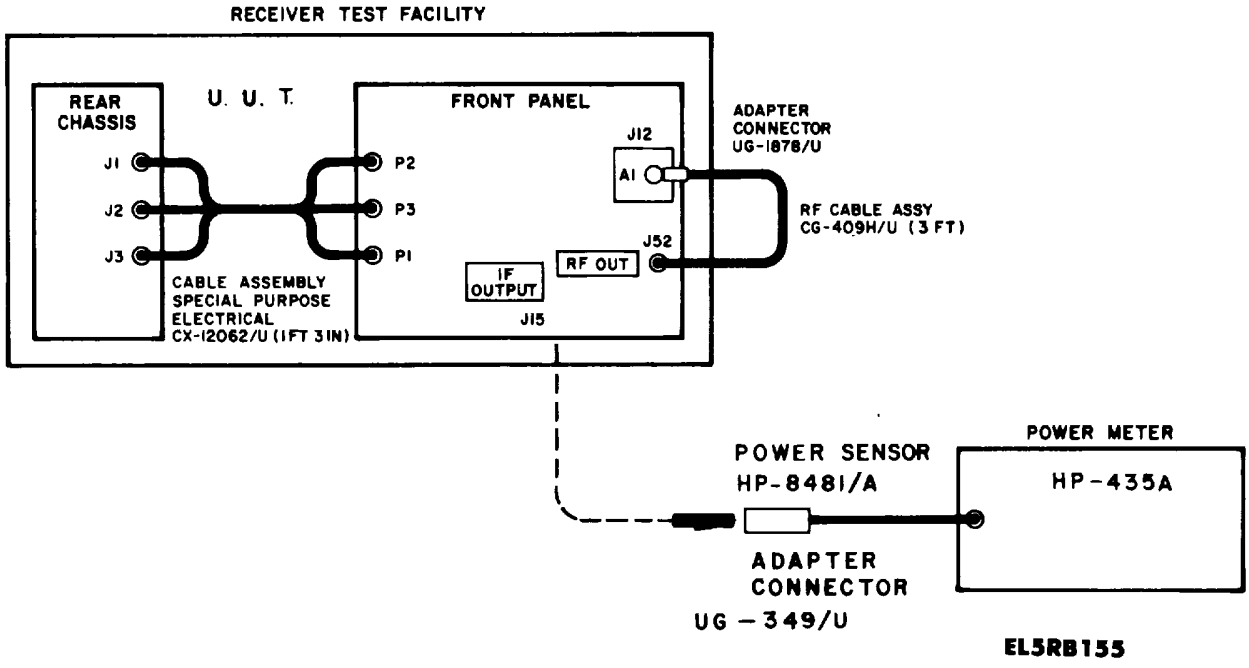


Figure 3-25. Turner Radio Frequency Section, IF Gain Measurement Test Setup

58. Baseband (System) Level

a. Performance Check.
(1) Connect test equipment as shown in figure 3-26.
(2) Set U.U.T. switch positions as follows:
(a) S6 to 24 CHAN.
(b) S7 to AGC.
(c) S9 to 30 MHz LEVEL.
(d) AT1 to 20 db.
(3) VTVM shall indicate less than -5 dbm.
(4) Set switch S9 to 300 kHz. VTVM shall indicate between 250 and 280 millivolts. Meter M1 shall indicate within the green band.
(5) Set switch S9 to 180 kHz, VTVM shall indicate between 150 and 168 millivolts.
(6) Set switch S9 to 75 kHz, set switch S6 to FDM, meter M1 shall indicate within green band.
b. Adjustments.
(1) Adjust GAIN control on Amplifier, Video CMC 455-975 (rear panel) (fig. 3-4) for 265 millivolts, (4) above.
(2) Adjust METER 24 CH control on Amplifier, Video CMC 455-975 (rear panel) (fig. 3-4) for a 50% indication on meter M1, (4) above.
(3) Adjust METER FDM control on Amplifier, Video CMC 455-975 (rear panel) (fig. 3-4) for a 50% indication on meter M1, (6) above.

59. Amplifier IF Ampl Freq Mult Gain Calibration

a. Performance Check.
(1) Connect test equipment as shown in figure 3-27.
(2) Position controls on unit under test as follows:
(a) Switch S1 to ON.
(b) Switch S12 to AMPL IF.
(3) Turn GAIN control on section under test fully counterclockwise. Voltmeter shall indicate between -10.69 and -11.81 volts dc.
(4) Turn GAIN control fully clockwise. Voltmeter shall indicate between -8.79 and -9.71 volts dc.
b. Adjustments. No adjustments can be made.

60. Restorer Pulse Form Frequency Variation

a. Performance Check.
(1) Connect test equipment as shown in A, figure 3-28.
(2) Position controls on unit under test as follows:
(a) Switch S1 to ON.
(b) Switch S15 to PCM and TMG.

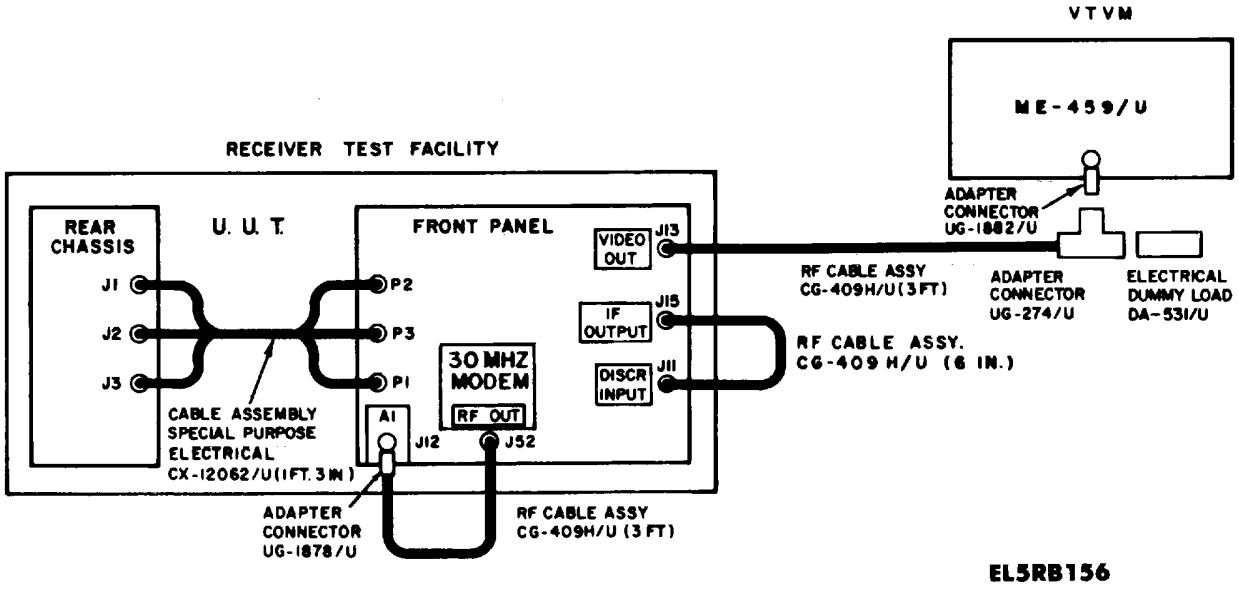


Figure 3-26. Turner Radio Frequency Section, Baseband (System) Level Testy Setup

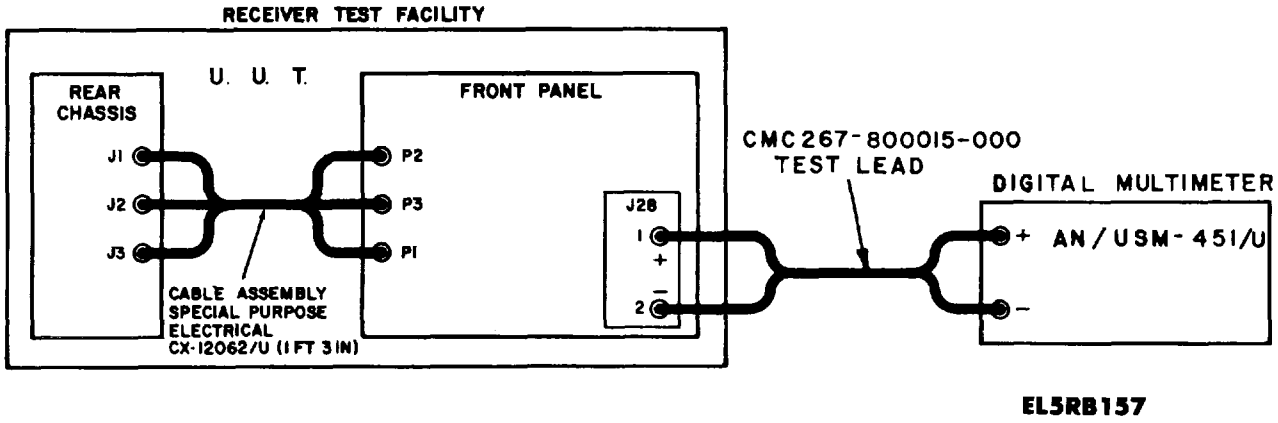


Figure 3-27. Amplifier IF-Ampl Mult Section, Amplifier Gain Measurement Test Setup.

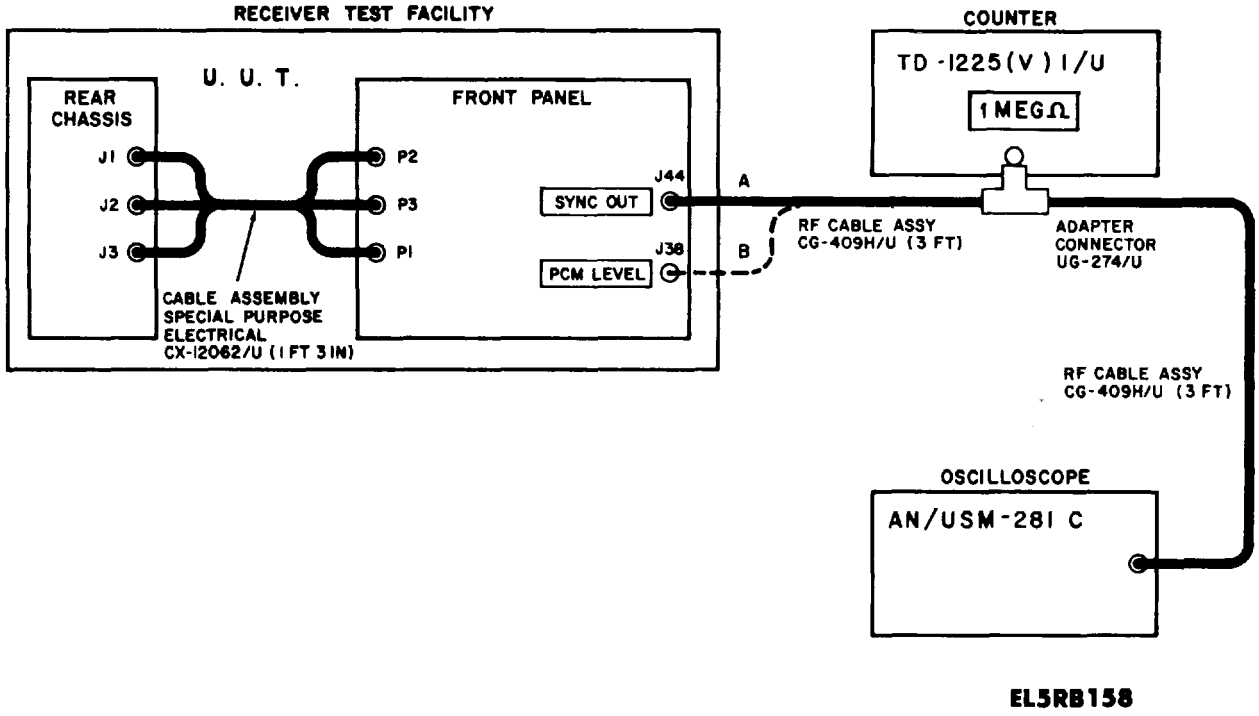


Figure 3-28. Restorer Pulse Form Section, Frequency Variation and PCM Level Check Test Setup.

(3) Vary the FREQ ADJ control for maximum and minimum frequencies indicated on the frequency counter. The frequency shall vary between not lower than 576.03 kHz and not more than 575.97 kHz respectively.

(4) Adjust FREQ ADJ control for a frequency of 576.000 kHz at J44 as indicated on frequency counter. Oscilloscope shall display a near square wave 3.6 to 4.4 volts peak-to-peak.

b. Adjustments. No adjustments can be made.

61. PCM Level

a. Performance Check.

(1) Connect test equipment as shown in B, figure 3-28.

(2) Turn PCM LEVEL control to midrange. Frequency at J38 shall be 288 kHz as measured on the frequency counter.

(3) Turn PCM LEVEL control from fully counterclockwise to fully clockwise. Level at J38 shall vary between zero and at least 1.5 volt as indicated on oscilloscope.

b. Adjustments. No adjustments can be made.

62. Random Operation

a. Performance Check.

(1) Connect test equipment as shown in B, figure 3-28.

(2) Turn switch S15 to NOISE.

(3) Turn PCM LEVEL control from fully counterclockwise to fully clockwise.

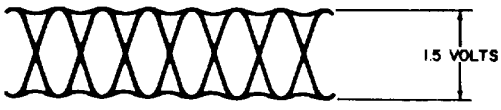
(4) Waveform displayed on oscilloscope (fig. 3-29) shall vary from 0 to at least 1.5 volt peak-to peak.

(5) Reset PCM LEVEL control for 1.5 volt peak- to-peak as indicated on oscilloscope.

(6) Turn switch S15 to OUTPUT.

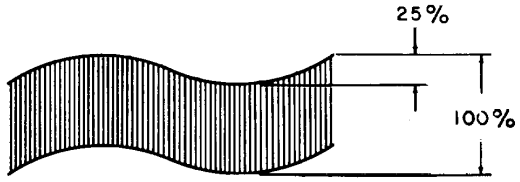
(7) By increasing time base, oscilloscope shall display the noise signal to which a 1-kHz signal has been added (fig. 3-30).

(8) Turn PCM LEVEL control fully counter-clockwise.



EL5RB159

Figure 3-29. Restorer Pulse Form Section, Random Operation, Amplitude Modulated Signal Display



EL5RB160

Figure 3-30. (9) Sine wave displayed on oscilloscope shall be between 440 and 480 millivolts.

b. Adjustments.

(1) Adjust R5 on circuit card assembly CMC 456-624 (fig. 3-2) for an undistorted sine wave of maximum amplitude as indicated on oscilloscope.

(2) Adjust R3 for 460 millivolts peak-to-peak as indicated on oscilloscope.

63. Test Signal Out

a. Performance Check.

(1) Turn switch S15 to PCM to TMG and PCM LEVEL control to midrange.

(2) Connect test equipment as shown in A, figure 3-31. Frequency counter shall indicate 288 kHz.

(3) Turn PCM LEVEL from fully counter clock- wise to fully clockwise. Waveform displayed on oscilloscope shall vary from 0 volt to at least 2 volts peak- to-peak. Reset PCM LEVEL control for 2 volts peak-to-peak as indicated on oscilloscope.

(4) Connect test equipment as shown in B, figure 3-31. Waveform at J47 shall be a square wave at 288 kHz as indicated on frequency counter and between 104 and 156 millivolts peak-to-peak as indicated on oscilloscope.

b. Adjustments. No adjustments can be made.

64. Filter Response

a. Performance Check

(1) Connect test equipment as shown in figure 3-32.

(2) Set coaxial switch to position 1.

(3) Set wide range oscillator frequency to 1 kHz as indicated on frequency counter, at a level of 0 dbm as indicated on VTVM.

(4) Set coaxial switch to position 2.

(5) Turn S15 to NOISE. Level at J45 shall be

between -5 and -7 dbm as indicated on VTVM.

(6) Repeat (1) through (5) above for each frequency listed in table 11. VTVM shall measure within the specified limits.

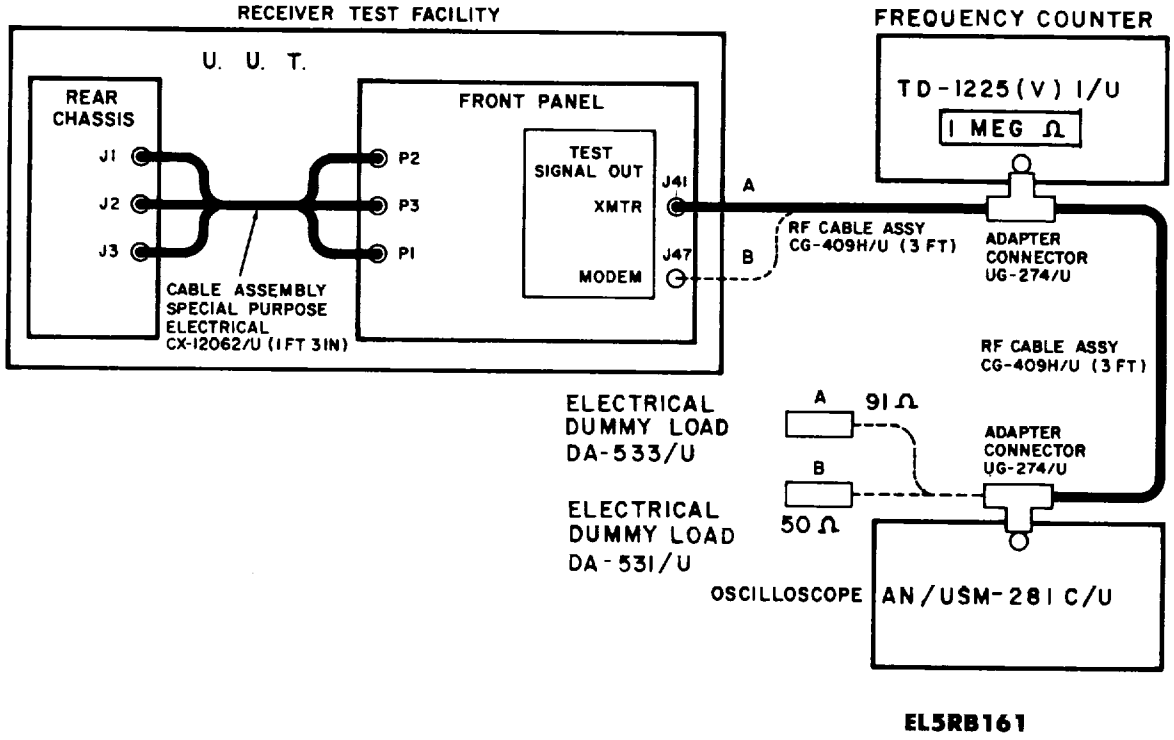


Figure 3-31. Restorer Pulse Form Section, Test Signal Out Check Test Setup.

Table 11. Filter Response Test

Wide range oscillator		Unit under test filter	
		Output level VTVM (dbm)	
Frequency	Level (dbm	Minimum	Maximum
100	0		- 31.00
300	0	- 18.50	- 12.50
400	0	- 12.50	- 8.50
1.00 kHz	0	- 7.00	- 5.00
2.00 kHz	0	- 10.00	- 6.00
3.00 kHz	0	- 14.50	- 10.50
4.00 kHz	0	- 24.00	- 18.00
5.50 kHz	0		- 46.00

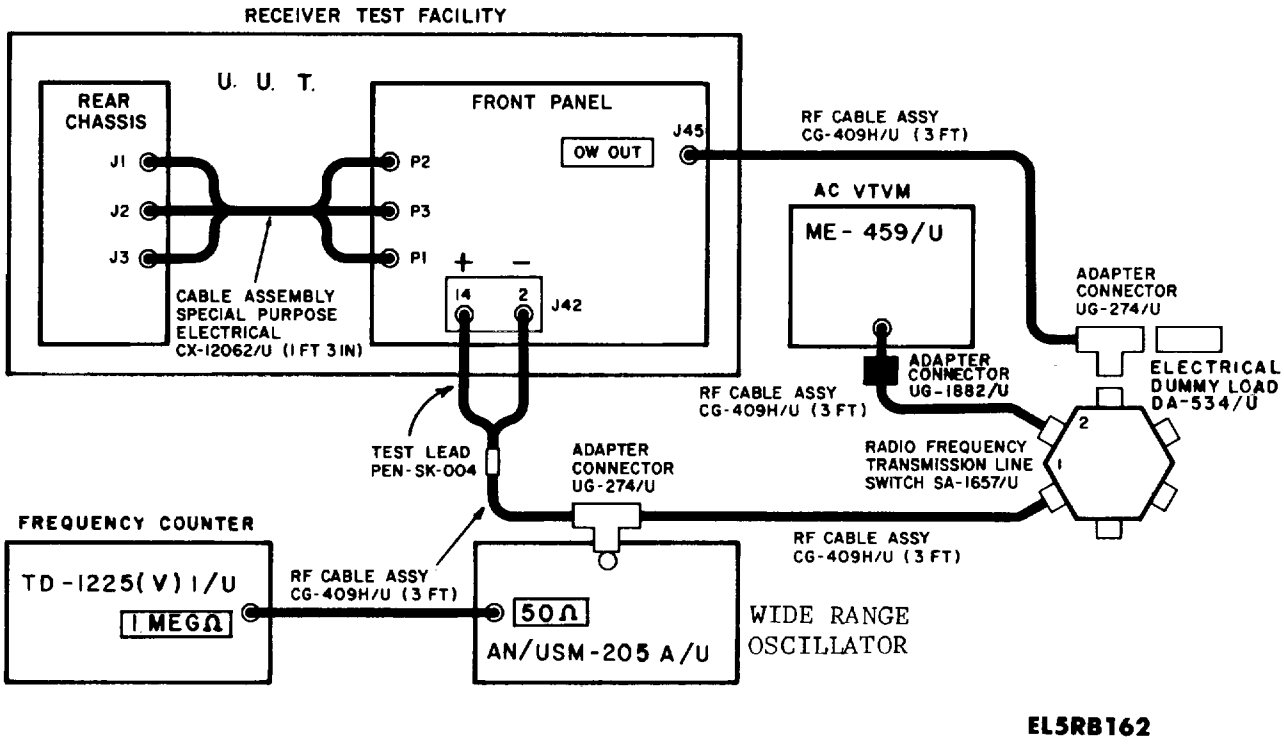


Figure 3-32. Restore Pulse Form Section, Filter Responce Calibration Test Setup.

(7) Turn switch S15 to DISTORTION. Remove 600 ohm load on switch. Vary wide range oscillator between 200 Hz and 5.5 kHz. VTVM shall indicate sharp drop in level around 1 kHz.

8) Tune wide range oscillator for a minimum indication on VTVM, which shall occur between and 1010 Hz, Level at J45 shall be -35 dbm or less indicated on VTVM.

b Adjustments.

(1) Turn switch S15 to NOISE and set coaxial switch to position 1. Put on 600 ohm load at switch (2) Adjust wide range oscillator frequency 5.5 kHz as indicated on frequency counter and adjust output level for - 16 dbm as indicated on VTVM

(3) Set coaxial switch to position 2.

(4) On circuit card assembly CMC 456-854 (fig. 3-2), adjust R4 and R5 alternately for minimum indication on VTVM.

(5) Set coaxial switch to position 1.

(6) Adjust wide range oscillator frequency for 1 kHz as indicated on frequency counter and adjust output level for -16 dbm as indicated on VTVM.

(7) Set coaxial switch to position 2.

(8) Voltage level at J45 shall be between -21 and -23 dbm as indicated on VTVM. If reading is not within specified limits proceed with (9) through (13) below.

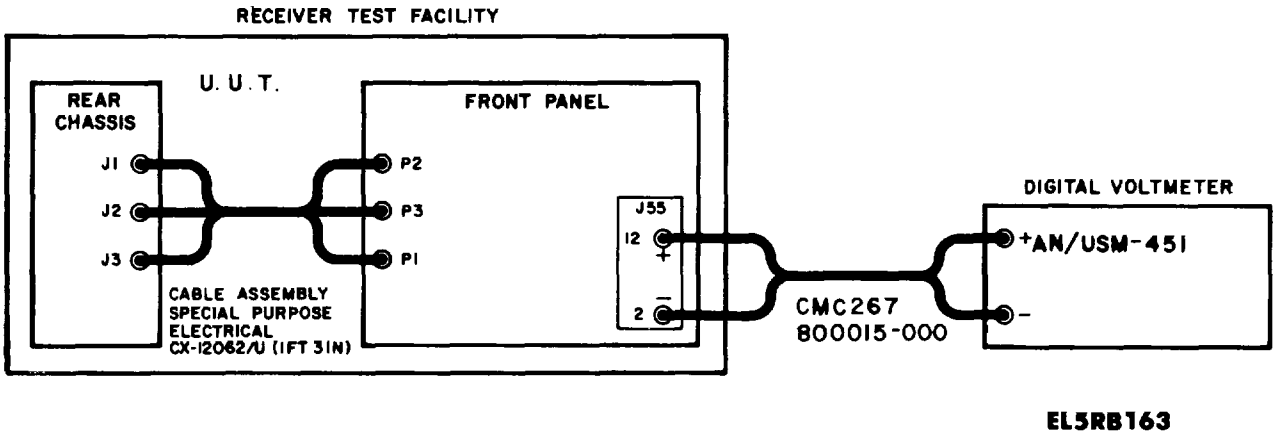


Figure 3-33. Amplifier Video Section, Receiver Signal Calibration Test Setup.

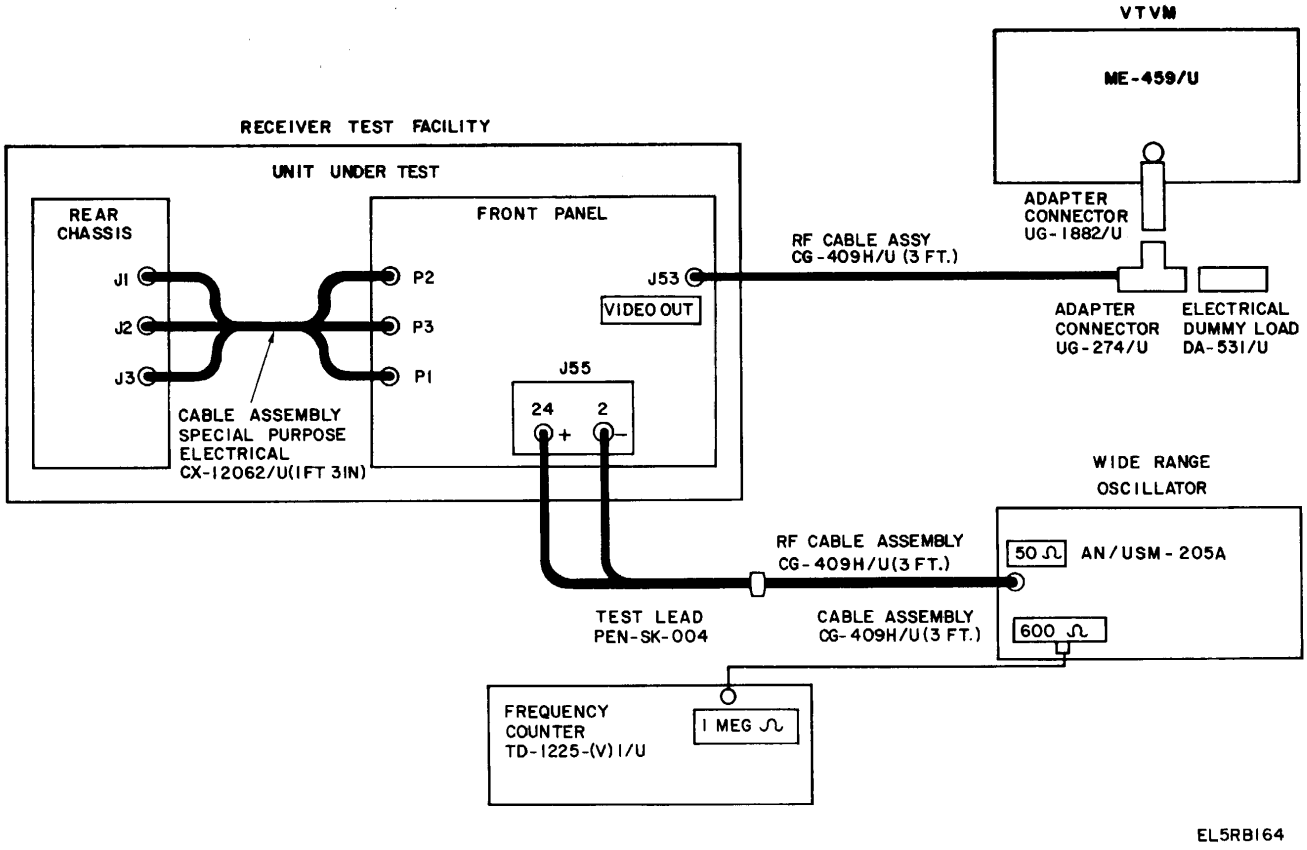


Figure 3-34. Amplifier Video Section, Compensating Network Check Test Setup.

(9) Set coaxial switch to position 1.

(10) Adjust wide range oscillator for 2 kHz as indicated on frequency counter and adjust output level for -16 dbm as indicated on VTVM.

(11) Set coaxial switch to position 2.

(12) Adjust R9 on circuit card assembly CMC 456-854 for 2 db below the reading obtained in (8) above.

(13) Repeat (6), (7), and (8) above and keep or repeating this procedure until the requirement of (8) and (12) is met.

(14) Repeat a(6) above to check overall response

65. Amplifier Video Section Receiver Signal

a. Performance Check.

(1) Connect test equipment as shown in figure 3-33.

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S20 to RCVR SIG.

(c) All other switch to OFF.

Voltage between pin 12 (+) and pin 2 (-) o fJ55 shall be -8.83 volts dc as indicated on the voltmeter.

b. Adjustments. Adjust R15 on circuit card as assembly CMC 456-842 (fig. 3-2) for -8.83 volts dc as indicated on the voltmeter.

66. Compensating Network

a. Performance Check.

(1) Connect test equipment as shown in figure -34.

(2) Set switch S21 on unit under test to OUT.

(3) Set wide range oscillator frequency to 10 kHz as indicated on frequency counter at a level of 0 dbm as measured on VTVM.

(4) Set switch S21 to IN.

(5) VTVM shall measure between - 16 and - 20 dbm. This is the reference level

(6) Increase wide range oscillator frequency in steps as shown in table 12.

(7) Compensating network response shall be as shown in table 12.

Table 12. Compensating Network Response

Frequency Counter Indication kHz	VTVM indication (dbm)
205	Reference level plus 0.75 db ±0.2
410	Reference level plus 3.00 db ±0.2
720	Reference level plus 9.25 db ±0.35
960	Reference level plus 16.50 db ±1.20

b. Adjustments. No adjustments can be made.

67. Electronic Switch Voltage and Ripple

a. Performance Check.

(1) Connect test equipment as shown in figure 3-35.

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S19 to INT.

(c) Switch S5 to S17.

(3) Perform metering and ripple checks as shown in table 13.

b. Adjustments. No adjustments can be made.

Table 13. Voltage and Ripple Test

S18 position	S17 position	M1 indication	Oscilloscope display (maximum peak-to, peak voltage
NORM	+ 12V	Green area	
NORM	-12V	Green area	
NORM	100V	30% to 50%	40 millivolts
NORM	200V	Green area	40 millivolts
NORM	6V	Green area	300 millivolts
ALARM TEST	ALARM TEST	Green area	1400 millivolts

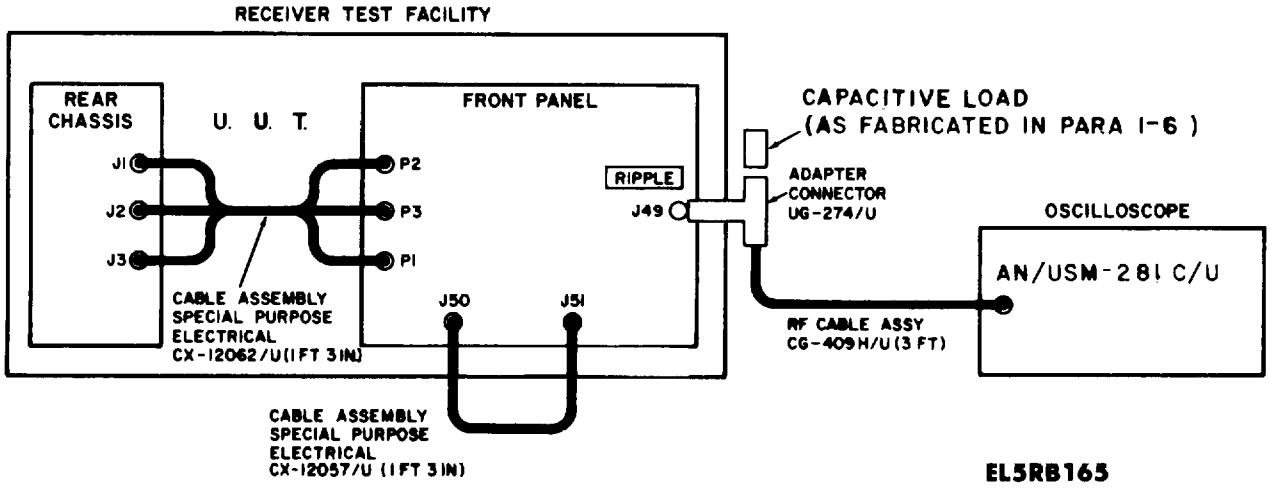


Figure 3-35. Electronic Switch Section Voltage and Ripple Measurement Test Setup.

SECTION IV
CALIBRATION PROCEDURES FOR ELECTRICAL TEST PANEL SB-4048/GRM-95(V) PART OF TRANSMITTER TEST FACILITY TS-2866(V)2/GRM-95(V)

68. Preliminary Procedures

The following preliminary procedure is applicable when calibrating Electrical Test Panel SB-404 GRM-95(V) (fig. 1-1) (transmitter test facility).

a. Set Power Supply PP-6304/GRM-95(V) (fig. 1-3) AC POWER switch to OFF and turn the voltage control fully counterclockwise.

b. Position controls on unit under test as follows:

(1) Set switches S1, S2, S6, and S13 off (down

(2) Set switch S15 to DRIVER.

(3) Set switch S16 to OUTPUT NORMAL.

(4) Set switch S27 to indicator A (right).

(5) Set switch S29 to OUTPUT.

(6) Set switches S12, S17, S18, S21, S25, S2 S28, S30 through S33 to OFF.

(7) Turn switches S4 and S20 to +12V.

NOTE

For all subsequent tests, remove the transmitter test facility from the transit case as required to gain access to the rear panel (fig. 4-4). Separate the front panel (fig. 4-2) from the rear chassis (fig. 4-3) only when necessary to make adjustments within the unit under test. Open the power supply door on the front panel (fig. 1-1) as required to gain access to test points.

c. Connect the unit test ac power cable to one connector on power supply.

d. Connect power supply ac power cable to 115-volt ac power source.

e. Set power supply AC POWER switch to ON; the AC POWER indicator glows.

f. Turn power supply voltage control until the VOLT meter indicates 115V.

NOTE

During following calibration procedures, the VOLT meter indication may vary as the load varies. Periodically check the VOLT meter and adjust the voltage control for a 115-volt indication, if necessary. The following paragraphs are divided into subparagraph a performance check, and subparagraph b adjustments. When the performance check is not within tolerance and no adjustment is specified, the deficiency must be corrected before continuing with the procedure.

69. Transmitter Test Facility Meter Ml

a. Performance Check.

CAUTION

Turn Power Supply HP-6002A output voltage to minimum before switching on.

(1) Connect test equipment as shown in figure 4-1.

(2) Turn unit under test switches S20 to S4 and S4 to +12V METER.

(3) Adjust power supply output voltage for 50 percent as indicated on meter M1 of unit under test.

(4) Voltmeter shall indicate between 240 and 260 millivolts.

b. Adjustments. No adjustments can be made.

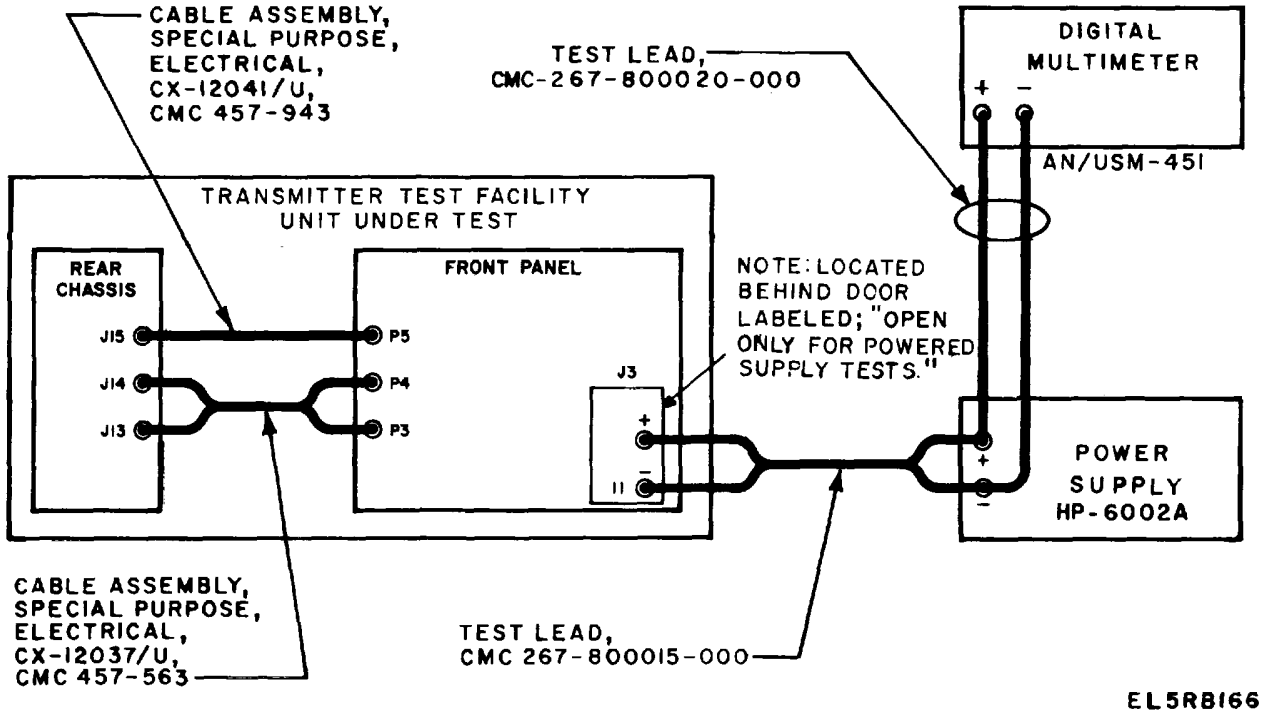


Figure 4-1. 7Tansmitter Test Facility Meter M Calibration Test Setup.

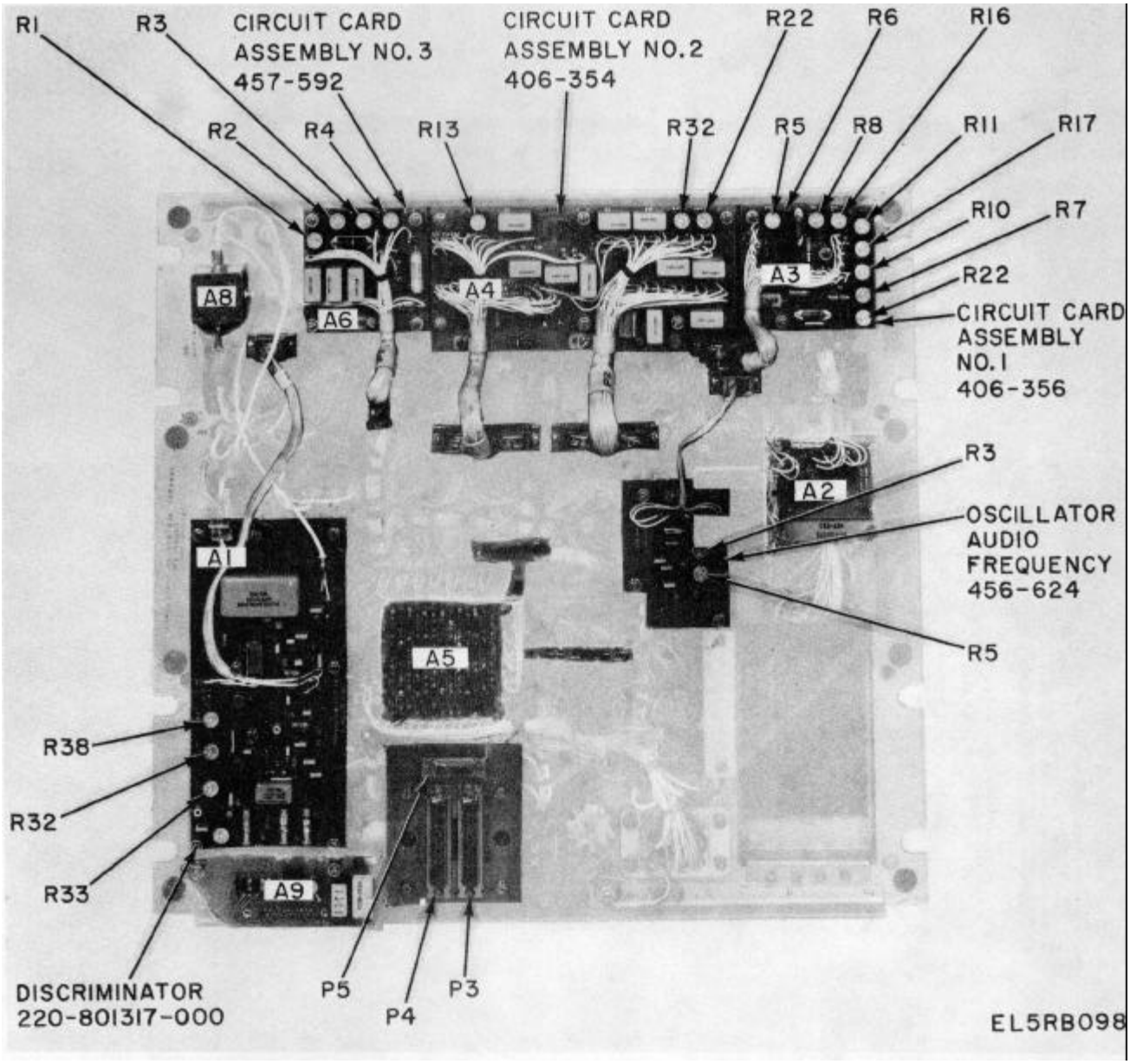


Figure 4-2. Electrical Test Panel SB-40481GRM-95(V) Front Pane4 Rear View.

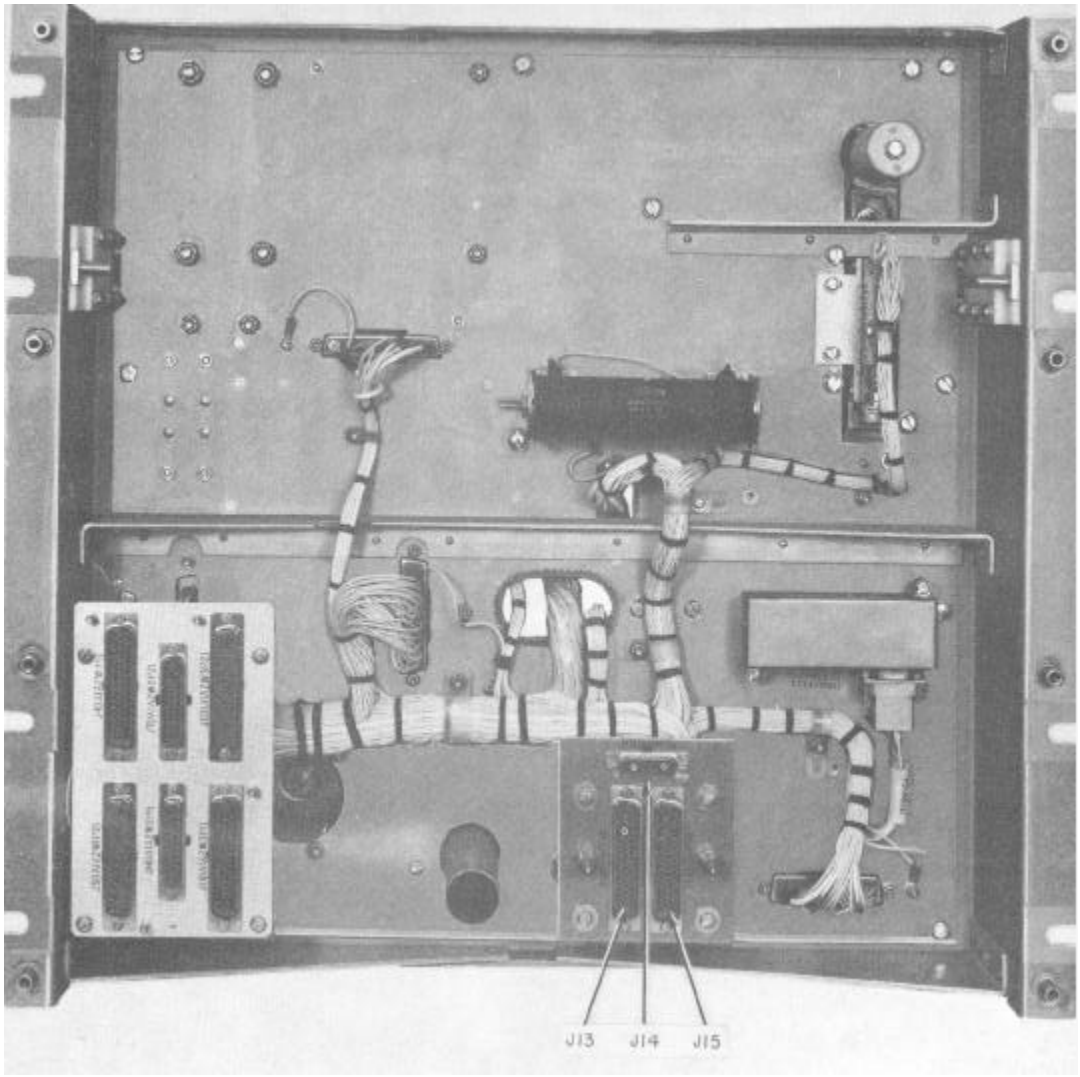


Figure 4-3. Electrical Test Panel SB-3368/GRM-95(V) Rear Chassis, Front View.

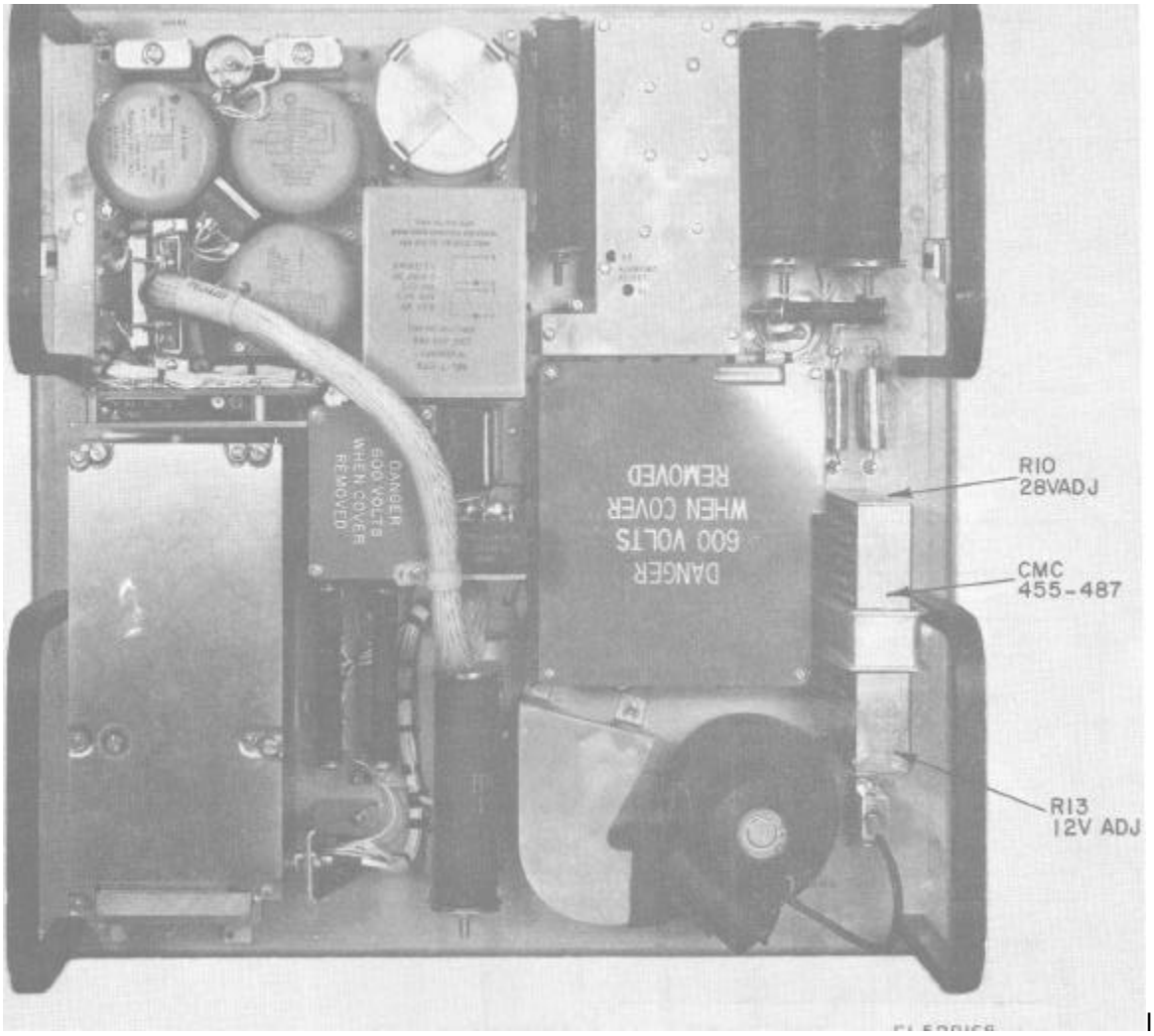


Figure 4-4. Electrical Test Panel

70. Power Supply Section Metering Circuits

NOTE

Open the power supply door on the front panel (fig. 1-1).

a. Performance Check.

(1) Connect the test equipment as shown in figure 4-5.

(2) Turn switch S20 to position S4.

(3) Turn switch S4 to all positions indicated table 14.

(4) Set the power supply voltage to the value indicated for each position of S4.

(5) Meter M1 shall indicate 50 percent ñ the width of the pointer.

b. Adjustments. Refer to table 14 and adjust the corresponding potentiometer on circuit car assembly CMC 406-356 (fig. 4-2) to obtain a 50 percent indication on M1 meter.

Table 14. Circuit Test

S4 switch position	Connect 11-power supply to - P4* pins +	P4* pins -	J3 pins +	J3 pins -	Set power supply voltage to-	Adjust potentiometer on circuit card assy CMC 406-356
+12V			2	3	12.0v	R11
+28 V **			1	3	28.0v	R10
**			2	3	12.0v	
+26V			4	5	26.0v	R17
DRIVER FIL			21	23	7.15v	R8
OUTPUT FIL			23	22	7.15v	R16
DRIVER CUR			24	3	2.24v	R7
OUTPUT CUR			25	3	1.9v	R6
26V AC			19	18	28.0v	R22
600V	40	3 .			0.5v	R5

*P4 is located at the rear of the front panel (fig. 4-2).
**Feed +28 volts and +12 volts supplies simultaneously.

