TM 11-6625-1628-15

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DS, GS AND DEPOT MAINTENANCE MANUAL

MAINTENANCE TEST FACILITY

(PHILCO 367-1693)

HEADQUARTERS, DEPARTMENT OF THE ARMY
SEPTEMBER 1971

WARNING

HIGH VOLTAGES EXIST IN THIS EQUIPMENT

DEATH ON CONTACT

may result if safety precautions are not observed. Be careful not to contact the terminal boards connected to the internal power supplies. Voltage potentials of 117 vac, 300 vdc, 250 vdc, and 150 vdc exist at these terminalboards.

DON'T TAKE CHANCES!

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DEPARTMENT OF THE ARMY

WASHINGTON, D.C., 30 September 1971

OPERATOR, ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL FOR PHILCO MAINTENANCE TEST FACILITY

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*This technical manual is an authentication of the manufacturer's commercial iterature and does not conform with the format and content specified in AR 310-3, ilitary Publications. This technical manual does, however, contain available nformation that is essential to the operation and maintenance of the equipment.

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SECTION 1

INTRODUCTION

A.1 SCOPE

a. This manual includes installation and operation instructions and covers operator's, organizational, direct support (DS), general support (GS), and depot **maintenance.** It describes the Maintenance Test Facility (Philco part number 367-1693) and also contains information pertaining to power supplies manufactured by Deltron Incorporated, models 1819, 1820, 2390A, A6-15, A28-.95, A144-.4, and A192-.3. Detailed information pertaining to the internal Test Exciter, Test Receiver and Test Panel Assemblies is also supplied. These assemblies are of new design; no individual manuals hale been written for them.

b. There are nine minor variations of the Maintenance Test Facility, designated 367-1693-1 through -9. These test facilities differ in such respects as the intermediate translation frequency, the frequencies of certain noise filters and marker oscillators, and the pre-emphasis and de-emphasis networks These differences are given in paragraph 1.4 and in paragraph 2.5. The variations in the Maintenance Test Facility permit optimum operation at sites which differ in channel capacity and operating frequency. Procedures for installation, operation, and maintenance are identical for all test facilities.

A.2 INDEX OF PUBLICATIONS

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 for modification work orders pertaining to the equipment.

1.1 FORMS AND RECORDS

Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of' Packaging and Handling Deficiencies. F111 out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Publication 378 (Navy), AFR 71-4 (Air Force), and MCO P4610-5 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF361). FE11 out and

forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55-38 (Army), NAVSUP Pub 459 (Navy), AFM 75-34 (Air Force), and MCO P4610.19 (Marine Corps).

1.2 PURPOSE OF EQUIPMENT

The Maintenance Test Facility (Philco part number 367-1693), shown in figure l-l, is a self-contamed test facility designed to monitor equipment performance characteristics and to facilitate basic system testing and alignment of Philco Model LRC-3 microwave exciters and receivers, or similar type radio equipment operating in the 1.7- to 2.4-Gc frequency range.

1.3 FUNCTION OF EQUIPMENT

The Maintenance Test Facility provides a convenient mobile assembly of frequently used test equipment for initial alignment, maintenance, and troubleshooting of tropospheric scatter or line-of-sight radio equipment, and is specifically adapted to the Phlico LRC-3.

A Test Exciter and Test Receiver, with associated power supplies, are furnished to be substituted for portions of the operating equipment when comparison and substitution techniques are used in performing tests. The Test Exciter is used as a signal source for equipment checkout. The Test Exciter and Test Receiver also function as a standard in the troubleshooting of faulty equipment.

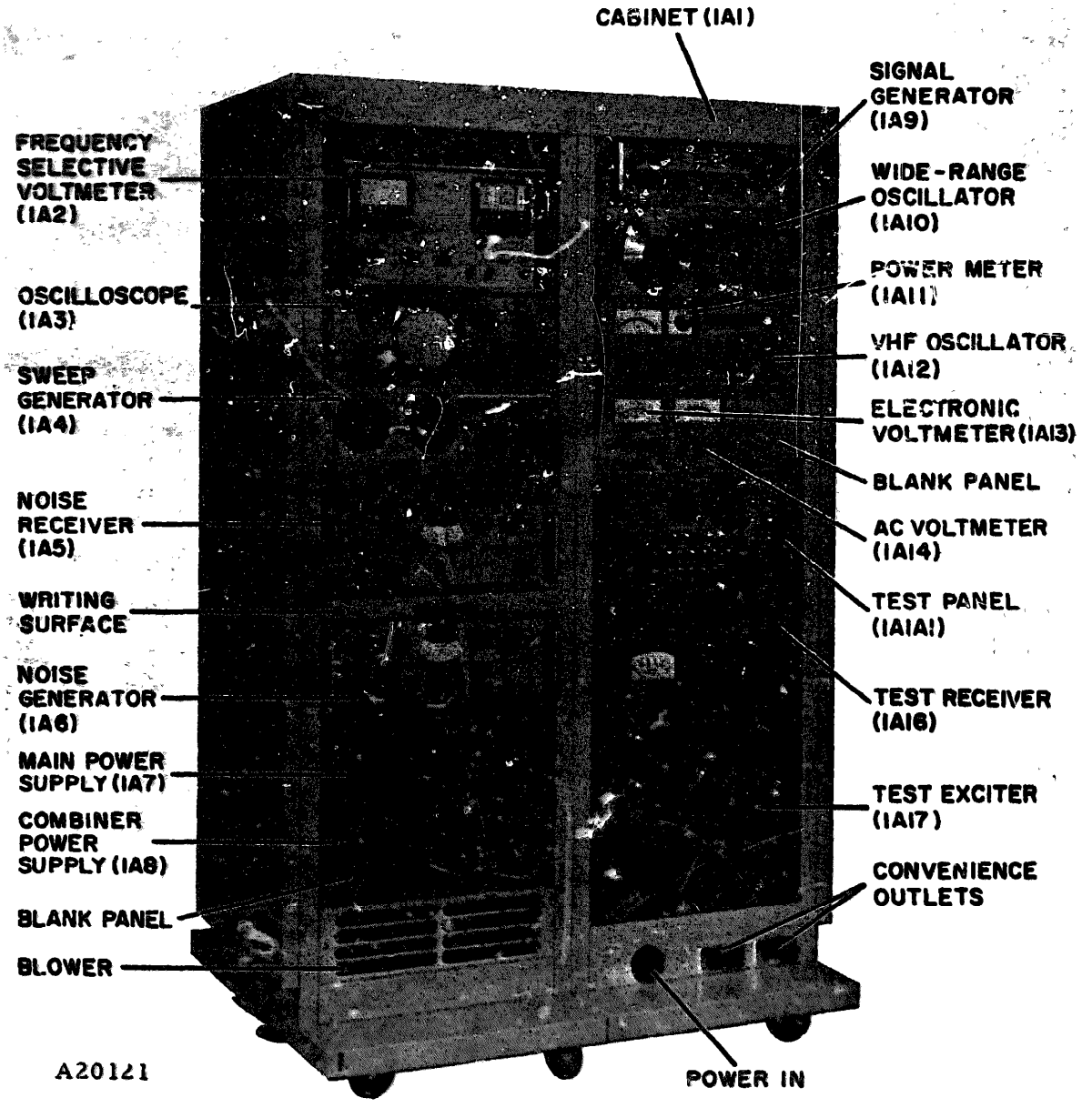


Figure 1-1. Maintenance Test Facility Front View

Frequency-c rsion equipment is furnished to convert intermediate frequencies to rad frequencies, and to translate radio frequencies for back-to-hack radio testing within a station.

1.4 PHYSICAL DESCRIPTION

The Maintenance Test Facility (figure l-l) consists of a steel cabinet (Main Assembly (1A1), mounted on a mobile dolly, which houses the following as assemblies. a Test Exciter (1A17), a Test Receiver (1A16), a Power Supply (1A15), which furnishes power for both the Test Exciter and Test Receiver, two power supplies (Main Power Supply 1A7 and Combiner Power Supply 1A8) that furnish external power for testing an LRC-3 exciter or receiver, and standard items of commercial test equipment required for normal system testing and alignment. In addition, a Test Panel (1A1A1) provides input and output connections, as required, for the appropriate **test** equipment, as well as coaxial attenuators and test points. Dual-115-volt, a-c outlets are located on the front base of the cabinet to provide a readily accessible source **of power for** soldering Irons, trouble lights, or additional test equipment. See table l-l for a complete listing of all assemblies and test equipment.

The cabinet is 75 inches high, 47 inches wide, 34 inches deep, and weighs 1025 pounds fully assembled. The cabinet is equipped with a blower and **air** filter, **located at, the bottom of the rack.** Storage **areas for test cables, adapters, instruction manuals,** etc., are **provided in the inferior of the cabinet, these areas are accessible through the side panels and the rear doors. A retractable writing shelf is also provided to facilitate the recording of test data.**

A list of accessories supplied with the Maintenance Test Facility is given in table 1-2, along with a key to their locations in the Maintenance Test Facility s orage areas. For a complete listing of reference material consisting of instruction manuals, supplements, and calibration charts supplied with the Maintenance Test Facility, refer to Appendix A. The storage locations of these publications in the cabinet are indicated by a key in the table and are shown in figure 1-2. The unused plug-in oscillator for the sweep generator is stored in the rear of the Maintenance Test Facility (see figures 1-2 and 7-1).

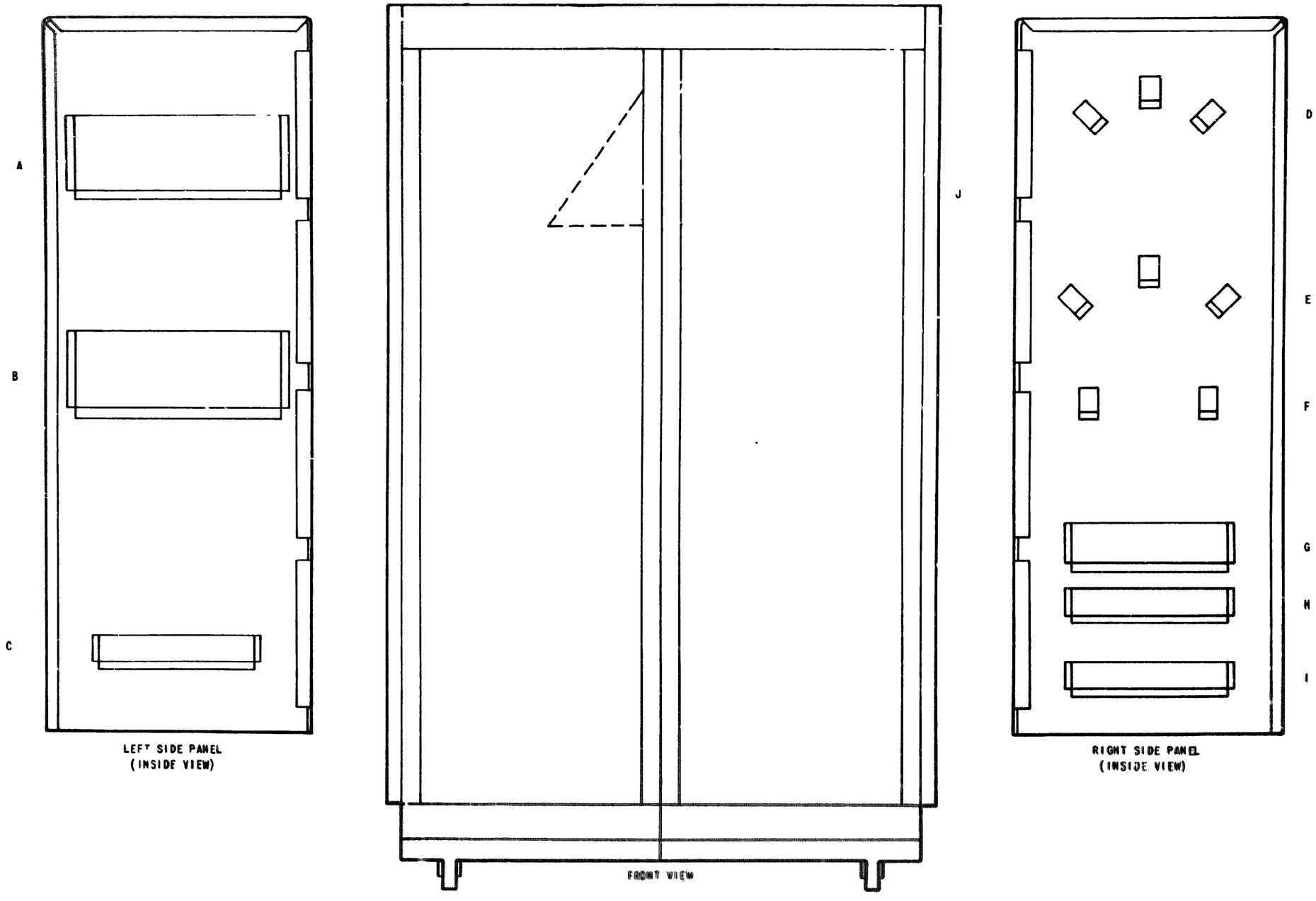


Figure 1-2. Maintenance Test Facility Storage Areas

TABLE 1-1 MAINTENANCE TEST FACILITY TEST EQUIPMENT AND ASSEMBLIES

DESCRIPTION	MANUFACTURER	MODEL OR PART NO.	QTY
Oscilloscope (1A3)	Hewlett-Packard	130C (options 6 and 13)	1
Wide-Range Oscillator (1A10)	Hewlett-Packard	200CDR (Philco 368-42399)	1
Electronic Voltmeter (1A13)	Hewlett-Packard	C01-410C	1
AC Voltmeter (1A14)	Hewlett-Packard	400E	1
Power Meter (1A11)	Hewlett-Packard	C14-431B/02	1
with Thermistor Mount	Hewlett-Packard	478A	1
Signal Generator (1A9)	Hewlett-Packard	8614A	1
VHF Oscillator (1A12)	Hewlett-Packard	3200B	1
White Noise Test Set, Consisting of the following:	Marconi	OA 2090	1
Noise Generator (1A6) (See Table 2-6)	Marconi	TF 2091 (Philco 368-42534)	
Noise Receiver (1A5) (See Table 2-6)	Marconi	TF 2092 (Philco 368-42535)	
Sweep Generator (1A4) Consisting of the following:	Telonic	Philco 368-42536	1
Sweep Generator (See Table 2-1)	Telonic	SM-2000	

TABLE 1-1. MAINTENANCE TEST FACILITY TEST EQUIPMENT AND ASSEMBLIES (CONT.)

DESCRIPTION	MANUFACTURER	MODEL OR PART NO.	QTY
Plug-in Oscillator	Telonic	L-6M	1
Plug-in Oscillator	Telonic	E-2M	1
RF Detector	Telonic	XD-23A	1
Frequency Selective Voltmeter (1A2)	Sierra	125BZ	1
Test Exciter Assembly (1A17)	Philco	368-42046	1
Test Receiver Assembly (1A16)	Philco	368-41998	1
Main Power Supply (1A7)	Deltron	Philco 368-37635-3	1
Test Panel Assembly (1A1A1)	Philco	368-42000	1
Combiner Power Supply (1A8)	Deltron	Philco 368-37700-1	1
Power Supply Assembly (1A15)	Philco	368-41997	1
Main Power Supply (1A7)	Deltron (Model 1819 and 2390A)		
Combiner Power Supply (1A8)	Deltron (Model 11820)		
Power Supply Assembly (1A15) consisting of the following: Power supplies (Deltron) Models A6-15, A28-.95, A144-.4, and A192-.3.			

TABLE 1-2. ACCESSORY AND ANCILLARY EQUIPMENT SUPPLIED WITH MAINTENANCE TEST FACILITY

DESCRIPTION	MANUFACTURER	PART NO.	QTY.	STORAGE AREA
Power Cable	Philco	461-4804	1	D
Combiner Test Cable	Philco	461-4850	1	D
Rec/Exciter Test Cable	Philco	461-4851	1	D
Attenuator	Kay	20-0	2	H & I
Thermistor Mount	Hewlett-Packard	478A	1	G
RF Detector	Telonic	XD-23A	1	G
Connector	Gremar	6011	2	G
Connector	Gremar	6051	4	G
Connector	Gremar	6054	3	G
Connector	MIL Spec.	UG491A/U	1	G
Connector	MIL Spec.	UG914/U	3	G
Connector	MIL Spec.	UG274A/U	3	G
Connector	MIL Spec.	M-358	2	G
Connector	MIL Spec.	UG273/U	3	G
Connector	MIL Spec.	UG255/U	1	G
Connector	MIL Spec.	UG201/U	4	G
Connector	MIL Spec.	UG349A/U	1	G
Connector	MIL Spec.	UG107B/U	1	G
Connector	MIL Spec.	UG29B/U	3	G
Connector	MIL Spec.	UG260B/U	1	G
Connector	Hewlett-Packard	10110A	3	G
Connector	Hewlett-Packard	10111A	3	G
Connector	Pomona	1269	3	G

TABLE 1-2. ACCESSORY AND ANCILLARY EQUIPMENT SUPPLIED WITH MAINTENANCE TEST FACILITY (CONT.)

DESCRIPTION	MANUFACTURER	PART NO.	QTY	STORAGE AREA
Plug	Pomona	1330	8	G
Plug	H. H. Smith	JANPJ051B	3	G
Test Leads	Hewlett-Packard	11003A	2	F
Cable	H. H. Smith	1871-60	4	D
Cable	H. H. Smith	1871-36	3	E
Cable	H. H. Smith	1589-60	4	D
Cable	Hewlett-Packard	10503A	3	E
Cable	Hewlett-Packard	10502A	4	F
Cable	Hewlett-Packard	11000A	3	E
Cable	Hewlett-Packard	11001A	3	E
Cable	Hewlett-Packard	11037A	2	E
Cable	Hewlett-Packard	11500A	3	D
Cable	Hewlett-Packard	11501A	2	D
Cable	H. H. Smith	1537-60	2	D
Cable	H. H. Smith	1872-60	1	D
Cable	H. H. Smith	1873-60	2	D
Fuse, 1/4 amp	Buss	1/4A-AGC	1 Box (5)	G
Fuse, 3/4 amp	Buss	3/4A-AGC	1 Box (5)	G
Fuse, 1 amp	Buss	1A-AGC	1 Box (5)	G
Fuse, 3 amp	Buss	3A-AGC	1 Box (5)	G
Fuse, 1/4 amp	Buss	1/4A-ABC	1 Box (5)	G

TABLE 1-2. ACCESSORY AND ANCILLARY EQUIPMENT SUPPLIED WITH MAINTENANCE TEST FACILITY (CONT.)

DESCRIPTION	MANUFACTURER	PART NO.	QTY	STORAGE AREA
Fuse, 8 amp	Buss	8A-ABC	1 Box (5)	G
Fuse, 1/2 amp	Buss	1/2A-ABC	1 Box (5)	G
Fuse, 1/2 amp SLO BLO	Buss	3AG-1/2ASB	1 Box (5)	G
Fuse, 1-1/2 amp SLO BLO	Buss	3AG-1-1/2 ASB	1 Box (5)	G
Fuse, 2 amp SLO BLO	Buss	3AG-2ASB	1 Box (5)	G
Fuse, 5 amp SLO BLO	Buss	3AG-5ASB	1 Box (5)	G
Resistor, 75 ohms	Philco	393-175031	2	G
Resistor, 50 ohms	Philco	393-150031	2	G
Resistor, 604 ohms	Philco	RN65C604OF	2	G
Tuning Tool	Cambion	2033-1	3	G
Tuning Tool	JFD	5284	3	G
Plug-in Oscillator	Telonic	E-2M	1	See Note
Plug-in Oscillator	Telonic	L-6M	1	See Note
Cable Assembly	Philco	461-4849	2	D
Storage Box	Bradley	435	2	G
Storage Box	Bradley	512	1	C
Audio Attenuator	Philco	368-42595	1	G
Attenuator	Microlab	AD-1ON	1	H
Attenuator	Microlab	AD-2ON	1	I
Adapter	Philco	368-42263	1	G
Adapter	Philco	368-42264	1	G

NOTE:
One of these plug-in oscillators will be installed in the Telonic Sweep Generator, Model SM-2000. The unused oscillator sub-assembly will be stored in Area J (see figures 1-2 and 7-1).

1.5 TECHNICAL CHARACTERISTICS

1.5.1 Over-all Maintenance Test Facility

a. Power Requirements

Line Voltage	**120v +10%,** 50 **or 60 cps +3 cps**

Current

Maintenance Facility Equipment l . .	**11 amp max.**
Convenience Outlets Only	**5 amp max.**
Maintenance Facility Equipment & Convenience Outlets	**16 amp max.**

b. Environment

Temperature

Non-operating.	**-40°C to +75°C**
Operating	**0 to +55°C**
Relative Humidity	**up to 90%**

Altitude

Non-operating	**50,000 ft max**
Operating	**10,000 ft max**

c. Physical Dimensions

Size	**Approx 47” wide x 34” deep x 75" high**
Weight	**Approx 1025 lb**

1.5.2 Test Exciter

a. Type	**Phase-Shift f-m modulator, followed by double-conversion heterodyne frequency** translation. Output frequency may be in r-f **band or may be** taken **from** output of f-m deviator, at 70 mc.
k. **Output Frequency**	
RF	**1700 to 2400 mc**
Deviator	**70 mc**
C. **Output Level**	
RF	**-24 dbm approx**
Deviator	**+25 dbm**
d. Output Impedance	
RF	**50 ohms**
Deviator	**50 ohms**
e. Harmonic Suppression	-63 **db min**
f. Nominal Deviation	**2.1 mc peak**
g- Baseband Frequency Response . .	**to. 5 db from 30 cps to -550 kc**
h. Input Impedance	75 **ohms**
i. Input Level	**-35 dbm**

j. **First Local-Oscillator Frequency (Varies with Test Facility):**

Test Facility Part No.	Frequency (mc)
367-1693-2,4	1722. 5
-1, 7	1727. 5
-5, 9	1732. 5
-3, 6	2 128. 0
-8	2 132. 0

k. Second Intermediate Frequency (Varies with Test Facility):

Test Facility Part No.	Frequency (mc)
367-1693-2,4	1792. 5
-1, 7	1797.5
-5, 9	1802.5
-3, 6	2 198. 0
-8	2202.0

l. **Second Local Oscillator ..... Variable 10 to 500 mc**

m. **Frequency Stability**

Deviator ..... ±17 kc

First Local Oscillator (1722 to 2132 mc) ..... ±17.2 to ±21. 3 kc

Second Local Oscillator (10 to 500 mc)

Short Term ..... ±0. 2 to ±10 kc

Long Term ..... ±0. 5 to ±25 kc

Over-all, Typical

Short Term	+0.002%
Long Term	+0.0025%

1.5.3 Test Receiver

d.	Type	Frequency modulation, double-conversion super-heterodyne. Input signal may be at rf or at second if and applied directly to input of limiter-discriminator.
b.	Frequency	
	RF	1700 to 2400 mc
	Second IF	70 mc
C.	First-Local-Oscillator Frequency .	Variable 10 to 500 mc

d. First Intermediate Frequency (Varies with Test Facility):

Test Facility Part No.	Frequency (mc)
367-1693-2,4	1792.5
-1, 7	1797.5
-5, 9	1802.5
-3, 6	2198.0
-8	2202.0

e. Second-Local-Oscillator Frequency (Varies with Test Facility).

Test Facility Part No.	Frequency (mc)
367-1693-2, 4	1722.5
-1, 7	1727.5
-5, 9	1732.5
-3, 6	2128.0
-8	2132.0

f. Second Intermediate Frequency ... 70 mc

g. Frequency Stability

First Local Oscillator (1722 to 2132 mc) ..... ±17.2 to ±21.3 kc

Second Local Oscillator (10 to 500 mc)

Short Term ..... ±0.2 to ±10 kc

Long Term ..... ±0.5 to ±25 kc

Over-all, Typical, Long Term .. ±0.0015%

h. Input Signal Level

RF ..... Approx -9 dbm

Second IF (70 mc) ..... Min +0 dbm

i. Input Impedance

RF ..... 50 ohms

Second IF (70 mc) ..... 50 ohms

j.	Output Level	-15 dbm
k.	Output Impedance	75 ohms
l.	Baseband Frequency Response	±0.5 db from 300 cps to 550 kc
m.	Metering Indications	Power-supply voltages, mixer crystal currents, and agc voltage

1.5.4 Main Power Supply (for External Test Purposes)

a.	Outputs ..... (Deltron Models 1819 and 2390A)	vdc at 300 ma
		- .c at 90 ı
		+28 vdc at 750 ma
		6.3 vdc at 8 amp

1.5.5 Combiner Power Supply (for External Test Purposes)

a.	D-C Outputs ..... (Deltron Model 1820)	+300 vdc at 500 ma
		+100 vdc at 60 ma
		-250 vdc at 60 ma
b.	A-C Output	6.3 vac at 10 amp

1.5.6 Test Equipment

a.	Signal Generator, Hewlett-Packard 8614A	800 to 2400 mc
		+10 dbm to -127 dbm

b.	VHF Oscillator, Hewlett-Packard 3200B	10 to 500 mc
		+14 dbm to 100 dbm
c.	Sweep Generator, Telonic SM-2000	Sweep and c-w generator
	With Plug-in Oscillator L-6M	50 mc to 125 mc
	With Plug-in Oscillator E-2M	600 mc to 2400 mc
d.	Power Meter, Hewlett-Packard 431B	10 mc to 10 Gc
		-30 dbm to +10 dbm
e.	Oscilloscope, Hewlett-Packard 130C	0.2 mv/cm to 20 v/mc
		DC to 500 kc
f.	Wide-Range Oscillator, Hewlett-Packard 200CDR	5 cps to 600 kc
		10v max at 600 ohms
g.	Electronic Voltmeter, Hewlett-Packard 410C	
	D-C Voltage Range	15 mv to 1500v (full scale)
	A-C Voltage Range	0.5v to 300v (full scale)
	Frequency Limits	20 cps to 700 mc
	Resistance Range	10 ohms to 10 megohms

h. AC Voltmeter, Hewlett-Packard 400E

Voltage Range	1 mv to 300 v (full scale)
Frequency Limits	10 cps to 10 mc

i. Frequency Selective Voltmeter, Sierra 125BZ

Frequency Range	3 kc to 620 kc
Voltage Range	300 uv to 30v (full scale)

j. White Noise Test Set, Marconi OA 2090 ..... 12 kc to 12.388 mc

1.5.7 Power Supply Assembly 1A15

(Deltron Model)

A6-15	6.3 vdc at 15 amp
A28-.95	28 vdc at 0.95 amp
A144-.4	150 vdc at 0.4 amp
A192-.3	200 vdc at 0.3 amp

1.6. Items Comprising an Operable Equipment.

FSN	Item	Quantity	Height (in)	Depth (in)	Width (in)	Weight (lb)
No FSN	Philco Maintenance Test Facility	1	75 (appr)	34 (appr)	47 (appr)	1025 (appr)

Note: See Table 1-1 for complete listing of test equipment and assemblies used in this equipment.

SECTION 2

INSTALLATION INSTRUCTIONS

2.1 GENERAL

This chapter contains information pertaining to the installation of the Maintenance Test Facility. Instructions are given for locating and mounting the equipment and for making interconnections, where needed, between the Maintenance Test Facility and associated equipment.

2.2 SPECIAL TOOLS REQUIRED

No special tools are required for the installation of the Maintenance Test Facility.

2.3 LOCATING AND MOUNTING THE EQUIPMENT

The Maintenance Test Facility is shipped with the following assemblies mounted in the cabinet: test exciter (1A17), test receiver (1A16), test panel (1A1A1), power supplies (1A15, 1A7, and 1A8), blower, and retractable writing shelf.

Standard items of commercial test equipment used in the test facility are shipped separately to prevent damage to any delicate components (see figure 1-1 for proper location).

Test Exciter Cables W1 through W3 and Test Receiver Cables W4 through W6 are shipped with the test facility and are mounted in their proper location. Test equipment cables W7 through W10, W15 through W21 and W23 are also shipped with the facility, but these cables are disconnected from the test equipment and are firmly taped

and secured to take interior of the cabinet. (See figure 7-6 for all cable interconnection data.) Accessory cables, adapters, instruction manuals, etc., are shipped in a separate carton and should be placed in their designated storage area (table 1-2 and figure 1-2).

The Maintenance Test Facility should be installed in a site free of excessive dust, well ventilated, and away from any major heat source.

The Maintenance Test Facility has been adjusted and tested before shipment from the factory. Consequently, care should be exercised in unpacking and handling to prevent changes in factory adjustments and damage to delicate components. Remove all tape, rope. and cushioning material from the facility with care. Visually inspect the equipment for any damage incurred during shipment or handling. Check all terminal boards, connectors, and Jacks for loose connections. See that all vacuum tubes are firmly seated in their sockets. Check for missing accessory cables, adapters, callbration data. etc., using the list given in table 1-2.

All mounting hardware is placed in a cloth bag and included with each test equipment assembly. Before installing Sweep Generator (1A4), Norse Receiver (1A5), or Norse Generator (1A6), check table 2-2 to determine the proper marker complement needed for the Sweep Generator and the proper filter complement needed for the Norse Receiver and Norse Generator.

The Maintenance Test Facility is affixed to a mobile dolly to facilitate its movement to the equipment under test. With all doors closed, the facility occupies a minimum floor space of approximately 34 inches x 47 Inches. The minimum aisle width required for moving the Maintenance Test Facility is 36 inches. When the facility is in use, space must be provided to permit access to the storage areas inside the doors The minimum total floor space required is 47 x 88 Inches (figure 2-1)

NOTES.
1. CENTER OF GRAVITY IS DESIGNATED BY ●.
2. WEIGHT OF UNIT:
3. FLOOR LOADING OF UNIT:
4. INPUT CURRENT OF UNIT:
5. INPUT POWER OF UNIT:
6. INPUT VOLTAGE OF UNIT:
7. ASSEMBLY NO. 367-1693.
8. WIRING DIAGRAM NO. GWD2845 & GWD2846.

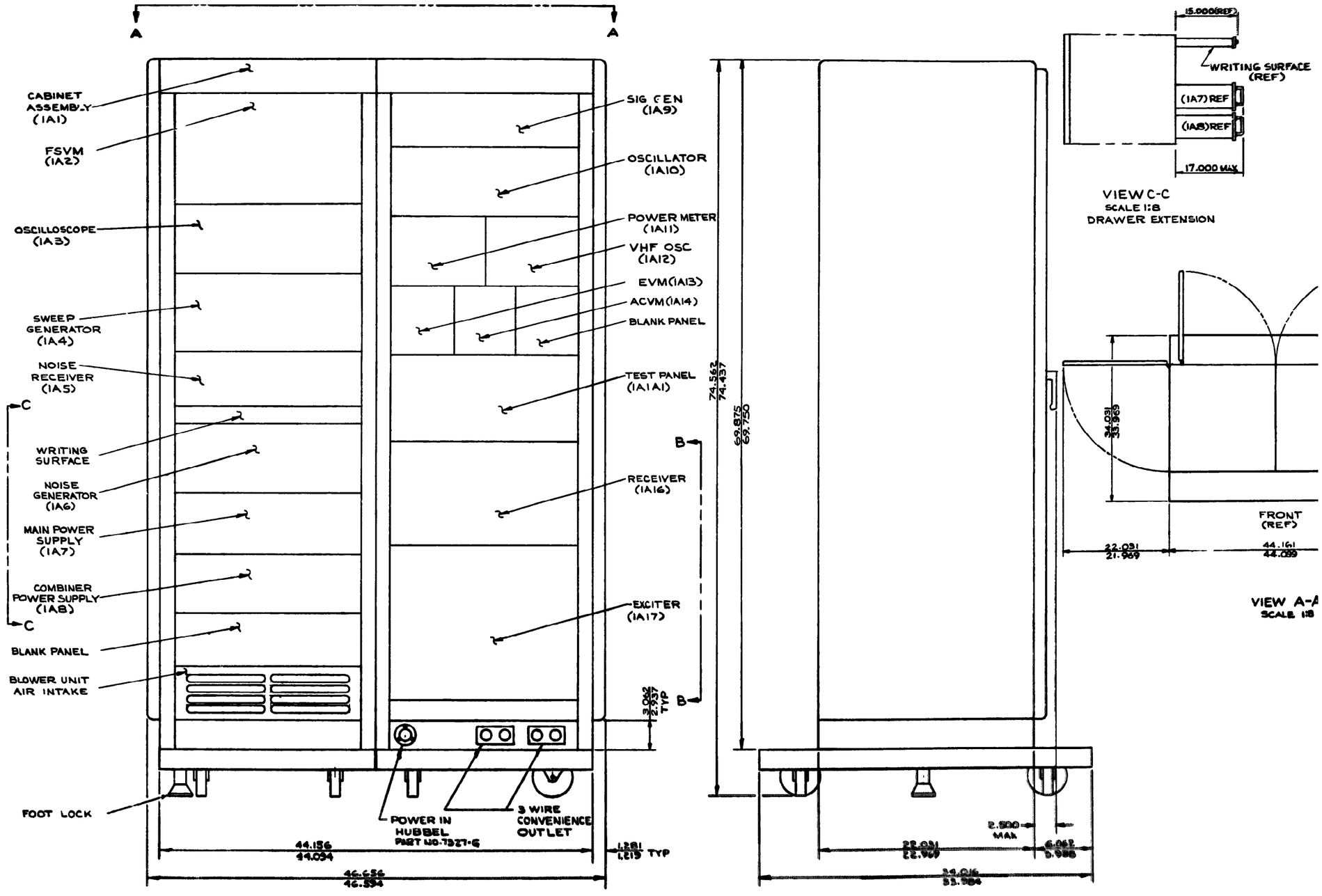


Figure 2-1. Maintenance Test Floor Space Requirement

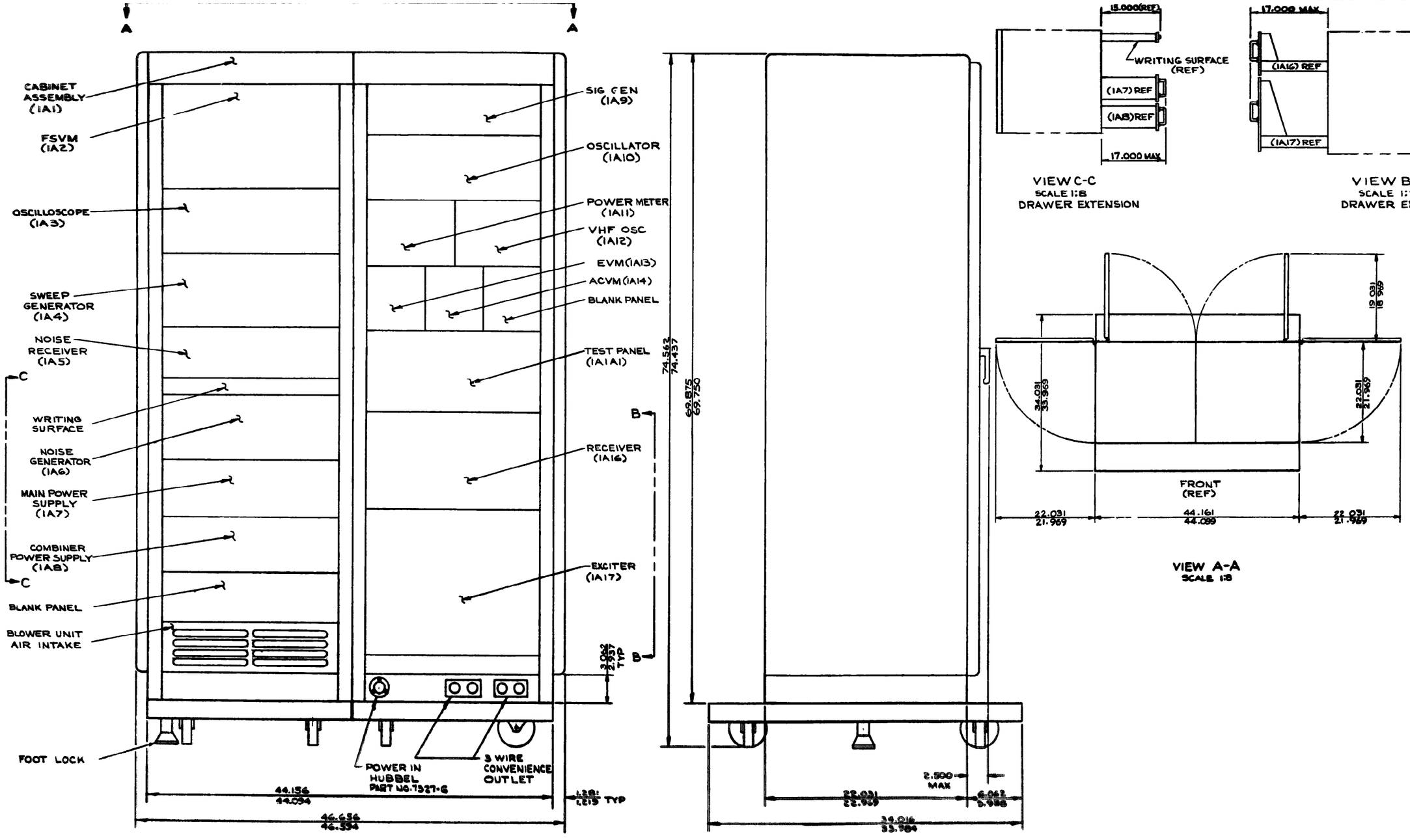


Figure 2-1. Maintenance Test Facility
Floor Space Requirements

2.4 ELECTRICAL CONNECTIONS

The primary power required for the Maintenance Test Facility is 120 volts, 60 cps, at 16 amperes. This is supplied to the facility through a detachable a-c power cable (part number 461-4804), which may be plugged into any standard 3-prong, female a-c receptacle capable of carrying 16 amperes. This receptacle is located at the front base of the Maintenance Test Facility cabinet.

The 16-ampere load is distributed as follows: 11 amperes to the Maintenance Test Facility equipment (protected by a 15-ampere circuit breaker); and 5 amperes to the convenience outlets at the front base of the test facility (protected by a 5-ampere circuit breaker). Both circuit breakers are located on the Test Panel.

2.5 VARIATIONS OF MAINTENANCE TEST FACILITY

Nine minor variations of the Maintenance Test Facility have been designed to provide optimum operation at sites which differ in channel capacity and operating frequency. The usages of special frequency-determining components with the different variations of the Maintenance Test Facility are shown by assembly part number and by frequency in tables 2-1 and 2-2, respectively.

The test facilities differ in such details as the intermediate translation frequency, the frequencies of certain noise filters and marker oscillators, and the pre-emphasis and de-emphasis networks. These differences are shown in tables 2-3 through 2-5.

Table 2-6 shows the accessories that are included with the White Noise Test Set OA 2090.

TABLE 2-1. USAGE OF SPECIAL FREQUENCY-DETERMINING COMPONENTS, BY ASSEMBLY PART NO.

MAINT TEST FACILITY	LOCAL OSC	SIDEBAND GEN	LOCAL OSC FILTER	REC FILTER	LIM-DIS ASSY	INSERT AMP ASSY	SWEEP GEN	NOISE GENERATOR	NOISE RECEIVER
367-1693-1	368-37328-26	368-41709-19	368-38128-8	BA4440-1797.5	368-41748-1	368-37662-9	368-42536-4	368-42534-3	368-42535-3
-2	-25	-18	-7	BA4440-1792.5	-1	-9	-4	-3	-3
-3	-28	-21	-10	BA5440-2198	-1	-9	-4	-3	-3
-4	-25	-18	-7	BA4440-1792.5	-1	-9	-3	-4	-4
-5	-27	-20	-9	BA4440-1802.5	-1	-9	-3	-4	-4
-6	-28	-21	-10	BA5440-2198	-1	-9	-3	-4	-4
-7	-26	-19	-8	BA4440-1797.5	-1	-9	-1	-1	-1
-8	-29	-22	-11	BA5440-2202	-1	-9	-1	-1	-1
-9	-27	-20	-9	BA4440-1802 5	-2	-8	-2	-2	-2

TABLE 2-2. USAGE OF SPECIAL FREQUENCY-DETERMINING COMPONENTS, BY FREQUENCY

ASSEMBLY		MAINTENANCE TEST FACILITY 367-1693								
		-1	-2	-3	-4	-5	-6	-7	-8	-9
Insertion Ampl Pre-Emph Network		60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	24/ch
Limiter-Disc. De-Emph Network		60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	60/120 ch	24/ch
Receiver Filter Freq (mc)		1797.5	1792.5	2198	1792 5	1802.5	2198	1797.5	2202	1802.5
L O. Filter Freq (mc)		1727 5	1722 5	2128	1722.5	1732.5	2128	1727.5	2132	1732.5
Sideband Gen Freq (mc)		1797.5	1792 5	2198	1792 5	1802.5	2198	1797 5	2202	1802.5
Local Oscillator Freq (mc)		1727.5	1722 5	2128	1722 5	1732.5	2128	1727 5	2132	1732 5
Sweep Generator								67	67	
Crystal Marker		68	68	68	67	67	67	68	68	69.25
Freq (mc)		70	70	70	70	70	70	70	70	70
		72	72	72	73	73	73	72	72	70.75
								73	73	
Noise Generator Accessories Freq (kc)	High-Pass Filter	60	60	60	60	60	60	60	60	12
	Low-Pass Filter	300	300	300				300	300	108
	Low-Pass Filter				552	552	552	552	552	
	Band-Stop Filter	70	70	70	70	70	70	70	70	70
	Band-Stop Filter	185	185	185				185	185	105
	Band-Stop Filter	270	270	270	270	270	270	270	270	40
	Band-Stop Filter				534	534	534	534	534	
Noise Receiver Accessories Freq (kc)	Bandpass Filter	70	70	70	70	70	70	70	70	70
	Bandpass Filter	185	185	185				185	185	105
	Bandpass Filter	270	270	270	270	270	270	270	270	40
	Bandpass Filter				534	534	534	534	534	
	Oscillator	70	70	70	70	70	70	70	70	70
	Oscillator	185	185	185				185	185	105
	Oscillator	270	270	270	270	270	270	270	270	40
	Oscillator				534	534	534	534	534	
Number of Channels		60	60	60	120	120	120	60/120	60/120	24

TABLE 2-3. FREQUENCY SPECIFICATION OF SPECIAL COMPONENTS

COMPONENT PART NO.	FREQUENCY (mc)
LOCAL OSCILLATOR	
368-37328-25	1722.5
-26	1727.5
-27	1732.5
-28	2128
-29	2132
SIDEBAND GENERATOR	
368-41709-18	1792.5
-19	1797.5
-20	1802.5
-21	2198
-22	2202
LOCAL OSCILLATOR FILTER	
368-38128-7	1722.5
-8	1727.5
-9	1732.5
-10	2128
-11	2132
RECEIVER FILTER	
Ba4440-1792.5	1792.5
-1797.5	1797.5
-1802.5	1802.5
BA5440-2198	2198
-2202	2202

TABLE 2-4. CHANNEL CAPACITY OF INSERTION AMPLIFIER AND LIMITER - DISCRIMINATOR

COMPONENT PART NO.	CHANNEL CAPACITY
INSERTION AMPLIFIER ASSEMBLY	
368-37662-8	24 channels
-9	60/120 channels
LIMITER-DISCRIMINATOR ASSEMBLY	
368-41748-1	60/120 channels
-2	24 channels

TABLE 2-5. LIST OF SWEEP GENERATORS SHOWING CRYSTAL-MAKER FREQUENCIES AVAILABLE

SWEEP GENERATOR PART NO.	CRYSTAL MARKER FREQUENCIES (mc)
368-42536-1	67, 68, 70, 72, and 73
-2	69.25, 70, and 70.75
-3	67, 70, and 73
-4	68, 70, and 72

PART NO.	MAIN ASSEMBLY	ACCESSORIES																							
		FREQ (KC)	60	12	108	300	552	40	40	40	70	70	70	105	105	105	185	185	185	270	270	270	534	534	534
		PART NO.	HPF TM7728/1	HPF TM7728	LPF TM7720	LPF TM7720/1	LPF TM7720/2	BSF TM7729/1	BPF TM7730/1	OSC TM7793/1	BSF TM7729/2	BPF TM7730/2	OSC TM7794	BSF TM7729/3	BPF TM7730/3	OSC TM7794/1	BSF TM7729/4	BPF TM7730/4	OSC TM7794/2	BSF TM7729/5	BPF TM7730/5	OSC TM7794/3	BSF TM7729/6	BPF TM7730/6	OSC TM7794/4
368-42534-1	Generator TF 2091		1			1	1				1						1			1			1		
-2	Generator TF 2091			1	1			1			1			1											
-3	Generator TF 2091		1			1					1						1			1					
-4	Generator TF 2091		1				1				1									1			1		
368-42535-1	Receiver TF 2092											1	1					1	1		1	1		1	1
-2	Receiver TF 2092								1	1		1	1		1	1									
-3	Receiver TF 2092											1	1					1	1		1	1			
-4	Receiver TF 2092											1	1								1	1		1	1

SECTION 3

OPERATING INSTRUCTIONS

3.1 GENERAL

This chapter describes the operation of the Maintenance Test Facility as a complete unit. For operation of a particular assembly or item of test equipment, the reader is referred to the manual for that assembly.

3.2 CONTROLS, INDICATORS, AND TEST POINTS

The controls, indicators, and test points listed and described by assembly in table 3-1 are used in the over-all normal operation of the Maintenance Test Facility. Items not listed in table 3-1 are described in the manuals covering the separate assemblies. Figures 3-1, 3-2. and 3-3 illustrate the controls and indicators of the Test Panel, Test Exciter, and Test Receiver, respectively. All controls, indicators, and test points are located on the front panels of the three assemblies unless otherwise indicated.

TABLE 3-1. CONTROLS, INDICATORS, AND TEST POINTS

NAME	FUNCTION
TEST PANEL	
BLOWER FAILURE indicator	Lights (red) when the blower fuse is open (located at rear of blower unit).
TEST RCVR/EXC FUNCTION switch	EXC, RCVR, and RCVR/EXC switch positions energize Power Supply Assembly and Test Receiver, along with portions of Test Exciter. EXC and RCVR/EXC switch positions supply +200 vdc to 70-mc deviator assembly of Test Exciter.

TABLE 3-1. CONTROLS, INDICATORS, AND TEST POINTS (CONT.)

NAME	FUNCTION
TEST PANEL (Cont)	
CONV OUTLETS PWR switch	Controls power input to convenience outlets at front base of Maintenance Test Facility and to CONV OUTLETS PWR indicator.
CONV OUTLETS PWR indicator	Illuminates (white) when CONV OUTLETS PWR switch is in the ON position.
MAINT FACILITY PWR switch	Controls main power input to all test equipment, Test Exciter, Test Receiver, Auxiliary Power Supplies, and MAINT FACILITY PWR indicator.
MAINT FACILITY PWR Indicator	Lights (white) when MAINT FACILITY PWR switch is in the ON position.
GRD test point (TP1)	Permits connection to neutral ground.
DISCR test point (TP2)	Permits check of discriminator crossover voltage.
COMBINER PWR SUP test points -6.3V (TP3) +6.3V (TP4) -100V (TP5) -250V (TP6) +300 (TP7)	Provides technician with convenient test points for checking Combiner Power Supply voltages, and also provides voltages for testing purposes.

TABLE 3-1. CONTROLS, INDICATORS, AND TEST POINTS (CONT.)

NAME	FUNCTION
TEST PANEL (Cont)	
IF ATTEN control	Provides 10-db attenuation in 1-db steps.
RF ATTEN control	Provides 30-db attenuation in 6-db steps.
TRANSLATION OSC, COUNTER jack	VFO signal output for COUNTER.
TRANSLATION OSC, VFO jack	VFO signal for Power Meter.
SWEEP GEN, RF OUTPUT jack	R-F output from Sweep Generator.
SWEEP GEN, MARKER IN jack	To MARKER ADDER jack on Sweep Generator.
SIG GEN, OUTPUT jack	R-F output from Signal Generator
SIG GEN, EXT FM jack	External FM input to Signal Generator
SCOPE, VERT INPUT jack	Vertical input to Oscilloscope
SCOPE, EXT TRIG jack	External trigger input to Oscilloscope
IF ATTEN jacks	One input and one output for attenuator
RF ATTEN jacks	One input and one output for attenuator
TEST RECEIVER, VIDEO OUT	[illegible]
TEST RECEIVER [illegible] IN	[illegible]

TABLE 3-1. CONTROLS, INDICATORS, AND TEST POINTS (CONT.)

NAME	FUNCTION
TEST PANEL (Cont.)	
TEST RECEIVER, RF IN jack	R-F input to Test Receiver.
TEST EXCITER, RF OUT jack	R-F output from Test Exciter.
TEST EXCITER, 70 MC OUT jack	70-mc output from Test Exciter.
TEST EXCITER, VIDEO IN jack	Video input to Test Exciter.
AUX PWR SUPPLIES, COMBINER jack	Combiner Power Supply output for use with combiner drawer.
AUX PWR SUPPLIES, RCVR/EXC jack	Main Power Supply output for use with Test Receiver and Test Exciter drawers.
NOISE REC jack	Input to Noise Receiver.
FSVM jack	Input for Frequency Selective Voltmeter.
NOISE GEN jack	Output from Noise Generator.
AUDIO GEN jack	Output from Wide Range Oscillator.
TEST RECEIVER	
FILTER TUNING control	Control for bandpass filter which tunes Test Receiver input to desired frequency.
POWER indicator	Lights (white) when TEST RCVR/EXC FUNCTION switch on Test Panel is switched to EXC, RCVR or RCVR/EXC position.

TABLE 3-1. CONTROLS, INDICATORS, AND TEST POINTS (CONT.)

NAME	FUNCTION
TEST RECEIVER (Cont.)	
PRE-AMP INPUT Jack	R-F input used for self-check.
MIXER OUTPUT Jack	Output from first mixer; jumpered to PRE-AMP INPUT Jack for normal use.
METER selector switch	Enables operator to check following circuits on monitor meter. 1. OFF 2. +200 vdc 3. +150 vdc 4. +28 vdc 5. AGC 6. XTAL current 1 7. XTAL current 2
TEST EXCITER	
POWER indicator	Lights (white) when TEST RCVR/EXC FUNCTION switch on Test Panel is switched to EXC or RCVR/EXC position.

TABLE 3-1, CONTROLS INDICATORS, AND TEST POINTS (CONT.)