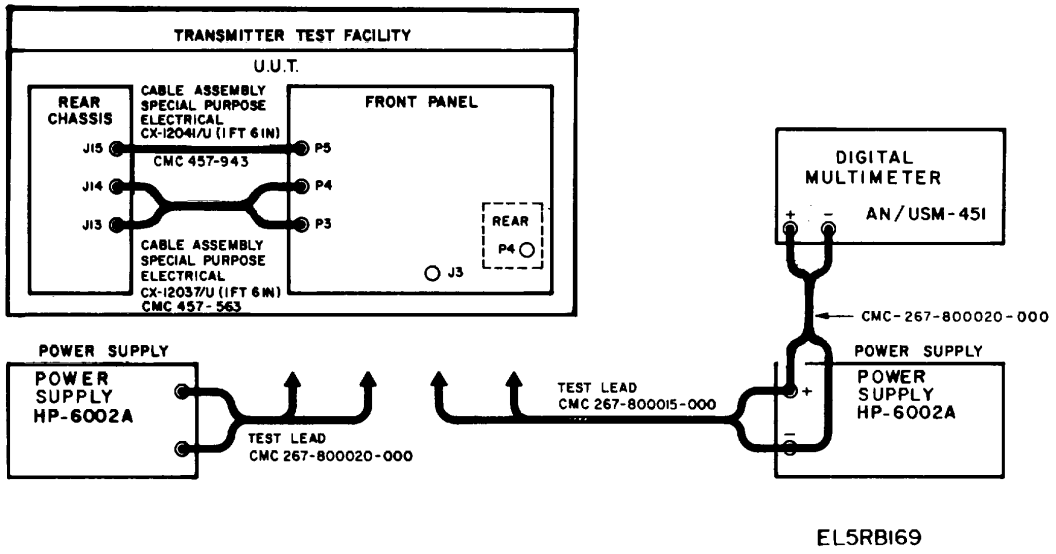


Figure 4-5. Power Supply Section Metering Circuits Calibration Test Setup.

71. Power Supply Voltage Output and Meter Calibration Check

a. Performance Check.

(1) Connect test equipment as shown in A, figure 4-6.

(2) Set switches as follows:

(a) S1 to ON

(b) S2 to ON

(c) Press and hold S5 (+12V load) and S7(+ 28V load).

(3) Digital multimeter shall indicate between11.8 and 12.2 vdc.

(4) Connect test equipment as shown in B, figure4-6.

(5) Repeat 2(c) above.

(6) Digital multimeter shall indicate between 27.8and 28.2 vdc.

(7) Connect test equipment as shown in C, figure 4-6.

(8) Repeat 2(c) above.

(9) Digital multimeter shall indicate between 24.7 and 27.3 vdc.

b. Assignments.

(1) Perform (1) and (2) above, adjust R-13 or voltage regulator amplifier CMC 455-487, located on rear chassis for digital multimeter indication of 12.0 vdc.

(2) Perform (4) and (5) above, adjust R-10 on voltage regulator amplifier, CMC 455-487 for digital multimeter indication of 28.0 vdc.

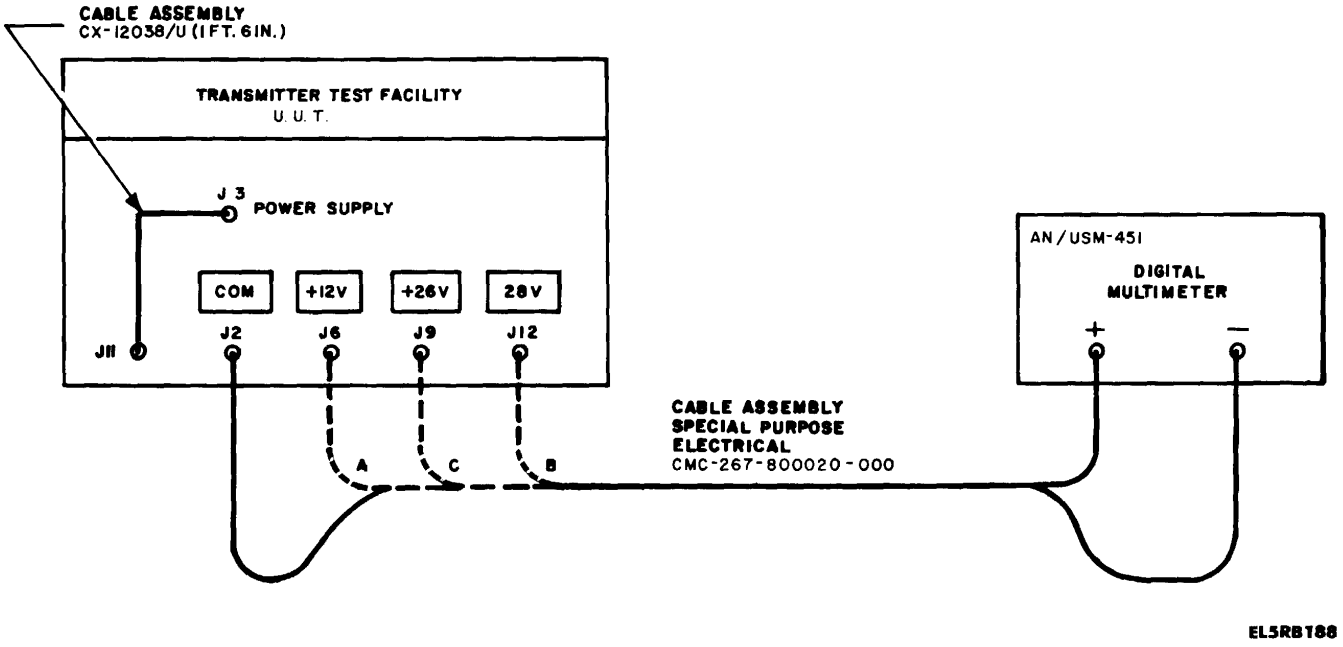


Figure 4-6. Power Supply Voltage and Meter Calibration Checks.

72. Meter Readings and Ripple Voltage

a. Performance Check.

(1) Connect test equipment as shown in figure 4-7.

(2) Set switches S1 and S2 to ON.

(3) Turn switch S4 to positions indicated in table 15 and observe meter M1 and VTVM indications.

(4) The readings shall be in accordance with those listed in table 15.

(5) Turn switch S4 to 600V.

(6) Set switch S2 to OFF.

(7) Press and hold switch S3 + 600V.

(8) Set Switch S2 to ON.

(9) Meter M1 shall indicate in the green band.

(10) VTVM shall indicate 10 mv maximum rip ple.

(11) Turn switch S4 to 600V METER

(12) Meter Ml shall indicate between 45 and 55 percent.

Table 15. Voltage and Ripple Test

S4 Position	Operation	Meter M1 Indication	Max Ripple VTVM Indication
+ 12V	Press S5, S7	Green Band	3.6 MV
+ 12V Meter	Press S5, S7	50% ± Needle Width	
+28V	Press S5, S7	45% to 55%	5.0 MV
+ 28V Meter	Press S5, S7	50% + Needle Width	
+26V	Press S3, S5, S7	45% to 55%	350MV
Output Fil	Press S3, S5, S7	45% to 60%	1OOMV
Driver Fil	Press S3, S5, S7	45% to 60%	100 MV above OUTPUT FIL
Driver Current		Green Band	
Output Current		Green Band	
26 vac		Green Band	

b. Adjustments.

(1) + 12V meter. Press S5 and S7, adjust R20 on voltage regulator amplifier, CMC 455-487 for 50% indication on meter M1.

(2) +28V meter. Press S5 and S7, adjust R17 on voltage regulator amplifier, CMC 455-487 for 50% indication on meter M1.

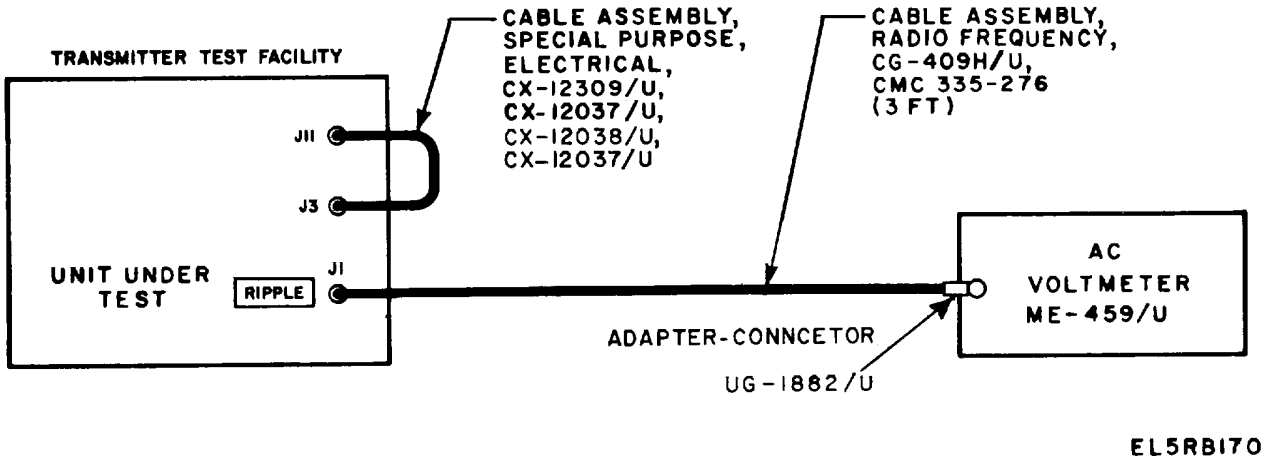


Figure 4-7. Power Supply Section, Meter Readings and Ripple Voltage Calibration Test Setup.

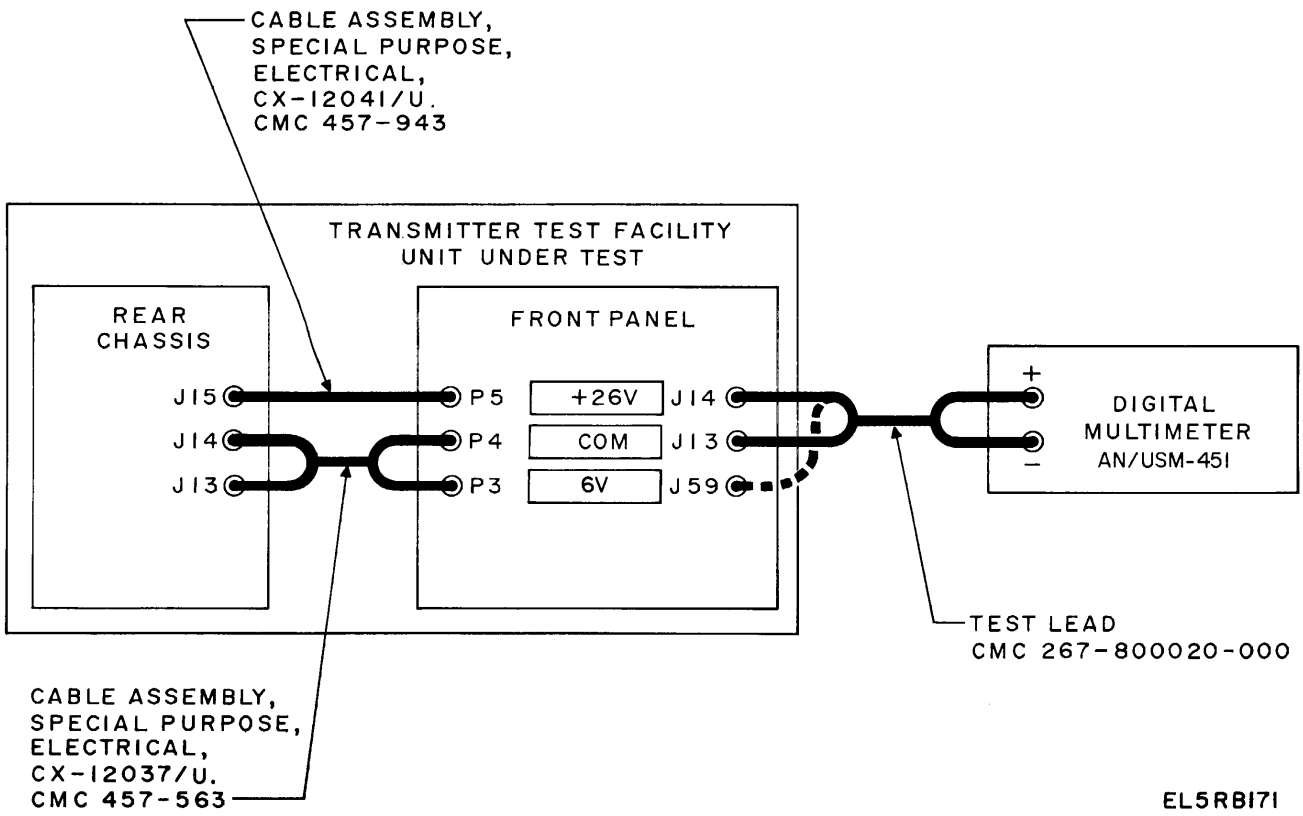


Figure 4-8. 26V Supply Section, Output Voltage Measurements Test Setup.

73. A 26V Output Supply

a. Performance Check.

(1) Connect the test equipment as shown in figure 4-8.

(2) Set switch S1 and S6 to ON.

(3) Voltmeter shall indicate not less than 24.7 vdc.

(4) Remove cable from J14 and connect it to J59.

(5) Voltmeter shall indicate between 5.7 and 6.5 volts dc.

b. Adjustments. No adjustments can be made.

74. Ampl Freq Multiplier Switch S12, Position Ref

a. Performance Check.

(1) Connect the test equipment as shown in figure 4-9.

(2) Turn transmitter test facilities METERING switch S20 to S12 and switch S12 to position REF, set switch S1 to OFF.

(3) Adjust power supply voltage to 7.15 volts dc.

(4) Meter M1 shall indicate 50 percent ± the width of the pointer.

b. Adjustments. Adjust potentiometer R22 on circuit card assembly CMC 406-354 (fig. 4-2) for a 50 percent indication on the meter M1.

75. Ampi Freq Multiplier Switch S12, Position Fil V

a. Performance Check.

(1) Connect test equipment as shown in figure 4-10.

(2) Turn switch S12 to position Fil V.

(3) Adjust power supply voltage to 6.3 volts dc.

(4) Meter M1 should indicate 50 percent + the width of the pointer.

b. Adjustments. Adjust potentiometer R32 on circuit card assembly CMC 406-354 (fig. 4-2) for a 50 percent indication on meter M1.

76. Ampl Freq Multiplier Switch S12, Positions Osc-Dblr-Emissions

a. Performance Check.

(1) Connect test equipment as shown 4-11.

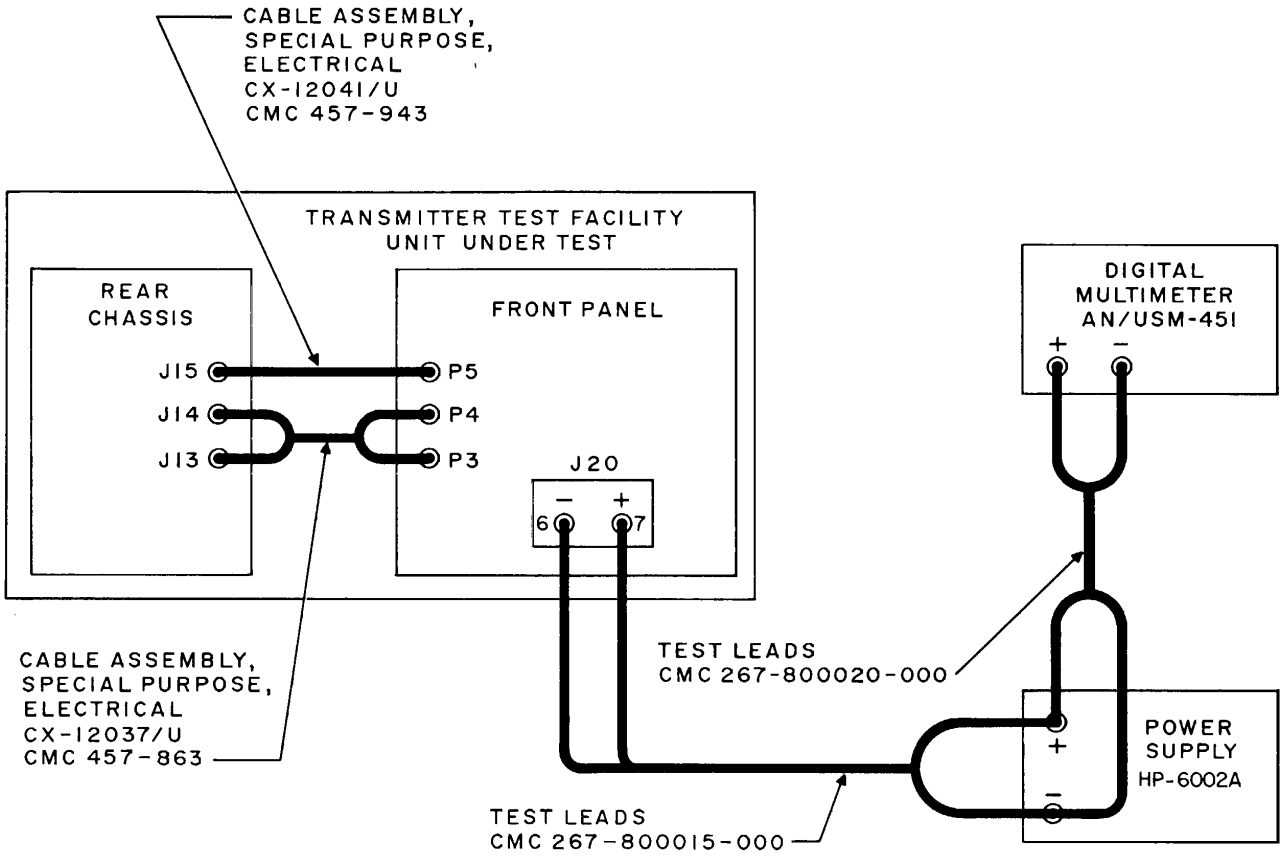


Figure 4-9. Amp Freq Multiplier Section, Switch S12 Position Ref Calibration Test Setup.

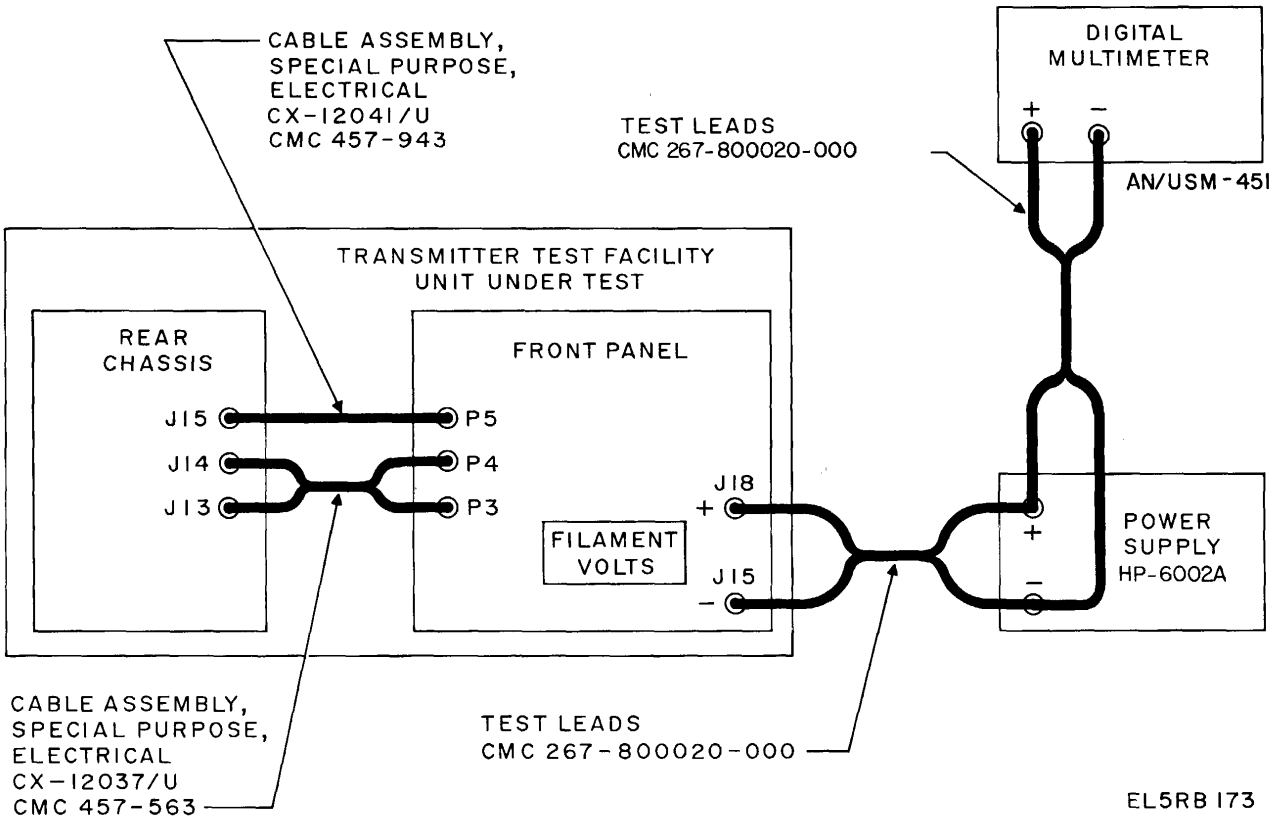


Figure 4-10. Ampl Freq Multiplier Section, Switch S12 Position Fil V Calibration Test Setup.

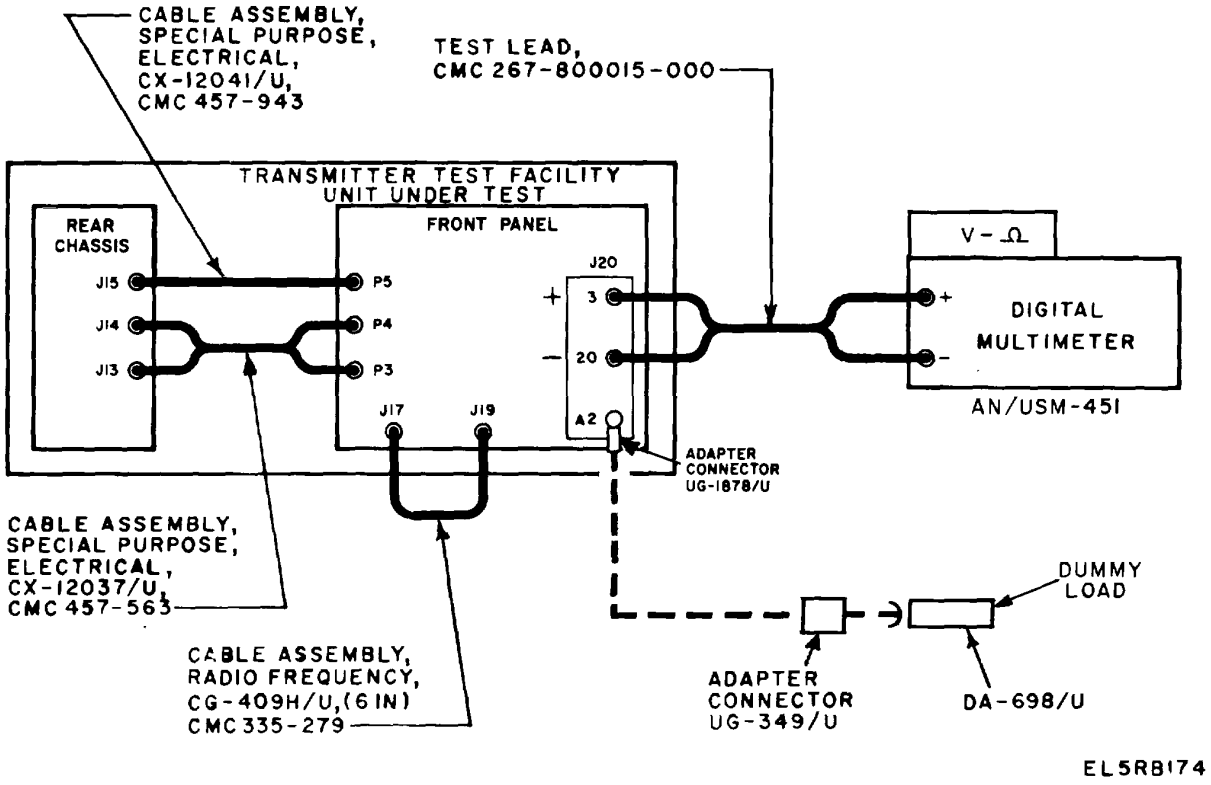


Figure 4-11. Ampl Freq Multiplier Section, Switch S12 Position Osc-Dblr-Emission Calibration Test Setup.

(2) Position controls on unit under test as lows:
(a) Switch S1 to ON.
(b) Switch S18 to 47.50.
(c) Switch S17 to ON.
(3) Turn switch S12 to OSC.
(4) Meter M1 shall indicate between 20 and percent.
(5) Turn switch S12 to DBLR.
(6) Meter M1 shall indicate between 20 and percent.
(7) Turn switch S12 to EMISSION and switch S15 to DRIVER.
(8) Press and hold switch S14.
(9) Unit Under Test Meter M1 indication shall drop to zero within 15 to 25 seconds after depressing S14.
(10) Set switch S1 to OFF.

b. Adjustments. No adjustments can be made.

77. Synthesizer Output

a. Performance Check.

(1) Connect test equipment as shown in A, figure 4-12.
(2) Position unit under test controls as follows:
(a) Switch S1 to ON.
(b) Switch S17 to ON.
(c) Switch S12 to OSC.
(d) Switch S18 to 47.50.
(e) Switch S20 to S12.

NOTE

Allow 5 minutes for oscillator to stabilize.

(3) Meter Ml shall indicate between 20 and 90 percent.
(4) Frequency at J17 shall be between 47.499650 and 47.500350 MHz as indicated on counter.
(5) Frequency for remaining position of switch S18 shall be as shown in table 16.

(6) Connect test equipment as shown in B, figure 4-12.

(7) Set switch S18 to 47.5. The power meter shall

(8) Set switch S18 to each of the positions listed in table 16. The power meter shall indicate between +12.5 and +15.5 dbm.

b. Adjustments. No adjustments can be made.

Table 16. Synthesizer Frequency Checks

S18 Position	Frequency Counter Measurement (MHz)	Tolerance (Hz)
48.83	48.343750	±350
50.65	50.656250	+400
52.31	52.328125	±400
54.98	54.979166	+400
58.25	58.265625	+450
61.66	61.666666	+450
63.46	63.484375	+ 450
66.00	66.000000	+500
67.50	67.510417	±500
72.50	72.500000	500

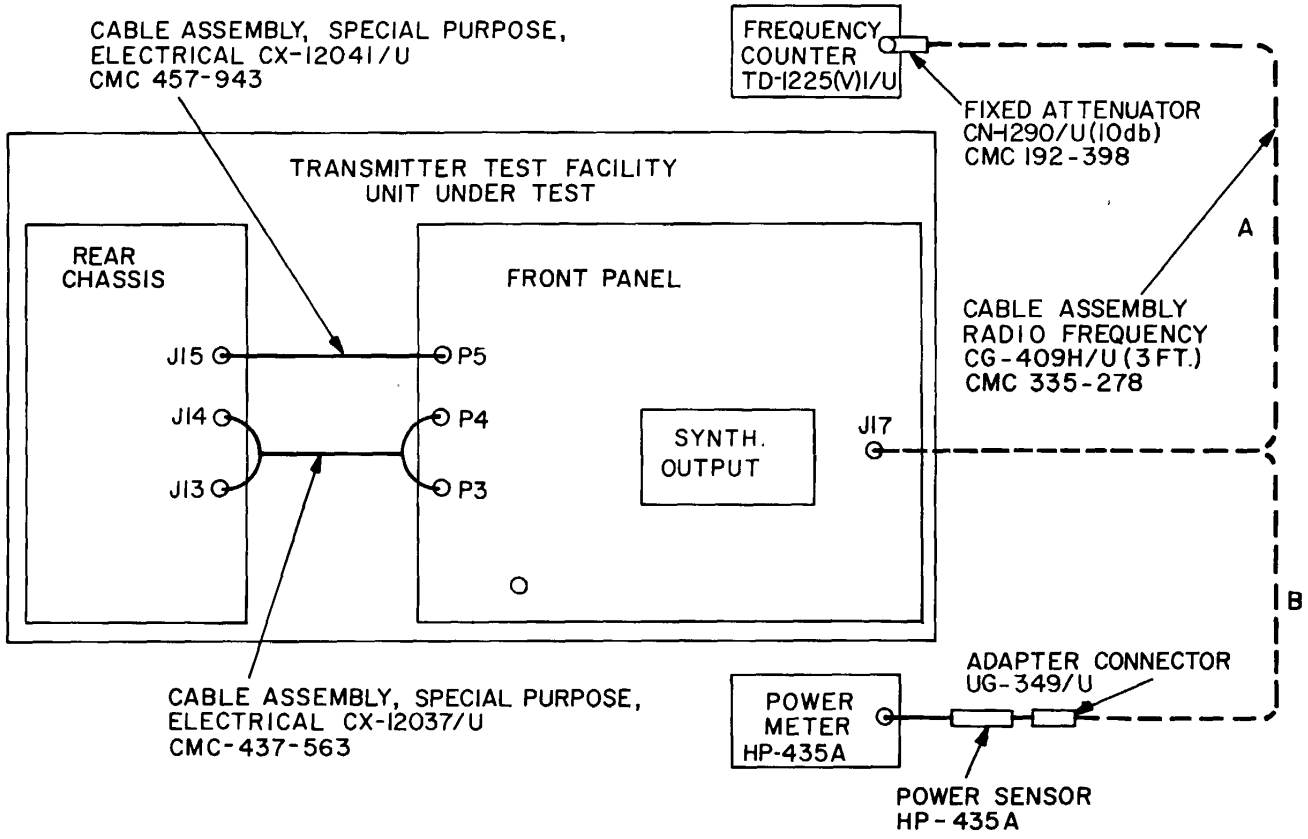


Figure 4-12. Ampl Freq Multiplier Section, Synthesizer Output Test Setup

78. Synthesizer Deviation.

a. Performance Check.

(1) Connect test equipment as shown in figure 4-13.

(2) Position the test facility set controls as follows:

S1 to ON
S17 to ON
S12 to OSC
S18 to 47.50 MHz
S20 to S12

(3) Adjust the wide range oscillator to 1 kHz at an output level of 133 MV as indicated on the Ac voltmeter.

(4) Tune the deviation meter to 47.5 MHz.

(5) The deviation shall be between 46.0 kHz and 54.5 kHz.

(6) Repeat (4) and (5) above at all remaining positions of switch S-18.

b. Adjustments. No adjustments can be made.

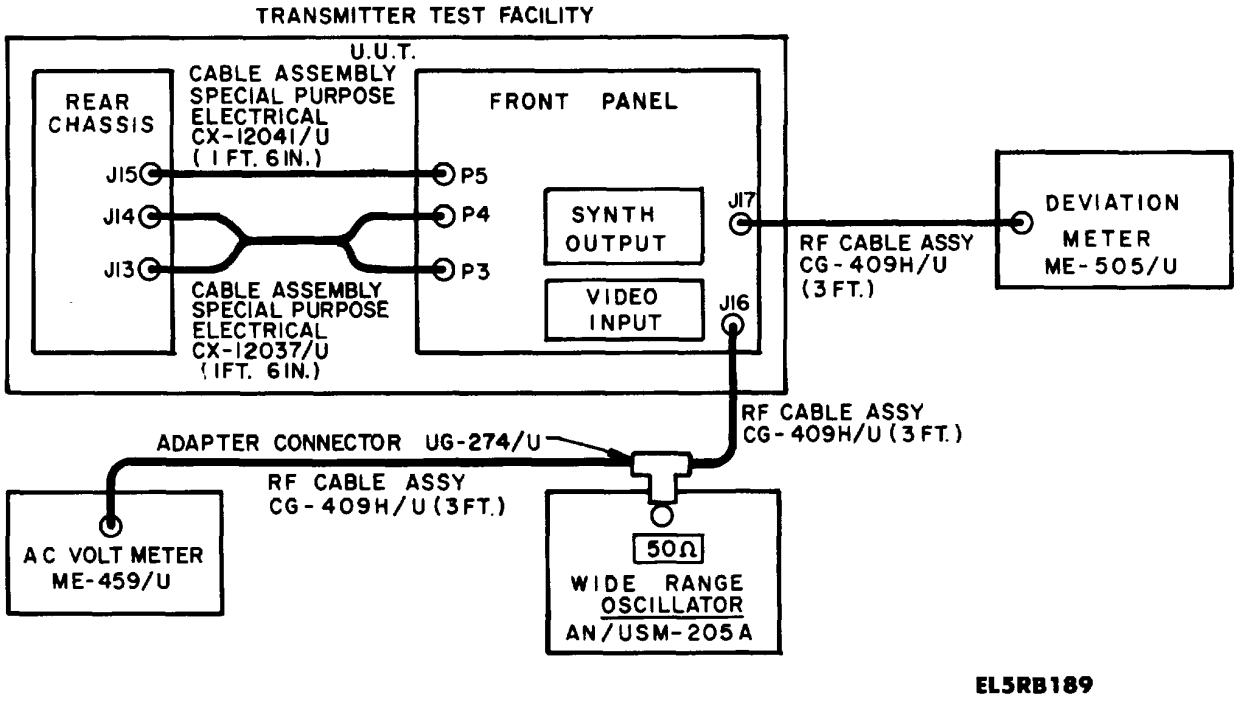


Figure 4-13. Synthesizer Deviation Test

79. Doubler Output

a. Performance Check.

(1) Connect test equipment as shown in figure 4-14.

(2) Turn switch S12 to DBLR, and S18 to 47.50.

(3) Meter M1 shall indicate between 20 and 90 percent.

(4) Power level as indicated on the power meter shall be between + 4 and + 7 dbm.

(5) Repeat (3) and (4) for all positions of S18.

b. Adjustments. No adjustments can be made.

80. A 1 kHz Synthesizer Modulating Signal Level

a. Performance Check.

(1) Connect test equipment as shown in figure 4-15. Use 500 ohm load fabricated in section I, paragraph 6b(5).

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S17 to MOD ON.

(3) Voltage at J21 pins 14 and 4 shall be 133 millivolts as indicated on VTVM.

(4) Oscilloscope shall display an undistorted sine wave.

b. Adjustments.

(1) Adjust R5 on circuit card assembly CMC 456-624 (fig. 4-2) for an undistorted sine wave of maximum amplitude as indicated on oscilloscope.

(2) Adjust R3 on circuit card assembly CMC 456-624 for 133 millivolts as indicated on VTVM.

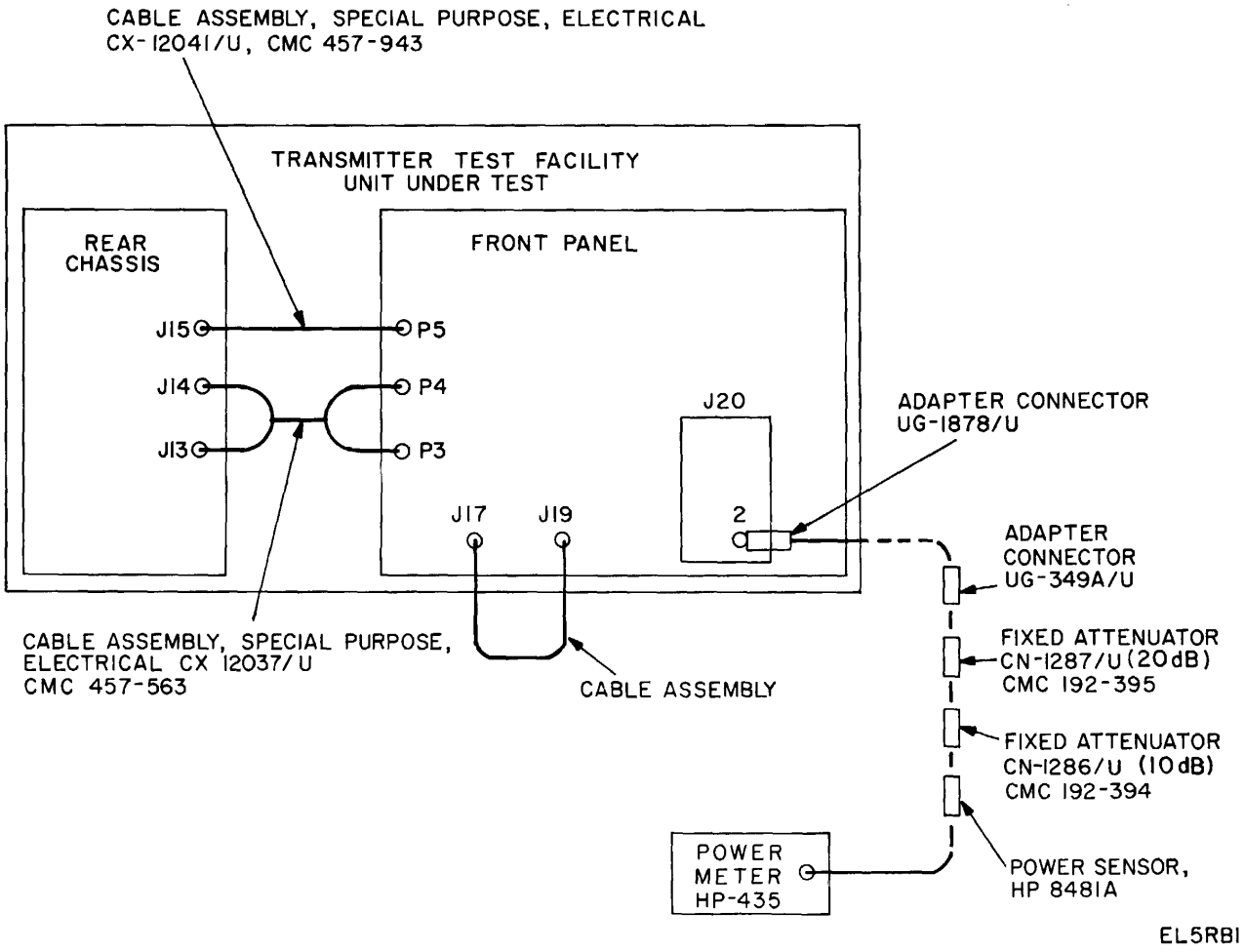


Figure 4-14. Ampl Freq Multiplier Section, Double Output Test Setup.

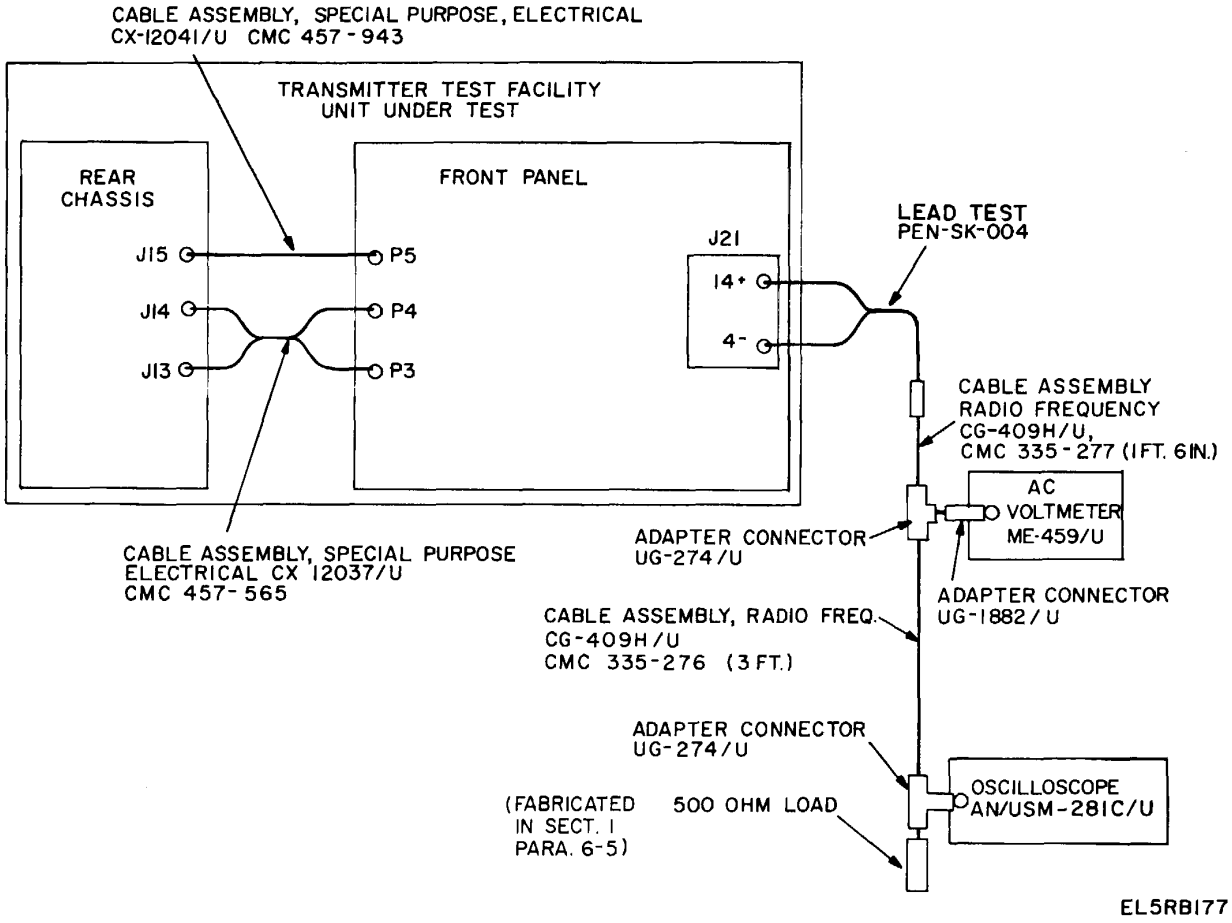


Figure 4-15. Synthesizer Section, 1 kHz Modulating Signal Calibration Test Setup.

81. Transmitter Radio 400-Hz Voltage

a. Performance Check.

(1) Connect test equipment as shown in figure 4-16.

(2) Set switches S1 and S6 to ON. Note indication on the voltmeter (NLT 24.7 vdc).

(3) Set switch S6 to OFF.

(4) Connect test equipment as shown in figure 4-17.

(5) Operate switch S22 to TEST and set switch S6 to ON.

(6) Voltage at J29 and J24 as indicated on the voltmeter shall be 1/10th of the reading noted in (2) above.

(7) Set switch S6 to OFF.

b. Adjustments. Adjust R13 on circuit card assembly 406-354 (fig. 4-2) to obtain the reading specified in (6) above.

82. Power Alarm Set Level

a. Performance Check.

(1) Connect test equipment as shown in figure 4-18.

(2) Set switch S6 to ON.

(3) Turn PWR ALM SET LEVEL control on unit under test from fully counterclockwise to fully clockwise.

(4) Voltage at J28 and J23 as indicated on the voltmeter shall increase from 0 to at least 500 millivolts dc.

b. Adjustments. No adjustments can be made.

83. Control Alarm Voltage Variation

a. Performance Check.

(1) Connect test equipment as shown in figure 4-19.

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S25 to ON.

(3) Turn SET INPUT control on unit under test from fully counterclockwise to fully clockwise.

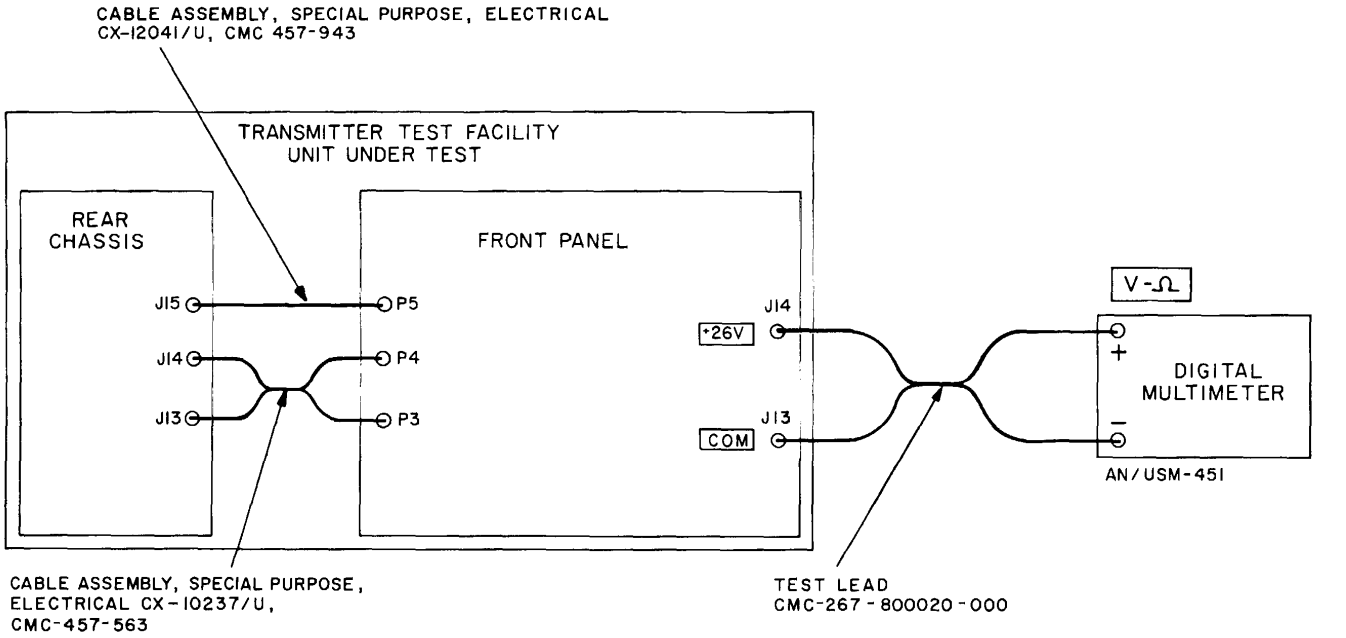


Figure 4-16. 400 Hz Supply Reference Voltage Calibration Test Setup.

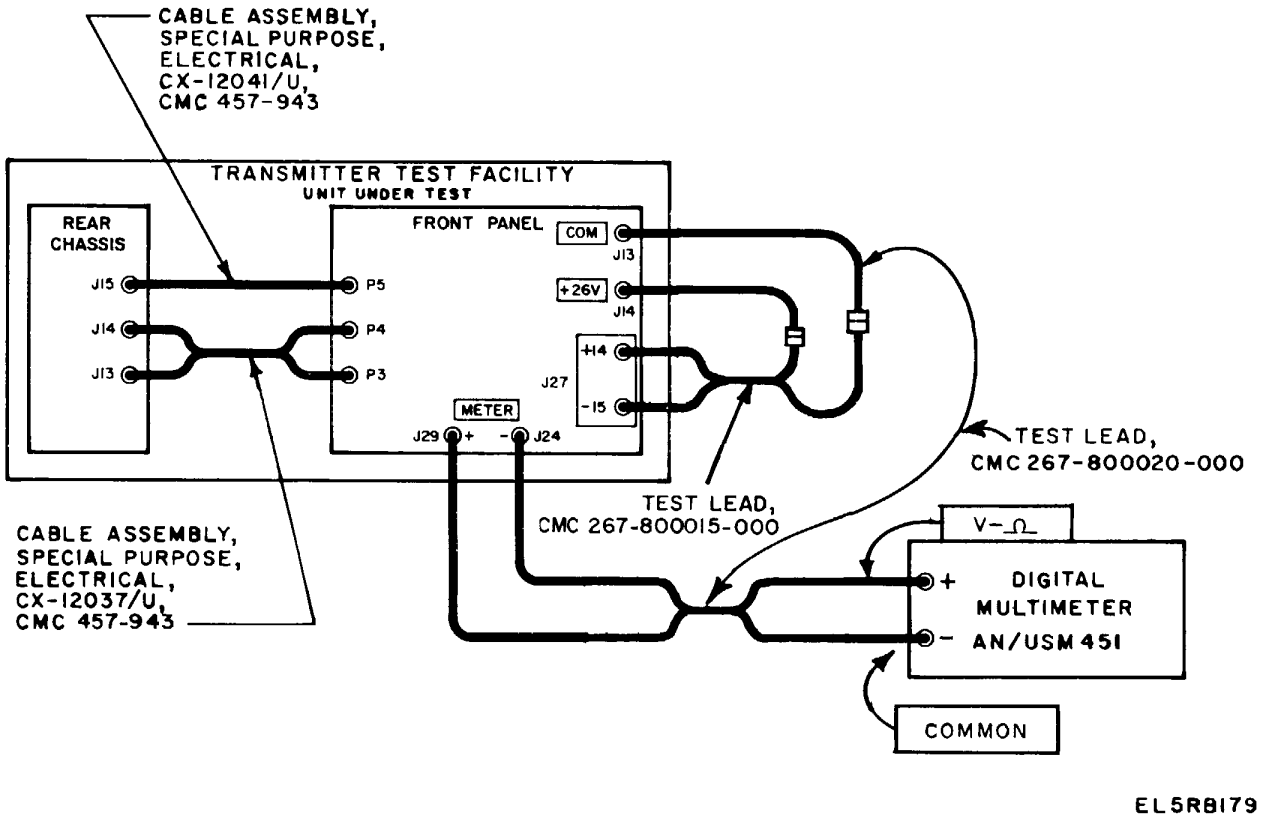


Figure 4-17. Transmitter Radio Section, 400 Hz Supply Output Voltage Measurement Test Setup.

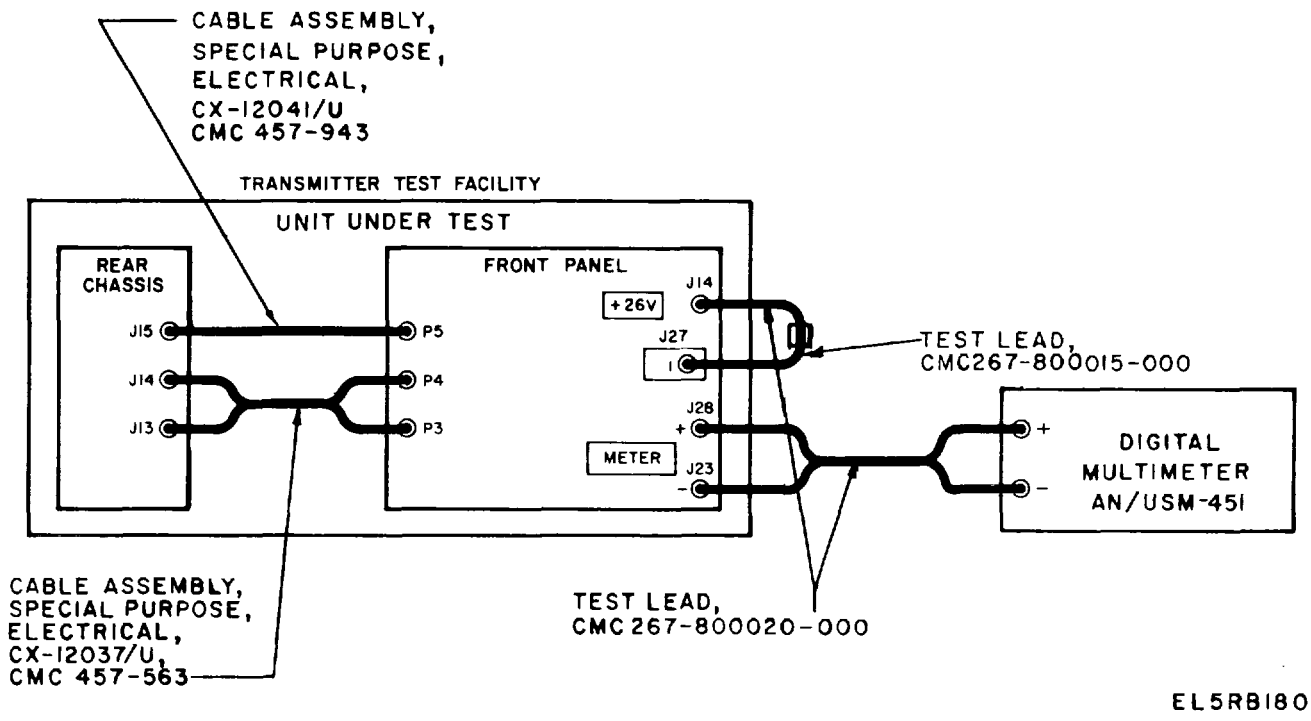


Figure 4-18. Transmitter Radio Section, Power Alarm Set Level Calibration Test Setup.

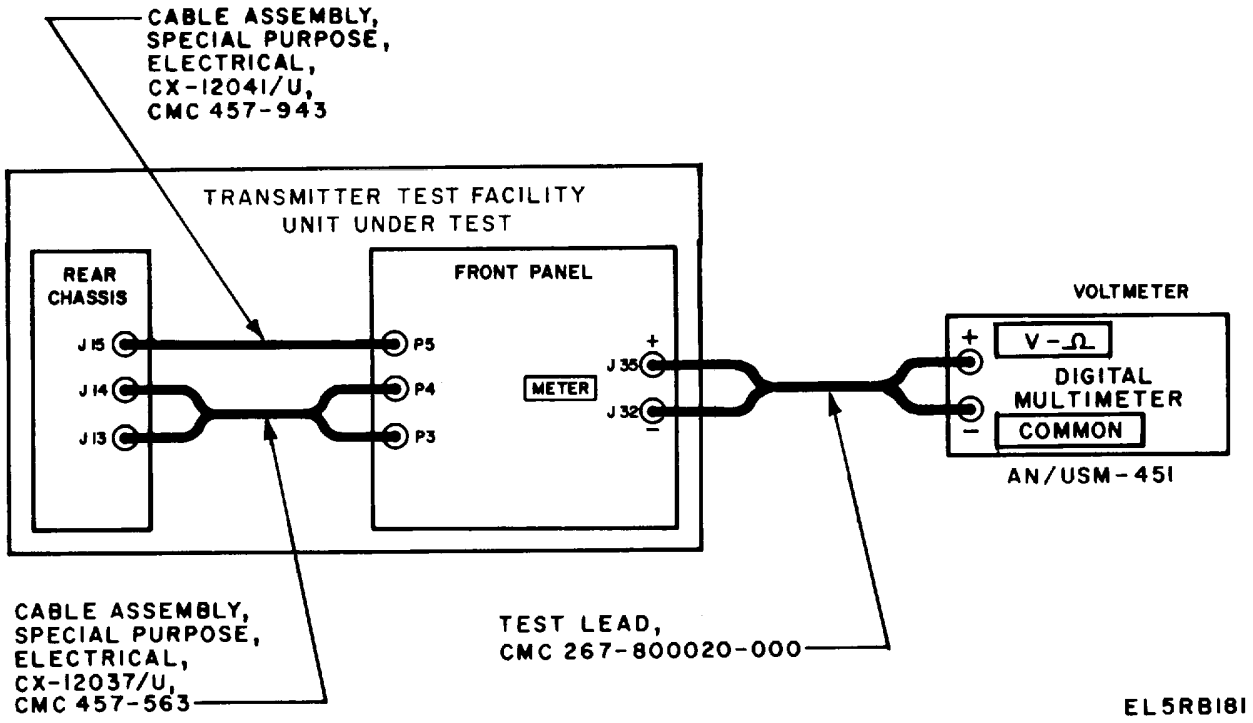


Figure 4-19. Control Alarm Section, Power Alarm Set Level Calibration Test Setup.

(4) Voltage at J35 and J32 shall increase from 0 to between 500 and 750 millivolts dc.

84. Electronic Switch 20-Volt Supply

a. Performance Check.

(1) Connect test equipment as shown in figure 4-20.

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S26 to 20V.

(3) Voltage at J34 pins 3 and 1 shall be between 18 and 22 volts dc as indicated on multimeter.

b. Adjustments. No adjustments can be made.

85. Ampl Freq Mult AGC Voltages

a. Performance Check.

(1) Connect test equipment as shown in figure 4-21.

(2) Position controls on unit under test as follows:

(a) Switch S1 to ON.

(b) Switch S30 to AGC 1.

NOTE

Voltage tolerances specified in paragraphs a(3), a(4), and a(5) are based on an absolute voltage requirement ± the digital multimeter tolerance, rounded off to two decimal places.

(3) Voltage at J41 pins 17 and 2 shall be between 8.08 and 8.12 volts dc as indicated on voltmeter.

(4) Turn switch S30 to AGC 2. Voltage at J41 pins 17 and 2 shall be between 8.68 and 8.72 volts dc.

(5) Turn switch S30 to AGC 3. Voltage at J41 pins 17 and 2 shall be between 9.08 and 9.12 volts dc.

b. Adjustments.

(1) To obtain the voltage specified in (3) above, proceed as follows:

(a) Turn switch S30 to AGC 1.

(b) Turn R4 on circuit card assembly CMC 457-592 (fig. 4-2) fully clockwise.

(c) Adjust R1 for 8.6 volts dc as indicated on the voltmeter.

(d) Adjust R4 for 8.1 volts dc as indicated on the voltmeter.

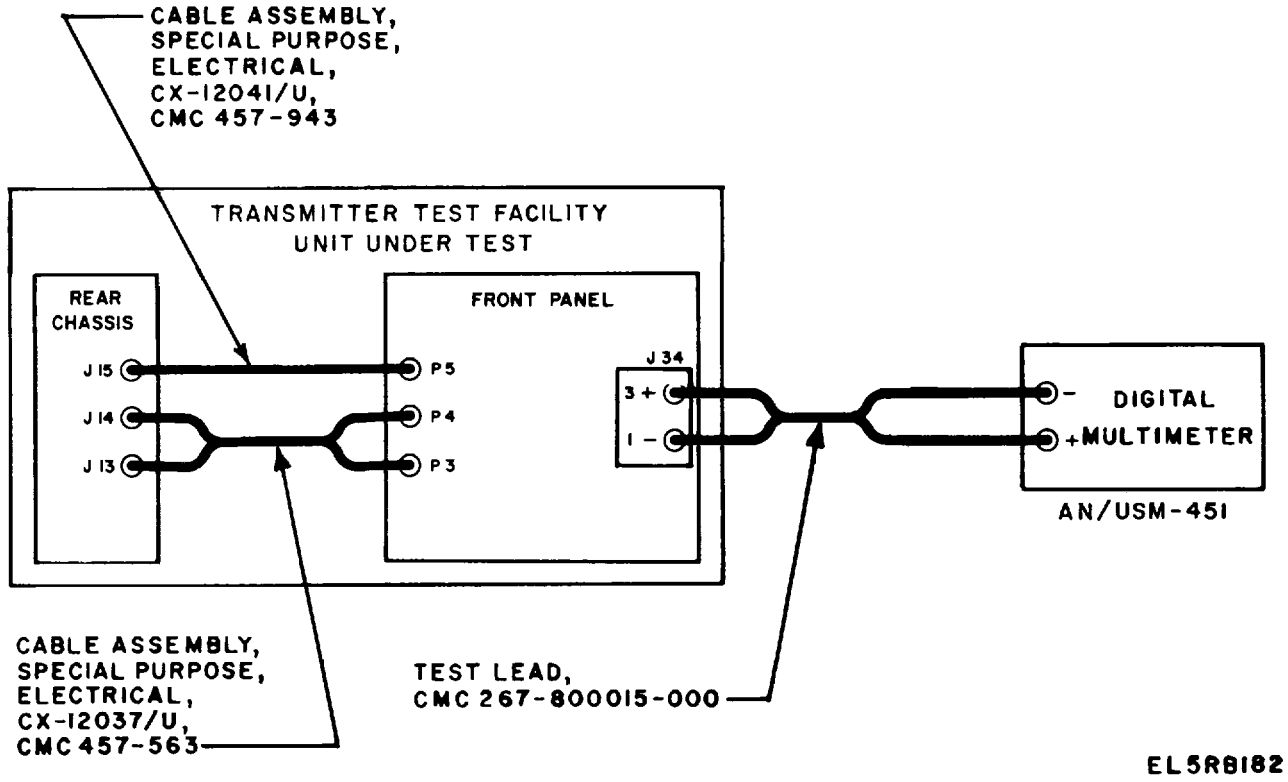


Figure 4-20. Electronic Switch Section, 20-Volt Supply Calibration Test Setup.

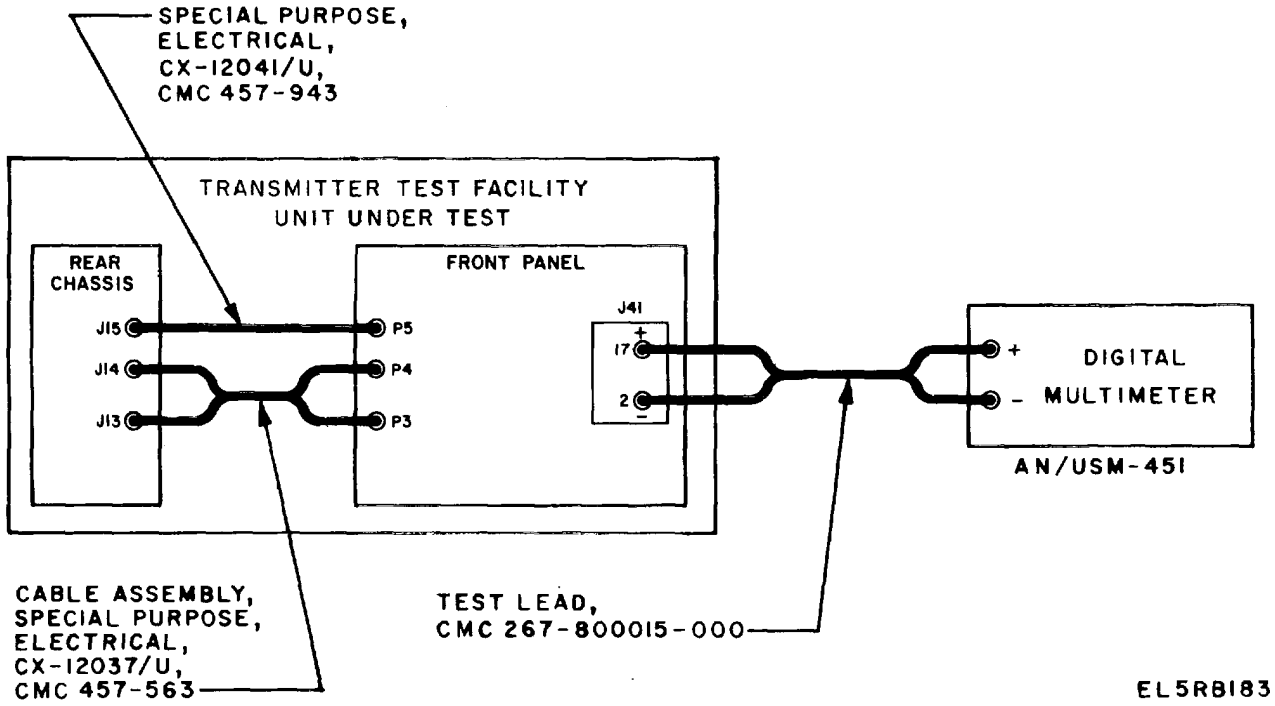


Figure 4-21. Ampi Freq Mult Section, AGC Voltage Calibration Test Setup.

(2) To obtain the voltage specified in a(4) above proceed as follows:

(a) Turn switch S30 to AGC 2.

(b) On circuit card assembly CMC 457-592, adjust R3 for 8.7 volts dc as indicated on voltmeter.

(3) To obtain the voltage specified in a(5) above proceed as follows:

(a) Turn switch S30 to AGC 3.

(b) On circuit card assembly CMC 457-592, adjust R2 for 9.1 volts dc as indicated on voltmeter.

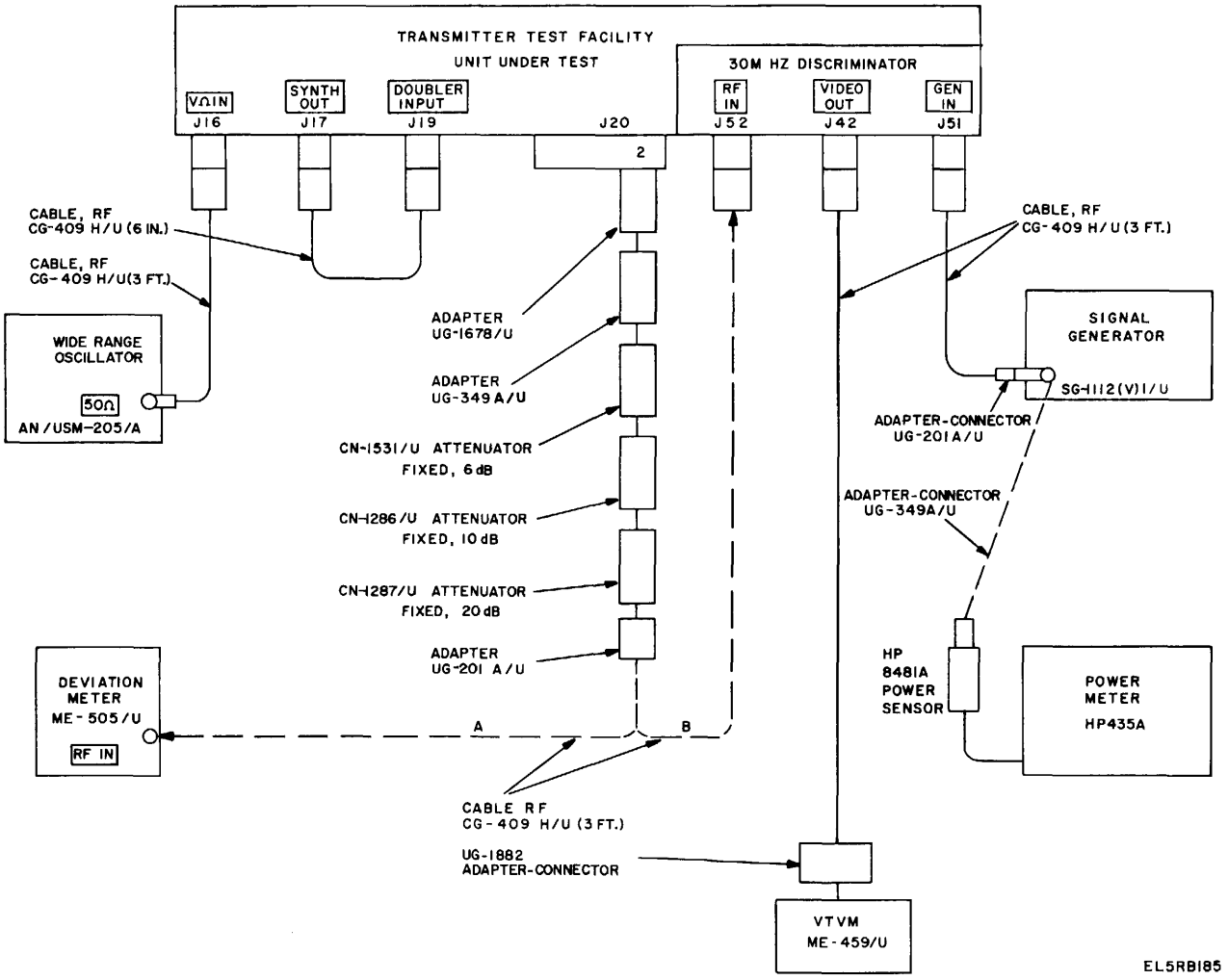


Figure 4-22. 30 MHz Discriminator Section, Balance and Gain Calibration Test Setup.

86. A 30 MHz Discriminator Balance and Gain

a. Performnance Check.

(1) Connect test equipment as shown in A, figure 4-22.

(2) Position controls on transmitter test facility as follows:

(a) Switch S1 to ON.

(b) Switch S20 to 30 MHz DISCR.

(c) Switch S17 ON.

(3) Turn S12 to OSC and S18 to 48.33.

(4) Set deviation meter to 96.69 MHz (doubler output frequency).

(5) Set WRO to 100 kHz. Adjust output level of WRO for a peak deviation of 50 KHz as measured on deviation meter.

(6) Set signal generator output to 126.69 ±10 KHz at a level of - 10 dbm. Connect test equipment as shown in B, figure 4-23. (Verify frequency with frequency counter).

(7) Adjust signal generator output level for 50% on meter Ml. Reading on meter M2 should be center zero.

(8) VTVM connected to J42 should measure be tween 49 to 51 millivolts.

(a) Adjust signal generator to 126.39 MHz ±20 kHz. M2 shall indicate on the left side of the calibration mark ± the width of the pointer.

(b) Adjust signal generator to 126.99 MHz + 20 kHz. M2 shall indicate on the right side of the calibration mark ±, the width of the pointer.

b. Adjustments

(1) Adjust R33 on circuit card assembly 220-801317-000 (fig. 4-2) for zero indication (midscale) on meter M2 as specified in a(7) above.

(2) Adjust R32 on circuit card assembly 220-801317-000 for a 50 millivolts indication on VTVM as specified in a(8) above.

(3) Recheck zero position of meter M2 and readjust R33, if necessary.

(4) Adjust R38 on circuit card No. 220-801317-000, so that meter M2 indicates on the right side of the calibration mark as in a(8)(b) above.

87. A 30 MHz Discriminator High Frequency Test.

a. Performance Check

(1) Connect test equipment as shown in A, figure 4-23.

(2) Set signal generator No. 1 to 1000 MHz, CW. Adjust the output level to 0 dbm as indicated on the power meter.

(3) Set signal generator No. 3 to 1030 MHz, CW. Adjust the output level to +8 dbm as indicated on the power meter.

(4) Fine tune signal generator No. 3 frequency for a center zero on meter M2 and a peak reading on meter Ml. Meter M1 shall read greater than 40%.

(5) Connect test equipment as shown in B, figure 4-23.

(6) Repeat (1) through (5) above at signal generator No. 2 frequency of 1850 MHz and signal generator No. 3 frequency of 1880 MHz.

b. Adjustments. No adjustments can be made.

88. A 30 MHz Discriminator Section Frequency Response Calibration

a. Performance Check.

(1) Receiver Test Facility TS-2867(V)2, 30 MHz modem initial calibration

(a) Connect test equipment as shown in figure 3-17.

(b) Set switch S9 to EXT VIDEO and S14 to 30 MHz.

(c) Set switch S1 to ON.

(d) Set the wide range oscillator to 10 KHz.

(e) Set the oscillator meter switch to NORMAL and adjust the 0 to 10 dB attenuator and the oscillator amplitude control to establish a 0 dB indication on the VTVM -60 dB range. Ensure that the oscillator meter is in the upper 10% of the scale.

(f) Set the oscillator meter switch to EXPAND scale. Center the meter indication at 0. Maintain this reference throughout the following test.

(g) Record the voltmeter indication in decibels for each of the frequencies in table I.

Table I

Frequency	CHANNEL A VIDEO OUTPUT dBm	Difference REF (+ or - dB)
10 KHZ		REF
30 KHZ		
60 KHZ		
120 KHZ		
240 KHZ		
360 KHZ		
480 KHZ		
600 KHZ		
720 KHZ		
840 KHZ		
960 KHZ		

(h) Determine the difference between the output level at each frequency and the reference level at 10 KHz and record the result in table I. This chart represents the correction factor of the receiver test facility 30 MHz modem. This chart will be used in (2) below.

(i) Set receiver test facility switch S1 to OFF.

(2) 30 MHz discriminator section, frequency response.

(a) Loosen the eight retaining screws on the front panel of Transmitter Test Facility TS-2866(V)2/GRM-95(V).

(b) Separate the front panel from the rear panel and pull out until the panel stops.

(c) Remove P2 from the balanced mixer and pull cable through the top of the front panel.

(d) Push the front panel back to mate with the rear panel and ensure that all connections are tight. Tighten retaining screws on front panel.

(e) Connect test equipment as shown in figure 4-24.

(f) Set Receiver Test Facility TS-2867(V)2/GRM-95(V) switches as follows: S9 to EXT VIDEO; S14 to 30 MHz; and AT1 to 20.

(g) Set Transmitter Test Facility TS-2866(V)2/GRM-95(V) switch S20 to 30 MHz DISCR.

(h) Set S1 on both receiver and transmitter test facilities to ON.

(i) Adjust the 0 to 10 dB attenuator for an indication in the green band of M1 on the transmitter test facility. Adjust AT1 if necessary. M2 should be centered.

(j) Set the wide range oscillator to 10 KHz as indicated on the frequency counter.

(k) Set the oscillator meter switch to NORMAL and adjust the output level for a convenient dB indication close to 50 mV on the voltmeter. Ensure that the oscillator meter is within the gray band.

(l) Set the oscillator meter switch to EXPAND SCALE. Center the meter indication at 0. Maintain this reference throughout all of the remaining tests.

(m) Record the voltmeter indication in decibels for each of the frequencies listed in the table II below.

Table II

Frequency	VIDEO OUTPUT dbM	Difference REF (+ or dB)
10 KHZ		REF
30 KHZ		
60 KHZ		
120 KHZ		
240 KHZ		
360 KHZ		
480 KHZ		
600 KHZ		
720 KHZ		
840 KHZ		
960 KHZ		

(n) Determine the difference, not to exceed 2 dB, between the output at each frequency and the reference level at 10 KHz. Determine the difference between the above results and those for the receiver test facility 30 MHz modem in (1)(g) above. The result shall be within ±01. dB of the FREQUENCY RESPONSE dB CORRECTION CHART affixed to the front panel on the 30 MHz discriminator section.

NOTE

If a chart has not been provided, record the serial number of the transmitter test facility on the FREQUENCY RESPONSE dB CORRECTION CHART and attach it to the front of the 30 MHz discriminator section.

(o) Turn off all test equipment and reattach P2 of the transmitter test facility to the balanced mixer. Ensure that the front panel is properly mated with the rear panel and all eight retaining screws are properly tightened.

b. Adjustments. No adjustments can be made.

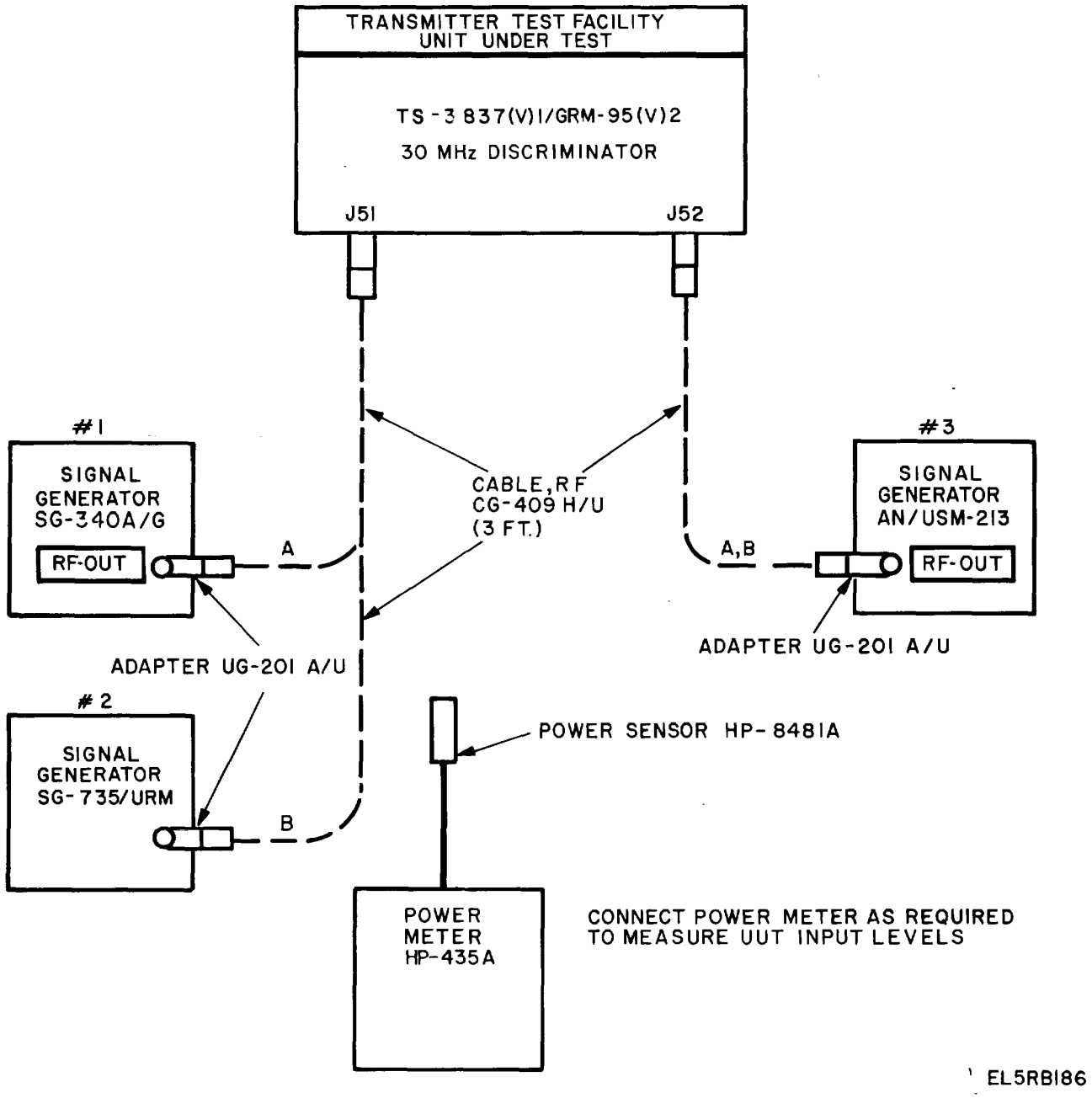


Figure 4-23. 30 MHz Discriminator Section, High Frequency Response Calibration Test Setup.

89. Control Monitor, Temperature Sensor

a Performance Check.

(1) Connect test equipment as shown in figure 4-25.

(2) Set the digital multimeter for ohms operation and connect the test leads between pins 5 and 6 of J71 on U.U.T.

(3) Set switch S1 to OFF, and S33 to positions listed in table 17 below. The digital multimeter shall read as listed in the table 17 below.

Table 17. Digital Multimeter Positions and Reading

S-33 Position	Digital Multimeter Reading (ohms)
Off	Inf
Fail 1	1.8 to 2.2 meg
Fail 2	Not more than 1.0
Zero Speed 1	286 to 316K
Zero Speed 2	7.125 to 7.875K
Max Speed 1	1.947 to 2.152 K
Max Speed 2	783 to 866
Alarm	574 to 634
Trip	372 to 411

(4) Set the digital multimeter to measure volts and connect the test leads between J70 and J69 on U.U.T.

(5) Set the U.U.T. switches as follows:

(a) S1 to ON.

(b) S33 to OFF.

(6) The blower should operate and the voltmeter shall indicate 0 vac.

(7) Set switch S33 to Fail 1 position and perform the tests listed in table 18 below.

Table 18. Performance Test

J71 Jumper Pins	Normal Indications	
	U.U.T.	Voltmeter
None	Blower ON, 'lip Lamp ON	"0"-vac
7 and 3	Blower ON, Trip Lamp ON, Alarm ON	*"O"-vac
4 and 8	Blower ON, Trip Lamp OFF	*"O"-vac
14 and 15	Blower OFF, Trip Lamp ON	--
**14 and 15, 2 and 9	Blower ON, 'lip Lamp ON	128to156v ac

*Some Residual AC volts may be present (approximately 80 mv).

**Before connecting jumpers turn U.U.T. S1 to OFF After jumpers are in place turn U.U.T. Si ON for readings.

b. Adjustments. No adjustments can be made.

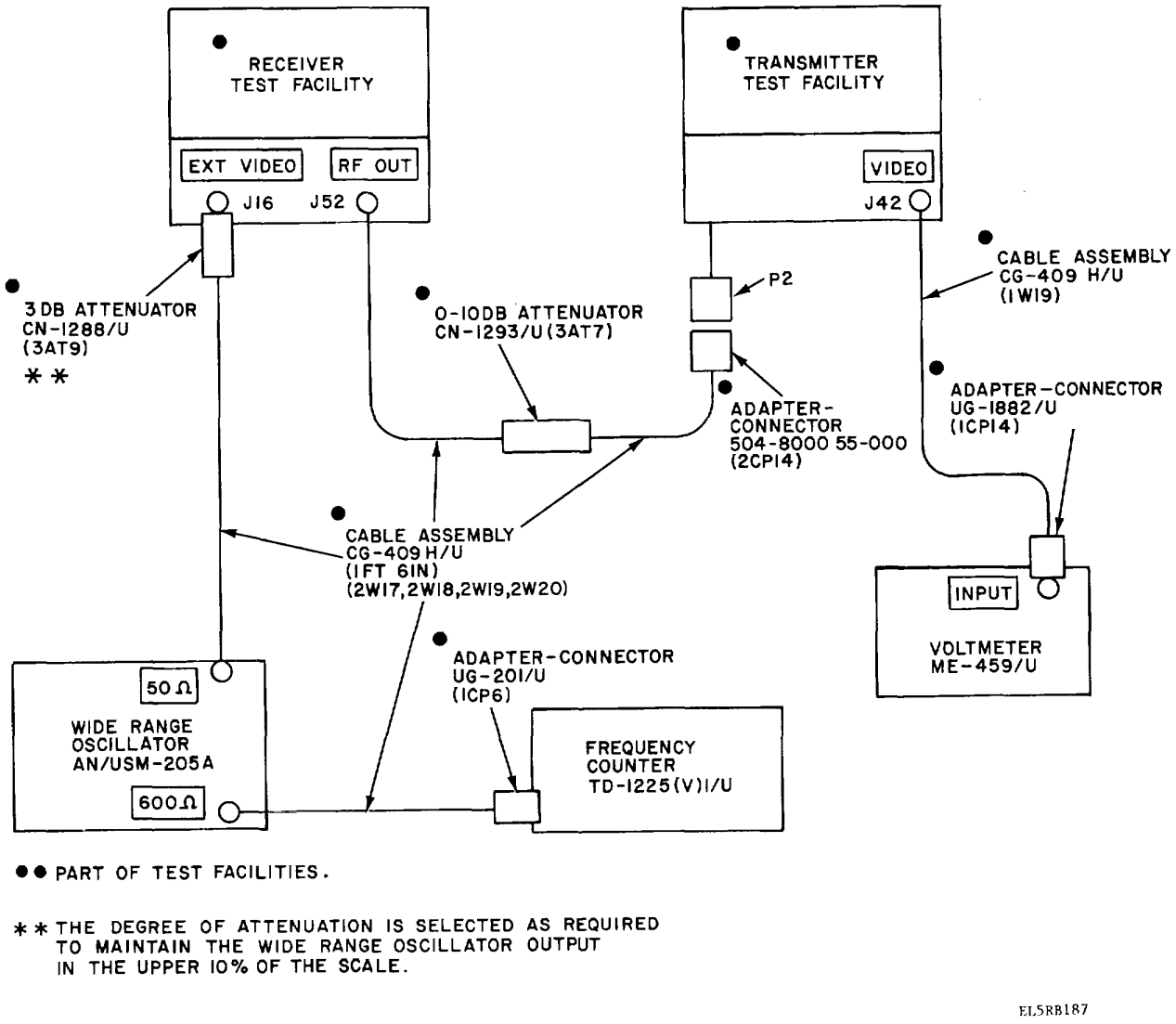


Figure 4-24. 30 MHz Discriminator Demodulation Frequency Response Test Setup.

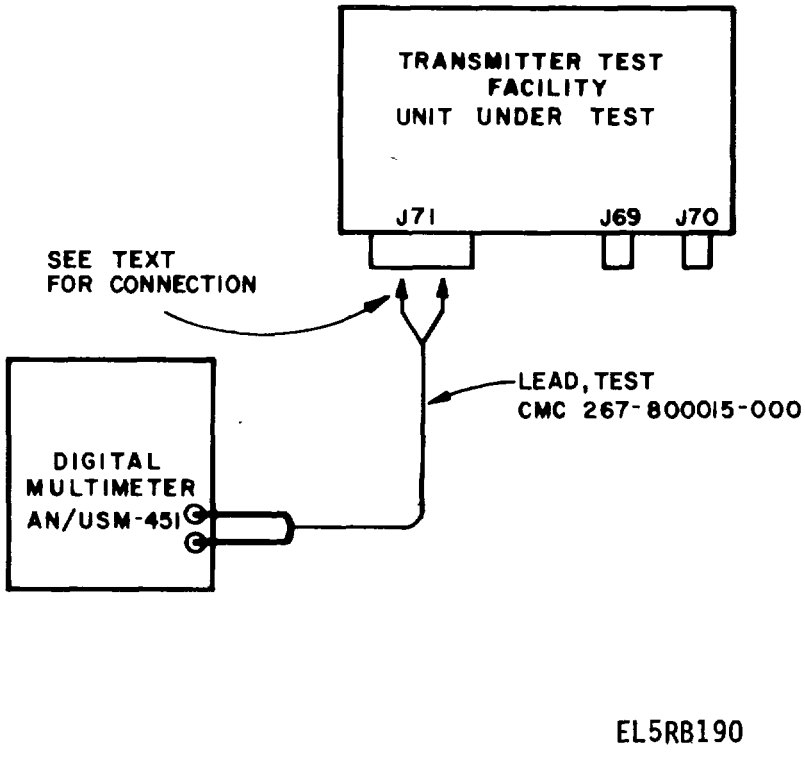


Figure 4-25. Control Monitor, Temperature Sensor.

SECTION V
CALIBRATION PROCEDURES FOR MISCELLANEOUS ACCESSORIES PART OF TEST FACILITY RF MODULES TS-3837(V)1/GRM-95(V) AND ACCESSORY KIT, TEST FACILITY SET MK-1985(V)1/GRM-95(V)

90. Preliminary Procedures

a. Remove the components for each test setup from their storage locations only when required for use in procedure. Return the components to their storage locations upon completion of each calibration.

b. Remove only those cover plates required to make necessary adjustments.

NOTE

The following paragraphs are divided into subparagraphs a performance check, and subparagraph b adjustments. When the performance check is not within tolerance and no adjustment is specified, the deficiency must be corrected before continuing with the procedure. If the deficiency cannot be corrected refer to instructions in paragraph 168, final procedure.

91. Dummy Load Electrical, Telonic TRM-1-1.60F (4A2), Telonic TRM-1-1.30F 44A3), Telonic TRM-l-.1OF (4A4), and Telonic TRM-1-1.65F (4A6)

a Performance Check. Refer to procedure in paragraph 8 except that the dc resistance value for each load shall be shown in table 19.

Table 19. Load Resistance Measurement

Unit under test	Resistance ohms	
	Minimum	Maximum
TRM-1-1.60F(4A2)	76.0	84.0
TRM-1-1.30F(4A3)	61.75	68.25
TRM-1-l.lOF(4A4)	52.25	57.75
TRM-1-1.65F(4A6)	78.375	86.625

b. Adjustments. No adjustments can be made.

92. Fixed Attenuators 4AT1 and 4AT2 (CN-1286/U and CN-1287/U) Attenuation Measurement (See para 12 for performance check procedure

93. Attenuator, Fixed 6db, 4AT3, 4AT4 (CN-15311U) Attenuation Measurement (See para 114 for performance check procedures)

94. Variable Attenuator 6 to 120 db (CN-1532/U) Attenuation Measurement (fig. 5-1)

a. Performance Check.

(1) Connect the test equipment as shown in A, figure 5-2.

(2) Adjust signal generator output level to + 10 dbm as indicated on the power meter at a frequency of 1850 MHz CW.

(3) Connect test equipment as shown in B, figure 5-2. Change attenuator settings and note the power meter readings for each entry in table 20. Subtract the power meter reading from + 10 dbm to obtain the attenuation.

Table 20. Attenuator Measurement

Attenuator Setting	Attenuator
10	8.75-11.25 db
20	18.65-21.25 db
30	28.65-31.25 db
40	38.75-41.25 db

b. Adjustments. No adjustments can be made.

95. Directional Coupler 4DC1 and 4DC2 (CU-2247/U) Insertion Loss Measurement (fig. 5-3)

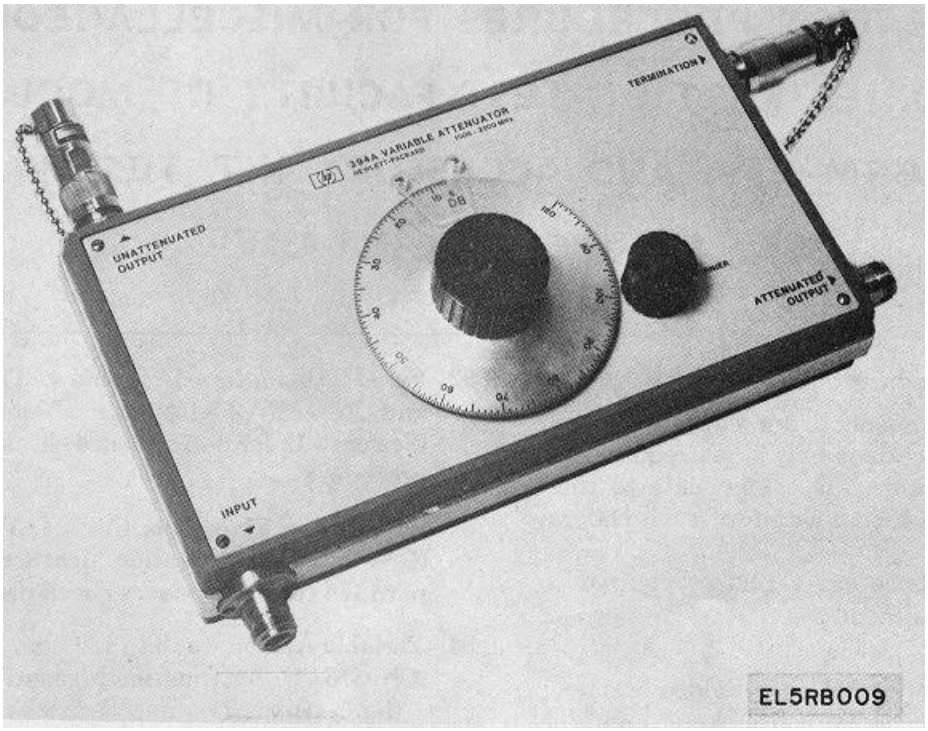


Figure 5-1. Variable Attenuator CN-1532/U (6 to 120 db).

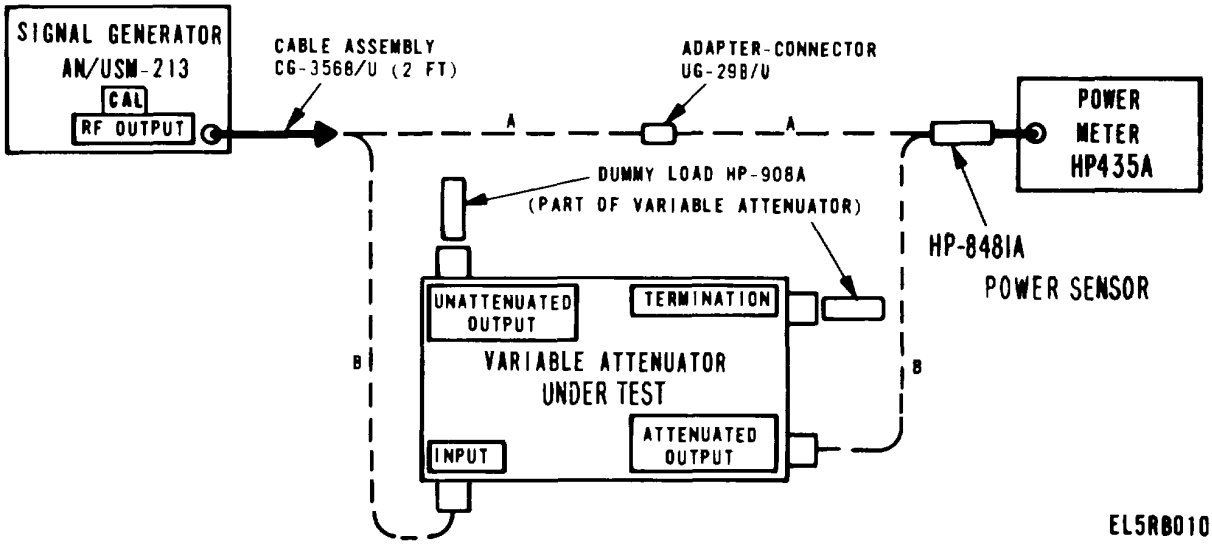


Figure 5-2. Variable Attenuator CN-1532/U (6 to 120 db) Measurement Test Setup.

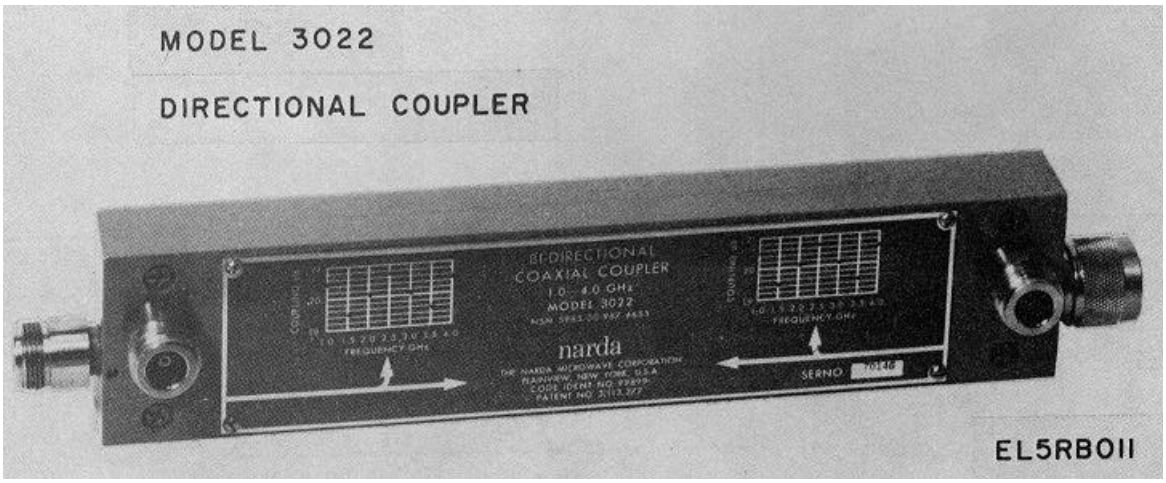


Figure 5-3. Directional Coupler CU-2247/U (Narda 3022).

a. Performance Check.

(1) Connect the test equipment as shown in A, figure 5-4.

(2) Set signal generator frequency to 1350 MHz, CW at 0 dbm as indicated on power meter.

(3) Connect the unit under test in the circuit as shown in B, figure 5-4. The power meter indication should not be less than 0.2 dbm.

(4) Reverse the unit under test and connect in the circuit as shown in C, figure 5-4. The power meter indication should not be less than -0.2 dbm.

b. Adjustments. No adjustments can be made.

96. Directional Coupler 4DC1 and 4DC2 (CU-22471U) Coupling Loss Measurement

a. Performance Check.

(1) Connect the test equipment as shown in A, figure 5-5.

(2) Set signal generator to 1350 MHz, CW, at + 5 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-5. The power meter indication should be within ±0.5 db of the U.U.T. calibration chart at the frequency being tested.

(4) Reverse the unit under test as shown in C, figure 5-5. The power meter indication shall be within ±0.5 db of the U.U.T. calibration chart at the frequency being tested.

b. Adjustments. No adjustments can be made.

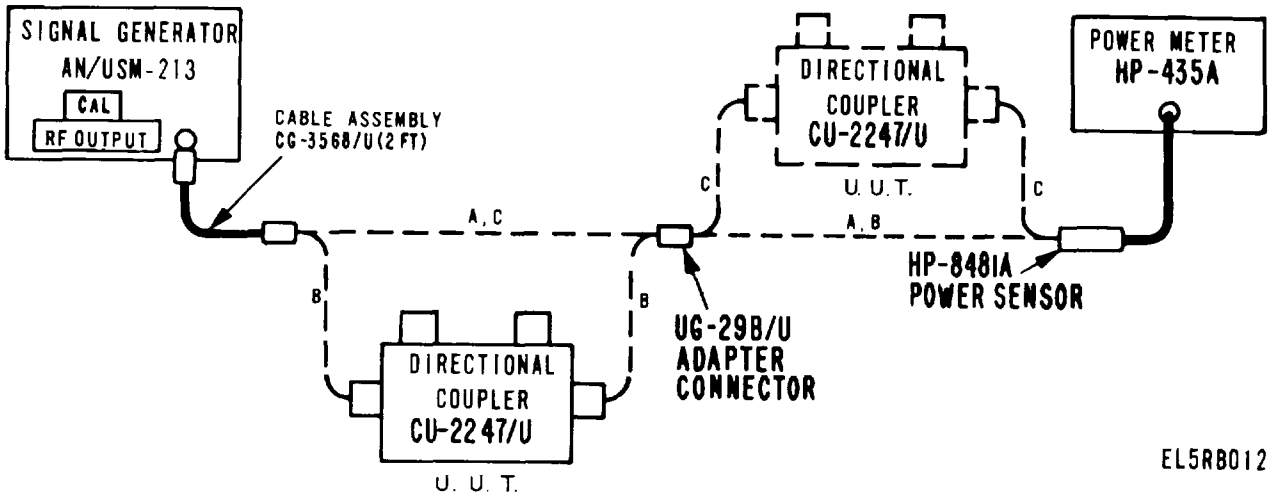


Figure 5-4. Directional Coupler CU-2247/U (Narda 3022) Insertion Loss Test Setup

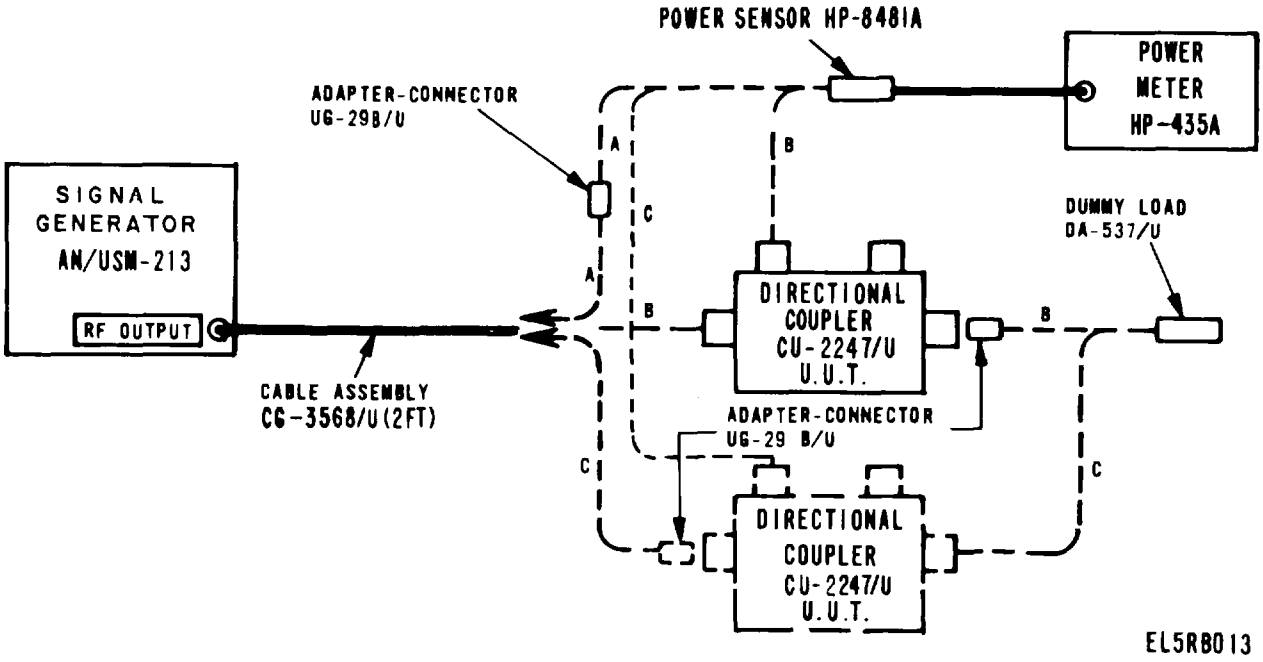


Figure 5-5. Directional Coupler CU-2247/U (Narda 3022). Coupling Loss Measurement Test Setup.

97. Directional Coupler 4DC1 and 4DC2(CU-2247/U) Directivity Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-6. Set signal generator to 1350 MHz, CW, and adjust output level for a reading of -20 dbm on power meter.

(2) Connect test equipment as shown in B, figure 5-6. Power meter reading shall not exceed 50 dbm.

(3) Reverse the unit under test and connect test equipment as shown in C, figure 5-6. Adjust signal generator output level for a reading of -20 dbm on power meter.

(4) With the unit under test reversed, connect test equipment as shown in D, figure 5-6. Power meter reading shall not exceed -50 dbm.

b. Adjustments. No adjustments can be made.

98. Low Pass Filter 4FL1 (F-1493/U) VSWR Measurement

(fig. 5-7)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-8.

(2) Set signal generator to 2000 MHz, CW, at a level of -10 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-8. Power meter shall indicate below -23 dbm (equivalent to better than 1.6 VSWR).

b. Adjustments. No adjustments can be made.

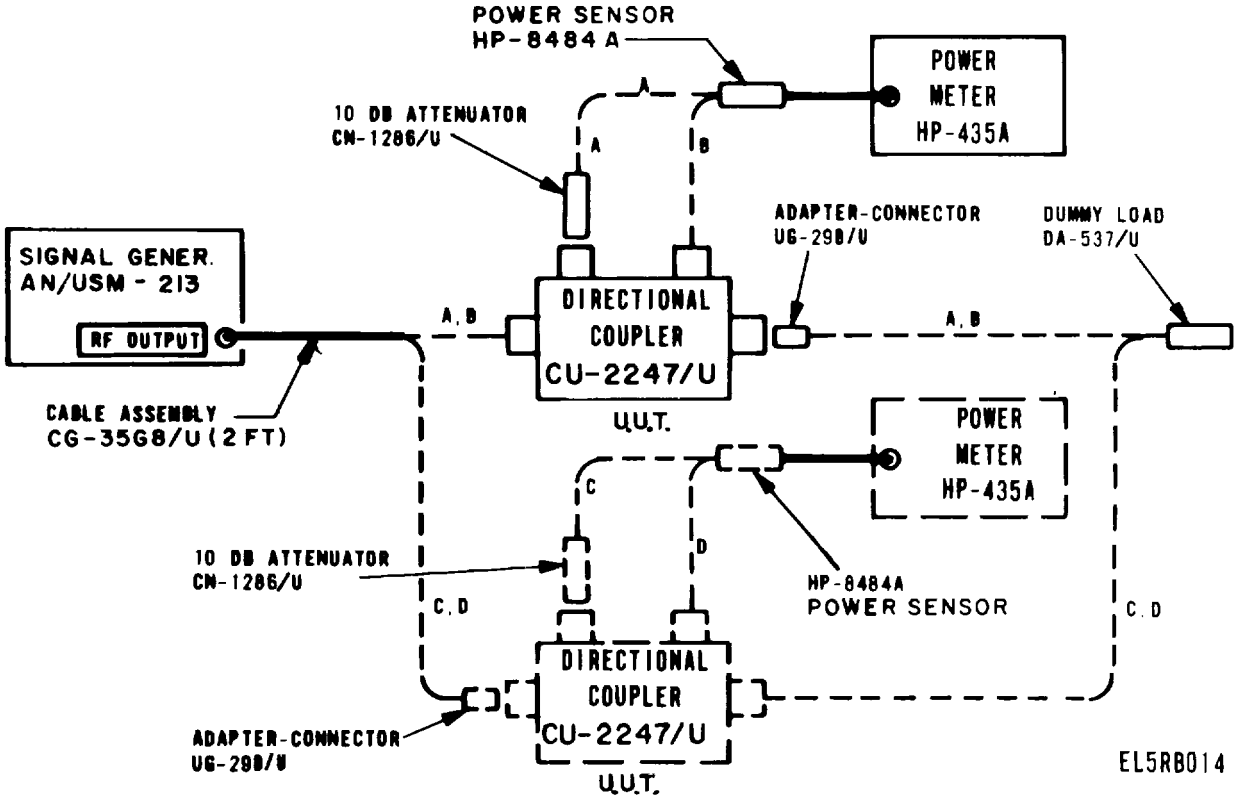


Figure 5-6. Directional Coupler CU-2247/U(Narda 3022) Directivity Measurement Test Setup.