NAME	FUNCTION
TEST EXCITER **(Cont.)**	
DEVIATOR indicator	**Lights (white) when TEST RCVR/EXC FUNCTION switch on Test Panel is switched to EXC or RCVR/ EXC position.**
FILTER TUNING control	**Control for bandpass filter which tunes Test Exciter output to desired frequency.**
MIXER OUT Jack	**R-F** output from second **mixer for use in self-check.**
FILTER IN jack	Input to tunable filter; jumpered to MIXER OUT jack for normal use.
SB **GEN** OUT jack	R-F output from sideband generator for use in self-check.
MIXER IN jack	**Input to second mixer; jumpered to SB GEN OUT jack for normal use.**

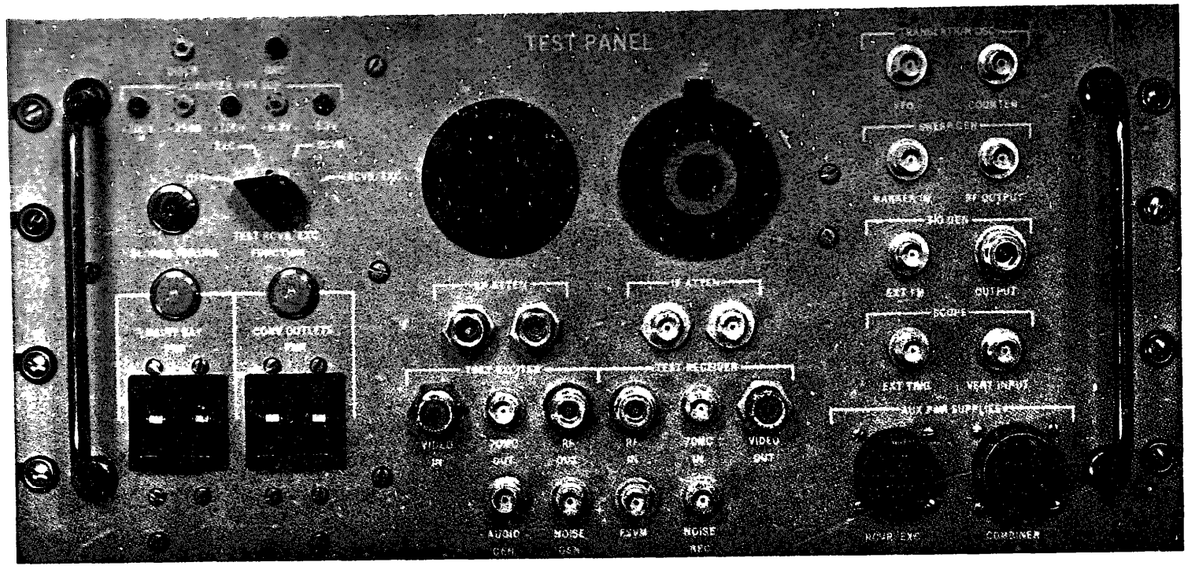


Figure 3-1. Test Panel, Controls, Indicators, and Test Points

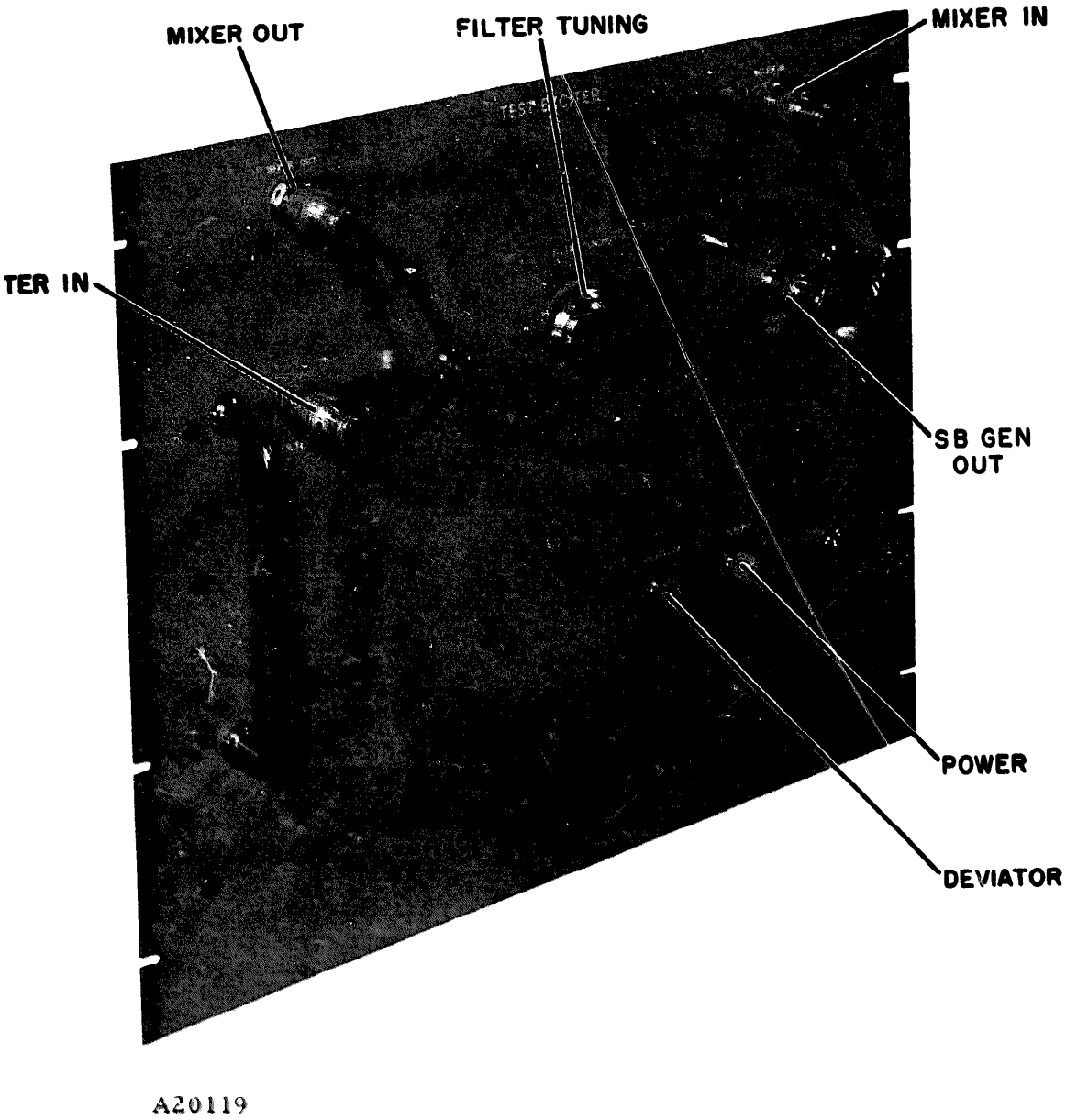


Figure 3-2. Test Exciter, Controls and Indicators

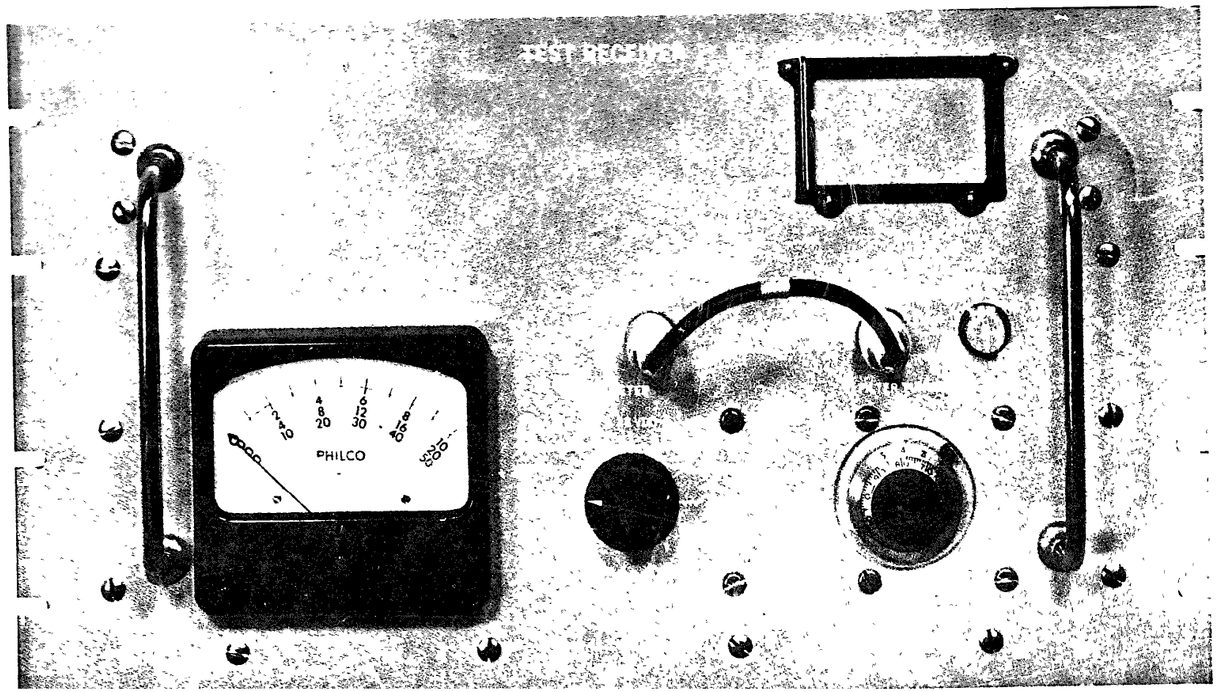


Figure 3-3. Test Receiver, Controls and Indicators

3.3 OPERATING PROCEDURES

3.3.1 Preliminary Adjustments and Control Settings

CAUTION

Before turning the equipment on, the operator should be certain that any interconnecting jumpers or lines presently patched into the Test Panel will not cause damage to the Maintenancc Test Facility or any external equipment. In case of doubt, all lines should be disconnected from the Test Panel before turning on the equipment.

3.3.2 Starting the Equipment

The CONV OUTLETS PWR and MAINT FACILITY PWR indicator lights should be checked when turning on the CONV OUTLETS PWR and MAINT FACILITY PWR switches (CB1 and CB2). The Main Power Supply, Combiner Power Supply, and Power Supply Assembly should be energized by means of the power switch on the receiver or combiner drawer being tested approximately 15 minutes before any tests are performed, so that all power supplies will be stabilized properly. Check the facility for visual indication of trouble. Turning the TEST RCVR/EXC FUNCTION switch to the proper testing mode will energize only the equipment needed for that test. All test equipment concerned with the various modes should be put on a standby basis so that all circuits will be stabilized. Check the blower unit tar normal operation and air flow.

3.3.3 Operation

3.3.3.1 General.- Proper setup and adjustment of test equipment can be determined by reference to the appropriate instruction manual. The following paragraphs contain operating mode instructio ' for the Maintenance Test Facility. It trouble is encountered in any of the units being tested, the operator should refer to the appropriate manual for instructions concerning troubleshooting or alignment of the equipment.

NOTE

Use 50-ohm test cables for r-f connections, use 75-ohm test cables for video connections (50-ohm test cable can be used for lengths under 6 feet).

3.3.3.2 Self-Check of Maintenance Test Facility. - *The Maintenance* Test Facility should be checked for satisfactory over-all *performance* before it is used to test any LRC-3 equipment. A back-to-back test is made to check the Test Exciter and Test Receiver NPR (noise power ratio) performance. The Noise Generator is connected to supply a noise signal to the Test Exciter through the VIDEO IN JACK on the Test Panel. The signal passes through the insertion amplifier, the 70-mc deviator, the first translation mixer sideband generator, and the second Translation Mixer in the Test Exciter drawer. The noise-modulated r-f output from the Test Exciter is connected through the r-f attenuators to the Test Receiver RF IN jack, and the signal passes through the first translation *mixer,* the second translation mixer (mixer preamplifier), the 70-mc i-f amplifier, and the limiter-discriminator modules. The NPR of the demodulated signal is checked with the Noise Receiver. The operational procedure for conducting a noise check of the combined Test Exciter and Test Receiver is as follows.

a. Connect the equipment test cables of the Maintenance Test Facility as shown in figure 3-4.

b. Connect test cables from RF OUT Jack in series with the RF ATTEN Jacks to the RFIN Jack on the Test Panel. Set the RF ATTEN control for maximum attenuation.

c. Turn the Test RCVR/EXC FUNCTION switch to the RCVR/EXC position, and turn the MAINT FACILITY PWR switch (CB2) to the ON position (both switches are located on Test Panel of Maintenance Test Facility). Operate the power switches of the Power Meter, the VHF Oscillator, the Noise Generator, and the Noise Receiver to the ON position (all test equipment is located in the Maintenance Test Facility). Verify that all power lights are lit, that BLOWER FAILURE light is out, and that Test Exciter DEVIATOR light is lit.

d. Select the operating frequency requiring the highest VFO frequency within those specified for the Maintenance Test Facility to set the VHF oscillator for this noise check. Adjust the output of the oscillator until the AC Voltmeter Indicates an output level of 1.1 vac at the VFO Jack on the Test Panel.

e. Set the FILTER TUNING control, as specified in the filter tuning chart on the Test Receiver front panel, to tune the Test Receiver to the selected frequency.

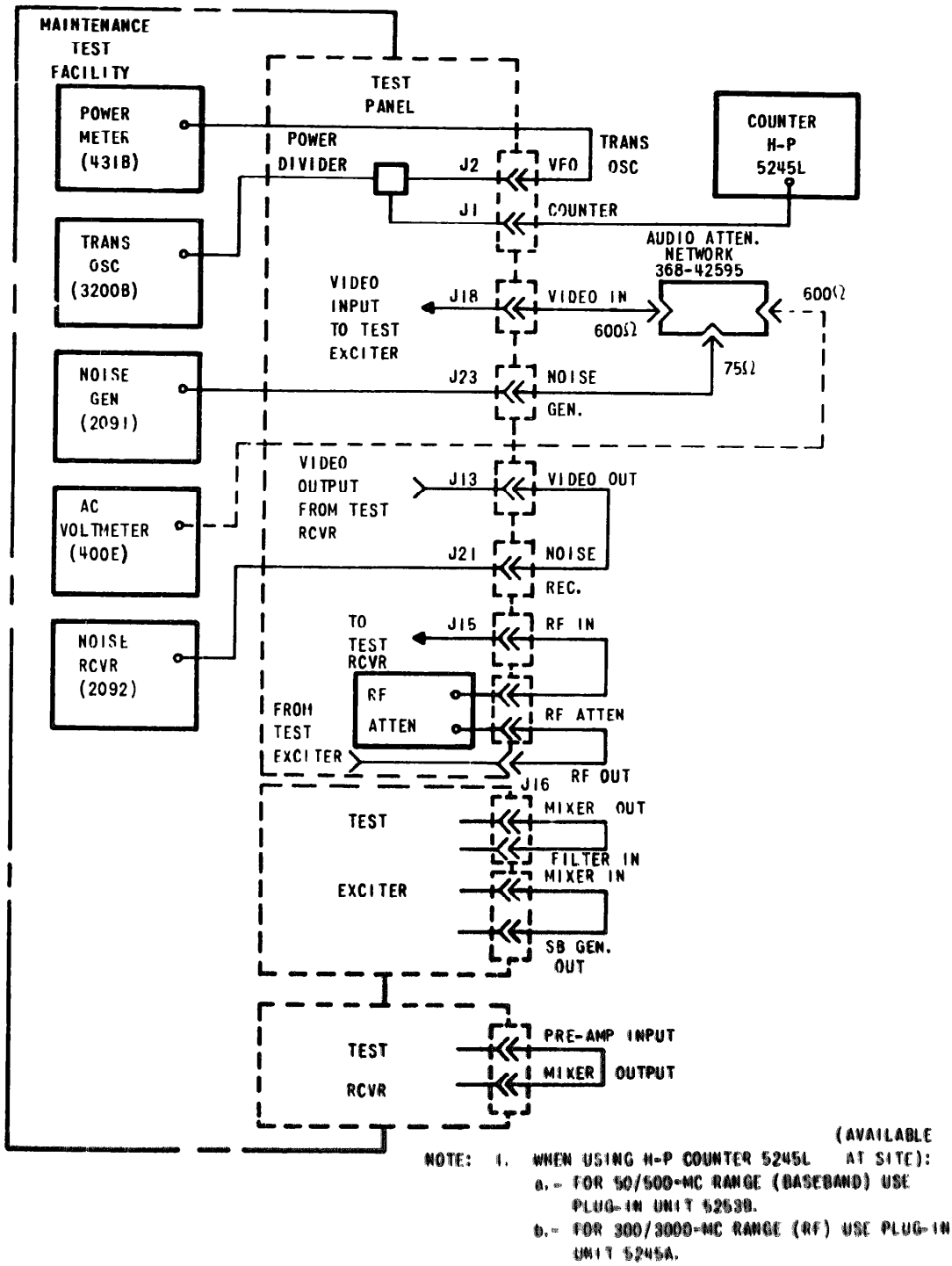


Figure 3-4. Test Exciter-Test Receiver Self-Check (Complete Loop Check). Cable Connections

f. Refer to Section 2, paragraph 2.5 in the White Noise Test Set instruction manual for the proper procedures, and set up the noise loading equipment for the highest channel capacity of the Test Receiver and Test Exciter.

g. Check the output power of the VHF Oscillator with the AC Voltmeter at the TRANSLATION OSC VFO output jack on the Test Panel, and adjust the slide attenuator on the back of the oscillator until the meter indicates 1.1 vac (+14 dbm), with the RF output control (on the front panel of the VHF Oscillator) set at mid-range.

h. Remove the test cable from the RF IN Jack, and connect to a type 14 barrel already connected to a Thermistor Mount (part of Power Meter) and the test cable to the Power Meter so that the input power to the Test Receiver can be measured.

i. Set the RF ATTEN control on the Test Panel for an input of approximately -24 dbm to the Test Receiver. Upon completion of the measurement, reconnect the test cable to the RF IN Jack.

j. Adjust the Noise Generator output attenuators until the noise voltage (V_1) indicated on the AC Voltmeter connected to TP4 on the insertion amplifier chassis has the appropriate value given by the equations below for the highest channel capacity of the Maintenance Test Facility.

For 120 channels

V_1l (in volts) = 2.32 $\Delta F / D$ (For 182-kc rms deviation, $V_1$1 is 1 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 60 channels.

V_{12}(in volts) = 2. 02 $\Delta F / D$ (For 182-kc rms deviation, v_{i2} is 2 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 24 channels:

V_{i3} (in volts) = 1.68 · $\Delta F/D$ (For 144-kc rms deviation, V_{i3} is 6 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

where **D = deviation sensitivity of Test Deviator in mc/volt**

ΔF = deviation per channel for zero db level in the system

k. **Measure and record the NPR through the Test Exciter and the Test Receiver for the highest, lowest, and mid-frequency baseband slots. The NPR should be 56 db or more in all slots for 24 and 60 channel operation, and 54 db for 120 channels. If the required NPR cannot be obtained, check the setting of the Test Receiver FILTER TUNING control and VHF oscillator frequency as described below; if necessary, refer to Section 5, Table 5-2 where troubleshooting procedures are provided for isolating the cause of the nonlinearity.**

NOTE

If the NPR requirements cannot be met, check the FILTER TUNING control setting by readjusting the control to obtain the highest NPR ratio at the highest baseband slot frequency. Note first the FILTER TUNING control setting, then rotate the control to either edge of the tuning range over which the AGC voltage indicated on the Test Receiver monitor meter dips to establish the tuning range. Observe the NPR as the FILTER TUNING control is varied, and set FILTER TUNING control for highest NPR in the tuning range. If the NPR requirements still cannot be met, slightly retune the VHF Oscillator for best NPR.

l. **Upon completion of the intermodulation (NPR) test, remove the test cables and restore all connections to their normal configuration.**

3. 3. 3. 3. LRC-3 Exciter Operation Checks. - Perform the following checks.

3.3.3.3.1 Exciter Drawer Intermodulation Distortion Test. **is performed twice to check an LRC-3 exciter for intermodulation distortion – once for Channel A and once for Channel B.**

NOTE

To avoid the transmission of noise over the tropo-scatter path, turn off the LRC-3 exciter power amplifier associated with the drawer being tested.

The test setup [illegible] in the following steps.

a. Connect test cables between the [illegible] and the LRC-5 exciter assembly [illegible].

b. Turn the power switches of the [illegible] and the Main Power Supply Unit (Channel A) located on the LRC-3 exciter rack to the ON position and observe that all power lights are lit.

C. **Observe whether the values indicated on the LRC-5 exciter monitor meter for the selector switch positions given. below fall within the tolerances specified. If the values art- not within tolerance, adjust the associated potentiometers listed to obtain the required values. The potentiometers are located on the main power supply chassis of the LRC-3 exciter.**

1. 200 + **10 vdc (R 17)**
2. 150 ±*7.5* **vdc (R22)**
3. 28 **±1.4 vdc (R28)**

d. **Turn the MAINT FACILITY PWR** switch (CB2) to the ON **position, and the TEST RCVR/EXC** FUNCTION switch to the RCVR position **(both switches** located on the Test Panel of the Maintenance Test Facility). Operate the power switches **of** the **Power Meter,** the VHF Oscillator. and the AC Voltmeter to the ON position. Observe that all power lights are lit, that BLOWER FAILURE light is out, and that Test Exciter DEVIATOR light is **not lit.**

e. **Adjust the VHF Oscillator (using H-P 5245L counter available at** site) to the exciter frequency specified for the type of **LRC-3 exciter being checked. (Refer to the calibration chart located on the Test Receiver panel.)**

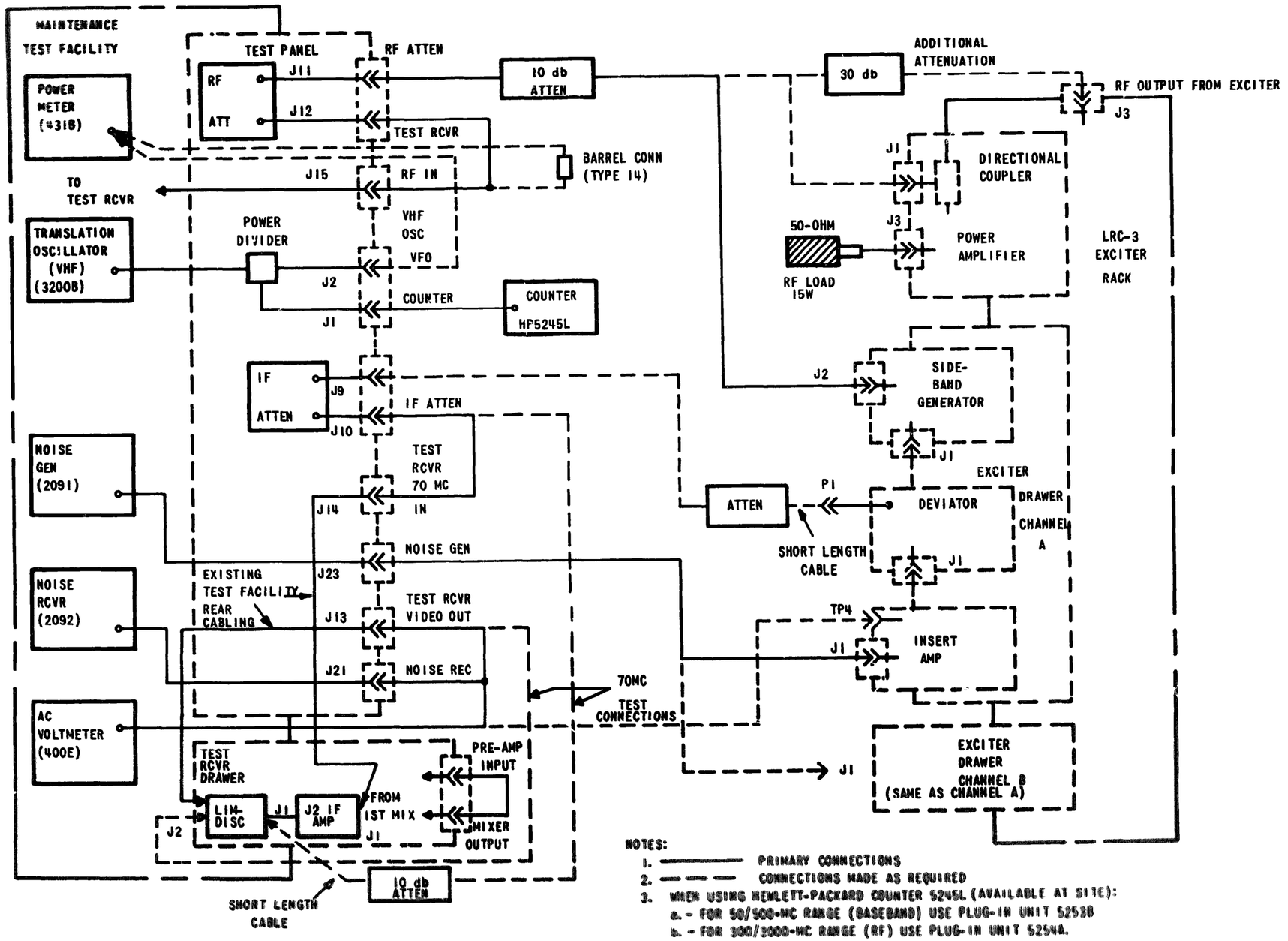


Figure 3-5. Exciter Intermodulation Distortion Test and 70-MC Deviator Cable Connections

. **Check the power output of the VHF Oscillator with the AC Voltmeter at the TRANSLATION OSC VFO output Jack on the Test Panel. Adjust the power output of the VHF Oscillator until the meter indicates 1.1 vac (+14 dbm).**

g. **Remove test cable from RF** IN **Jack on Test Panel** and connect to a type 14 barrel adapter already connected to a Thermistor Mount (part of Power Meter) and the **test** cable to the Power Meter, so **that the output power from the LRC-3 exciter may be checked.** If the signal reads higher than -21 dbm at the RF IN Jack, r-f attenuation must be added to reduce the signal input to the receiver. Upon completion of the measurement, reconnect the test cable to the RF IN Jack.

h. **Adjust** the **FILTER TUNING** control on the Test Receiver front panel **to** tune the Test Receiver **to** the desired frequency, as indicated by the calibration chart located on the Test Receiver front panel.

1. Set up the White Noise Test Set as specified in Section 2 of the operating Instruction manual for the channel capacity of the exciter drawer being tested.

J. **Adjust** the Noise Generator output attenuators until the noise input voltage (V_1), as indicated on the AC Voltmeter connected to TP4 on the insertion amplifier chassis of the exciter being tested, has the appropriate value given by the equations below:

For 120 channels:

v_1l (in volts) = 2.32 · Δ F/D **(For 182-kc** rms **deviation, V_{il} is 1 db below DEV SENSITIVITY value given in millivolts** on deviator test **data** sheet.)

For 60 channels:

V_{i2} (in volts) = 2.02 · ΔF/D (For 182-kc rms deviation, V_{i2} is 2 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 24 channels:

V_{13} **(in volts) = 1.68** Δ **F/D** **(For 144-kc rms deviation, V_{13} is 6 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)**

where ΔF = **the deviation per channel for zero dbm level in the system**

D = the deviation sensitivity of the deviator in megacycles per volt

k. Measure and record the noise power ratio through the receiver for the noise voltage (V_1) at TP4 specified in step J **and compare with the standard established for the receiver being tested. If the required NPR is not obtained, readjust the Test Receiver FILTER TUNING control and VHF Oscillator frequency as described in the note given below, and measure the NPR of the LRC-3 deviator at 70 mc, as described in paragraph 3. 3. 3. 3. 1. 1, to isolate the nonlinearity.**

NOTE

If NPR requirements cannot be met, readjust the FILTER TUNING control on the Test Receiver front panel (following the procedure given in the note for step k, of paragraph 3. 3. 3. 2) to verify that NPR readings at the highest slot frequency are not being limited by the FILTER TUNING control setting. If NPR requirements still cannot be met, slightly re-tune the VHF Oscillator for best NPR.

l. Upon completion of the intermodulation test, remove the test cables, and restore all connections to their normal configuration. If further testing of the power amplifier is required, proceed to the next paragraph.

3.3.3.3.1.1. Exciter Cabinet Intermodulation Test. **This test provides a checkout for intermodulation (NPR) of the LRC-3 exciter drawer and power amplifier together, and is performed only when the power amplifier needs to be tested for poor NPR performance.**

N O T E

To avoid transmitting noise during noise loading tests, the r-f output from the power amplifier under test should be disconnected from the cabinet output.

This permits the station to pass traffic with the other exciter on, except when the over-all LRC-3 exciter cabinet is being checked.

a. After the above steps on the LRC-3 exciter drawer have been completed, Turn off the power and reconnect the test receiver input to J1, located on the front panel of the LRC-3 power amplifier. Connect a 50-ohm load to the r-f output Jack (J3) on the power amplifier.

b. Apply power and allow equipment to warm up at least 20 minutes. Verify that the LRC-3 power amplifier is tuned and operating properly.

c. To check the over-all operation of the LRC-3 exciter through the cabinet, connect the Test Receiver input (with 30-db additional attenuation) to the RF OUTPUT (J1) located on top of LRC-3 exciter cabinet. Repeat the noise-loading check outlined in steps i and j of paragraph, 3. 3. 3. 3. 1.

d. Upon completion of the Intermodulation test, remove the test cables and restore all connections to their normal configuration.

e. Repeat the over-all operational procedures given in paragraphs 3. 3. 3. 3. 1 and 3. 3. 3. 3. 1. 1 for Channel B of the LRC-3 exciter.

3. 3. 3. 3. 1. 2 Exciter 70-Mc Deviator Test. - When the required NPR (noise-power ratio) cannot be obtained from the exciter intermodulation tests, the LRC-3 exciter deviator can be tested by itself with the procedure given below. This will aid the technician in isolating nonlinearities or pin-pointing troubles in the LRC-3 exciter drawer. The technician should refer to the LRC-3 Exciter Modification Kit alignment procedures and the LRC-3 exciter technical manual for the proper troubleshooting, test, and alignment procedures.

a. Refer to figure 3-5 and make connections as indicated.

b. Adjust the Kay attenuator to provide a signal level of -3 dbm at the input to the 70 MC EN jack located on the test receives drawer.

c. Set the output attenuators of the Noise Generator to provide the noise voltages at TP4 on the deviator specified in paragraph 3. 3. 3. 3. 1, step j.

d. Make a noise-loading check as described in Section 2 of the instruction book for the White Noise Test Set, and compare with standards specified for the LRC-3 unit.

e. When the test has been completed, turn off the power and restore all connections to their normal configuration

3. 3. 3. 3. 2 Exciter Deviation Sensitivity Check. - To perform this check, proceed as follows

a. Connect test cables between the Maintenance Test Facility and Channel A of the LRC-3 exciter rack as shown in figure 3-6

b. Adjust the Wide: *Range* Oscillator to 117.5 kc using a counter.

C. Set the selector switch on the Frequency Selective Voltmeter to the 600 KC position

d. Check to see that the output level of the Wide Range Oscillator is zero with the output level control turned fully counterclockwise. If necessary, short the output terminals together to obtain a zero reading.

e. Adjust the frequency-of the VHF Oscillator until a maximum reading is obtained on the Frequency Selective Voltmeter at 70.6 mc.

f. Remove the short from the Wide Range Oscillator, and raise the **Output level** of **the Oscillator** slowly until a null point is observed on the Frequency Selective Voltmeter. set the output level of the oscillator to this null point.

g. Read the input voltage on the AC Voltmeter at J1 on the deviator chassis of the Channel A LRC-3 exciter unit, and record this value as E

h. Calculate and record the deviator sensitivity, as follows:

$$D = \frac{283\ kc}{E \times 1.41} = \frac{kc}{mv}$$

where D = deviation sensitivity in mc per volt

E = indication of AC Voltmeter in millivolts

i Check and record the deviation sensitivity of Channel B by repeating steps a through h for that channel.

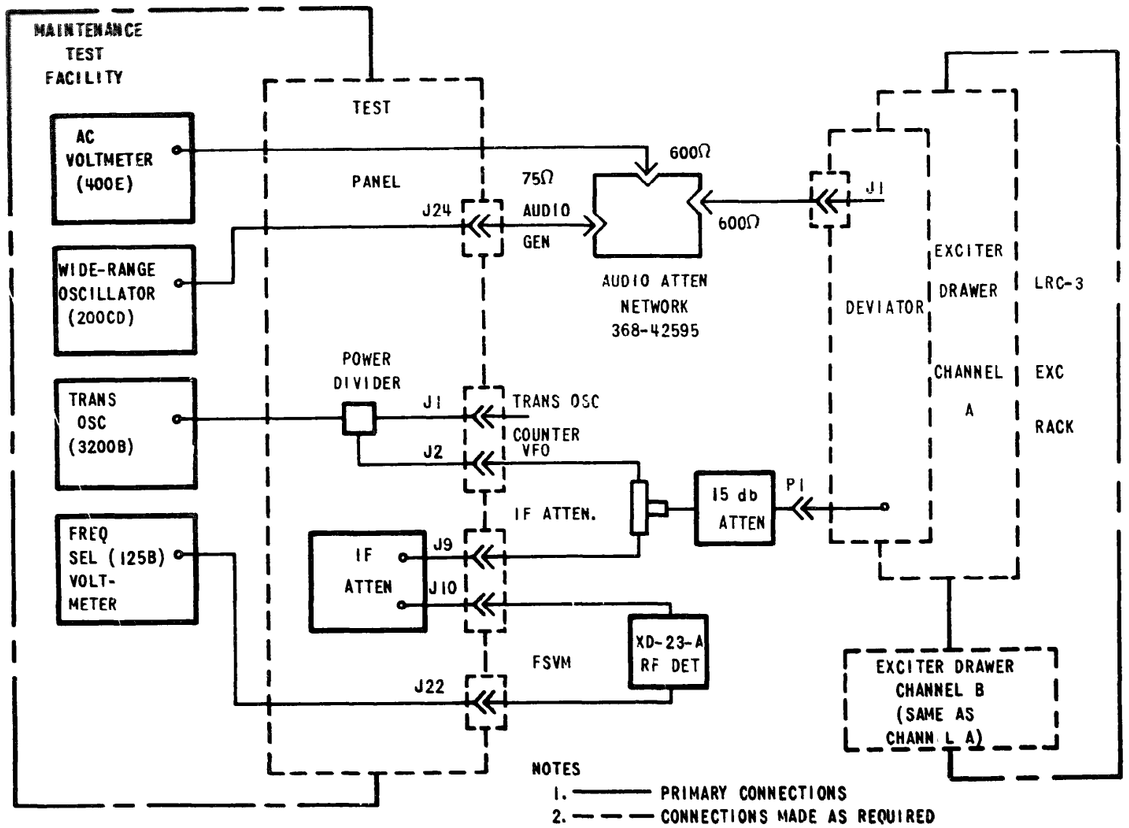


Figure 3-6. LRC-3 Deviation Sensitivity Check, Cable Connections

3.3.3.3.3 Exciter Frequency-Response Check. - This test provides a check of the modulation frequency response of the LRC-3 exciter. This test should be performed whenever a baseband level variation exists or whenever the pre-emphasis networks have been checked or tuned.

a. Remove the a-c input power from the power amplifier drawer of the LRC-3 exciter, and make provisions to stop transmission of the exciter signal during the test.

b. Connect test cables between the LRC-3 exciter and the Maintenance Test Facility as shown in figure 3-7.

C. Tune the Test Receiver to the frequency of the r-f output from the LRC-3 exciter drawer. To accomplish this, set the VHF Oscillator to that frequency required to translate the LRC-3 sideband generator frequency to the fixed frequency of the Test Receiver, as specified on the front panel calibration chart. For other frequencies, use the formula given below.

$$f_1 = f_{SB} - f_R \text{ (or } f_R - f_{SB})$$

where

f_1 = frequency of signal required from VHF Oscillator

f_{SB} = frequency of signal from side band generator output

f_R = first l-f frequency of signal at input to the mixer preamplifier in the Test Receiver

d. Using H-P counter 5245L (available at site), set the frequency of the VHF Oscillator to the required frequency (f_1); then check the output of the oscillator at the VFO output jack on the Test Panel with the AC Voltmeter. Adjust the output of the oscillator (by adjusting the slide attenuator on rear of oscillator) until the voltmeter indicates an output level of 1.1 vac (+14 dbm). This level should be checked for each new setting of the VHF Oscillator.

e. Set the Wide-Range Oscillator to 10 kc. and check the output of the oscillator at J2 on the limiter-discriminator chassis of the Test Receiver. Adjust the output of the oscillator until the AC Voltmeter indicates a baseband output level of -24 db (48 mv). Measure and record the baseband input level supplied by the oscillator to the LRC-3 exciter. This level should be held constant and is used as a reference during the frequency-response test measurements.

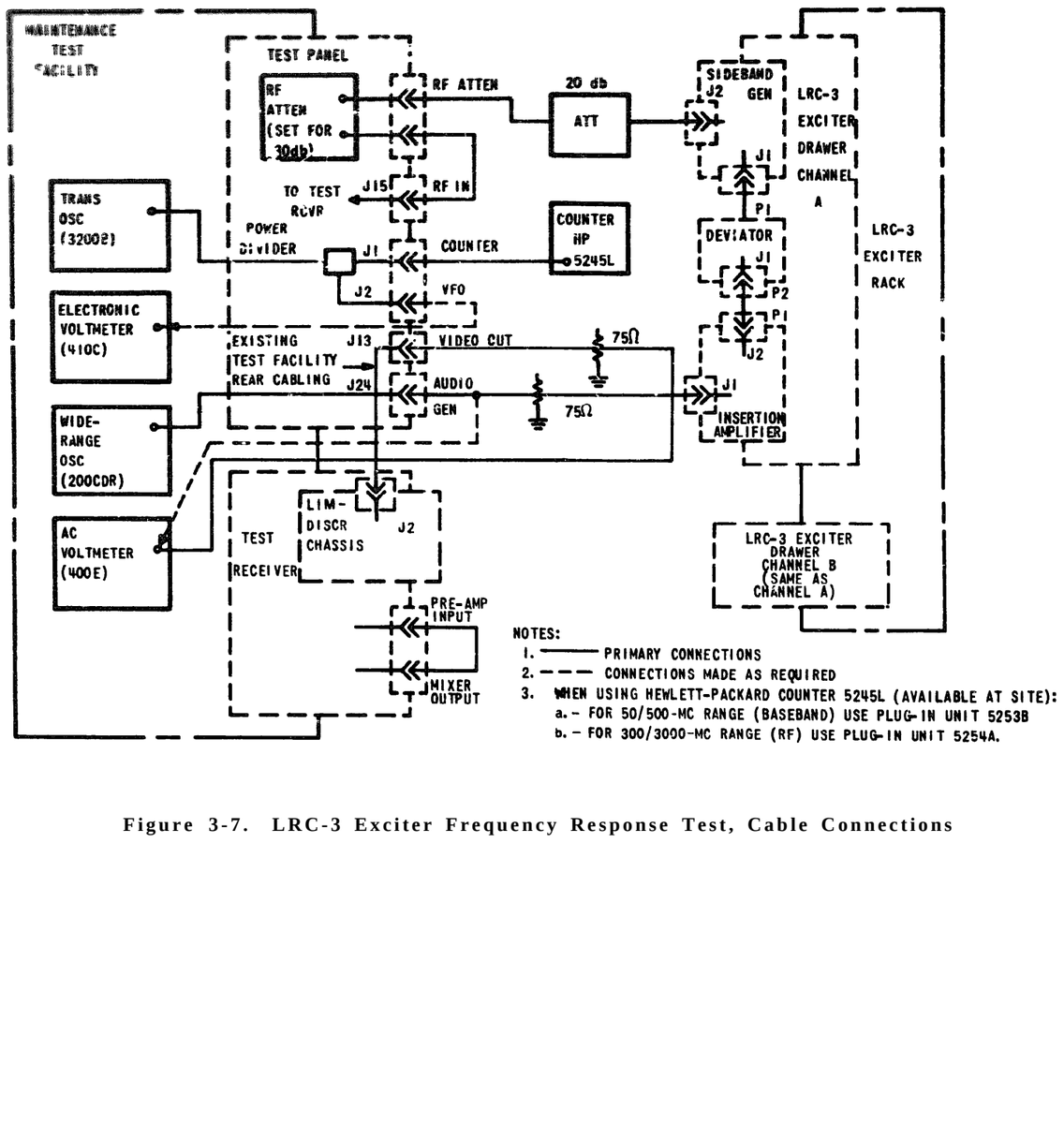


Figure 3-7. LRC-3 Exciter Frequency Response Test, Cable Connections

NOTE

The de-emphasis network used in the Test Receiver limiter-discriminator should be identical in channel capacity to that of the pre-emphasis network used in the LRC-3 exciter insertion amplifier. If they are dissimilar, **change the pre-emphasis and/or** de-emphasis network strapping to make them similar.

f. Set the frequency of the Wide-Range Oscillator to those frequencies specified for the channel capacity of the baseband being used. Adjust the output of the oscillator to maintain the reference input level established in step e.

g. Measure and record the output from J2 on the limiter-discriminator chassis of the Test Receiver for each frequency at the reference input level specified in step e.

h. When all necessary adjustments have been made and the frequency-response test is complete, compare with the standard to determine whether the requirements have been met.

i. Disconnect the test cables, and **restore the Maintenance** Test Facility connections to their normal form.

3.3.3.4 LRC-3 Receiver Operational Checks. - Perform the following checks.

3.3.3.4.1 Receiver Intermodulation Tests. - These tests are performed twice to test the LRC-3 receiver - once **for** Channel A and once for Channel B. To avoid disabling the LRC-3 receiver cabinet completely during the operational checks of a receiver drawer, first disconnect the baseband output lead from the phase lock **or** discriminator chassis. Connect the RF **OUT jack (J16) from the Maintenance Facility Test** Exciter to the s**tub tuner located in the mixer preamplifier of the**

3.3.3.4.1.1 Receiver Drawer Intermodulation Testing. **The proper operational procedure to check a receiver drawer is as follows:**

a. Turn the TEST RCVR/EXC FUNCTION switch to the EXC position, and operate the MAINT FACILITY PWR switch to the ON position (both switches on Test Panel of Maintenance Test Facility). Operate the power switches of the Power Meter, VHF Oscillator, AC Voltmeter, Electronic Voltmeter, Noise Generator, Noise Receiver, and Oscilloscope to the ON position (all test equipment housed in Maintenance Test Facility).

b. Observe that all power lights are lit, that BLOWER FAILURE light is out, and that Test Exciter DEVIATOR light is on.

C. Adjust the VHF Oscillator frequency (using H-P counter 5245L available at site) to the frequency specified for the type of LRC-3 receiver being used (see calibration chart on panel of Test Exciter). If the receiver lock voltage (corresponding to the frequency of the receive signal) is known, readjust the VHF Oscillator frequency slightly, if necessary, to obtain the exact lock voltage. For installation using a discriminator, adjust the frequency to reproduce the crossover voltage present with a received signal or a 700-mc signal.

d. Disconnect first the combiner input leads from J1 located on the phase lock chassis (or J2 of the limiter-discriminator chassis if it is employed) of *the receiver* drawer under test.

e. Connect teat cables between the Maintenance Test Facility and the LRC-3 receiver drawer as shown in figure 3-8.

f. Connect a 75-ohm coaxial cable from the NOISE REC jack (J21) on the Maintenance Test Facility Test Panel to J1 on the LRC-3 phase lock chassis. The NOISE REC jack will provide a 75-ohm load for the phase lock chassis. If this jack is not used, the video output from J1 of the phase lock chassis should be terminated with a 75-ohm load.

g. With power applied to the LRC-3 receiver drawer, observe that all power lights are lit, and that the d-c voltages shown on the LRC-3 receiver front panel monitor meter fall within the values shown below. If the voltages are out of tolerance, adjust the associated potentiometers. (Located on main power supply chassis.)

1. 200 ± 10 vdc (R17)
2. 150 ± 7.5 vdc (R22)
3. 28 ± 1.4 vdc (R28)

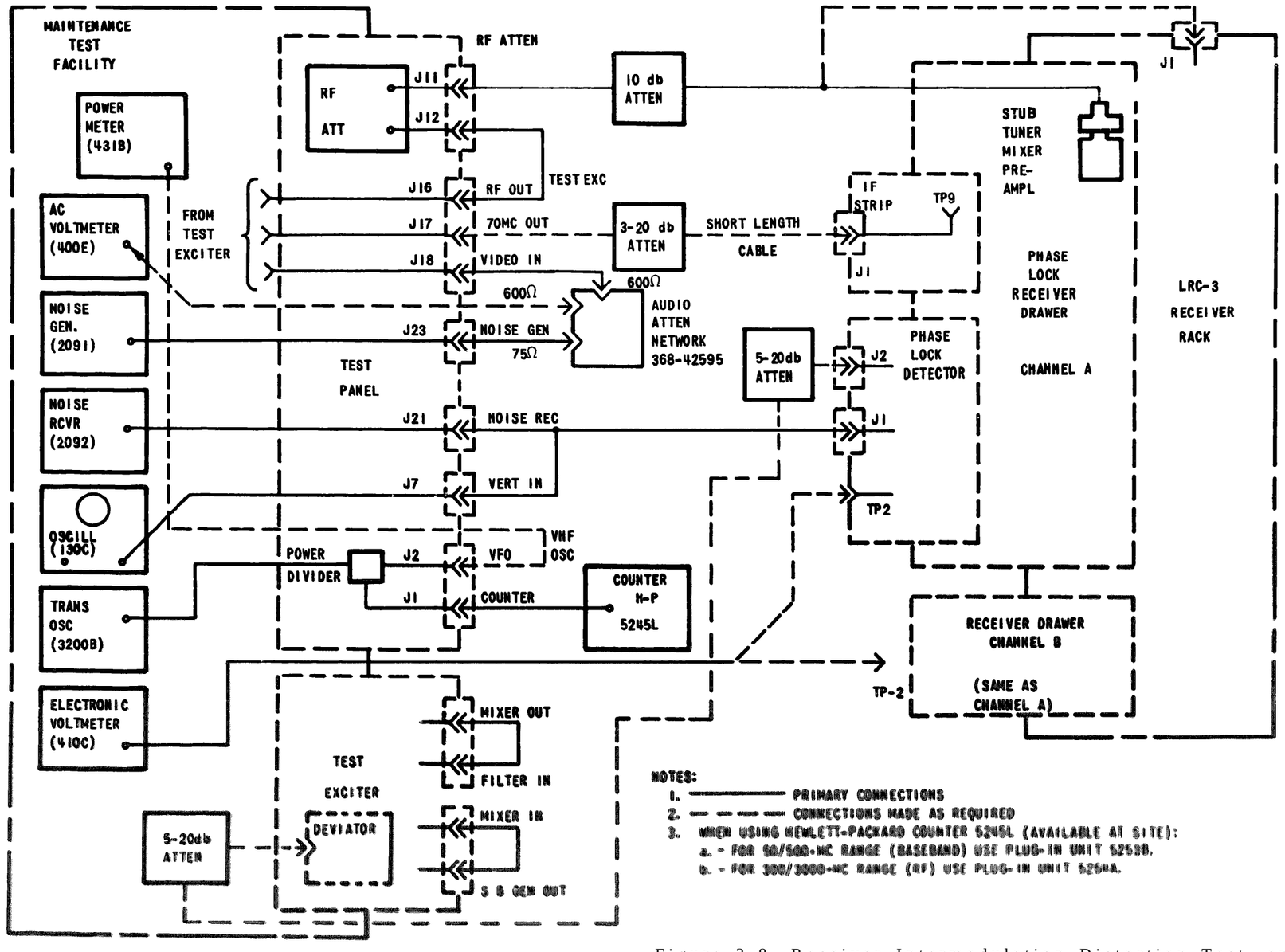


Figure 3-8. Receiver Intermodulation Distortion Test, and Limiter-Discriminator and Phase Lock Intermodulation Test. Cable Connections

h. **Using the** AC Voltmeter, check the output of the VHF Oscillator **at the VF**O output jack located on the Maintenance Test Facility **Test Panel.** Adjust the output of the oscillator until the meter **indicates 1.** 1 vac (+14 dbm).

i. Adjust the FILTER TUNING control on the Test Exciter for the desired frequency as specified by the chart on the Test Exciter front panel.

j. Remove the test cable connected from the Test Exciter RF OUT **Jack to the stub tuner (connected to the mixer preamplifier located in the LRC-3 receiver drawer), and connect the cable to the Power Meter using a barrel connector (Type 14). Calibrate the output from the Maintenance Test Facility Test Exciter at the RF OUT Jack on the Test Panel and adjust the RF ATTEN control to insert sufficient attenuation for an input level of approximately -37 dbm at the input to the LRC-3 receiver. Reconnect the cable to the stub tuner in the mixer preamplifier.**

k. **Set up for a noise-loading test as specified in Section 2 of the White Noise Test Set instruction book.**

l **Adjust the Noise Generator output attenuators until the noise input voltage (V_1) (applied to TP4 on the insertion amplifier of the Test Exciter) shown on the AC** Voltmeter has the value specified below **for the channel capacity** of the receiver being tested.

For 120 channels:

V_1l(in volts) = 2 . 3 2 · ΔF / D (For 182-kc rms deviation, V_{il} is 1 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 60 channels:

V_{i2} (in volts) = 2. 02 · Δ F/D (For 182-kc rms deviation, V_{i2} is 2 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 24 channels·

V_{i3} (in volts) = 1. 68 · Δ F/D (For 144-kc rms deviation, V_{i3} is 6 db below DEV SENSITIVITY value given on deviator test data sheet.)

where D = deviation sensitivity in mc/volt given on the tag attached to the deviator

ΔF = deviation per channel for zero dbm level in the system

m. Measure and record the NPR through the Test Exciter and LRC-3 Receiver for the noise voltage specified above in step 1, and compare with the standard established for the receiver being tested. If the NPR required cannot be obtained from the receiver drawer, isolate the nonlinearities by checking the setting of the Test Exciter FILTER TUNING control on the Test Exciter as described below, and then measuring at 70 mc the NPR of the LRC-3 phase lock detector or limiter-discriminator and the 70-mc i-f amplifier as described in Table 5-2 of Section 5.

NOTE

If the NPR requirements cannot be met, check the FILTER TUNING cont rol setting by readjusting the control to obtain the highest NPR reading in the highest frequency baseband slot. Note first the FILTER TUNING control setting, then rotate the control to each side of the tuning range over which the AGC voltage indicated on the monitor meter of the LRC-3 receiver dips, to establish the tuning range. Observe the NPR as the FILTER TUNING control is varied and set FILTER TUNING control for highest NPR in the tuning range. If the NPR requirements still cannot be met after normal alignment of the LRC-3 receiver drawer, slightly readjust the frequency of the VHF Oscillator for best NPR.

n. Upon completion of the intermodulation test, remove the test cables and restore all connections to their normal configuration. If further testing through the receiver cabinet or of the receiver subassemblies is required, proceed to the applicable tests given below.

3.3.3.4.1.2 Receiver Cabinet Intermodulation Testing. This operational check utilizes the diplexer filter and LRC-3 cabinet r-f

cabling when checking the LRC-3 receiver cabinet. It should be noted that both LRC-3 receiver drawers are disabled during this test. Each receiver drawe r should be individually checked (following the procedures given in paragraph 3. 3. 3. 2. 4. 1. 1) before proceeding to the LRC-3 receiver cabinet check. In this way, the down-time for the LRC-3 receiver can be kept to a minimum. The effect of the stub tuner setting on the diplexer filter pass band and the resulting FM distortion are measured in this test.

a. Disconnect the baseband output cables from both LRC-3 phase lock receiver chassis. Combiner pilot tones should operate to shut off both combiners.

b. Disconnect the antenna coaxial lead-in cable from J1 at the top of the LRC-3 cabinet.

C. Connect an r-f signal lead from the RF OUT Jack through the RF ATTEN Jacks (both signal functions on Maintenance Test Facility Test Panel) to J1 (r-f input Jack) located on the top of the LRC-3 receiver cabinet to be tested.

d. Make adjustments on Channel A as specified in the LRC-3 receiver alignment procedures. Perform the noise loading tests given in paragraph 3. 3. 3. 4. 1 and in Section 2 of the White Noise Test Set instruction book.

e. Repeat the noise power ratio test and the adjustment performed in step e for Channel B.

f. After making certain that the LRC-3 cabinet passes all operating checks satisfactorily, disconnect the r-f test cable from the Maintenance Test Facility. Reconnect the antenna coaxial lead-m cable to J1 an the top of the LRC-3 receiver cabinet.

g. Observe that both phase lack receivers lack-in and that AGC is present in the two receivers. Reconnect the baseband output cables to J1 on the phase lock receivers of the Channel A and B receiver drawers.

h. Verify that the pilot tone alarm lights go out, and that the excess noise alarm lights are operating properly, indicating that the receiver has been restored to normal operating condition.

3. 3. 3. 4. 1. 3 **Receiver Limiter-Discriminator and Phase Lock Intermodulation Test. - Refer to figure 3-8 for the proper connections needed to** test **the LRC-3 receiver phase lock and discriminator chassis.**

a. **Adjust the attenuator so that a signal level of 0.3 to 4 vac is** supplied from the 70 **MC** OUT **jack** (Test Exciter **70-mc signal) to J2 of the LRC-3 phase lock chassis or J1 of the LRC-3 discriminator chassis. Either chassis can be checked with this setup.**

NOTE

If the required r-f output level cannot be obtained, disconnect the deviator r-f output plug, P1, **from the sideband load and connect to a Kay attenuator pad with a short length of coaxial cable. Insert approximately 15 db attenuation in this pad and** connect **the output from this pad through a length of coaxial cable to pad connected to** the **phase lock or limiter-discriminator chassis with another short** length of **coaxial** cable as **shown in figure 3-8.**

b. Set up for a noise loading test as specified in Section 2 **of the White Noise** Test **Set operating instructnon manual.**

c. **Adjust the Noise Generator output attenuators until the noise input voltage, V_i, applied to TP4 on the insertion amplifier corresponds to the values calculated from the expressions of step 1 in paragraph 3. 3. 3. 4. 1. 1**

d. **Make a noise loading check on the phase lock chassis as described in Section 2 of the White Noise Test Set instruction book and compare with the standard established for this unit in the LRC-3 modification kit instruction procedures.**

e. **Perform the adjustments if needed to obtain the required NPR in the LRC-3 phase lock chassis as specified in the alignment procedures for the subassembly in the LRC-3 instruction manual. (Operate switches on attenuator to provide the best input level for the phase lock chassis and thus obtain optimum NPR conditions.)**

NOTE

If the required NPR cannot be obtained, refer to Section 5, Table 5-2, steps 12 and 13 to check the Test Exciter deviator and isolate the cause of the nonlinearity to the Test Exciter deviator or the LRC-3 unit.

3.3.3.4.1.4 70-Mc I-F Amplifier NPR Test.-

a. Make certain that the LRC-3 phase lock chassis or limiter-discriminator chassis is operating properly as tested in the paragraph above. Then reconnect the 70-mc coaxial cable (Test Exciter deviator) to J1 on the i-f amplifier located in the LRC-3 receiver drawer, and reconnect the i-f amplifier output cable from J2 to the phase lock or discriminator chassis.

b. Insert 10 db of additional attenuation in the 70-mc coaxial line (Test Exciter deviator). The 70-mc signal level input to the LRC-3 i-f amplifier should be less than -4 dbm.

c. Make a noise loading check on the i-f amplifier as described in Section 2 of the White Noise Test Set instruction book for the noise loading calculated in step 1 of paragraph 3. 3. 3. 4. 1. 1. If the required NPR cannot be obtained, perform the adjustments needed to obtain maximum NPR with the LRC-3 70-mc i-f amplifier as specified under the alignment procedures in the LRC-3 instruction manual, or the applicable modification kit.

f. When all operating checks on the LRC-3 phase lock and i-f amplifier chassis have been completed, disconnect the 70-mc coaxial cable from the *70* MC OUT Jack on the Test Panel and from J1 on the LRC-3 i-f amplifier.

g. Restore the connections to both the LRC-3 a-f amplifier and the LRC-3 phase lock chassis to their normal operating condition.