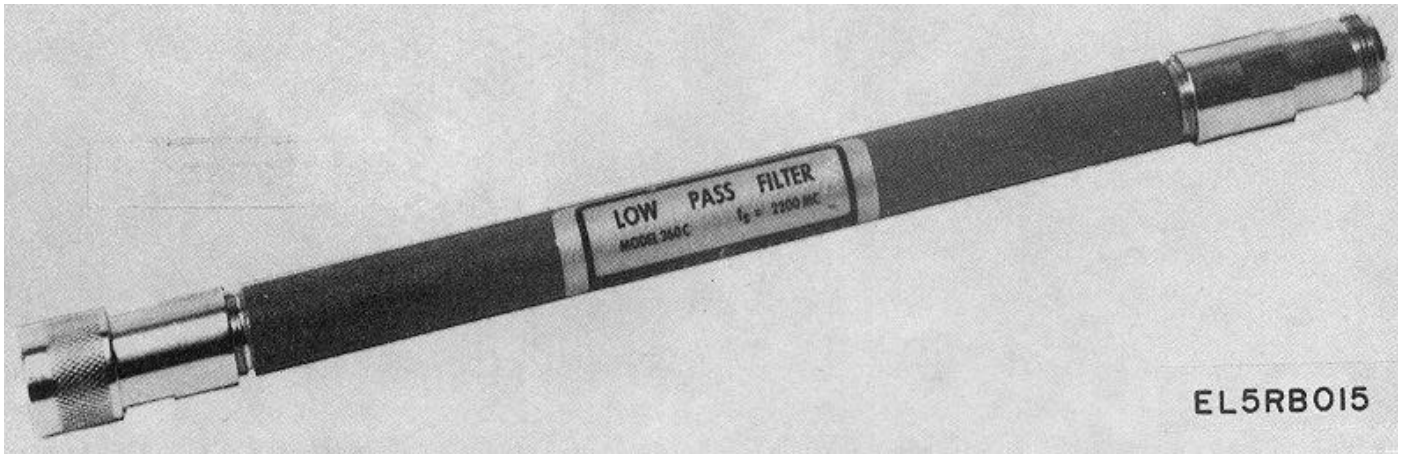


Figure 5-7. Low Pass Filter F-1493/U (HP-360C).

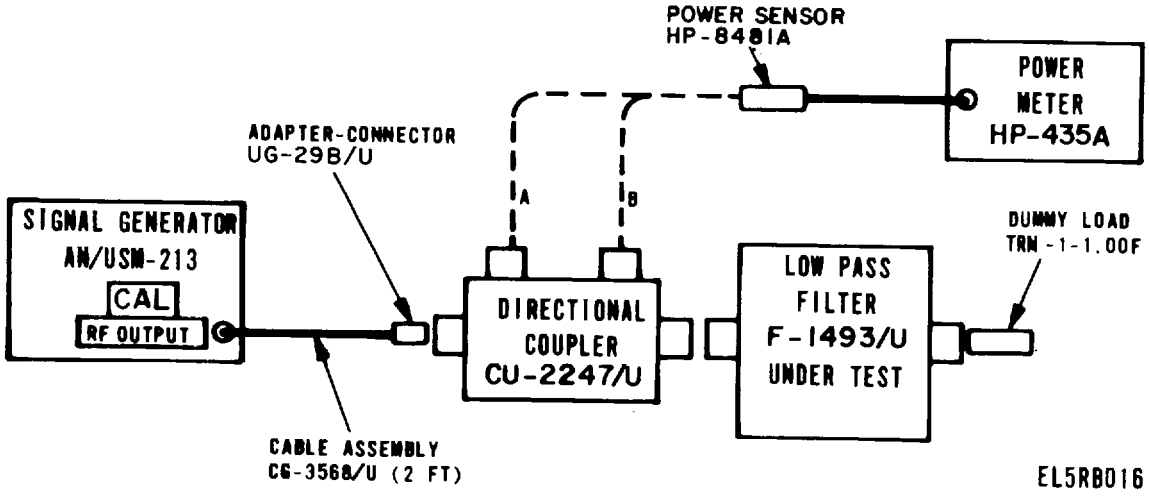


Figure 5-8. Low Pass Filter F-1493/U(HP-360C) VSWR Measurement Test Setup.

99. Lo Pass Filter HP-360C (F-1493/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect the test equipment as shown in A, figure 5-9.

(2) Set signal generator to 1980 MHz, CW, at a level of 0 dbm as indicated on power meter.

(3) Connect test equipment as shown in B, figure 5-9. Power meter indication should not be less than -1.0 dbm.

b. Adjustments. No adjustments can be made.

100. Low Pass Filter 4FL1 (F-1493/U) Rejection Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-10. Set signal generator to 2750 MHz, CW, at a level of -30 dbm as indicated on power meter.

(2) Connect test equipment as shown in B, figure 5-10. Power meter indication shall be less than 50 dbm.

b. Adjustments. No adjustments can be made.

101. Low Pass Filter 4FL2 and 4FL3 (F-14941U)VSWR Measurement

(fig. 5-11)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-12.

(2) Set signal generator to 705 MHz, CW, at a level of 13 dbm as indicated on the power meter.

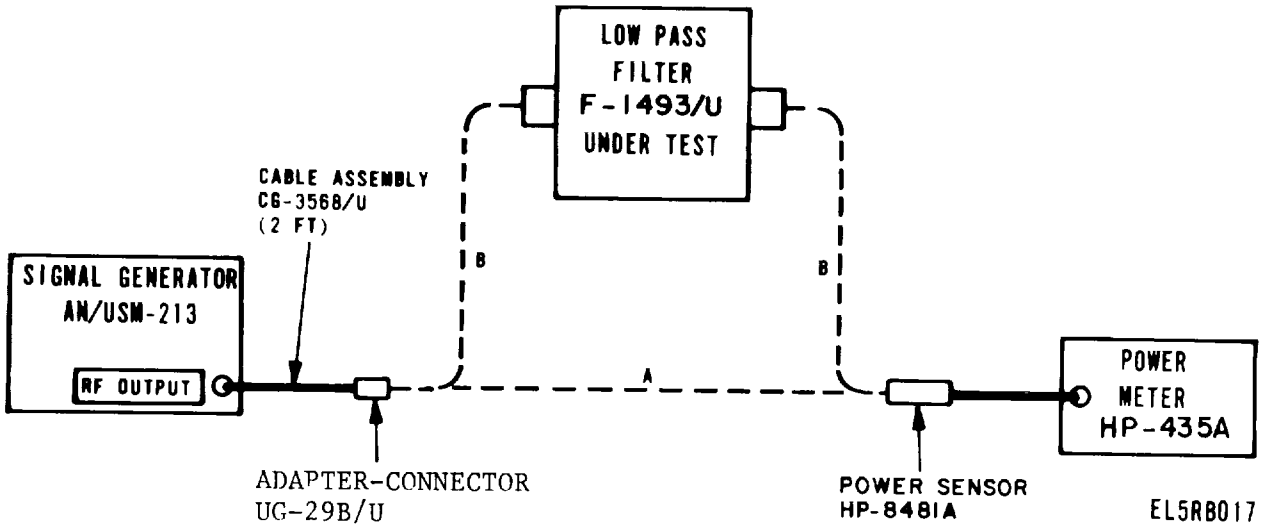


Figure 5-9. Low Pass Filter F-1493U (HP-360C), Insertion Loss Measurement Test Setup.

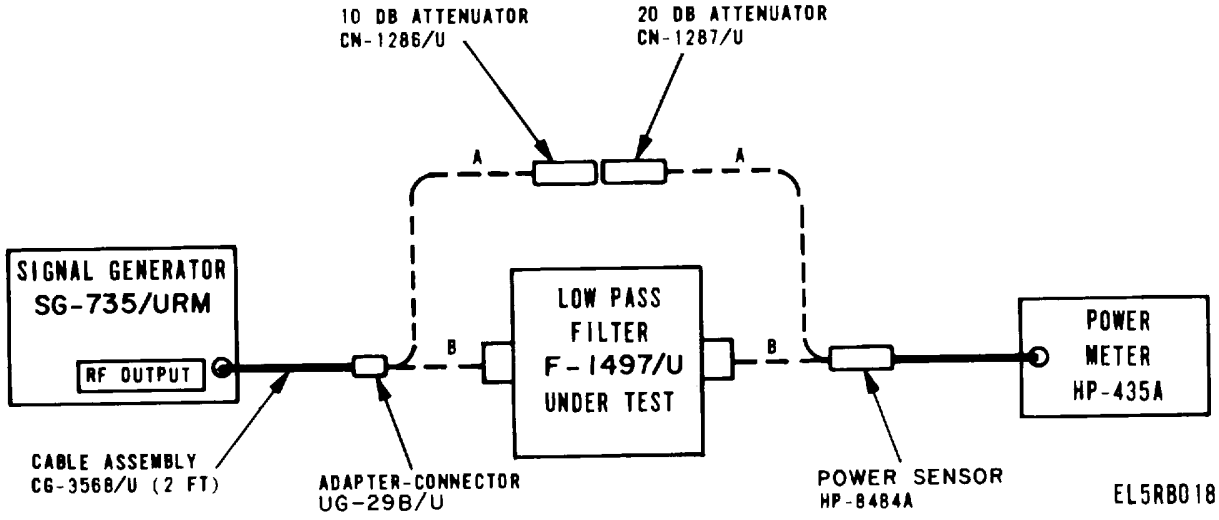


Figure 5-10. Low Pass Filter F-1493/U (HP-360C) Rejection Measurement Test Setup.

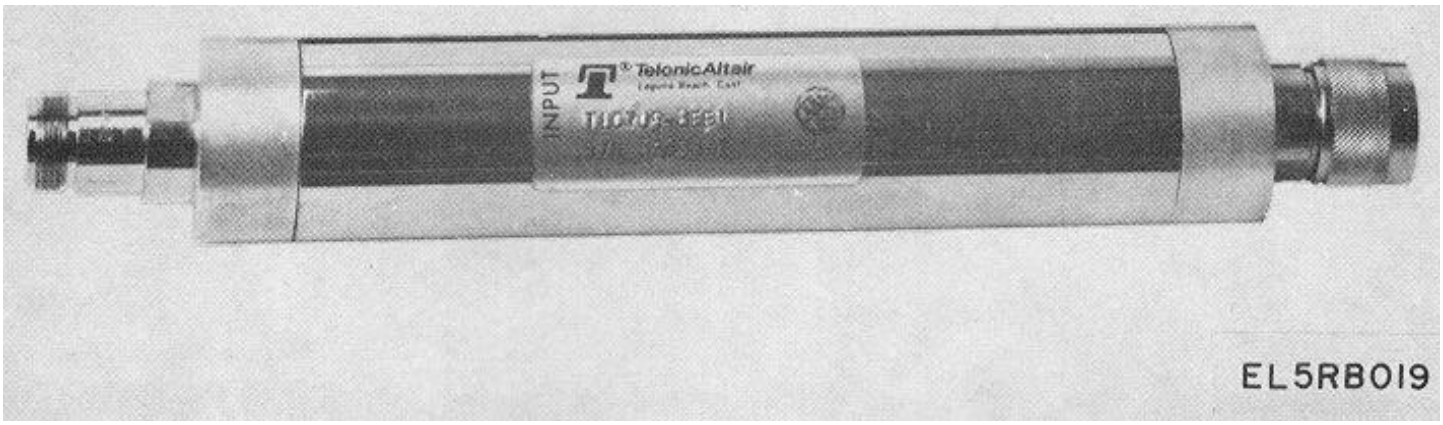


Figure 5-11. Low Pass Filter, (F-1494/U).

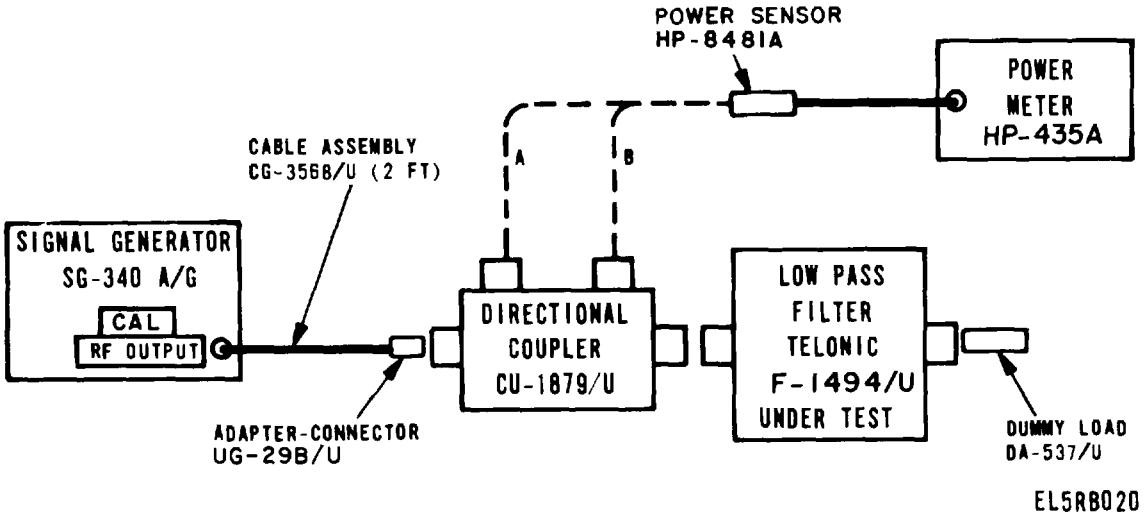


Figure 5-12. Low Pass Filter, (F-1494/U) VSWR Measurement Test Setup.

(3) Connect test equipment as shown in B, figure 5-12. Power meter reading should not exceed -27 dbm (equivalent to a VSWR better than 1.5:1).

b. Adjustments. No adjustments can be made.

102. Low Pass Filter 4FL2 and 4FL3 (F-1494/U)Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-13.

(2) Set signal generator to 705 MHz, CW, and adjust output level for an indication of 20 db on power meter.

(3) Connect test equipment as shown in B, figure 5-13. Power meter reading should not be less than -0.7 dbm.

b. Adjustments. No adjustments can be made.

103. Low Pass Filter 4FL2 and 4FL3 (F-1494(U)Rejection Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-13.

(2) Set signal generator to 825 MHz, CW, and adjust output level for an indication of -20 dbm on power meter.

(3) Connect test equipment as shown in B, figure 5-13. Power meter reading should be less than -50 dbm.

b. Adjustments. No adjustments can be made.

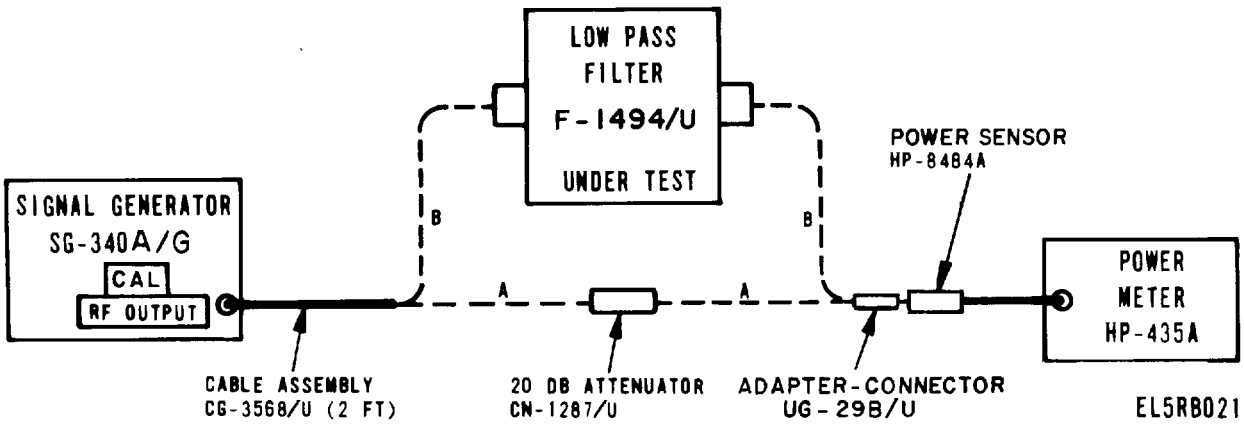


Figure 5-13. Low Pass Filter F-1494/U Insertion Loss and Rejection Measurement Test Setup.

104. Power Divider 5A4 (TS-3833/U) VSWR Measurement
(fig. 5-14)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-15.

(2) Set signal generator to 1850 MHz, CW, and adjust output level for an indication of 10 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-15. Power meter reading shall not exceed 24 dbm (equivalent to VSWR better than 1.5:1).

b. Adjustments. No adjustments can be made.

105. Power Divider 5A4 (TS-3833/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-16.

(2) Set signal generator to 1850 MHz, CW, and adjust output level for an indication of + 10 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-16. Power meter shall read greater than +5.7 dbm.

(4) Interchange connections on ports C and D of unit under test, figure 5-16, leaving port B connected as before. Power meter shall read +5.7 dbm minimum.

b. Adjustments. No adjustments can be made.

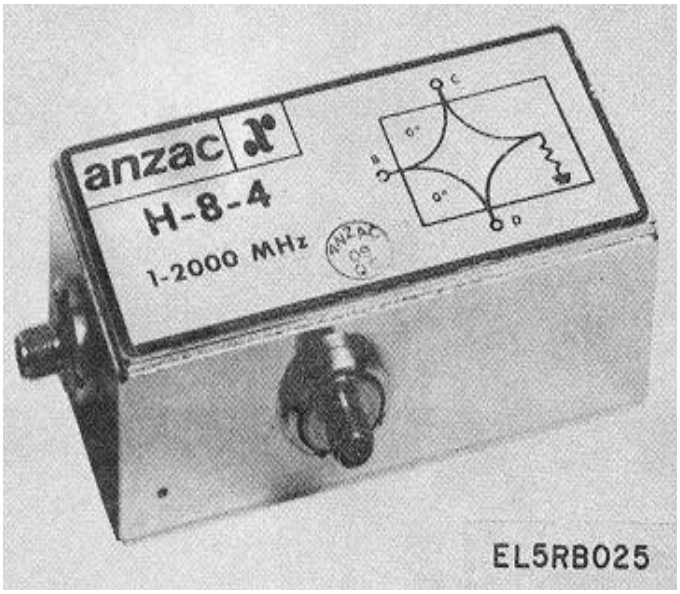


Figure 5-14. Power Dicider TS-3833/U.

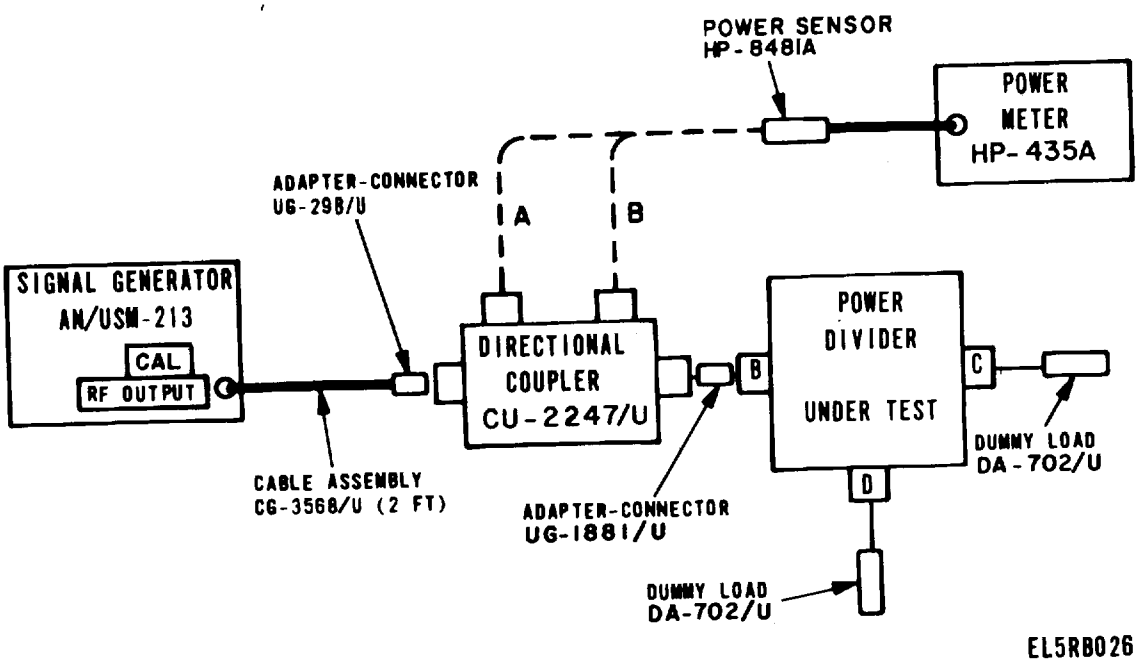


Figure 5-15. Power Divider TS-3833/U VSWR Measurement Test Setup.

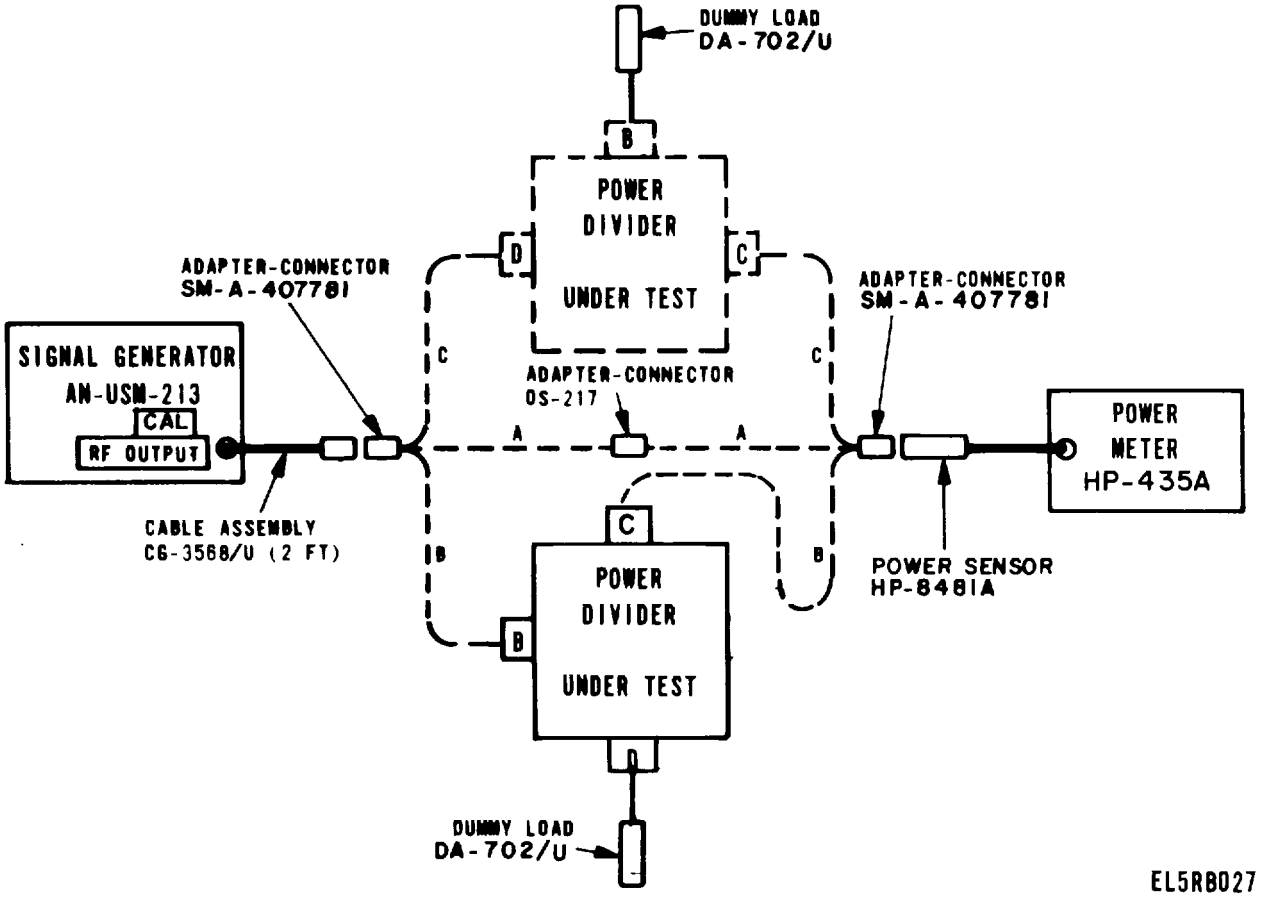


Figure 5-16. Power Divider TS-3833/U Insertion Loss and Isolation Measurement Test Setup.

106. Power Divider 5A4 (TS-3833/U) Isolation Measurement

a. Performance Check.

(1) Connect test equipment as shown in C, figure 5-16, Power meter shall read less than -10 dbm.

(2) Interchange connections on ports C and D of unit under test, figure 5-16, leaving port B terminated. Power meter shall read less than 10 dbm.

b. Adjustments. No adjustments can be made.

107. VSWR Bridge 5A5 (IM-241/U) Directivity Measurement (fig. 5-17)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-18.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a reading of + 7 dbm on power meter.

(3) Connect test equipment as shown in B, figure 5-18. Power meter shall read less than -28 dbm.

(4) Interchange the "UNKNOWN" and TERMINATION ports as shown in B, figure 5-18, leaving the IN and OUT ports as previously connected.
Power meter shall read less than -28 dbm.

b. Adjustments. No adjustments can be made.

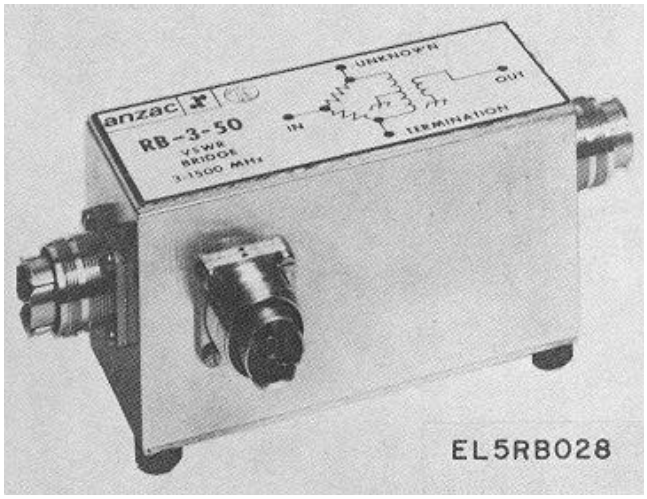


Figure 5-17. VSWR Bridge IM-241/U

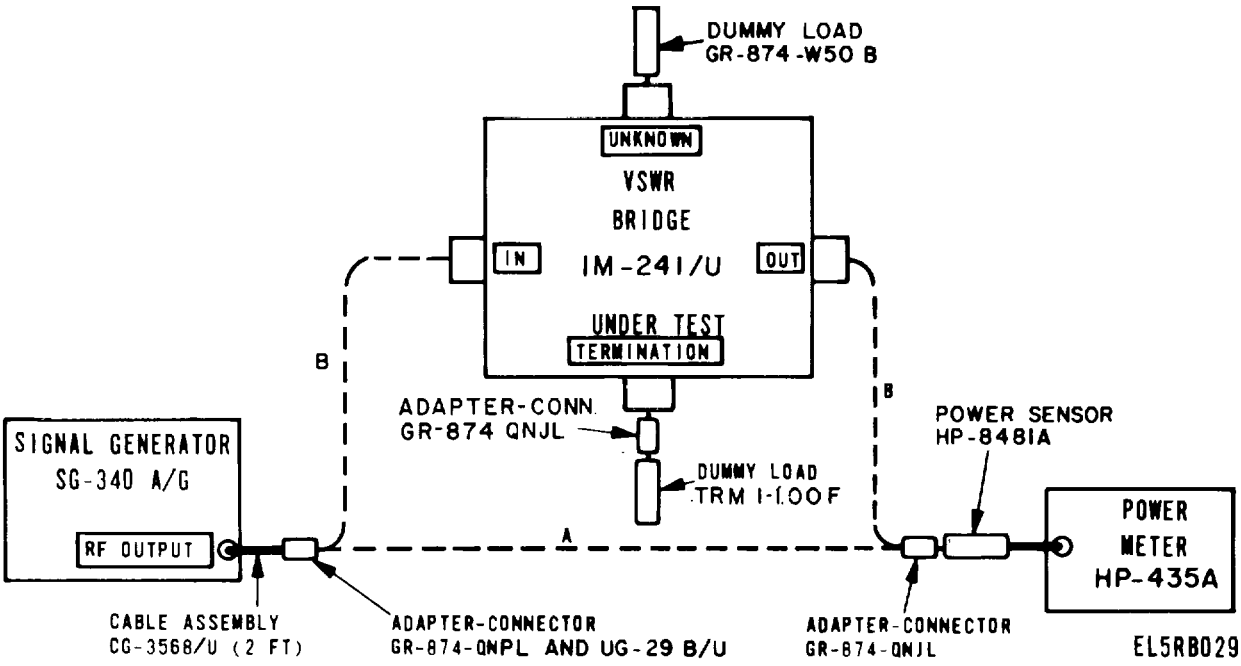


Figure 5-18. VSWR Bridge IM-241/UDirectivity Measurement Test Setup.

108. VSWR Bridge 5A5 (IM-241/U) Open-Short Radio Measurement

a. Performance Check.

(1) Connect test equipment as shown in figure 5-19. Note power meter indication.

(2) Remove termination short circuit DA-706/ U. Power meter indication shall be within 1 dbm of reading in (1) above.

b. Adjustments. No adjustments can be made.

109. Radio Frequency, Adjustable Line 5A6(CN-1539/U) VSWR Measurement
(fig. 5-20)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-21.

(2) Set signal generator to 1000 MHz and adjust output level for a power reading of 20 dbm.

(3) Connect test equipment as shown in B, figure 5-21. Vary length of trombone line from minimum to maximum. Power meter indication shall not exceed 30 dbm for any length adjustment of the trombone line.

b. Adjustments. No adjustments can be made.

110. Coupler Radio Frequency 5A7 (CU-2255/U) Conversion Loss Measurement
(fig. 5-22)

a. Performance Check.

(1) Test equipment calibration.

(a) Connect test equipment as shown in A, figure 5-23.

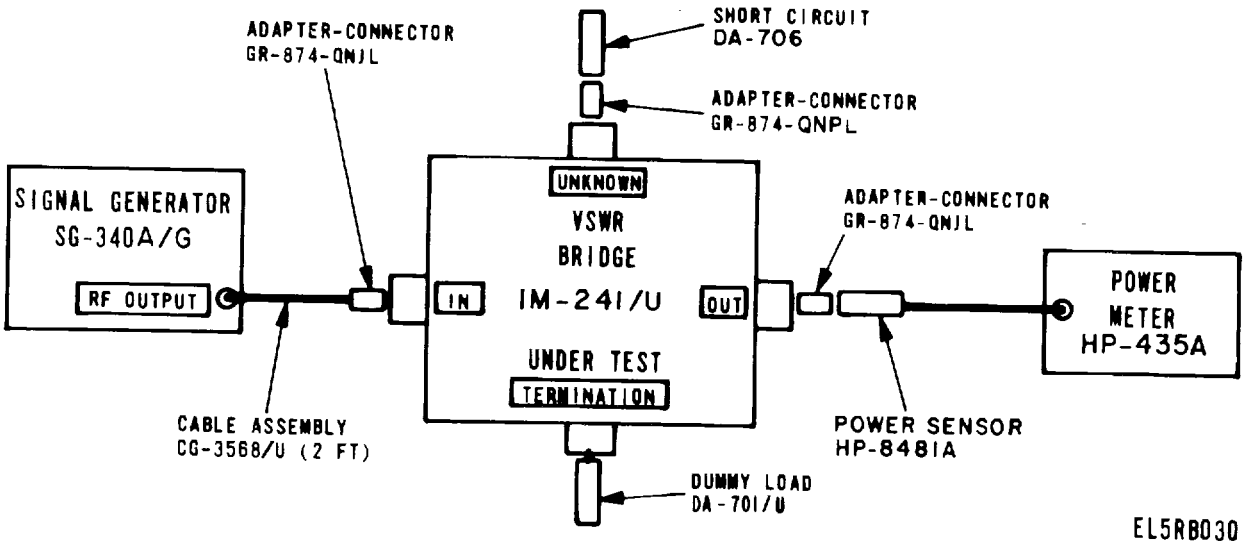


Figure 5-19. VSWR Bridge IM-241/U Open-Short, Ratio Measurement Test Setup.

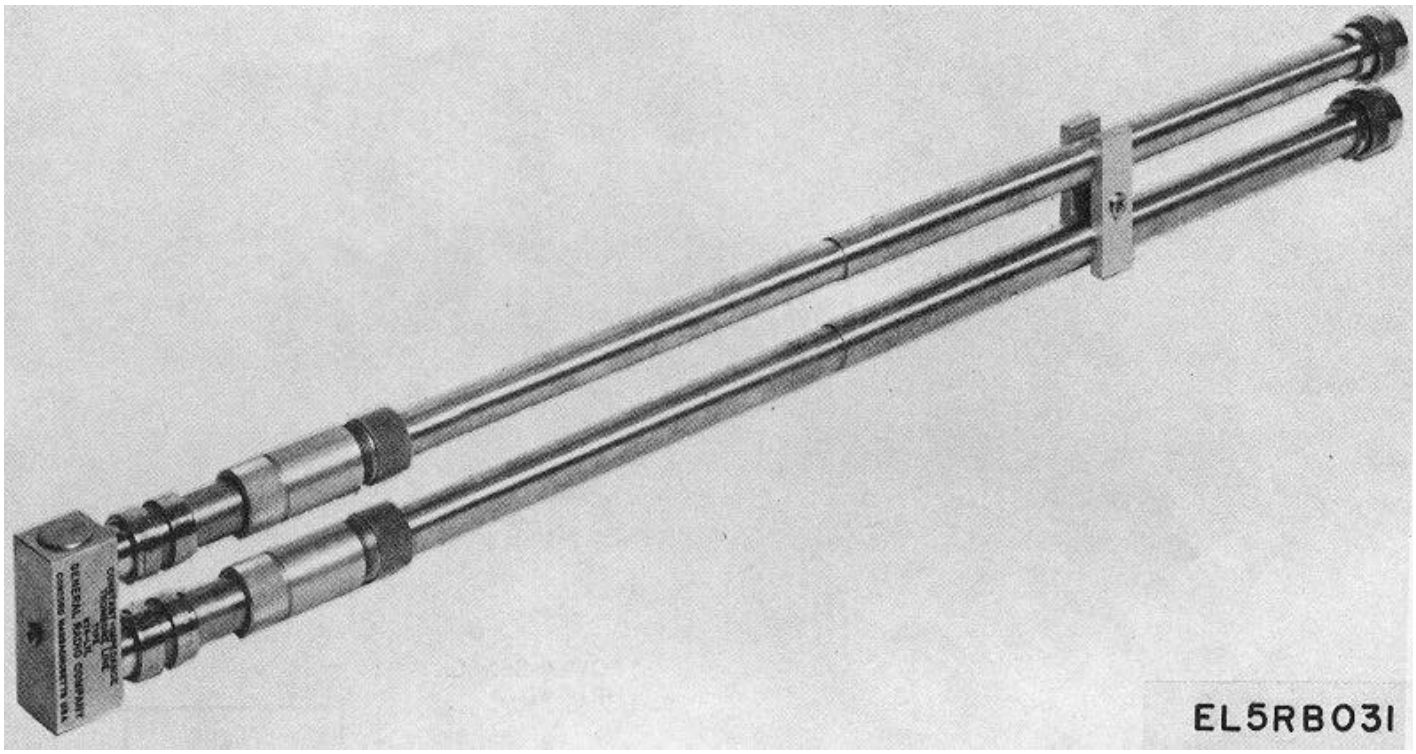


Figure 5-20. Radio Frequency, Adjustable Line CN-1539/U.

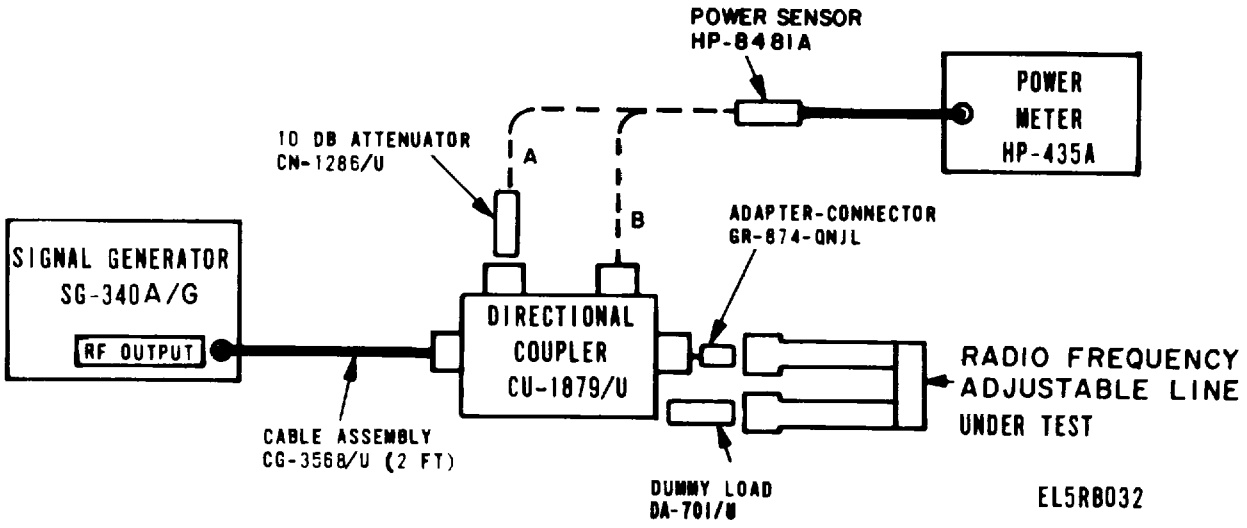


Figure 5-21. Radio Frequency, Adjustable Line CN-1539/U VSWR Measurement Test Setup.

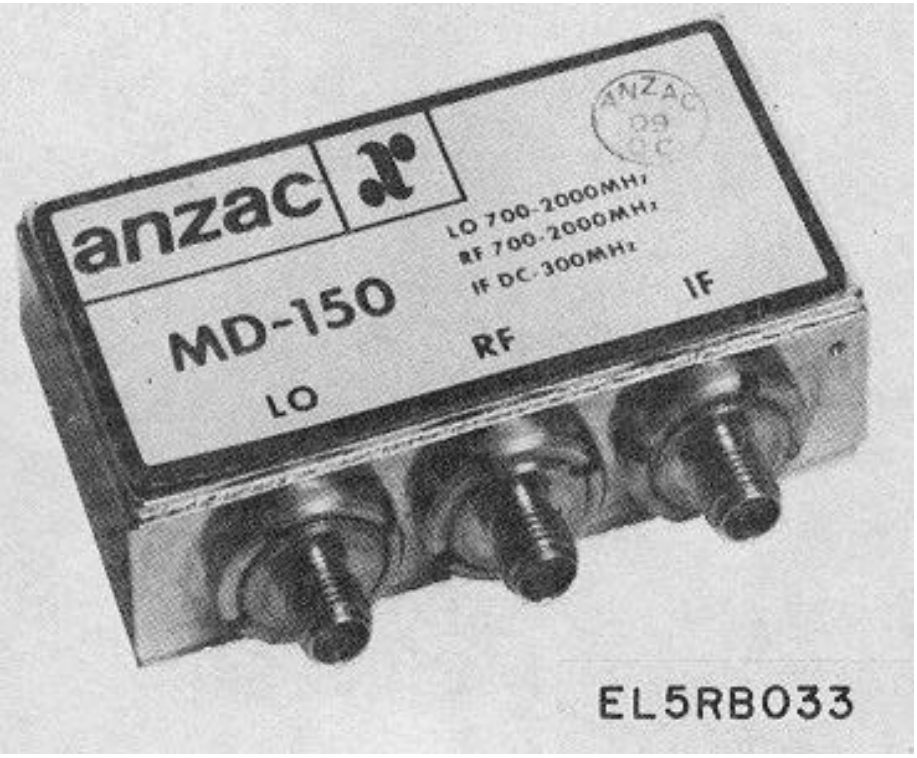


Figure 5-22. Coupler, Radio Frequency, CU-2255/U.

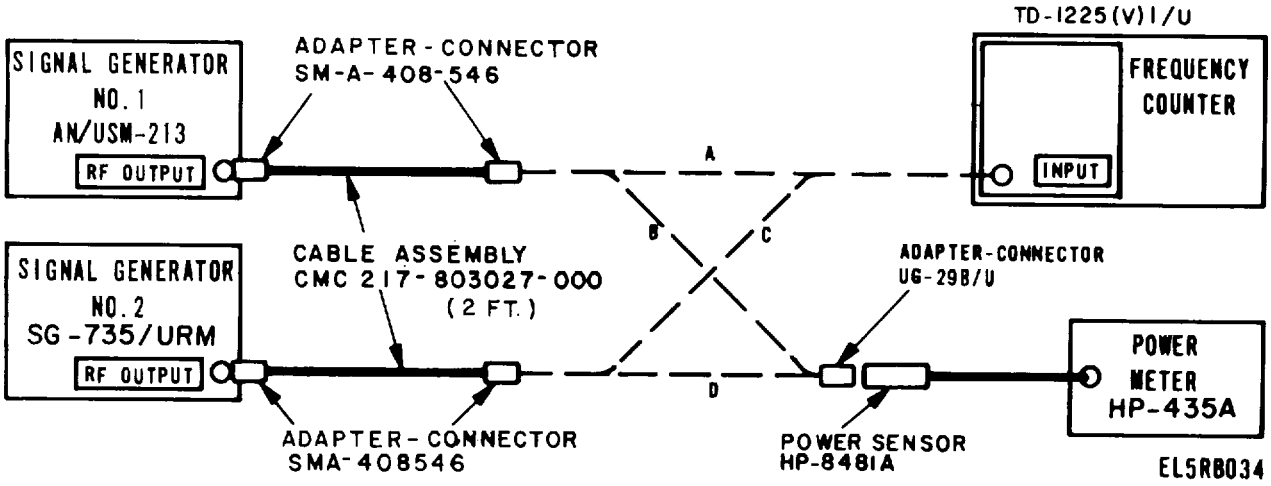


Figure 5-23. Coupler, Radio Frequency, CU-2255/U Calibration Test Setup.

(b) Set signal generator No. 1 to 1880 ±0.1 MHz, CW.

(c) Connect test equipment as shown in B, Figure 5-23.

(d) Adjust signal generator No. 1 output level control for a +7 dbm reading on the power meter. Do not disturb signal generator settings.

(e) Connect test equipment as shown in C, figure 5-23.

(f) Set signal generator No. 2 to 1850 ±0.1 MHz, CW.

(g) Connect test equipment as shown in D, figure 5-23.

(h) Adjust signal generator No. 2 output level control for a reading of 10 dbm on the power meter. Do not disturb the signal generator settings.

(2) Test procedure.

(a) Connect test equipment as shown in A, figure 5-24.

(b) The frequency counter shall read 30 MHz ±0.2 MHz.

(c) Connect test equipment as shown in B, figure 5-24.

(d) The power meter shall read not less than -18 dbm.

b. Adjustments. No adjustments can be made.

111. VSWR Detector 5A8 (IM-242/U) Detection Measurement (fig. 5-25)

a. Performance Check.

(1) Connect the test equipment as shown in A, figure 5-26.

(2) Set signal generator to 100 MHz, CW. Set variable attenuator (CN-1294/U) to 10 db. Adjust signal generator output level for a reading of 0 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-26. DVM shall read between -20 and -35 mvdc.

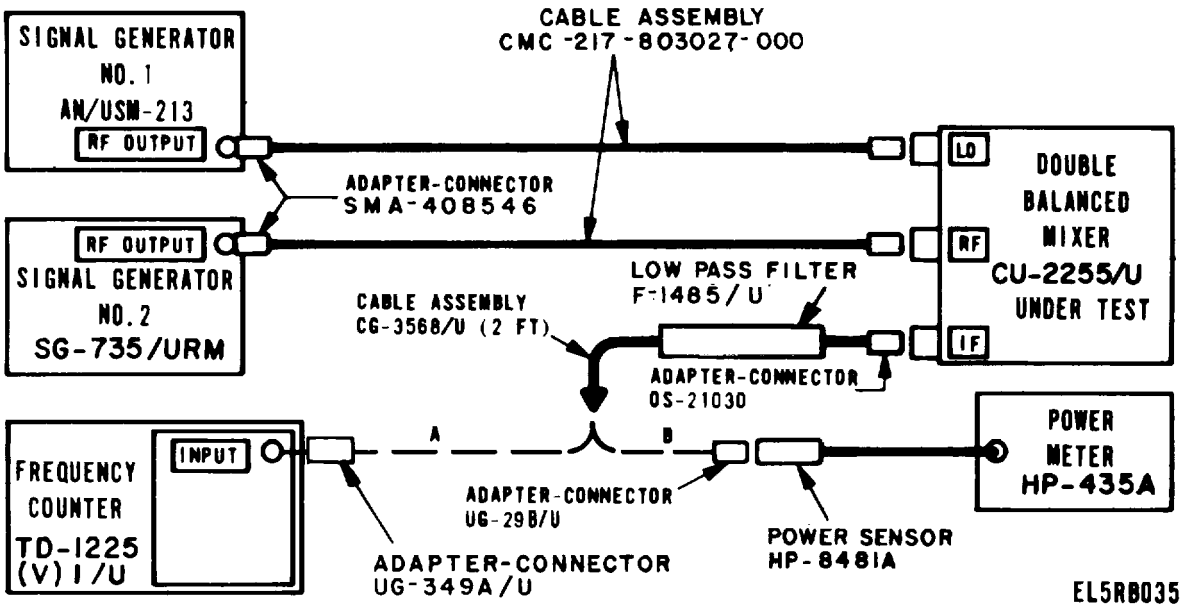


Figure 5-24. Coupler, Radio Frequency CU-2255/U Conversion Loss Measurement Test Setup.

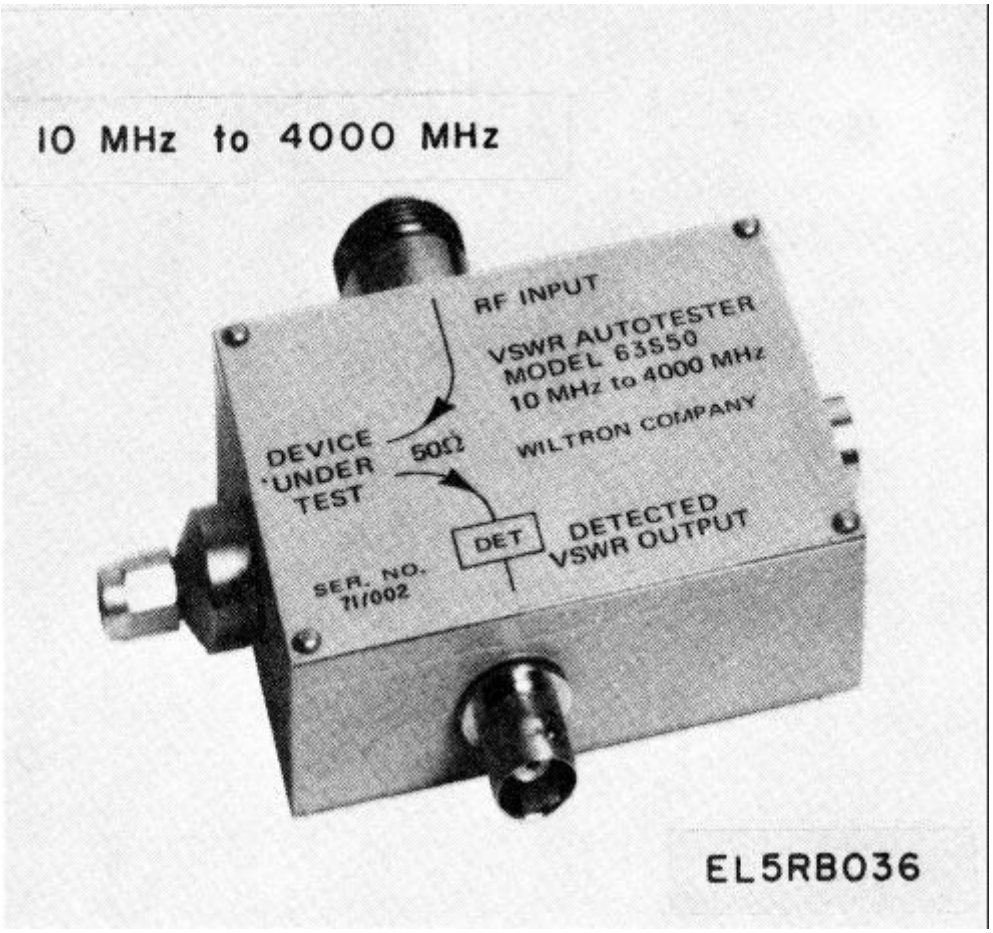


Figure 5-25. VSWR Detector IM-242U.

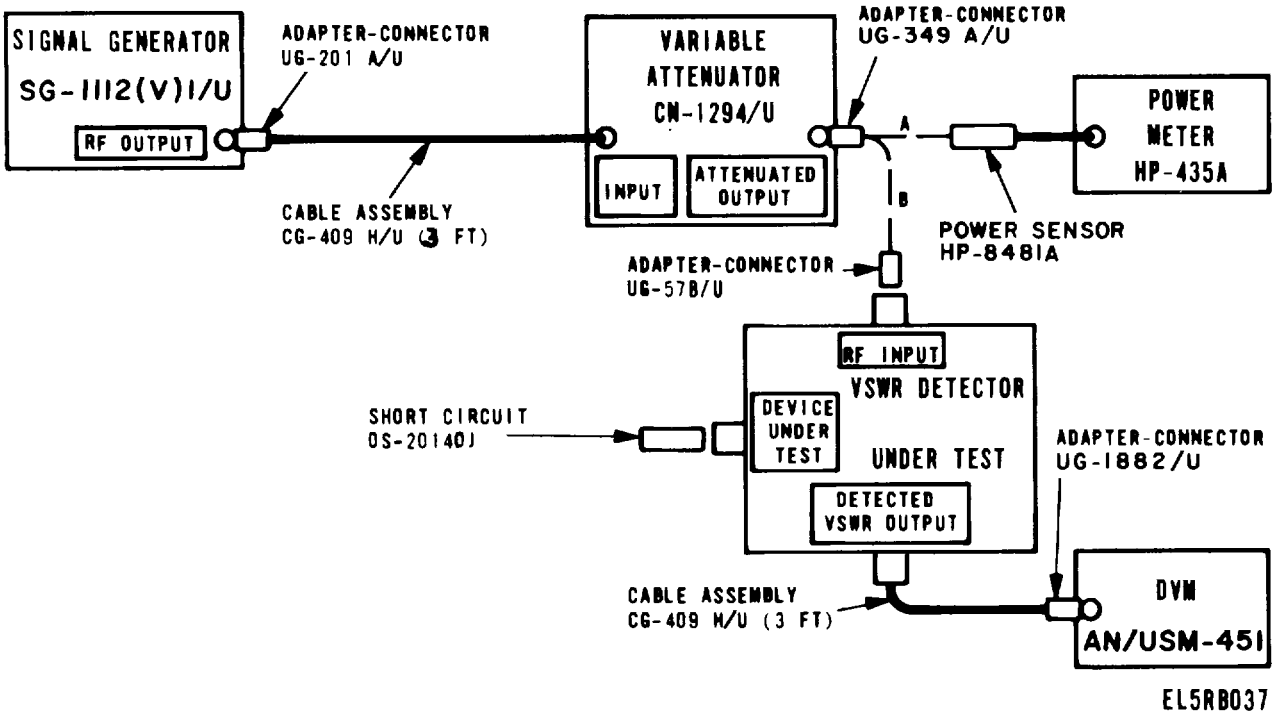


Figure 5-26. VSWR Detector IM-242/UDetection Measurement Test Setup.

(4) Set variable attenuator (CN-1294/U) to 20 db. DVM shall indicate -2 to -6 mvdc.

(5) Set variable attenuator (CN-1294/U) to 30 db. DVM shall read -0.2 mv to -0.6 mvdc.

112. VSWR Detector 5A8 (IM-2421U) Directivity Measurement

a. Performance Check.

(1) Connect test equipment as shown in figure 5-27.

(2) Set signal generator to 1850 MHz, CW, at a level of + 10 dbm.

(3) Digital voltmeter shall read less than 0.3 mv dc.

b. Adjustments. No adjustments can be made.

113. Coupler, Radio Frequency 5A9 (CU-2256/U) Conversion Loss Measurement (fig. 5-28)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-29.

(2) Set signal generator No. 1 to 1000 +0.1 MHz, CW.

(3) Connect test equipment as shown in B, figure 5-29.

(4) Adjust signal generator No. 1 output level control for a + 7 dbm reading on the power meter. Do not disturb signal generator settings.

(5) Connect test equipment as shown in C, figure 5-29.

(6) Set signal generator No. 2 to 970 + 0.1 MHz, CW.

(7) Connect test equipment as shown in D, figure 5-29.

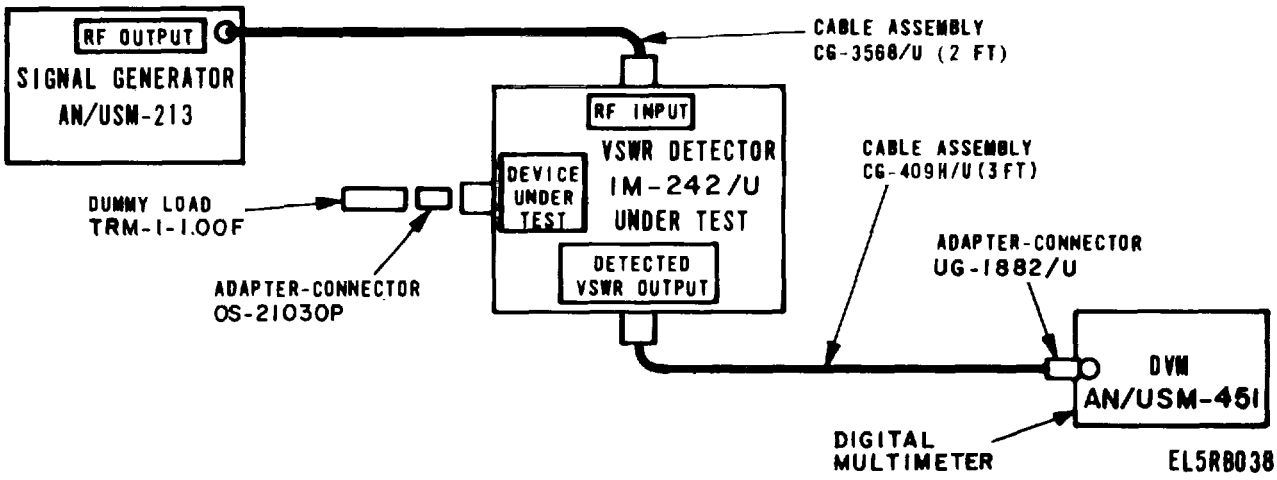
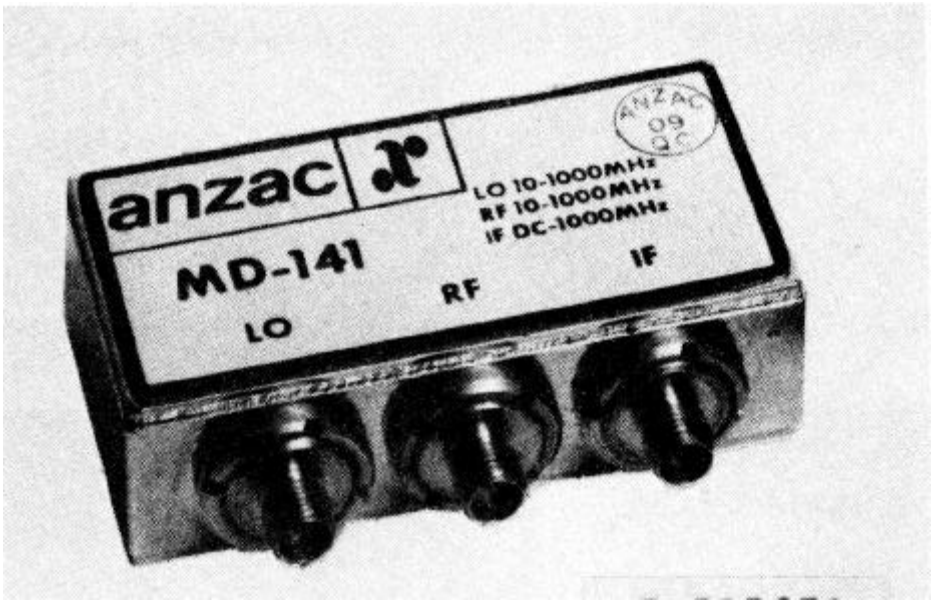


Figure 5-27. VSWR Detector IM-242/U Directivity Measurement Test Setup.



EL5RBO39

Figure 5-28. Coupler, Radio Frequency CU-2256/U.

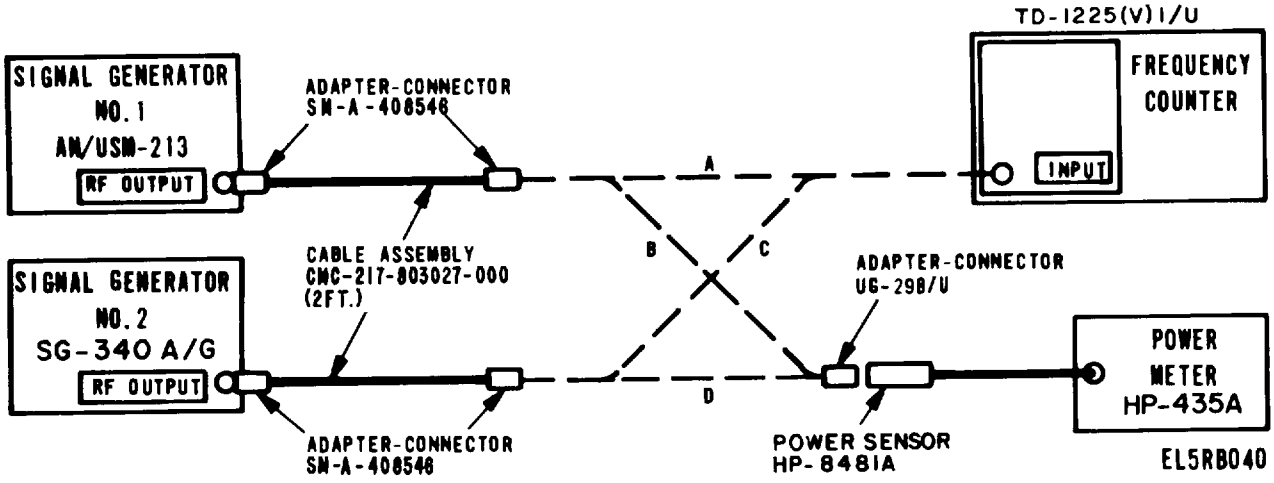


Figure 5-29. Coupler, Radio Frequency CU-22561U Calibration Test Setup.

(8) Adjust signal generator No. 2 output level control for a reading of -10 dbm on the power meter. Do not disturb the signal generator settings.

(9) Connect test equipment as shown in A, figure 5-30.

(10) The frequency counter shall read 30 MHz +0.2 MHz.

(11) Connect test equipment as shown in B, fig. 5-30.

(12) The power meter shall read not less than -18 dbm.

b. Adjustments. No adjustments can be made.

114. Fixed Attenuators Attenuation Measurement, Narda 765-20 (5AT1) (CN-1533/U), Narda 766-10 (5AT2) (CN-1534/U), Narda 766-6 (5AT3) (CN-1535/U), Narda 757C (4AT3, 4AT4) (CN-1531/U)

(fig. 5-31 and 5-32)

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-33.

(2) Set signal generator for 1850 MHz, CW, and set output level control for a reading of (see configuration A, in table 21). Do not disturb signal generator settings.

(3) Connect test equipment as shown in B, figure 5-33.

(4) The power meter shall read (see configuration B, in table 21 below).

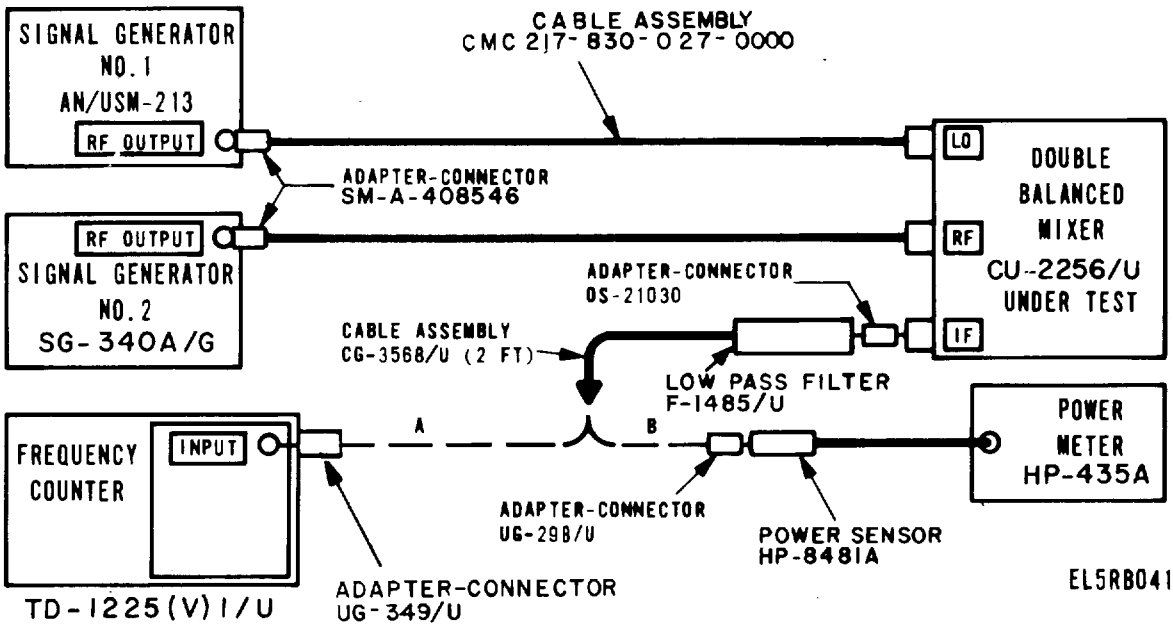


Figure 5-30. Coupler, Radio Frequency CU-2256/U Conversion Loss Measurement Test Setup.

Figure 5-31. Fixed Attenuators, Narda 765-20, Narda 766-6, and Narda 766-10.

Figure 5-32. Fixed Attenuator, Narda 757C-6.

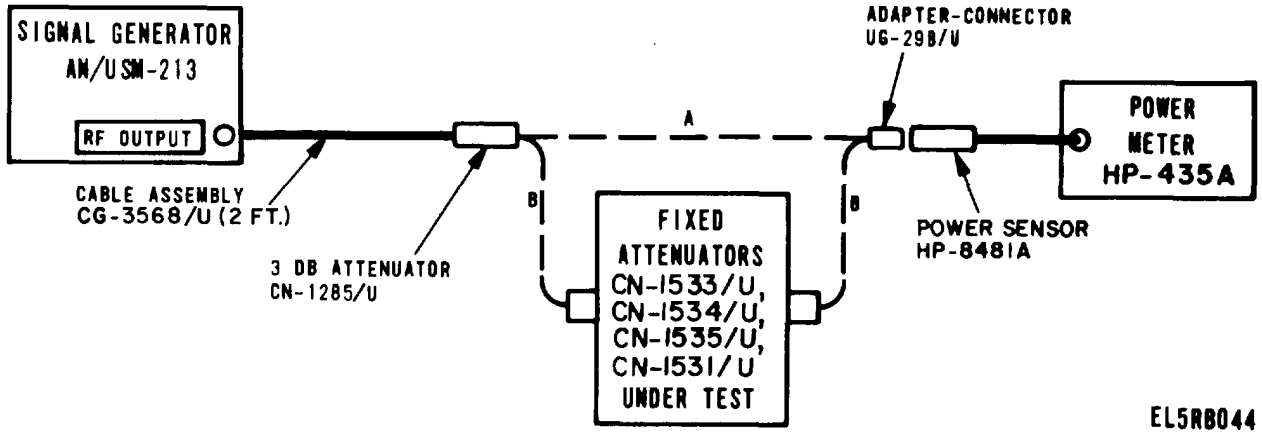


Figure 5-33. Fixed Attenuators, Narda 765-20, 766-10, 766-6, 757C-6, Attenuation Measurement Test Setup.

Table 21. Attenuation Measurement

Unit Under Test Attenuator	Power Meter Reading	
	Configuration A	Configuration B
Narda 765-20 (20 dB, 50W)	+5 dbm	-15 dbm ±0.30 dB
Narda 766-1-(10 dB, 20W)	+5 dbm	-5 dbm +0.25 dB
Narda 766-6 (6 dB, 20W)	+0 dbm	-6 dbm ±0.25 dB
Narda 757C-6 (6 dB, 5W)	+0 dbm	-6 dbm ±0.301 db

b. Adjustments. No adjustments can be made.

115. Fixed Attenuator 5AT4 (CN-1536/U) Attenuation Measurement (fig. 5-34)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-35.

(2) Set signal generator for 1850 MHz, CW and set output level control for a reading of 0 dbm on the power meter. Do not disturb signal generator settings.

(3) Connect test equipment as shown in B, figure 5-35.

(4) The power meter shall read -6 +0.3 db.

b. Adjustments. No adjustments can be made.

116. Variable Attenuator 0 to 10 db Continuous 5AT5 (CN-1537/U) Attenuation Measurement (fig. 5-36)

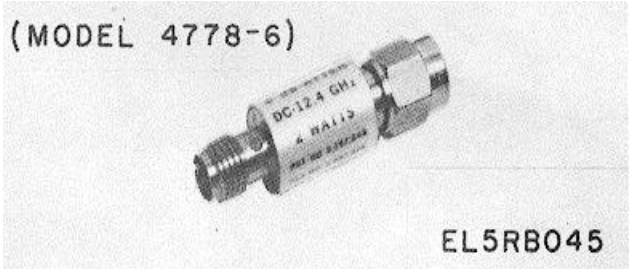


Figure 5-34. FixedAttenuatorCN-1536U(Narda4778-6).

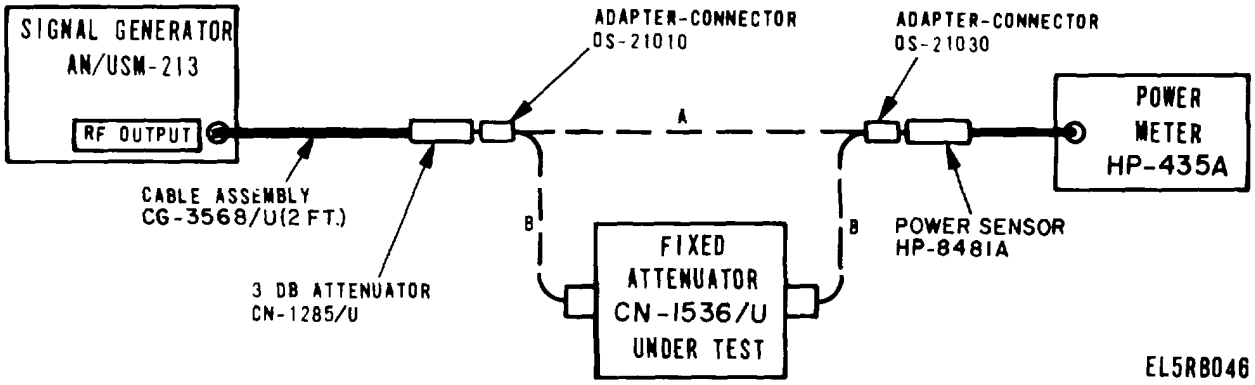


Figure 5-35. Fixed Attenuator CN-1536/U (Narda 4778-6) Attenuation Measurement Test Setup.

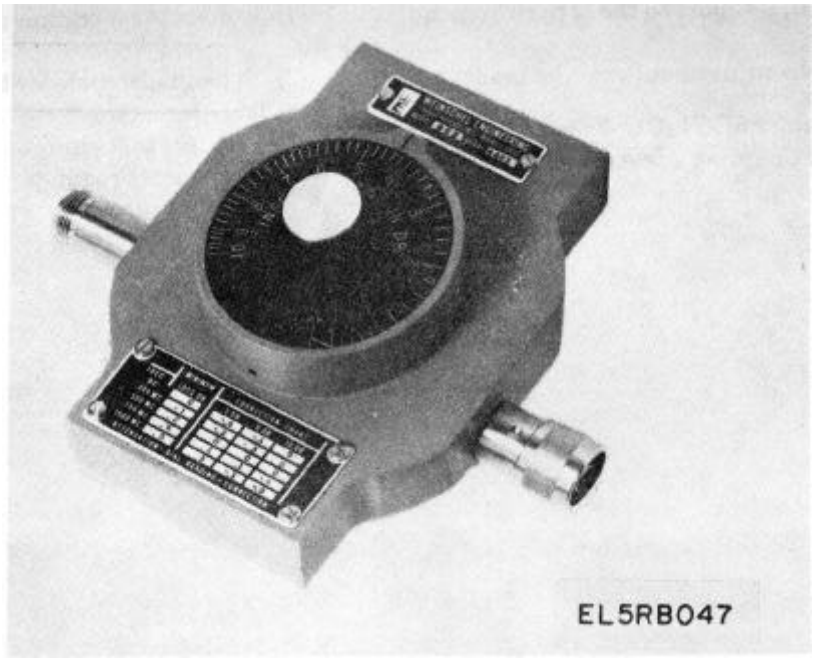


Figure 5-36. Variable Attenuator CN-1537/U (Weinschel 905).

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-37.

(2) Set signal generator to 300 MHz, CW, and adjust output level for a power meter reading of 0 dbm.

(3) Connect test equipment as shown in B, figure 5-37 and set variable attenuator to 3 db. The change in power meter reading from (2) above shall agree with the correction chart attached to the variable attenuator (U.U.T.) for 300 MHz, and 3 db setting, ±0.2 db.

(4) Replace Signal Generator SG-1112(V)1/U with Signal Generator SG-340A/G. Reconnect equipment as in A, figure 5-37.

(5) Set signal generator to 1000 MHz, CW, and adjust output level for a power meter reading of 0 dbm.

(6) Connect test equipment as shown in B, figure 5-37 and set variable attenuator to 10 db. The change in power meter reading from (5) above shall agree with the correction chart attached to the variable attenuator (U.U.T.) for 1000 MHz and 10 db setting, + 0.4 db.

b. Adjustments. No adjustments can be made.

117. Directional Coupler 5DC1 (CU-2246/U) VSWR Measurement (fig. 5-38)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-39.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a reading of - 10 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-39. Power meter reading shall not exceed - 28 dbm (equivalent to a VSWR better than 1.3:1).

(4) Move the test equipment connections from U.U.T. A port to the B port. Move the test equipment connections from U.U.T. C port to the D port. Repeat (1) through (3) above.

b. Adjustments. No adjustments can be made.

118. Directional Coupler 5DC1 (CU-22461U) Insertion Loss Measurement

a Performance Check.

(1) Connect test equipment as shown in C, figure 5-39.

(2) Set Signal Generator to 1000 MHz CW and adjust output level for a reading of + 10 dbm on the power meter.

(3) Connect test equipment as shown in D, figure 5-39.

(4) Note the reading obtained on the power meter.

(5) The difference between the power meter reading obtained in (2) above and the reading obtained in (4) above shall not exceed 0.7 db.

(6) Move the test equipment connections from

U.U.T. A port to the B port. Move the test equipment connections from U.U.T. C port to the D port. Repeat (1) through (5) above.

b. Adjustments. No adjustments can be made.

119. Directional Coupler 5DC1 (CU-2246/U) Directivity and Coupling Measurement (fig. 5-38)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-40.

(2) Set signal generator to 1000 MHz and adjust output level for a power meter reading of - 10 dbmn

(3) Connect test equipment as shown in B figure 5-40. Power meter reading shall be between -9 and -11 dbm. Note power meter reading.

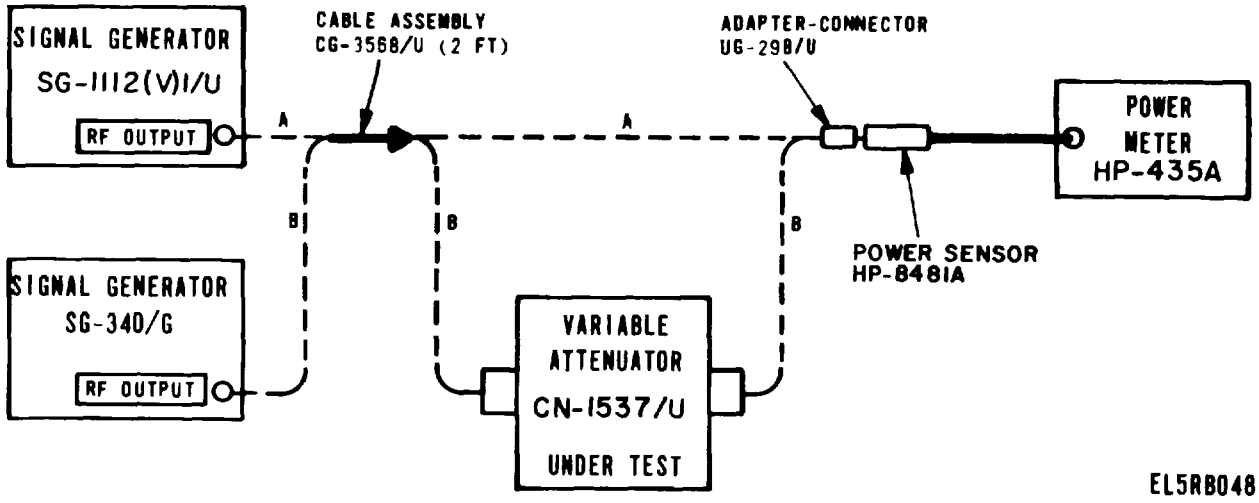
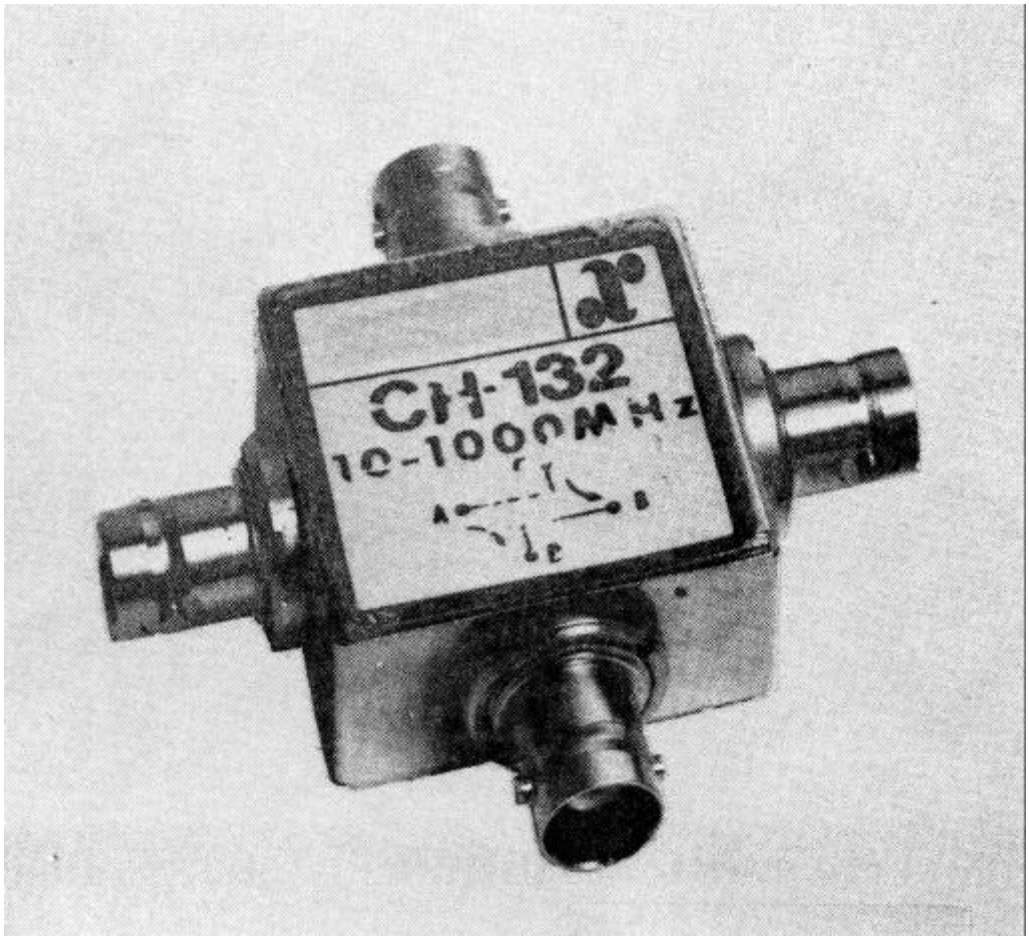


Figure 5-37. Variable Attenuator CN-1537/U (Weinschel 905) Attenuation Steps Measurement Test Setup



EL5RBO49

Figure 5-38. Directional Coupler CU-224U (Anzac CH-132).

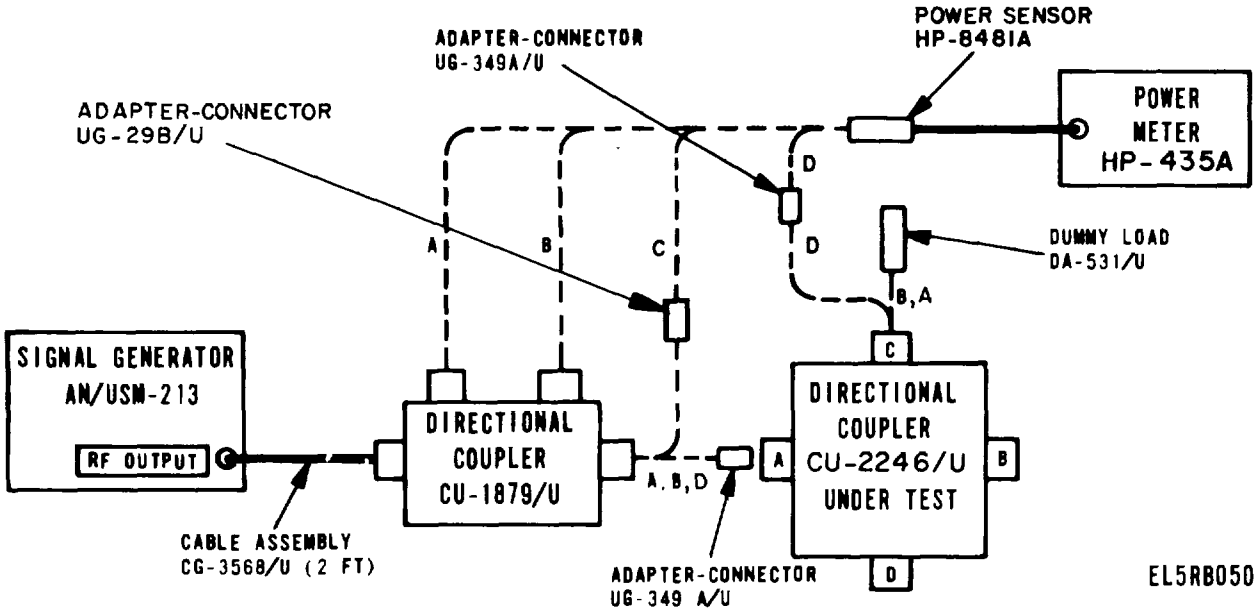


Figure 5-39. Directional Coupler CU-2246/U (Anzac CH-132) VSWR and Insertion Loss Measurements Test Setup.

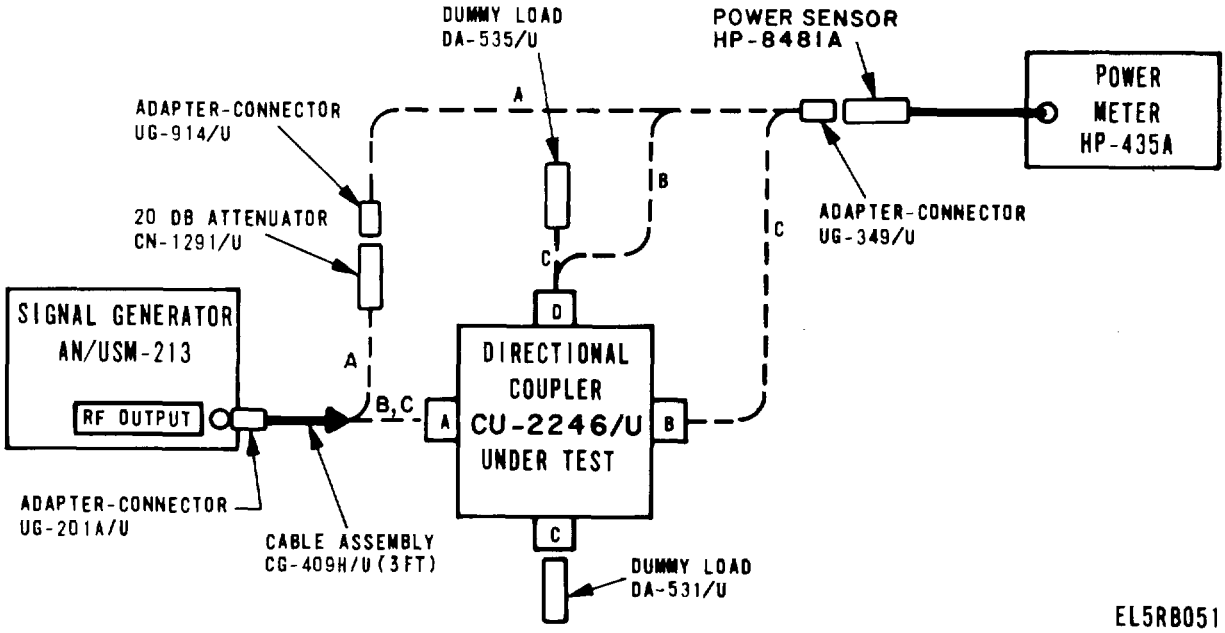


Figure 5-40. Directional Coupler CU-2246/U (Anzac CH-132) Directivity and Coupling Measurement Test Setup.

(4) Connect test equipment as shown in C, figure 5-40. Power meter reading shall be at least 20 db below the reading in (3) above.

(5) Repeat(l) through(4) above with ports A and B interchanged, and ports C and D interchanged.

b. Adjustments. No adjustments can be made.

120. Low Pass Filter 5FL1 (F-1484/U) VSWR Measurement. (fig. 5-41)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-42.

(2) Set signal generator to 1850 MHz, CW, and adjust output level for a reading of - 10 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-42. Power meter reading shall not exceed --28 dbm (equivalent to a VSWR better than 1.3:1).

(4) Reverse unit under test in test setup B, figure 5-42. Power meter reading shall not exceed - 28 dbm.

b. Adjustments. No adjustments can be made.

121. Low Pass Filter 5FL1 (F-1484/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-43.

(2) Set signal generator to 1850 MHz, CW, and adjust output level for a reading of 0 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-43. Power meter reading shall not be less than -0.4 dbm.

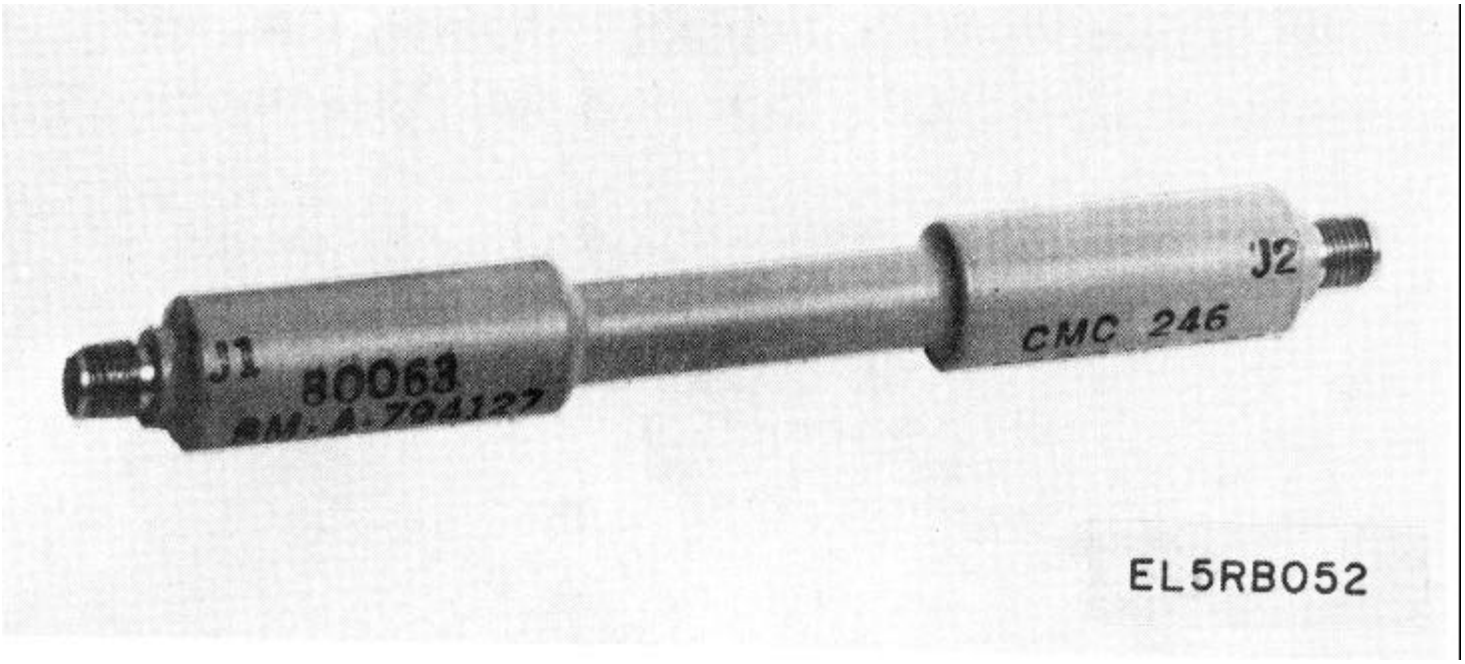


Figure 5-41. Low Pass Filter F-14/U (CMC 2468soo43-000).

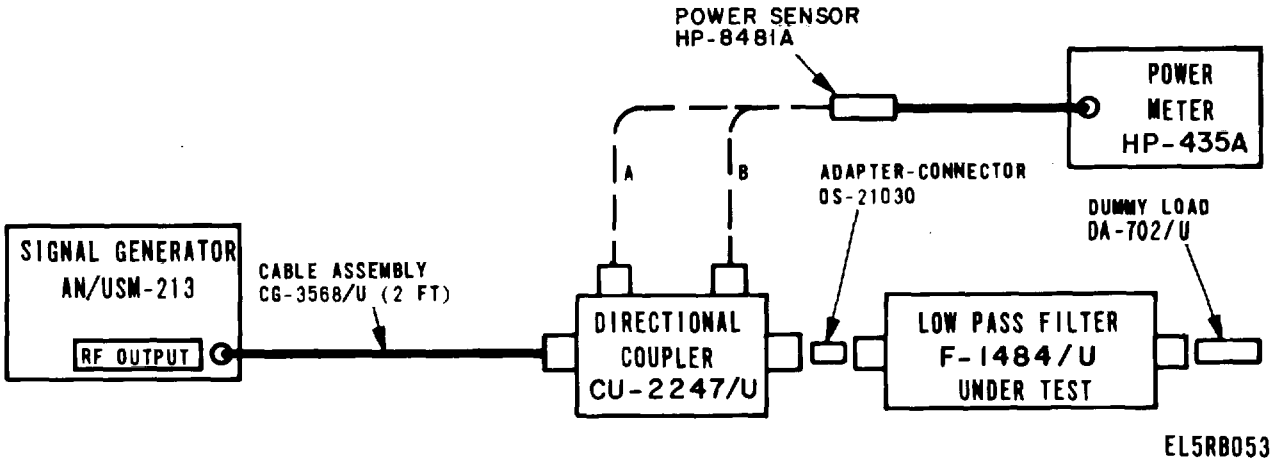


Figure 5-42. Low Pass Filter F-1484U (CMC 246-800043-000) VSWR Measurement Test Setup.

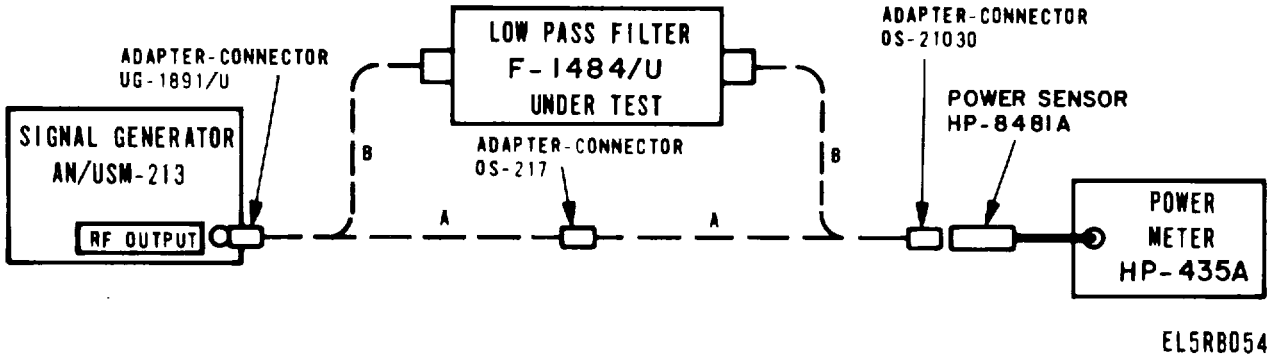


Figure 5-43. Low Pass Filter F-1484/U (CMC246-8000-000) Insertion Loss Measurement Test Setup

b. Adjustments. No adjustments can be made.

122. Low Pass Filter 5FL1 (F-1484/U) Rejection Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-44. Set signal generator to 2700 MHz, CW, at a level of -30 dbm as indicated on power meter.

(2) Connect test equipment as shown in B, figure 5-44. Power meter indication shall be less than -45 dbm.

(3) Repeat (1) and (2) above for a signal generator frequency of 3000 MHz, CW.

b. Adjustments. No adjustments can be made.

123. Low Pass Filter 5FL3 (F-1485/U) VSWR Measurement (Similar to fig. 5-11)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-45.

(2) Set signal generator to 290 MHz, CW, at a level of - 13 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-45. Power meter reading should not exceed -27 dbm (equivalent to better than 1.5:1 VSWR).

b. Adjustments. No adjustments can be made.

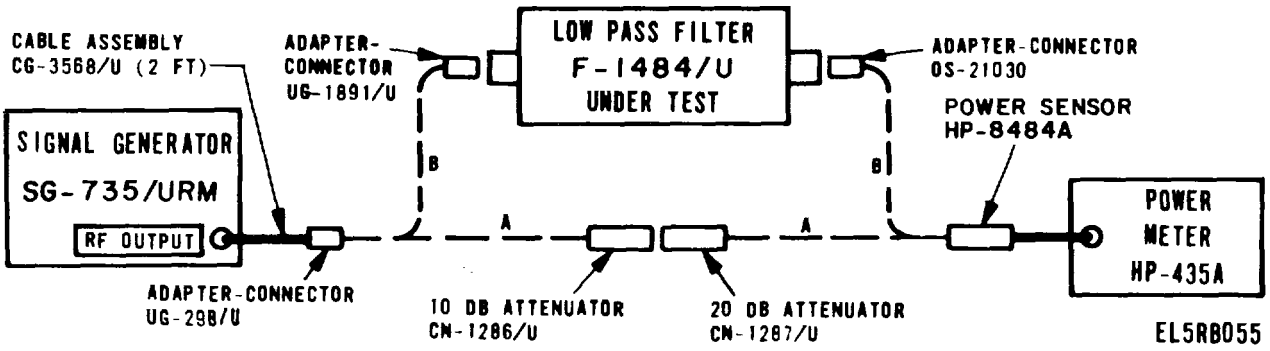


Figure 5-44. Low Pass Filter F-1484U(CMC246-80043-000), Rejection Measurement Test Setup.

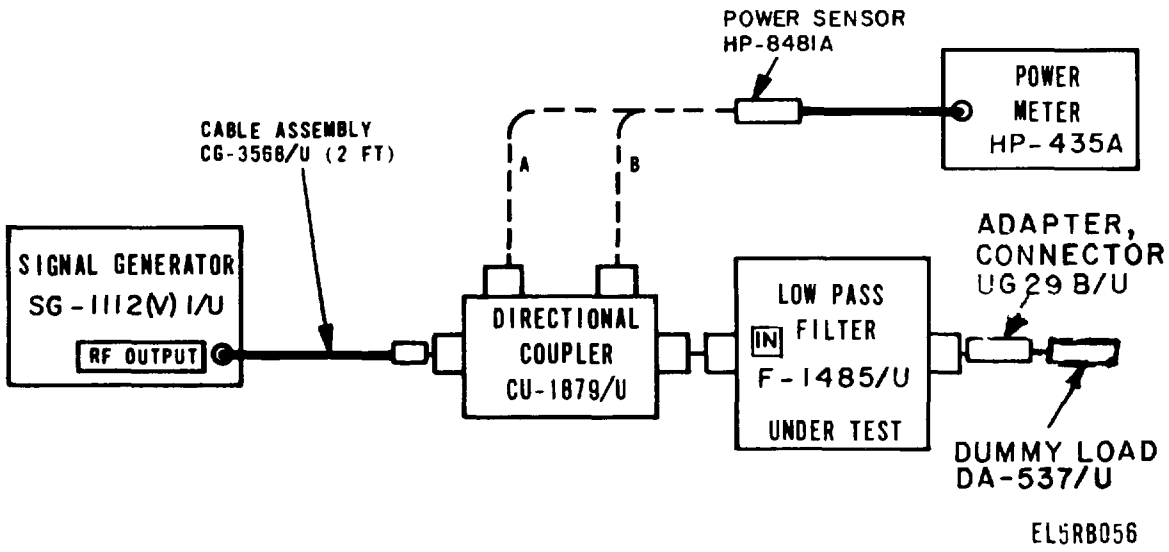


Figure 5-45. Low Pass Filter F-1 U (TLC290-5EF), VSWR Measurement Test Setup.

124. Low Pass Filter 5FL3 (F-1485/U) Insertion Loss Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-46.

(2) Set signal generator to 20 MHz, CW, and adjust output level for an indication of -0 dbm on power meter.

(3) Connect test equipment as shown in B, figure 5-46. Power meter reading should not be less than -0.4 dbm.

b. Adjustments. No adjustments can be made.

125. Low Pass Filter 5FL3 (F-14851U) Rejection Measurement

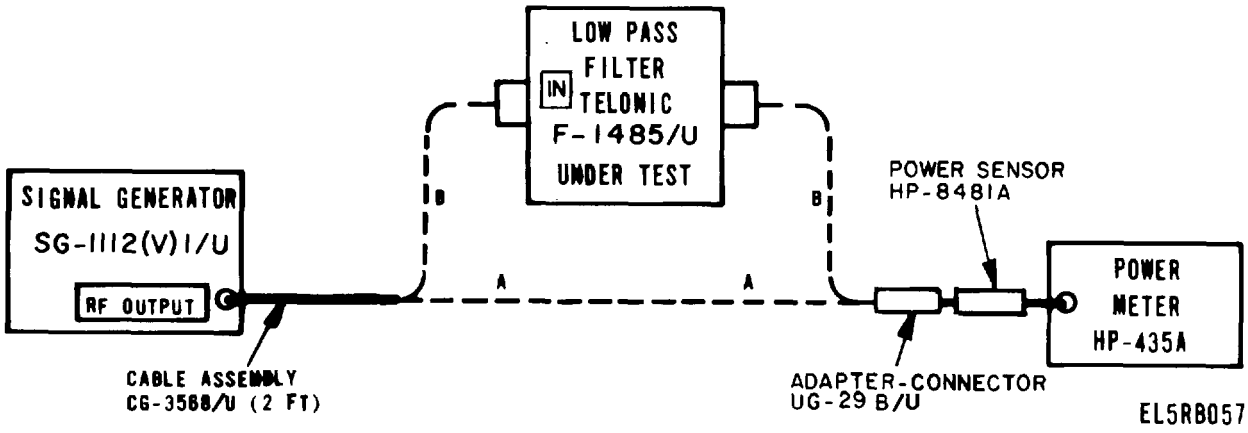


Figure 5-46. Low Pass Filter F-14851U (TLC 290-5EF), Insertion Loss and Rejection Measurement Test Setup.

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-46. Set signal generator to 377 MHz, CW, and adjust output level for an indication of + 10 dbm on power meter.

(2) Connect test equipment as shown in B, figure 5-46. Power meter reading should be less than -30 dbm, signifying a rejection of 40 db minimum.

126. Low Pass Filter 5FL4 and 5FL5 (F-1486/U) (Similar to fig. 5-11) VSWR Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-47.

(2) Set signal generator to 1000 MHz, CW, at a level of - 13 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-47. Power meter reading should not exceed -27 dbm (equivalent to a VSWR better than 1.5:1).

b. Adjustments. No adjustments can be made.

127. Low Pass Filter 5FL4A, 5FL5 (F-14861U) Insertion Loss Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-48.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for and indication of 0 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-48. Power meter reading should not be less than -0.4 dbm.

b. Adjustments. No adjustments can be made.

128. Low Pass Filter 5FIA and 5FL5 (F-14861U) Rejection Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-48. Set signal generator to 1230 MHz, CW, and adjust output level for an indication of 0 dbm on power meter.

(2) Connect test equipment, as shown in B, figure 5-48. Power meter reading should be less than -33 dbm (signifying a rejection of 33 db minimum).

b. Adjustments. No adjustments can be made.

129. Bandpass Filter 5FL6 (F-1487/U) VSWR Measurement (fig. 5-49)

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-50. Adjust the signal generator to a CW frequency of 500 MHz as indicated on the frequency counter.

(2) Connect equipment as shown in B, figure 5-50. Set the U.U.T. frequency dial to 500 MHz. Adjust the signal generator output level for a -13 dbm indication on the power meter.

(3) Connect test equipment as shown in C, figure 5-50. The power meter shall indicate less than -27 dbm (signifying a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

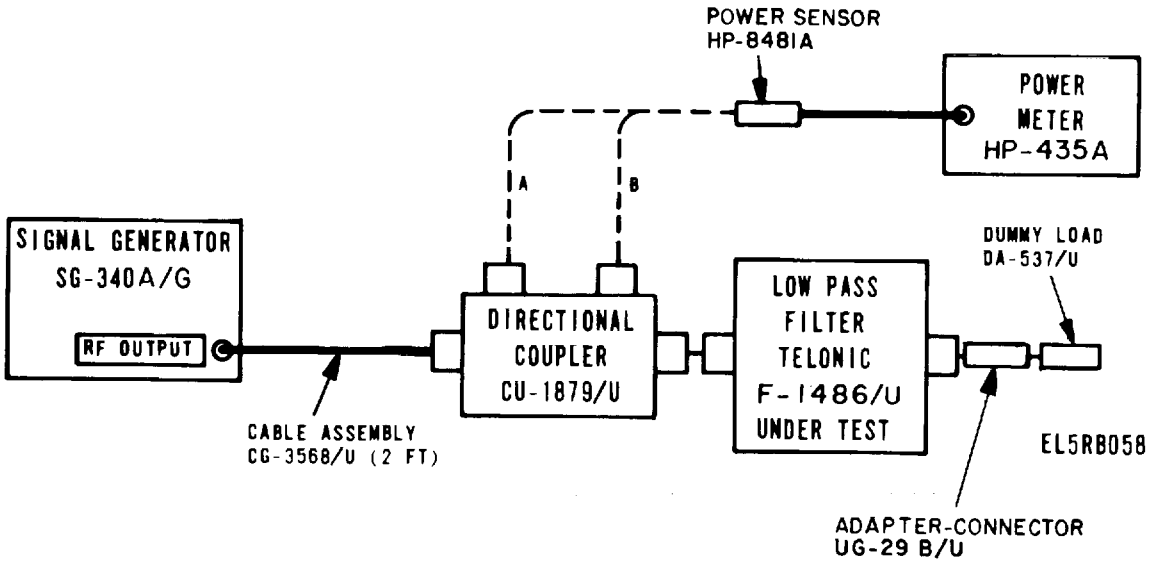


Figure 5-47. Low Pass Filter F-1486/U (TLC 1000-5EF) VSWR Measurement Test Setup.

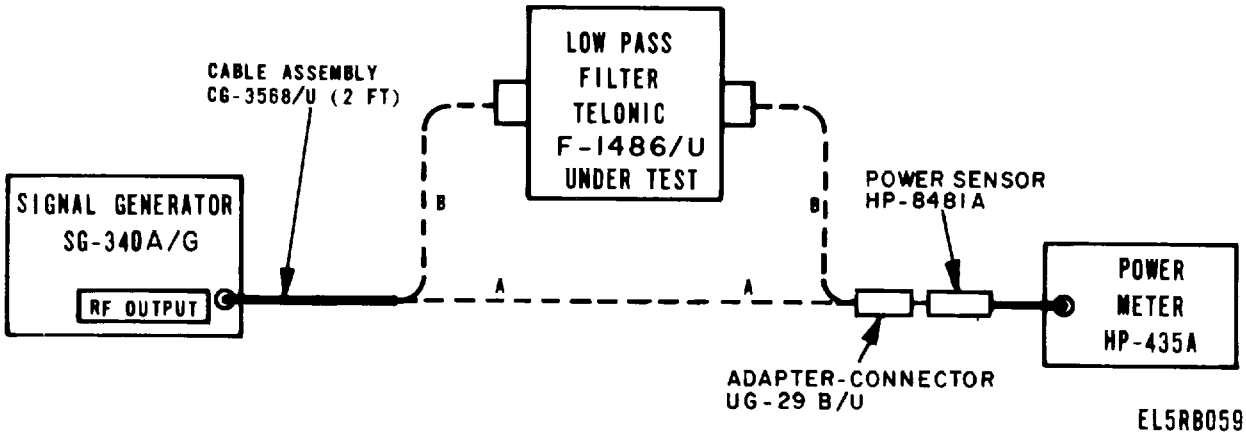


Figure 5-48. Low Pass Filter F-1486/U (TLC 100-5EF), Insertion Loss and Rejection Measurement Test Setup.

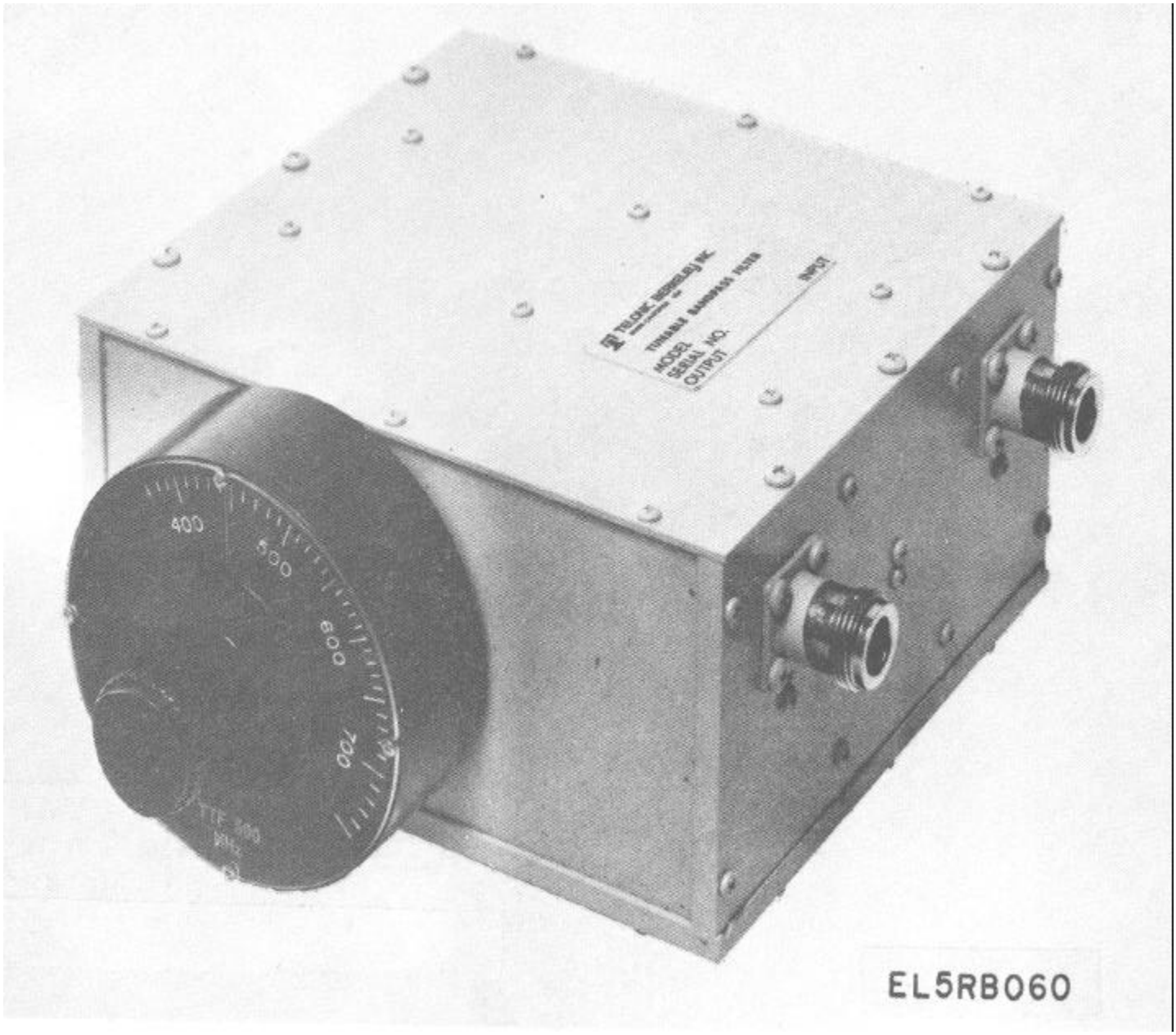


Figure 5-49. Bandpass Filter F-1487/U.