3.3.3.4.2 Receiver Frequency Response Test. - This test is not ordinarily part of a routine operation check, however, the baseband frequency response of the LRC-3 receiver should be checked whenever a baseband level variation exists or when the pre-emphasis or de-emphasis networks have been adjusted or detuned.

a. Disconnect the baseband output cable from J1 on the phase lock detector chassis of the LRC-3 receiver drawer. Connect a 75-ohm coaxial cable (with a 75-ohm load) from the output terminal of the AC Voltmeter to the output jack (J1) on the phase lock detector chassis.

b. Connect test cables between the LRC-3 receiver and the Maintenance Test Facility as shown in figure 3-9.

e. Adjust the Wide-Range Oscillator to 10 kc, and set the output of the oscillator so that an output level of -24 db from J1 on the phase lock detector or J2 on the limiter-discriminator chassis is Indicated on the AC Voltmeter. Measure and record the input level to the Test Exciter from the oscillator. This level should be held constant and used as a reference during the frequency-response test.

NOTE

The pre-emphasis network used in the Test Exciter insertion amplifier must be for the same number of channels as the de-emphasis network in the receiver. Otherwise both networks should be bypassed.

d. Set the frequency of the Wide-Range Oscillator to those frequencies specified for the baseband being used. Adjust the output level of the oscillator to the proper reference input level specified in step c.

e. Measure the output from J1 on the phase lock detector or J2 from the limiter-discriminator chassis at each frequency for the reference level of the input specified in step c.

f. After the frequency response test has been completed, compare with standard to establish whether requirements have been met. Then restore the receiver to its original operating condition. Reconnect the baseband output cable to J1 on the phase lock detector or to J2 on the limiter-discriminator chassis for normal operation.

g. To test the frequency response of Channel B, repeat steps a through f.

3.3.3.4.3 Receiver Threshold Test. - Before performing the following tests, allow the RF Signal Generator and the Frequency Selective Voltmeter to warm up for at least one-half hour

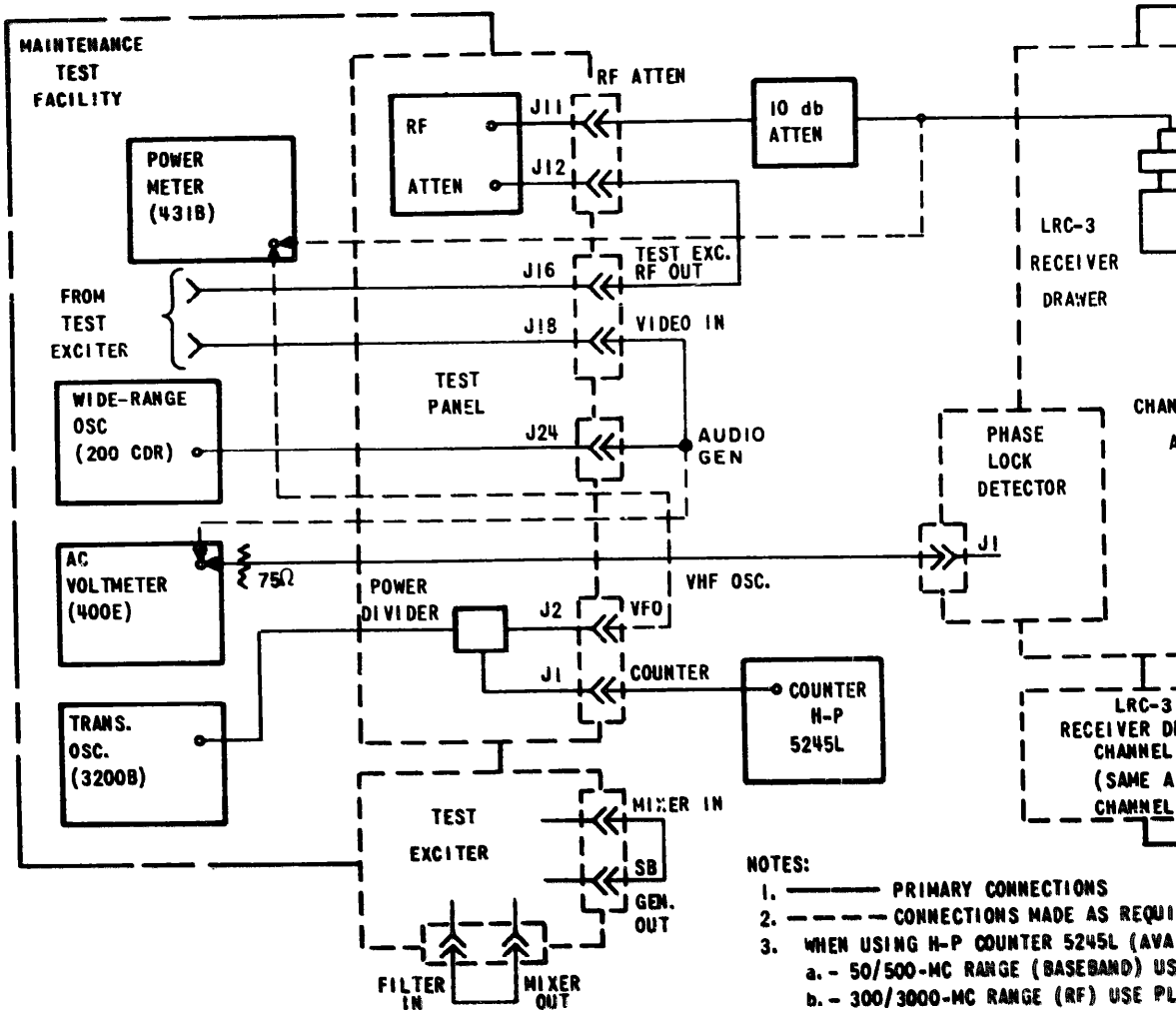


Figure 3-9. LRC-3 Receiver Frequency Response Test, Cable Conne

a. Depress pushbuttons LINE and F.F and FM on the RF Signal Generator and adjust the output level to approximately -40 dbm. Set the FREQUENCY RANGE selector switch to the 1.7 to 2.3-Gc range.

b. Connect test cables between the Maintenance Test Facility and the LRC-3 receiver cabinets as shown in figure 3-10. Before making connections on the LRC-3 receiver record the lock voltages present at TP2 or the crossover voltage at TP3 on the limiter-discriminator chassis from received signals. Disconnect first the multiplex output lead to the combiner at J1 on the LRC-3 phase lock chassis to prevent interference to traffic being handled.

c. Verify that the pilot tone alarm light on the front panel of the LRC-3 combiner drawer lights. This light indicates that Channel A is disconnected from the LRC-3 receiver cabinet multiplex output.

d. Adjust the frequency of the RF Signal Generator until a dip in AGC voltage occurs and the voltage measured at TP2 on the LRC-3 phase lock chassis is equal to the voltage obtained from the receive signal, or a 70-mc deviator signal of the channel under test. For receivers using a frequency discriminator, set the RF Signal Generator to produce the same discriminator crossover voltage at TP3 that is obtained with a receive signal. If this voltage is not known, insert a 70-mc deviator signal into the discriminator of the channel under test.

NOTE

The AGC voltage on the LRC-3 receiver drawer will dip when the RF Signal Generator is tuned to the receiver frequency.

e. Depress the EXTERNAL FM MODULATION pushbutton of the RF Signal Generator to the ON position.

f. Set the output control of the Wide-Range Oscillator to approximately one-fourth of the over-all signal output. Adjust the oscillator frequency to the pilot channel frequency of 66, 182, or 330 kc (.608 of the top baseband frequency for the receiver being tested).

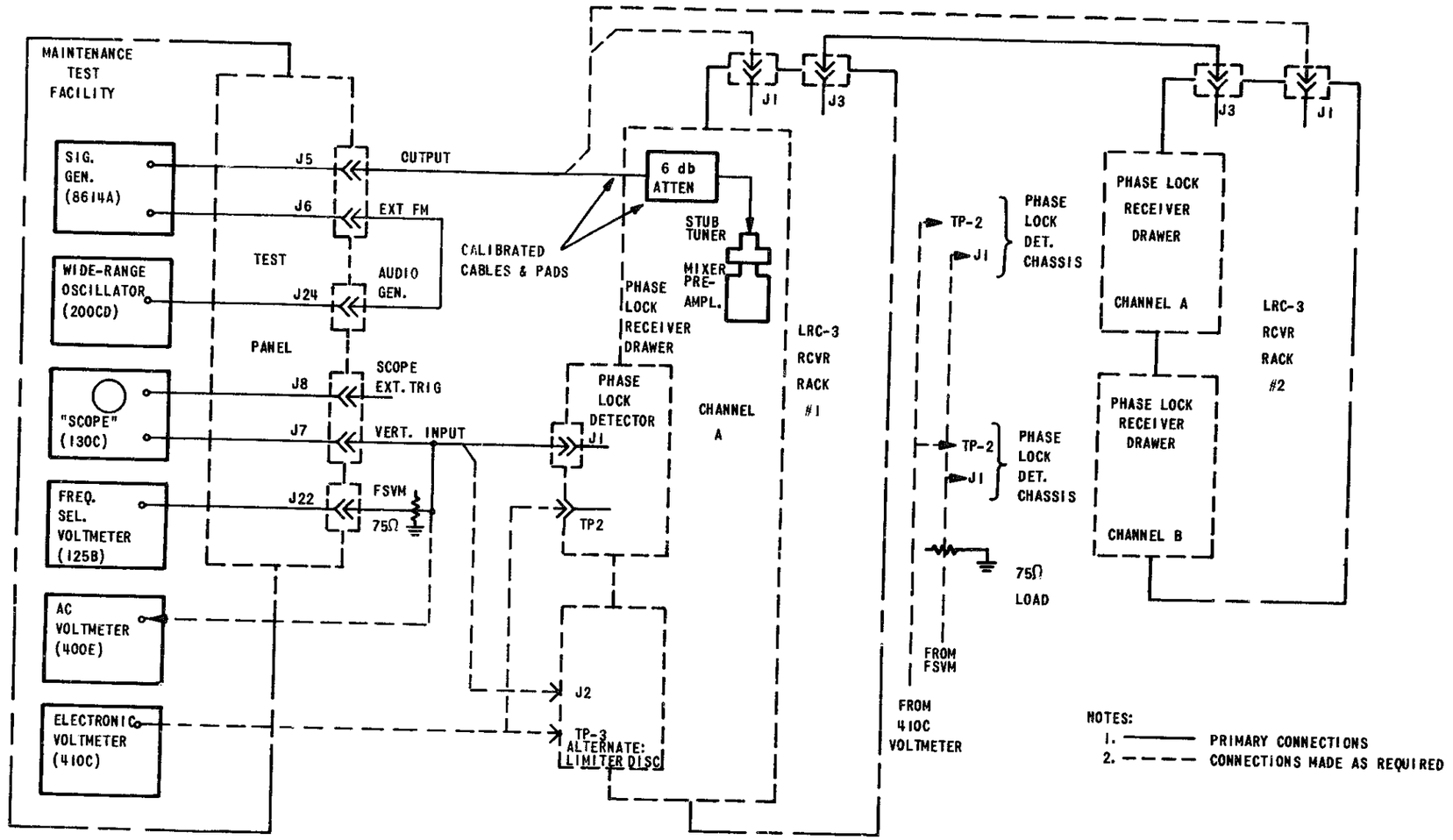
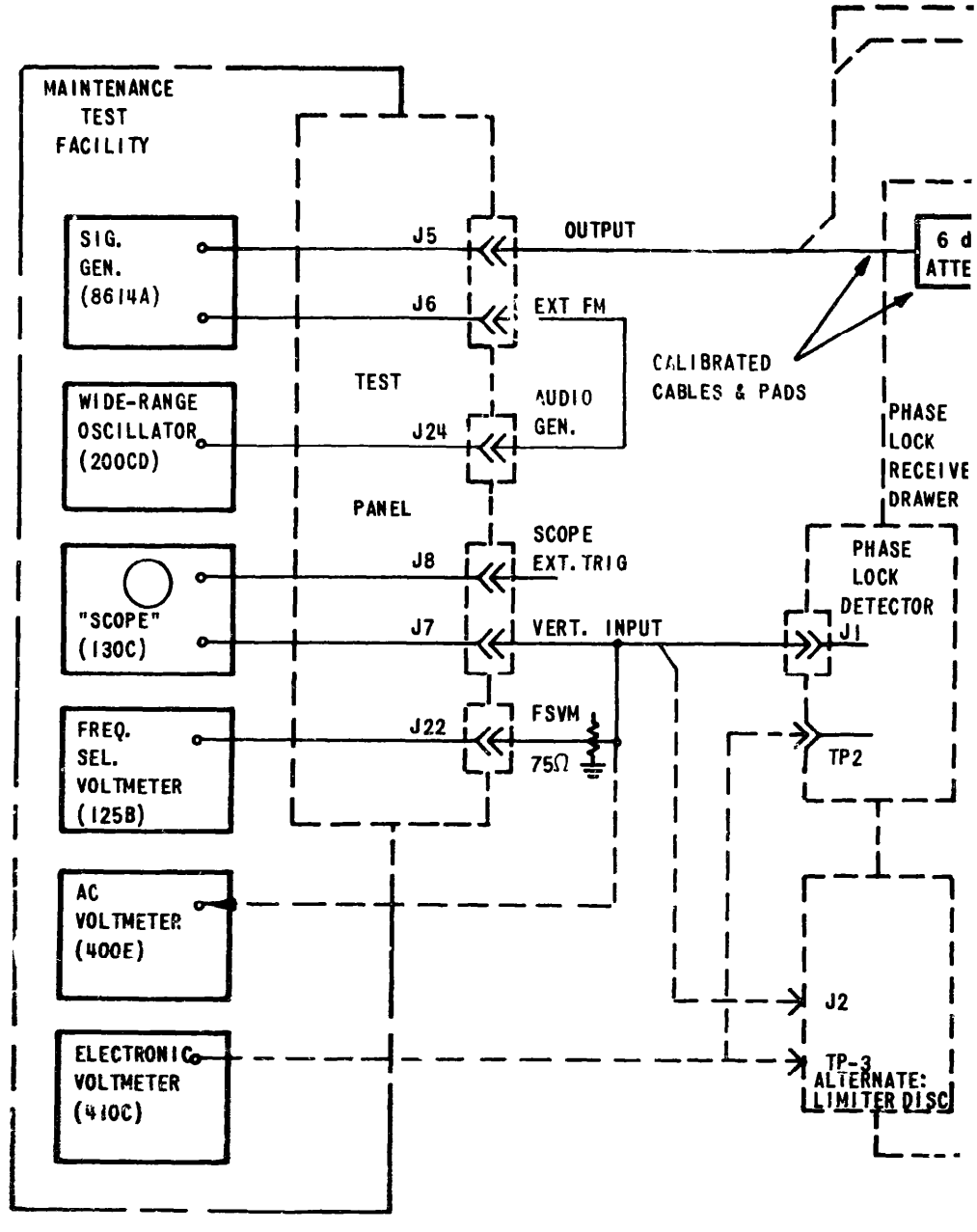


Figure 3-10. LRC-3 Receiver Threshold Check and Signal-to-Noise Check, Cable Connections


MAINTENANCE
TEST
FACILITY
SIG.
GEN.
(8614A)
WIDE-RANGE
OSCILLATOR
(200CD)
"SCOPE"
(130C)
FREQ.
SEL.
VOLTMETER
(125B)
AC
VOLTMETER
(400E)
ELECTRONIC
VOLTMETER
(410C)
J5
OUTPUT
J6
EXT FM
TEST
AUDIO
GEN.
J24
PANEL
SCOPE
EXT. TRIG
J8
J7
VERT. INPUT
J22
FSVM
75Ω
CALIBRATED
CABLES & PADS
6 d
ATTE
PHASE
LOCK
RECEIVE
DRAWER
PHASE
LOCK
DETECTOR
J1
TP2
J2
TP-3
ALTERNATE:
LIMITER DISC

Tune the Frequency Selective Voltmeter, set **at the 2500-cps** selector switch position, for maximum response to the demodulated tone being sent from the LRC-3 phase lock detector chassis. The output from the phase lock detector chassis must be terminated in a 75-ohm load.

Adjust the Wide-Range Oscillator until the oscillator output level shown on the Frequency Selective Voltmeter (connected to J1 on the phase lock detector chassis) reads -24 db or the baseband level which represents 0 db for the multiplex system.

Set the ATTENUATOR dial on the RF Signal Generator to 0 dbm and measure the r-f output power at OUTPUT Jack on the Test Panel, using the Power Meter. Record the correction which must be added to or subtracted from the RF Signal Generator ATTENUATOR dial to give the correct r-f output at OUTPUT Jack.

Measure and record losses in test cables and attenuators using the **Power** Meter and the RF Signal Generator. Add 30 db and add (or subtract) the correction from step i to obtain the total correction factor, which must be added to the **RF** Signal **Generator** ATTENUATOR dial **to** obtain the r-f level in dbw at the input to the LRC-3 Receiver.

Measure and record signal (with modulation as set in step h) and noise (with modulation signal lead disconnected) on the FSVM at each r-f level listed.

l. **Plot the S/N ratio as a function of r-f input to the receiver and record the threshold as the point where the S/N curve drops 1 db from the straight-line portion of the S/N curve above threshold.**

N O T E

When the coaxial cable length is short, the cable losses can be included as part of the actual generator output by calibrating the rf at the output of the cable with the Power Meter. Where long cable runs to an antenna tower are involved, the cable losses should be determined separately as indicated in the data sheet chart.

m. When the receiver threshold test has been completed, continue to the signal-to-noise check. If this check is not required, reconnect the antenna r-f cable to the receiver, and reconnect the internal baseband cable to J1 on the phase lock detector of the LRC-3 receiver drawer.

n. Repeat this general procedure to measure the threshold value for the Channel B receiver drawer, the threshold value through the receiver diplexer and cabinet, or the threshold value from the antenna through the receiver cabinet, as required.

3. 3. 3. 4. 4 Receiver Signal-to-Noise Check. - Use the procedure given under the Receiver Threshold Check to set up the equipment, and also to calibrate the r-f losses of the coaxial cable (figure 3-10). Calculate the r-f input level needed to give the signal-to-noise ratio required at the input to the receiver, taking into account all coaxial cable and attenuator losses.

a. Adjust the ATTENUATOR control on the RF Generator to provide an r-f input level of -66 dbw at the input to the LRC-3 receiver.

b. Set the Wide-Range Oscillator modulator and the Frequency Selective Voltmeter to the baseband frequency at which the signal-to-noise measurements are to be made.

C. Adjust the Wide-Range Oscillator to provide reference test tone level output from the receiver. Record the oscillator output for reference.

NOTE

If the reference (zero) dbm test tone level for the receiver is unknown, the level can be found by feeding a 70-mc signal from the test deviator (modulated to the specified frequency deviation at the required baseband frequency) into the i-f amplifier. For 182-kc deviation, the level of the tone fed in of the VIDEO IN Jack on the Test Panel should be 9.6 mv. For 144-kc deviation, the tone input should be 7. 7 mv.

d. Adjust the ATTENUATOR control on the RF Generator to provide the r-f signal level to the LRC-3 receiver that is

required for measuring signal-to-noise ratio taking into account the signal generator, r-f attenuator, and cable losses.

e. Verify that the baseband output level corresponding to zero dbm or the reference test tone level is still shown on the Frequency Selective Voltmeter, then turn the modulation selector switch on the RF Signal Generator to CW.

f. Observe and record the Frequency Selective Voltmeter reading of step e, and compute the signal-to-noise ratio using the chart given below. Record and compare this ratio to the standard given in test specifications for this receiver.

NOTE

If the signal-to-noise ratio cannot be met, refer to the LRC-3 receiver instruction manual and applicable alignment procedures supplied in connection with the modification kits.

SIGNAL-TO-NOISE CORRECTION FACTORS

____db Noise Level (Level in step f)

____db Signal Level (Level in Step c)

____db Difference

-. 8 db Correction from Frequency Selective Voltmeter Bandwidth of 2. 5 to 3. 0 kc

____db Flat "Weighted

+3 db Correction to F1A

____db S/N F1A

g. Repeat this general procedure to measure the signal-to-noise ratio for other receiver drawers, the signal-to-noise ratio through the receiver diplexer and cabinet, or the signal-to-noise ratio from the antenna through the receiver cabinet, as required.

3.3.3.5 LRC-3 Drawer and Miscellaneous Electronic Assembly Checks - Perform the following checks.

3.3.3.5.1 LRC-3 Receiver, Exciter, **or Combiner Drawer Assembly Checks.** - **The** Maintenance Test Facility **contains auxiliary power** supplies, **consisting of the Main Power Supply** and the Combiner Power Supply, which **furnish input power to any individual** drawer in the LRC-3 exciter or receiver, **with the exception of the power amplifier drawer.** Thus servicing of a **drawer assembly is possible when it is removed from the** LRC-3 **rack. Test cables with fanning strips provide convenient connections to the receiver, exciter, or combiner drawer assemblies. The proper procedures are as follows:**

a. **Set the power switches on the auxiliary power supplies and the drawer under test to the OFF position.**

b. **Use a combiner test cable (part number 461-4850) to test a combiner drawer, and a receiver/exciter test cable** (part number **461-4851) to check an exciter or receiver drawer.**

C. **Connect the fanning strip** from **the test cable to TB1, located at the rear of the drawer under test. Connect the a-c input plug of the test cable to the a-c socket on the drawer under test. In the receiver exciter test cable, two leads are not tied to the fanning strip. These leads should be connected as follows:**

Lead	Voltage	Receiver TB1 Connection	Exciter TB1 Connection
Orange	+150v	Terminal 9	Terminal 10
Yellow	+28v	Terminal 10	Terminal 9

d. **Connect the test cable plug to the appropriate Jack on the Maintenance Test Facility Test Panel.**

e. Turn the **power switches of the desired auxiliary power** supply and the drawer under **test to the ON** position.

NOTE

The power switches of both the drawer and the power supply must be turned on since the a-c input of each power **supply is interlocked with the drawer under test.** This **prevents the power supply from being operated without the proper load requirements.**

f. **Perform the** necessary alignment and test procedures **directed in the LRC-3 exciter and receiver technical manuals.**

3.3.3.5.2 Miscellaneous Electronic Assembly Checks - The auxiliary power supplies (Main power Supply and Combiner Power Supply) contained in the Maintenance Test Facility can also be used to furnish input power to electronic assemblies other than the complete LRC-3 exciter, receiver, or combiner drawers. An auxiliary power cable adapter (Part number 368-42263 or 368-42264) can be used in conjunction with an exciter/receiver test cable (part number 461-4851) or a combiner test cable (part number 461-4850) respectively and the power supply itself to furnish this power. Each adapter consists of a barrier strip which is connected to the fanning strip of either the exciter/receiver or combiner test cables. Lead connections to this barrier strip are made as required, to provide input power for the various assemblies under test.

NOTE

When either of the auxiliary power supplies is used to supply power to an assembly other than an exciter, receiver, or combiner drawer, it may be necessary to add external resistors to provide the proper loading requirements.

The proper procedures for testing electronic assemblies are as follows:

a. Set the power switch of the power supply associated with the electronic electronic assembly to the OFF position.

b. Obtain the proper test cable to be used with the electronic assembly and connect the fanning strip from the test cable to the barrier strip of the associated auxiliary power cable adapter.

c. Lead connections to the barrier strip will be made as required, to provide input power for the various assemblies under test.

d. The barrier strip connections for the Main Power Supply and the Combiner Power Supply are as follows:

(1) Main Power Supply (Adapter 368-42263)

Terminal	Connection
1	A-C Line Input
2	A-C Line Input
3	-6.3V } at 8.0 amp max
4	-6.3V } at 8.0 amp max
5	+6.3V } at 8.0 amp max
6	+6.3V } at 8.0 amp max
7	+200V } at 100 to 300 ma.
8	+200V } at 100 to 300 ma.

Terminal	Connection
Orange Lead	**+150V** at 55 **to** 70 **ma.**
Yellow Lead	**+28V** at **750 mai max**
11	Ground
12	Ground

NOTE

The +200 volt supply and the +150 volt supply each require the minimum load specified in order to obtain good voltage regulation. The +200 volt supply requires a minimum load of 100 ma. To set up the +150-vdc portion of the Main Power Supply, adjust potentiometer R22 until V7 (an OA2 regulator tube) is Just fired with its normal load. When the +150 volt supply is not being used, operate switch S2 to shut off the power to the regulating circuitry.

(2) Combiner Power Supply (Adapter 368-42264)

Terminal	Connection
1	**A-C Line** Input
2	A-C Line Input
3	6.3 Vac at 10 amp max.
4	6.3 Vac at 10 amp max.
5	Open
6	Ground
7	**+300V** at 500 ma/ max.
8	+100V at 60 ma/**max.**
9	**-250V at 60 ma/ max.**
10	**Ground**
11	**Ground**

e. Connect the test cable plug to the appropriate jack on the Test Panel of the Maintenance Test Facility.

f. Connect the ac plug of the auxiliary power **supply cable** (connected to terminals 1 and 2 of the barrier strip) to the ac socket of the 120 vac power input cable (contained in combiner or exciter receiver test cable).

g. Turn the power switch of the desired auxiliary power supply to the ON position.

h. Perform the necessary alignment and test procedures directed in the LRC-3 exciter and receiver technical manuals.

3. 3. 3. 6 Radio Set LRC-3 Back-to-Back Test. - The following test checks the back-to-back performance of an LRC-3 station receiver with its exciter.

The first **translation mixer in the, Test Receiver is used to translate the frequency of the station exciter to that of a station receiver. R-F connections should be made at the LRC-3 receiver and exciter drawers being tested to avoid interrupting traffic.**

a. **Observe and record the lock voltage from received signals at TP2 on the phase lock detector chassis or the crossover voltage ant TP3 on the limiter-discriminator chassis of the LRC-3 receiver drawer.**

b. **Turn the power switches on the front panels** of the Test Exciter **and the LRC-3 exciter and receiver** drawers to the ON position. **and check** to see that all lights **are lit.**

c. **Set the TEST RCVR/EXC FUNCTION switch on the** Test Panel of the Maintenance Test Facility to **the RCVR position. Turn the power switches of the Power Meter, VHF Oscillator, and the AC Voltmeter to the ON position. Observe that all power lights are lit. that BLOWER FAILURE light is out, and that the Test Exciter DEVIATOR light is out.**

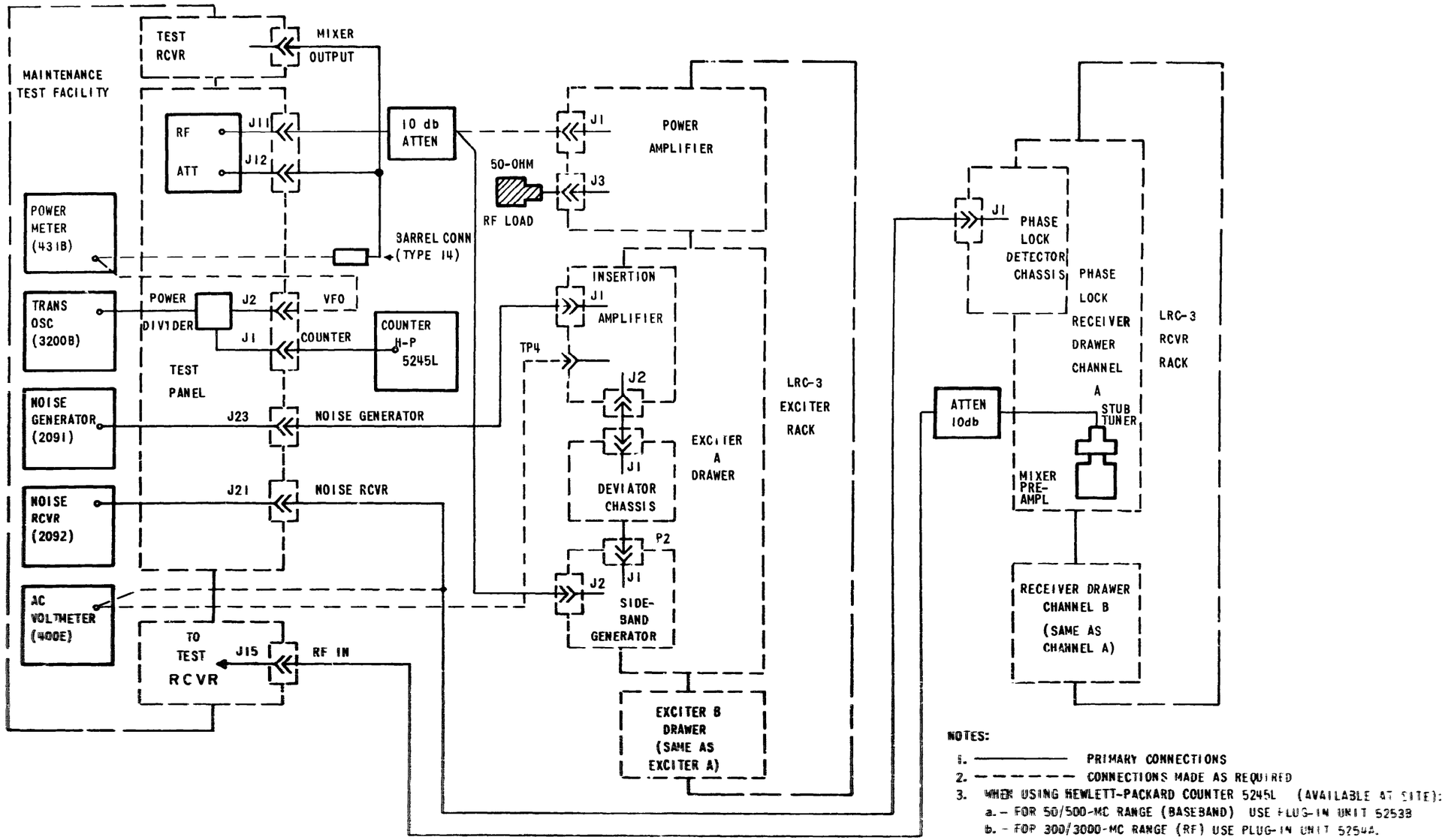
d. **Disconnect the baseband output cable from J1 on the phase lock detector chassis of the LRC-3 receiver drawer.**

e. **Connect test cables between the Maintenance Test Facility and the LRC-3 exciter and receiver as shown in figure 3-11.**

f. **Disconnect the coupling loop (W8) from the PRE-AMP IN and MIXER OUTPUT jacks located on the front panel of the Test Receiver. Connect a coaxial cable (RG-8) from the stub tuner (attached to the mixer preamplifier) of the LRC-3 phase lock receiver drawer) to the RF IN jack of the Test Panel. Also connect a coaxial cable (RG-8) from the MIXER OUTPUT jack on the Test Receiver panel to one RF ATTEN jack. Connect a coaxial cable from the other RF ATTEN jack (through a 10 db pad) to the sideband generator output on the LRC-3 exciter drawer.**

g. **Set the FILTER TUNING control on the Test Receiver front panel to the frequency indicated for the station LRC-3 receiver. (See filter calibration chart providedfor the Test Receiver.)**

h. **Adjust the VHF Oscillator, using H-P counter 5245L (available at site), to translate (beat) the station exciter frequency to the frequency of the station receiver. The required oscillator injection frequency can be calculated from the following relation:**



NOTES:

1. ———— PRIMARY CONNECTIONS
2. – – – – – – – CONNECTIONS MADE AS REQUIRED
3. WHEN USING HEWLETT-PACKARD COUNTER 5245L (AVAILABLE AT SITE):
   a. – FOR 50/500-MC RANGE (BASEBAND) USE PLUG-IN UNIT 5253B
   b. – FOR 300/3000-MC RANGE (RF) USE PLUG-IN UNIT 5254A.

Figure 3-11. Radio Set LRC-3 Back-to-Back Test. Cable Connections

$$f_l = f_1 = f_r$$

or

$$f_l = f_r = f_t$$

where f_l = required frequency of VHF Oscillator in mc

f_t = frequency of station exciter in mc

f_r = frequency of VFO station receiver in mc

i. Check the power output of the VFO (VHF Oscillator) with the AC Voltmeter at the VFO output Jack on the Test Panel Adjust the slide attenuator on the back of the VHF Oscillator until it signal level of 1. 1 vac (+14 dbm) is obtained.

j. Remove the test exciter output cable from the MIXER OUTPUT Jack on the Test Receiver front panel, and connect it to the Power Meter (using a Type 14 barrel connector). Adjust the RF ATTEN on the Test Panel until an output level of approximately -1 dbm is indicated on the Power Meter Set up the White Noise Test Set for 182-kc rms deviation per channel Calculate the proper noise voltage needed at TP4 on the insertion amplifier chassis of the Test Exciter, using the equations in paragraph 3. 3. 3. 3. **1,** step j.

K. While performing the noise check in **Section 2** of the White Noise lest Set instruction book, readjust the FILTER **TUNING control on the Test Receiver front panel so that the response curve of** the bandpass filter **is centered. To check the setting of the FILTER TUNING control,** turn **this control in either directnon until the AGC voltage shown on the monitor meter (on the LRC-3 receiver** front panel) rises abruptly. **This indicates that the edge of the pass-band selectivity curve has been reached. Adjust the FILTER TUNING control for best NPR of this tuning range. If NPR requirements cannot be met slightly readjust the frequency of the VHF Oscillator for best NPR**

l The first mixer in the Test Receiver has now been set to translate the frequency of the LRC-3 station exciter to the frequency of the LRC-3 station receiver. This arrangement makes possible two additional back-to-back tests of the station equipment

m. When all tests have been completed, turn off all power switches and restore all equipment to its normal operating condition.

3. 3. 4 Stopping the Equipment

Set all the power switches to the OFF position to shut off the Maintenance Test Facility. This is essentially the reverse of the procedure specified in paragraph 3. 3. 2.

SECTION 4

THEORY OF OPERATION

4.1 GENERAL

This section contains a functional description of the Maintenance Test Facility (Philco Part No. 367-1693) as a unit, or system. The theory of operation of individual assemblies is limited to the Test Exciter, Test Receiver, Test Panel, Power Distribution, and Combined Power Supply Assemblies, which are described on a block diagram level. A discussion of these assemblies is necessary since there are no separate instruction manuals for them, For the theory of operation of any other test equipment assembly housed in the Maintenance Test Facility, refer to the instruction manual for the assembly.

4.2 FUNCTIONAL DESCRIPTION

4.2.1 General

The Maintenance Test Facility is a self-contained test facility designed to monitor equipment performance characteristics and to facilitate the basic system testing and alignment of Philco Model LRC-3 microwave exciters and receivers, or similar type radio equipment operating in the 1.7- to 2.4-Gc frequency range.

The facility contains a Test Exciter, a Test Receiver, and standard items of commercial test equipment required for normal system testing and alignment. In addition, it includes power supplies to furnish input power for any individual drawer in an LRC-3 exciter or receiver. The facility also incorporates a Test Panel, which provides input and output connections, as required, for the appropriate test equipment, as well as coaxial attenuators and test points.

See figure 4-1 for a simplified block diagram of the Maintenance Test Facility. Standard LRC-3 subassemblies are used wherever possible in the Test Exciter and Test Receiver to simplify servicing.

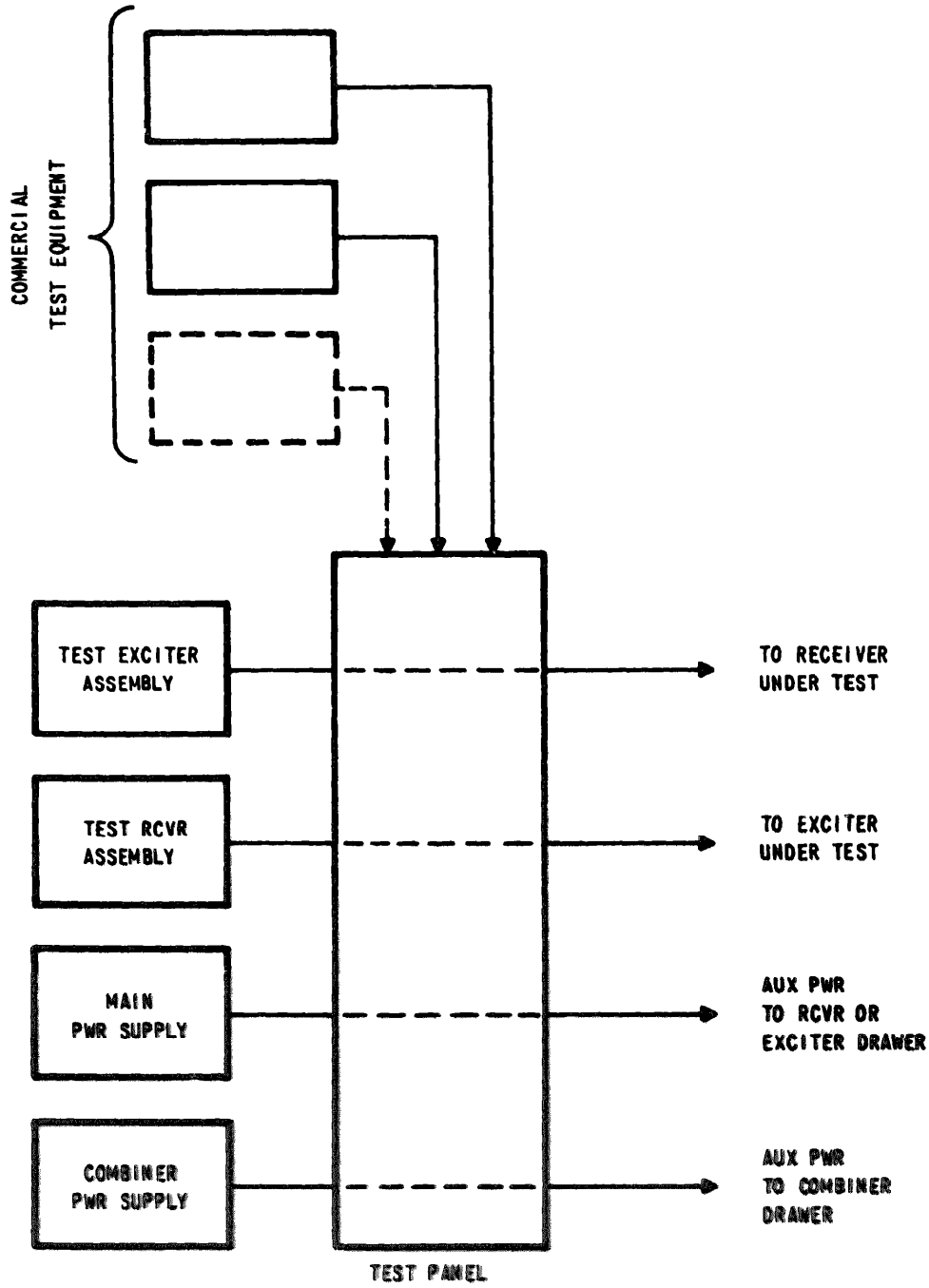


Figure 4-1. Maintenance Test Facility. Simplified Block Diagram

4.2.2 Test Exciter and Test Receiver, **Block Diagram Description**

'The main elements of the Maintenance Test Facility are the Test Exciter and Test Receiver assemblies.

The Test Exciter assembly is used to test LRC-3 receivers operating in the 1.7- to 2.4-Gc frequency range. It enables the technician to make alignment and system tests such as meter-modulation distortion measurements and baseband frequency response checks. These tests may he performed at either the r-f or the 70-mc 1-f frequencies. The Test Exciter basically consists of a deviator (operating at 70 mc), followed by two heterodyne mixers which translate this signal to the frequency of the receiver under test.

The Test Receiver is used to test LRC-3 exciters operating in the 1.7- to 2.4-Gc frequency range. It enables the technician to make alignment, intermodulation, and frequency-response checks. These checks may be performed at the r-f or 70-mc i-f frequencies. The dual-frequency capability makes possible the isolation of **de-**fective **r-f subassemblies** in **the LRC-3** exciter.

4.2.2.1 Test Exciter - The Test Exciter (figure 4-2) employs the standard LRC-3 exciter frequency conversion scheme for translating the 70-mc FM signal to the 2-Gc band. A standard LRC-3 type deviator, local oscillator, and sideband generator make up this stage. The 70-mc signal can be translated over a range of frequencies in the 2-Gc band, without having to change the frequency of the LO (local oscillator) or sideband generator, by beating this signal with a VFO (variable frequency oscillator) signal in a second mixer and using a tunable bandpass filter to select the required mixer product. The VFO frequency can be varied over a frequency range of 10 to 500 mc.

The 70-mc deviator is the same as that used in the LRC-3 exciter. When the Maintenance Test Facility is in the RCVR mode, the test deviator is disabled by removing its +200 vdc supply voltage.

The four-section tunable bandpass filter can be tuned to select either the sum or difference frequency, making it possible to translate the output signal over a wide band of frequencies in the 2-Gc band. The output-signal level from the test exciter is approximately -25 dbm

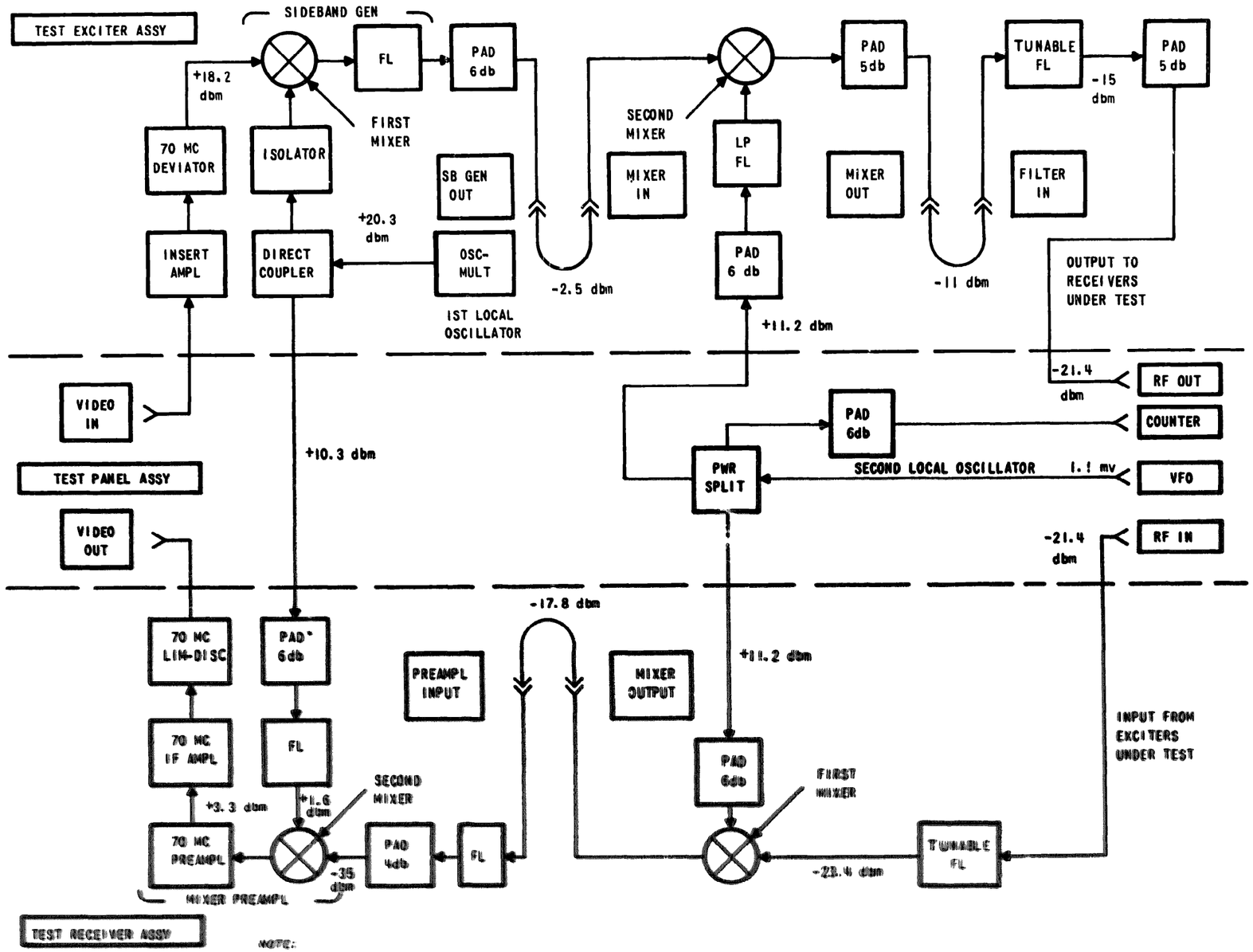


Figure 4-2. Block Diagram of Test Exciter, Test Receiver and Test Panel Assemblies

due to losses incurred in the second mixer stage. This signal level is lower than the usual output for a standard LRC-3 exciter drawer, but it is high enough for the alignment and testing of LRC-3 receiver drawers. (Typical r-f levels are shown in figure 4-2.)

4. 2. 2. 2 Test Receiver. - The Test Receiver, shown in figure 4-2, contains a basic fixed-frequency LRC-3 receiver consisting of an LRC-3 mixer-preamplifier, a 70-mc i-f amplifier, and a limiter-discriminator chassis. A frequency translation mixer, which precedes this part of the over-all receiver, translates signals in the 2-Gc frequency range to the particular fixed frequency of the LRC-3 receiver stage following it. A local VFO (variable frequency oscillator) signal is beat against the incoming signal to translate it to the value required for the particular fixed-frequency stage. The VFO frequency can be varied over a frequency range of 10 to 500 mc.

The limiter-discriminator is a standard LRC-3 discriminator, which is interchangeable with the units employed in the LRC-3 equipment. A plug-m arrangement an the limiter-discriminator chassis permits external selection of a 60- or 120-channel de-emphasis network. To obtain a 24-channel system, it is only necessary to remove the 120-channel de-emphasis network and put a 24-channel de-emphases network in its place.

A standard 120-channel LRC-3 i-f amplifier with a nominal bandwidth of 8 mc is employed for all installations, as FM linearity is an important requirement for this receiver and no threshold extension is required.

The four-section, tunable bandpass filter can be tuned to select either the sum or difference frequency, making it possible to translate a wide range of input signal frequencies to the particular fixed frequency of the receiver. Since losses are incurred in the translation mixer, the input level to the receiver should be no lower than -9 dbm (approx) to insure a satisfactory signal-to-noise ratio. This inpu -signal level is well below the output power of +7 dbm (approx) available from the sideband generator in an exciter drawer, but is higher than that for a standard LRC-3 receiver.

4. 2. 3 Power Distribution and Combined Power Supply Assemblies

4. 2. 3. 1 Power Distribution. - The primary power for the Maintenance Test Facility is obtained from a 120-volt, 60-cps power source rated at 16 amperes (figure 4-3). Two circuit breakers, located on the test panel, control the power supplied to the individual circuits. The first circuit breaker, with a 15-ampere capacity, controls the main power input to all the equipment located in the Maintenance Test Facility. The normal current drawn from this line is about 11 amperes. The second circuit breaker, rated at 5 amperes, controls the main power input to the convenience outlets located at the front base of the test facility. The total current drawn from the primary power line is between 11 and 16 amperes depending on the load connected to the convenience outlets. For a complete wiring diagram of the power distribution system, refer to figure 7-4.

4. 2. 3. 2 Combined Power Supply Assemblies

4. 2. 3. 2. 1 Power Supply Assembly (368-419973. - The Power Supply Assembly (figure 4-3) contains four power supplies which provide operating voltages of +200 vdc, +150 vdc, +28 vdc, and 6.3 vdc for the Test Exciter and Test Receiver assemblies. The TEST RCVR/EXC FUNCTION switch controls all four power supplies. When this switch is in the OFF position, no primary power is applied to the Power Supply Assembly. When the switch is turned to the EXC, RCVR, or RCVR/EXC position, primary power is applied to the assembly, and the Test Receiver is energized along with portions of the Test Exciter circuitry. When the function switch is in the EXC or RCVR/EXC position, +200 vdc is supplied to the 70-mc deviator assembly.

4.2.3.2.2. Auxiliary Power Supplies. These supplies provide power for testing an LRC-3 drawer assembly when it is removed from its rack. The auxiliary power supplies consist of two supplies,

namely, the Main Power Supply and the Combiner Power Supply (figure 4-3). The Main Power Supply furnishes power for an LRC-3 receiver or exciter drawer, while the Combiner Power Supply provides power for a combiner drawer. Note that the a-c input of each supply is interlocked with the drawer under test. This precaution is taken to prevent damage to the power supplies resulting from operation without the proper load. In particular the 200-vdc portion of the Main Power Supply requires a load of 100 to 300 ma.

These auxiliary power supplies can also be used to provide power to assemblies other than the complete receiver, exciter or combiner drawers (see paragraph 3. 3. 3. 5. 2).

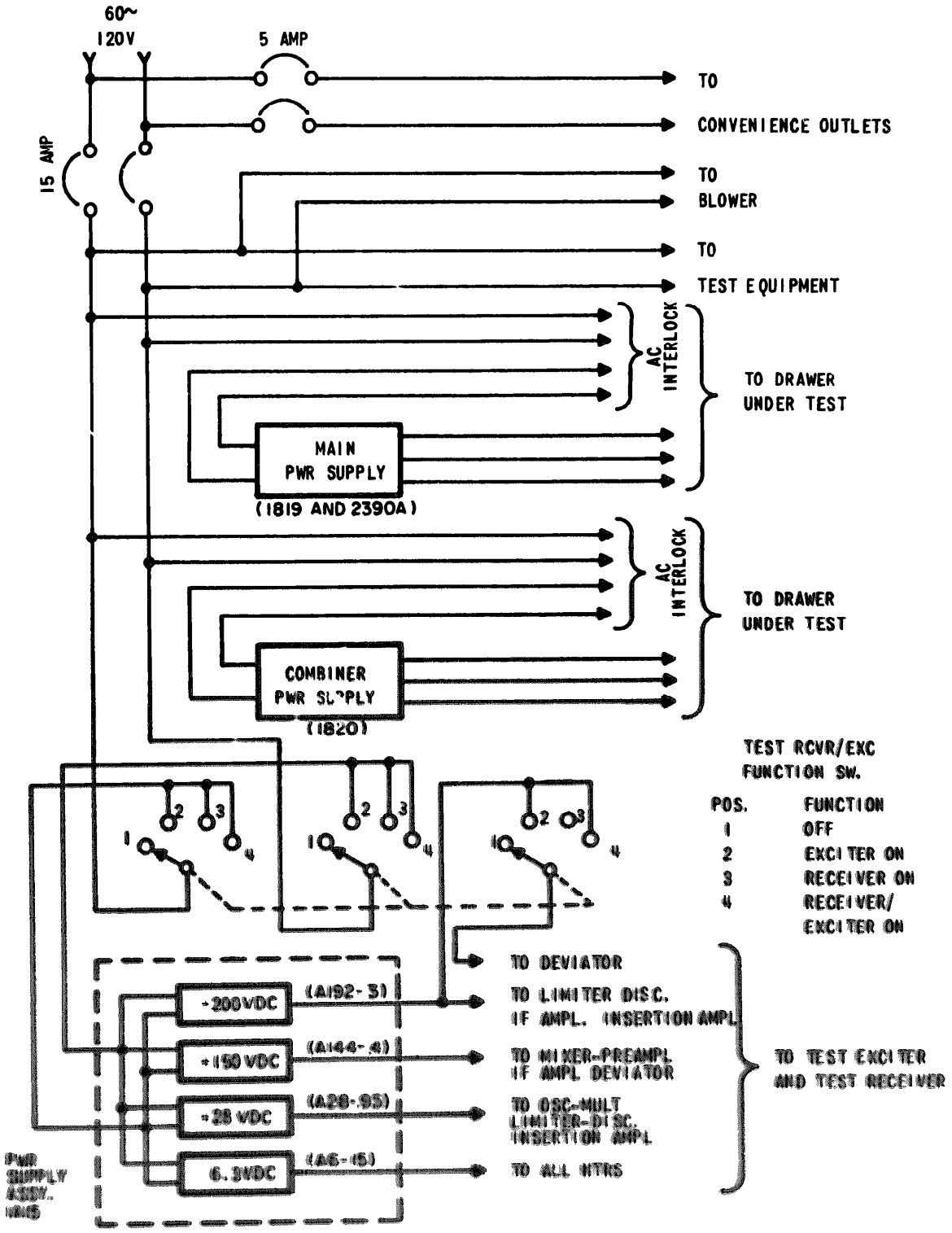


Figure 4-3. Block Diagram of Power Distribution System and Combined Power Supply Assemblies

SECTION 5

MAINTENANCE

5. 1 GENERAL

This section contains information on preventive maintenance, adjustment and alignment, and trouble shooting of the Maintenance Test Facility as a unit. For maintenance instructions concerning a particular test equipment assembly of the Maintenance Test Facility, refer to the manual for that assembly.

Before attempting any maintenance on the equipment, maintenance personnel should have a thorough knowledge of the equipment as described in Section 1 (Introduction), Section 3 (Operating Instructions), and Section 4 (Theory of Operation).

5.2 TEST EQUIPMENT REQUIRED

The Maintenanct Test Facility contains all the items of test equipment required to perform normal depot maintenance and alignment testing of the Test Exciters and Test Receivers with the exception of the Frequency Counter (Hewlett-Packard 5245L), UHF Noise Source (Hewlett-Packard 349A), and the Noise Figure Meter (Hewlett-Packard 342A) which are available at the site. To use the Maintenance Test Facility for these purposes, refer to the instruction manuals for the equipment under test.