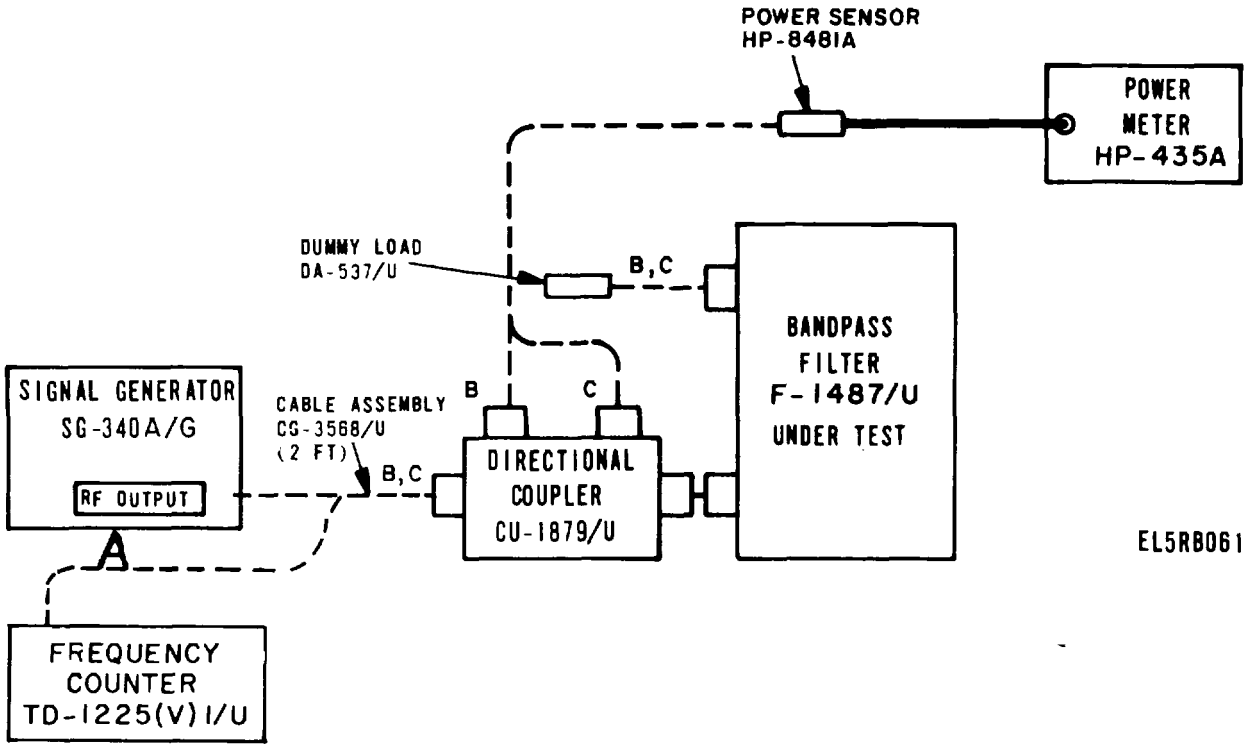


Figure 5-50. Bandpass Filter F-1487/U(TTF-500-5-3EE) VSWR Measurement Test Setup.

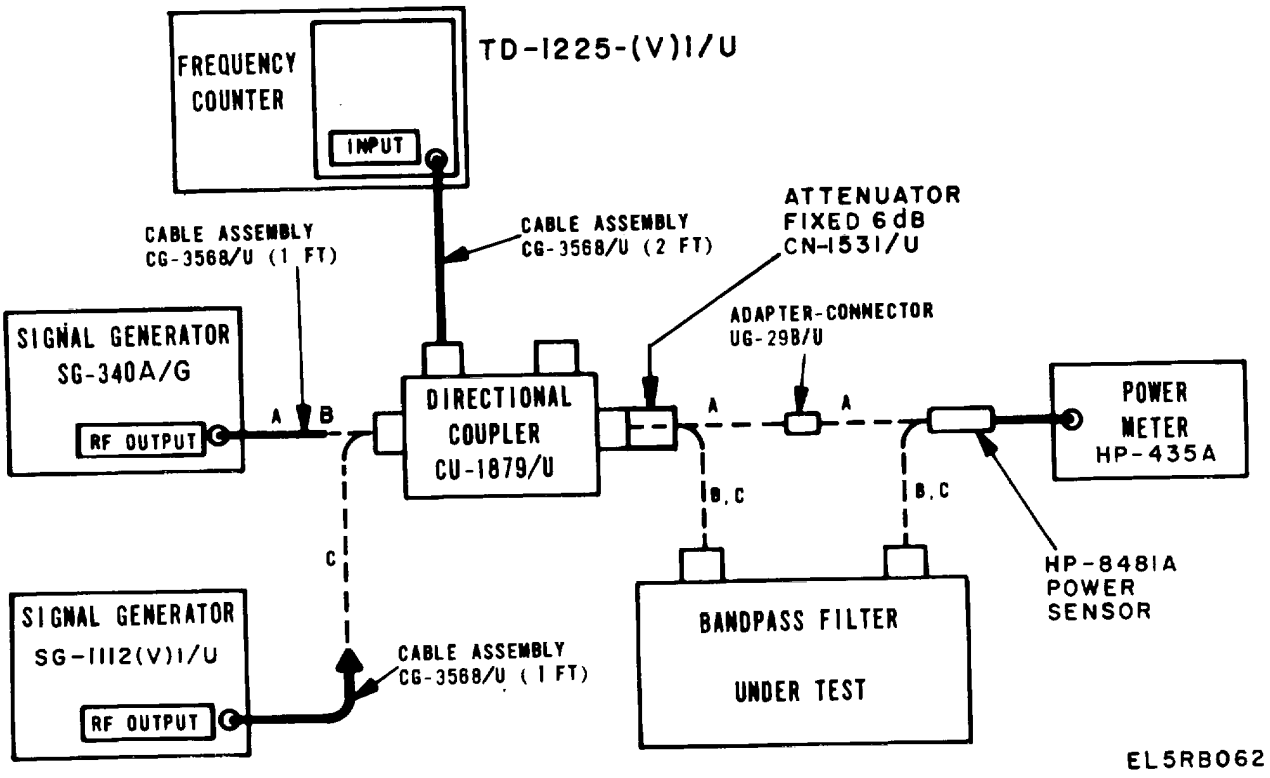


Figure 5-51. Bandpass Filter F-1487/U (TTF-50-3EE) Insertion Loss and Bandwidth Measurements Test Setup.

130. Bandpass Filter 5FL6 (F-1487/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, 5-51.

(2) Set signal generator to a CW frequency 750 MHz as read on frequency counter and output level for a 0 dbm indication on the meter.

(3) Connect test equipment as shown in B, 5-51. Set the U.U.T. frequency dial to 750 MH power meter shall indicate not less than -0.(equivalent to a maximum insertion loss of 0.8

b. Adjustments. No adjustment can be made.

131. Bandpass Filter 5FL6 (F-1487/U Bandwil Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, 5-51.

(2) Set the U.U.T. frequency dial to 750 adjust the signal generator to a CW frequency MHz as indicated on Frequency Counter and output level for a 0 dbm indication on the meter.

(3) Tune the signal generator frequency than 750 MHz, until the power meter indication drops by 3.0 db. Note the frequency reading.

(4) Tune the signal generator frequency than 750 MHz, until the power meter indication again drops by 3.0 db. Note the new frequency counter indication, subtract this frequency from the one noted in (3) above. The difference (bandwidth) shall be between 30 and 45 MHz.

(5) Connect test equipment as shown in C, figure 5-51.

(6) Repeat (2), (3) and (4) above at signal generator and U.U.T. dial frequency of 375 MHz. The difference (bandwidth) shall be between 15 and 22.5 MHz

b. Adjustments. No adjustment can be made.

132. Bandpass Filter 5FL7 (F-1488/U) VSWR Measurement (fig. 5-49)

a. Performance Check

(1) Connect test equipment as shown in A, figure 5-52. Adjust the signal generator to a CW frequency of 750 MHz as indicated on the frequency counter.

(2) Connect equipment as shown in B, figure 5-52. Set the U.U.T. frequency dial to 750 MHz. Adjust the signal generator output level for a -13 dbm indication on the power meter.

(3) Connect test equipment as shown in C, figure 5-52. The power meter shall indicate less than -27 dbm (signifying a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

133. Bandpass Filter 5FL7 (F-1488/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-53.

(2) Set signal generator to a CW frequency of 1000 MHz as read on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-53. Set the U.U.T. frequency dial to 1000 MHz. The power meter shall indicate not less than -1.5 dbm (equivalent to a maximum insertion loss of 1.5 db).

b. Adjustments. No adjustment can be made.

134. Bandpass Filter 5FL7 (F-1488/U) Bandwidth Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, figure 5-53.

(2) Set the U.U.T. frequency dial to 1000 MHz. Adjust the signal generator to a CW frequency of 1000 MHz, as indicated on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Tune the signal generator frequency higher than 1000 MHz until the power meter indication drops by 3.0 db. Note the frequency counter indication.

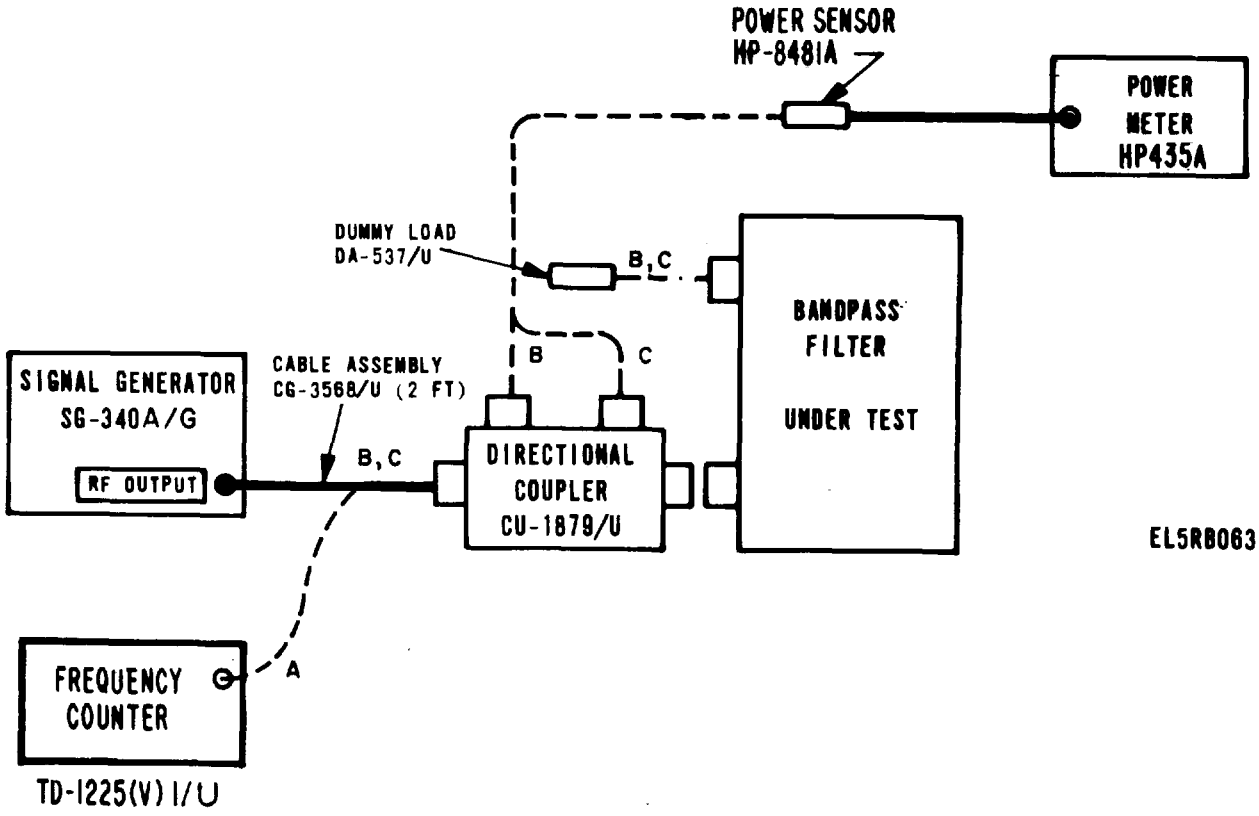


Figure 5-52. Bandpass Filter F-1488/U (TF- 750-5-5EE) VSWR Measurement Test Setup.

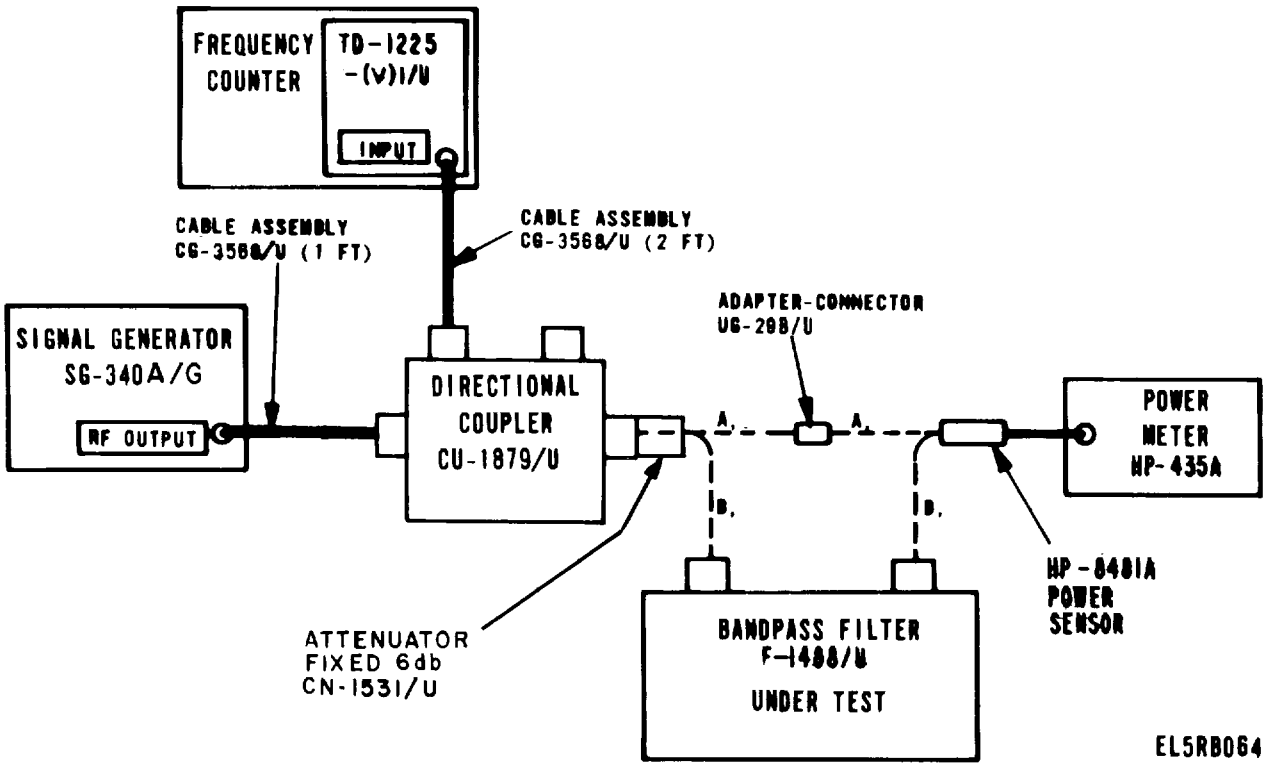


Figure 5-53. Bandpass Filter F-1488/U (TTF- 750-5-5EE) Insertion Loss and Bandwidth Measurements Test Setup.

(4) Tune the signal generator frequency lower than 1000 MHz, until the power meter indication again drops by 3.0 db. Note the new frequency counter indication, subtract this frequency from the one noted in (3) above. The difference (bandwidth shall be between 40 and 60 MHz.

(5) Repeat (1) through (4) above at signal generator and U.U.T. dial frequency of 500 MHz. The difference (bandwidth) shall be between 20 and 30 MHz.

b. Adjustments. No adjustment can be made.

135. Bandpass Filter 5FL8 (F-14891U) VSWR Measurement

(fig. 5-49)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-54.

(2) Set the U.U.T. frequency dial to 1000 MHz. Set signal generator to a CW frequency of 1000 MHz as read on frequency counter and adjust output level for a -13 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-54. The power meter shall indicate less than -27 dbm (signifying a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

136. Bandpass Filter 5FL8 (F-14891U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-55.

(2) Set signal generator to a CW frequency of 1500 MHz as read on the frequency counter and adjust the output level for a 0 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-55. Set the U.U.T. frequency dial to 1500 MHz. The power meter shall indicate not less than -0.8 dbm (equivalent to a maximum insertion loss of 0.8 db).

b. Adjustments. No adjustment can be made.

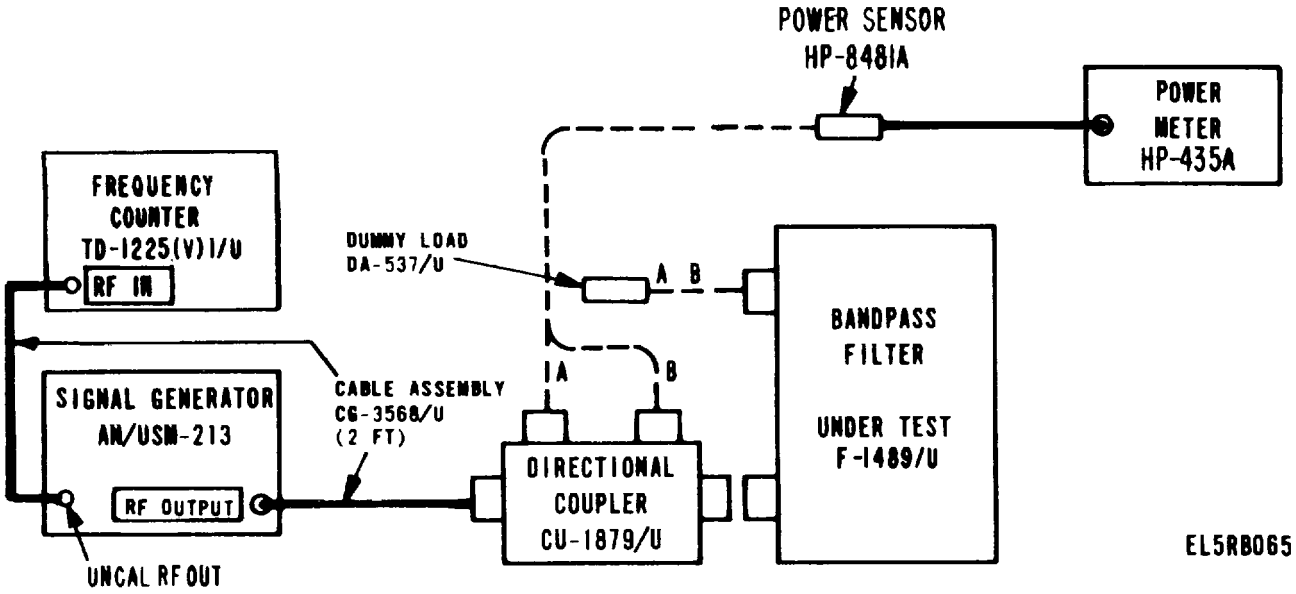


Figure 5-54. Bandpass Filter F-1489/U(TTF-1000-5-3EE) VSWR Measurement Test Setup.

137. Bandpass Filter 5FL8 (F-1489/U) Bandwidth Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, figure 5-55.

(2) Set the U.U.T. frequency dial to 1500 MHz. Adjust the signal generator to a CW frequency of 1500 MHz as indicated on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Tune the signal generator frequency higher than 1500 MHz, until the power meter indication drops by 3.0 db. Note the frequency counter indication.

(4) Tune the signal generator frequency lower than 1500 MHz, until the power meter indication again drops by 3.0 db. Subtract the new frequency from the one noted in (3) above. The difference (bandwidth) shall be between 60 and 90 MHz.

(5) Repeat (2), (3) and (4) above at signal generator and U.U.T. dial frequencies of 825 MHz. The difference (bandwidth) shall be between 34 and 50 MHz.

b. Adjustments. No adjustments can be made.

138. Bandpass Filter 5FL9 (F-14901U) VSWR Measurement

(fig. 5-49)

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-56.

(2) Set the U.U.T. frequency dial to 1500 MHz. Set signal generator to a CW frequency of 1500 MHz as read on frequency counter and adjust output level for a -13 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-56. The power meter shall indicate less than -27 dbm (signifying a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

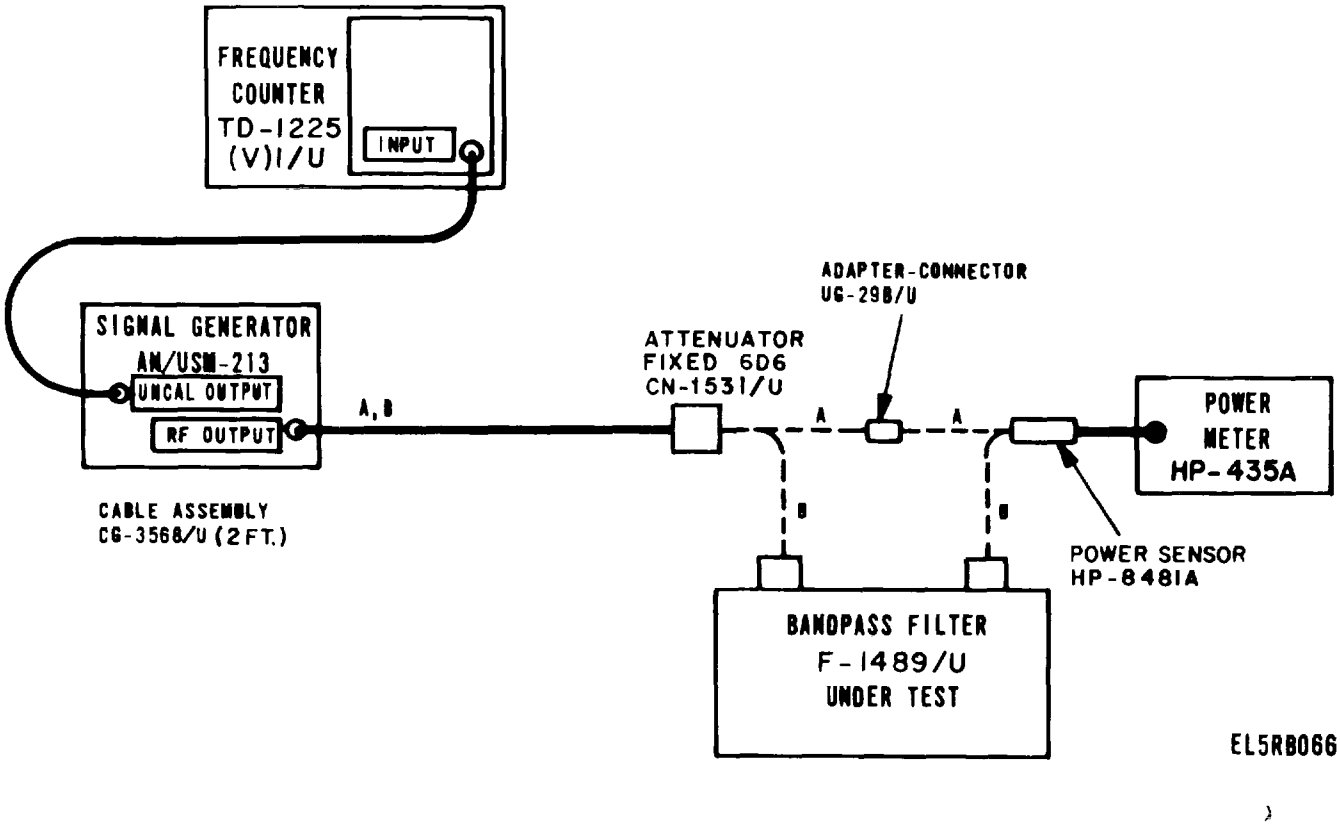


Figure 5-55. Bandpass Filter (F-1489/U) Insertion and Loss and Bandwidth Measurements Test Setup.

139. Bandpass Filter 5FL9 (F-1490/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-57.

(2) Set signal generator to a CW frequency of 2000 MHz as read on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-57. Set the U.U.T. frequency dial to 2000 MHz The power meter shall indicate not less than -1.0 dbm (equivalent to a maximum insertion loss of 1.0 db).

b. Adjustments. No adjustment can be made.

140. Bandpass Filter 5FL9 (F-1490/U) Bandwidth Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, figure 5-57.

(2) Set the U.U.T. frequency dial to 2000 MHz. Adjust the signal generator to a CW frequency of 2000 MHz as indicated on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Tune the signal generator frequency higher than 2000 MHz, until the power meter indication drops by 3.0 db. Note the frequency counter indication.

(4) Tune the signal generator frequency lower than 2000 MHz, until the power meter indication again drops by 3.0 db. Note the new frequency counter indication. Subtract this frequency from the one noted in (3) above. The difference (bandwidth) shall be between 80 and 120 MHz.

(5) Repeat (2) through (4) above at a signal generator and U.U.T. dial frequency of 1000 MHz. The difference (bandwidth) shall be between 40 and 60 MHz.

b. Adjustments. No adjustment can be made.

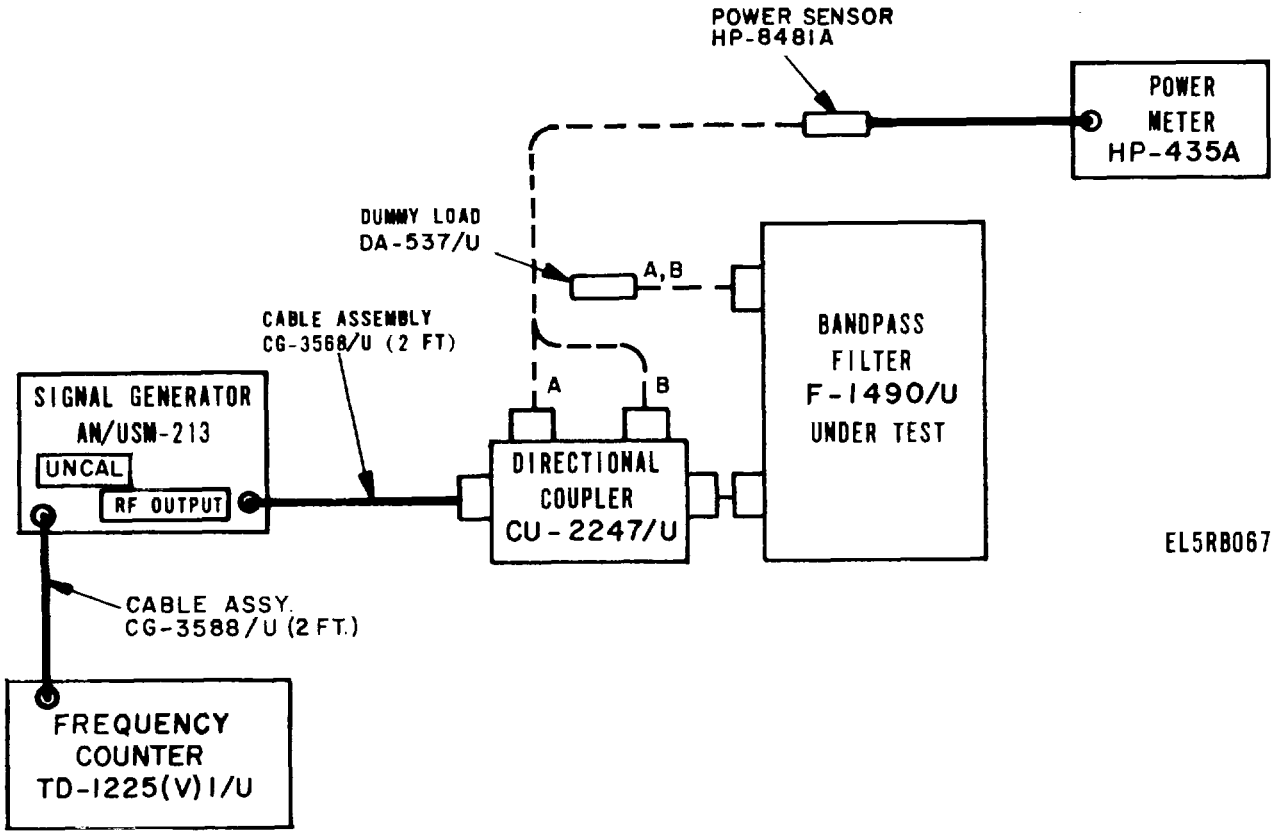


Figure 5-56. Bandpass Filter F-149WU (TTF-150-5-5EE), VSWR Measurement Test Setup.

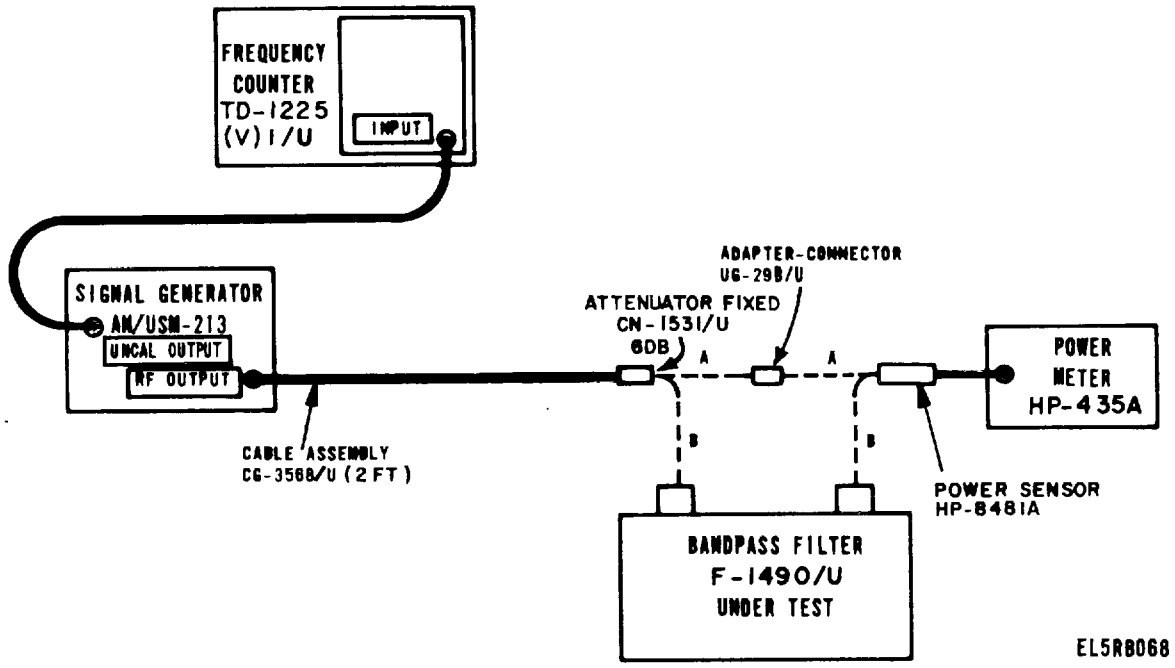


Figure 5-57. Bandpass Filter F-14901U (TTF-1500-5-5EE), Insertion Loss and Bandwidth Measurements Test Setup.

141. Bandpass Filter 5FL10 (F-1491/U) VSWR Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-58.

(2) Set the U.U.T. frequency dial to 250 MHz Set signal generator to a CW frequency of 250 MHz as read on frequency counter and adjust output level for a -13 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-58. The power meter shall indicate less than -27 dbm (signifying a VSWR of 1.5:1 or better).

b. Adjustments. No adjustments can be made.

142. Bandpass Filter 5FL10 (F-1491/U) Insertion Loss Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-59.

(2) Set signal generator to a CW frequency of 375 MHz as read on frequency counter and adjust output level for a 0 dbm indication on the power meter.

(3) Connect test equipment as shown in B, figure 5-59. Set the U.U.T. frequency dial to 375 MHz. The power meter shall indicate not less than -1.0 dbm (equivalent to a maximum insertion loss of 1.0 db).

b. Adjustments. No adjustments can be made.

143. Bandpass Filter 5FL10 (F-1491/U) Bandwidth Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, figure 5-59.

(2) Set the U.U.T. frequency dial to 375 MHz. Adjust the signal generator to a CW frequency of 375 MHz as indicated on frequency counter and adjust output level for a 0 dbm indication on the power meter.

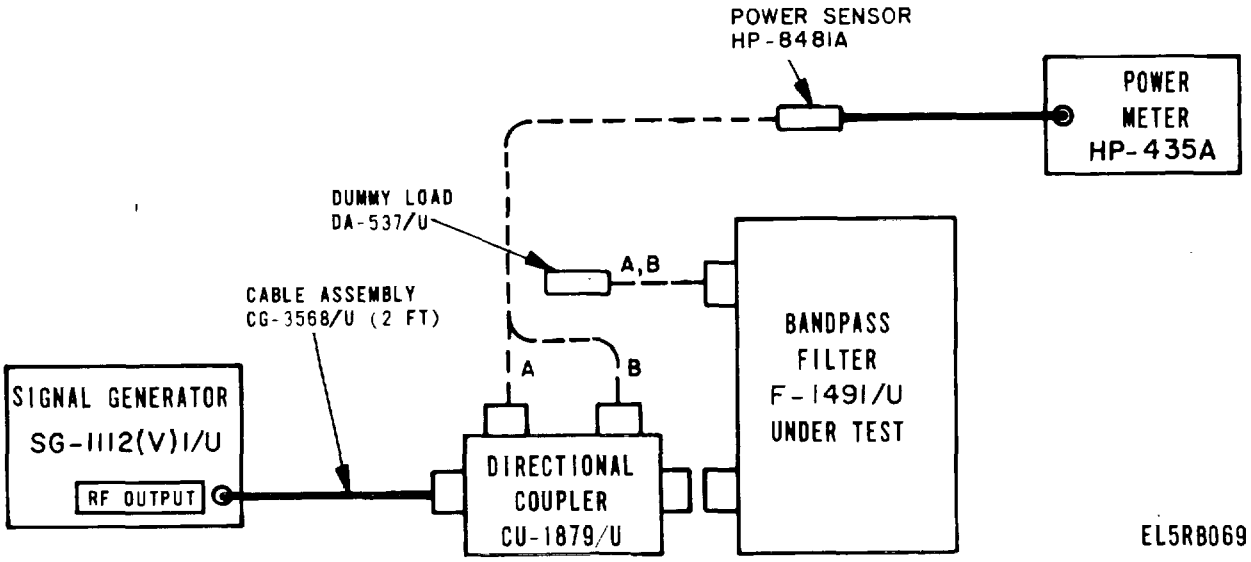


Figure 5-58. Bandpass Filter F-1491/U (TTF-250-5-3EE), VSWR Measurement Test Setup.

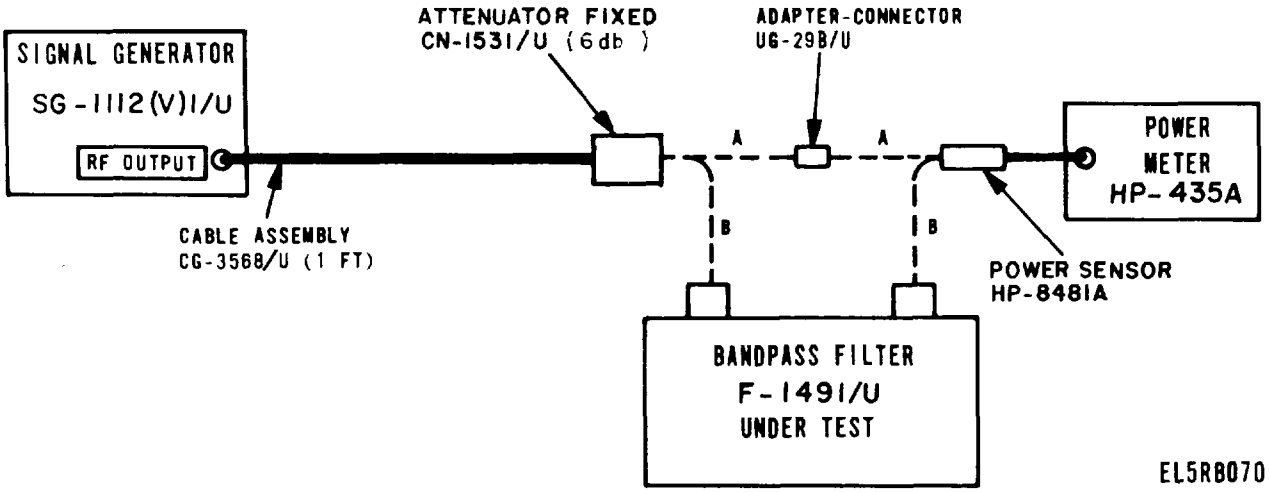


Figure 5-59. Bandpass Filter F-1491/U (7TF-25-5-3EE) Insertion Loss and Bandwidth Measurements Test Setup.

(3) Tune the signal generator frequency higher than 375 MHz, until the power meter indication drops by 3.0 db. Note the frequency counter indication.

(4) Tune the signal generator frequency lower than 375 MHz, until the power meter indication again drops by 3.0 db. Note the new frequency counter indication, subtract this frequency from the one noted in (3) above. The difference (bandwidth) shall be between 15 and 22.5 MHz.

(5) Repeat (2) through (4) above at a signal generator and U.U.T. dial frequency of 190 MHz. The Difference (bandwidth) shall be between 7.6 and 11.4 MHz.

b. Adjustments. No adjustment can be made.

144. Low Pass Filter 5FLll (F-1492/U) VSWR Measurement

(fig. 5-60 and 5-61)

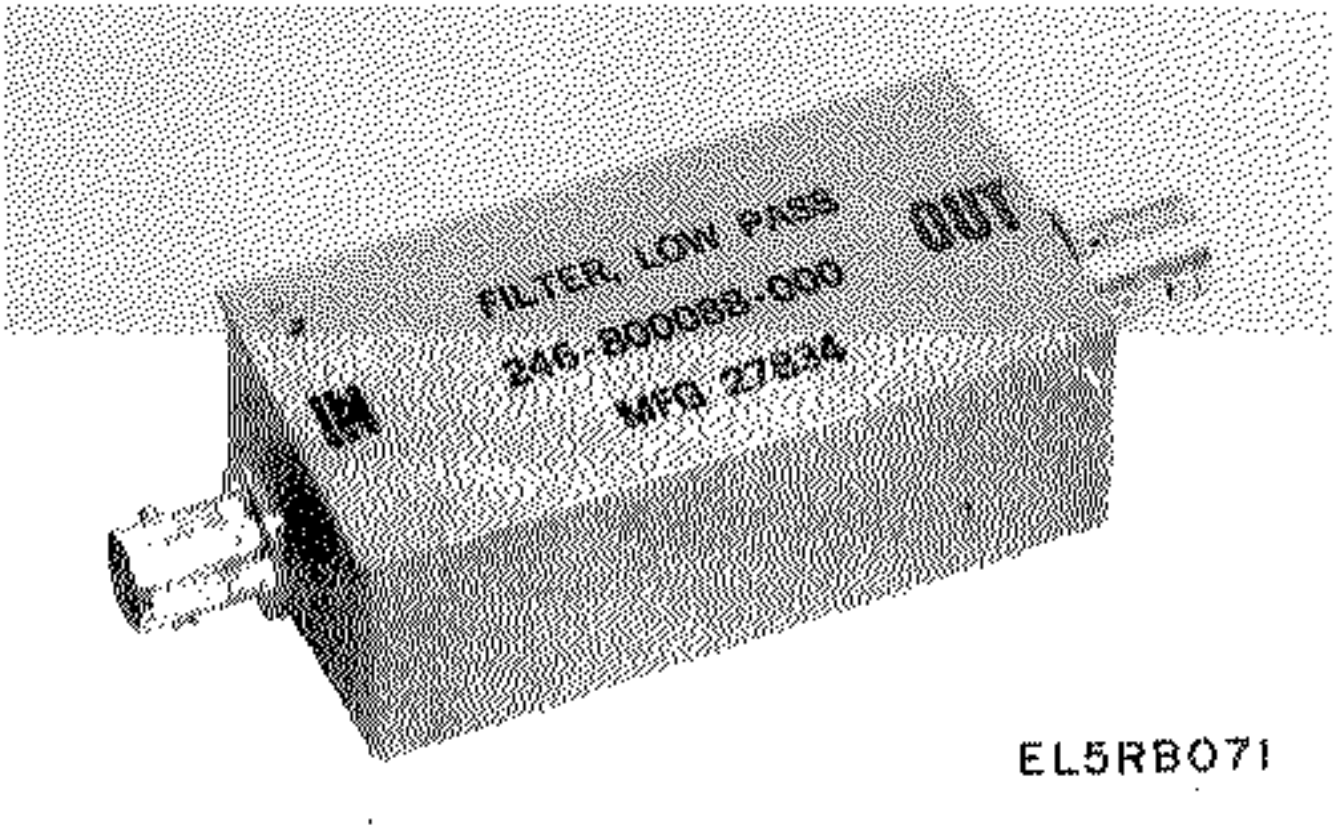


Figure 5-60. Low Pass Filter F-1492/U (CMC 246-800088-000).

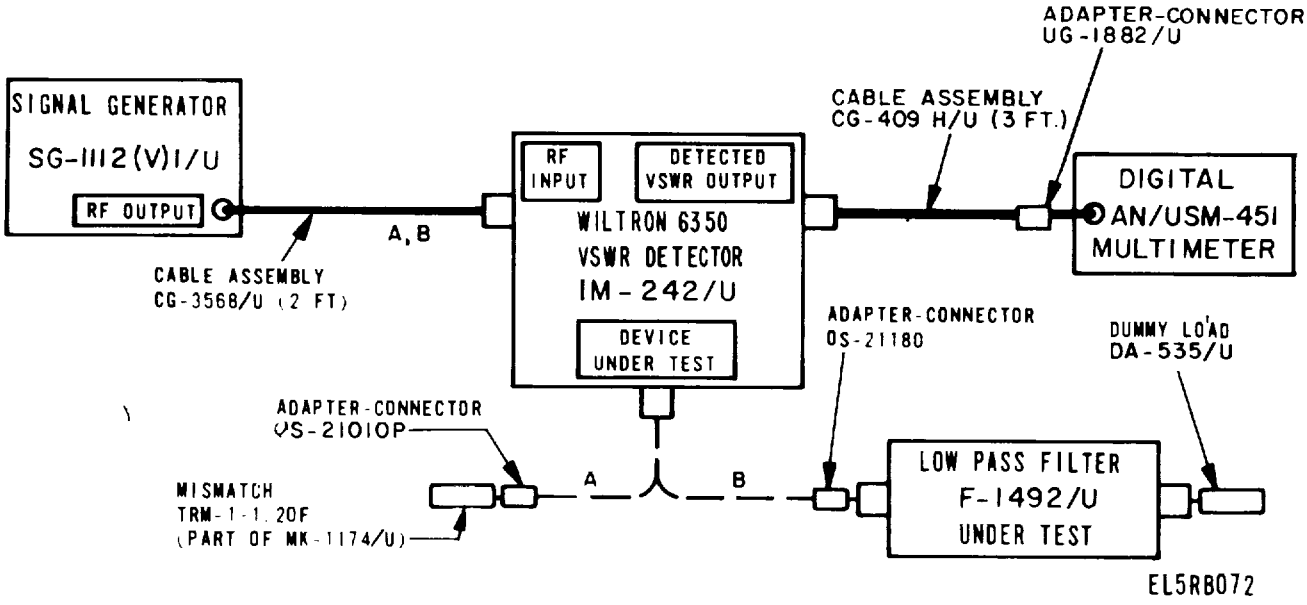


Figure 5-61. Low Pass Filter F-14921U (CMC246-800088-000) VSWR Measurement Test Setup.

a. Performance Check.

(1) Connect test equipment as shown in A, Figure 5-61.

(2) Set signal generator to 15 MHz, CW, adjust output level to + 1U dbm. Note reading on DVM.

(3) Connect test equipment as shown in B, figure 5-61. DVM reading shall be less than that in (2) above (equivalent to a VSWR better than 1.2:1).

b. Adjustments. No adjustments can be made.

145. Low Pass Filter 5FLll (F-14921U) Insertion Loss Measurement

a Performance Check.

(1) Connect test equipment as shown in A, Figure 5-62.

(2) Set signal generator to 15 MHz, ± 10 kHz as indicate on frequency counter. Adjust signal generator output level for a reading of - 20 dbm on power meter.

(3) Connect test equipment as shown in B, figure 5-62. Power meter shall read not less than - 21 dbm.

b. Adjustments. No adjustments can be made.

146. Low Pass Filter 5FLll (F-1492/U) Rejection Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-62. Adjust signal generator frequency to 30 MHz ± 10 kHz. Adjust output level for a - 20 dbm indication on power meter.

(2) Connect test equipment as shown in C, figure 5-62. Power meter reading shall not exceed -55 dbm.

(3) While maintaining the output level constant, slowly tune signal generator from 30 MHz to 300 MHz. Power meter reading shall not exceed -55 dbm for any frequency between 30 MHz and 300 MHz.

b. Adjustments. No adjustments can be made.

147. Radio Frequency Circulator 5HY1 and 5HY2 (TS-3842/U), VSWR Measurement

(fig. 5-63)

a. Performance Check.

NOTE

When checking VSWR at any port, remaining ports shall be terminated in 50 ohms.

(1) Connect test equipment as shown in A, figure 5-64.

(2) Set signal generator to 1850 MHz, CW and adjust output level for a reading of -13 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-64. Power meter reading shall not exceed -28.6 dbm (equivalent to a VSWR better than 1.40:1).

(4) Repeat (2) and (3) above with directional coupler connected at port 2, dummy loads connected at ports 1 and 3.

(5) Repeat (2) and (3) above with directional coupler connected at port 3, dummy loads connected at ports 1 and 2.

b. Adjustments. No adjustments can be made.

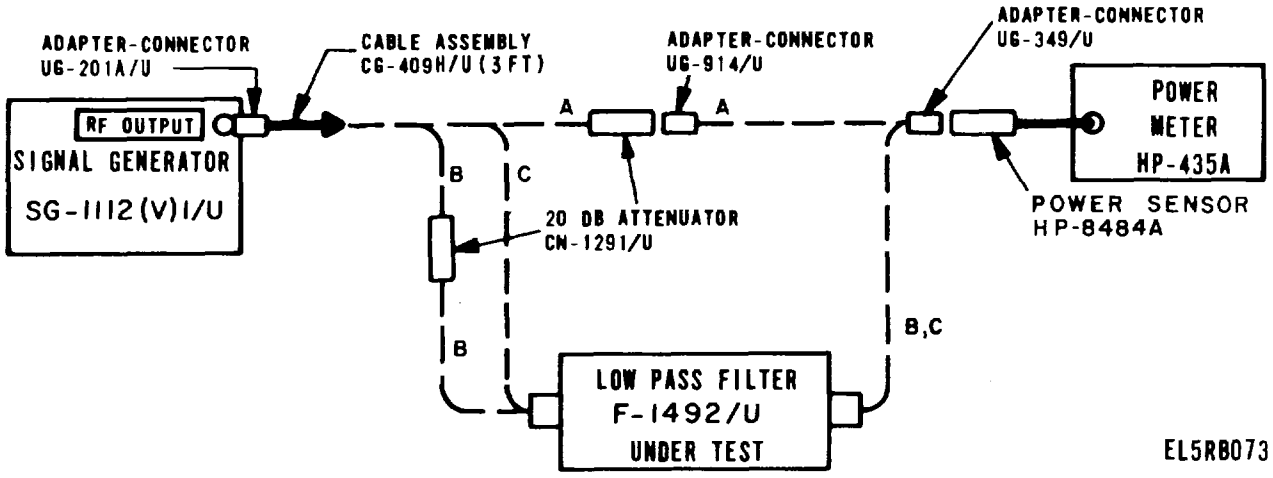


Figure 5-62. Low Pass Filter F-1492/U (CMC 246-8018-000), Insertion Loss and Rejection Measurements Test Setup.

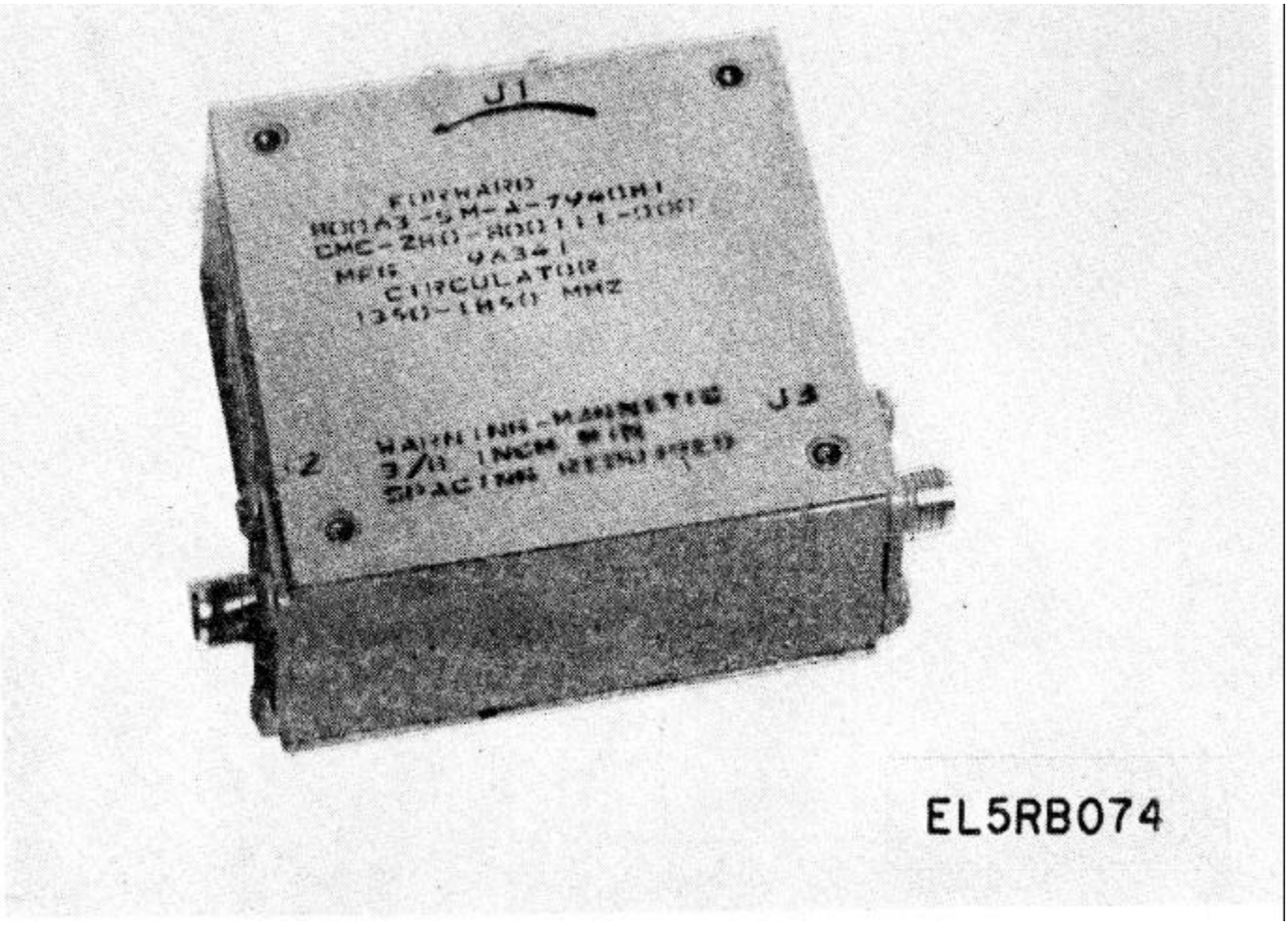


Figure 5-63. Radio Frequency Circulator TS-3842U (CMC2800111-000).

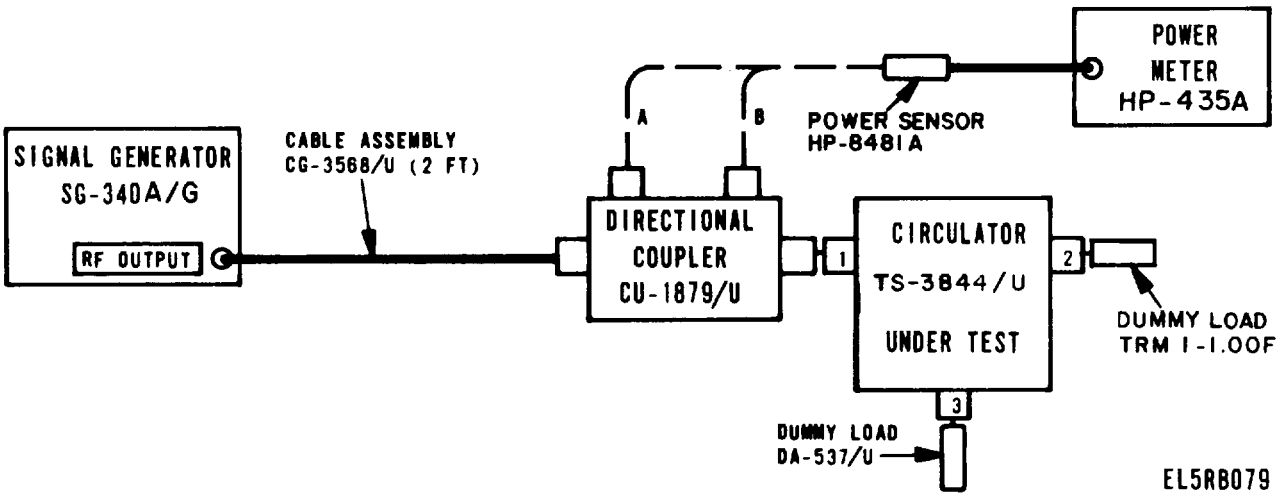


Figure 5-64. Radio Frequency Circulator TS-3842/U (CMC 280-800111-000) VSWR Test Setup.

148. Radio Frequency Circulator 5HY1 and 5HY2 (TS-3842/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-65.

(2) Set signal generator for 1500 MHz at 0 dbm and square-wave modulation.

(3) Adjust VSWR indicator gain for O dB indication on expanded scale.

(4) Connect test equipment as shown in B, figure 5-65.

(5) The indication on the VSWR indicator shall be 0.5 or less, indicating insertion loss of 0.5 dB or less.

(6) Connect test equipment as shown in C, figure 5-65.

(7) The indication on the VSWR indicator shall be 0.5 dB or less.

(8) Connect test equipment as shown in C, figure 5-65, except interchange the connections to the U.U.T. as follows: Lead connected at J2 to J3, lead connected at J3 to J1, and dummy load connected at J3 to J2.

(9) The indication on the VSWR indicator shall be 0.5 db or less.

(10) Repeat 1 to 9 above for signal generator frequencies of 1350 and 1850 MHz.

b. Adjustments. No adjustments can be made.

149. Radio Frequency Circulator 5HY1 and 5HY2 (TS-3842/U) Isolation Measurement

a. Performance Check.

(1) Connect test equipment as shown in B, figure 5-66.

(2) Set signal generator for 1500 MHz at 0 dbm with square-wave modulation.

(3) Adjust the controls of the VSWR indicator for a convenient indication. Record the indication.

(4) Connect test equipment as shown in A, figure 5-66 and set variable attenuator to obtain the same indication as recorded in (3) above.

(5) The attenuator setting shall be 9 db or greater which is equivalent to isolation of 15 db greater (6 db fixed attenuator, plus variable attenuator setting).

(6) Connect test equipment as shown in C, figure 5-66.

(7) Repeat (3), (4) and (5) above.

(8) Connect test equipment as shown in C, figure 5-66, except interchange the connections to the U.U.T. as follows: lead connected at J3 to J2, lead connected at J2 to J1, and dummy load connected at J1 to J3.

(9) Repeat (3), (4) and (5) above.

(10) Repeat (1) through (9) for signal generator frequencies of 1350 and 1850 MHz.

b. Adjustments. No adjustments can be made.

150. Radio Frequency Circulator (TS-38441U) VSWR Measurement

(fig. 5-67)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-68.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a reading of -13 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-68. Power meter reading shall not exceed -29.5 dbm (equivalent to a VSWR better than 1.35:1.

(4) Interchange connections at port 1 and 2 of the U.U.T. power meter reading shall not exceed -29.5 dbm.

(5) Interchange connections at port 2 and 3 of the U.U.T. power meter reading should not exceed -29.5 dbm

b. Adjustments. No adjustments can be made.

151. Radio Frequency Circulator (TS-3844/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-69.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a reading of 0 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-69. The power meter reading shall not be less than -1.0 dbm.

(4) Repeat (3) above with signal generator connected to port 2, power meter connected to port 3 and dummy load connected to port 1.

(5) Repeat (3) above with signal generator connected to port 3, power meter connected to port 1 and dummy load connected to port 2.

b. Adjustments. No adjustments can be made.

152. Radio Frequency Circulator (TS-3844/U) Isolation Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-70.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a reading of 0 dbm on the power meter.

(3) Connect test equipment as shown in B, figure 5-70. Power meter reading shall not exceed - 17 dbm (equivalent to a minimum isolation of - 17 dbm).

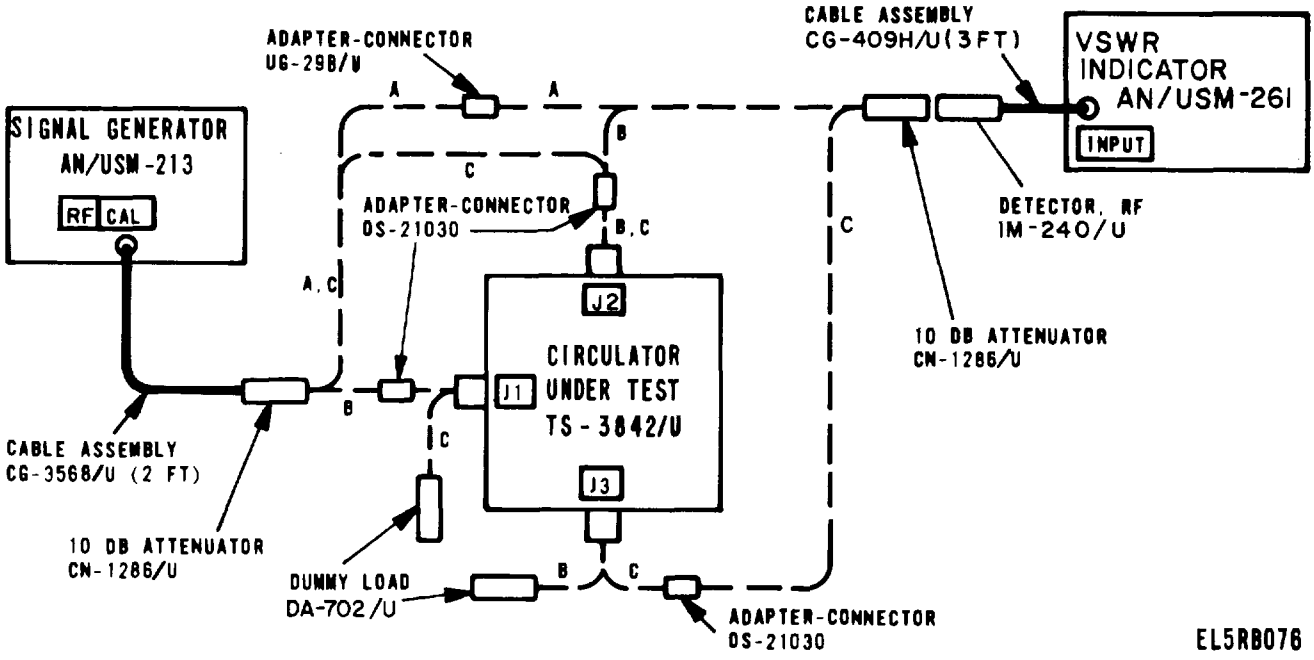


Figure 5-65. Radio Frequency Circulator TS-3842/U(CMC 280800111-000, Insertion Loss Test Setup.

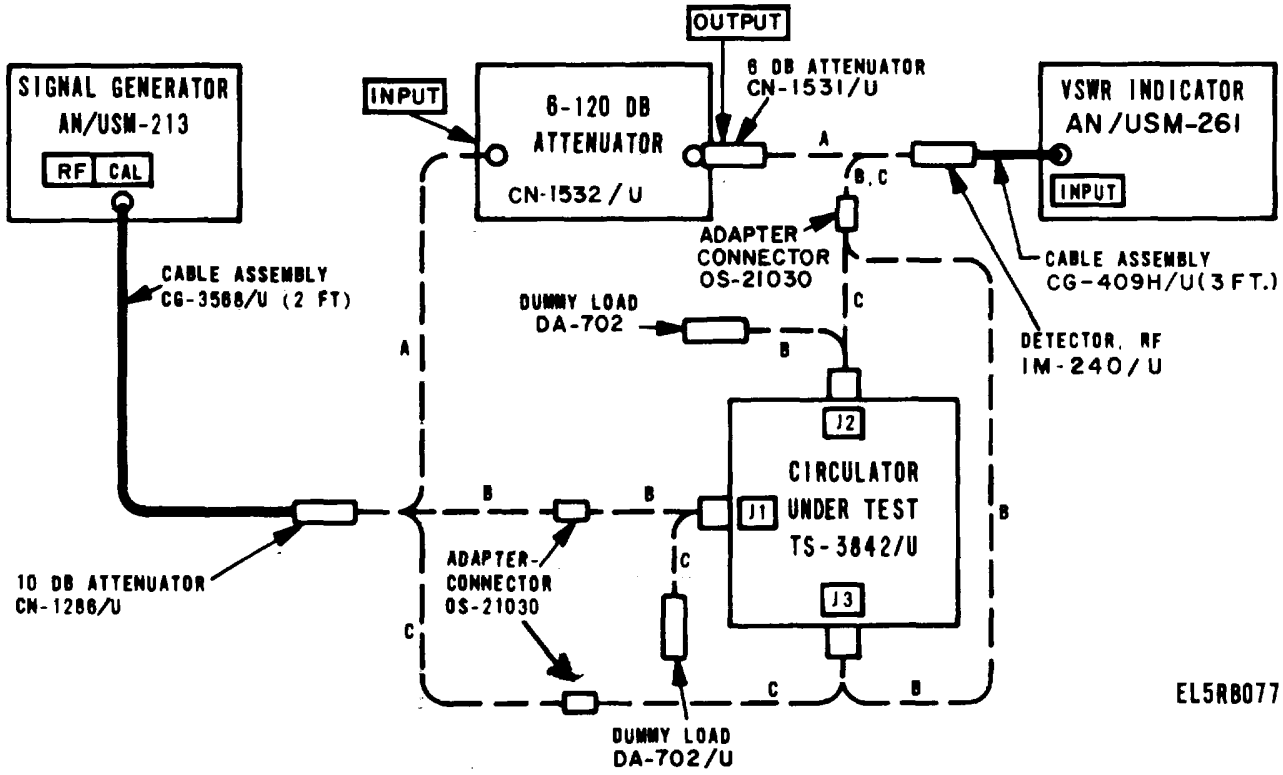


Figure 5-66. Radio Frequency Circulator TS-3842/U (CMC 280-800111-O00), Isolation Measurement Test Setup.

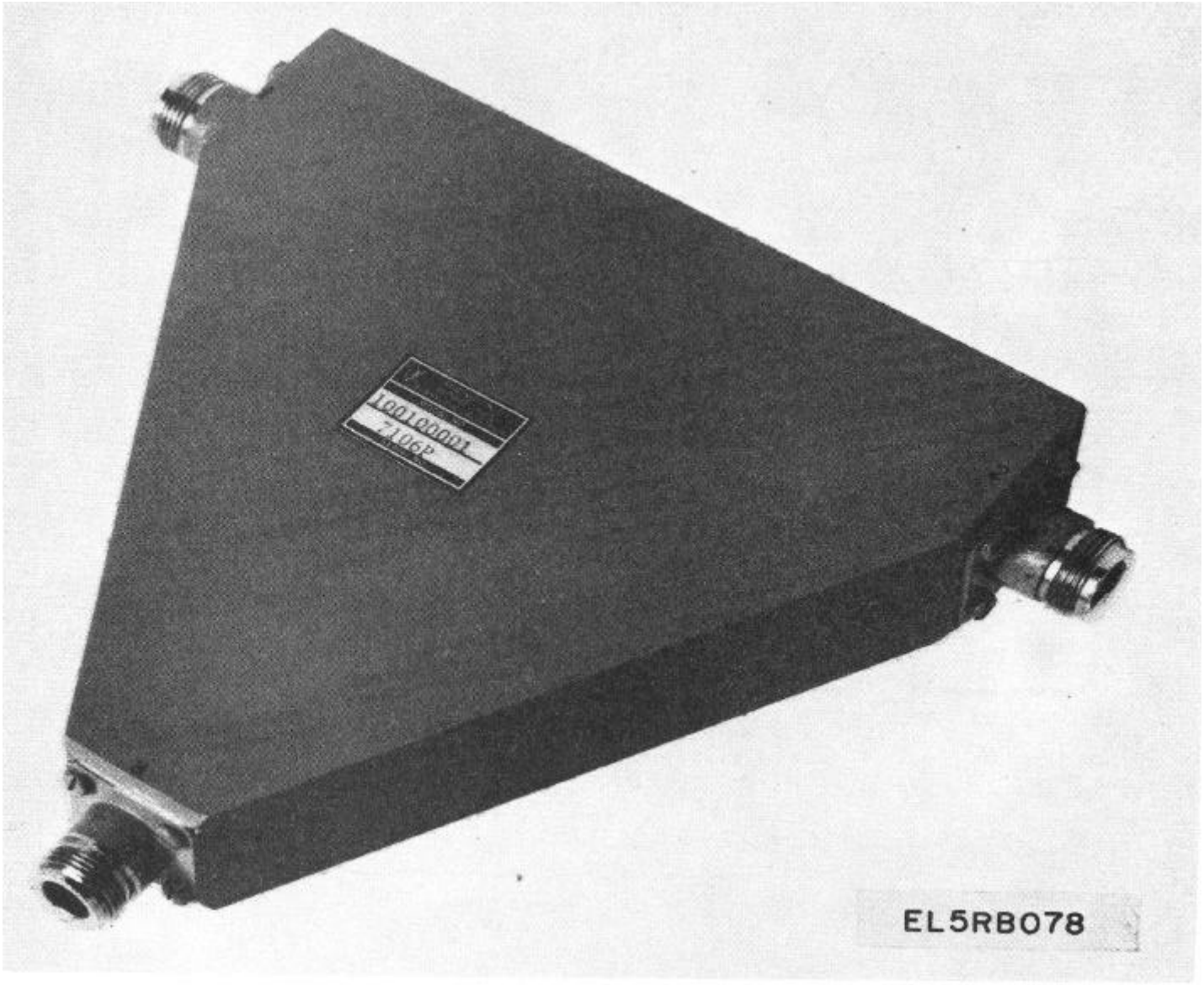


Figure 5-67. Radio Frequency Circulator TS-384U (Addington 1001-00001).

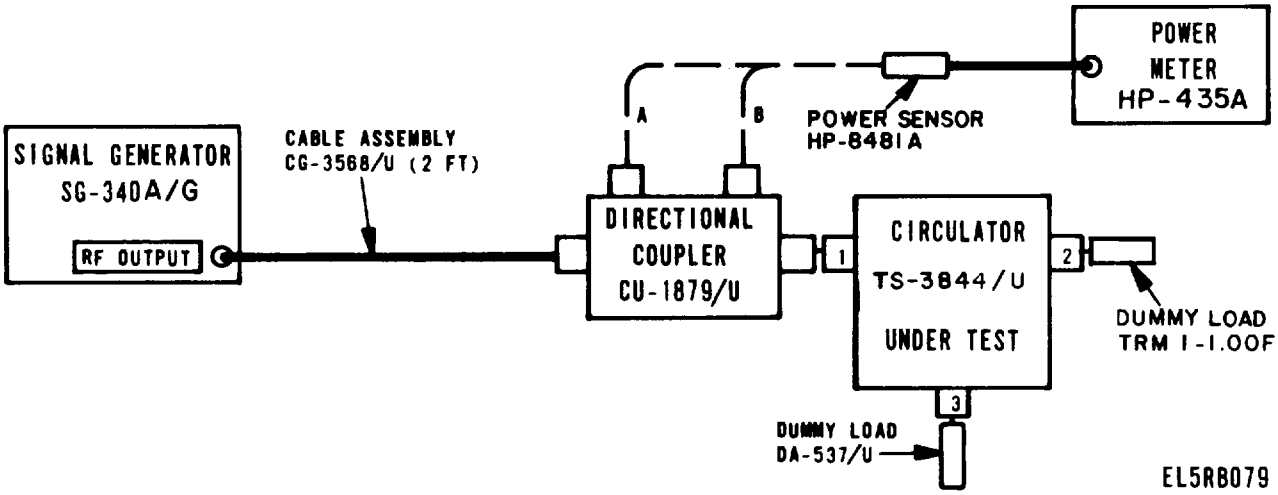


Figure 5-68. Radio Frequency Circulator TS-3844/U (Addington 1001-00001) VSWR Check Test Setup.

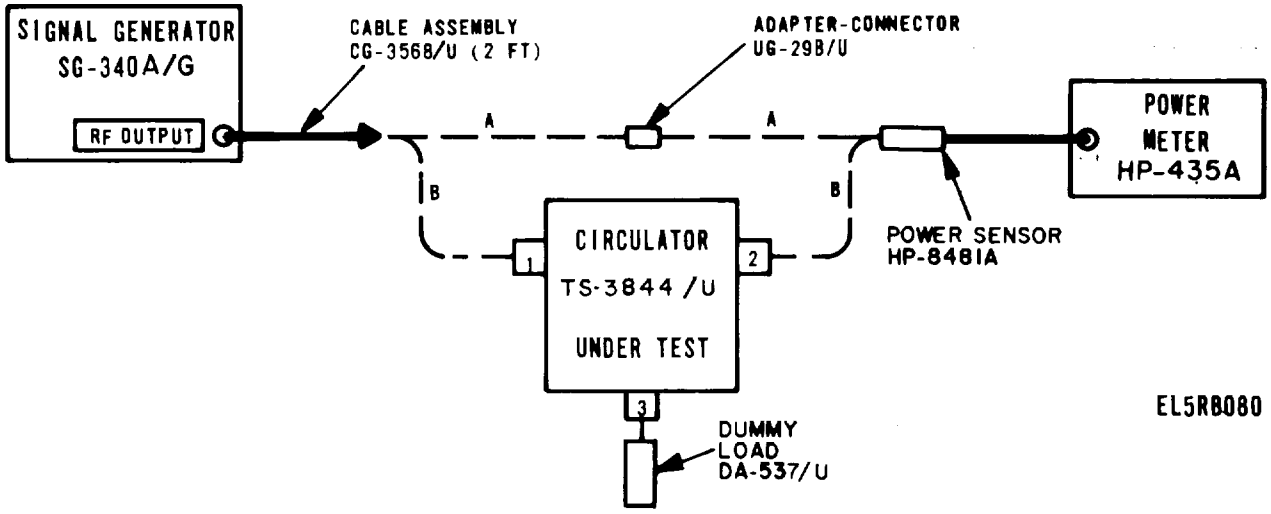


Figure 5-69. Radio Frequency Circulator TS-3844/U (Addington 1001-00001), Insertion Loss Measurement Test Setup.

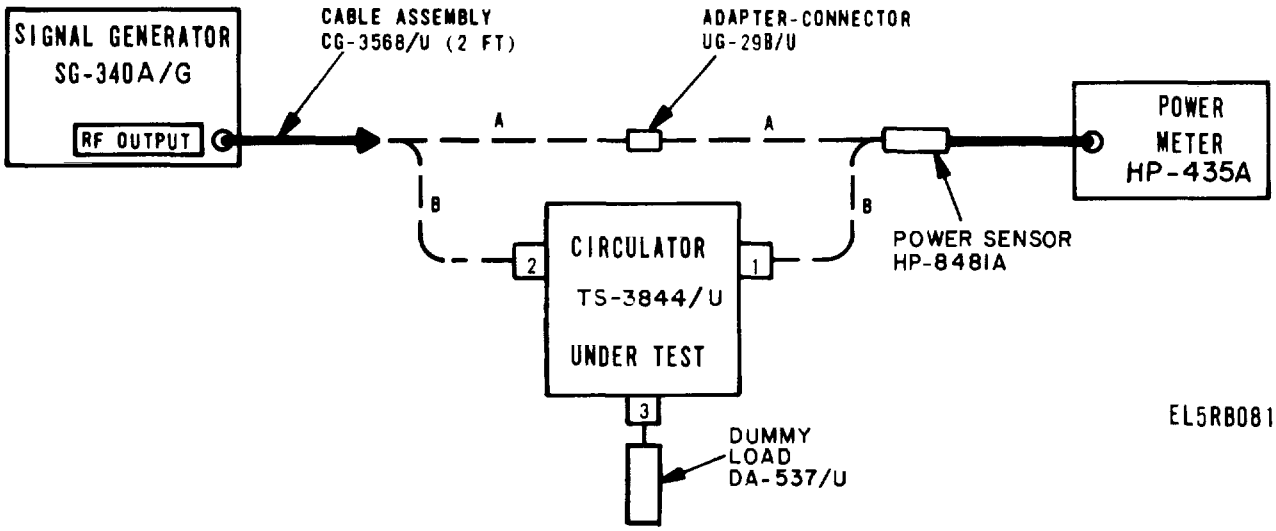


Figure 5-70. Radio Frequency Circulator TS-3844/U (Addington 1001-00001), Isolation Measurement Test Setup.

(4) Repeat (3) above with signal generator connected to port 3, power meter connected to port 2,and dummy load connected to port 1.

(5) Repeat (3) above with signal generator connected to port 1, power meter connected to port 3,and dummy load connected to port 2.

b. Adjustments. No adjustments can be made.

153. Radio Frequency Circulator (TS-3843/U) VSWR Measurement

(fig. 5-71)

a. Performance Check

(1) Connect test equipment as shown in A, figure 5-72.

(2) Set signal generator to 500 MHz, CW, andadjust level for a reading of - 13 dbm on power meter.

(3) Connect test equipment as shown in B, figure 5-72. Power meter reading shall not exceed -30.7 dbm (equivalent to a VSWR of 1.3:1 maximum).

(4) Interchange the connections at ports 1 and 2 of the U.U.T. Power meter reading shall not exceed -30.7 dbm.

(5) Interchange the connections at ports 2 and 3 of the U.U.T. Power meter reading shall not exceed -30.7 dbm.

b. Adjustments. No adjustments can be made.

154. Radio Frequency Circulator (TS-3843/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-73.

(2) Set signal generator to 500 MHz, CW, and adjust output level for a power meter reading of 0 dbm.

(3) Connect test equipment as shown in B, figure 5-73. Power meter reading shall not be less than -0.6 dbm.

(4) Repeat (3) above with signal generator connected to port 2, power meter connected to port 3 and dummy load connected to port 1.

(5) Repeat (3) above with signal generator connected to port 3, power meter connected to port 1 and dummy load connected to port 2.

b. Adjustments. No adjustment can be made.

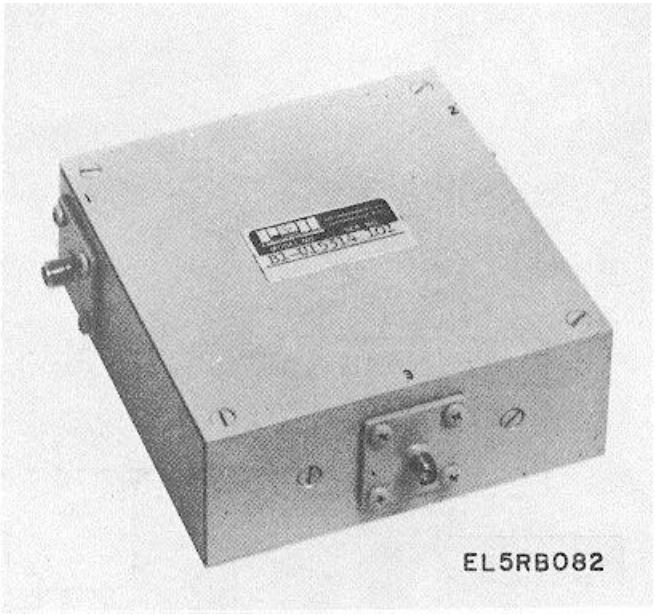


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Figure 5-71. Radio Frequency Circulator TS-3843/U (P & H Labs (B)1- U15314).

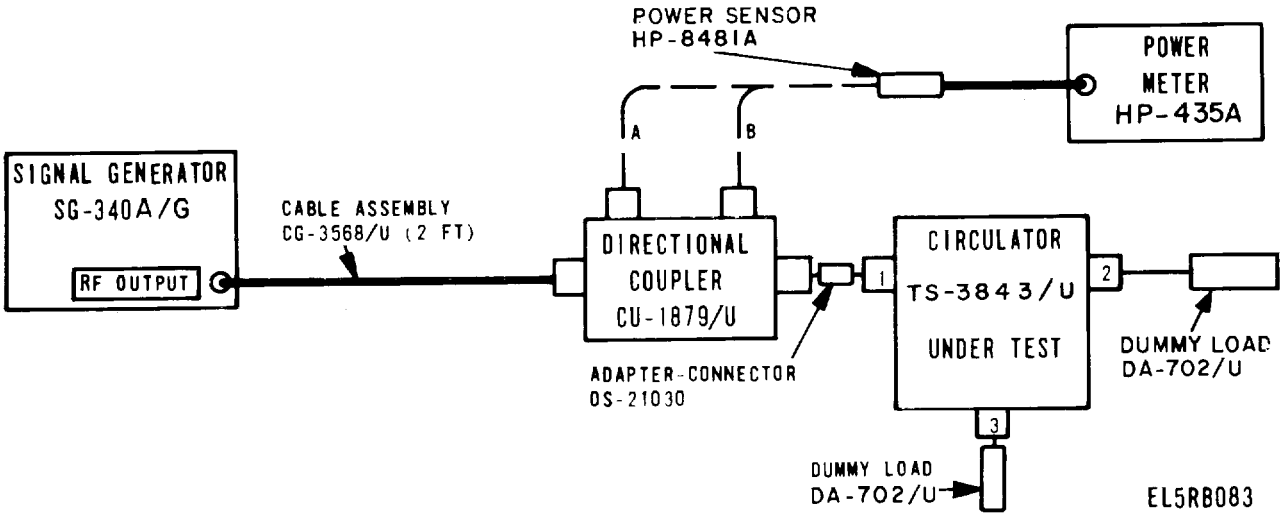

Figure 5-72. Radio Frequency Circulator TS-3843/U (P & H Labs (B)1- U15314) VSWR Measurement Test Setup.

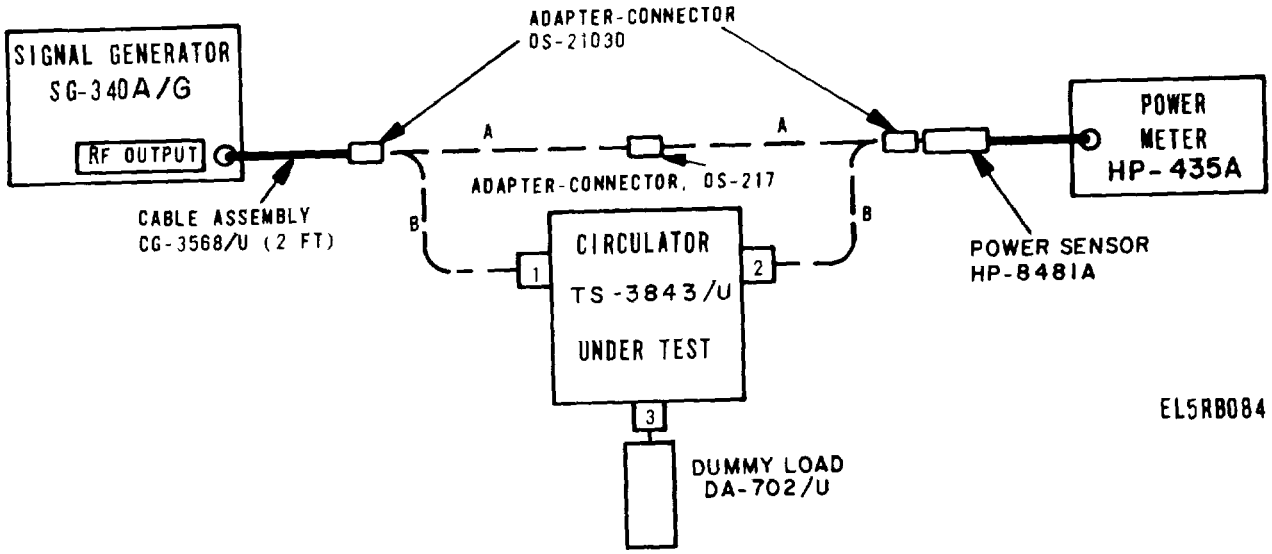

Figure 5-73. Radio Frequency Circulator TS-3843/U (P & H Labs (B)1- U15314), Insertion Loss and Isolation Measurement rest Setup.

155. Radio Frequency Circulator (TS-3843/U) Isolation Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-73.

(2) Set signal generator to 500 MHz, CW, and adjust output level for a power meter indication of 0 dbm.

(3) Connect test equipment as shown in B, figure 5-73 except reverse the connections to ports 1 and 2 on the U.U.T. The power meter reading shall not exceed -17 dbm (equivalent to a minimum isolation of 17 dbm).

(4) Repeat (3) above with signal generator connected to port 3, power meter connected to port 2 and dummy load connected to port 1.

(5) Repeat (3) above with signal generator connected to port 1, power meter connected to port 3, and dummy load connected to port 2.

b. Adjustments. No adjustments can be made.

156. Isolator, Coaxial 5AT9 (CMC-336-800044-000) VSWR Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-74.

(2) Set signal generator to 1500 MHz, CW, at an output level of -13 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-74. The power meter shall indicate -27.8 dbm or less (equivalent to VSWR of 1.45:1 or better).

(4) Repeat (1), (2) and (3) above at signal generator frequencies of 1350 and 1850 MHz.

b. Adjustments. No adjustment can be made.

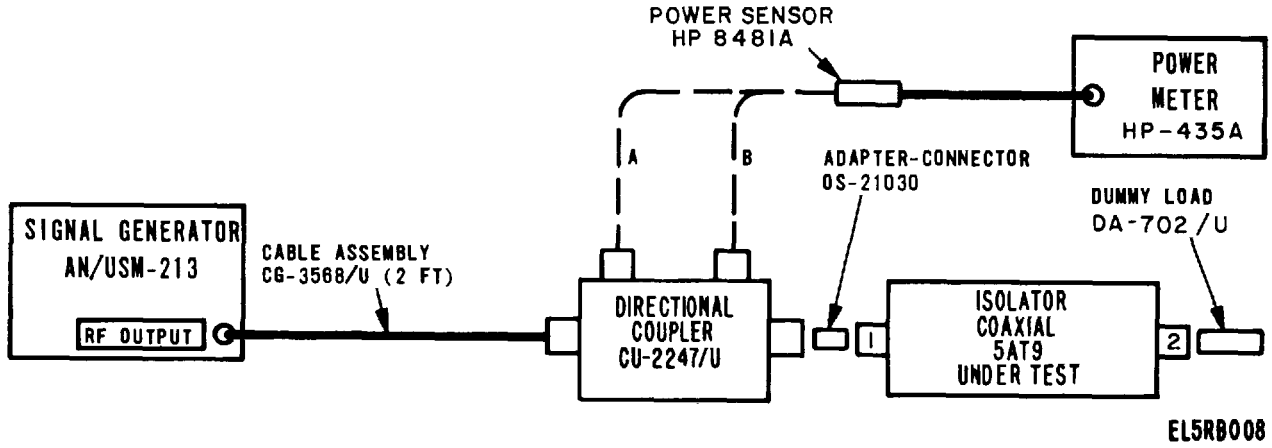

Figure 5-74. Isolator Coaxial (5AT9) CMC-336-800044-000 VSWR Measurement

157. Isolator, Coaxial 5AT9 (CMC-336-800044-000) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-75.

(2) Set signal generator to 1500 MHz, CW, at an output level of 0 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 5-75. The power meter shall indicate not less than -0.7 dbm (equivalent to a maximum insertion loss of 0.7 db).

(4) Repeat (1), (2) and (3) above at signal generator frequencies of 1350 and 1850 MHz.

b. Adjustments. No adjustments can be made.

158. Isolator, Coaxial 5AT9 (CMC-336800044-000), Isolation Measurement

a Performance Check.

(1) Connect test equipment as shown in A, figure 5-75.

(2) Set signal generator to 1500 MHz, CW, at an output level of 0 dbm as indicated on the power me- ter.

(3) Connect test equipment as shown in B, figure 5-75, except reverse the connections to port 1 and 2 of the U.U.T. The power meter reading shall not exceed - 15 dbm (equivalent to a minimum isolation of 15 db).

(4) Repeat (1), (2) and (3) above at signal generator frequencies of 1350 and 1850 MHz.

b. Adjustments. No adjustment can be made.

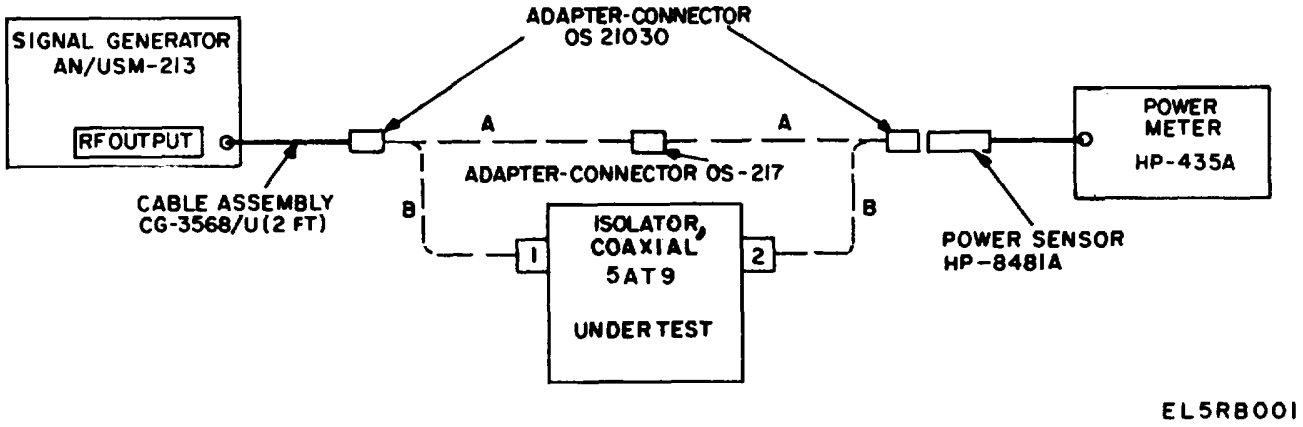

Figure 5-75. Isolator, Coaxial(5AT9) Insertion Loss and Isolation Measurement Test Setup

159. Phase Shifter (TS-3845/U) VSWR Measurement

(fig. 5-76)

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-77.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a power meter reading of - 20 dbm.

(3) Connect test equipment as shown in B, figure 5-77. Power meter reading shall not exceed - 39 dbm (equivalent to a VSWR of 1.25:1 or better).

b. Adjustments. No adjustments can be made.

160. Phase Shifter (TS-3845/U) Insertion Loss Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 5-78.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for a power meter reading of 0 dbm.

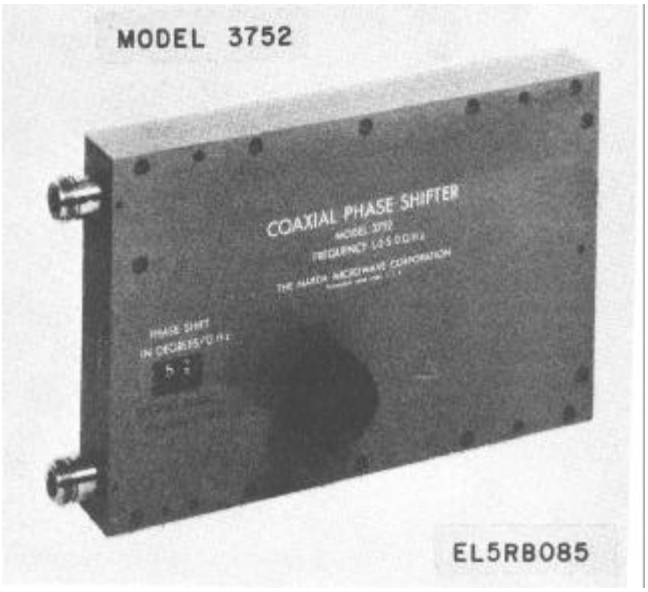

Figure 5-76. Phase Shifter TS-3845/U(Narda 3752)

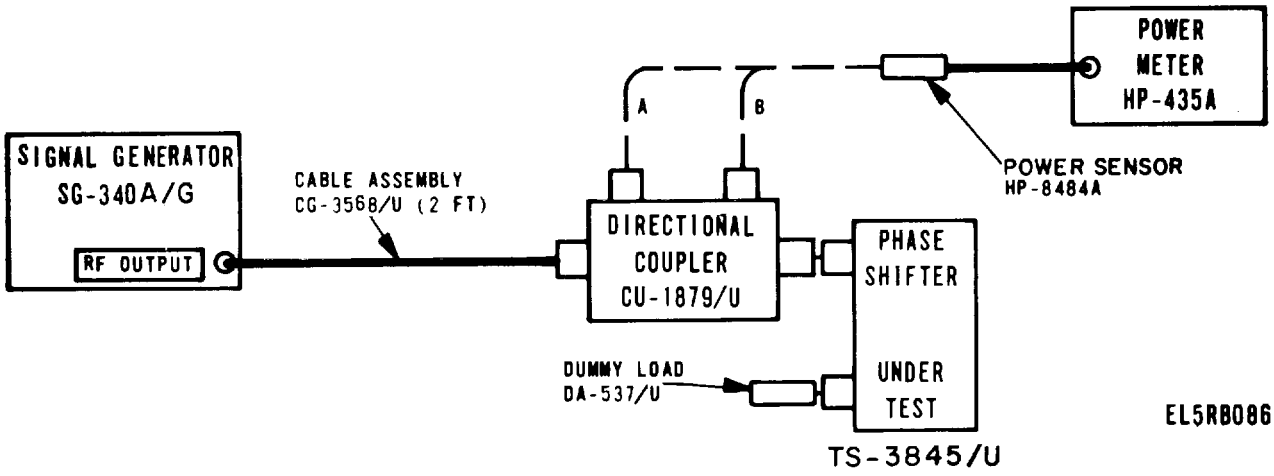

Figure 5-77. Phase Shifter TS-3845/U (Narda 3752), VSWR Measure Test Setup.

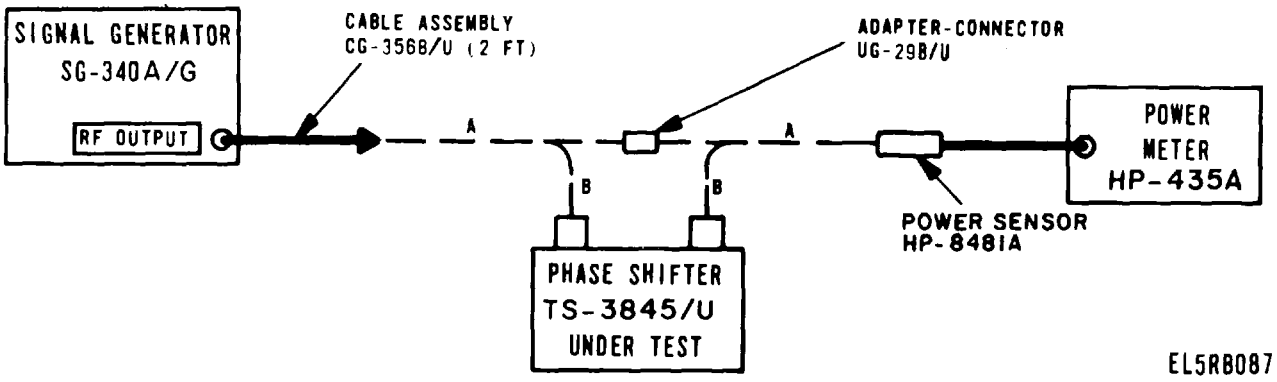

Figure 5-78. Phase Shifter TS-3845/U(Narda 3752), Insertion Loss Measurement Test Setup.

(3) Connect test equipment as shown in B, figure 5-78 vary the phase shift control. Power meter reading shall not be less than -0.5 dbm for any position of the digital phase shift counter on the U.U.T. between 000 and 180.

b. Adjustments. No adjustments can be made.

161. Phase Shifter (TS-3845/U) Phase Shift Measurement

a Performance Check.

NOTE

VECTOR VOLTMETER TEES. One tee is supplied with accessory kit, the second tee is customer supplied.

(1) Connect test equipment as shown in figure 5-79.

(2) Set signal generator to 1000 MHz, CW, and adjust output level for -10 dbm as measured on the Vector Voltmeter channel A (tuned to 1000 MHz).

(3) Set digital phase shift counter on U.U.T. to 000.

(4) Set vector voltmeter offset to +30° and adjust the zero on ±6° range.

(5) Rotate digital phase shift counter to 60°, set the vector voltmeter offset to 90° . The reading on the vector voltmeter should be 0° ±2.5°.

(6) Rotate digital phase counter to + 120°. Set the vector voltmeter offset to + 1500. The reading on the vector voltmeter should be 0° ±2.5°.

(7) Rotate digital phase shift counter to 180°. Set the vector voltmeter offset to 150°. The reading on the vector voltmeter should be 0° ±2.5°.

b. Adjustments. No adjustments can be made.

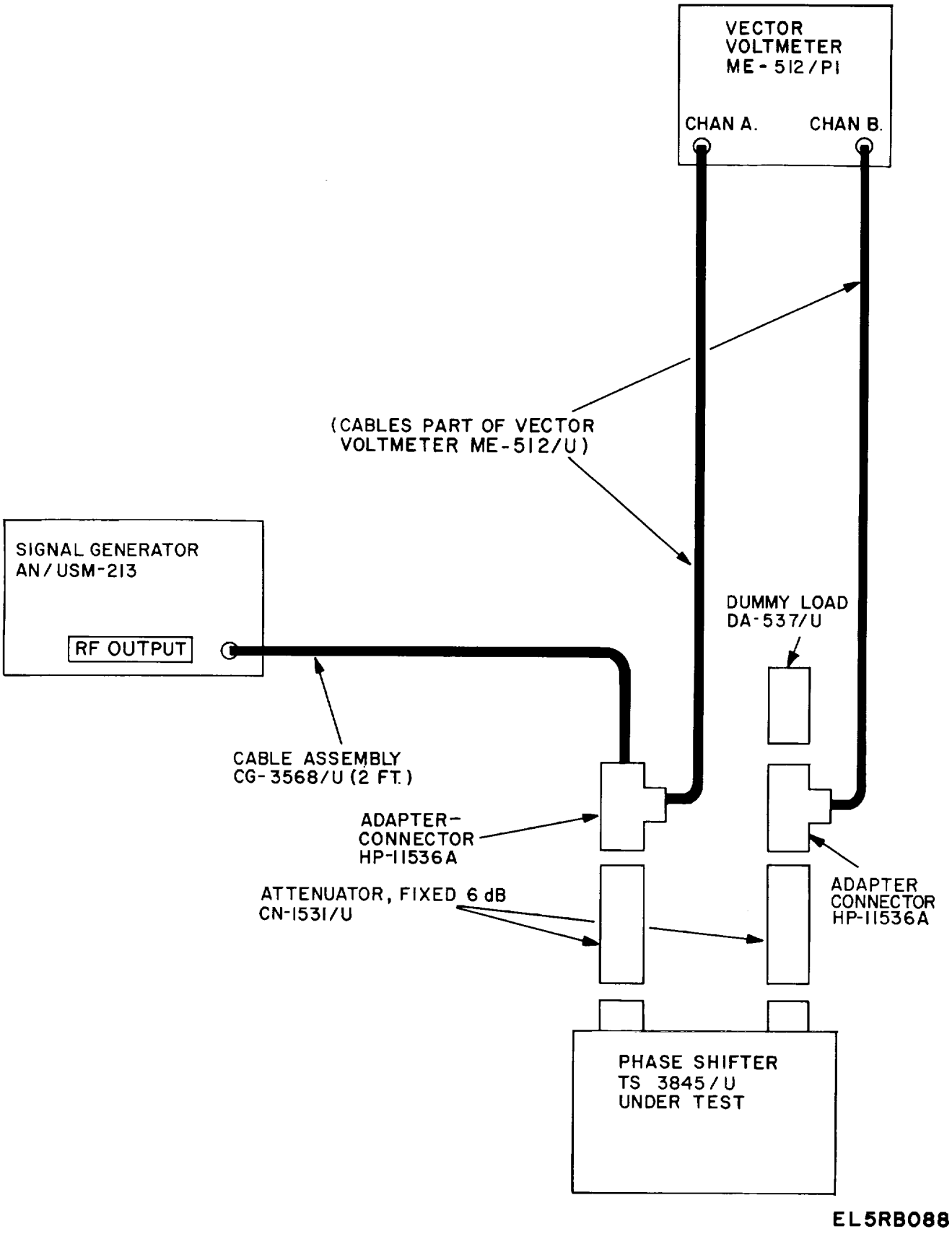

Figure 5-79. Phase Shifter TS-3845/U (Narda 3752), Phase Shift Measurement Test Setup.

SECTION VI
CALIBRATION PROCEDURES FOR ELECTRICAL TEST PANEL TS-3832(V)2/GRM-95(V) PART OF RADIO FREQUENCY MODULES TS-3837(V)2/GRM-95(V)

162. Preliminary Procedures

The following preliminary procedure is applicable when calibrating or checking the performance of Test Panel Electrical Assembly TS-3832/GRM-95(V)2, part of Test Facility Radio Frequency Modules TS-3837(V)2/GRM-95(V). The test facility radio frequency modules does not contain its own power supply. In order to provide the different voltages and power sources required for operating the test set, an external power supply, and, either the receiver test facility or the transmitter test facility is required.

163. Regulator Voltage Section (

(fig. 6-1)

a. Performance Check.

(1) Connect test equipment as shown in figure 6-2. Connect the digital multimeter to the power supply output.

(2) Adjust the power supply for 13 vdc as indicated on the digital multimeter.

(3) Set the U.U.T. switches as follows:

S1 to ON
S2 to 6.4V
S3 to INPUT V
S4 to OFF
S5 to 0 OHM

(4) Set the digital multimeter to measure dc volts and connect it between pins 2(+) and 10(-) of J7.

(5) Press and hold switch S6 and adjust INPUT V adjust control for 6.4±0.01V vdc as indicated on the digital multimeter.

(6) Rotate switch S2 to the 7.2 V and 8.0 V position in turn, press and hold switch S6. The digital multimeter shall indicate 7.2 ±0.2 vdc and 8.0 ±0.2 vdc respectively.

(7) Set U.U.T. switches as follows:

S1 to OFF
S4 to NOM MAX

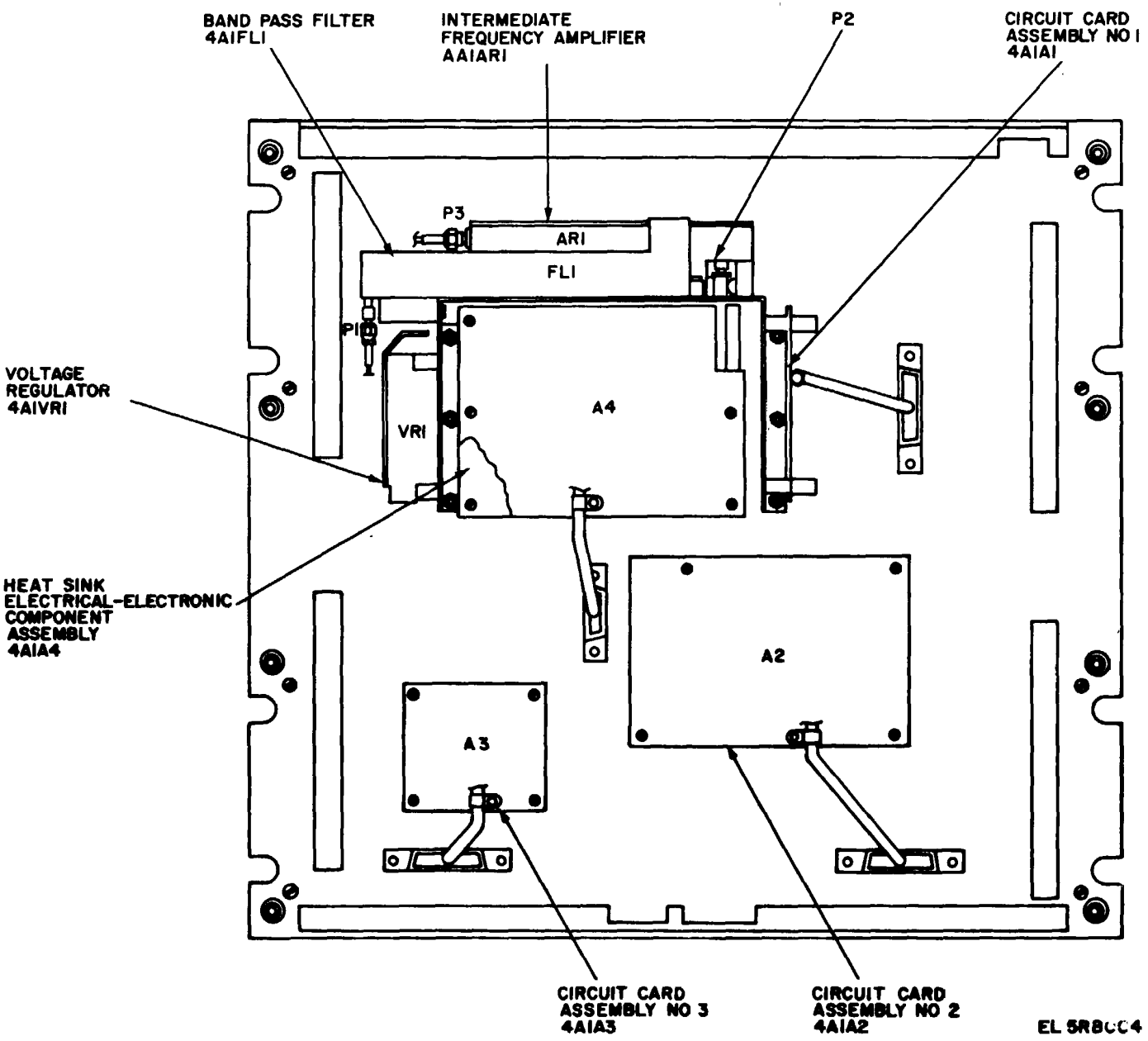

Figure 6-1. Test Panel, Electrical Assembly TS-3832/GR,-95(V)2, Rear View

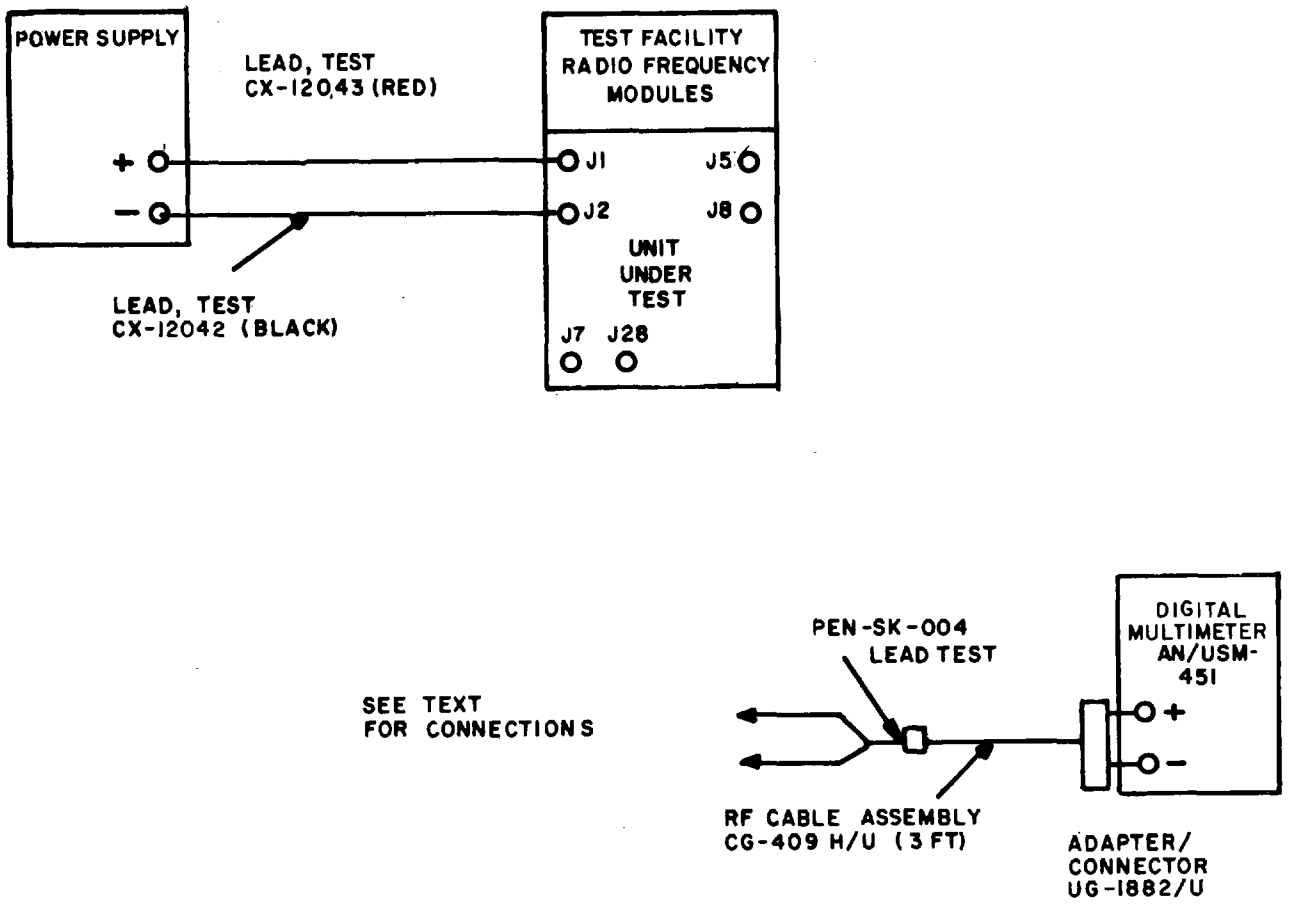

Figure 6-2. Regulator, Voltage Section, Input Voltage Test Setup

(8) Set the digital multimeter to measure resistance and connect the digital multimeter between pins 2 and 11 of J7.