5.3 PREVENTIVE MAINTENANCE

Table 5-1 contains a list of recommended preventive-maintenance routines. These maintenance tasks are to be performed as required. For additional maintenance information, refer to the instruction manuals for the test equipment.

TABLE 5-1. PREVENTIVE MAINTENANCE ROUTINES

ITEM	PROCEDURE
Completeness	Check to see that all test equipment and accessories are complete (tables 1-1 and 1-2), and that all instruction manuals and calibration charts supplied with the Maintenance Test Facility are present (table 1-3).
Cleanliness	Remove dirt, grease, and any other foreign matter using a clean, lint-free cloth (or a soft-bristle brush). If necessary, moisten the cloth with an authorized cleaning solvent. WARNING Before cleaning the interior of the equipment, disconnect the input power cable.
Rust and Corrosion	Inspect all surfaces for evidence of rust or corrosion, remove any rust or corrosion and touch up surface with authorized paint.
Damage	Inspect all surfaces for dents and scratches. Inspect all cables, connectors, terminals, clamps, fasteners, controls, indicator lamps, and hardware for looseness and damage.
Operational Performance	Test the operational performance of the equipment, refer to paragraph 5-5. (Check tubes every 3 months so that the amount of down-time will be kept to a minimum.)

TABLE 5-1 PREVENTIVE MAINTENANCE ROUTINES (Cont)

ITEM	PROCEDURE
Blower Motor Assembly	The blower motor in the Maintenance Test Facility contains lubricant adequate for 6 months of operation. Add 10 drops of light machine oil (or electric motor oil) to the motor cup once each month after the initial 6-month period has expired.
Air Filter	Clean the air filter, when necessary, in detergent and hot water. After the filter has been cleaned and dried thoroughly, spray it with lightweight oil.

5.4 ADJUSTMENT AND ALIGNMENT

5.4.1 General

The maintenance adjustment procedures given in paragraph 5.4.2 through 5.4.3.3 pertain only to the Test Exciter and Test Receiver assemblies of the Maintenance Test Facility. Adjustment and alignment procedures required for the remaining assemblies (test equipment) of the Maintenance Test Facility are given in the manuals for those equipments. Complete depot-level adjustment and alignment procedures for the Test Exciter and the Test Receiver subassemblies, such as the insertion amplifier and deviator, are given in the LRC-3 Tropospheric Scatter Exciter and Receiver manuals and in the modification kit alignment procedures. The following adjustment procedures for the Test Exciter and the Test Receiver are performed after any operation involving the repair, replacement, or modification of any integral unit. These procedures are also performed if for any reason the Test Exciter or Test Receiver does not conform satisfactorily to the initial operational checks given in Section 3 of this manual. See note in paragraph 3.4.3 about test cables.

5.4.2 Test Exciter Adjustments

The portion of this procedure concerning the tunable, filter adjustment requires a Receiver (LRC-3 or Test Receiver drawer) having known linearity (NPR) characteristics in order to check the filter adjustment. Connect equipment cables between the Test Exciter and LRC-3 or Test Receiver drawer as shown in figure 5-1 to make the following tests.

5.4.2.1 Power-Supply Adjustment. - To adjust the power supply, proceed as follows:

a. Turn the MAINT FACILITY PWR switch (CB2) to ON, and the TEST RCVR/EXC FUNCTION switch to EXC (both switches on Test Panel of Maintenance Test Facility). Operate the power switches of the RF Signal Generator, Power Meter, VHF Oscillator, Noise Generator, Noise Receiver, and AC Voltmeter to ON. Observe that all power lights are lit, that BLOWER FAILURE light is out, and that Test Exciter DEVIATOR light is lit.

b. Observe whether the values indicated on the Test Receiver MONITOR meter fall within the tolerances specified for the selector switch positions. If the values are not within tolerance, adjust the associated potentiometers to obtain the required value. The potentiometers are located on the power supply modules of the Test Facility power supply chassis behind the Test Panel. (Para 5.4.3.1c)

5.4.2.2. Insertion Amplifier Padding Adjustment. - The Maintenance Test Facility tests LRC-3 equipment having a maximum capacity of 24, 60, or 120 channels. To perform the padding adjustment, proceed as follows

a. Adjust the variable attenuators on the Noise Generator until the noise input voltage (applied to J6 at the input to the insertion amplifier chassis) reaches a value of 22 mv across 75 ohms. This noise output voltage specification is for systems having a maximum capacity of 120 channels. On systems having a maximum capacity of 60 channels, an input level of 19.2 mv across 75 ohms is required, and for systems of 24-channel capacity, a noise input voltage level of 12.5 mv is required Adjust the attenuators on the Noise Generator until this value is indicated on the AC Voltmeter at the VIDEO IN jack on the Test Panel

b Refer to the deviator sensitivity data for the deviator chassis in the Test Exciter drawer Calculate the noise voltage input (V_i) that will be required at TP4 of the deviator chassis (Test Exciter)

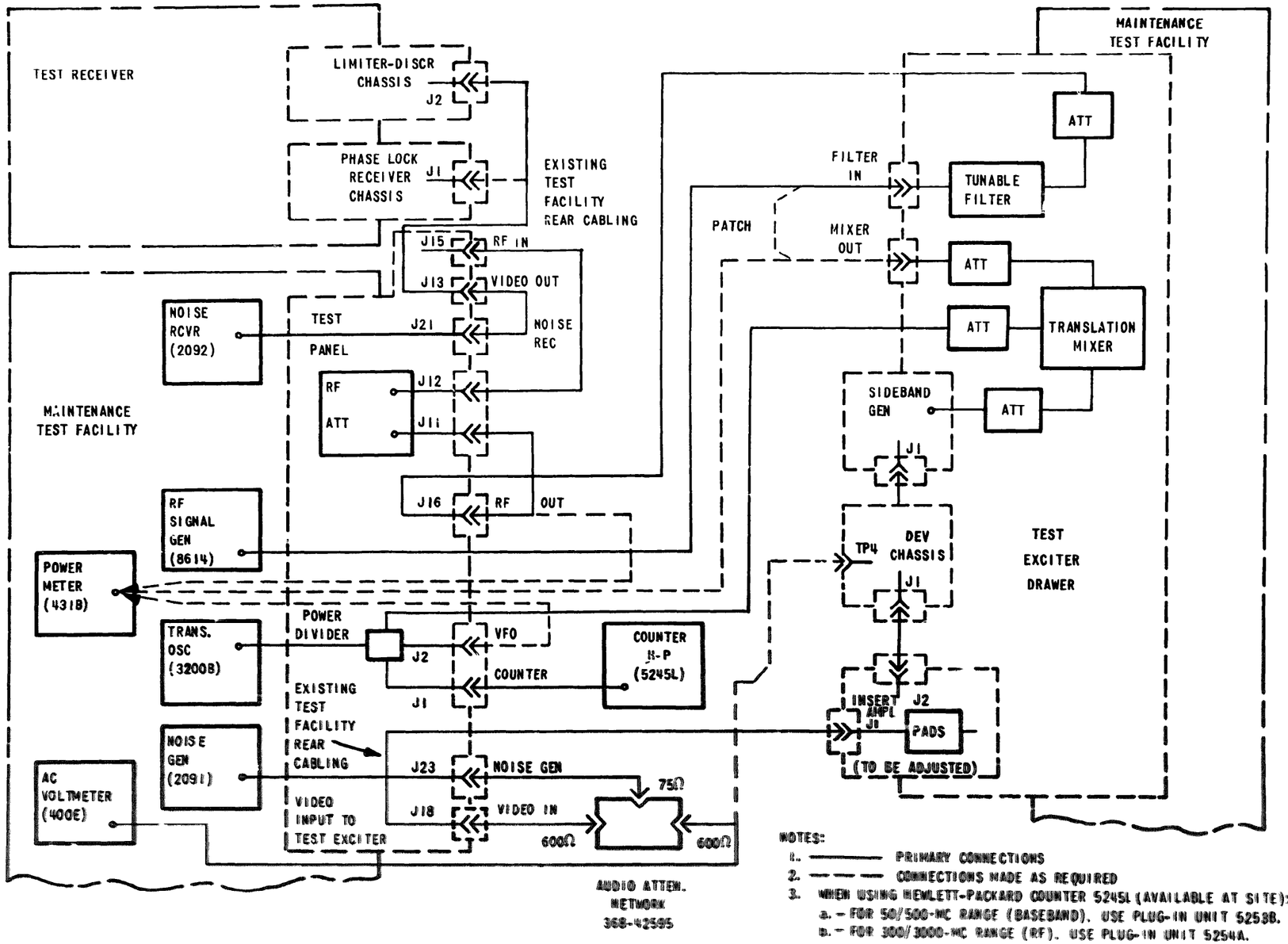


Figure 5-1. Insertion Amplifier Padding Adjustment and Tunable Filter Adjustment, Cable Connections

Use the formula that applies to maximum loading for the system plan.

For 120 channels:

$$V_{i1} \text{ (in volts)} = \frac{2.32 \times 0.182}{D}$$

(For 182-kc deviation, V_{i1} is 1 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 60 channels.

$$V_{i2} \text{ (in volts)} = \frac{2.02 \times 0.182}{D}$$

(For 182-kc deviation, V_{i2} is 2 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

For 24 channels:

$$V_{i3} \text{ (in volts)} = \frac{1.68 \times 0.182}{D}$$

(For 144-kc deviation, V_{i3} is 6 db below DEV SENSITIVITY value given in millivolts on deviator test data sheet.)

where D = deviation sensitivity of the deviator in **mc/volt given on tag or *data* furnished with deviator.**

NOTE

If the deviation sensitivity of the deviator is unknown, refer to paragraph 3.3.3.3.2 of this manual for the proper method of measuring deviator sensitivity.

c. When the noise input voltage (specified in step a, of paragraph 5.4.2.2) is applied to J6 of the insertion amplifier chassis, the proper attenuation must be selected (by connecting pads located in the input section of the insertion amplifier), in order to obtain the noise voltage level specified in step b at TP4 of the deviator chassis.

5.4.2.3 Local Oscillator (LO) Signal Level Adjustment. - To perform this adjustment, proceed as follows:

a. Calculate the highest Injection frequency at which the VHF **oscillator (3200B) will be set to translate the signal from** the **sideband generator to the frequency of the receiver according to the relation:**

$$f_1 - f_{SB} - f_R \text{ (or } f_R - f_{SB})$$

where f_R **-the frequency of the known reciver**

f_{SB} **the frequency of the output signal from the** sideband generator

f_1**- the frequency of the signal required from the** VHF Oscillator

b. **Set the VHF Oscillator to the required injection frequency (f_i) with Helett-Packard frequency** counter 5245L (available at site) **Check the output of the oscillator at the VFO output Jack** on **the Test Panel** with the Power Meter. Adjust the output of the **oscillator until the Power Meter** indicates an output level of 1.1 vac.

C. **Measure the VFO** signal level **at** the LO i**nput** to the translation mixer. The LO signal level at t**his point should be 3 ±2 dbm.**

d. If the LO signal level is outside **of this range, change the value** of the VFO input as required to **obtain an LO signal level of approximately +3 dbm. A different value LO attenuator pad may be substituted, if available.**

5.4.2.4 Tunable Filter Adjustment **- Use the same test equipment (including the receiver drawer with known NPR characteristics) shown in figure 5-1 to perform the following tests.**

a. **Set the FILTER TUNING control on the Test Exciter front panel for the desired frequency, as specified by the tunable filter chart located on the Test Exciter front panel.**

b. Connect the Power Meter to the RF OUT Jack on the Test Panel, and measure the power output at this point. The power output should be -24 +3 dbm. If the measured power at the MIXER OUT jack differs by-more than 3 db from -24 dbm change the attenuation in the pad located at the output of the tunable filter.

C. Set the RF ATTEN on the Test Panel to provide a power output level of approximately -38 dbm at the output end of the cable that connects to the stub tuner in the LRC-3 receiver drawer.

NOTE

When the Maintenance Test Facility Test Receiver is employed for checking the NPR of the Test Exciter, it will be necessary to set the variable RF ATTEN on the Test Panel to provide an r-f level of approximately -25 dbm at the RF IN jack on the Test Panel. This level is required to overcome the losses and noise of the translation mixer that will cause a high NPR residual in the 534-kc baseband slot in the noise loading test.

d. Connect the noise filter in the White Noise Test Set for the maximum channel capacity that the Maintenance Test Facility will be required to test.

e. Measure the NPR (noise/power ratio) through the system (including a receiver drawer with known linearity characteristics) for the noise voltage level at TP4 OR the deviator chassis (Test Exciter), as specified in step b of paragraph 5.4.2.2. The value of the NPR measured should be 56 db or more for all slots on test facilities containing 24 and 60 channels and 54 db or more for test facilities containing 120 channels.

NOTE

If the NPR requirements cannot be met because of filter tuning misalignment, note and record the setting of the FILTER TUNING control on the Test Exciter front panel, before readjusting the FILTER TUNING control to obtain the optimum NPR indication on the Noise Receiver. Rotate

the FILTER TUNING control to each edge of the tuning range where the receiver AGC voltage dips, then tune the FILTER TUNING control within the range for maximum NPR. In addition, tune the Test Receiver FILTER TUNING control for best NPR following the above procedure. The required NPR **should be obtained for a filter setting near the center of the tuning range.**

f. Upon completion of the filter tuning adjustment, record the filter setting, remove the test cable between the Teat Receiver and Test Exciter, and restore the Maintenance Test Facility connections to their normal form.

5.4.3 Test Receiver Adjustments

5.4.3.1 Power Supply Adjustment. - To **perform this adjustment, proceed as follows:**

d. **Check blower motors on Maintenance Test Facility for normal operation and air flow.**

b. Set the MAINT FACILITY PWR circuit breaker on the Test **Panel** to the ON position; **verify** that the power indicators on the Test Receiver drawer, Test Exciter drawer, and test equipment are lit.

c. Observe that the monitor meter on the Test Receiver indicates the proper d-c voltages as l**isted below. If any voltage is not** within the tolerance specified, **adjust the associated potentiometer located on** the power s**upply modules of the Maintenance Test Facility power supply chassis located behind the Test Panel.**

1. 200 ± 10 vdc (A192-.3)

2. 150 ± 7.5 vdc (A144-.4)

3. 28 ± 1.4 vdc (A28-.95)

Ncte: VOLTAGE ADJUST control R4 used to set output voltages on individual power supply.

d. Set the TEST RCVR/EXC FUNCTION switch on the Test Panel to the RCVR position.

5.4.3.2 Local Oscillator Drive Adjustment. - To adjust the local oscillator drive, proceed as follows:

a. Turn the meter selector switch on the Test Receiver to the XTAL 1 position; the panel meter on the Test Receiver should indicate a current in the range of 0.6 to 2 ma. (The meter indicates 2 ma full scale.)

CAUTION

If the crystal current exceeds 2.0 ma in this or the next step, turn off the a-c power by setting the MAINT FACILITY PWR switch (CB2) to the OFF position. Insert additional attenuation in series with the local oscillator input to the mixer to reduce the crystal current for both switch positions to approximately 1.2 ma.

b. Turn the meter selector switch on the Test Receiver to the XTAL 2 position; the panel meter should again indicate a crystal current in the range of 0.6 to 2 ma.

c. Allow the equipment to warm up for at least 20 minutes to permit the local oscillator to stabilize. If crystal currents are outside the range given, turn off the a-c power, and change the attenuator in series with the local oscillator input to the mixer preamplifier using a value of attenuation that will come the closest to producing an average crystal current of 1.2 ±0.3 ma in the XTAL 1 and XTAL 2 positions after the equipment temperature has stabilized.

CAUTION

Do not attempt to change attenuators with the power applied to the receiver drawer as transient voltages without oscillator drive may damage the crystals.

5.4.3.3. I-F Drive to Limiter-Discriminator. - To perform this adjustment, proceed as follows:

a. Connect equipment cables as shown in figure 5-2.

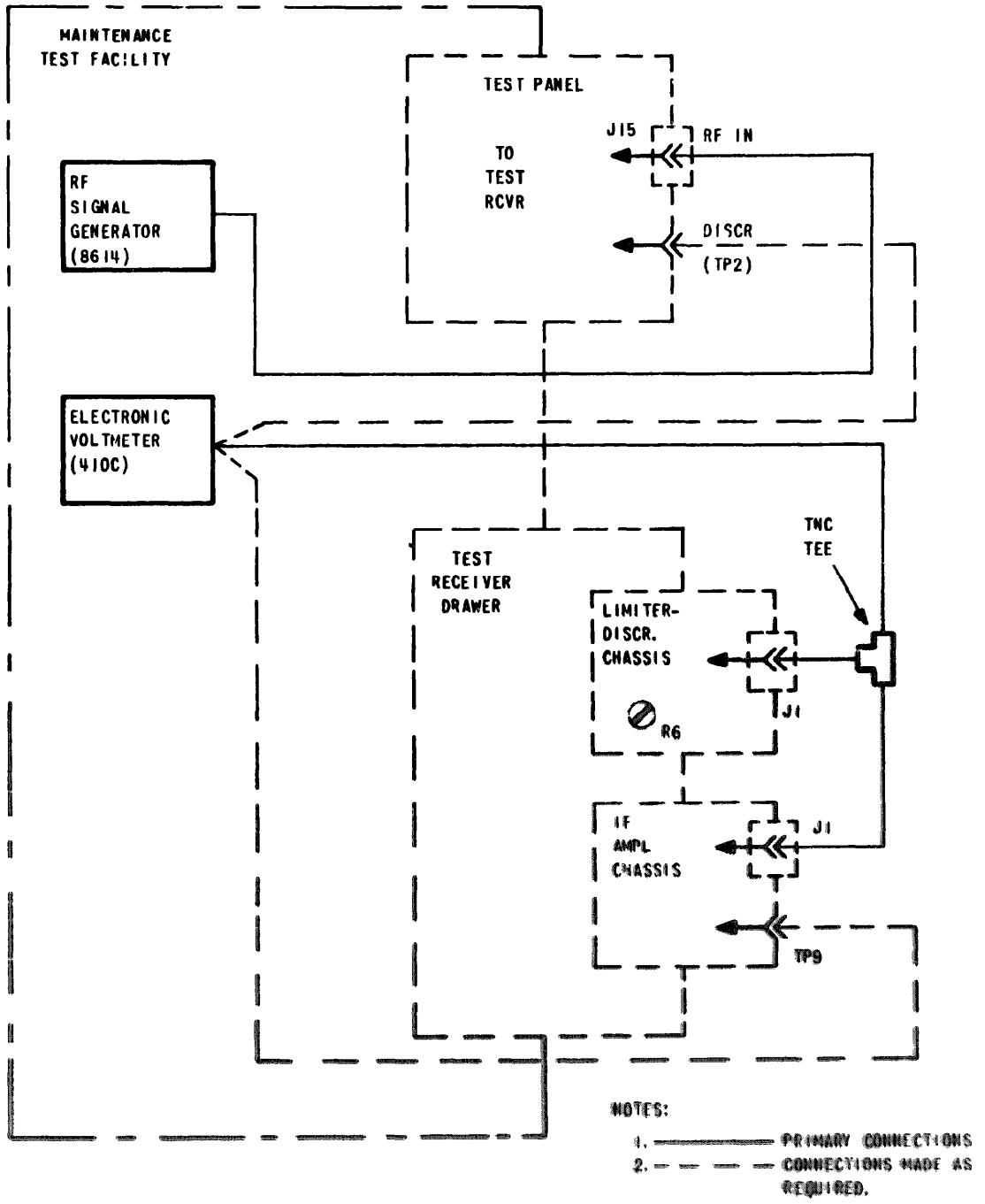


Figure 5-2. Drive to Limiter-Discriminator Check, Cable Connections

b. Turn the TEST RCVR/EXC FUNCTION switch to the RCVR/EXC position and set the MAINT FACILITY PWR switch (CB2) to the ON position (both switches on Test Panel of Maintenance Test Facility). Operate the power switches of the RF Signal Generator and Electronic Voltmeter to the ON position, and allow the equipment to stabilize for at least 20 minutes.

c. Using the Electronic Voltmeter, check the output of the RF Signal Generator at the RF IN jack located on the Maintenance Test Facility Test Panel. Adjust the RF ATTEN on the generator until the voltmeter indicates an r-f output level of -25 dbm.

d. Connect the Electronic Voltmeter to the DISCR test point on the Test Panel. Adjust the frequency of the RF Signal Generator to the Test Receiver frequency by tuning for zero d-c crossover voltage as indicated on the Electronic Voltmeter.

e. Using a TNC Tee-connector, measure and record the i-f drive with the Electronic Voltmeter (with r-f probe) connected to the input to the limiter-discriminator chassis. The voltage should he between 0.3 and 0.4 volt ac.

If the r-f voltage measured is outside this range, adjust the AGC potentiometer (R6) located on the limiter-discriminator of the Test Receiver until 0.35 volt ac is indicated on the Electronic Voltmeter.

g. Operate the RF ATTEN control on the RF Signal Generator to vary the signal level at the RF IN jack on the Test Panel over the range from -25 to -40 dbm. Observe the values of this varying voltage on the Electronic Voltmeter.

h. The a-c voltage (at TNC Tee) at the input (J1) to the limiter-discriminator chassis should hold within the range of 0.3 to 0.4 volt ac as the RF ATTEN dial is operated over the range specified above.

i. Record the AGC voltage indicated on the Test Receiver front panel monitor METER for RF input levels of -25, -30, and -40 dbm at the RF IN jack on the Test Panel. Compare these readings with previous data contained on test data sheets furnished with the Maintenance Test Facility for any evidence of receiver degradation. The readings should not differ by more than 2 volts dc from the previous readings for a -40 dbm input.

5.4.3.4 Filter Tuning Adjustments. - Connect the equipment test cables to the Maintenance Test Facility as shown in figure 3-4. (An r-f signal in the range of -20 to -25 dbm is applied to the RF IN jack on the Test Panel from the RF OUT Jack on the Test Panel.)

a. Turn the TEST RCVR/EXC FUNCTION switch to the RCVR/EXC position, and set the MAINT FACILITY PWR switch (CB2) to the ON position (both switches on Test Panel of Maintenance Test Facility). Operate the power switches on the Power Meter, VHF Oscillator, Noise Generator, and Noise Receiver to the ON position. (Allow the equipment to stabilize for at least 20 minutes.)

b. Adjust the FILTER TUNING control on the Test Receiver front panel for the desired frequency as specified by the filter tuning chart stored in the accessory compartment of the Test Receiver.

c. Refer to Section 2 of the White Noise Test Set instruction manual, and set up the filters for the maximum number of channels that the Maintenance Test Facility will be required to test.

d. Set the RF ATTEN on the Test Panel for an r-f input level of approximately -24 dbm at the RF IN jack on the Test Panel. Measure the noise/power ratio through the system for 182-kc rms deviation per channel. Refer to paragraph 3.3.3.2, step j to determine the noise voltage levels corresponding to this deviation. The NPR should be 57 db or more for 24- and 60-channel test facilities and 54 db or more for 120-channel systems.

N O T E

If the NPR requirements cannot be met and the residual is high, note the setting of the FILTER TUNING control on the Test Receiver front panel, before re-adjusting it to obtain minimum NPR indication on the Noise Receiver. To do this, center the tunable bandpass filter by rotating the FILTER TUNING control to each edge of the tuning range. This will be indicated by a dip in the AGC voltage as indicated by the MONITOR meter on the Test Receiver front panel. Tune the

FILTER TUNING control within this range for the setting which will provide the best NPR. If NPR cannot be obtained, repeat this procedure for setting the test exciter FILTER TUNING control.

5.5 TROUBLESHOOTING DATA

This paragraph includes performance tests that are to be performed if the Maintenance Test Facility is suspected of improper operation. Additionally, applicable voltage and reference signal level measurements to assist personnel in locating a defective assembly and/or component are included in this subsection.

5.5.1 Performance Tests

The purpose of the operational performancetests, table 5-2, is to check the over-all performance of the equipment. These checks should be performed after the initial installation, after any repair work, and periodically as a preventive-maintenance measure.

Maintenance personnel should perform the Test Exciter-Test Receiver Self-Check performance test first (steps 1 through 5). If the NPR requirements are unsatisfactory, proceed to steps 6 through 9 in order to isolate the trouble in the Test Exciter or Test Receiver drawer. After establishing which assembly is faulty, perform steps 10 through 15 to find the faulty subassembly. Although not stated in the table, the probable cause of trouble may also be *in the* facility harness wiring and distribution buses, or external cabling. See note in paragraph 3.3.3 about test cables.

5.5.2 Voltage Resistance, and Reference Signal Level Measurements

Troubleshooting is limited to identifying the faulty subassembly in the Test Exciter or Test Receiver assemblies. When the trouble is isolated to a particular subassembly, the technician can pin-point the trouble by making voltage and resistance measurements at significant test points (table 5-3). The test points for each subassembly of the Test Exciter or Test Receiver drawers are listed as a group for that assembly (all readings are taken from the test points indicated to ground). The Electronic Voltmeter should be used to take these readings as it has a 10-megohm input and will not load down the circuit.

Various reference signal levels have been established for the Test Exciter and Test Receiver for troubleshooting and maintenance purposes (table 5-4). Refer to figure 4-2 for the exact location of these reference signal levels.

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST EXCITER AND TEST RECEIVER SELF-CHECK (COMPLETE LOOP CHECK)		
1	Connect equipment test cables to the Maintenance Test Facility as shown in figure 3-4.		
2	Turn Test RCVR/EXC FUNCTION switch to RCVR/EXC position, and turn MAINT FACILITY PWR switch (CB2) to ON position. Operate power switches of Power Meter, VHF Oscillator, Noise Generator, and Noise Receiver to ON positions (all switches in Maintenance Test Facility).		
3	Select any frequency from those specified for the Maintenance Test Facility to align VHF Oscillator for this noise check. Adjust output of VHF oscillator until AC Voltmeter indicates an output level of 1.1 volts.		
4	Set FILTER TUNING control on Test Receiver front panel to setting given on chart for the filter, to tune Test Receiver to the selected frequency.		

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
TEST EXCITER AND TEST RECEIVER SELF-CHECK (COMPLETE LOOP CHECK) (Cont)			
5	Refer to Section 2, paragraph 2.5 of White Noise Test Set Instruction manual and paragraph 3. 3. 3. 2 of the manual for details concerning a complete noise test. The noise loading test is made from the VIDEO IN jack (Test Panel} through the insertion amplifier (Test Exciter), 70-mc deviator, SB Gen, translator mixer, RF OUT Jack (Test Panel), to the RF IN Jack (Test Panel), through the tunable filter (Test Receiver), first translation mixer, second translation mixer and preamplifier, 1-f amplifier, limiter-discriminator (Test Receiver, to VIDEO OUT jack on the Test Panel. Adjust the Test Exciter and Test Receiver FILTER TUNING controls for best NPR.	NPR (Noise Power Ratio) for 182-kc deviation of 54 db or more on all slots for the 120 channels, and 56 db or more for 60 and 24 channels. **NOTE** If the NPR test requirements are satisfactory, use the Maintenance Test Facility to test LRC-3 equipment. (Steps 6 through 15 need not be performed.)	Test Exciter or Test Receiver faulty. Perform tests in steps 6 and 7 or 8 and 9 to isolate trouble.
TEST EXCITER DRAWER CHECK			
6	Obtain an LRC-3 receiver drawer that is in good operating condition and has known NPR performance that meets requirements for the Test Receiver channel capacity Connect test cables between Test Exciter		

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST EXCITER DRAWER CHECK (Cont)		
6 (Cont)	and LRC-3 receiver drawer as shown in figure 3-8.		
7	Make a noise loading test as described in Section 2, paragraph 2.5 of White Noise Loading Test Set Instruction manual and in step 5 above, and paragraph 3.3.3.2.	NPR for 182-kc deviation of 54 db or more for 120 channels and 56 db or more for 60 or 24 channels on all slots.	If test requirements can be met, proceed to step 10 and isolate trouble in Test Receiver. if test requirements cannot be met, proceed to step 10 and isolate trouble in Test Exciter.
	TEST RECEIVER DRAWER CHECK		
8	Obtain an LRC-3 exciter drawer that is in good operating condition and meets the Test Exciter drawer NPR requirements. Connect test cables between Test Receiver and LRC-3 exciter drawer as shown in figure 3-5.		
9	Make a noise loading test as described in Section 2, paragraph 2.5 of White Noise Test Set instruction manual and in step 5 above and paragraph 3.3.3.2	NPR for 182-kc deviation of 54 db or more for 120 channels and 56 db or more for 60 and 24 channels.	If test requirements can be met, proceed to step 10 and isolate trouble in Test Receiver. If test

TABLE 5-2. OPERATIONAL **PERFORMANCE TESTS (Cont)**

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST RECEIVER DRAWER CHECK (Cont)		
9 (Cont)			reqrirments cannot be **met,** proceed to step 10 **and isolate** trouble in Test Exciter.
	TEST EXCITER AND TEST RECEIVER SELF-CHECK WITHOUT TRANSLATION MIXERS		
10	After checking Test Exciter and Test Receiver drawers, reconnect both together as shown in figure 5-3 to measure the NPR without the second translation, mixer stage included in either drawer circuit. This loop test will help to further isolate the faulty subassembly in the Test Exciter or Test Receiver drawer.		
11	Refer to Section 2, paragraph 2.5 of White Noise Test Set instruction manual and to step 5 above for instructions concerning a complete noise test. The noise loading test is made from the VIDEO IN jack (Test Panel) through the insertion amplifier (Test	NPR for 182-kc deviation of 54 db or more for 120 channels and 56 db or more for 60 and 24 channels.	If teat requirements can be met, isolate trouble in translation mixer of Test Receiver or Test Exciter depending on the results of step 6 or 8.

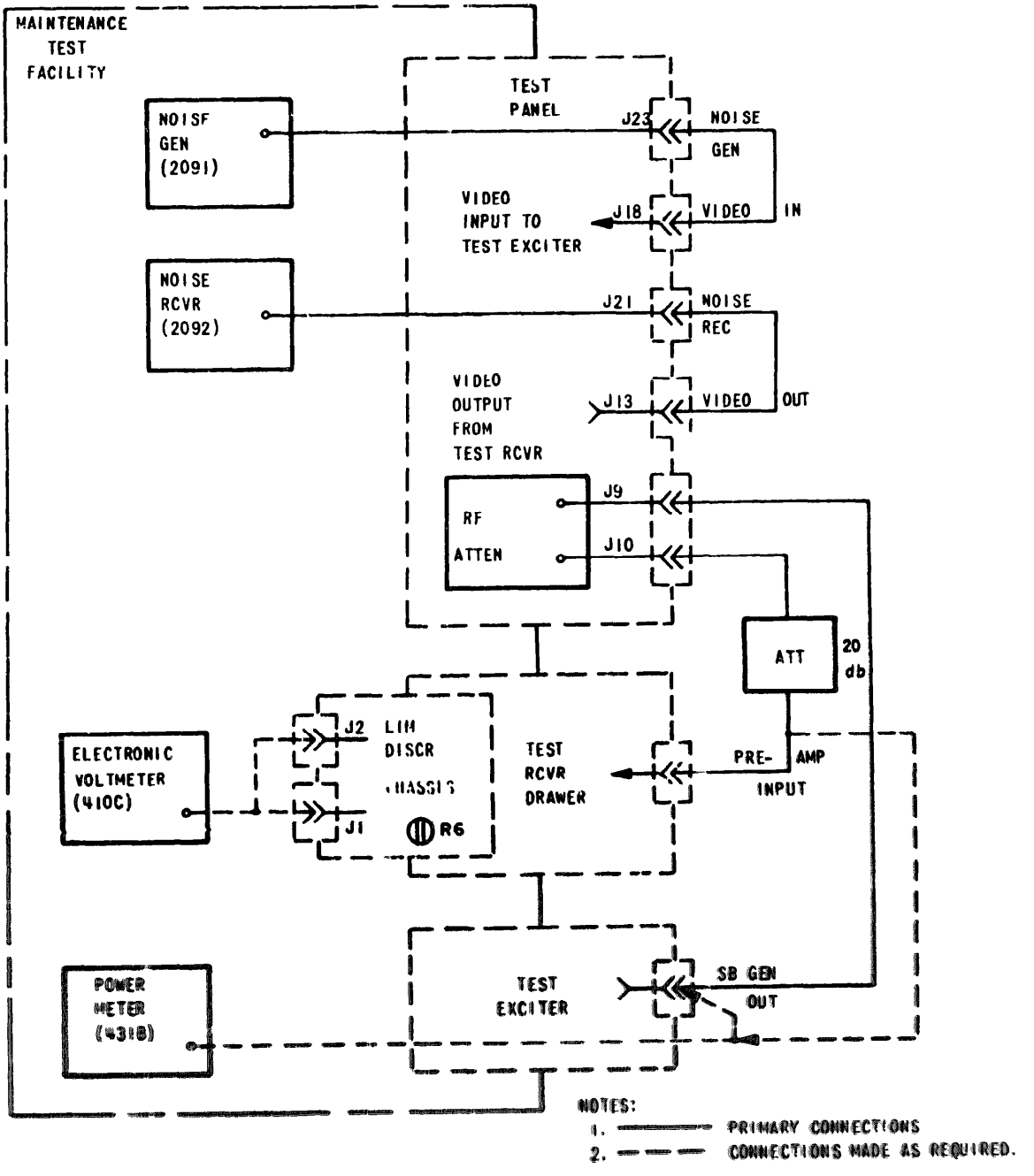


Figure 5-3. Test Exciter-Test Receiver Self-Check (Without Translation Mixer), Cable Connections

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST EXCITER AND TEST RECEIVER SELF-CHECK WITHOUT TRANSLATION MIXERS (Cont)		
11 (Cont)	Exciter), 70-mc deviator, first translation SB generator, SB GEN OUT Jack (Test Exciter) through external attenuator pads of 40 db to PRE-AMP IN Jack (Test Receiver) through the mixer pre-amplifier, i-f amplifier, limiter discriminator (Test Receiver) to VIDEO OUT Jack on Test Panel.		If test requirements cannot be met, proceed to step 12.
	TEST EXCITER AND TEST RECEIVER 70-MC SELF-CHECK		
12	Connect test cables between Test Exciter and Test Receiver as shown in figure 5-4 to measure the NPR at 70 mc.		
13	Refer to Section 2, paragraph 2. 5 of White Noise Test Set instruction manual and to step 5 above for instructions concerning a complete Noise Test. The noise loading test is made from the VIDEO IN jack (Test Panel) through insertion amplifier (Test Exciter), 70-mc deviator, Side Band Load, 70 MC OUT (Test Panel) to 70 MC IN (Test Panel), then through Kay attenuators, i-f amplifier (Test Receiver) limiter-discriminator, to VIDEO OUT	NPR for 182-kc deviation of at least 56 db on all slots for the number of channels required.	If test requirements can be met, isolate trouble in sideband generator, mixer pre-amplifier, or local oscillator and associated components depending on the results

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST EXCITER AND TEST RECEIVER 70-Mc SELF-CHECK (Cont)		
13 (Cont)	Jack on Test Panel. Set Kay attenuators for approximately 10 db attenuation in each pad.		of step 6 or 8. If test requirements cannot be met, bypass the 70-mc i-f amplifier and feed the signal directly into limiter-discriminator as indicated in figure 5-4 at a level of +3 dbm (340 mv) from the deviator; then proceed to step 14.
	NOISE GENERATOR AND NOISE RECEIVER NOISE LOADING CHECK		
14	Connect test cables between Noise Loading Test Set and insertion amplifier in Test Exciter drawer as shown in figure 5-5.		
15	Refer to paragraph 4.6, and paragraph 2.5 of White Noise Test Set instruction manual and to step 5 of this table when making a back-to-back test of Noise Generator and Noise Receiver.	NPR for 20 millivolts of noise at at VIDEO IN jack on Test Panel should be 65 db or better on all slots for the number of	If test requirements can be met, isolate trouble in Test Exciter deviator or

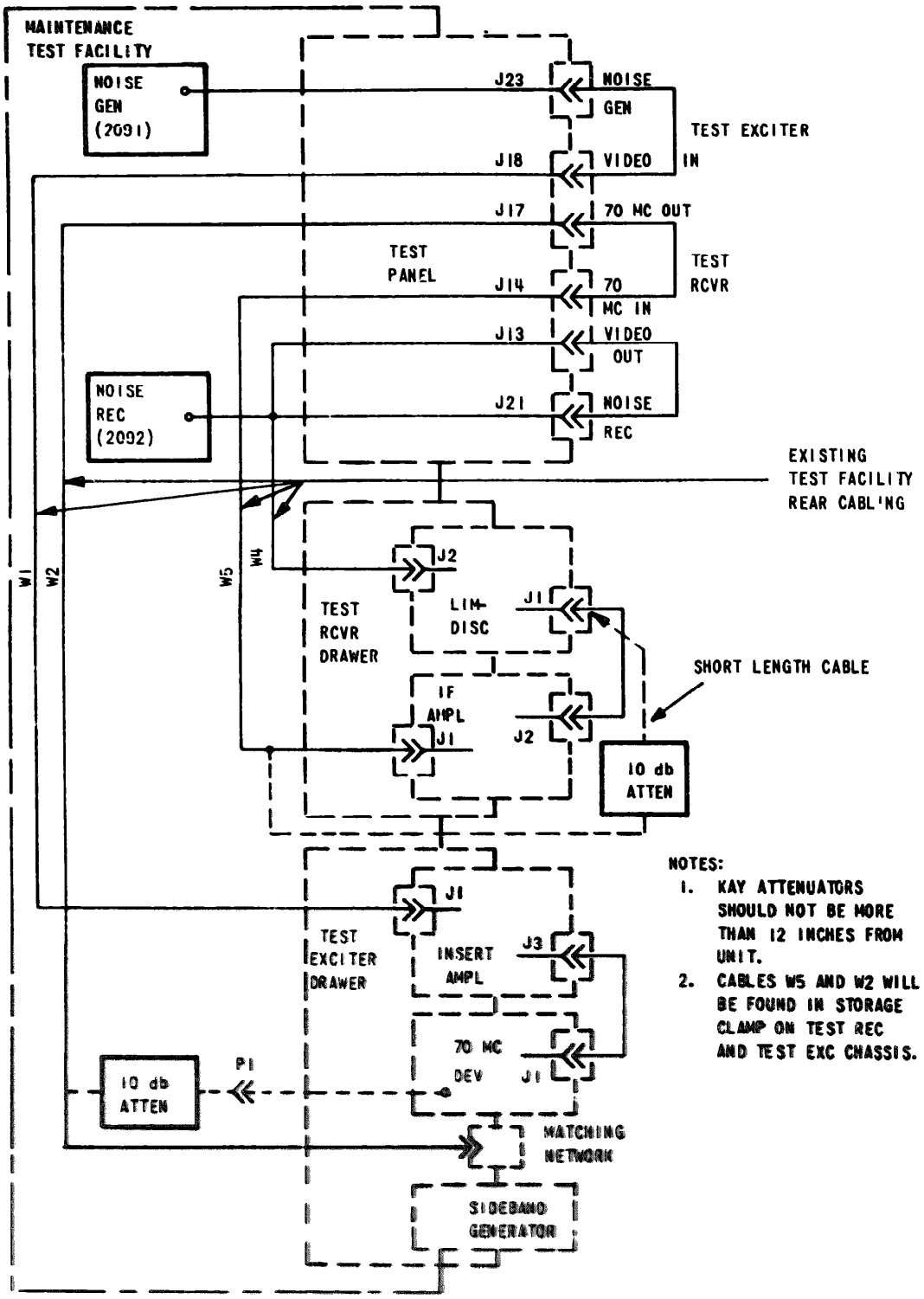


Figure 5-4. Test Exciter-Test Receiver 70-Mc Self-Check. Cable Connections

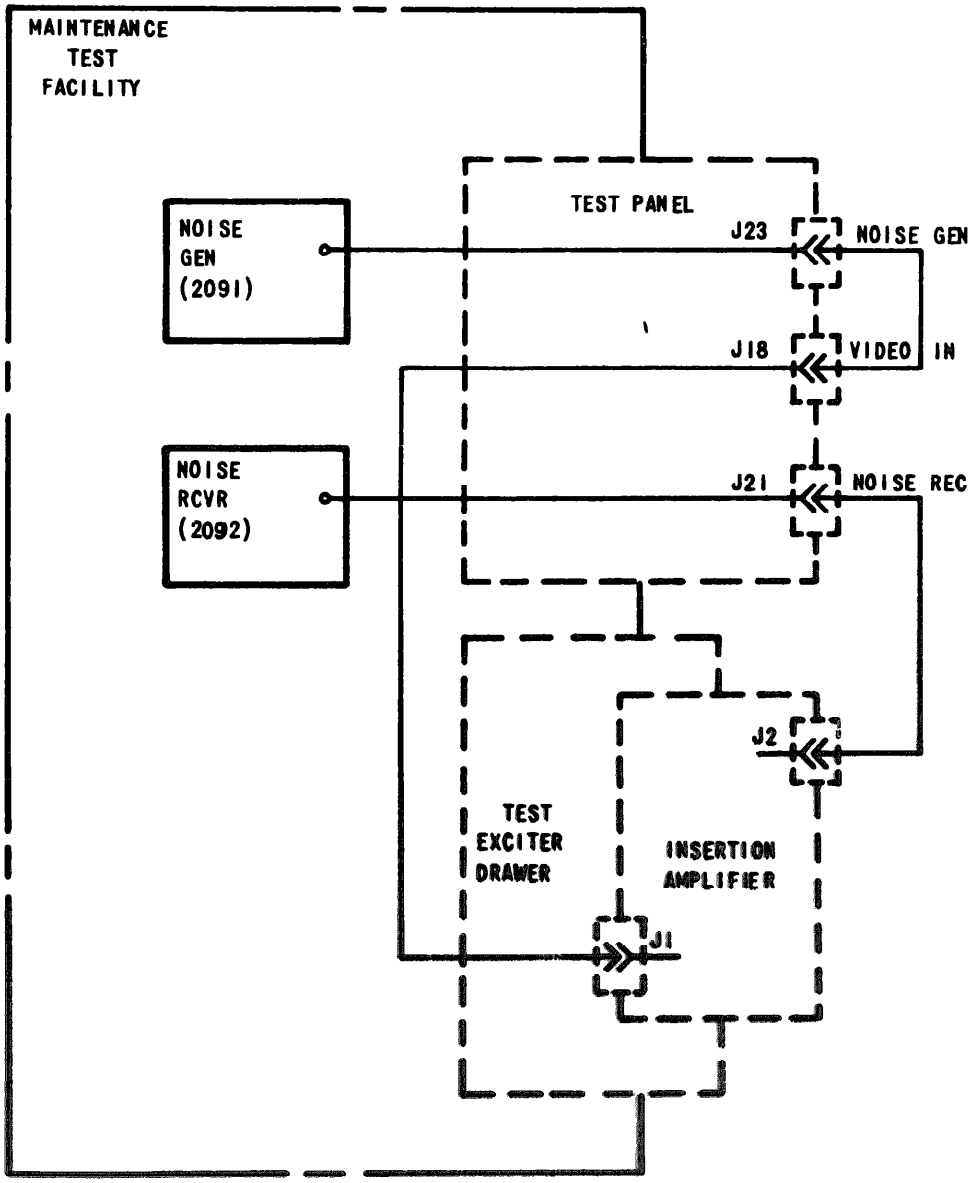


Figure 5-5. Noise Generator-Noise Receiver Back-to-Back Test, Cable Connections

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	NOISE GENERATOR AND NOISE RECEIVER NOISE LOADING CHECK (Cont)		
15 (cont)		channels being tested.	Test Receiver i-f amplifier or limiter-discriminator. If test requirements cannot be met, trouble is in Insertion Amplifier or White Noise Test Set. Refer to the back-to-back check (given in section 4.6 of the Marconi OA 2090 instruction book) to check the noise loading equipment.
	THRESHOLD CHECK OF TEST RECEIVER		
16	Turn Test RCVR/EXEC FUNCTION switch to RCVR position, and turn MAINT FACILITY PWR switch (CB2) to ON position. Operate power switches of RF Signal Generator, VHF Oscillator, Wide-Range Oscillator, and		

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	THRESHOLD CHECK OF TEST RECEIVER (Cont)		
16 (cont)	Frequency Selective Voltmeter to ON position (all switches in Maintenance Test Facility). Allow equipment to stabilize for at least 15 minutes.		
17	Connect RF Signal Generator to RF IN Jack on Test Panel. Set VHF Oscillator for highest receiver frequency for test facility, and set the FILTER TUNING control on Test Receiver for the desired frequency.		Defective coaxial cable or connectors in Test Receiver. Recheck setting of VHF Oscillator and FILTER TUNING control on Test Receiver.
18	Refer to the set-up procedures given in Section 3, paragraph 3.3.3.4.3, and follow these procedures for making an LRC-3 receiver drawer threshold check in order to calibrate the RF Signal Generator output and all cable losses.		
19	Operate the modulation pushbutton selector on RF Signal Generator to FM and tune Wide-Range Oscillator and Frequency Selective Voltmeter to pivot frequency of de-emphasis network being used in limiter-discriminator (pivot		

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	THRESHOLD CHECK OF TEST RECEIVER (Cont)		
19 (cont)	frequency is 608 times highest baseband frequency).		
20	Adjust attenuator on Wide-Range Oscillator until oscillator output level shown on Frequency Selective Voltmeters reads -24 dbm.		
21	Adjust ATTENUATOR control on RF Signal Generator to reduce r-f input to Test Receiver to a value where tone level indicated on Frequency Selective Voltmeter decreases by 1/4 db.	The 1/4 db decrease in tone level should occur when an r-f level of less than -66 dbm is provided at the RF IN jack.	If threshold requirement still cannot be met, make Test Receiver Noise-Figure Check as given in steps 22 through 25 of this performance test. If noise figure meets requirements, substitute new limiter-discriminator and reset AGC for 350 mv signal drive from limiter-discriminator.

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST RECEIVER NOISE-FIGURE CHECK		
22	Connect a calibrated noise output cable from UHF Noise Source (Hewlett-Packard 349A) to bandpass filter at input of mixer pre-amplifier located in Test Receiver drawer. Connect a noise input cable from Noise Figure Meter (Hewlett-Packard 342A) to J2 of mixer preamplifier located in Test Receiver drawer. (The UHF Noise Source and the Noise Figure Meter are not supplied as part of the Maintenance Test Facility.) Allow equipment to stabilize for at least 20 minutes.		
23	Turn TEST RCVR/EXC FUNCTION switch to RCVR, and set MAINT FACILITY PWR switch (CB2) to ON (both switches located on Test Panel of Maintenance Test Facility).		
24	Set up Noise Figure Meter as follows: a. INPUT(MC) to 70. b. METER FUNCTION to 2 MA. c. NOISE SOURCE TO GAS TUBE. d. CURRENT (gas tube) to 150 MA. e. METER FUNCTION to CALIBRATION INF. f. Adjust INF potentiometer for INF indication on meter.	Crystal current Xtal No. 1 and Xtal No. 2 of TEST RCVR should average 1.2 ±3 ma. The individual crystal currents should be in the range of 0.6 to 2.0 ma.	Attenuator pad in local oscillator input to mixer preamplifier may be changed to provide correct crystal current.

TABLE 5-2. OPERATIONAL PERFORMANCE TESTS (Cont)

STEP	OPERATION	NORMAL INDICATION	PROBABLE CAUSE OF TROUBLE
	TEST RECEIVER NOISE-FIGURE CHECK (Cont)		
24 (cont)	g. METER FUNCTION to CALIBRATION ZERO h. ADJUST ZERO potentiometer for ZERO SET indication on meter. l. METER FUNCTION to NOISE FIGURE.		
25	Read noise figure indicated on meter. Subtract insertion loss of calibrated cable between noise source and bandpass filter located at input to mixer preamplifier.	Noise figure measured should not be greater than 16 db.	Mixer preamplifier bad. Cable from noise source is too long.

TABLE 5-3. VOLTAGE AND RESISTANCE MEASUREMENTS

TEST POINT	VOLTAGE	RESISTANCE
INSERTION AMPLIFIER (TEST EXCITER)		
TP1	+2.6 vdc	150 ohms
TP2	+1.3 vdc	220 ohms
TP3	+26 vdc	950 ohms
TP4	36 mv. ac (Notes 1, 2)	75 ohms (Cable connected to J2)
DEVIATOR CHASSIS (TEST EXCITER)		
TP1	+7.5 vdc	680 ohms
TP2	+5.5 vdc	680 ohms
TP3	-0.3 vdc	0 ohms
TP4	-0.3 vdc	0 ohms
TP5	+5.2 vdc	60 ohms
TP6	+5.2 vdc	11K ohms
TP7	+7.0 vdc	11K ohms
TP8	+3.4 vdc	75K ohms - depends on setting of R35 and R38
TP9	+0.4 vdc	23K ohms
TP10	0 vdc (AVG)	56K ohms

TABLE 5-3. VOLTAGE AND RESISTANCE MEASUREMENTS (Cont)

TEST POINT	VOLTAGE	RESISTANCE
LIMITER-DISCRIMINATOR (TEST RECEIVER)		
TP1	+2.4 vdc	1K ohm
TP2	-2.0 vdc	12K ohms
TP3	0 vdc	80K ohms
TP4	+5.0 vdc	10K ohms
TP5	+20 vdc;	2 Megohms
	0.104 ac (Note 1)	(Remove Jumper)
'IO-MC I-F AMPLIFIER (TEST RECEIVER) (NOTE 3)		
TP1	+12.6 vdc	2K ohm
TP2	+12.5 vdc	1.8K ohms
TP3	+12.5 vdc	1.8K ohms
TP4	+12.5 vdc	1.8K ohms
TP5	+12.7 vdc	1.8K ohms
TP6	+55 vdc	1.4K ohms
TP7	+0.04 vdc	0 ohms (Gd)
TP8	0 20 vdc	10K ohms (Remove jumper)
TP9	+11 vdc	Infinity ohms (Remove jumper)

NOTES:

Voltage readings taken in Back-to-Back Test of Test Exacter and Test Receiver (all readings taken with Electronic Voltmeter, Hewlett-Packard Model 410C).

1. Measured at pivot frequency for 60-channel system (183 kc). Deviation 182 kc.

2. Typical reading for 60 or 120 channel; reading varies with deviator sensitivity. Typical reading for 24 channel system would be 28 mv.

3. All I-F Amplifier readings taken with no signal Input, and the VHF Oscillator (VFO) turned off.

Resistance readings were taken with Electronic Voltmeter Hewlett-Packard Model 410C. All power **was** removed and unit removed from drawer. **Positive** lead of ohmmeter **connected to test point in each** case.

TABLE 5-4. REFERENCE SIGNAL LEVELS (TYPICAL)

TEST EXCITER	
REFERENCE POINT	LEVEL (dbm)
70-MC Deviator Out	+18.2
LO Output	+20.3
SB GEN OUT (Front Panel)	-2.5
LO Driver (Output of Pwr Split)	+11.2
MIXER OUT (Front Panel)	-11.0
RF OUT (Front Panel)	-21.4

TABLE 5-4. REFERENCE SIGNAL LEVELS (TYPICAL) **(Cont)**

TEST RECEIVER	
REFERENCE POINT	LEVEL (dbm)
RF IN (Front Panel)	-21.4
Translation Mixer Input	-23.4
LO Drive (Output of Pwr Split)	+11.2
MIXER OUTPUT (Front Panel)	-17.8
Mixer Pre-Amp Input	-35
LO Drive	+1.6
70-MC I-F Input	+3.3
I- F Amplifier Output	+4*

NOTES

1.* This reading taken with T-connector between X-F Amplifier and Limiter-Discriminator

2. Readings taken in Back-to-Back Test of Test Exciter and Test Receiver (readings taken with RF power Meter, Hewlett-Packard Model 431B).

SECTION 6

REPAIR

6.1 GENERAL

This section contains repair information for the Maintenance Test Facility. This includes 'removal and replacement of assemblies, disassembly, and test information.

6.2 REMOVAL AND REPLACEMENT OF ASSEMBLIES

The removal and replacement of assemblies mounted in the Maintenance Test Facility are obvious upon inspection; therefore, no special procedures are required.

Most of the assemblies are secured in place on the rack by means of mounting screws which are visible from the front of the cabinet. An assembly should be removed only when tests indicate that it is defective. All interconnecting wiring must be disconnected and tagged before any assembly is removed.

6.3 DISASSEMBLY

The insertion amplifier, sideband generator, and deviator chassis subassemblies of the Test Exciter and the mixer preamplifier, 70-mc i-f amplifier, and limiter-discriminator subassemblies of the Test Receiver are identical in design to the corresponding subassemblies used in the LRC-3 exciter and receiver assemblies.

Complete disassembly and repair procedures for the removal and replacement of the subassemblies and parts will be found in the LRC-3 Tropospheric Scatter Exciter and Receiver manuals and in the modification kit literature. For repairing all other assemblies of the Maintenance Test Facility, refer to the manual for that assembly.

6.4 TESTING

After the repairs have been completed and the assembly has been reinstalled in the Maintenance Test Facility, perform the operational performance test given in paragraph 5.5

SECTION 7

ILLUSTRATIONS

7.1 GENERAL

This section contains schematic and wiring diagrams, and photographs useful in the maintenance of the Maintenance Test Facility.

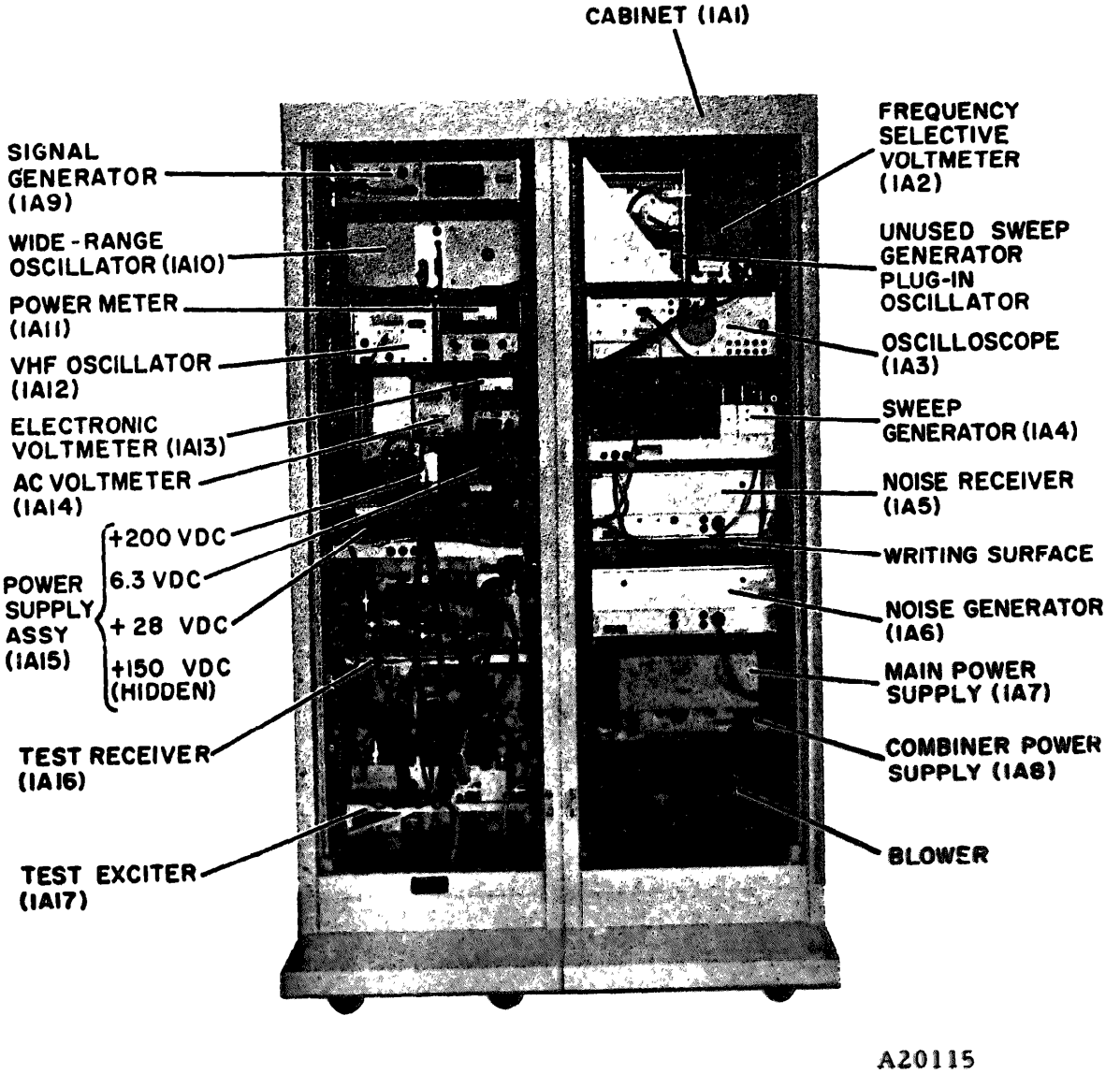


Figure 7-1. Maintenance Test Facility. Rear View

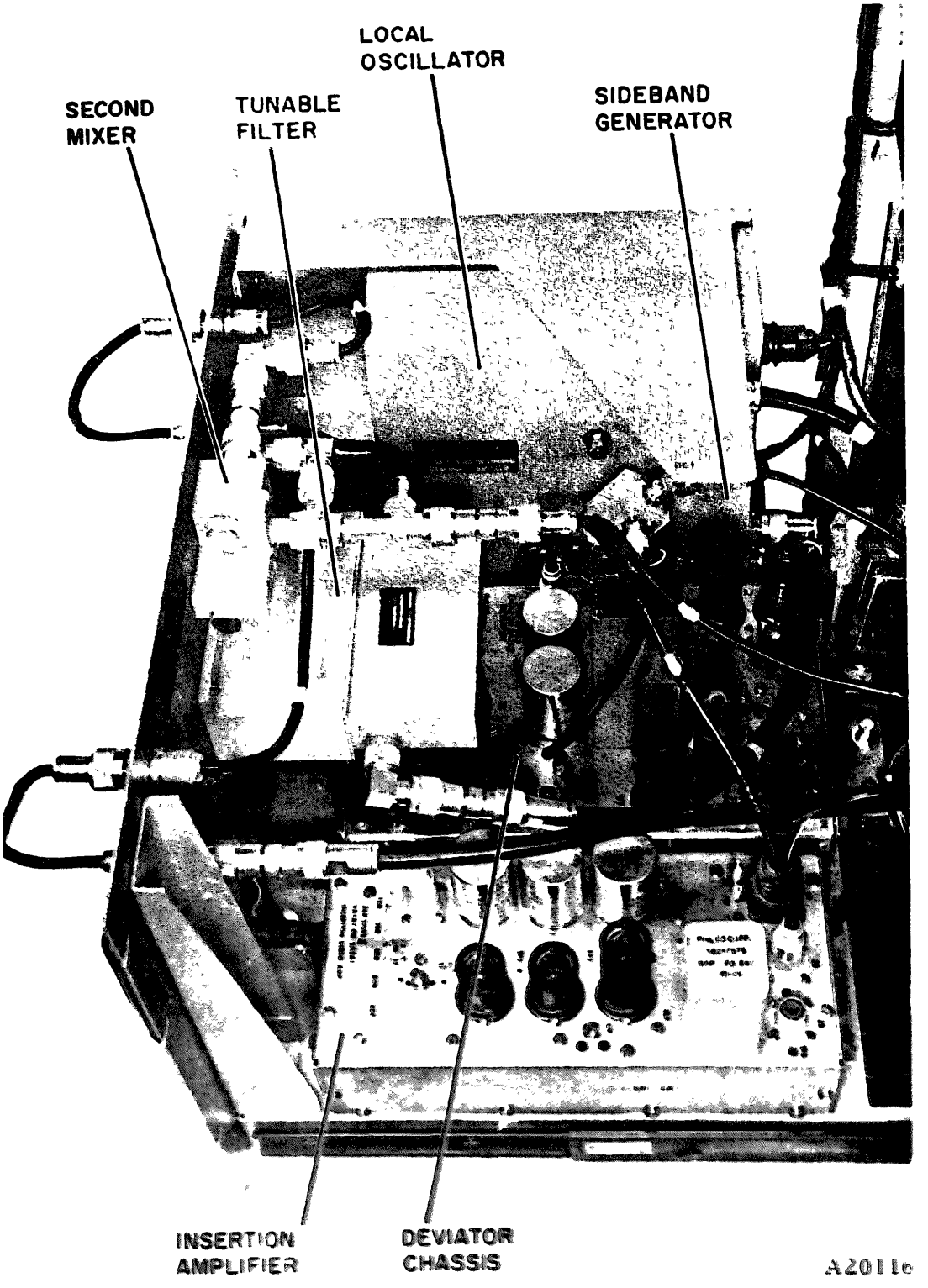


Figure 7-2. Test Exciter. Top View

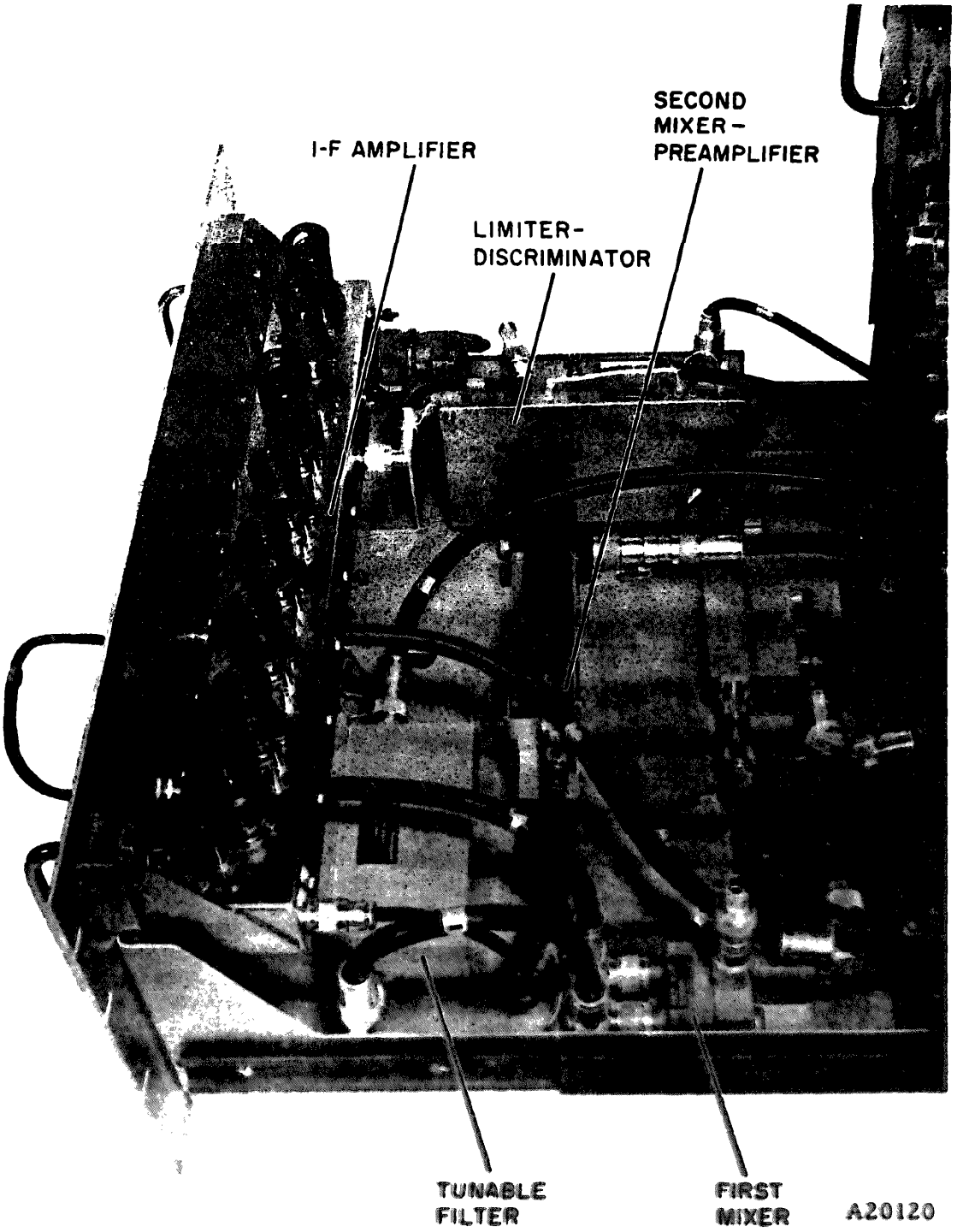


Figure 7-3. Test Receiver. Top View

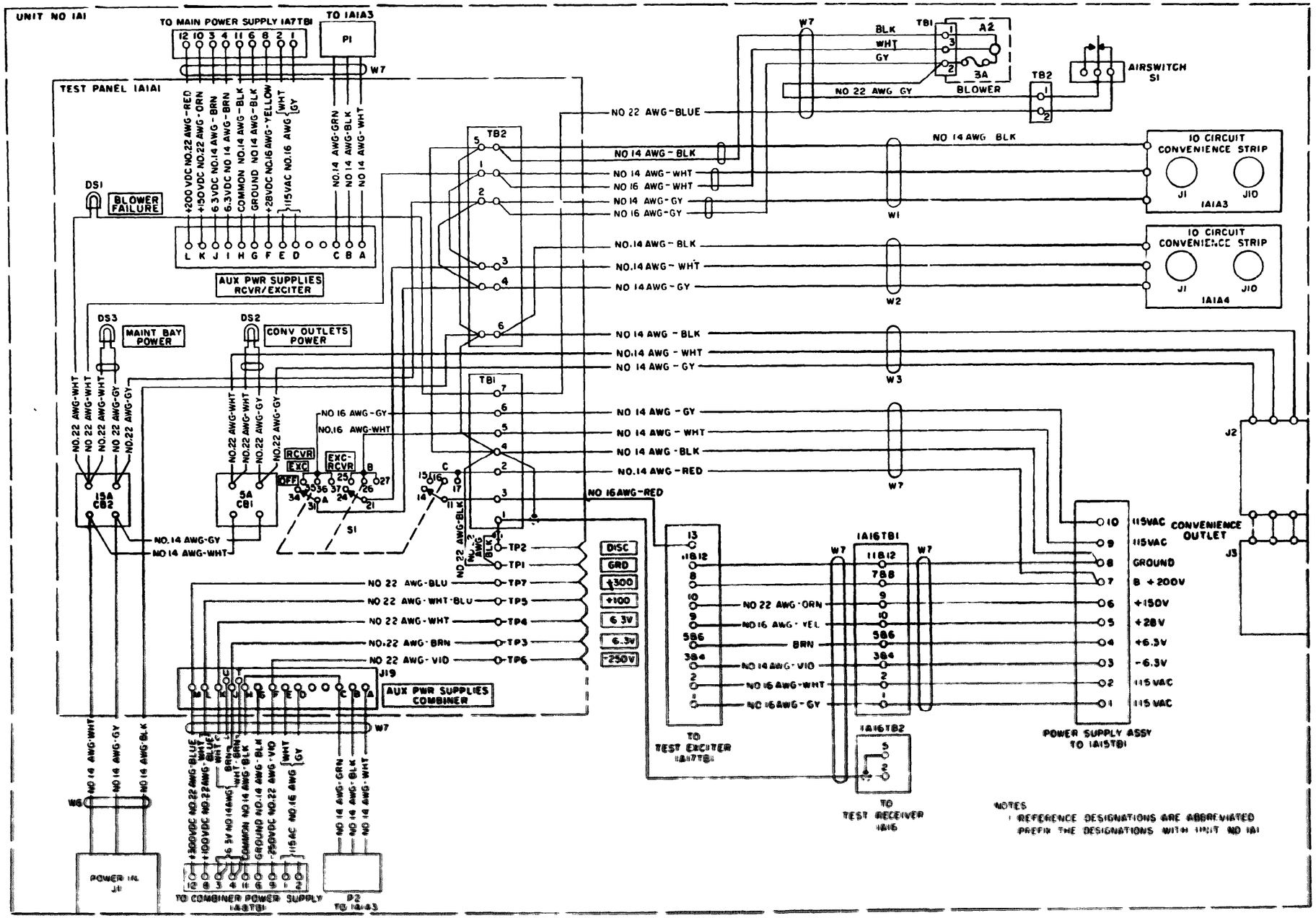
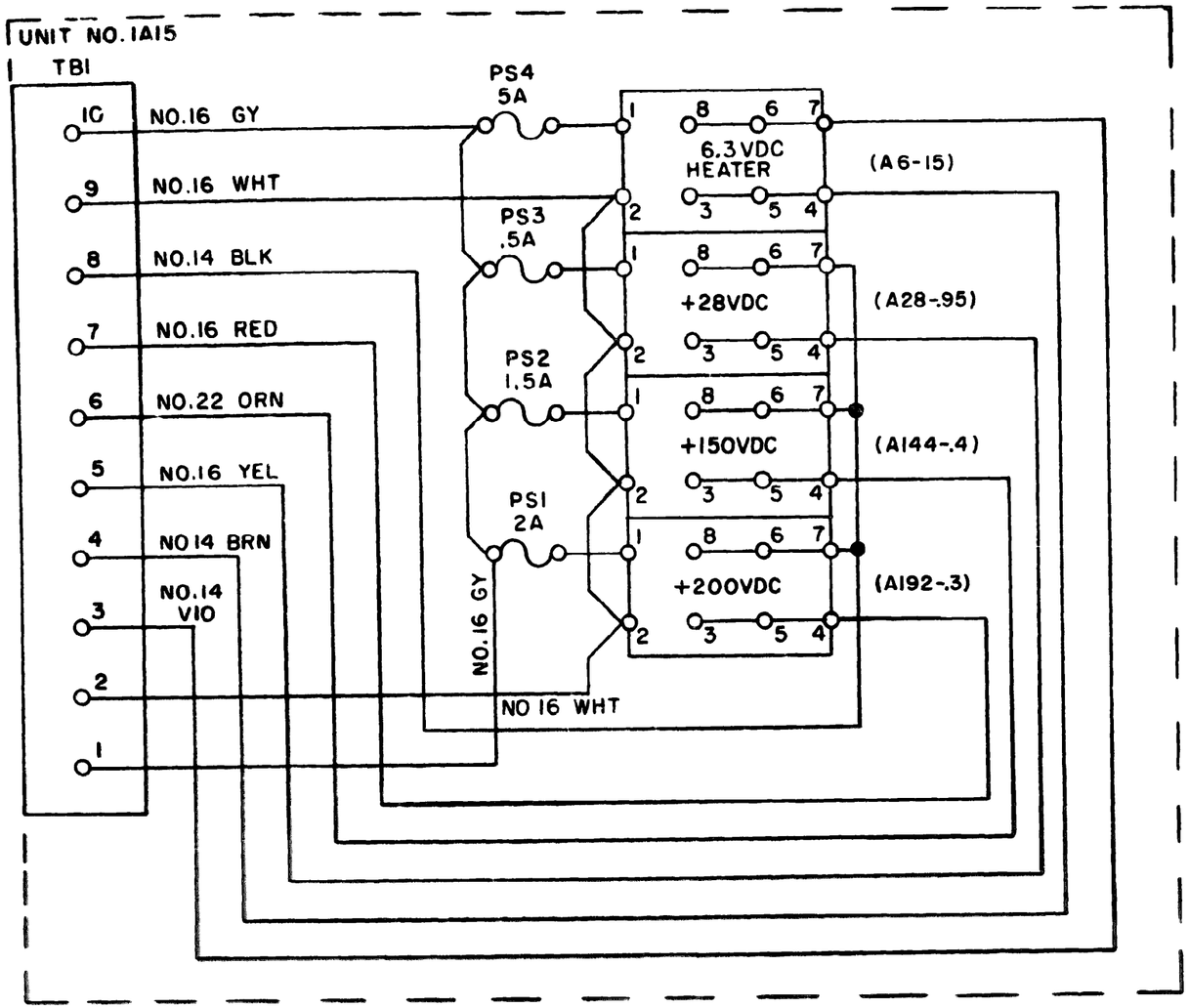


Figure 7-4. Maintenance Test Facility Cabinet Assembly. Power Wiring Diagram



NOTES
REFERENCE DESIGNATIONS ARE ABBREVIATED
PREFIX THE DESIGNATIONS WITH UNIT NO 1A15

Figure 7-5. Maintenance Test Facility Power Supply Wiring Diagram

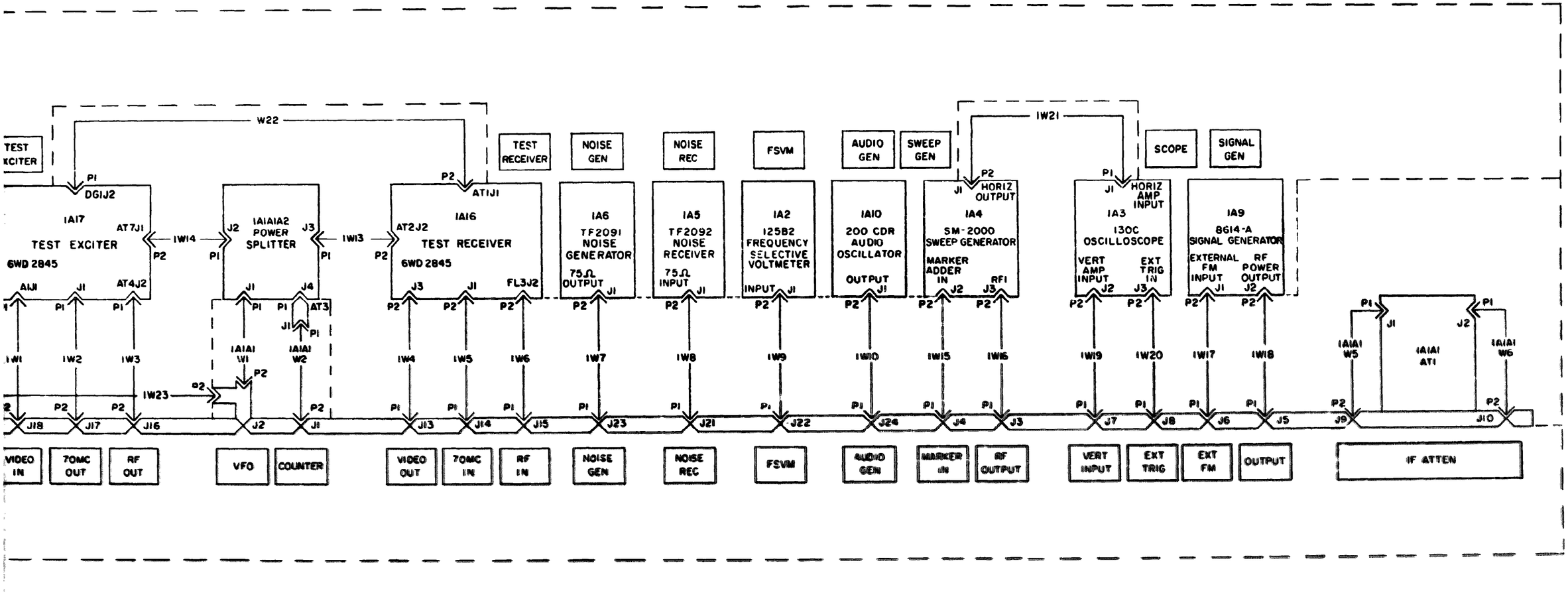


Figure 7-6. Maintenance Test Facility, R-F Wiring Diagram

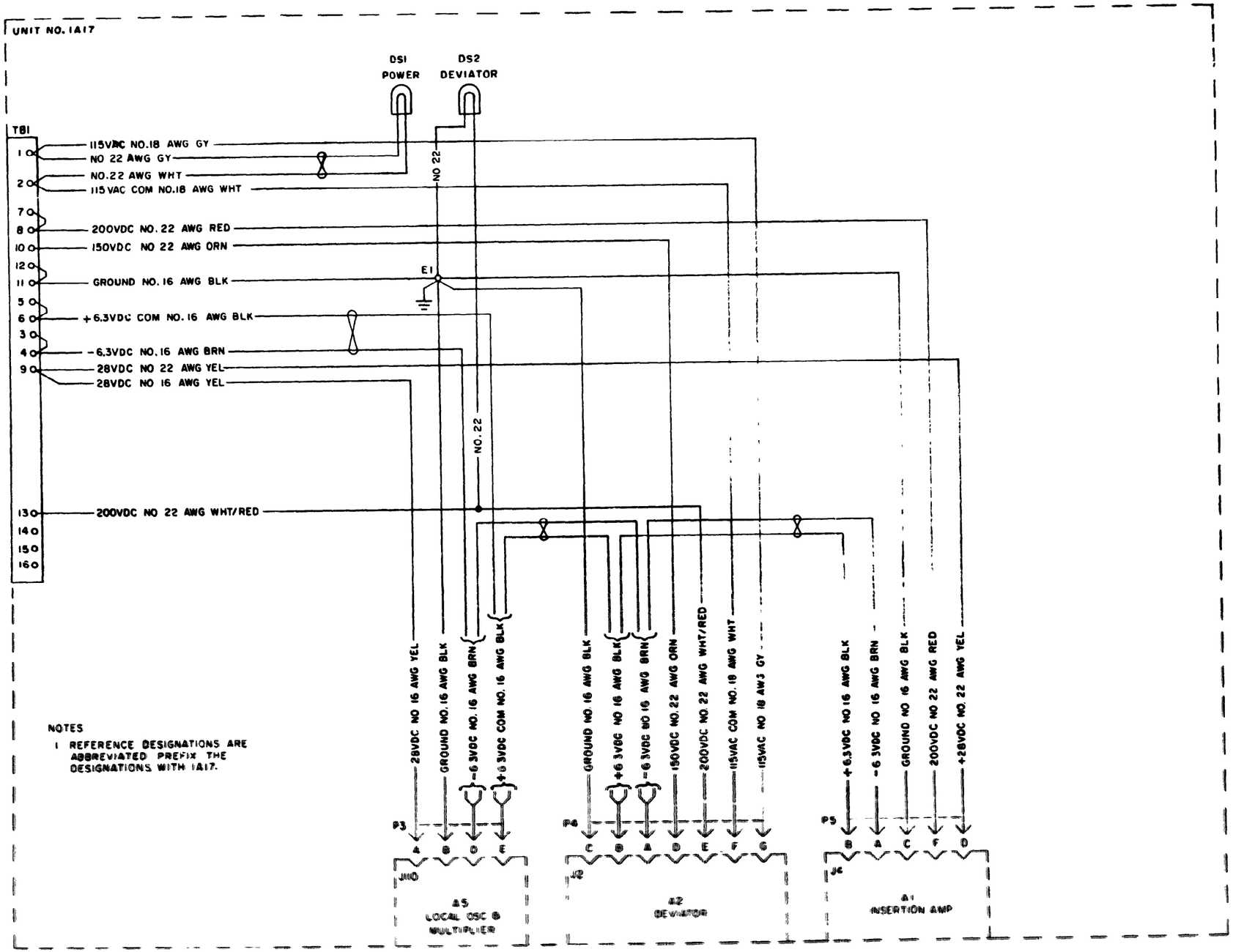
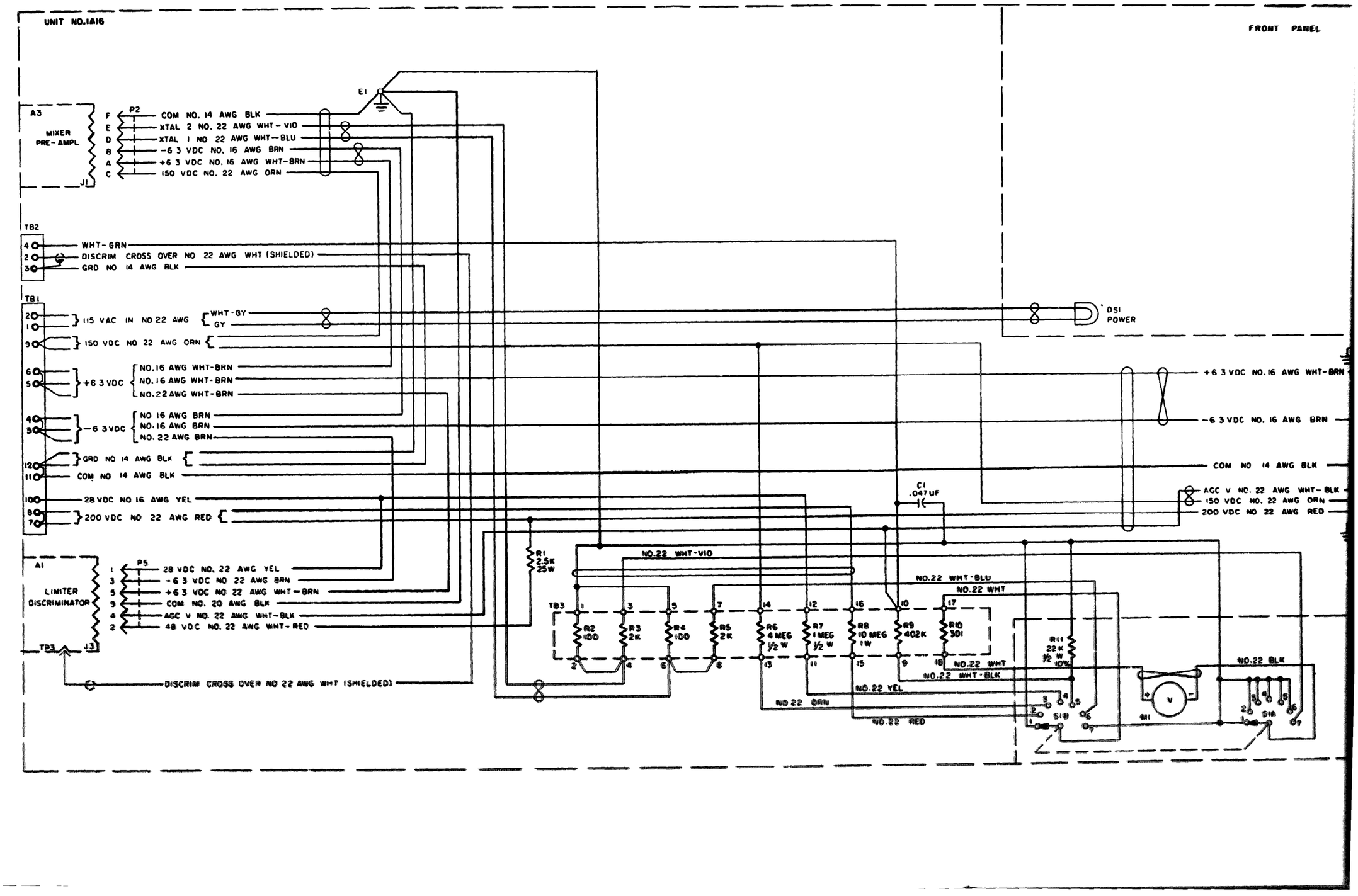
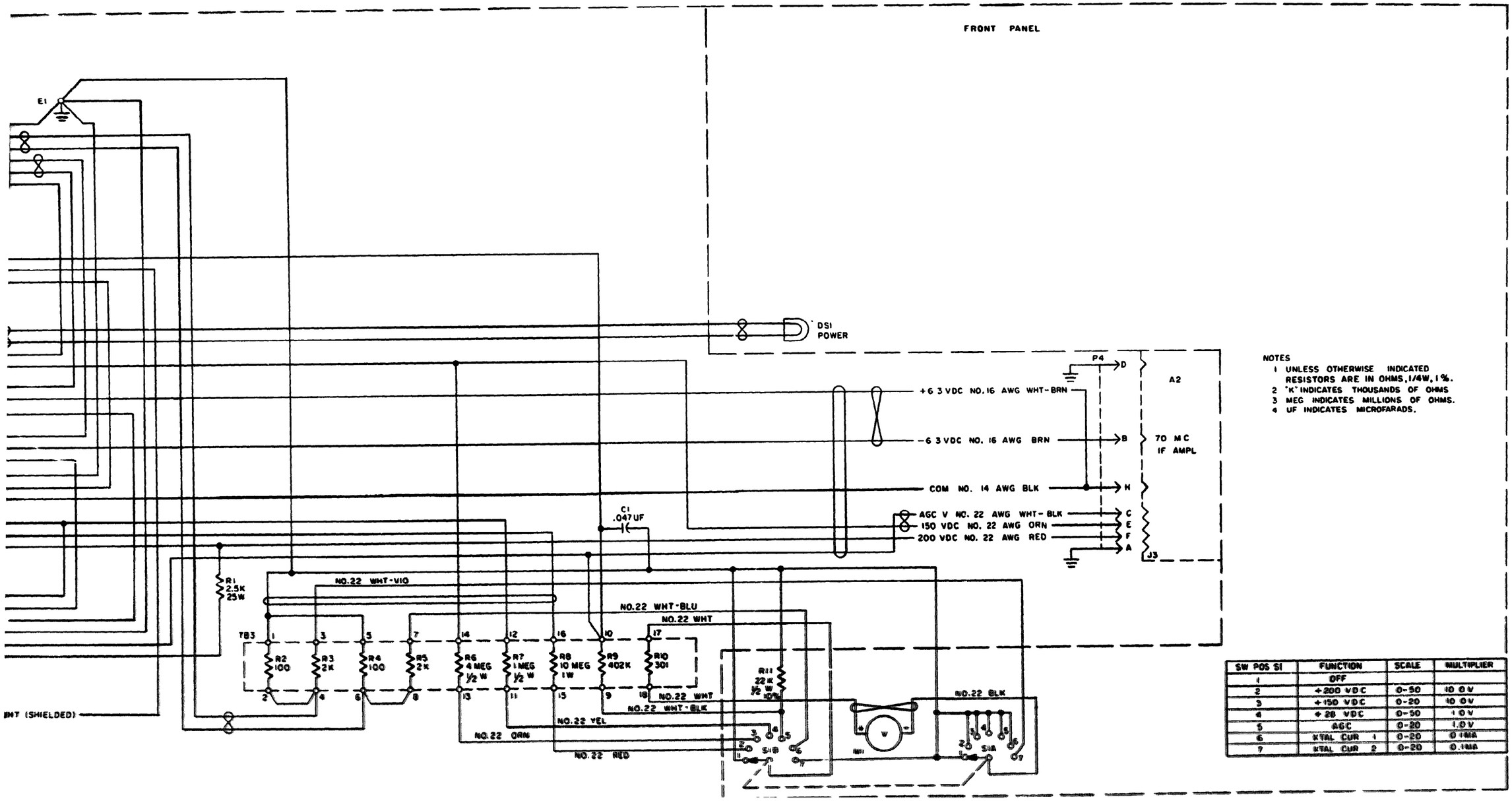


Figure 7-7. Maintenance Test Facility. Exciter Drawer. Wiring Diagram


UNIT NO.1816
FRONT PANEL
A3
MIXER PRE-AMPL
J1
P2
F COM NO. 14 AWG BLK
E XTAL 2 NO. 22 AWG WHT-VIO
D XTAL 1 NO 22 AWG WHT-BLU
B -6 3 VDC NO. 16 AWG BRN
A +6 3 VDC NO. 16 AWG WHT-BRN
C 150 VDC NO. 22 AWG ORN
E1
T82
4 WHT-GRN
2 DISCRIM CROSS OVER NO 22 AWG WHT (SHIELDED)
3 GRD NO 14 AWG BLK
T81
2
1
115 VAC IN NO 22 AWG
WHT-GY
GY
9
150 VDC NO 22 AWG ORN
6
5
+6 3 VDC
NO.16 AWG WHT-BRN
NO.16 AWG WHT-BRN
NO.22 AWG WHT-BRN
4
3
-6 3 VDC
NO 16 AWG BRN
NO.16 AWG BRN
NO. 22 AWG BRN
12
11
GRD NO 14 AWG BLK
COM NO 14 AWG BLK
10
28 VDC NO 16 AWG YEL
8
7
200 VDC NO 22 AWG RED
A1
LIMITER DISCRIMINATOR
TP3
J3
P5
1 28 VDC NO. 22 AWG YEL
3 -6 3 VDC NO 22 AWG BRN
5 +6 3 VDC NO 22 AWG WHT-BRN
9 COM NO. 20 AWG BLK
4 AGC V NO. 22 AWG WHT-BLK
2 48 VDC NO. 22 AWG WHT-RED
DISCRIM CROSS OVER NO 22 AWG WHT (SHIELDED)
R1 2.5K 25W
TB3
R2 100
R3 2K
R4 100
R5 2K
R6 4 MEG ½ W
R7 1 MEG ½ W
R8 10 MEG 1W
R9 402K
R10 301
NO.22 WHT-VIO
NO.22 WHT-BLU
NO.22 WHT
NO.22 WHT-BLK
NO.22 YEL
NO 22 ORN
NO.22 RED
C1 .047 UF
R11 22K ½ W 10%
S1B
S1A
M1
V
DSI POWER
+6 3 VDC NO.16 AWG WHT-BRN
-6 3 VDC NO. 16 AWG BRN
COM NO 14 AWG BLK
AGC V NO. 22 AWG WHT-BLK
150 VDC NO. 22 AWG ORN
200 VDC NO 22 AWG RED
NO.22 BLK



NOTES
1. UNLESS OTHERWISE INDICATED RESISTORS ARE IN OHMS, 1/4W, 1%.
2. "K" INDICATES THOUSANDS OF OHMS
3. MEG INDICATES MILLIONS OF OHMS.
4. UF INDICATES MICROFARADS.

SW POS S1	FUNCTION	SCALE	MULTIPLIER
1	OFF		
2	+200 VDC	0-50	10.0 V
3	+150 VDC	0-20	10.0 V
4	+28 VDC	0-50	1.0 V
5	AGC	0-20	1.0 V
6	XTAL CUR 1	0-20	0.1MA
7	XTAL CUR 2	0-20	0.1MA

Figure 7-8. Maintenance Test Facility. Receiver Drawer. Wiring Diagram

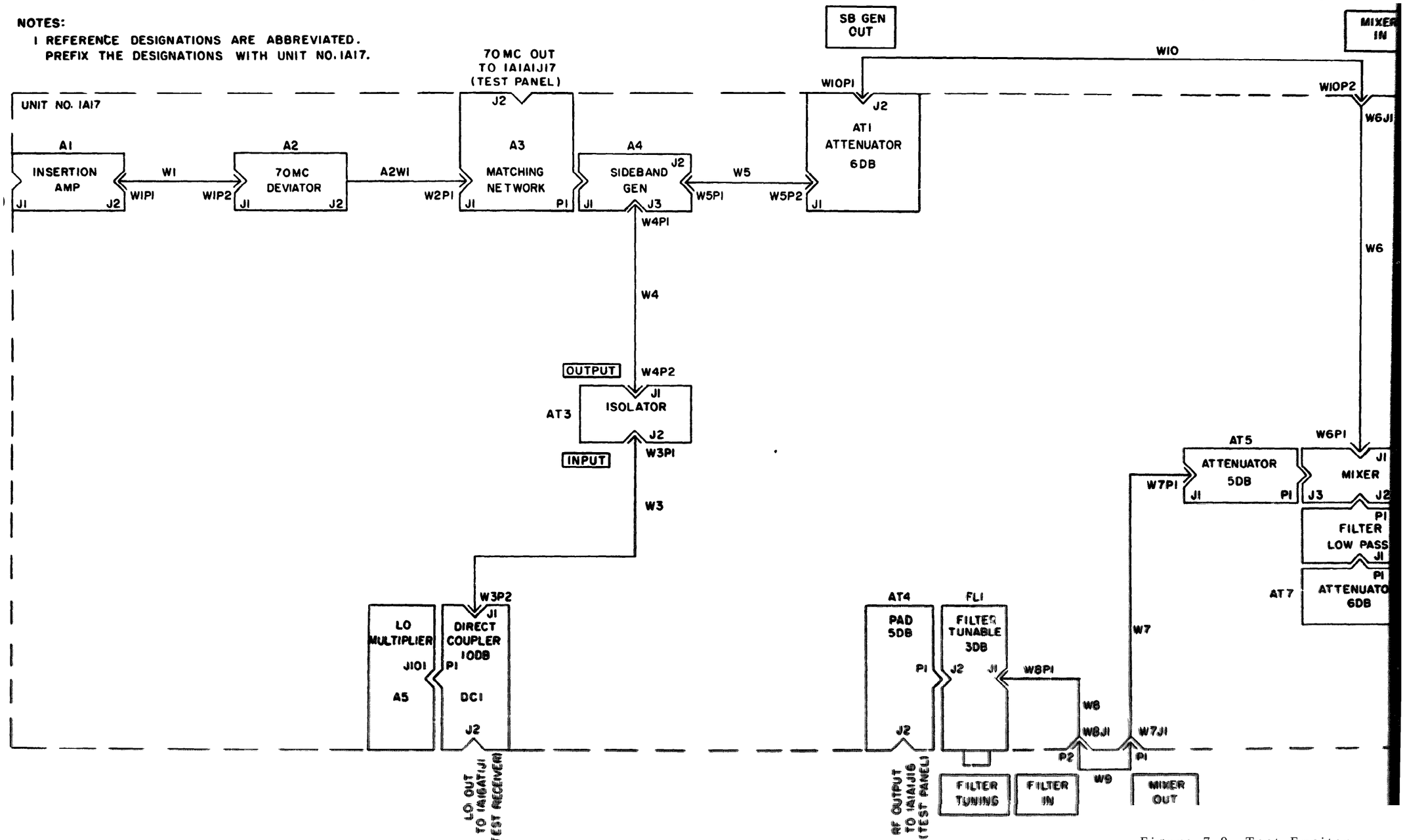


Figure 7-9. Test Exciter.
R-F Wiring Diagram

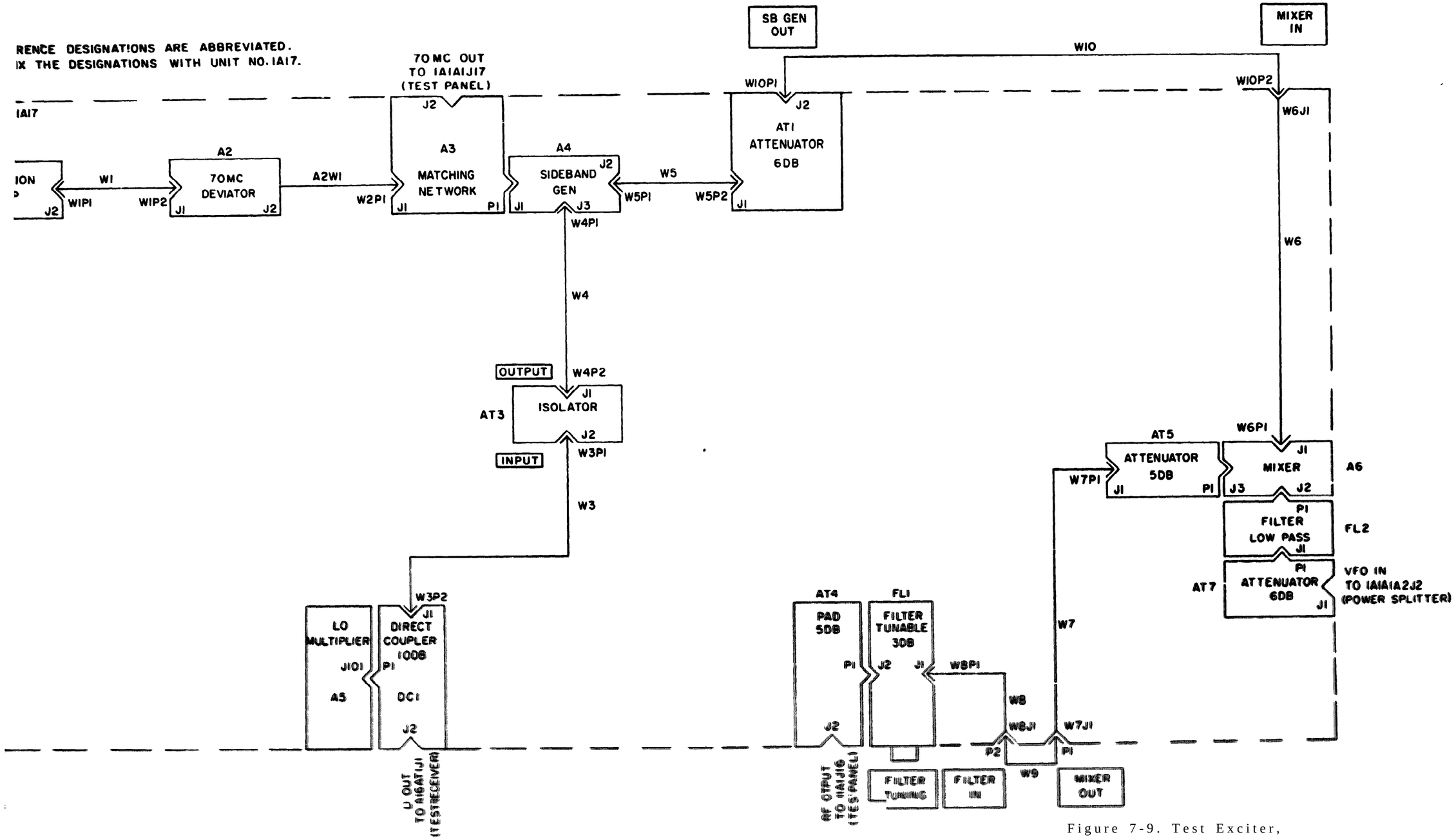
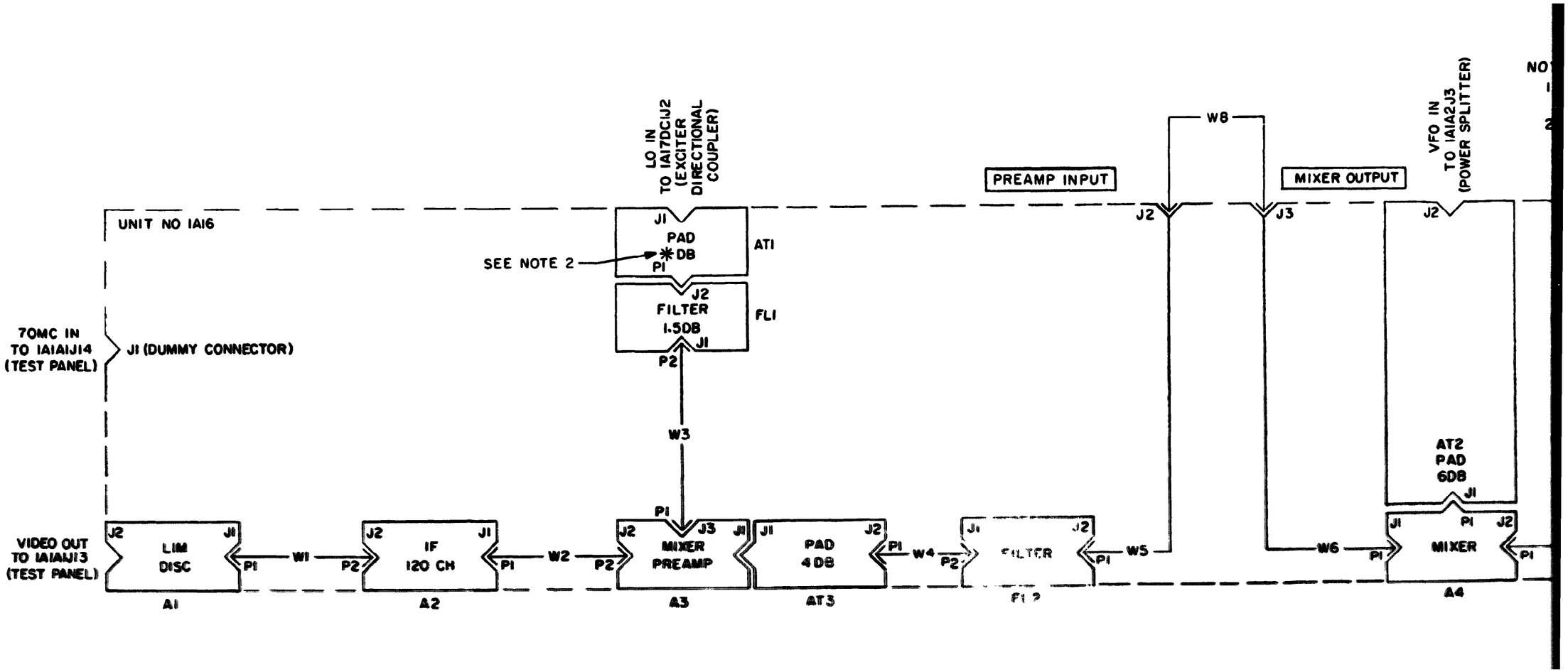


Figure 7-9. Test Exciter, R-F Wiring Diagram


LO IN
TO IA17DC1J2
(EXCITER
DIRECTIONAL
COUPLER)
PREAMP INPUT
W8
MIXER OUTPUT
VFO IN
TO IAIA2J3
(POWER SPLITTER)
UNIT NO IAI6
J1
PAD
* DB
P1
SEE NOTE 2
AT1
J2
FILTER
1.5DB
J1
P2
FL1
70MC IN
TO IAIAIJ14
(TEST PANEL)
J1 (DUMMY CONNECTOR)
J2
J3
W3
AT2
PAD
6DB
J1
P1
VIDEO OUT
TO IAIAJ13
(TEST PANEL)
J2
LIM
DISC
J1
P1
W1
P2
A1
J2
IF
120 CH
J1
P1
W2
P2
A2
J2
J3
J1
MIXER
PREAMP
P1
A3
J1
PAD
4 DB
J2
P1
W4
P2
AT3
J1
J2
P1
W5
W6
P1
J1
P1
J2
MIXER
P1
A4