(9) Set U.U.T. switch S3 to DRIVER. The digital multimeter shall indicate between 4.6 and 5.0 ohms.

(10) Set U.U.T. switch S4 to NOM. The digital multimeter shall indicate between 4.8 and 5.4 ohms.

(11) Set U.U.T. switch S4 to NOM MIN. The digital multimeter shall indicate between 5.2 and 5.8 ohms.

(12) Connect the digital multimeter between pins 2 and 4 of J7.

(13) Set the U.U.T. switch S3 to OUTPUT and S4 to NOM MAX. The digital multimeter shall indicate between 4.6 and 5.0 ohms.

b. Adjustments. No adjustments can be made.

164. Amplifier Radio Frequency Section, Filament Voltage, Current and Cathode Constant Current Tests

CAUTION

Hazardous voltages present at the RF Modules Test Facility Connector J16 Pin A1.

a. Performance Check (fig. 6-3).

(1) Connect J20 on the transmitter test facility to J28 on the U.U.T. using Special Purpose Cable Assembly CX-12028/U. Connect a short piece of insulated wire between J16 pin 6 and J7 pin 11. Connect another short piece of insulated wire between J16 pin 7 and J7 pin 12.

(2) Set transmitter test facility switches as follows:

S1 to ON
S12 to OSC

(3) Set RF module test facility switches as follows:

S3 to DRIVER
S8 to ON
S10 to DRIVER FIL CUR

(4) Connect the digital multimeter set to measure dc volts to J5 (+) and J6(-) on the U.U.T. Set switch S4 on the U.U.T. to NOM MAX, NOM, and NOM MIN positions in turn. The digital multimeter shall indicate between 5.5 and 6.1 vdc at all positions.

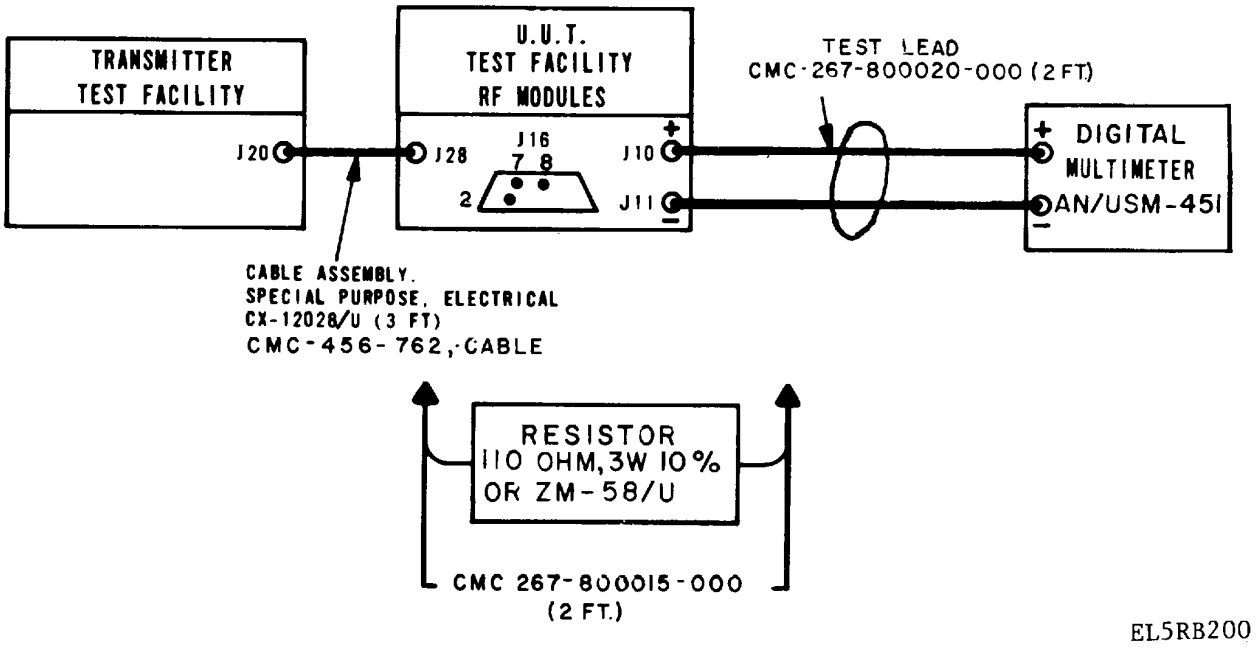

Figure 6-3. Amplifier, Radio Frequency Section, Filament Voltage and Current Voltage Tests.

(5) Set switch S4 on the U.U.T. to NOM MAX position. Connect the digital multimeter, set for dc volts, to J12 (+) and J13 (-) on the U.U.T. The digital multimeter shall indicate between 100 MV and 120 MV dc.

(6) Turn S8 to the U.U.T. to OFF. Reconnect the jumpers on J16 and J7 as follows:

J16 pin 1 to J7 pin 4
J16 pin 2 to J7 pin 2

(7) Set the RF module test facility switches as follows:

S3 to OUTPUT
S8 to ON
S10 to OUTPUT FIL CUR

(8) Repeat (4) and (5) above.

(9) Turn S8 on U.U.T. to OFF and remove all jumpers from J16 and J7.

(10) Connect test equipment as shown in figure 6-3. Set the digital multimeter to the 200 MA dc current range.

(11) Connect a 110 ohm 3 watt resistor between pins 7 and 8 of J16 on U.U.T.

(12) Set the U.U.T. switches as follows: S8 to ON S10 to DRIVER CUR

(13) The digital multimeter shall indicate between 68 and 72 MA dc.

(14) Set S8 on the U.U.T. to OFF and connect the 110 ohm 3 watt resistor between pins 2 and 8 of J16 on the U.U.T.

(15) Set the U.U.T. switches as follows: S8 to ON S10 to OUTPUT CUR (16) The digital multimeter shall indicate be tween 136 and 144 MA dc.

b. Adjustments.

(1) Adjust R1 on circuit card assembly 4A1A2 (fig. 6-5) for the digital multimeter reading specified in (13) above.

(2) Adjust R2 on circuit card assembly 4A1A2 (fig. 6-5) for the digital multimeter reading specified in (16) above.

165. Amplifier, Radio Frequency Section, ALC Loop Test.

a. Performance Check.

(1) Connect test equipment as shown in A, figure 6-4.

(2) Turn power supply No. 1 to ON and adjust its output for -1.0 vdc ±0.01 vdc as indicated on the digital multimeter.

(3) Connect test equipment as shown in B, figure 6-4. Refer to figure 6-5 for detail view of connections to circuit card No. 2.

(4) Turn power supply No. 2 to ON and adjust its output for +2.0 vdc +0.01 vdc as indicated on the digital multimeter.

(5) Connect test equipment as shown in C, figure 6-4.

(6) Set transmitter test facility switch S1 to ON and S12 to OSC. Set the RF module test facility S8 to ON. The digital multimeter shall indicate between -350 and -550 MV.

(7) Disconnect power supply No. 1 from U.U.T. ' J14. The digital multimeter shall indicate between -200 and -320 MV.

(8) Disconnect power supply No. 2 from U.U.T. J16. The digital multimeter shall indicate 0 vdc ± 10 MV.

b. Adjustments. No adjustment can be made.

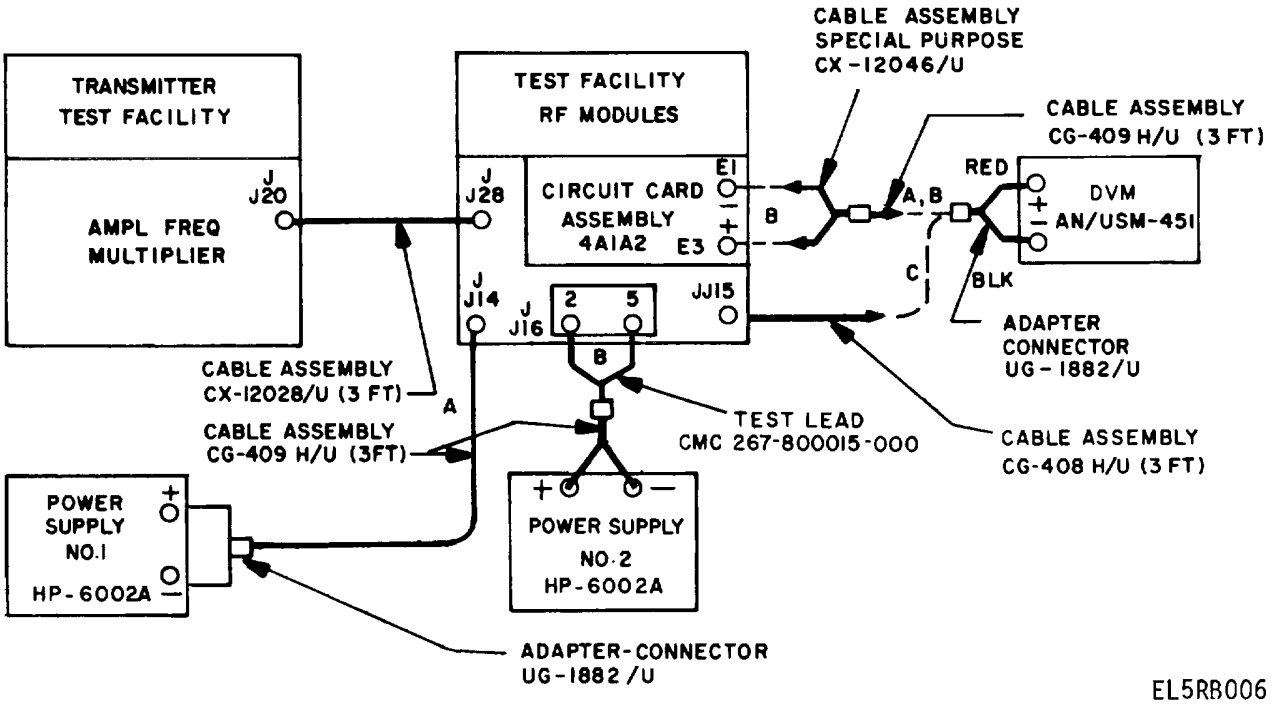

Figure 6-4. Amplifier, Radio Frequency Section ALC Loop Test

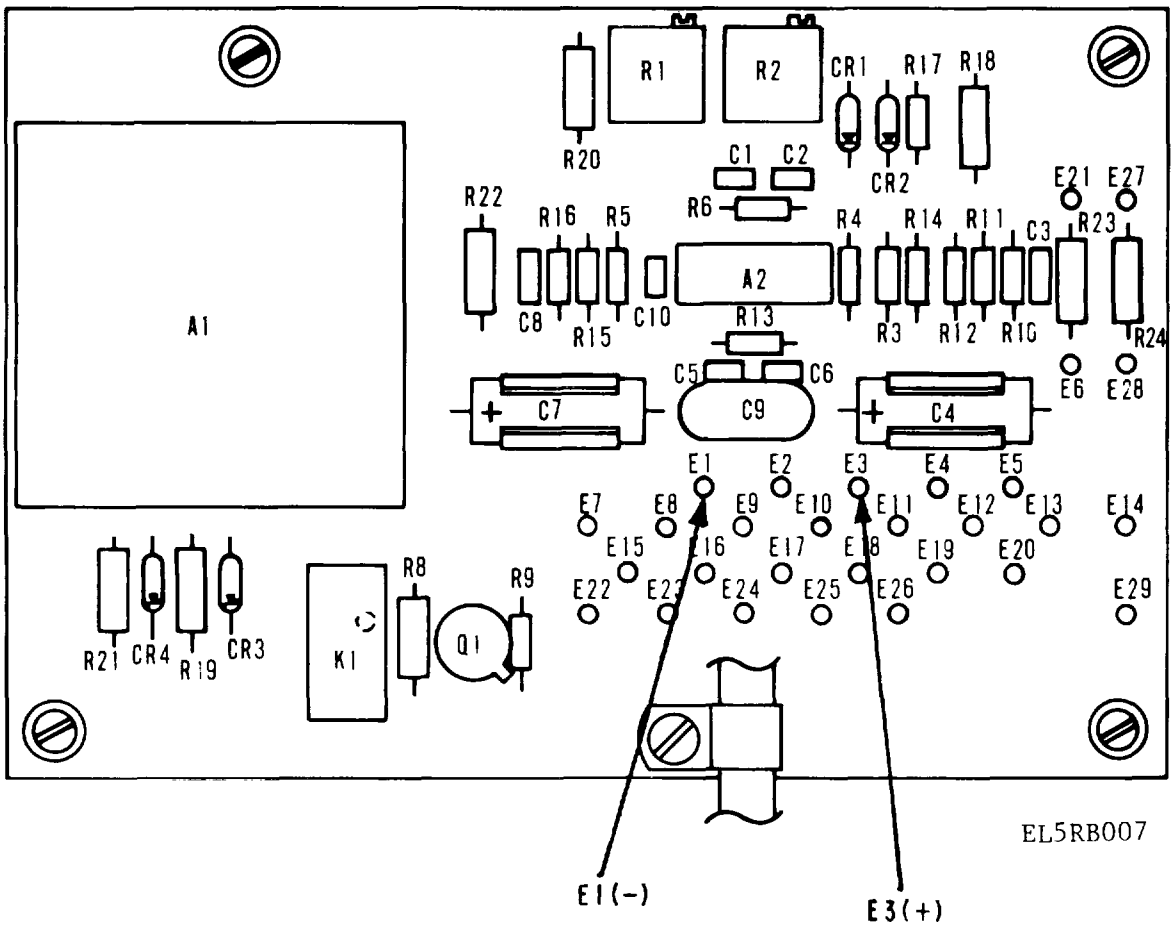

Figure 6-5. Circuit Card No. 2 (CMC-220-803017-000) 4A1A2.

166. Filter, Bandpass Section Insertion Loss and Frequency Response Measurement

a. Performance Check.

(1) Connect test equipment as shown in A, figure 6-6.

(2) Adjust the signal generator for a CW frequency of 30 MHz, at an output level of 30 dbm as indicated on the power meter.

(3) Connect test equipment as shown in B, figure 6-6. Fine tune the signal generator frequency for a maximum indication on the power meter.

(4) The frequency indicated on the frequency counter shall be 30 MHz +50 kHz. Note the frequency.

(5) The power meter shall indicate -42 dbm minimum (equivalent to a maximum insertion loss of 12 db). Note the power meter indication.

(6) Adjust the signal generator to the frequencies listed in table 21 below. Subtract the power me ter reading for each frequency from the power meter reading noted in (5) above, to obtain the frequency response. The results should be within the attenuation (db) limits specified below.

Table 21. Signal Generator Frequencies

Signal Generator Frequency Reference Frequency (4) above +/- frequency below (kHz)	Attenuation (db)	
	Min	Max
-360	2.40	3.00
+360	2.50	3.10
+600	7.10	8.50
-600	7.00	8.40
-840	14.00	18.00
+840	13.00	17.00

b. Adjustments. No adjustment can be made.

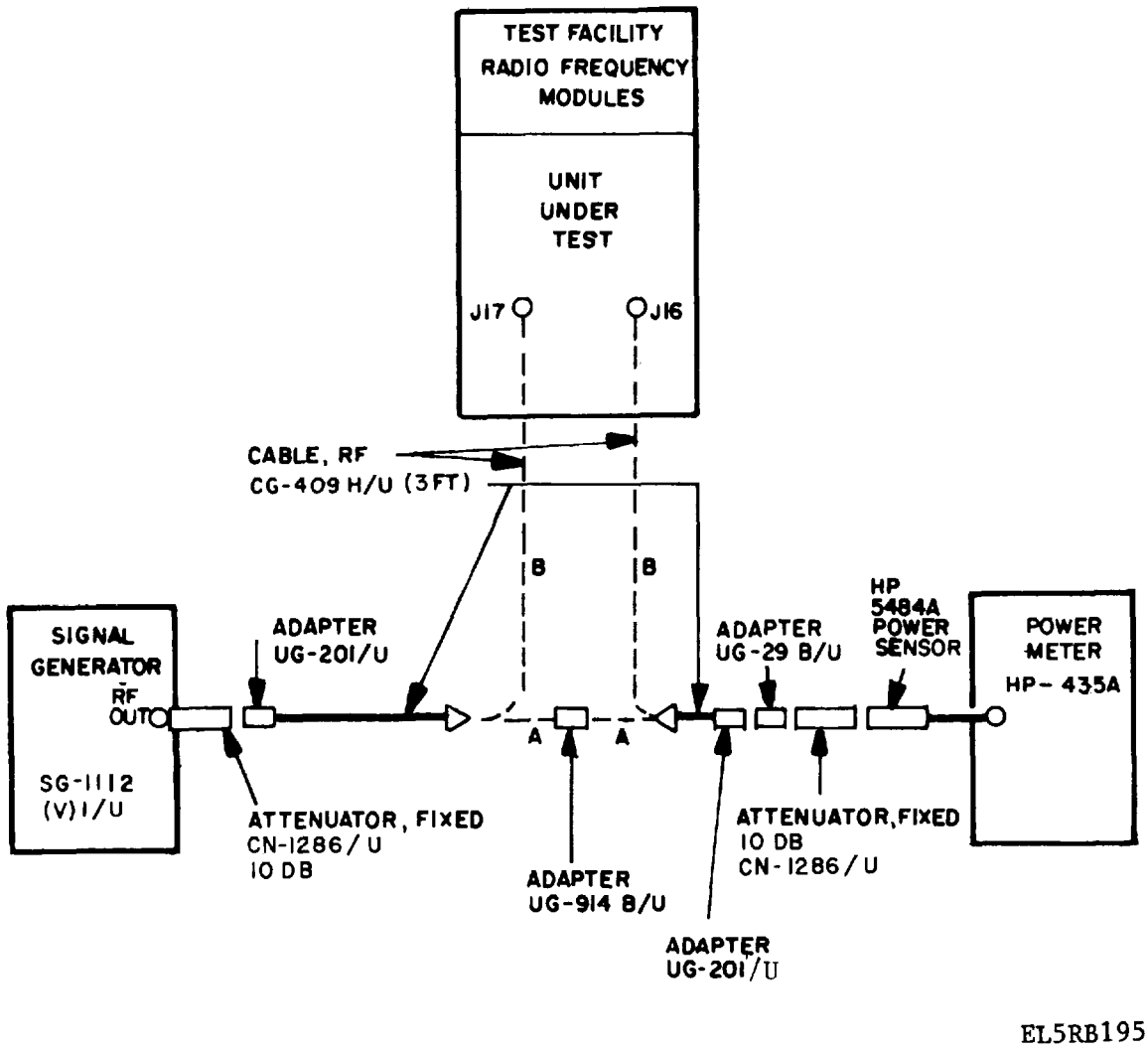

Figure 6-6. Filter, Bandpasss Section, Insertion Loss and Frequency Response Measurement

167. Amplifier If Section (CMC 245-406479-000)

a. Performance Check.

(1) Connect test equipment as shown in figure 6-7.

(2) On receiver test facility set switches as follows:

S1 to ON
S6 to REFL PWR
S9 to EXT VIDEO
S14 to 30 MHz
AT1 to 60

(3) On the test facility rf modules set switch S12 to ON.

(4) The power meter shall read between -7 and -13 dbm, and the - 12V lamp shall illuminate.

b. Adjustments. No adjustments can be made.

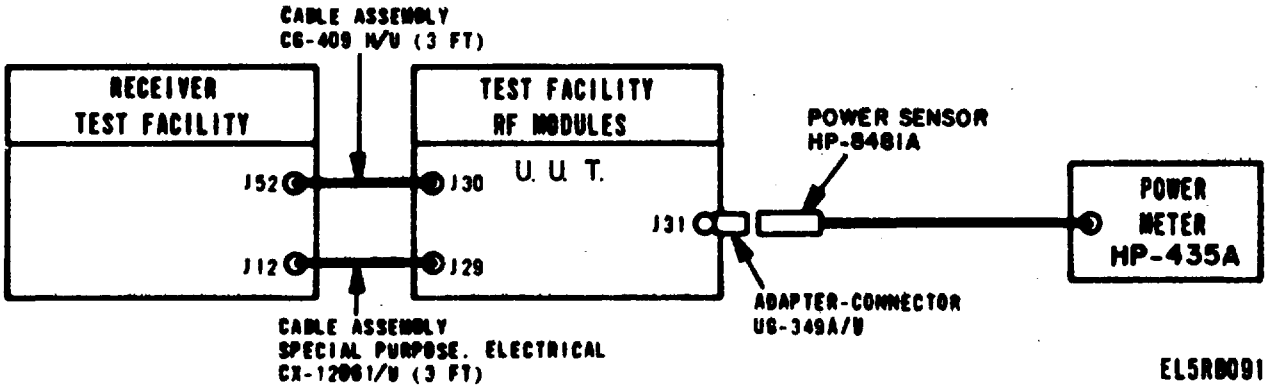

Figure 6-7. Amplifier If Section, Gain Measurement Test Setup.

SECTION VII

CALIBRATION PROCEDURES FOR TEST FIXTURE, RESTORE PULSE FORM

TS-4116/GRM-95(V)

168. Preliminary Procedure.

a. The following table lists the required outputs of a fully functional and calibrated test fixture, restorer pulse form.

Table 21. Test Fixture Restorer Pulse Form TS-4116/GRM-95(V), Performance Requirements

Parameters	Requirements
Filtered baseband pcm level	1.38 v p-p at 576 kb/s 2.3 v pp at 1152 kb/s
Signal-to-noise ratio	20.5 db at 576 kb/s 29.5 db at 1152 kb/s (volts p-p/volts rms)
Pcm frequency adjustment	576 kb/s ±100 Hz 1152 kb/s : ±200 H
Supply voltage	+12 ±0.5 V -12 ±0.5 v +24 ±1.0 v

b. When calibrating the test fixture, restorer pulse form it will be necessary to remove the front panel from its aluminum case to make adjustments. If required to do so, turn power off; loosen 10 screws securing the front panel to the case and separate the panel from the housing.

WARNING

Removing front panel exposes live circuits. Exercise caution when working near these circuits.

NOTE

All adjustments to be made for calibration purposes are done on either the video processor pcb A2 or power supply pcb's PSi and PS2. The video processor pcb is the uppermost board of the stacked pcb's and therefore it will not be necessary to remove any boards from their mounts. The power supply boards are mounted on their own chassis and no removal is required for adjustments.

c For preliminary setup, connect the test equipment as shown in A, figure 7-1. Do not turn on the wide range oscillator at this time.

169. Video Processor A2 and Pcm Gain Check

a. Performance Check

(1) Set the test fixture, restorer pulse form switches as follows:

(a) Switch S7 (POWER) to ON.
(b) Switch S2 (PCM) to PR CODE.
(c) Switch S6 (LEVEL) to dB.
(d) Switch S1 (FUNCTION) to 1.
(e) Switch S5 (COMBINER CONTROL) to OPEN.
(f) Switch S3 (COUNTER) to CLK,
(g) Switch S4 (VTVM) to VIDEO.
(h) Switch S8 (NOISE) to OFF.
(i) Switch S9 (LOAD) to ON.

(2) Set oscilloscope trigger source to EXT.

(3) Set oscilloscope RIGHT CHAN VOLTS/DIV control for 0,5 VQLTS/DIV.

(4) Adjust the LEVEL AKJ (R 2) on the test fixture, restorer pulse form for an oscilloscope display as shown in A, figure 7-2.

(5) The AC voltmeter shall indicate 0.55 v ±0.01 v. Note the AC voltmeter indication in dBm.

(6) Connect the oscilloscope LEFT CHAN probe to J7, pin 7 and J7, pin 8 (gnd), using test lead 267-800015-000.

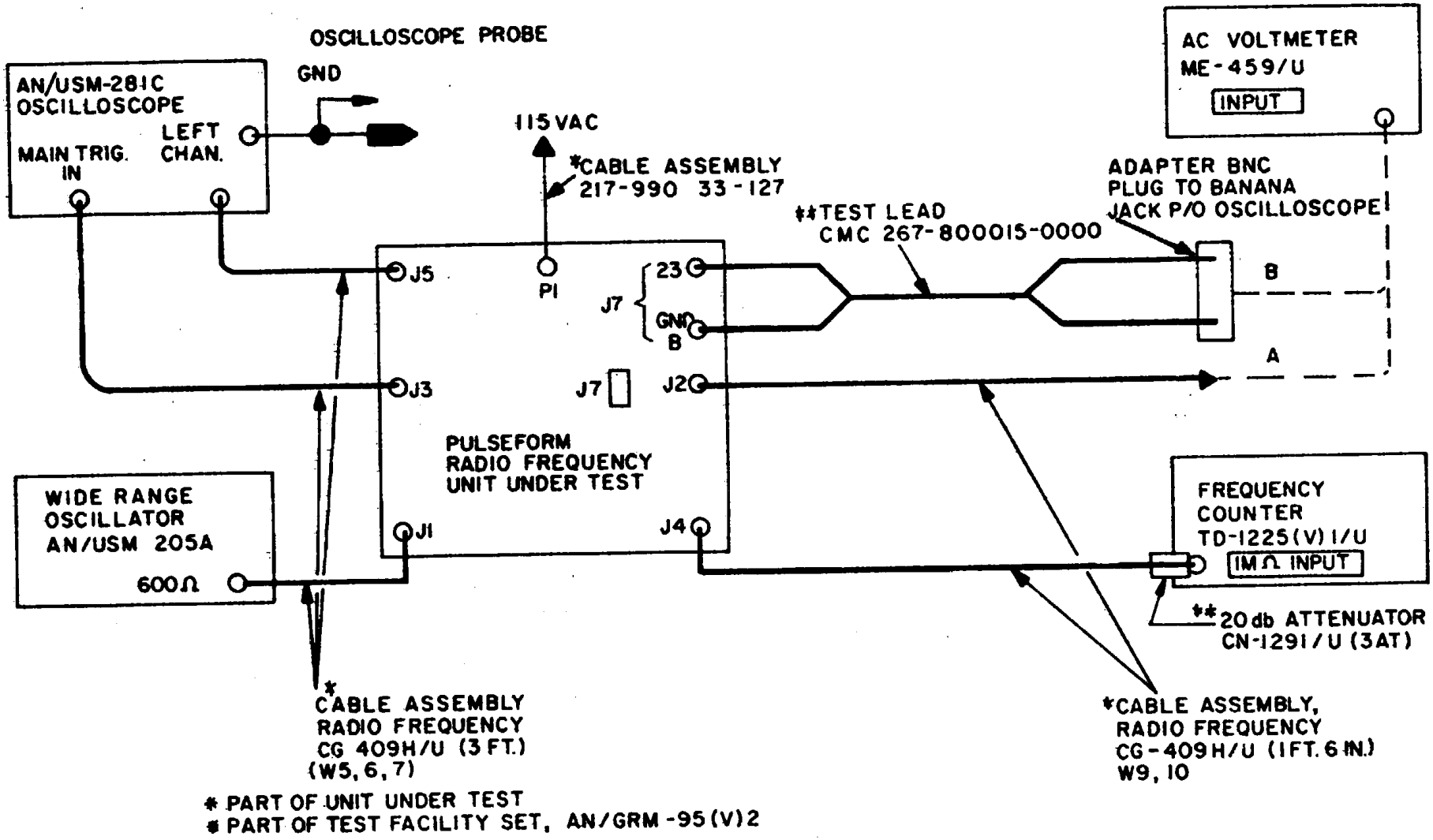

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Figure 7-1. PFR Test Set, PCM Gain OW Gain, Crystal Oscillator Frequency and Error Rate Comparator Check Test Setup

(7) The oscilloscope shall display the same waveform as that obtained in (4) above. (Amplitude may differ.)

(8) Set the test fixture, restorer pulse form LEVEL SWITCH (S6) to ±6 db. The AC voltmeter indication shall increase by 6 ±0.2 db from the indication noted in (5) above.

(9) Set the test fixture LEVEL SWITCH(S6) to -6 db. The AC voltmeter indication shall decrease by 6 ±0.2 db from the indication noted in (5) above.

(10) Set the test fixture LEVEL SWITCH(S6) to 0 db.

(11) Turn the test fixture FUNCTION switch(S1) to position 3.

(12) RIGHT CHAN on the oscilloscope shall sisplay a waveform as shown in B, figure 7-2.

b. Adjustment. Adjust R24 (fig 7-3) on the video processor board to obtain the indication given in a(4) and (5) above.

170. Order Wire Gain Check

a. Performance Check

(1) Connect the equipment as shown in A, figure 7-1 . Set test oscillator LINE/POWER switch to ON.

(2) Set the test fixture. restorer pulse form switches as follows:

(a) Switch S2 (PCM) to OFF.

(b) Switch S1 (FUNCTION) to 4.

(c) Switch S3 (COUNTER) to OW FREQ.

(d) Switch S4 (VTVM) to VIDEO.

(3) Adjust the WIDE RANGE oscillator frequency for 1 kHz +2 Hz indication on the frequency counter.

(4) Adjust the WIDE RANGE oscillator output level for -16 dbm indication on the voltmeter.

(5) Turn the test fixture. restorer pulse from FUN CTION switch (SI) to position 5.

(6) The AC voltmeter shall indicate -16 dbm ±1.0 db.

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

(8) The AC voltmeter shall indicate -10 dbm ±0.1 db.

b. Adjustments (1) Adjust R16 (fig. 7-3) on the video processor board to obtain the indication in (3) above.

(2) Adjust R18 (fig 7-3) on the video processor board to obtain the indication given in *a*(6) above.

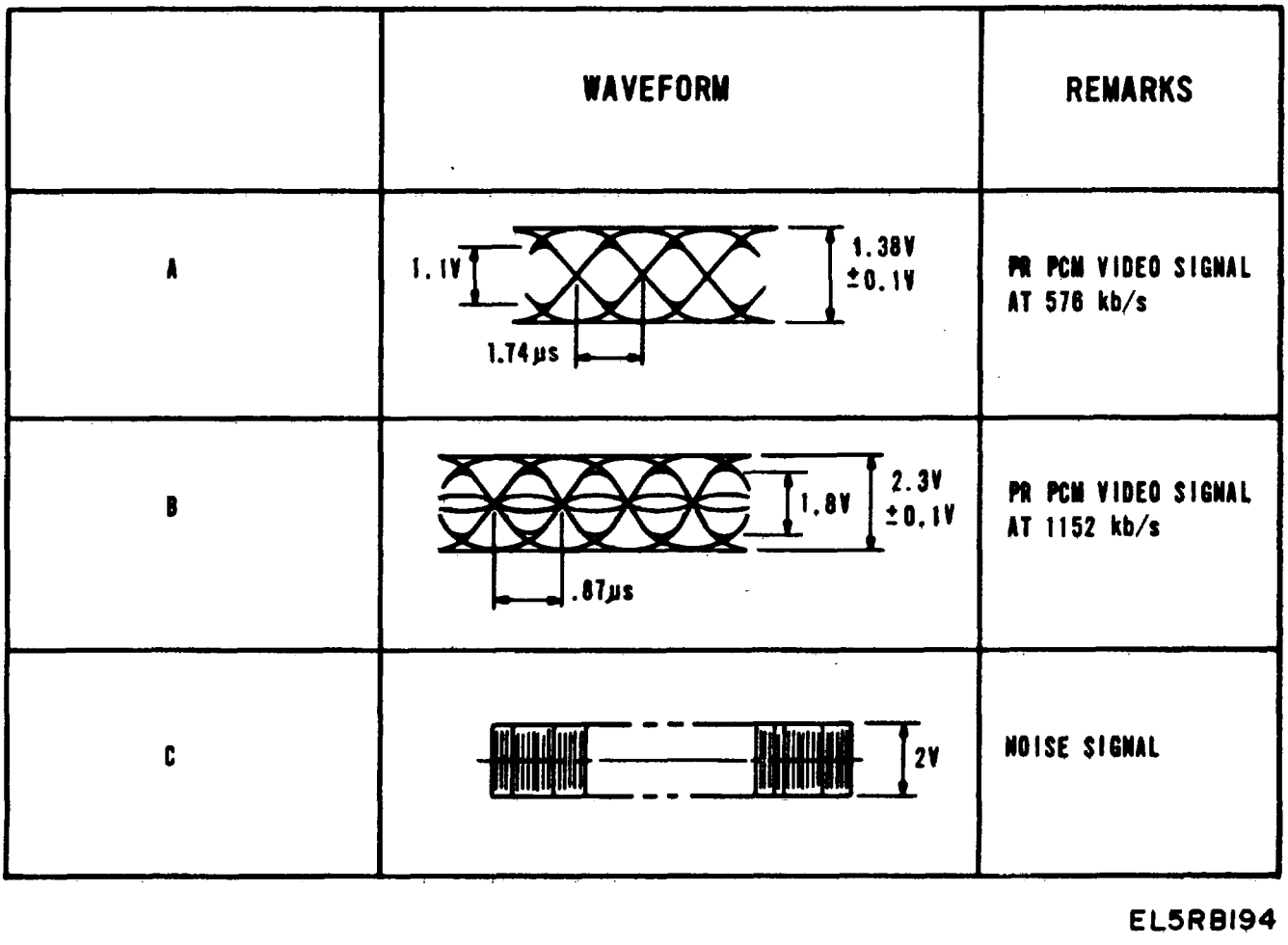

Figure 7-2. Restorer Pulse Form Test Set, Typical Video Waveforms.

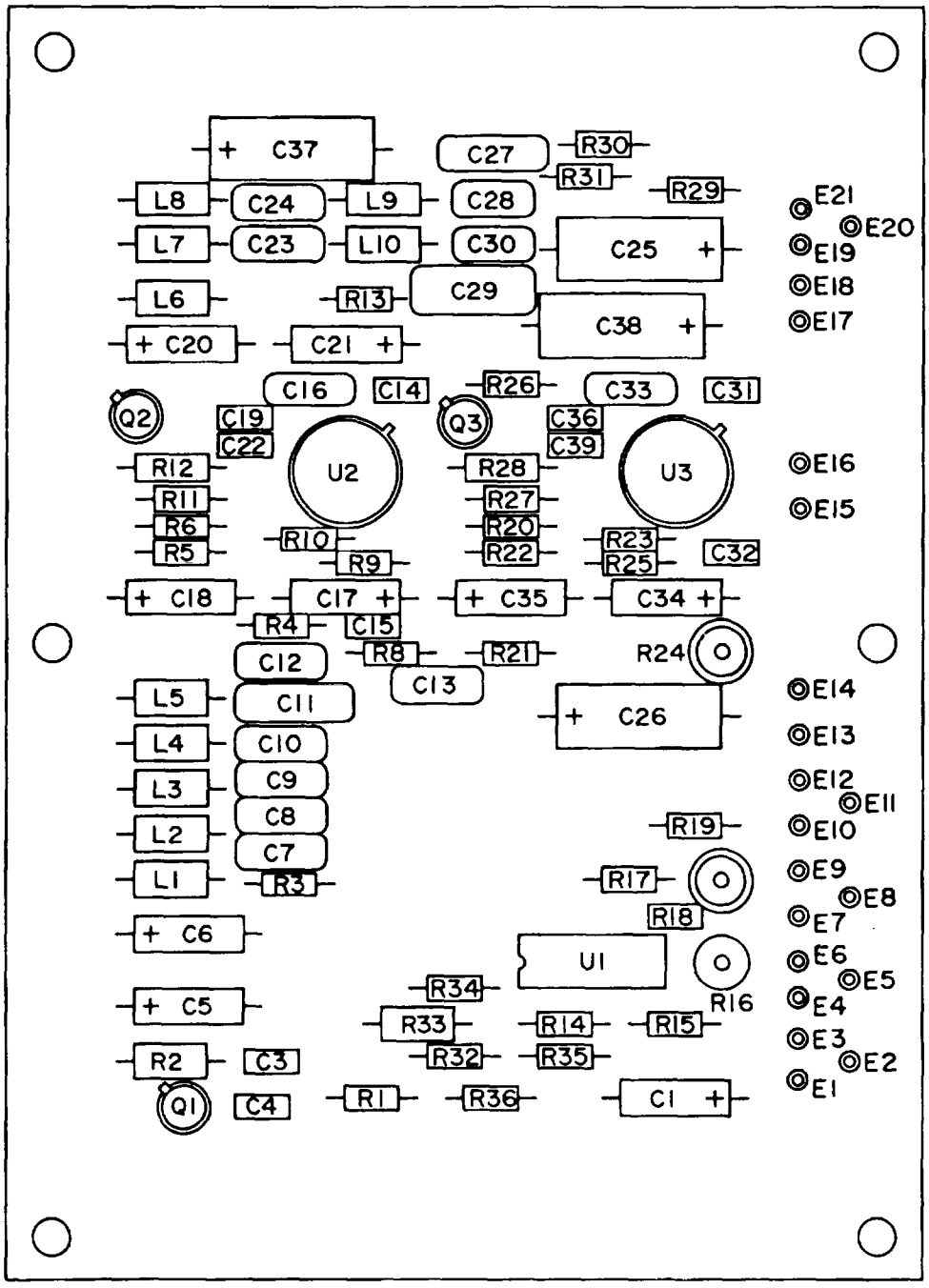

Figure 7-3. Video Processor A2, PCB Assembly.

171. Pcm Generator A3 Crystal Oscillator and Error Rate Comparator Check

a. Performance Check

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

(2) Set the test fixture, restorer pulse form COUNTER switch (S3) to CLK.

(3) Set the FUNCTION switch (SI) to position 1.

(4) Vary the FREQ CONTROL (R5) over its full range. The counter shall indicate not more than 575,900 Hz (low) frequency limit and not less than 576,100 Hz (high) frequency limit.

(5) Set the FUNCTION switch to position 3.

(6) Vary the FREQ CONTROL (R5) over its full range. The counter shall indicate not more than 1,151,800 Hz (low) frequency limit and not less than 1, 152,000 Hz (high) frequency limit.

(7) Set the test fixture, restorer pulse form COUNTER switch (S3) to the ERRORS position.

(8) Set the FUNCTION switch (SI) to position 1.

(9) The frequency counter should vary around the 288 kHz indication.

(10) Set the FUNCTION switch (SI) to position 2.

(11) The frequency counter indication should vary around 576 kHz +500 Hz.

b. Adjustments. No adjustments can be made.

172. Pseudo-Random Noise Generator A1 Check

a. Performance Check .

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

(2) Set the test fixture, restorer pulse form NOISE switch (S8) to ON, and Pcm switch to OFF.

(3) Turn the NOISE ADJ(R11) control fully clockwise.

(4) Set the oscilloscope TIME/DIV control to 1 msec/DIV.

(5) The oscilloscope RIGHT CHAN shall display a waveform similar to that shown in C, figure 7-2.

(6) Check that the oscilloscope RIGHT CHAN waveform can be adjusted using the NOISE ADJ (R11) control, to be the same as the waveform with S8 set to OFF.

b. Adjustments. No adjustments can be made.

173. Noise. Weighting Network A4 Check

a. Performance Check

(1) Connect the test equipment as shown in figure 7-4.

(2) Set the test fixture, restorer pulse form switches as follows:

(a) Switch S3 (COUNTER) to OW FREQ.

(b) Switch S2 (PCM) to OFF.

(c) Switch S8 (NOISE) to OFF.

(d) Switch S4 (VTVM) to OW LEVEL

(3) Adjust the wide range oscillator for a 1 kHz (nominal) indication on the frequency counter.

(4) Adjust the wide range oscillator output level for a -10 dbm indication on the voltmeter.

(5) Set the test fixture, restorer pulse form VTVM switch (S4) to OW NOISE.

(6) Vary the wide range oscillator frequency between 350 Hz and 5 kHz. The sine wave displayed on the oscilloscope shall be free of any distortion and clipping over the entire frequency range.

NOTE

The amplitude of the sine wave in (6) above will vary over the frequency range.

(7) Adjust the wide range oscillator to the frequencies listed in Table 22 below. The voltmeter indications shall be listed.

Table 22.. Noise Weighting Network Check Frequency Response

Frequency (Hz)	Voltmeter indication (dbm ±db)
200	-35 ±1.6
500	-17.5 ±1.6
1000*	Less than -45
1500	-11 ±1.6
3000	-12.5 ±1.6
4000	24.5 ±1.6
5000	-38.5 ±1.6

*1000 50 Hz = Notch frequency

b. Adjustments. No adjustments can be made.

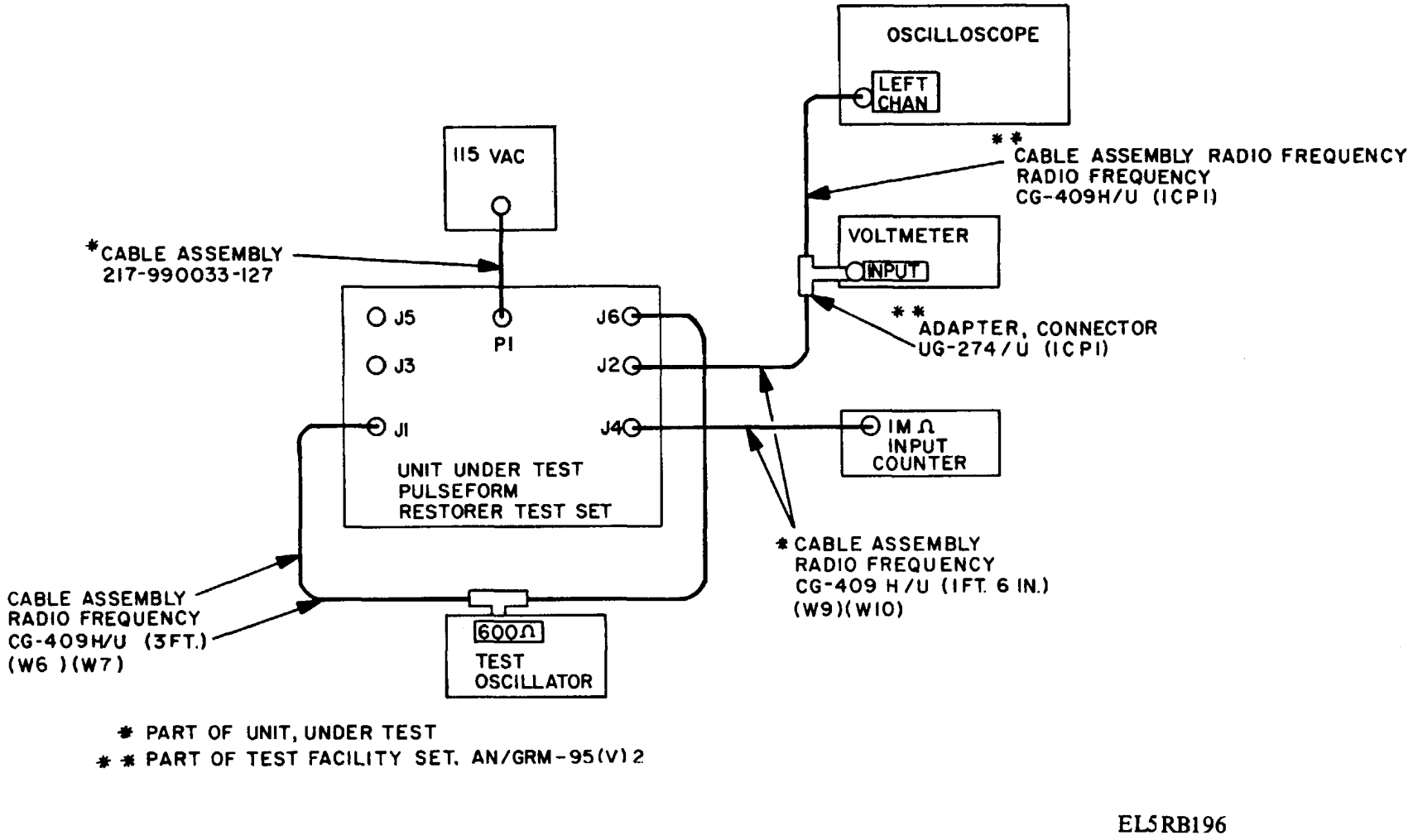

Figure 7-4. Noise Weighting Network Check Test Setup.

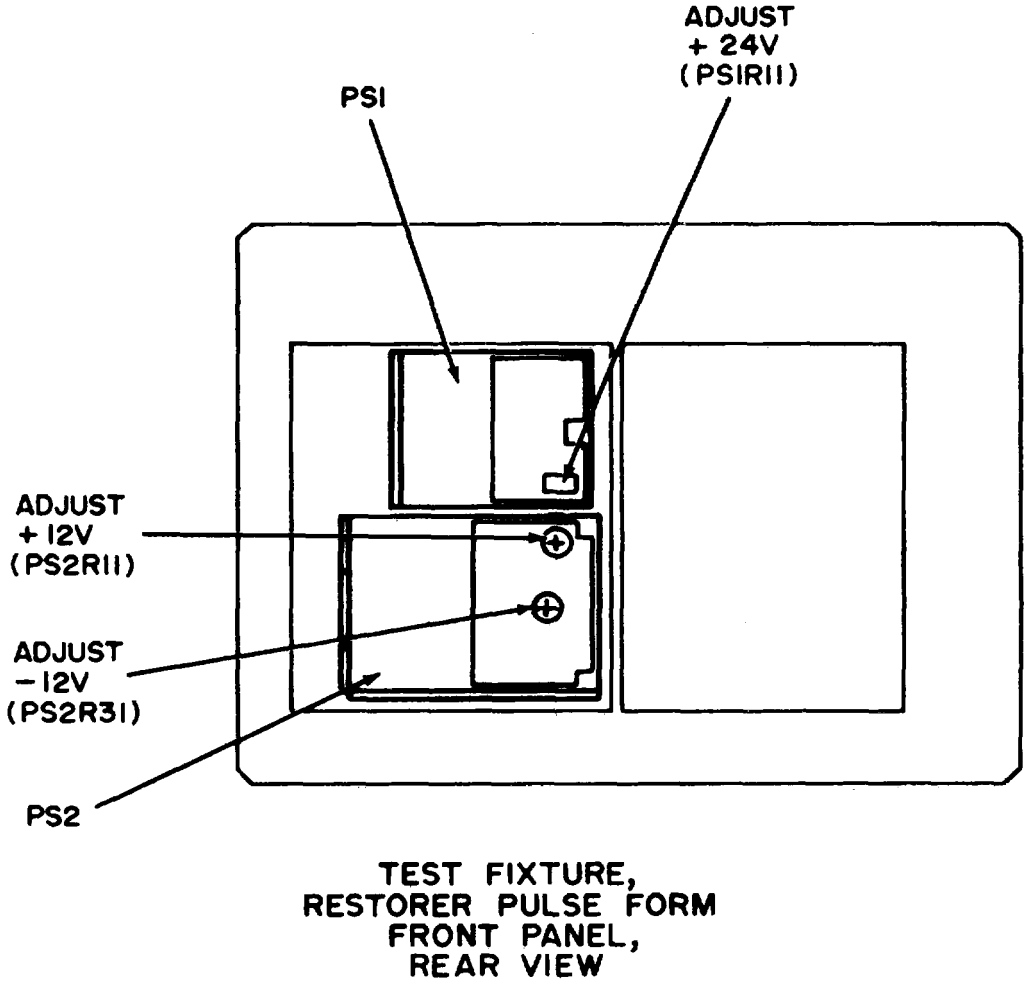

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Figure 7-5. Location of Power Supply PS1 and PS2 Adjustment Controls.

174. Power Supplies PS1 and PS2, Checks ant Adjustments.

a. Performance Check

(1) Set S7 to ON and check to see that the POWER (DS1), +12V (DS2), -12V (DS3), +24 (DS4), and +5V (DSS) indicator lamps light.

(2) Using the digital multimeter and test lead 267-800015-000 (4W1 5), check the voltage between J7 pin 2 (gnd) and pins listed in Table 23 below.

Table 23. Power Supply Voltage Measurements

Pin from connector J7	Digital multimeter indication(vdc)
1	±12 + ±0.5
3	-12 ±0.5
4	±24 ±1.0

b. Adjustments If the specifications in Table23 are not met, adjust the power supply potentiometers (fig 7-5) as follows to obtain the designated voltages.

(1) Adjust RI 1 on PS2 to obtain a voltage of +12 ±0.5 volts

(2) Adjust R31 on PS2 to obtain a voltage of -12 ±0.5 volts

(3) Adjust RI 11 on PSI to obtain a voltage of +24 ±0.5 volts.

175. Final Procedure

a. Deenergize and disconnect all test equipment

b. Separate all fabricated cables, loads, etc from unit
under test cables and components and return all components to their proper storage locations

c. Reassemble the calibrated units in their cases.

d. In accordance with TB 75025, annotate and affix calibration DA Label 80 (US Army Calibration System). When the unit under test cannot be adjusted to within tolerance, annotate and affix DA Form 2417 (Unserviceable Test Instrument or Standard) (red tag).

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