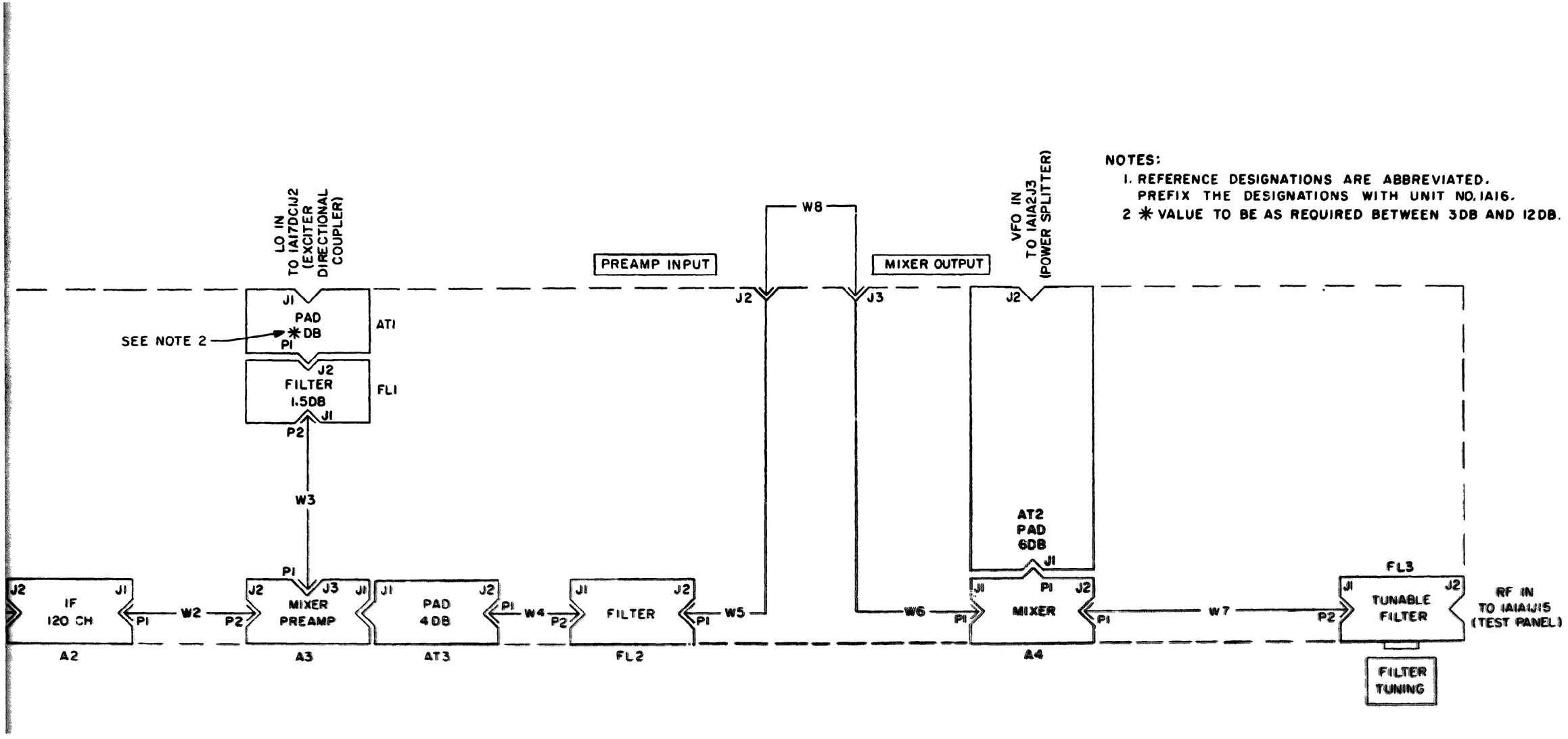


Figure 7-10. Test Receiver, R-F Wiring Diagram

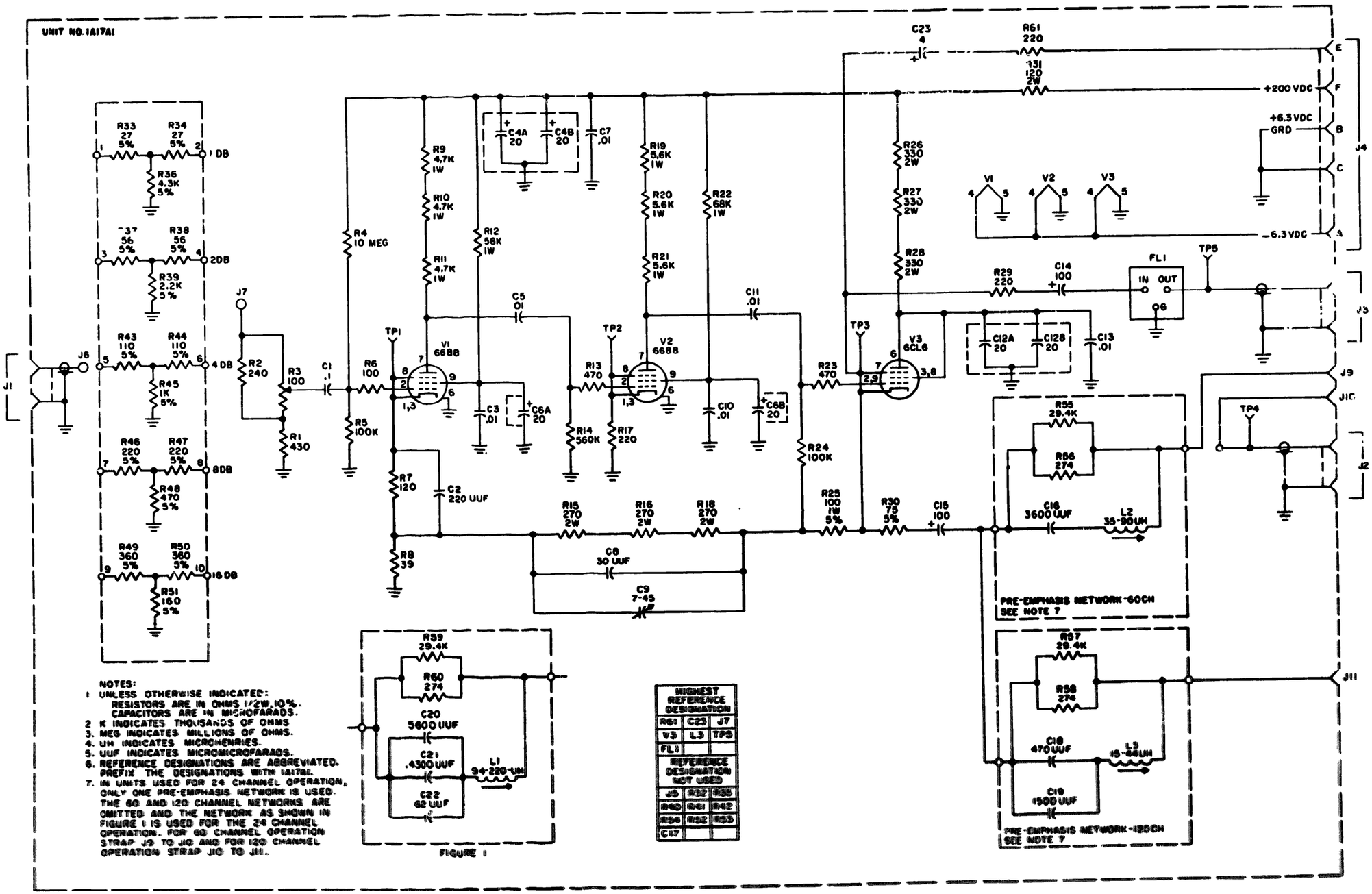


Figure 7-11. Insertion Amplifier (Test Exciter) Schematic Diagram

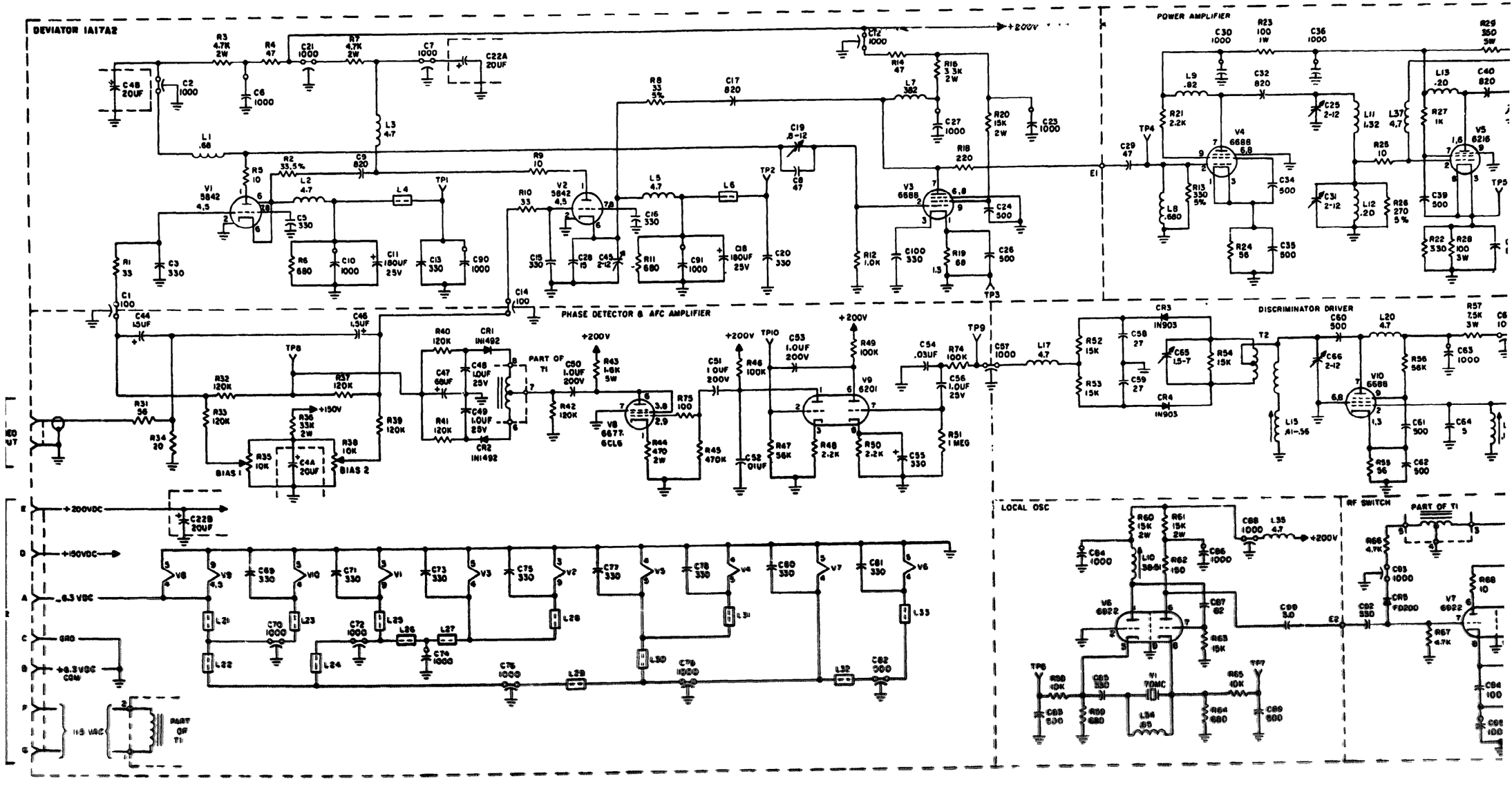

DEVIATOR 1A17A2
POWER AMPLIFIER
PHASE DETECTOR & AFC AMPLIFIER
DISCRIMINATOR DRIVER
LOCAL OSC
RF SWITCH
PART OF T1
+200V
+150V
BIAS 1
BIAS 2
+200VDC
+150VDC
-6.3 VDC
GRD
+6.3 VDC COM
115 VAC

Figure
E

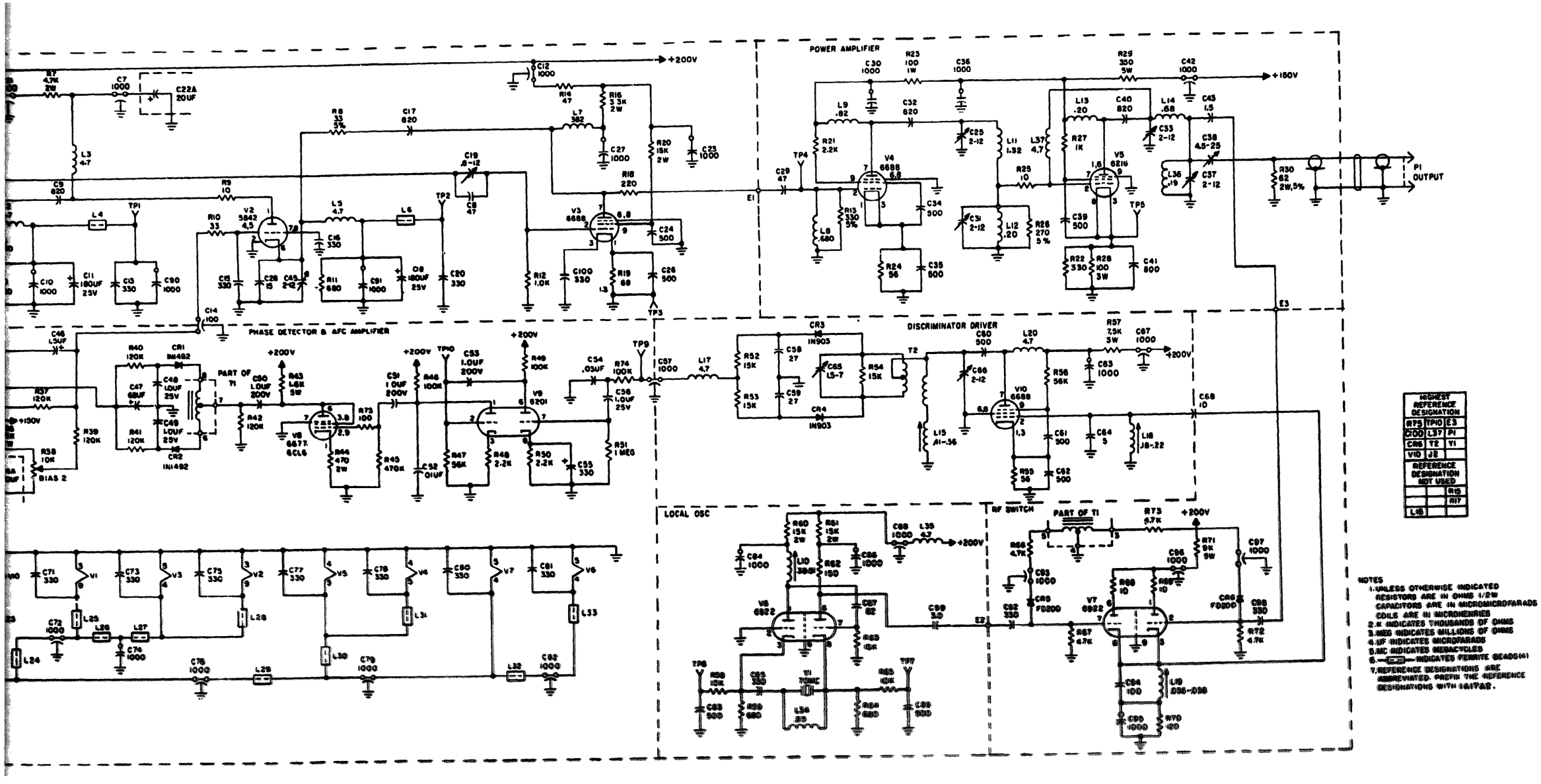


Figure 7-12. Deviator Chassis (Test Exciter). Schematic Diagram

UNIT NO. 1A17A5

OSCILLATOR

DOUBLER OR TRIPLER STAGE

OSCILLATOR/AMPLIFIER

DRIVER AMPLIFIER

POWER AMPLIFIER

Q101 2N708

C105 SEE NOTE 1 & 2

C103 A.R.

C102 .8-8

L101

C104 .01UF

L107 1.0 UH

L108 3.3 UH

CR101

C101A A.R.

C101 7-25

R103 100

R104 1.5K

R101 1K

R102 12K

C120 .01 UF

C106 .8-8

C106A A.R.

Q102 2N2951

L109 3.3UH

R105 1.5K

C107 .001 UF

C108 8-8UUF

C109 .001 UF

C110 7-25

L102 SEE NOTE 1 & 2

L110 3.3UH

R106 820

C121 01UF

Q103 2N3866

C112 100

L103

L111 1UH

R110 100

L112 SEE NOTE 1 & 2

R107 A.R.

C111 .001UF

C113 7-25

L104

Q104 2N3553

C117 7-25

L106

C118 8-8

C124 2

TEST POINT

C114 A.R.

C115 .8-8

R109 100

L113 1 UH

L105 A.R.

C116 .001 UF

C123 1000

C122 01UF

PLUG 80X

C603 1000

L601 3.3UH

C602 20 UF -50 V

VHF MULTIPLIER
1ST QUAD VHF

FILTER

J202

P201

UHF MULTIPLIER
2ND QUAD UHF

BAND PASS FILTER

STRIPLINE ATTENUATOR

THIS POLE ADDED FOR -25-26-8-27 UNITS SEE NOTE 2

C206 .8-8

L206

C207 8-8

L207

C205 8-8

L205

L204

C208 P.5-25UUF

L200 A.R

J201

L201

L202

C203 2.5-11

L203

C212 3

C201 .8-8

C202 .8-8

R201 A.R.

CR201

L208 A.R

C204 2.5-11

C209 8-8

P202

J301

C302 .8-4.5

L301

C301 .8-4.5

R301 A.R

CR301

C304 2-11

J302

P301

J401

P302

J402

J501

R501 100 Ω

C501 15

CR501

CR502

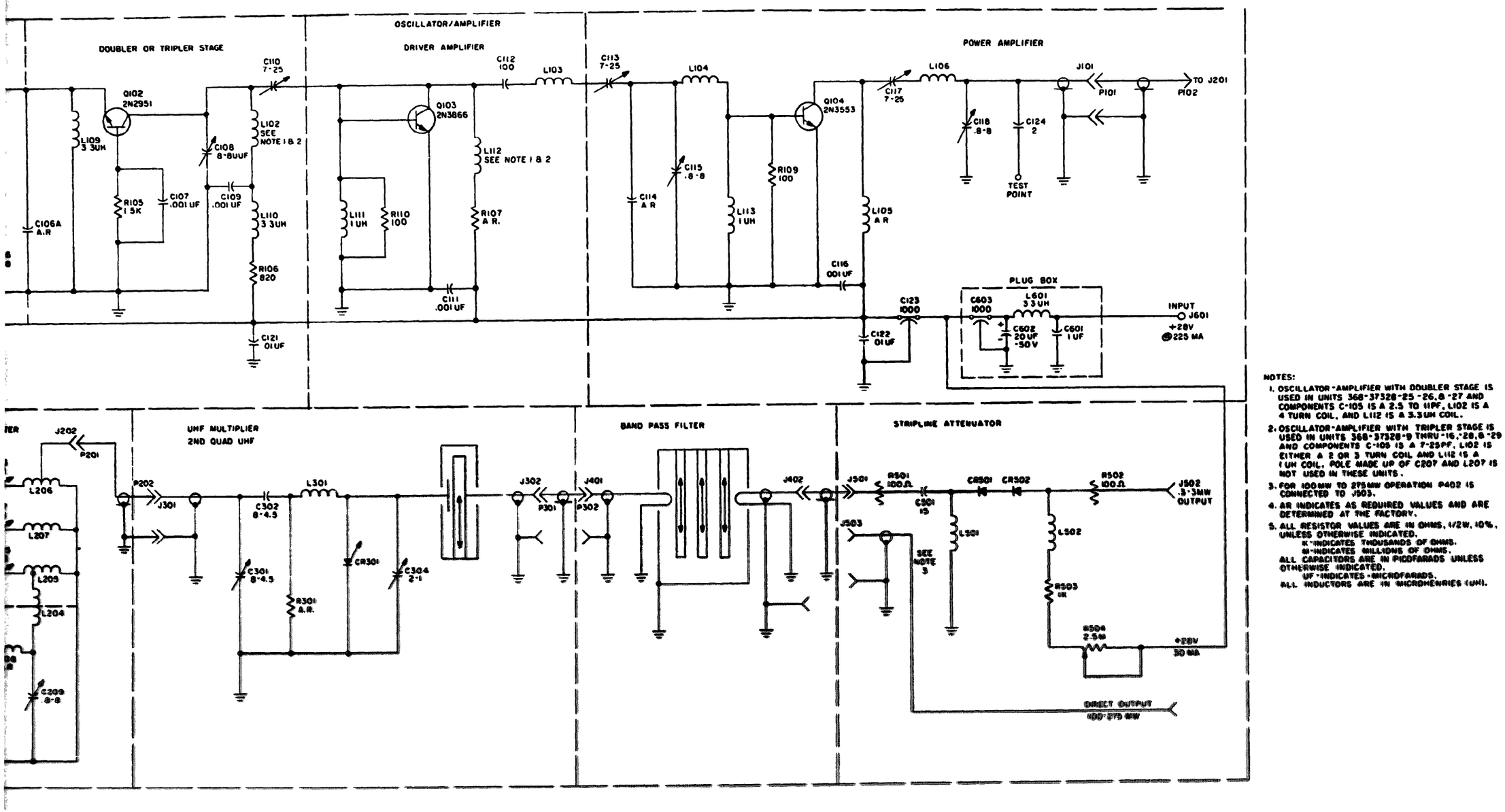
L501

L502

J503

SEE NOTE 3

R503 1K



NOTES:

1. OSCILLATOR-AMPLIFIER WITH DOUBLER STAGE IS USED IN UNITS 368-37328-25 -26,-27 AND COMPONENTS C-105 IS A 2.5 TO 11PF, L102 IS A 4 TURN COIL, AND L112 IS A 3.3UH COIL.
2. OSCILLATOR-AMPLIFIER WITH TRIPLER STAGE IS USED IN UNITS 368-37328-9 THRU -16,-28,-29 AND COMPONENTS C-105 IS A 7-25PF, L102 IS EITHER A 2 OR 3 TURN COIL AND L112 IS A 1 UH COIL, POLE MADE UP OF C207 AND L207 IS NOT USED IN THESE UNITS.
3. FOR 100MW TO 275MW OPERATION P402 IS CONNECTED TO J503.
4. AR INDICATES AS REQUIRED VALUES AND ARE DETERMINED AT THE FACTORY.
5. ALL RESISTOR VALUES ARE IN OHMS, 1/2W, 10%, UNLESS OTHERWISE INDICATED.
   K-INDICATES THOUSANDS OF OHMS.
   M-INDICATES MILLIONS OF OHMS.
   ALL CAPACITORS ARE IN PICOFARADS UNLESS OTHERWISE INDICATED.
   UF-INDICATES MICROFARADS.
   ALL INDUCTORS ARE IN MICROHENRIES (UH).

Figure 7-12.1. LOCAL OSCILLATOR AND MULTIPLIER (TEST EXCITER), SCHEMATIC DIAGRAM.

NOTES:

1. UNLESS OTHERWISE SPECIFIED
   ALL RESISTORS ARE IN OHMS, 1/2W, ±5%
   ALL CAPACITORS ARE IN UUF
   ALL INDUCTANCES ARE IN UH
   K INDICATES THOUSANDS OF OHMS
2. ONLY ONE DE-EMPHASIS NETWORK IS USED IN THE CIRCUIT, FOR 60 CHAN STRAP TP6 TO TP8, FOR 120 CHAN STRAP TP7 TO TP8
3. PLACE JUMPER BETWEEN POINTS A AND B WHEN DE-EMPHASIS IS NOT REQUIRED.
4. FOR 24 CHAN OPERATION REPLACE 120 CHAN DE-EMPHASIS NETWORK WITH FIG 1 AND STRAP TP7 TO TP8

HIGHEST REFERENCE DESIGNATIONS		
Q6	CR10	TP8
C42	L13	T1
R49	MD1	
REFERENCE DESIGNATIONS NOT USED		

1A1GA1

J3
3 -6.3VDC
4 AGCV
1 +28 VDC
9
5 GRD
2 +48VDC
CR10 IN3805B

J1

C1 20
CR2 IN903
CR1 IN903
C3 2200
R3 2.7K 10%
C4 .2UF
C2 2200
R1 4.7K 10%
R2 1.3K
CR3 IN903
CR4 IN903
-6.3V
R8 10K 10%
TP2
R5 1K
C5 .2UF
R6 500
R4 1K
R7 1.6K
-6.3V
MD1
-6.3VDC
+12VDC
R10 1.5K
CR5 IN963B
C6 820
L1 4.7
R12 4.7K 1W
C7 820
R11 220 10%
Q1 2N1613
CR6 IN457
CR7 IN457
R13 1K
-6.3V
R9 100K
R14 1K
TP4
C8 10UF 35V

L7 4.7
L8 4.7
C17 820
R23 2K
R25 2K
R26 22K 10%
C23 820
C25 47UF 35V
C18 820
C42 .01UF
Q3 2N706
C21 820
Q4 2N706
SYM ADJ
C24 2-12
R47 560
L9 LIN ADJ
T1
CR8 IN270
C28 10
R28 1.5K
C26 3-12
CR9 IN270
R29 1.5K
C27 10
L10 10
C29 18UF 15V
R30 10K 10%
TP3
+48V
C39 22UF 50V
R39 180 1W
R31 22K 10%
R34 1K
R36 6.8K 10%
C30 22UF 35V
Q6 2N1613
Q5 2N706
R37 3K
R40 470 2W
R41 33 10%
R32 6.8K 10%
R35 43
R38 270 1W
R33 470 10%
C31 22UF 15V

R15 43
C11 820
C9 5
C10 2-12
Q2 2N3563
R16 3K
R17 22K 10%
C12 820
R18 4.7K 10%
C13 820
R19 1.5K
L2
C14 2-12
L3 4.7
C15 820
L4
R20 22K 10%
R21 1.8K
L5
C19 2-12
C16 820
R22 2.7K 10%
L6 4.7
TP1
C20 820
R24 120 10%
C22 820
R27 2.7K 10%

Figure 1
(Test Re

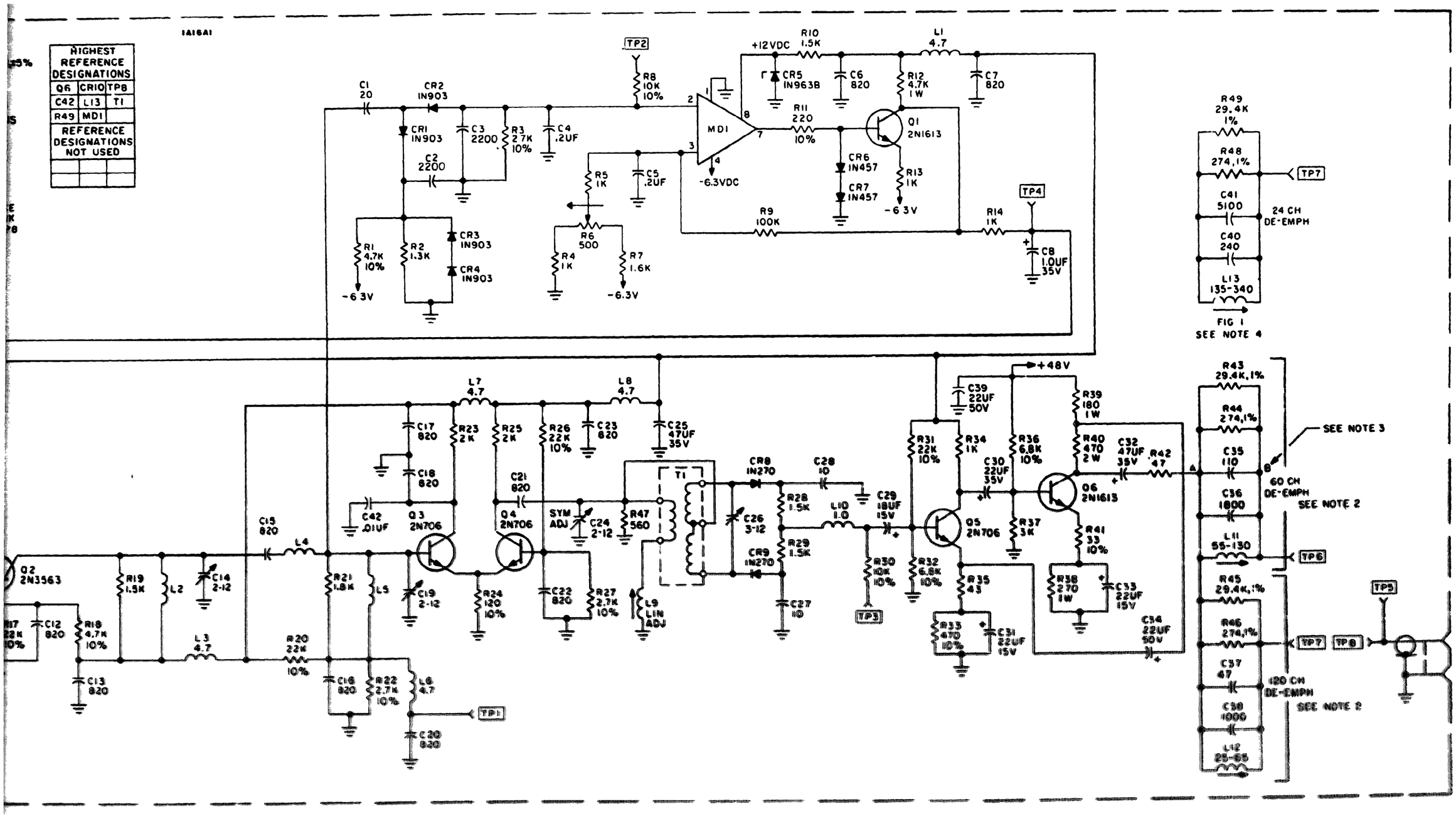


Figure 7-13. Limiter-Discriminator (Test Receiver). Schematic Diagram

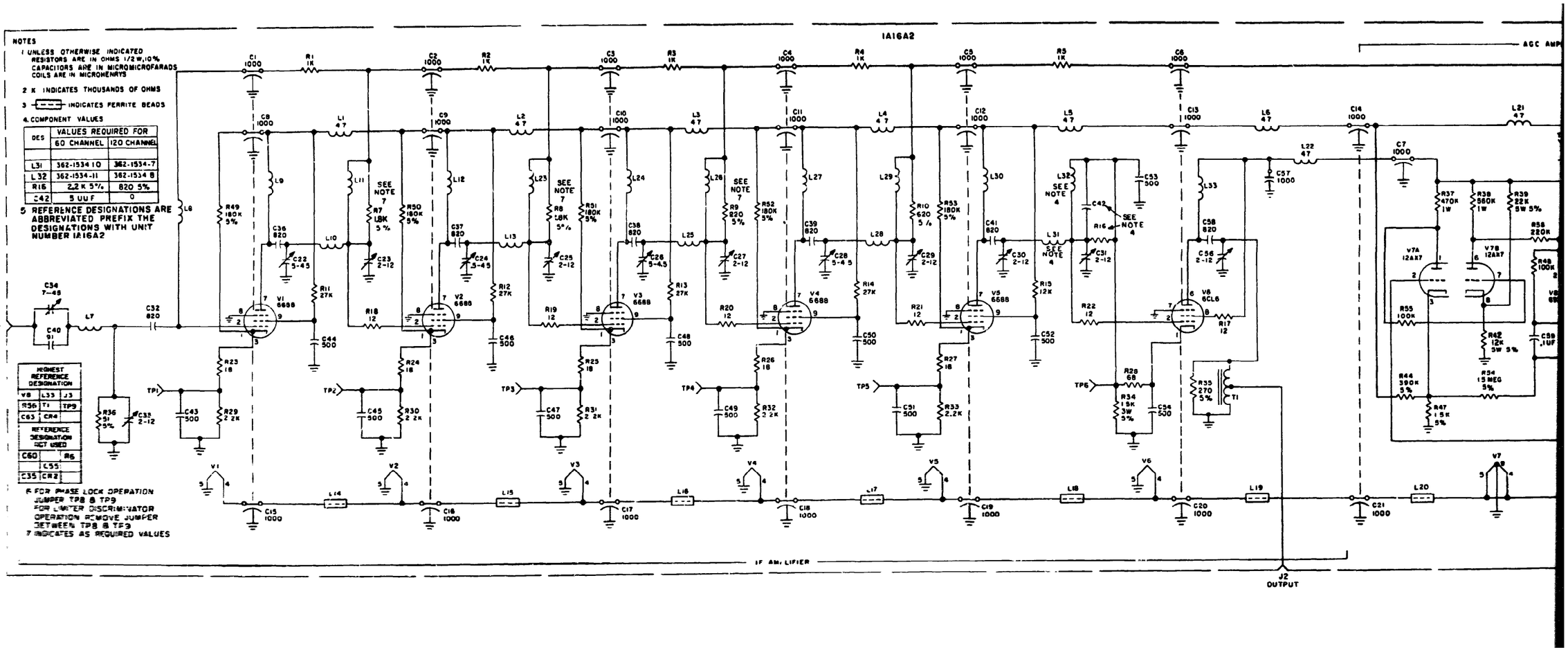


Figure 7-
(Test Receiver

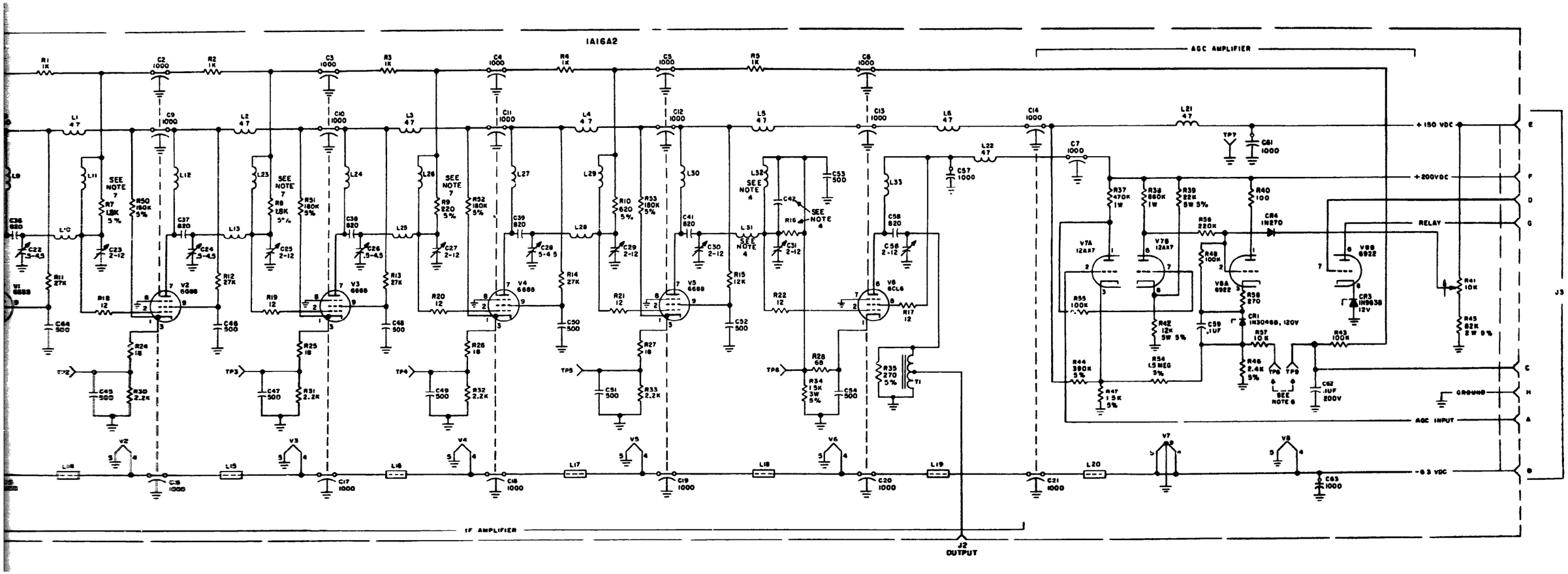


Figure 7-14. 70-Mc Amplifier
(Test Receiver), Schematic Diagram

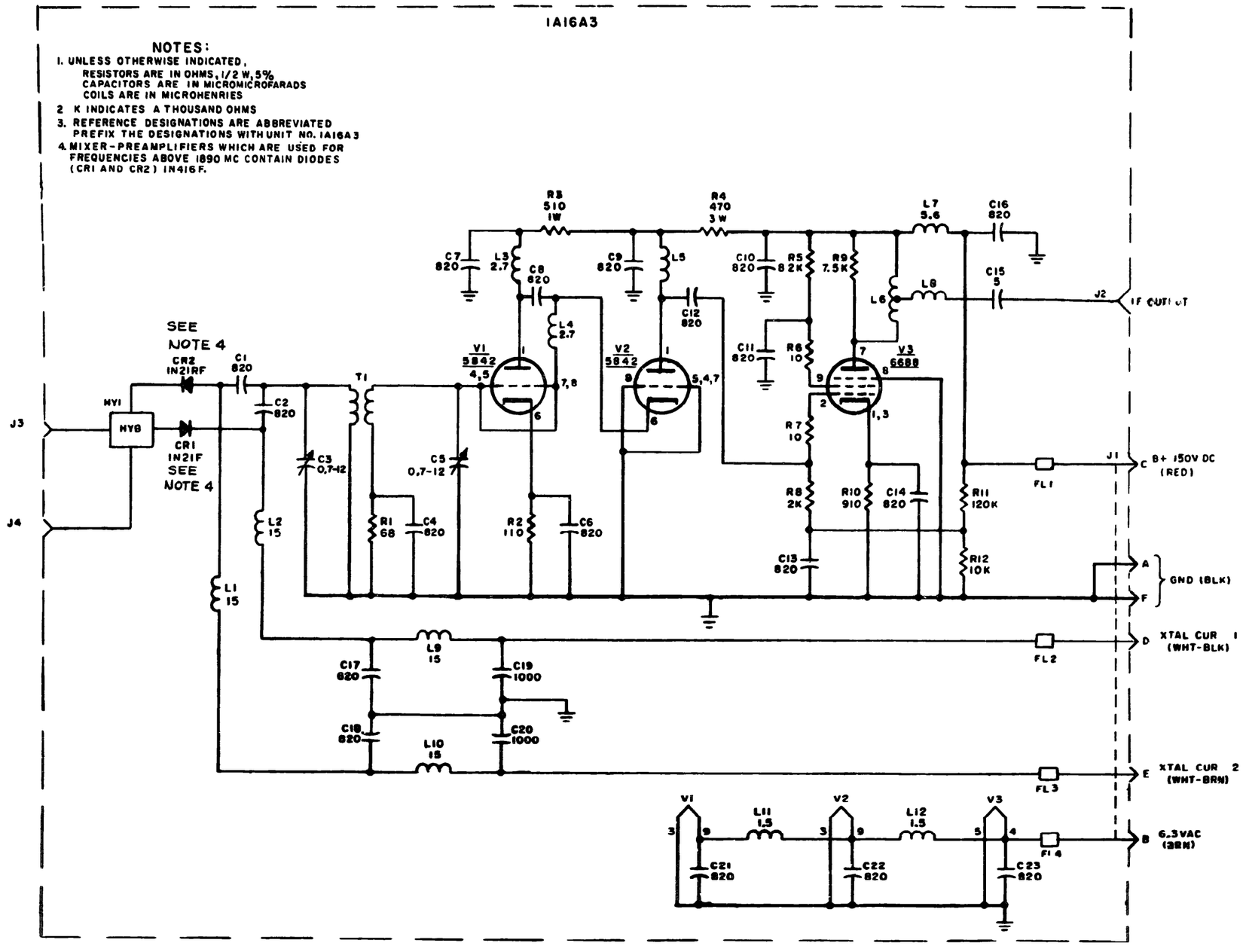


Figure 7-14.1 MIXER-PREAMPLIFIER (TEST RECEIVER), SCHEMATIC DIAGRAM

SECTION 8

COMPONENT IDENTIFICATION

8.1 GENERAL

This section lists and illustrates certain replaceable electrical and electronic assemblies, subassemblies, and component parts for the Maintenance Test Facility

8.2 ARRANGEMENT

The replaceable parts listing, Table 8-1, is arranged as follows:

a. The FIG. AND INDEX NO. column identifies the figure in which the part is illustrated and called out by index number.

b. The REF DESIG column lists in alphanumerical sequence the reference designations that have been established for the electrical and electronic parts contained within the equipment.

c. The MFR PART NUMBER column lists one of the following:

(1) Philco Corporation part number for an item manufactured or altered by Philco-Ford Corporation.

(2) The vendor's part number for purchased parts.

(3) A government standard part number such as AN or MS.

d. The DESCRIPTION column lists the item nomenclature placed in the drawing title block by the design activity in accordance with the contract drawing specification together with any additional information required to completely identify the part.

e. The QTY column lists one of the following:

(1) The exact quantity of the item as used per one next higher assembly.

(2) The abbreviation AR for as required.

(3) The abbreviation REF for reference. These items are listed for reference purposes only: they indicate that the quantity for the item is listed in its next higher assembly.

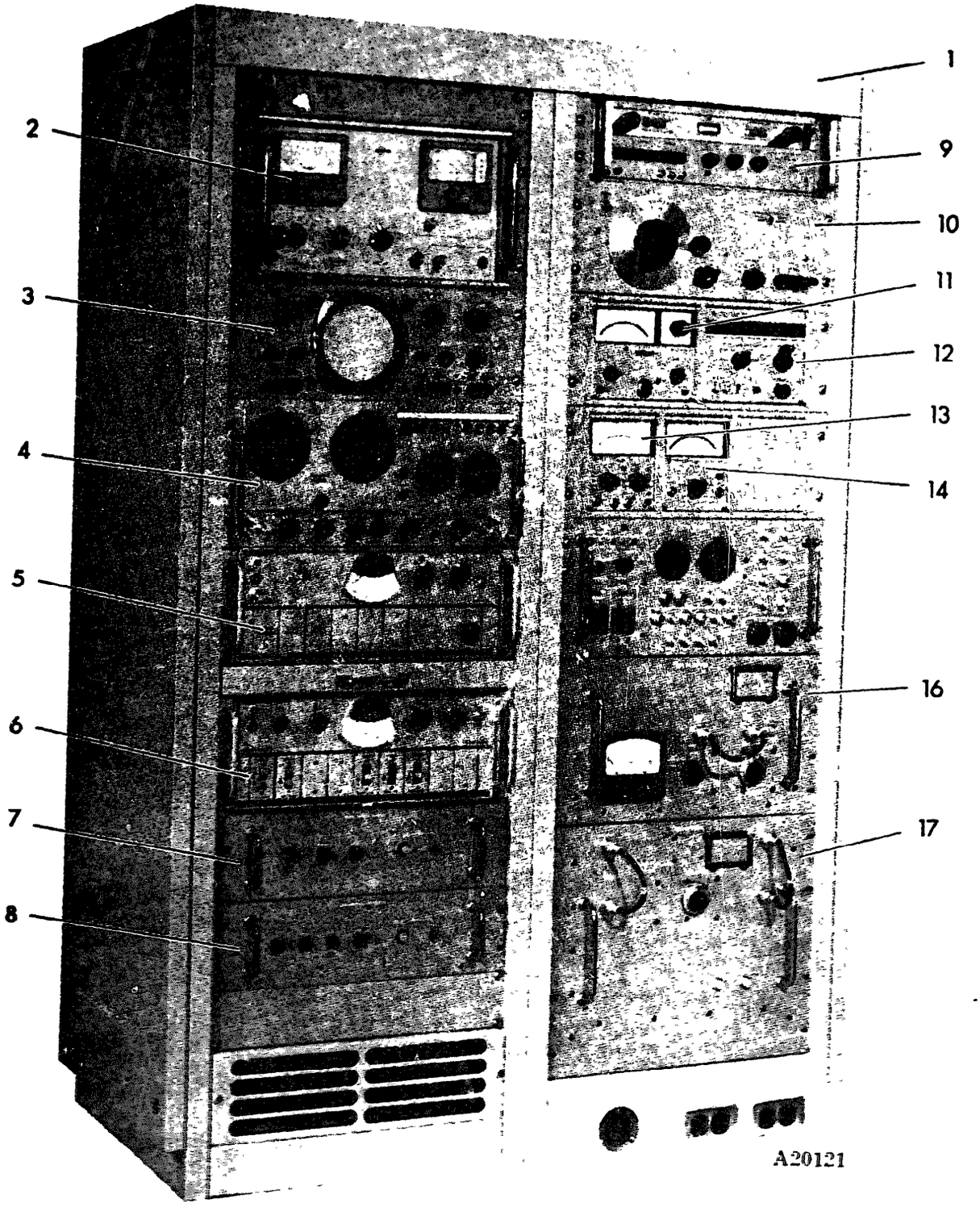


Figure 8-1(1). Maintenance Test Facility (Sheet 1 of 2)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-1		367-1693-1	**MAINTENANCE TEST FACILITY**	1
		367-1693-2	MAINTENANCE TEST FACILITY	1
		367-1693-3	MAINTENANCE TEST FACILITY	1
		367-1693-4	MAINTENANCE TEST FACILITY	1
		367-1693-5	MAINTENANCE TEST FACILITY	1
		367-1693-6	MAINTENANCE TEST FACILITY	1
		367-1693-7	MAINTENANCE TEST FACILITY	1
		367-1693-8	MAINTENANCE TEST FACILITY	1
		367-1693-9	MAINTENANCE TEST FACILITY	1
-1	1A1	368-41996	CABINET ASSEMBLY (see fig. 8-2)	1
-2	1A2	125BZ	VOLTMETER, Frequency Selective	1
-3	1A3	130C/OPT 6 AND 13	OSCILLOSCOPE	1
-4	1A4	MODEL 2000	SWEEP GENERATOR (used on 367-1693-7 and -8 only	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-1-4 (Cont)	1A4	MODEL 2000	SWEEP GENERATOR (used on 367-1693-9 only)	1
	1A4	MODEL 2000	SWEEP GENERATOR (used on 367-1693-4, -5 and -6 only)	1
	1A4	MODEL 2000	SWEEP GENERATOR - (used on 367-1693-1, -2 and -3 only)	1
-5	1A5	368-42535-1	NOISE RECEIVER (used on 367-1693-7 only) (See fig. 8-4)	1
	1A5	368-42535-2	NOISE RECEIVER (used on 367-1693-9 only) (See fig. 8-4)	1
	1A5	368-42535-3	NOISE RECEIVER (used on 367-1693-1 -2 and -3 only) (See fig. 8-4)	1
	1A5	368-42535-4	NOISE RECEIVER (used on 367-1693-4, -5, -6 and -8 only) (See fig. 8-4)	1
-6	1A6	368-42534-1	NOISE GENERATOR (used on 367-1693-7 and -8 only) (See fig. 8-5)	1
	1A6	368-42534-2	NOISE GENERATOR (used on 367-1693-9 only) (See fig. 8-5)	1

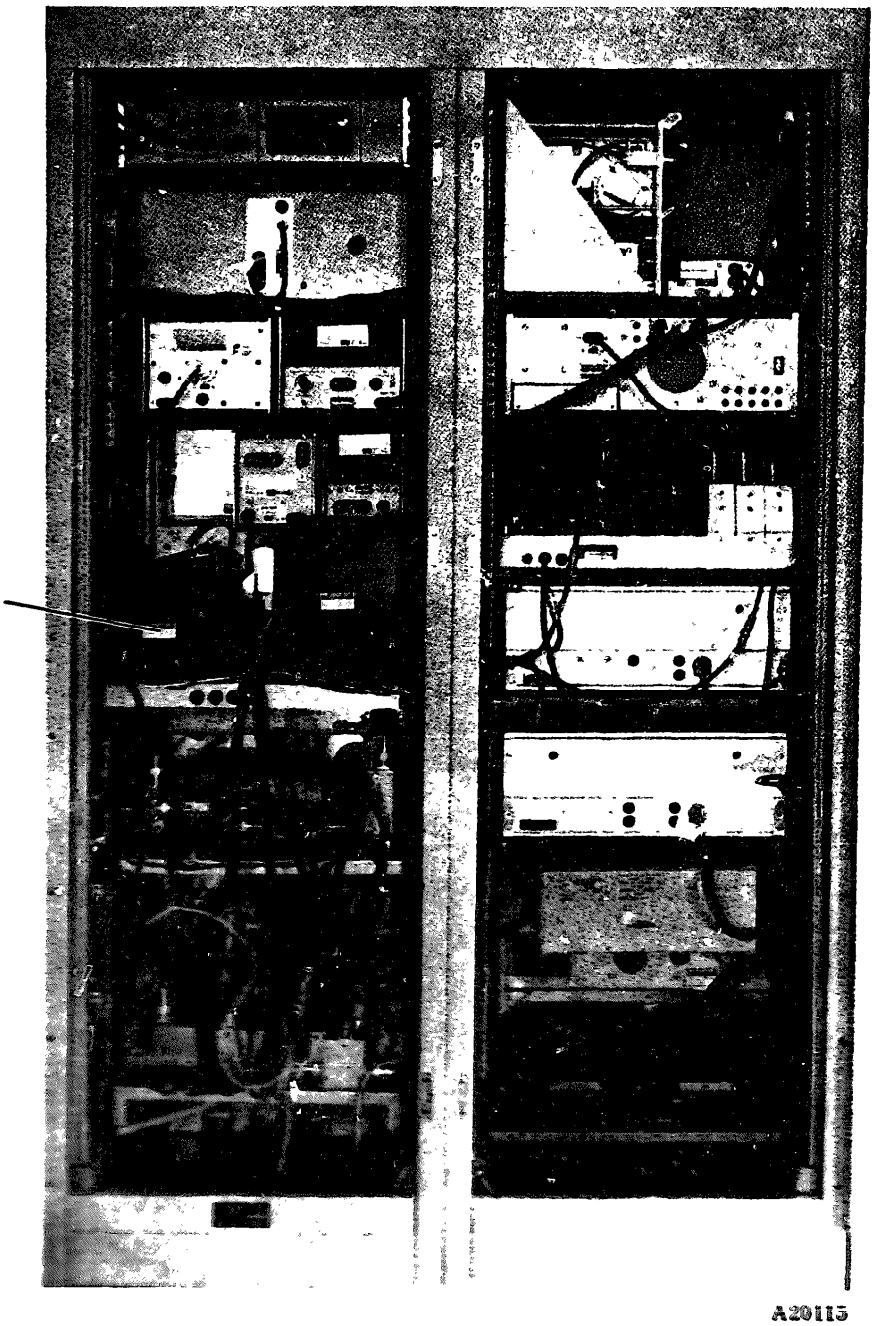


Figure 8-1(2). Maintenance Test Facility (Sheet 2 of 2)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-1-6 (Cont)	1A6	538-42534-3	**NOISE GENERATOR (used on 367-1693-1, -2 and -3 only)** (See fig. 8-5)	1
	1A6	368-42534-4	**NOISE GENERATOR (used on 367-1693-4, -5 and -6)** (See fig. 8-5)	1
-7	1A7	368-37635-3	**MAIN POWER SUPPLY** (See fig. 8-6)	1
-8	1A8	C-6313	**POWER SUPPLY, Combiner**	1
-9	1A9	8614AOPT01	**SIGNAL GENERATOR**	1
-10	1A10	200CD	**WIDE-RANGE OSCILLATOR**	1
-11	1A11	C14-431B/02	**POWER METER**	1
-12	1A12	3200B	**VHF OSCILLATOR**	1
-13	1A13	C01-401C	**ELECTRONIC VOLTMETER**	1
-14	1A14	400E	**AC VOLTMETER**	1
-15	1A15	368-41997	**POWER SUPPLY ASSEMBLY** (See fig. 8-7)	1
-16	1A16	368-41998-1	**TEST RECEIVER (used on 367-1693-2 and -4 only)** (See fig. 8-8)	1

FIG. AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-1-16 (Cont)	1A16	368-41998-2	**TEST RECEIVER (used on 367-1693-1 and -7 only)** (See fig. 8-8)	1
	1A16	368-41998-3	**TEST RECEIVER (used on 367-1693-5 only)** (See fig. 8-8)	1
	1A16	368-41998-4	**TEST RECEIVER (used on 367-1693-3 and -6 only)** (See fig. 8-8)	1
	1A16	368-41998-5	**TEST RECEIVER** (used on 367-1693-8 **only)** (See fig. 8-8)	1
	1A16	368-41998-6	TEST RECEIVER (used on 367-1693-9 only) (See fig. 8-8)	1
-17	1A17	368-42046-l	TEST EXCITER (used on 367-1693-2 **and** -4 only) (See fig, 8-11)	1
	1A17	368-42046-2	TEST EXCITER (used on 367-1693-1 and -7 only) (See fig, 8-11)	1
	1A17	368-42046-3	TEST EXCITER (used on 367-1693-3 and -6 only) (See fig. 8-11)	1
	1A17	368-42046-4	TEST EXCITER (used on 367-1693-5 only) (See fig. 8-11)	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-1-17 (Cont)	1A17	368-42046-5	TEST EXCITER (used on 367-1693-8 only) (See fig. 8-11)	1
	1A17	368-42046-6	TEST EXCITER (used on 367-1693-9 only) (See fig. 8-11)	1
		461-4901	CABLE ASSEMBLY (not illustrated)	1
		UG89B/U	CONNECTOR, Jack, electrical	2
		461-4809	CABLE ASSEMBLY (not illustrated)	1
		UG89B/U	CONNECTOR, Jack, electrical	1
		UG88B/U	CONNECTOR, Plug, electrical	1

Figure 8-2(1). **Cabinet Assembly 1A1 (Sheet 1** of 2)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	M F R PART NUMBER	DESCRIPTION	QTY
8-2	1A1	368-41996	**CABINET ASSEMBLY** (See fig. 8-1 for NHA)	Ref
- 1		368-41715	**CABINET SUBASSEMBLY**	1
- 2		B-350	**BLOWER**	1
- 3	A1	368-42000	TEST PANEL (See fig. 8-3)	1
- 4	J1	7327G	CONNECTOR, Receptacle, electrical	1
- 5	J2, J3	2515	CONNECTOR, Receptacle, electrical	2
- 6	S1	V4-14	SWITCH, Blower **air-vane**	1
- 7	TB2	2-140	BOARD, TERMINAL	1
			FOR CABLE LOCATIONS REFER TO RF WIRING DIAGRAM, FIGURE 7-6.	
		461-4808	CABLE ASSEMBLY	1
	1W1	461-812	CABLE ASSEMBLY	1
	P1, P2	UG111/U	CONNECTOR, Plug, electrical	2
	1W2	461-4813	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR, Plug, electrical	2

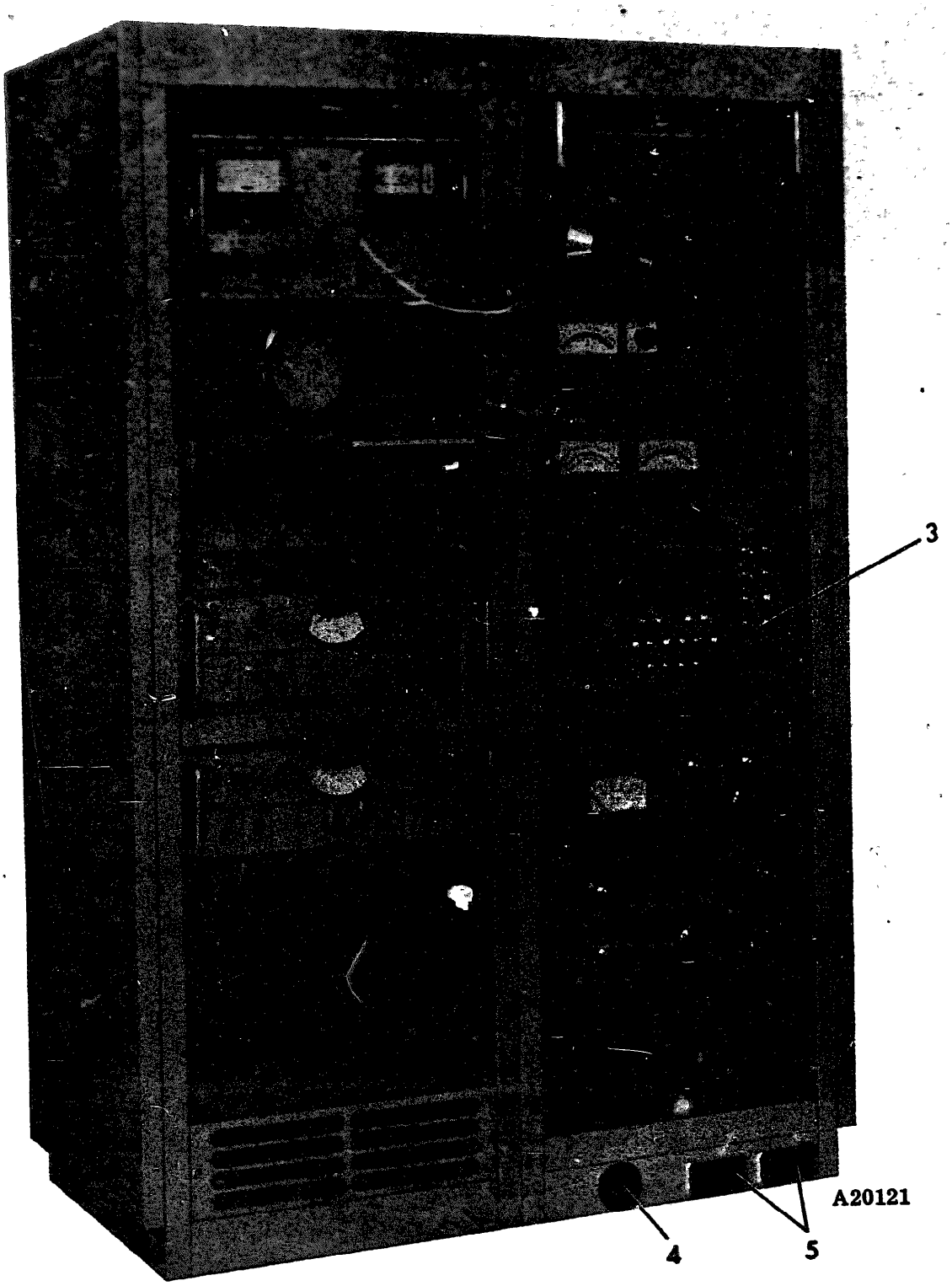


Figure 8-2(2). Cabinet Assembly 1A1 (Sheet 2 of 2)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-2- 7 (Cont)	1W3	461-4814	CABLE ASSEMBLY	1
	P1, P2	UG21C/U		2
	1W4	461-4815	CABLE ASSEMBLY	1
	P1, P2	UG111/U	CONNECTOR, Plug, electrical	2
	1W5	461-4816	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR,, Plug, electrical	2
	1W6	461-4817	CABLE ASSEMBLY	1
	P1, P2	UG21C/U	CONNECTOR, Plug, electrical	2
	1W7	461-4818	CABLE ASSEMBLY	1
	P1, P2	UG260B/U	CONNECTOR, Plug, electrical	2
	1W8	461-4819	CABLE ASSEMBLY	1
	P1, P2	UG260B/U	CONNECTOR, Plug, electrical	2
	1W9	461-4820	CABLE ASSEMBLY	1
	P1	UG260B/U	CONNECTOR, Plug, electrical	1
	P2	MDPBLK	CONNECTOR, Plug, electrical	1
	1W10	461-4821	CABLE ASSEMBLY	1
	P1	UG260B/U	CONNECTOR, Plug, electrical	1
	P2	MDPBLK	CONNECTOR, Plug, electrical	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-2- 7 (Cont)	1W13	461-4822	CABLE ASSEMBLY	1
	P1	UG88C/U	CONNECTOR, Plug, electrical	1
	P2	UG536B/U	CONNECTOR, Plug, electrical	1
	1W14	461-4823	CABLE ASSEMBLY	1
	P1, P2	UG536B/U	CONNECTOR, plug, electrical	2
	1W15	461-4824	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR, Plug, electrical	2
	1W16	461-4825	CABLE ASSEMBLY	1
	P1, P2	UG8C/U	CONNECTOR, Plug, electrical	2
	1W17	461-4826	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR, Plug, electrical	2
	1W18	461-4827	CABLE ASSEMBLY	1
	P1, P2	UG21C/U	CONNECTOR, Plug, electrical	2
	1W19	461-4828	CABLE ASSEMBLY	1
	P1	UG88C/U	CONNECTOR, Plug, electrical	1
	P2	MPDBLK	CONNECTOR, Plug, electrical	1
	1W20	461-4829	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR, Plug, electrical	2

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	M F R PART NUMBER	DESCRIPTION	QTY
8-2- 7 (Cont)	1W21	461-4830	CABLE ASSEMBLY	1
	P1	UG88C/U	CONNECTOR, Plug, electrical	1
	P2	MPD BLK	CONNECTOR, Plug, electrical	1
	1W22	461-4831	CABLE ASSEMBLY	1
	P1, P2	UG1185/U	CONNECTOR, Plug, electrical	2
	1W23	461-4803	CABLE ASSEMBLY	1
	P1, P2	UG88C/U	CONNECTOR, Plug, electrical	2

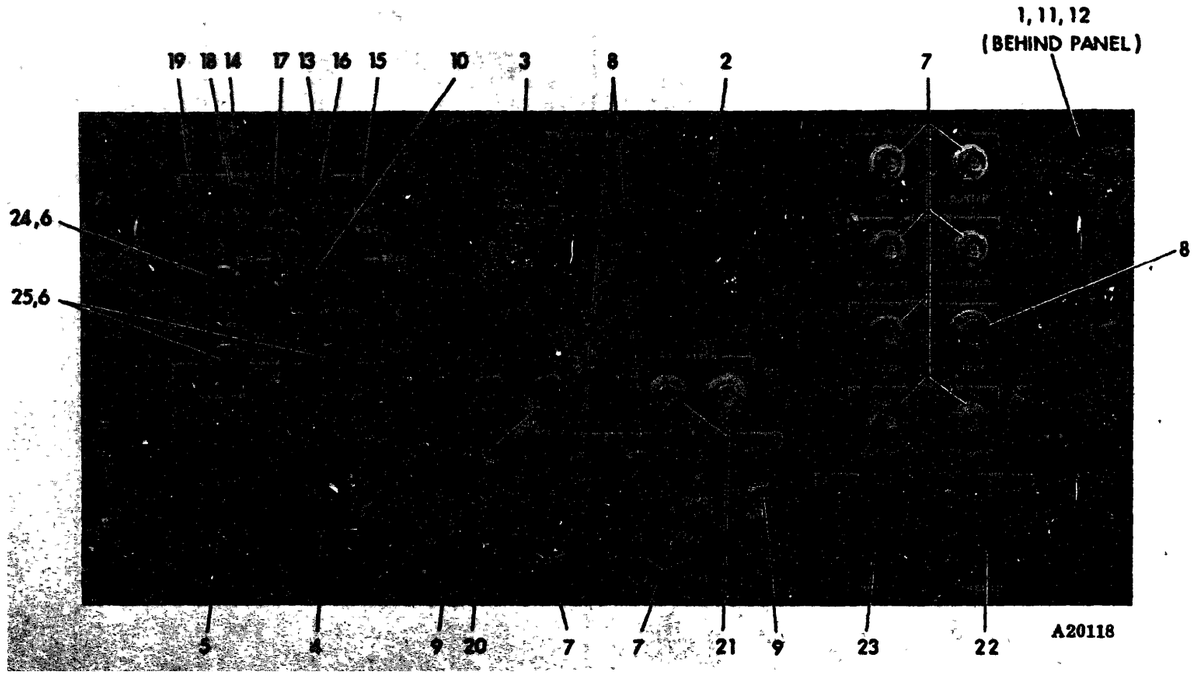


Figure 8-3. Test Panel 1A1A1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-3	1A1A1	368-42000	TEST PANEL (See fig. 8-2 for NHA)	Ref
- 1	A2	D3-2TB	POWER SPLITTER, 1000 to 3000 mc	1
- 2	AT1	TB50	ATTENUATOR, Turret, 0-10 db,	1
- 3	AT2	AX6FN	ATTENUATOR, Turret, 0-30 db, dc to 4500 mc, 50 ohms, 2W	1
- 4	CB1	AM33MG6-5A115V60C4	CIRCUIT BREAKER, 5 amp, 115V, 60 cps, curve 4	1
- 5	CB2	AM33MG6-15A115V60C4	CIRCUIT BREAKER, 15 amp, 115V, 60 cps, curve 4	1
- 6	DS1, DS2, DS3	NE51		3
- 7	J1 thru J4, J6 thru J8, J14, J17, J21 thru J24	UG492A/U	CONNECTOR, Receptacle, electrical	13
- 8	J5, J15, J16	UG30D/U	CONNECTOR, Receptacle, electrical	3
- 9	J13, J18	UG363/U	CONNECTOR, Receptacle, electrical	2
-10	S1	7263K11	SWITCH, Rotary	1

FIG. AND INDEX NO.	REF DESIG	M F R PART NUMBER	DESCRIPTION	QTY
8-3-11	TB1	8 -140Y	BOARD, Terminal	1
-12	TB2	5 24	BOARD, Terminal	1
-13	TP1	MS16108-3A	TEST POINT	1
-14	TP2	MS16108-1A	TEST POINT	1
-15	TP3	MS16108-4A	TEST POINT	1
-16	TP4	MS16108-6A	TEST POINT	1
-17	TP5	MS16108-5A	TEST POINT	1
-18	TP6	MS16108-8A	TEST POINT	1
-19	TP7	MS16108-2A	TEST POINT	1
	W1	461-4853	CABLE ASSEMBLY (not illustrated)	1
	W1P1	UG88C/U	CONNECTOR, Plug, electrical	1
	W1P2	UG89C/U	CONNECTOR, Plug, electrical	1
	W2	461-4854	CABLE ASSEMBLY (not illustrated)	1
	W2P1, W2P2	UG88C/U	CONNECTOR, Plug, electrical	2
	W3, W4	461-4840	CABLE: ASSEMBLY	2
-20	W3J11, W4J12	UG556/U		2
	W3P1, W4P1	18750	CONNECTOR, Plug, electrical	2

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8–3– (Cont)	W5, W6	461-4844	CABLE ASSEMBLY	2
–21	W5J9 W6J10	UG909/U	CONNECTOR, Receptacle, electrical	2
	W5P1, W6P1	UG913A	CONNECTOR, Plug, electrical (not illustrated)	2
	W7	461-4811	CABLE .ASSEMBLY	1
–22	W7J19	MS3102R20-27S	CONNECTOR, Receptacle, electrical	1
–23	W7J20	MS3102R20-14S	CONNECTOR, Receptacle, electrical	1
	W7P1, W7P2	5265	CONNECTOR, Plug, electrical (not illustrated)	2
–24	XDS1	52408-991	INDICATOR ASSEMBLY, Lamp	1
–25	XDS2, XDS3	52408-995	INDICATOR ASSEMBLY, Lamp	2

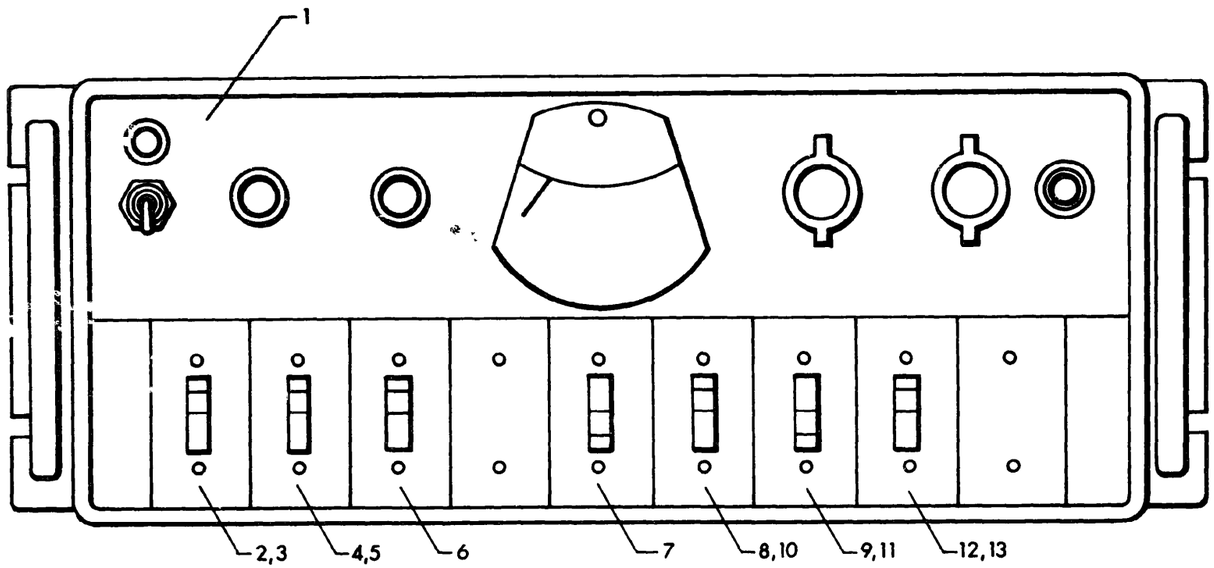


Figure 8-4. Noise Receiver 1A5

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-4	1A5	368-42535-1	NOISE RECEIVER (See fig, 8-1 for NHA)	Ref
	1A5	368-42535-2	NOISE RECEIVER (See fig. 8-1 for NHA)	Ref
	1A5	368-42535-3	NOISE RECEIVER (See fig. 8-1 for NHA)	Ref
	1A5	368-42535-4	NOISE RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41840-4	NOISE RECEIVER (Used on 368-42535-1)	1
		368-41840-5	NOISE RECEIVER (Used on 368-42535-2)	1
		368-41840-6	NOISE RECEIVER (Used on 368-42535-3)	1
		368-41840-7	NOISE RECEIVER (Used on 368-42535-4)	1
- 1		2092R	NOISE RECEIVER	1
- 2		TM7730-1	FILTER, Bandpass, 40 kc (Used on 368-41840-5 only)	1
- 3		TM7730-2	FILTER, Band pass, 70 kc	1
- 4		TM7730-3	FILTER, Band pass, 105 kc (Used on 368-41840-5 only)	1
- 5		TM7730-4	FILTER, Band pass, 185 kc (Used on 368-41840-4 and -6 only)	1
- 6		TM7730-5	FILTER, Band pass, 270 kc (Used on 368-41840-4, -6 and -7 only)	1
- 7		TM7730-6	FILTER, Band pass, 534 kc (Used on 368-41840-4 and -7 only)	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-4- 8		TM7793-1	**OSCILLATOR MODULE, 40 kc (Used** on 368-41840-5 only)	1
- 9		TM7794	OSCILLATOR MODULE, 70 kc	1
-10		TM7794-1	**OSCILLATOR MODULE, 105 kc (Used** on 368-41840-5 only)	1
-11		TM7794-2	**OSCILLATOR MODULE, 185 kc (Used** on 368-41840-4 and -6 only)	1
-12		TM7794-3	**OSCILLATOR MODULE, 270 kc (Used** on 368-41840-4, -6 and -7 only)	1
-13		TM7794-4	**OSCILLATOR MODULE, 534 kc (Used** on 368-41840-4 and -7 only)	1
	W1	461-4810	CABLE ASSEMBLY (not illustrated)	1
	J1	UG89B/U	CONNECTOR, Receptacle, electrical	1
	P1	UG88B/U	CONNECTOR, Plug, electrical	1

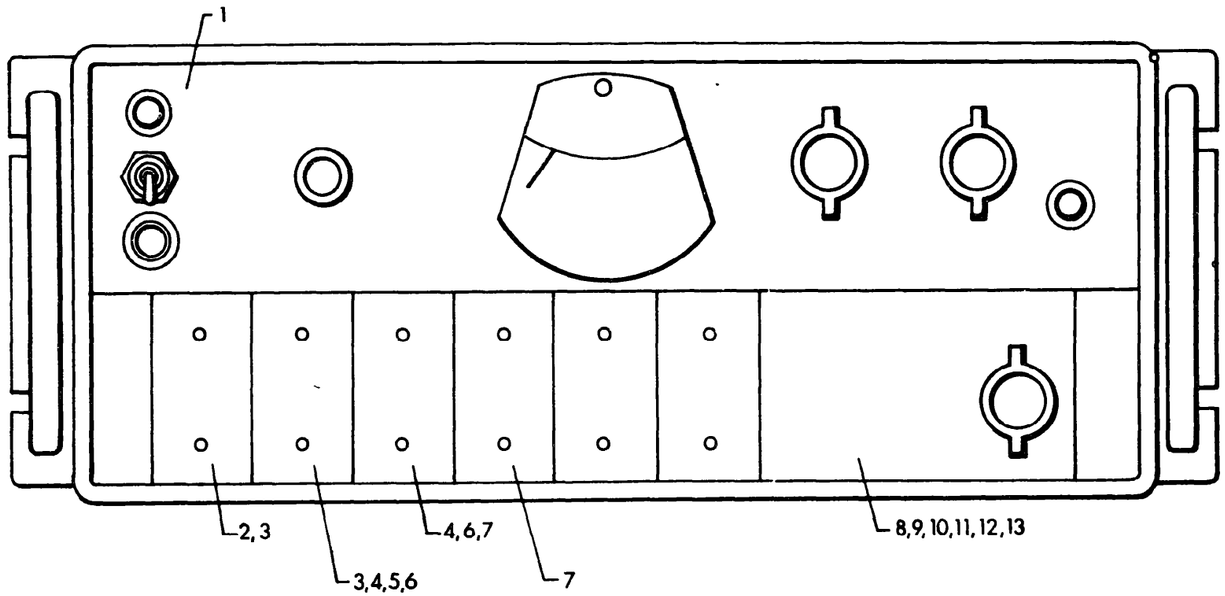


Figure 8-5. Noise Generator 1A6

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-5	1A6	368-42534-1	**NOISE GENERATOR,** (See fig. for NHA)	Ref
	1A6	368-42534-2	**NOISE GENERATOR,** (See fig. 8-1 for NHA)	Ref
	1A6	368-42534-3	**NOISE GENERATOR,** (See fig. 8-1 for NHA)	Ref
	1A6	368-42534-4	**NOISE GENERATOR,** (See fig. 8-1 for NHA)	Ref
		368-41840	**NOISE GENERATOR (used on 368-42534-1)**	1
		368-41840-1	**NOISE GENERATOR (used on 368-42534-2)**	1
		368-41840-2	**NOISE GENERATOR (used on 368-42534-3)**	1
		368-41840-3	**NOISE GENERATOR (used on 368-42534-4)**	1
- 1		2091R	**NOISE GENERATOR**	1
- 2		TM7728	**FILTER, High pass, 12 kc (used on 368-41840-1 only)**	1
- 3		TM7728-1	**FILTER, High pass, 60 kc (used on 368-41840, -2 and -3 only)**	1
- 4		TM7720	**FILTER, Low pass, 108 kc (used on 368-41840-1 only)**	1
- 5		TM7720-1	**FILTER, Low pass, 300 kc (used on 368-41840 and -2 only)**	1
- 6		TM7720-2	**FILTER, Low pass, 552 kc (used on 368-41840 and -3 only)**	1
- 7		TM7729-1	**FILTER, Band stop, 40 kc (used on 368-41840-1 only)**	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	M F R PART NUMBER	DESCRIPTION	QTY
8-5- 8		TM7729-2	FILTER, Band stop, 70 kc	1
- 9		TM7729-3	FILTER, Band stop, 105 kc (used on 368-41840-1 only)	1
-10		TM7729-4	FILTER, Band stop, 185 kc (used on 368-41840 only)	1
-11		TM7729-5	FILTER, Band stop, 270 kc (used on 368-41840, -2 and -3 only)	1
-12		TM7729-6	FILTER, Band stop, 534 kc (used on 368-41840 and -3 only)	1
-13		TM7729-4	FILTER, Band stop, 185 kc (used on 368-41840-2 only)	1
	W1	461-4810	CABLE ASSEMBLY (not illustrated)	1
	W1J1	UG89B/U	CONNECTOR, Receptacle, electrical	1
	W1P1	UG88B/U	CONNECTOR, Plug, electrical	1

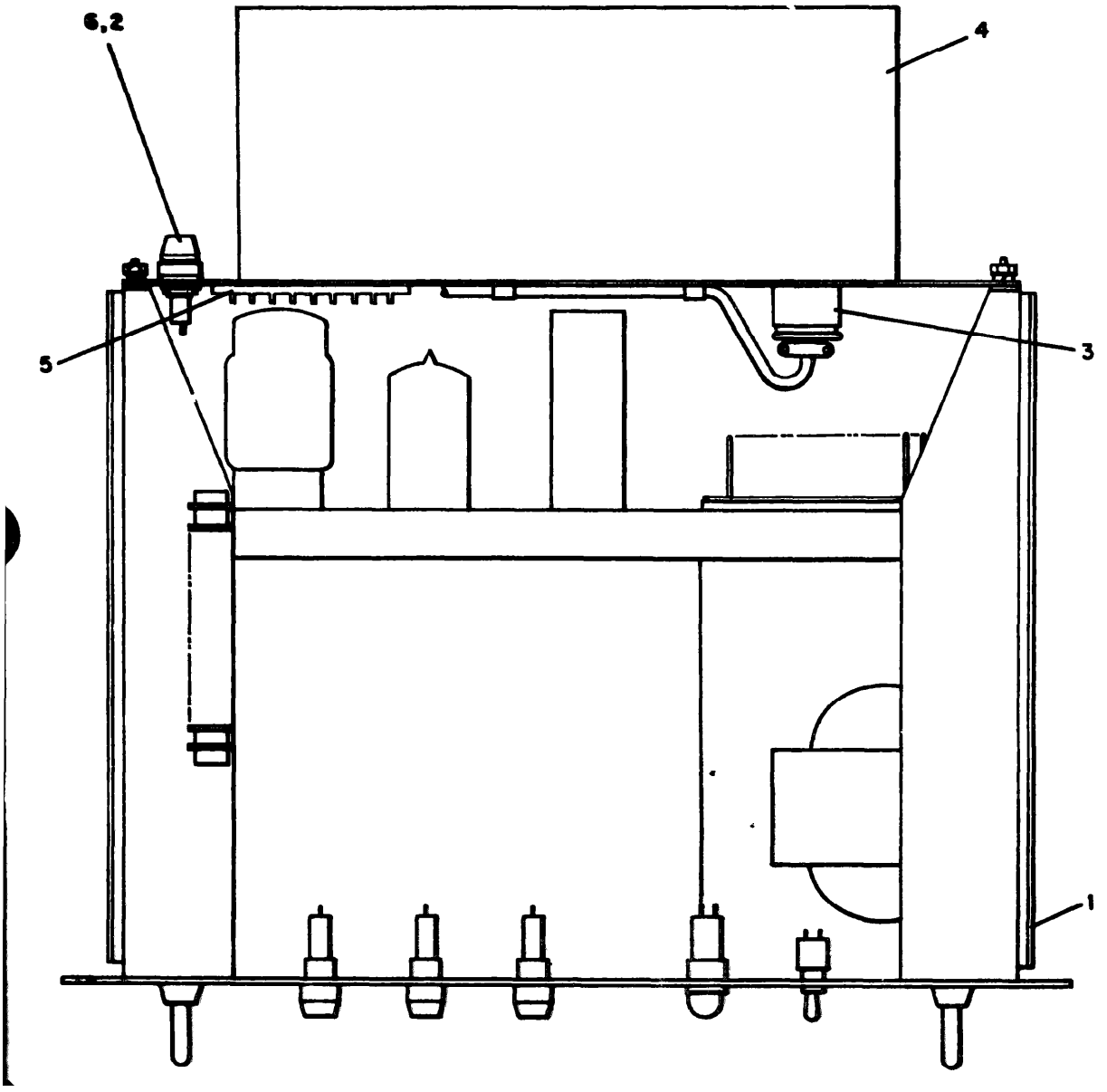


Figure 8-6. Main Power Supply 1A7

TABLE 8-1. COMPONENT IDENTIFICATION

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-6	1A7	368-37635-3	POWER SUPPLY, Main (See fig. 8-1 for NHA)	Ref
-1		C-6032	POWER SUPPLY	1
		368-41621	CHASSIS ASSEMBLY, DC filament power supply	1
-2	F4	10A-MDL	FUSE, Cartridge, 10 amp	1
-3	J1	8R6	CONNECTOR, Plug, electrical	1
-4	PS1	2390A	POWER SUPPLY, Dc regulated	1
-5	TB2	8-140	STRIP, Barrier	1
-6	XF4	372001	FUSEHOLDER, Cartridge	1

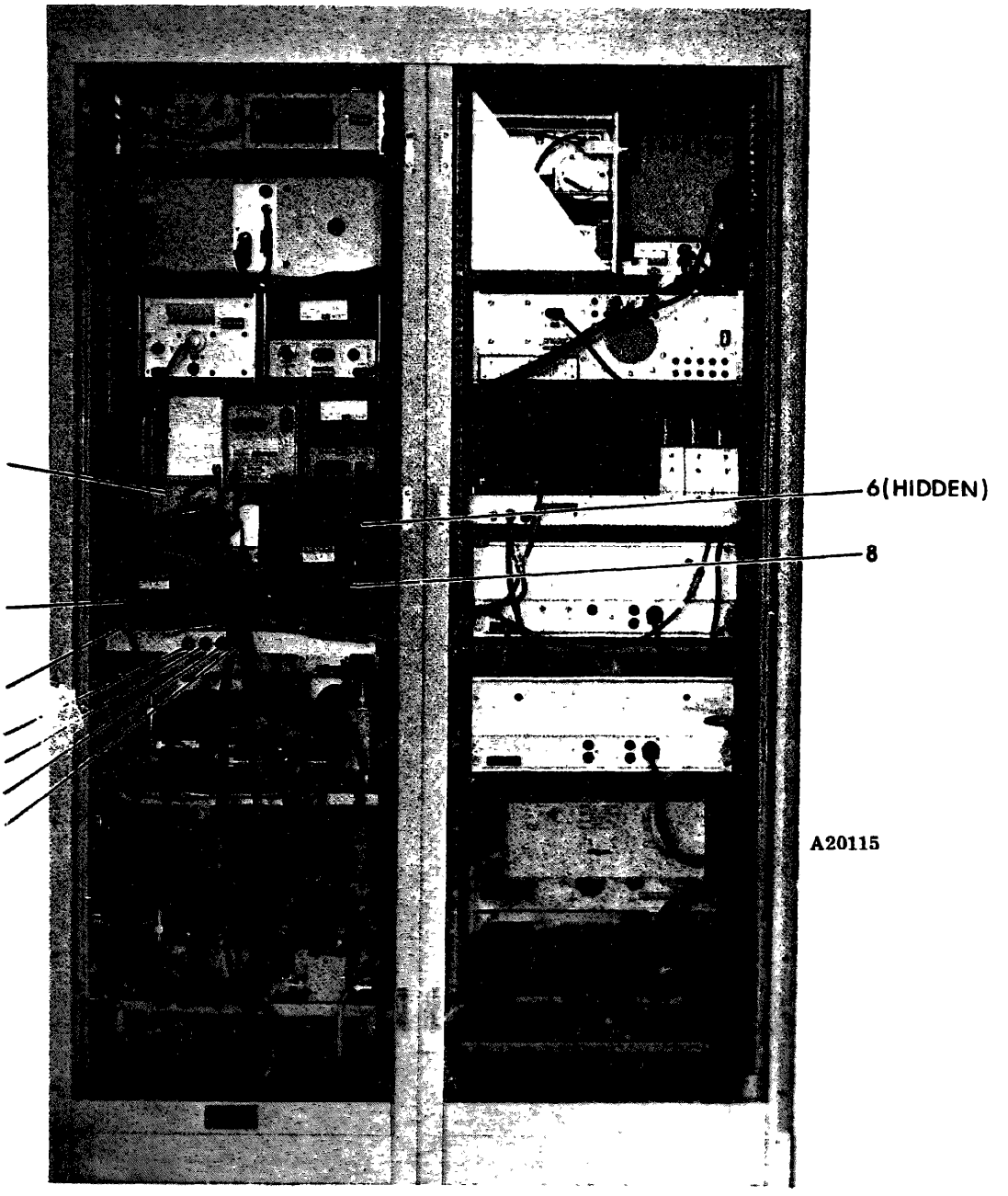


Figure 8-7. Power Supply Assembly 1A15

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-7	1A15	368-41997	**POWER SUPPLY ASSEMBLY** (See fig. 8-1 for NHA)	Ref
-1		F02B125V2AS	FUSE, Cartridge, 125V, 2 amp (PS1)	1
-2		F02B125V11-2AS	**FUSE, Cartridge, 125V, 1-1/2 amp (PS2)**	1
-3		F02B250V1-2AS	FUSE, Cartridge, 250V, 1/2 amp (PS3)	1
-4		F02B32V5AS	FUSE, Cartridge, 32V, 5 amp (PS4)	1
-5	PS1	A192-.30	POWER SUPPLY, +200 vdc	1
-6	PS2	A144-.40	POWER SUPPLY, +150 vdc	1
-7	PS3	A28-.95	POWER SUPPLY, +28 vdc	1
-8	PS4	5122XA6-15	POWER SUPPLY, 6.3V	1
-9	TB1	10-140Y	BOARD, Terminal	1

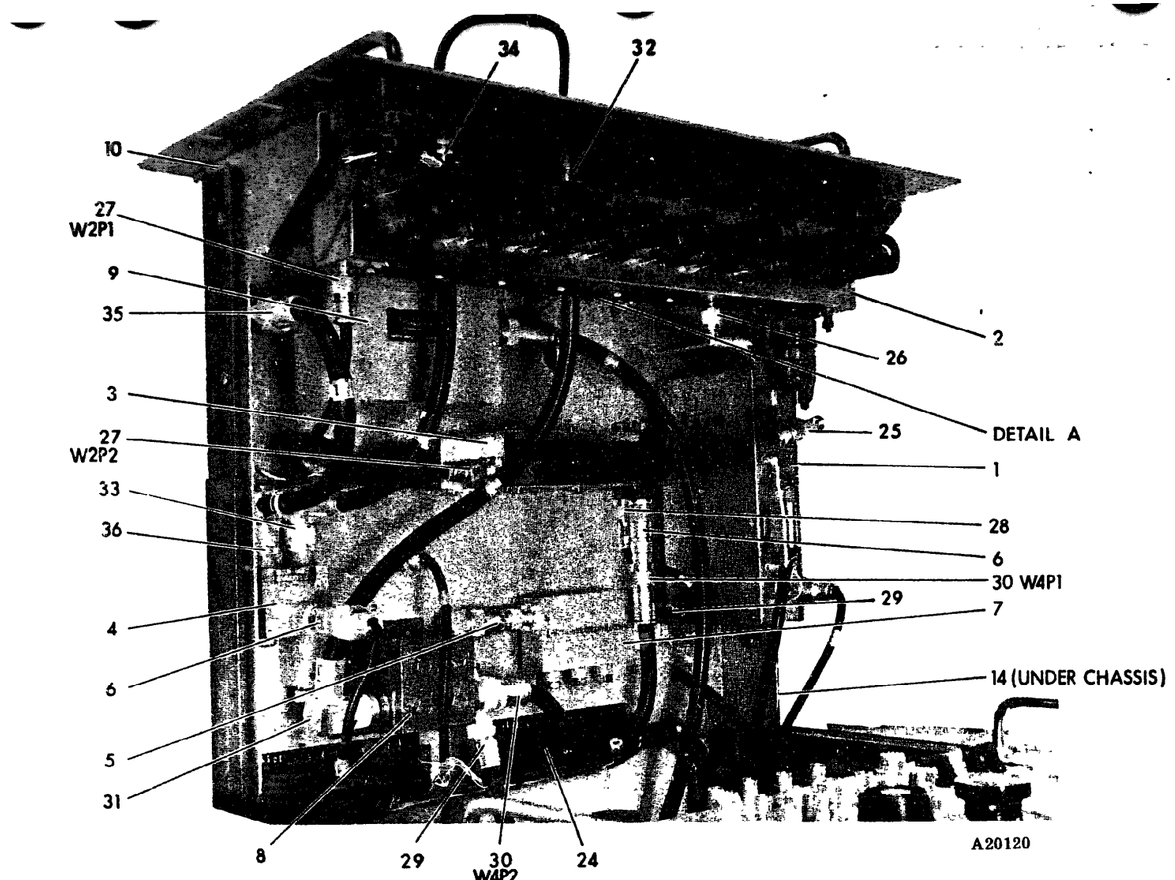


Figure 8-8(1). Test Receiver 1A16 (Sheet 1 of 3)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-8	1A16	368-41998-1	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41998-2	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41998-3	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41998-4	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41998-5	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
		368-41998-6	TEST RECEIVER (See fig. 8-1 for NHA)	Ref
- 1	A1	368-41748-1	LIMITER DISCRIMINATOR (used on 368-41998-1 through 5) (See fig. 8-9)	1
	A1	368-41748-2	LIMITER DISCRIMINATOR (used on 368-41998-6) (See fig. 8-9)	1
- 2	A2	368-37593-4	AMPLIFIER, Intermediate freq (See fig. 8-10)	1
- 3	A3	2253C02	MIXER UNIT, Preamplifier	1
- 4	A4	368-41438	MIXER	1
- 5	AT1	AA04N	ATTENUATOR, 4 db, 3w	1
- 6	AT2, AT3	AAO6N	ATTENUATOR, 6 db, 3w	2
- 7	FL1	368-38128-7	FILTER, Bandpass, 1722.5 MHz, 20 MHz baudwidth at 3 db (used on 368-41998-1)	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-8- 7 (Cont)	FL1	368-38128-8	FILTER, Bandpass, 1727.5 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-2)	1
	FL1	368-38128-9	FILTER, Bandpass, 1732.5 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-3 and -6)	1
	FL1	368-38128-10	FILTER, Bandpass, 2128 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-4)	1
	FL1	368-38128-11	FILTER, Bandpass, 2132 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-5)	1
- 8	FL2	BA4440-1792-5MC	FILTER, Bandpass, 1792.5 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-1)	1
	FL2	BA4440/1797.5MC	FILTER, Bandpass, 1797.5 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-2)	1
	FL2	BA4440/1802.5MC	FILTER, Bandpass, 1802.5 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-3 and -6)	1
	FL2	BA5440/2198MC	FILTER, Bandpass, 2198 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-4)	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-8- 8 (Cont)	FL2	BA5440/2202MC	FILTER, Bandpass, 2202 MHz, 20 MHz bandwidth at 3 db (used on 368-41998-5)	1
- 9	FL3	30D148400	FILTER, Tunable	1
-10		368-42001-1	RECEIVER DRAWER ASSEMBLY	1
-11	C1	5GAB-S47	CAPACITOR, Fixed, ceramic, 0.047 µf, ± 20%, 500 vdcw	1
-12	DS1	NE51	LAMP, Neon	1
-13	M1		METER, Panel	1
-14	R1		RESISTOR, Fixed, wirewound, 2500 ohms, 25w	1
-15	R2, R4		RESISTOR, Fixed, film, 100 ohms, ± 1%, 1/4w	2
-16	R3, R5		RESISTOR, Fixed, film, 2000 ohms, ± 1%, 1/4w	2
-17	R6		RESISTOR, Fixed, film, 4 mego, 1/2w	1
-18	R7		RESISTOR, Fixed, film, 1 mego, ± 1%, 1/2w	1
-19	R8		RESISTOR, Fixed, film, 10 mego, 1w	1

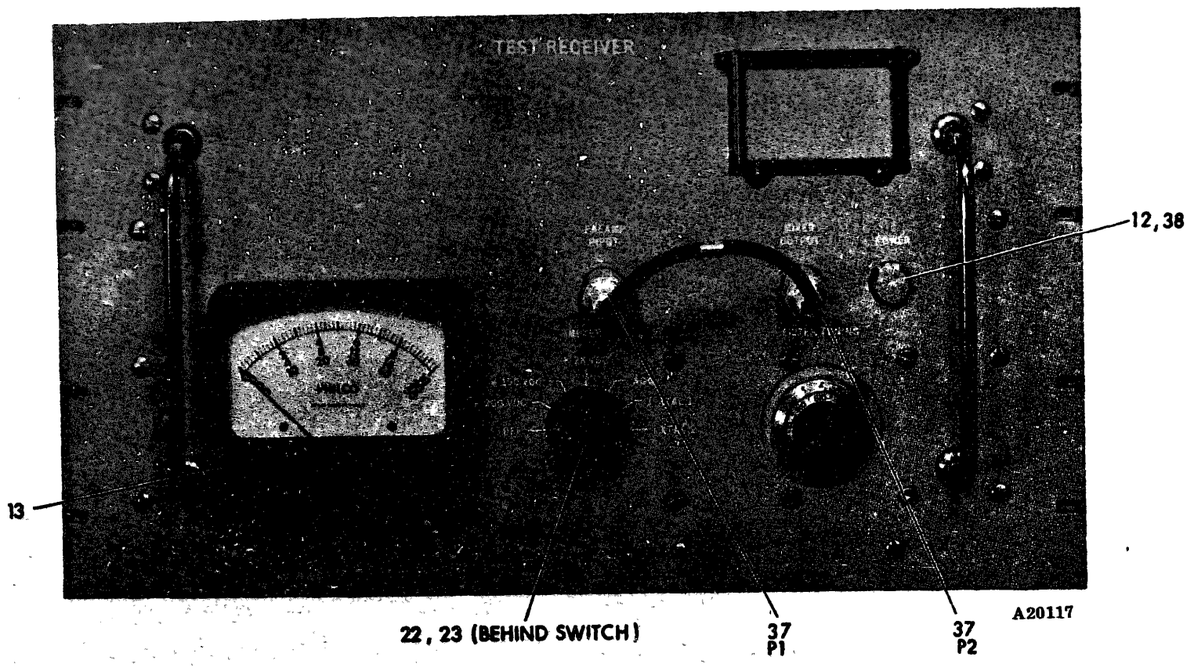


Figure 8-8(2). Test Receiver 1A16 (Sheet 2 of 3)

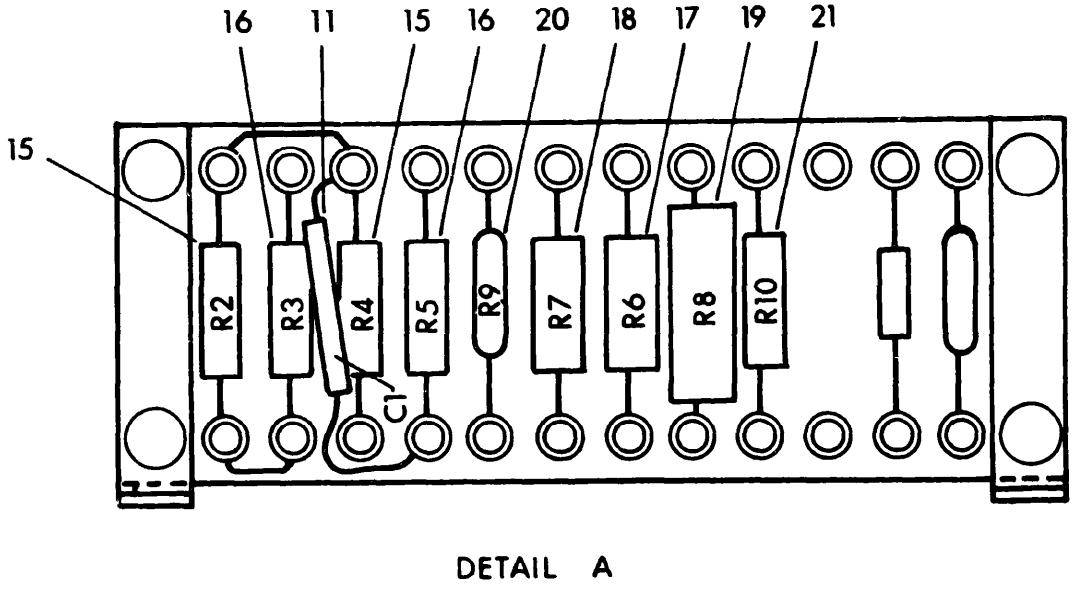


Figure 8-8(3). Test Receiver 1A16 (Sheet 3 of 3)

FIG. AND INDEX NO.	REF DESIG	*MFR PART NUMBER	DESCRIPTION	QTY
8-8-20	R9		RESISTOR, Fixed, film, 0.402 mego, ± 1%, 1/4w	1
-21	R10		RESISTOR, Fixed, film, 301 ohms, ± 1%, 1/4w	1
-22	R11		RESISTOR, Fixed, composition, 22,000 ohms, ±10%, 1/2w	1
-23	S1		SWITCH, Rotary	1
-24	TB1, TB2		STRIP, Barrier	2
	W1		CABLE ASSEMBLY	1
-25	W1P1		CONNECTOR, Plug, electrical	1
-26	W1P2		CONNECTOR, Plug, electrical	
	W2		CABLE ASSEMBLY	1
-27	W2P1, W2P2		CONNECTOR, Plug, electrical	2
	W3		CABLE ASSEMBLY	1
-28	W3P1		CONNECTOR, Plug, electrical	1
-29	W3P2	UG536B/U	CONNECTOR, Plug, electrical	1
	W4		CABLE ASSEMBLY	1
-30	W4P1, W4P2	UG21B/U	CONNECTOR, Plug, electrical	2

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-8 (Coat)	W5		CABLE ASSEMBLY	1
-31	W5P1		CONNECTOR, Plug, electrical	1
-32	W5J2	UG21B/U	CONNECTOR, Plug, electrical	1
	W6		CABLE ASSEMBLY	1
-33	W6P1		CONNECTOR, Plug, electrical	1
-34	W6J3	UG21B/U	CONNECTOR, Plug, electrical	1
	W7		CABLE ASSEMBLY	1
-35	W7P2		CONNECTOR, Plug, electrical	1
-36	W7P1	UG21B/U	CONNECTOR, Plug, electrical	1
	W8		CABLE ASSEMBLY	1
-37	W8P1, W8P2	UG536B/U	CONNECTOR, Plug, electrical	2
-38	XDS1	52408-995	INDICATOR ASSEMBLY, Lamp	1

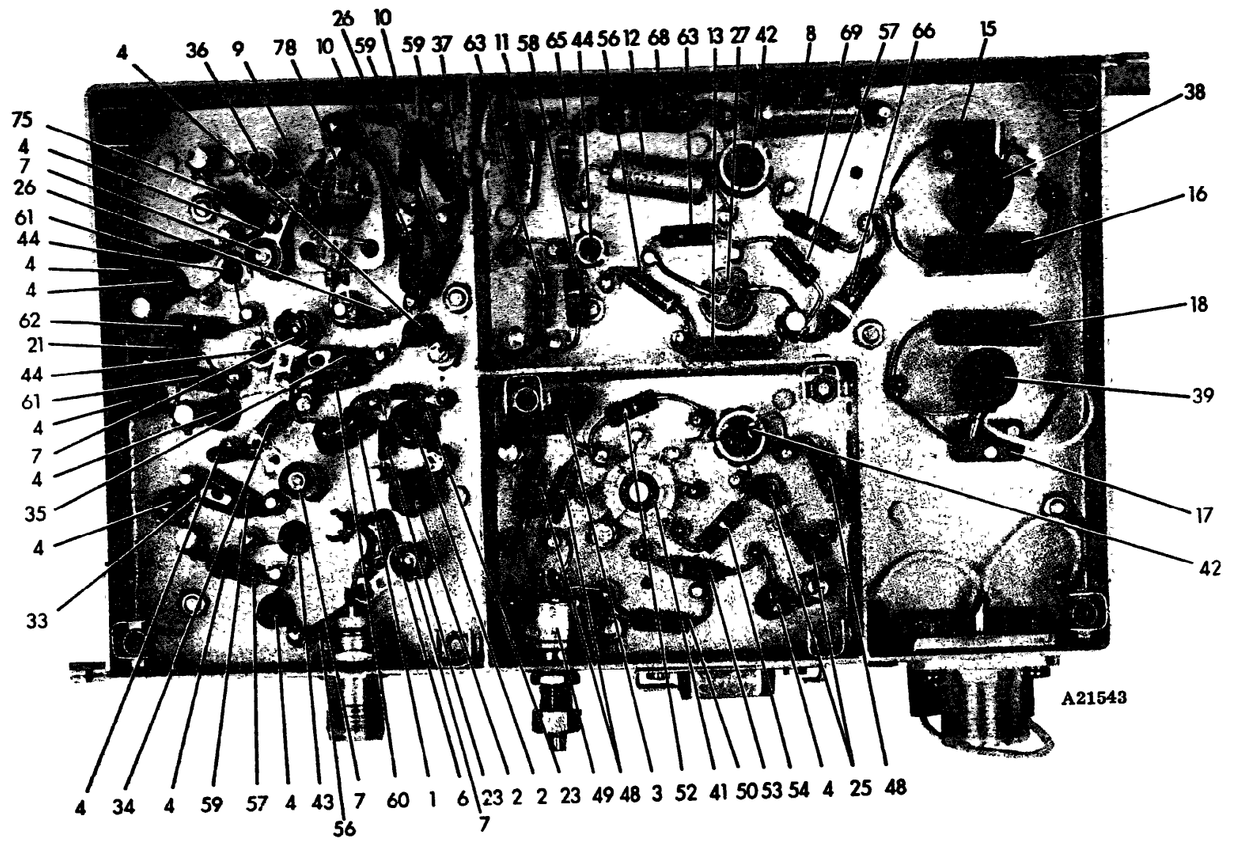


Figure 8-9(1). Limiter-Discriminator 1A16A1 (Sheet 1 of 3)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9	1A16A1	368-41748-1	LIMITER-DISCRIMINATOR (See fig. 8-8 for NHA)	Ref
		368-41748-2	LIMITER-DISCRIMINATOR (See fig. 8-8 for NHA)	Ref
- 1	C1		CAPACITOR, Fixed, mica, 20 μμf, ± 5%, 500 vdcw	1
- 2	C2, C3		CAPACITOR, Fixed, ceramic, 2200 μμf, ± 20%	2
- 3	C4, C5		CAPACITOR, Fixed, ceramic, 0.22 μf, +80, -20%, 12 vdcw	2
- 4	C6, C7, C11, C12, C13, C15, C16, C17, C18, C20, C21, C22, C23		CAPACITOR, Fixed, ceramic, 820 μμf, ± 20%	13
- 5	C8		CAPACITOR, Fixed, elect., 1μf, ± 10%, 35 vdcw	1
- 6	C9		CAPACITOR, Fixed, mica, 5μμf, ± 10%, 500 vdcw	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9- 7	C10, C14 C19, C24		CAPACITOR, Variable, ceramic, 2 to 12 μμf, 500 vdcw	4
			CAPACITOR, Variable, ceramic, 0.5 to 12 μμf, 500 vdcw	4
- 8	C25, C32		CAPACITOR, Fixed, elect., 47 μf, ± 10%, 35 vdcw	2
- 9	C26		CAPACITOR, Variable, ceramic, 3.0 to 12 μμf	1
-10	C27, C28		CAPACITOR, Fixed, mica, 10 μμf, ± 5%, 500 vdcw	2
-11	C29		CAPACITOR, Fixed, elect., 18 μf, ± 10%, 15 vdcw	1
-12	C30		CAPACITOR, Fixed, elect., 22 μf, ± 10%, 35 vdcw	1
-13	C31, C33		CAPACITOR, Fixed, elect., 22 μf, ± 10%, 15 vdcw	2
-14	C34, C39		CAPACITOR, Fixed, elect., 22 μf, ± 10%, 50 vdcw	2
-15	C35		CAPACITOR, Fixed, mica, 110 μμf	1
-16	C36		CAPACITOR, Fixed, mica, 1800 μμf, ± 1/2%, 500 vdcw	1

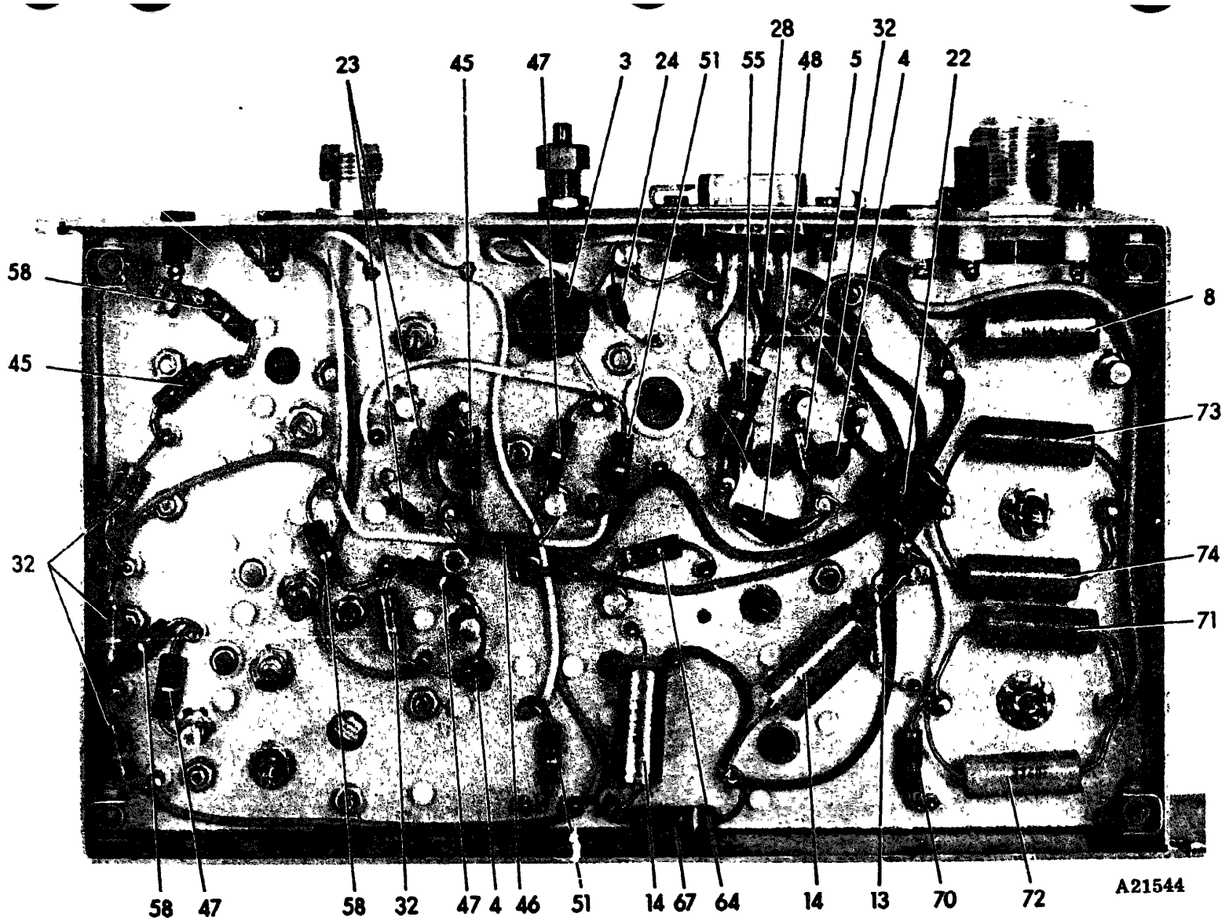


Figure 8-9(2). Limiter-Discriminator 1A16A1 (Sheet 2 of 3)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-26	CR8,CR9	1N270	SEMICONDUCTOR DEVICE, Diode	2
-27	CR10	1N3805B	SEMICONDUCTOR DEVICE, Diode	1
-28	CR11	1N4002	SEMICONDUCTOR DEVICE, Diode (used on 368-41748-1 only)	1
-29	J1		CONNECTOR, Receptacle, electrical	1
-30	J2		CONNECTOR, Receptacle, electrical	1
-31	J3		CONNECTOR, Receptacle, electrical	1
-32	L1,L3, L6,L7, L8		COIL, Rf, 4.7 mh	5
-33	L2		COIL, Rf, 0.625 mh	1
-34	L4		COIL, Rf, 1.35 mh	1
-35	L5		COIL, Rf, 0.33 mh	1
-36	L9		COIL, Variable, 134-171 mh	1
-37	L10		COIL, Rf, 1 mh	1
-38	L11		COIL, Variable, 55-130 mh	1
-39	L12		COIL, Variable, 25-65 mh (used on 368-41748-1 only)	1
-40	L13		COIL, Variable, 135-140 mh (used on 368-41748-2 only) (not illustrated)	1
-41	MD1		INTEGRATED CIRCUIT	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-42	Q1,Q6	2N1613	TRANSISTOR	2
-43	Q2	2N3563	TRANSISTOR	1
-44	Q3,Q4, Q5	2N706	TRANSISTOR (used on 368-41748-1 only)	3
-45	R1,R18		RESISTOR, Fixed, composition, 4700 ohms, ± 10%, 1/2w	2
-46	R2		RESISTOR, Fixed, composition, 1300 ohms, ± 5%, 1/2w	1
-47	R3,R22, R27		RESISTOR, Fixed, composition, 2700 ohms, ± 10%, 1/2w	3
-48	R4,R5, R13,R14		RESISTOR, Fixed, composition, 1000 ohms, ± 10%, 1/2w	4
-49	R6		RESISTOR, Variable, composition, 500 ohms, ± 10%, 1/2w	1
-50	R7		RESISTOR, Fixed, composition, 1600 ohms, ± 5%, 1/2w	1
-51	R8,R30		RESISTOR, Fixed, composition, 0.01 mego, ± 10%, 1/2w	2
-52	R9		RESISTOR, Fixed, composition, 0.10 mego, ± 5%, 1/2w	1
-53	R10		RESISTOR, Fixed, film, 1500 ohms, ± 5%, 350 vdcw, 1/2w	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-54	R11		RESISTOR, Fixed, composition, 220 ohms, ± 10%, 1/2w	1
-55	R12		RESISTOR, Fixed, composition, 4700 ohms, ± 5%, 1w	1
-56	R15,R35		RESISTOR, Fixed, composition, 43 ohms, ± 5%, 1/2w	2
-57	R16,R37		RESISTOR, Fixed, composition, 3000 ohms, ± 5%, 1/2w	2
-58	R17,R20, R26,R31		RESISTOR, Fixed, composition, 22,000 ohms, ± 10%, 112w	4
-59	R19,R28, R29		RESISTOR, Fixed, composition, 1500 ohms, ± 5%, 1/2w	3
-60	R21		RESISTOR, Fixed, composition, 1800 ohms, ± 5%, 1/2w	1
-61	R23,R25		RESISTOR, Fixed, composition, 2000 ohms, ± 5%, 1/2w	2
-62	R 2 4		RESISTOR, Fixed, composition, 120 ohms, ± 10%, 1/2w	1
-63	R32,R36		RESISTOR, Fixed, composition, 6800 ohms, ± 10%, 1/2w	2
-64	R33		RESISTOR, Fixed, composition, 470 ohms, ± 10%, 1/2w	1

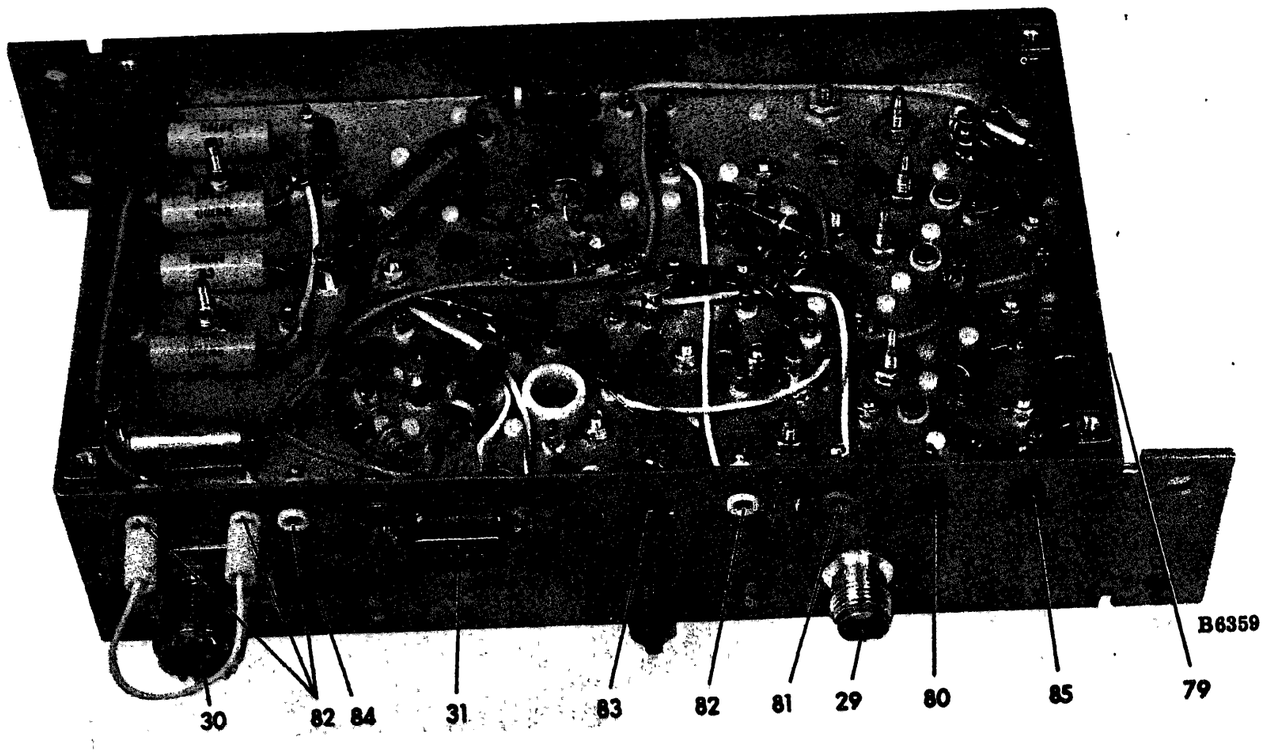


Figure 8-9(3). Limiter-Discriminator 1A16A1 (Sheet 3 of 3)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-65	R34		RESISTOR, Fixed, film, 1000 ohms, ± 5%, 1/2w	1
-66	R38		RESISTOR, Fixed, film, 270 ohms, ± 5%, 1w	1
-67	R39		RESISTOR, Fixed, film, 180 ohms, ± 5%, 1w	1
-68	R40		RESISTOR, Fixed, film, 470 ohms, ± 5%, 2w	1
-69	R41		RESISTOR, Fixed, composition, 33 ohms, ± 10%, 1/2w	1
-70	R42		RESISTOR, Fixed, composition, 47 ohms, ± 5%, 1/2w	1
-71	R43		RESISTOR, Fixed, film, 29,400 ohms, ± 1%, 1/2w	1
-72	R44		RESISTOR, Fixed, film, 274 ohms, ± 1%, 1/2w	1
-73	R45		RESISTOR, Fixed, film, 29,400 ohms, ± 1%, 1/2w (used on 368-41748-1 only)	1
-74	R46		RESISTOR, Fixed, film, 274 ohms, ± 1%, 1/2w (used on 368-41748-1 only)	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-75	R47		RESISTOR, Fixed, composition, 560 ohms, ±5% 1/2w	1
			RESISTOR, Fixed, composition, 680 ohms, ±5%, 1/2w (used on 368-41748-1 only)	1
			RESISTOR, Fixed, composition, 620 ohms, ±5%, 1/2w (used on 368-41748-1 only)	1
			RESISTOR, Fixed, composition, 510 ohms, ±5%, 1/2w (used on 368-41748-1 only)	1
			RESISTOR, Fixed, composition, 470 ohms, ±5%, 1/2w (used on 368-41748-1 only)	1
-76	R48		RESISTOR, Fixed, film, 274 *ohms,* ±1%, 1/2w (used on 368-41748-2 only) (not illustrated)	1
-77	R49		RESISTOR, Fixed, composition, 560 ohms, ±5%, 1/2w (used on 368-41748-2 only) (not illustrated)	1
-78	T1		TRANSFORMER	1
-79			CHASSIS SUBASSEMBLY	1
-80	TP1	(GREEN)	TEST POINT	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-9-81	TP2	(ORANGE)	TEST POINT	1
-82	TP3, TP6, TP7, TP8	(WHITE)	TEST POINT	4
-83	TP4	(RED)	TEST POINT	1
-84	TP5	(BLUE)	TEST POINT	1
-85	GND	(BLACK)	TEST POINT	1

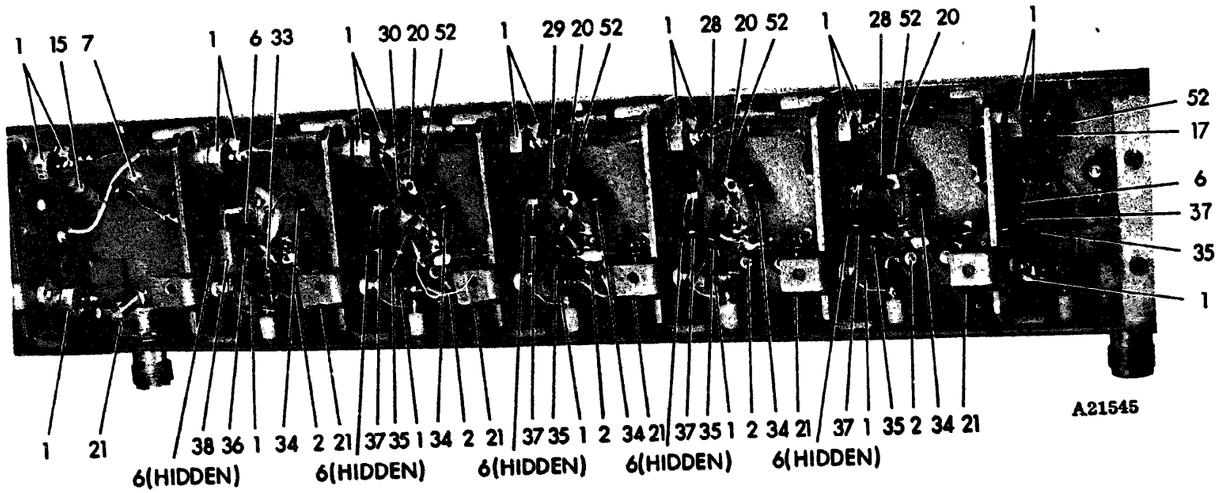


Figure 8-10(1). Intermediate Frequency Amplifier 1A16A2 (Sheet 1 of 5)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-10	1A16A2	**368-37593-4**	AMPLIFIER, Intermediate frequency (See fig. 8-8 for NHA)	**Ref**
- 1	C1 thru C21		CAPACITOR, Fixed, ceramic, feedthru, 1000 uuf	21
- 2	C22,C23, C24,C25, C26,C27, C28,C29, C30,C31, C33,C56		CAPACITOR, Variable, ceramic, 0.5 to 12 uuf, 500 vdcw	12
- 3	C32,C36, C37,C38, C39,C41, C58		CAPACITOR, Fixed, ceramic, 820 uuf, ±20%, 500 vdcw	7
- 4	C34		CAPACITOR, Variable, ceramic, 7 to 45uuf	1
- 5	C40		CAPACITOR, Fixed, mica, 91 uuf, ±5%, 500 vdcw	1
- 6	C43 thru C54		CAPACITOR, Fixed, mica, 500 uuf, ±10%, 500 vdcw	12
- 7	C57,C61, C63		CAPACITOR, Fixed, ceramic, stand-off, 1000 uuf	3
- 8	C59		CAPACITOR, Fixed, ceramic, 0.1 uf, ± 20%, 500 vdcw	1

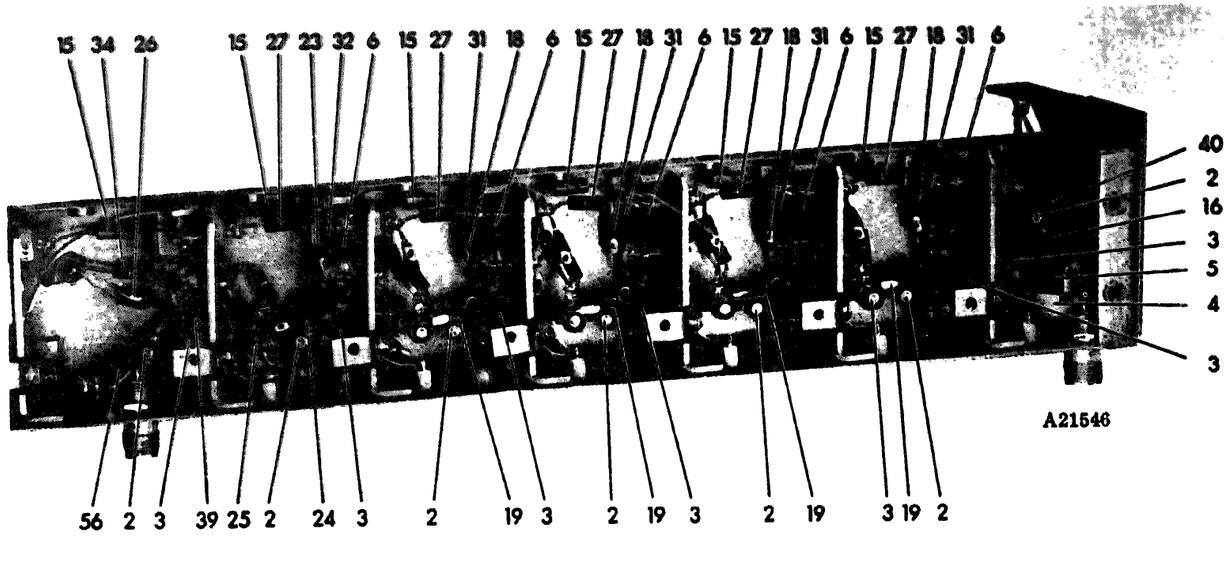


Figure 8-10(2). Frequency Amplifier 1A13A2 (Sheet 2 of 5)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-10- 9	C62		CAPACITOR, Fixed, film, 0.1 uf, ±10%. 200 vdcw	1
-10	CR1	1N3046B	SEMICONDUCTOR DEVICE, Diode	1
-11	CR3	1N963B	SEMICONDUCTOR DEVICE, Diode	1
-12	CR4	1N270	SEMICONDUCTOR DEVICE, Diode	1
-13	J1, J2		CONNECTOR, Receptacle, electrical	2
-14	J3		CONNECTOR, Receptacle, electrical	1
-15	L1 thru L6, L21, L22		COIL, Radio frequency, 4.7 uh	8
-16	L7		COIL, Radio frequency, 0.067 uh, ±2%	1
-17	L8		COIL, Radio frequency, 0.5uh, ±2%	1
-18	L9, L12, L24, L27		COIL, Radio frequency, 0.86uh, ±2%	4
-19	L10,L13, L25,L28		COIL, Radio frequency, 1.75uh, ±2%	4
-20	L11,L23, L26,L29		COIL, Radio frequency, 0.33uh, ±2%	4
-21	L14 thru L19		BEAD, Ferrite, 4 beads ea	24
-22	L20		BEAD, Ferrite, 3 beads	1

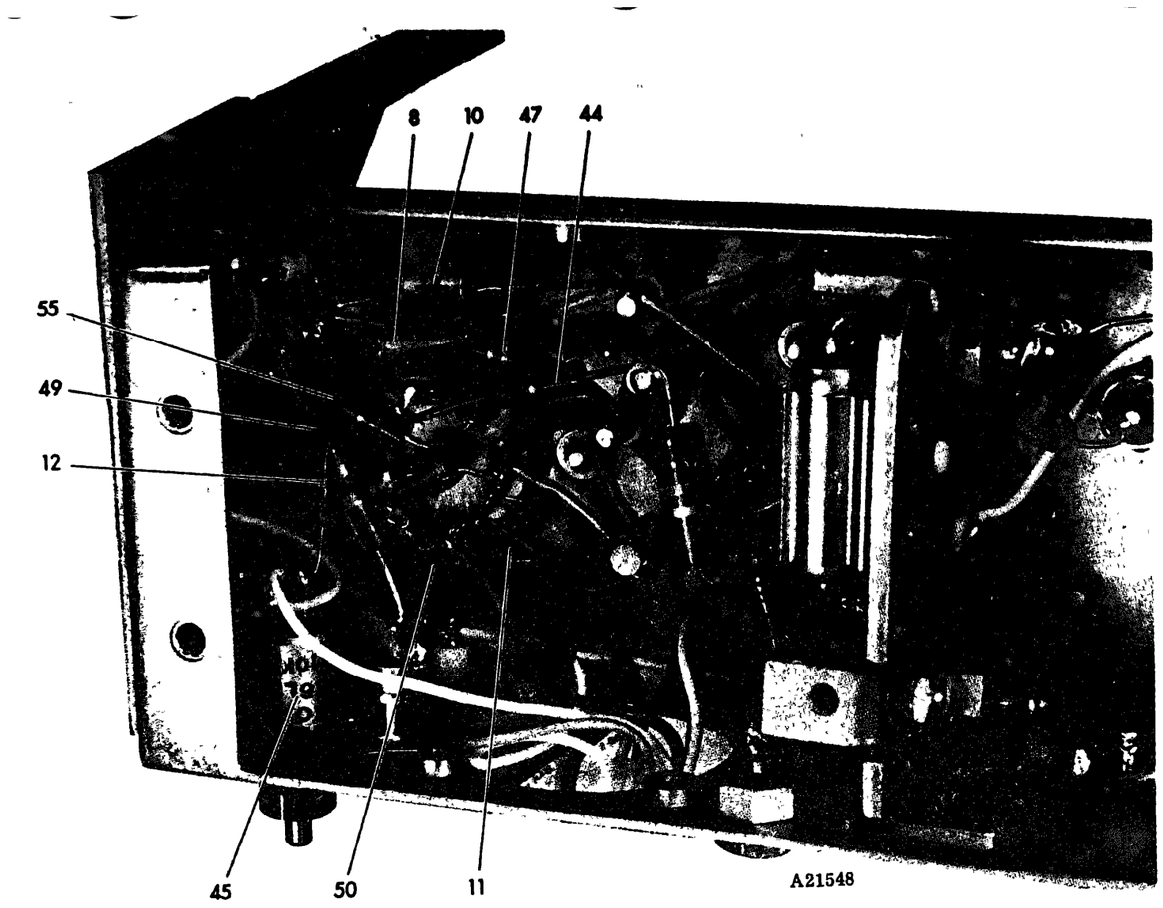


Figure 8-10(3). Intermediate Frequency Amplifier 1A16A2 (Sheet 3 of 5)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-10-23	L30		COIL, Radio frequency, 0.625 uh, ±2%	1
-24	L31		COIL, Radio frequency, 1.69 uh, ±2%	1
-25	L32		COIL, Radio frequency, 0.245 uh, ±2%	1
-26	L33		COIL, Radio frequency, 0.33 uh, ±2%	1
-27	R1 thru R 5		RESISTOR, Fixed, composition, 1000 ohms, ±10%, 1/2w	5
-28	R7, R8		RESISTOR, Fixed, composition, 1800 ohms, ±5%, 1/2w	2
-29	R 9		RESISTOR, Fixed, composition, 220 ohms, ±5%, 1/2w	1
-30	R10		RESISTOR, Fixed, composition, 620 ohms, ±5%, 1/2w	1
-31	R11 thru R14		RESISTOR, Fixed, composition, 27,000 ohms, ±10%, 1/2w	4
-32	R15		RESISTOR, Fixed, composition, 12,000 ohms, ±10%, 1/2w	1
-33	R16		RESISTOR, Fixed, composition, 820 ohms, ±5%, 1/2w	1
-34	R17 thru R22		RESISTOR, Fixed, composition, 12 ohms, ±10%, 1/2w	6
-35	R23 thru R27		RESISTOR, Fixed, composition, 18 ohms, ±10%, 1/2w	5

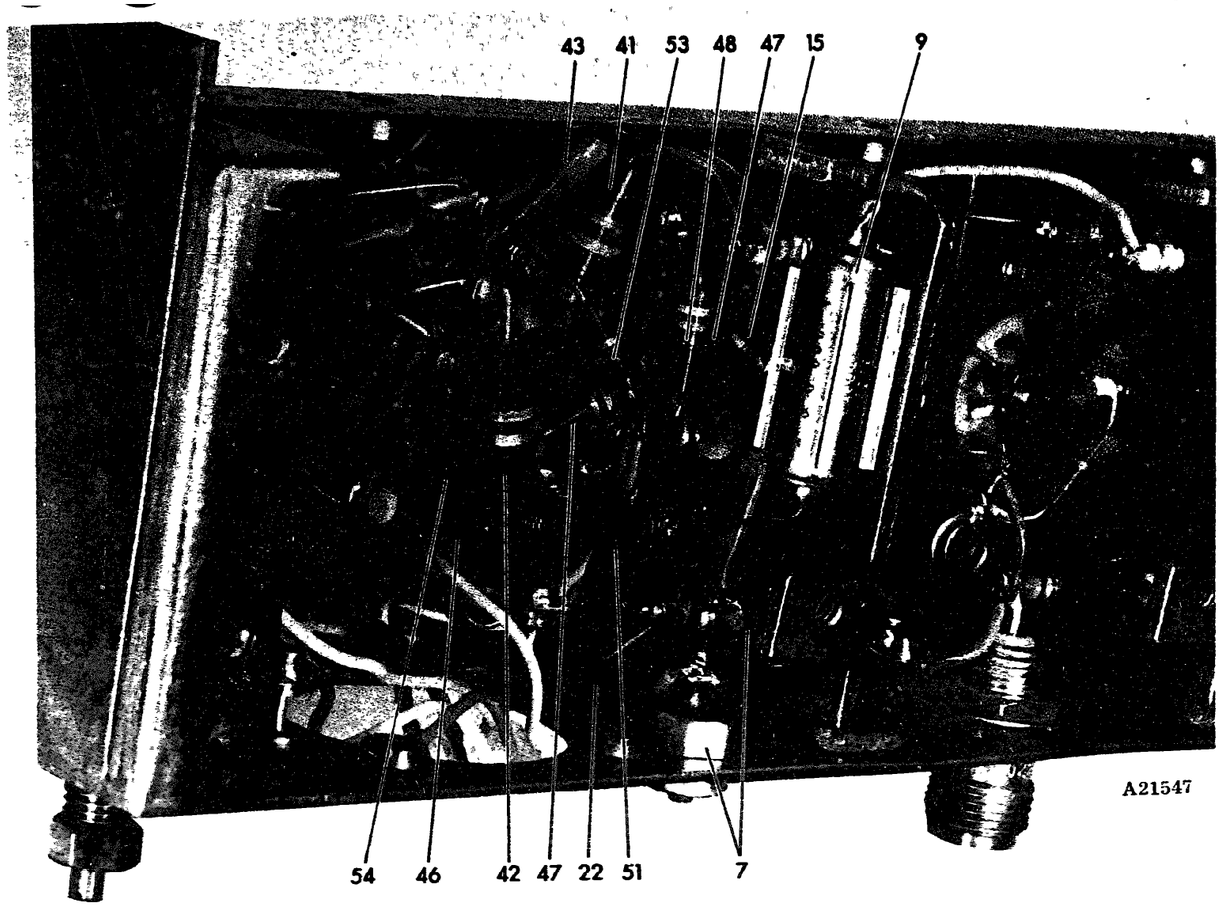


Figure 8-10(4). Intermediate Frequency Amplifier 1A16A2 (Sheet 4 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-10-36	R28		RESISTOR, Fixed, composition, 68 duns, ±10%, 1/2w	1
-37	R29 thru R33		RESISTOR, Fixed, composition, 2200 ohms, ±10%, 1/2w	5
-38	R34		RESISTOR, Fixed, wirewound, 1500 ohms, 3w	1
-39	R35		RESISTOR, Fixed, composition, 270 ohms, ±5%, 1/2w	1
-40	R36		RESISTOR, Fixed, composition, 51 ohms, ±5%, 1/2w	1
-41	R37		RESISTOR, Fixed, composition, 0.47 mego, ±10%, 1w	1
-42	R38		RESISTOR, Fixed, composition, 0.56 mego, ±10%, 1w	1
-43	R39		RESISTOR, Wirewound, 22,000 ohms, 5w	1
-44	R40		RESISTOR, Fixed, composition, 100 ohms, ±10%, 1/2w	1
-45	R41		RESISTOR, Variable, composition, 10,000 ohms, ±10%, 1/2w	1
-46	R42		RESISTOR, Wirewound, l2,000 ohms, 5w	1
-47	R43,R48, R55		RESISTOR, Fixed, composition, 0.10 mego, ±10%, 1/2w	3

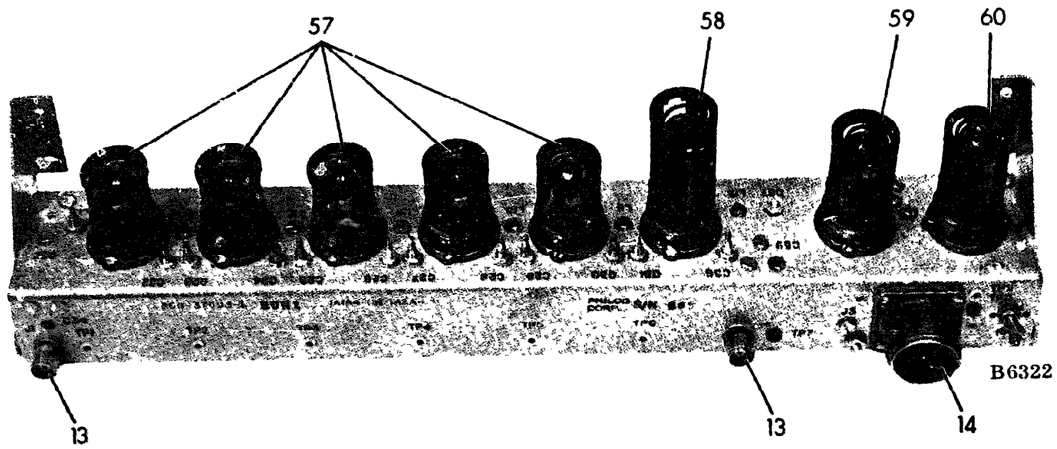


Figure 8-10(5). Intermediate Frequency Amplifier 1A16A2 (Sheet 5 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-10-48	R44		RESISTOR, Fixed, composition, 0.39 mego, ±5%, 1/2w	1
-49	R45		RESISTOR, Fixed, composition, 62,000 ohms, ±5%, 2w	1
-50	R46		RESISTOR, Fixed, composition, 2400 ohms, ±10%, 1/2w	1
-51	R47		RESISTOR, Fixed, composition, 1500 ohms, ±5%, 1/2w	1
-52	R49 thru R53		RESISTOR, Fixed, composition, 0.18 mego, ±5%, 1/2w	5
-53	R54		RESISTOR, Fixed, composition, 1.5 mego, ±5%, 1/2w	1
-54	R56		RESISTOR, Fixed, composition, 0.22 mego, ±10%, 1/2w	1
-55	R58		RESISTOR, Fixed, composition, 270 ohms, ±10%, 1/2w	1
-56	T1		TRANSFORMER	1
-57	V1 thru V5	JAN6688	ELECTRON TUBE	5
-58	V6	6677/6CL6	ELECTRON TUBE	1
-59	V7	6681/12AX7	ELECTRON TUBE	1
-60	V8	JAN6922	ELECTRON TUBE	1

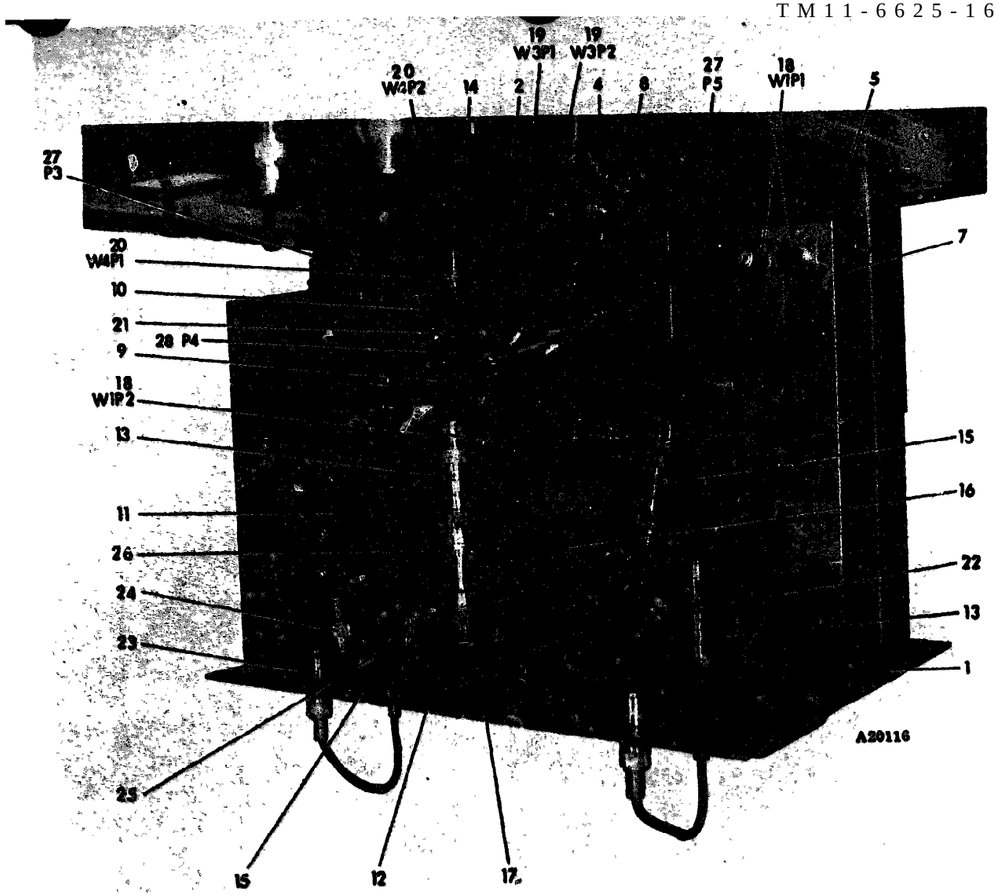


Figure 8-11(1). Test Exciter 1A17 (Sheet 1 of 2)

FIG AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
4-11	1A17	368-42046-1	**TEST EXCITER** (See fig. 8-1 for NHA)	Ref
	1A17	368-42046-2	**TEST EXCITER** (See fig. 8-1 for NHA)	Ref
	1A17	368-42046-3	**TEST EXCITER** (See fig. 8-1. for NHA)	Ref
	1A17	368-42046-4	**TEST EXCITER** (See fig. for NHA)	Ref
	1A17	368-42046-5	**TEST EXCITER** (See fig. 8-1 for NHA)	Ref
	1A17	368-42046-6	**TEST EXCITER** (See fig. 8-1 for NHA)	Ref
- 1		368-42047	**EXCITER DRAWER, Assembly**	1
- 2	DC1	DC51	**DIRECTIONAL COUPLER, Coaxial**	1
- 3	DS1, DS2	NE-51	**LAMP, Neon**	2
- 4	J1	UG492A/U	**CONNECTOR, Receptacle, electrical**	1
- 5	TB1		**BOARD, Terminal**	1
- 6	XDS1, XDS2		**INDICATOR ASSEMBLY, Lamp**	2
- 7	A1	368-37622-9	**INSERTION AMPLIFIER (used on 368-42046-1 thru -5)** (See fig. 8-12)	1
	A1	368-37622-8	**INSERTION AMPLIFIER (used on 368-42046-6)** (See fig. 8-12)	1
- 8	A2	368-37663-2	**DEVIATOR, 70 mc** (See fig. 8-14)	1
- 9	A3	368-41754-2	**NETWORK, Matching**	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-11-10	A4	368-41709-18	GENERATOR, Sideband (used on 368-42056-1)	1
	A4	368-41709-19	GENERATOR, Sideband (used on 368-42056-2)	1
	A4	368-41709-20	GENERATOR, Sideband (used on 368-42056-4 and -6)	1
	A4	368-41709-21	GENERATOR, Sideband (used on 368-42056-3)	1
	A4	368-41709-22	GENERATOR, Sideband (used on 368-42056-5)	1
-11	A5	368-37328-25	LOCAL OSCILLATOR AND MULTIPLIER (used on 368-42046-1)	1
	A5	368-37328-26	LOCAL OSCILLATOR AND MULTIPLIER (used on 368-42046-2)	1
	A5	368-37328-27	LOCAL OSCILLATOR AND MULTIPLIER (used on 368-42046-4 and -6)	1
	A5	368-37328-28	LOCAL OSCILLATOR AND MULTIPLIER (used on 368-42046-3)	1
	A5	368-37328-29	LOCAL OSCILLATOR AND MULTIPLIER (used on 368-42046-5)	1
-12	A6	368-41438	MIXER	1
-13	AT1, AT7		ATTENUATOR, Fixed, 6 db, 3w	2

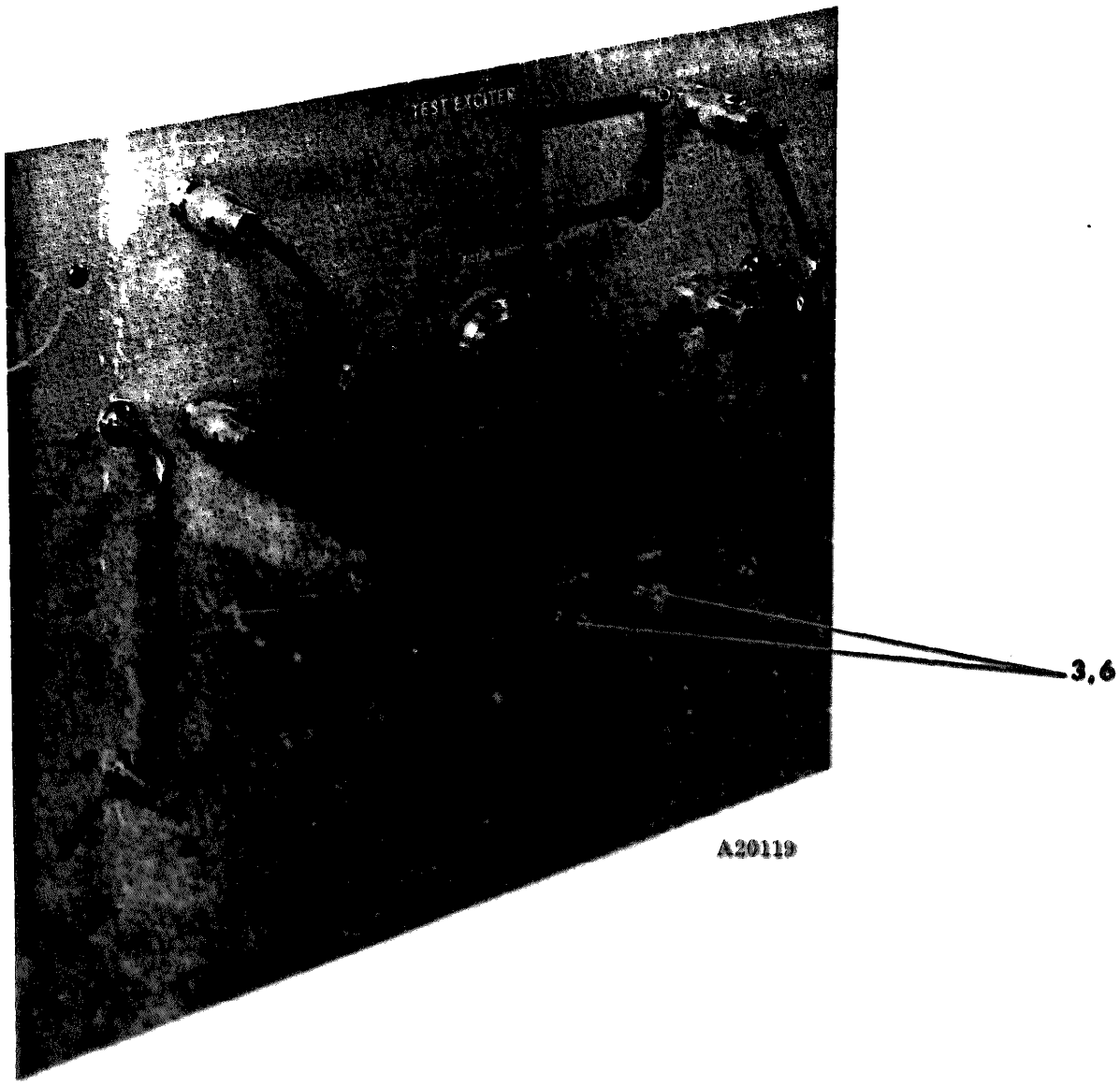


Figure 8-11(2). Test Exciter 1A17 (Sheet 2 of 2)

FIG. AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-11-14	AT3		ISOLATOR, 20 db	1
-15	AT4, AT5		ATTENUATOR, Fixed, 5 db, 3w	2
-16	FL1		FILTER, Tunable, 3 db	1
-17	FL2		FILTER, Lowpass, 700 mc, +20%, -0%, 1.80 vswr, 25w	1
	W1		CABLE ASSEMBLY	1
-18	W1P1, W1P2	UG111/U	CONNECTOR, Plug, electrical	2
	W3		CABLE ASSEMBLY	1
-19	W3P1, W3P2		CONNECTOR, Plug, electrical	2
	W4		CABLE ASSEMBLY	1
-20	W4P1, W4P2	UG536B/U	CONNECTOR, Plug, electrical	2
	W5		CABLE ASSEMBLY	1
-21	W5P1		CONNECTOR, Plug, electrical	1
-22	W5P2	UG21B/U	CONNECTOR, Plug, electrical	1
	W6		CABLE ASSEMBLY	1

FIG. AND INDEX NO	REF DESIG	MFR PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY
8-11-23	W6J1	UG556/U	CONNECTOR, Plug, electrical	1
-24	W6P1	UG536B/U	CONNECTOR, Plug, electrical	1
	W8		CABLE ASSEMBLY	1
-25	W8J1	UG556/U	CONNECTOR, Receptacle, electrical	1
-26	W8P1	UG536B/U	CONNECTOR, Plug, electrical	1
			CABLE ASSEMBLY	1
-27	P3, P5		CONNECTOR, Plug, electrical	1
-28	P4		CONNECTOR, Plug, electrical	1

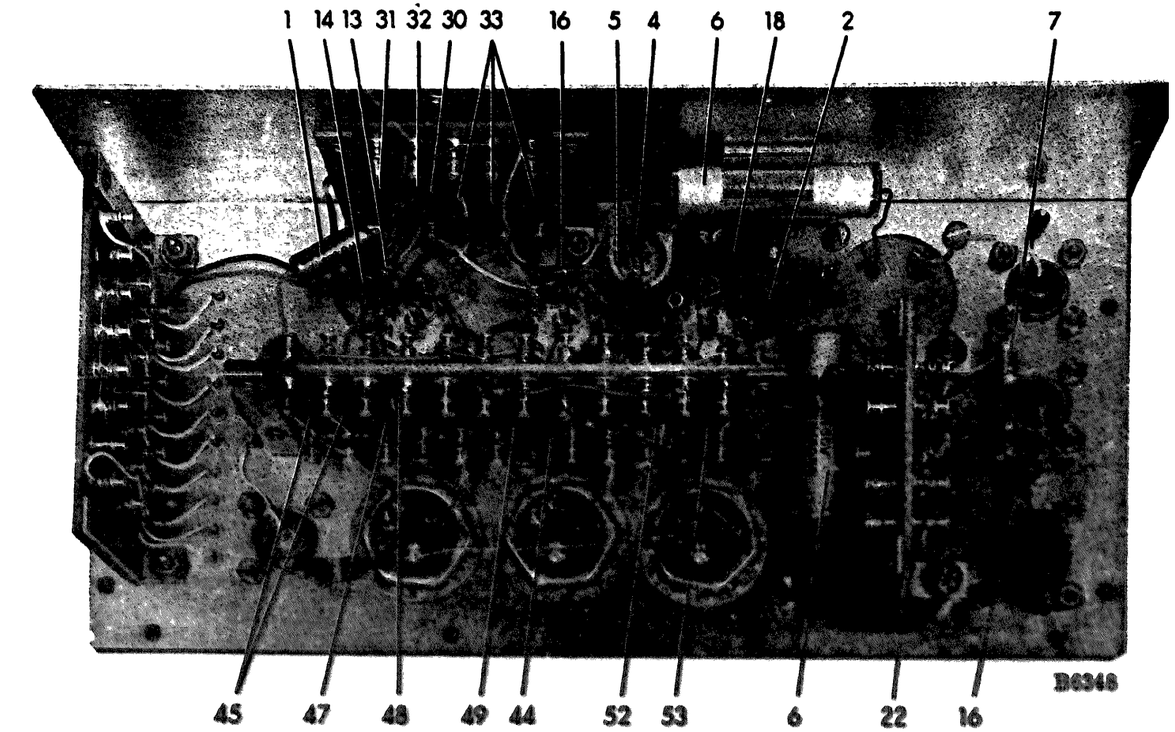


Figure 8-12(1). Insertion Amplifier 1A17A1 (Short 1 of 4)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-12	1A17A1	368-37622-8	INSERTION AMPLIFIER (See fig. 8-11 for NHA)	Ref
		368-37622-9	INSERTION AMPLIFIER (See fig 8-11 for NHA)	Ref
- 1	C1		CAPACITOR, Fixed, metallized, paper, 0.1 μf, ±10%, 200 vdcw	1
- 2	C3,C10, C13		CAPACITOR, Fixed, ceramic, 0.01 μf, 500 vdcw	3
- 3	C4,C6, C12		CAPACITOR, Fixed, elect., 20 μf, -10, +75%, 350 vdcw	3
- 4	C8		CAPACITOR, Fixed, mica, 30 μμf, ±5%, 500 vdcw	1
- 5	C9		CAPACITOR, Variable, ceramic, 7 μμf to 45 μμf	1
- 6	C14,C15		CAPACITOR, Fixed, elect., 100 μf, 50 vdcw	2
- 7	C23		CAPACITOR, Fixed, elect., 4 μf, 25 vdcw	1
- 8	FL1		FILTER	1
- 9	J1,J2,J3		CONNECTOR, Receptacle, electrical	3
-9A	J4		CONNECTOR, Receptacle, electrical	1
-10	R1		RESISTOR, Fixed, composition, 430 ohms, ±5%, 1/2w	1

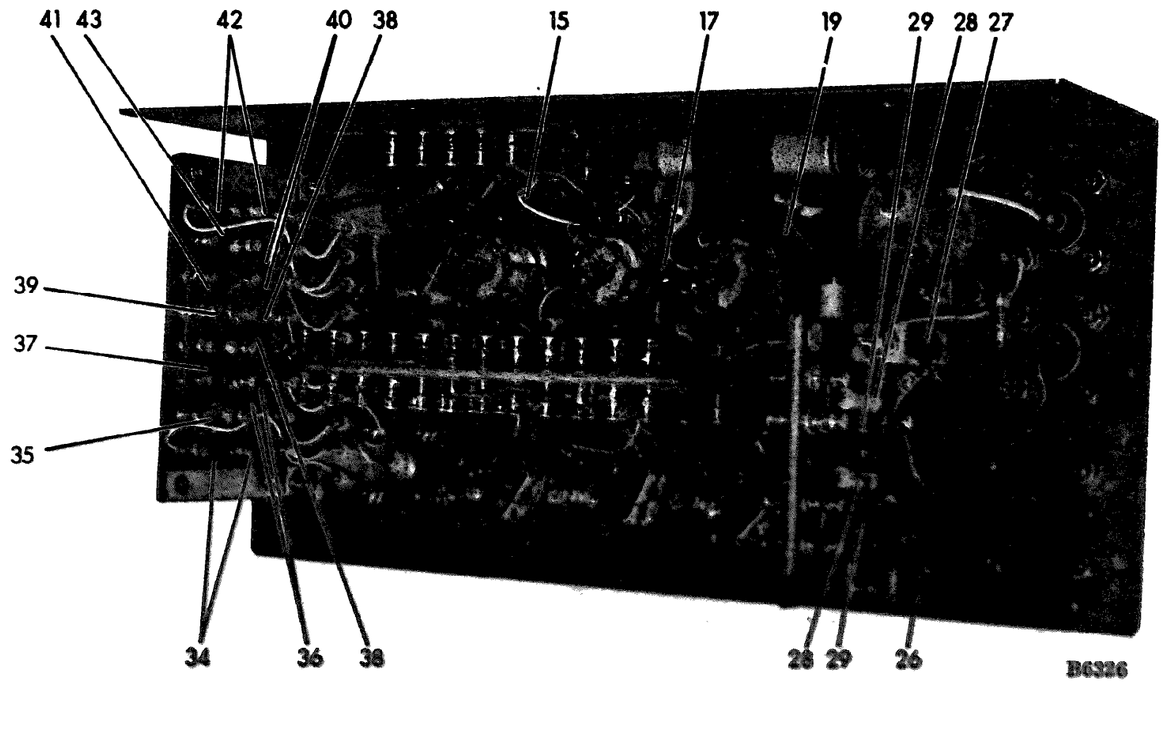


Figure 8-12(2). Insertion Amplifier 1A17A1 (Sheet 2 of 4)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-12-11	R2		RESISTOR, Fixed, composition, 240 ohms, ±5%, 1/2w	1
-12	R3		RESISTOR, Variable, composition, 100 ohms, ±10%, 1/2w	1
-13	R5		RESISTOR, Fixed, composition, 0.1 mego, ±10%, 1/2w	1
-14	R6		RESISTOR, Fixed, composition, 100 ohms, ±10%, 1/2w	1
-15	R8		RESISTOR, Fixed, composition, 39 ohms, ±10%, 1/2w	1
-16	R17,R61		RESISTOR, Fixed, composition, 220 ohms, ±10%, 1/2w	2
-17	R25		RESISTOR, Fixed, composition, 100 ohms, ±10%, 1w	1
-18	R29		RESISTOR, Fixed, composition, 200 ohms, ±5%, 1/2w	1
-19	R30		RESISTOR, Fixed, composition, 75 ohms, ±10%, 1/2w	1
-20	V1,V2	JAN6688	ELECTRON TUBE	2
-21	V3	6677/6CL6	ELECTRON TUBE	1
-22		368-37732-1	PRE-EMPHASIS NETWORK, 24 channel (used on 368-37622-8 only) (See fig. 8-13)	1

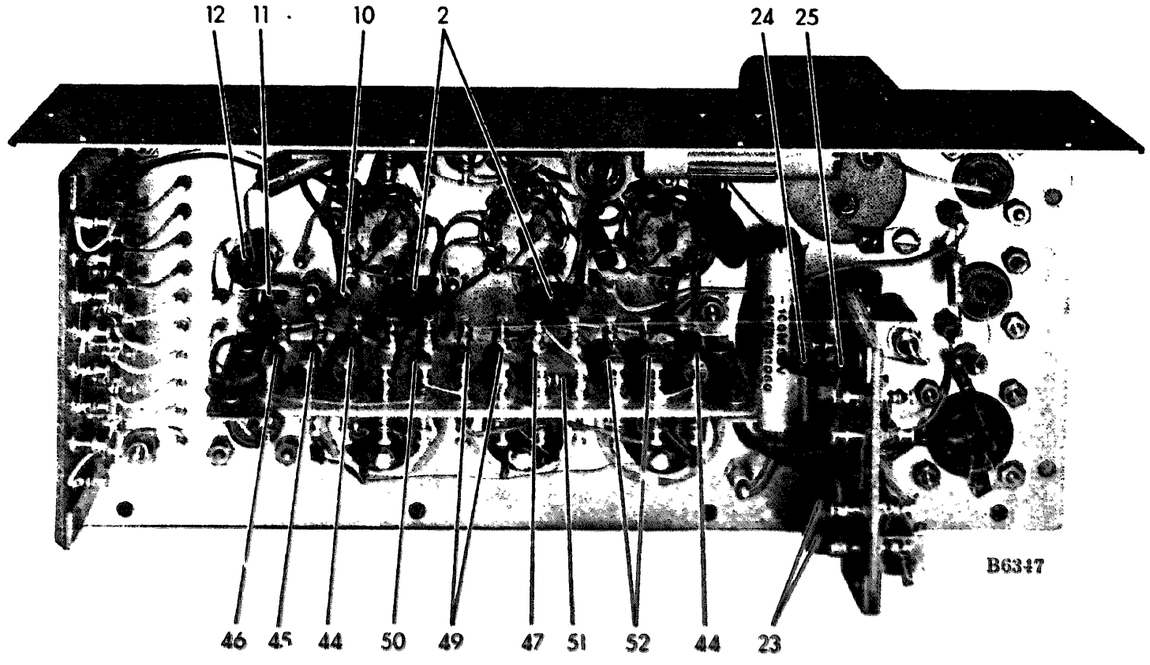


Figure 8-12(3). Insertion Amplifier 1A14A1 (Sheet 3 of 4)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-12 (Cont)		368-41753-1	PRE-EMPHASIS NETWORK, 60 or 120 channels (used on 368-37622-9 only)	1
-23	C16		CAPACITOR, Fixed, mica, 3600 μμf, ±1%, 500 vdcw	1
-24	C18		CAPACITOR, Fixed, mica, 470 μμf, ±1%, 500 vdcw	1
-25	C19		CAPACITOR, Fixed, mica, 1500 μμf, ±1/2%, 500 vdcw	1
-26	L2		COIL, Variable, 35 — 90 mh	1
-27	L3		COIL, Variable, 15 — 44 mh	1
-28	R55,R57		RESISTOR, Fixed, film, 29,400 ohms, ±1%	2
-29	R57,R58		RESISTOR, Fixed, film, 274 ohms, ±1%	2
			TERMINAL BOARD ASSEMBLY	1
-30	C2		CAPACITOR, Fixed, mica, 220 μμf, ±5%, 500 vdcw	1
-31	R4		RESISTOR, Fixed, composition, 10 mego, ±10%, 1/2w	1
-32	R7		RESISTOR, Fixed, composition, 120 ohms, ±10%, 1/2w	1

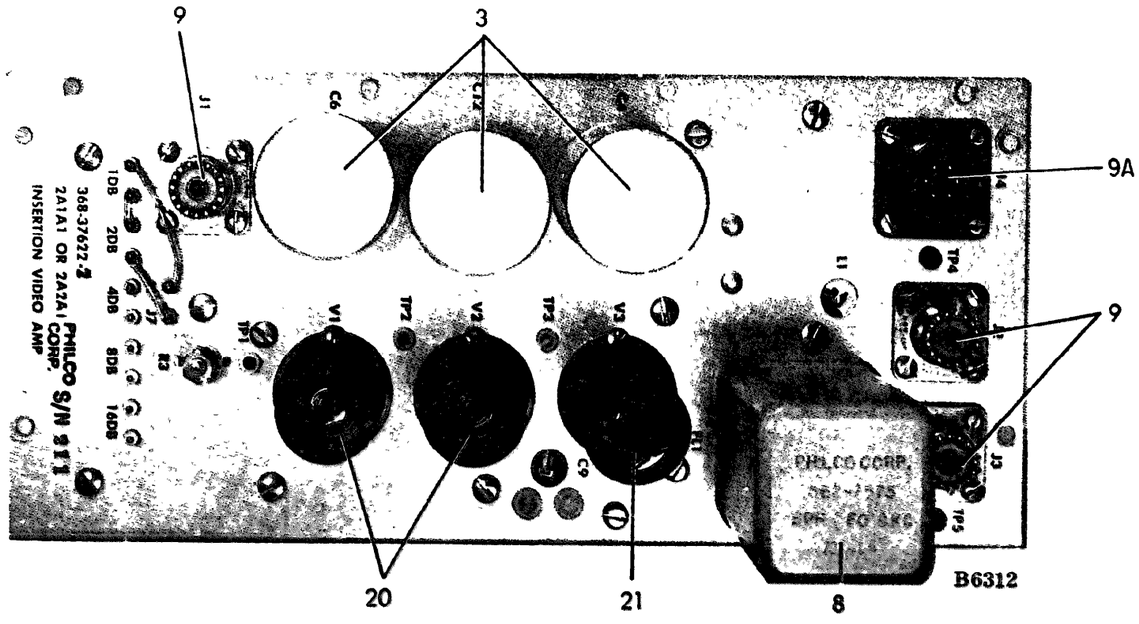


Figure 8-12(4). Insertion Amplifier 1A17A1 (Sheet 4 of 4)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-12-33	R15,R16, R18		RESISTOR, Fixed, composition, 270 ohms, ±10%, 2w	3
			TERMINAL BOARD ASSEMBLY	1
-34	R33,R34		RESISTOR, Fixed, composition, 27 ohms, ±5%, 1/2w	2
-35	R36		RESISTOR, Fixed, composition, 4300 ohms, ±5%, 1/2w	1
-36	R37,R38		RESISTOR, Fixed, composition, 56 ohms, ±5%, 1/2w	2
-37	R39		RESISTOR, Fixed, composition, 2200 ohms, ±5%, 1/2w	1
-38	R43,R44		RESISTOR, Fixed, composition, 110 ohms, ±5%, 1/2w	2
-39	R45		RESISTOR, Fixed, composition, 1000 ohms, ±5%, 1/2w	1
-40	R46,R47		RESISTOR, Fixed, composition, 220 ohms, ±5%, 1/2w	2
-41	R48		RESISTOR, Fixed, composition, 470 ohms, ±5%, 1/2w	1
-42	R49,R50		RESISTOR, Fixed, composition, 360 ohms, ±5%, 1/2w	2
-43	R51		RESISTOR, Fixed, composition, 160 ohms ±5%, 1/2w	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-12 (Cont)			TERMINAL BOARD ASSEMBLY	1
-44	C5, C7 C11		CAPACITOR, Fixed, film, 0.01 μf, ±10%, 600 vdcw	3
-45	R9, R10, R11		RESISTOR, Fixed, composition, 4700 ohms, ±10%, 1w	3
-46	R12		RESISTOR, Fixed, composition, 56,000 ohms, ±10%, 1w	1
-47	R13, R23		RESISTOR, Fixed, composition, 470 ohms, ±10%, 1/2w	2
-48	R14		RESISTOR, Fixed, composition, 0.56 mego, ± 10%, 1/2w	1
-49	R19, R20, R21		RESISTOR, Fixed, composition, 5600 ohms, ±10%, 1w	3
-50	R22		RESISTOR, Fixed, composition, 68,000 ohms, ±10%, 1w	1
-51	R24		RESISTOR, Fixed, composition, 0.10 mego, ±10%, 1/2w	1
-52	R26, R27, R28		RESISTOR, Fixed, composition, 330 ohms, ±10%, 2w	3
-53	R31		RESISTOR, Fixed, composition, 120 ohms, ±10%, 2w	1

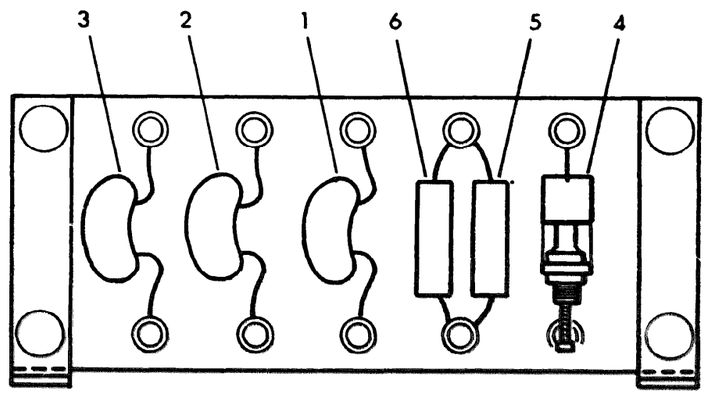


Figure 8-13. Pre-emphasis Network, 21 Channel

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-13		368-37732-1	PRE-EMPHASIS NETWORK, 24 channel, used on 368-37622-8 only (See fig. 8-12 for NHA)	Ref
-1	C20		CAPACITOR, Fixed, mica, 5600 μμf, ±1%, 500 vdcw	1
-2	C21		CAPACITOR, Fixed, mica, 4300 μμf, ±1%, 500 vdcw	1
-3	C22		CAPACITOR, Fixed, mica, 62 μμf, ±1%, 500 vdcw	1
-4	L1		INDUCTOR, Variable, 94—220 mh	1
-5	R59		RESISTOR, Fixed, film, 29,400 ohms, ±1%, 1/2w	1
-6	R60		RESISTOR, Fixed, film, 274 ohms, ±1%, 1/2w	1

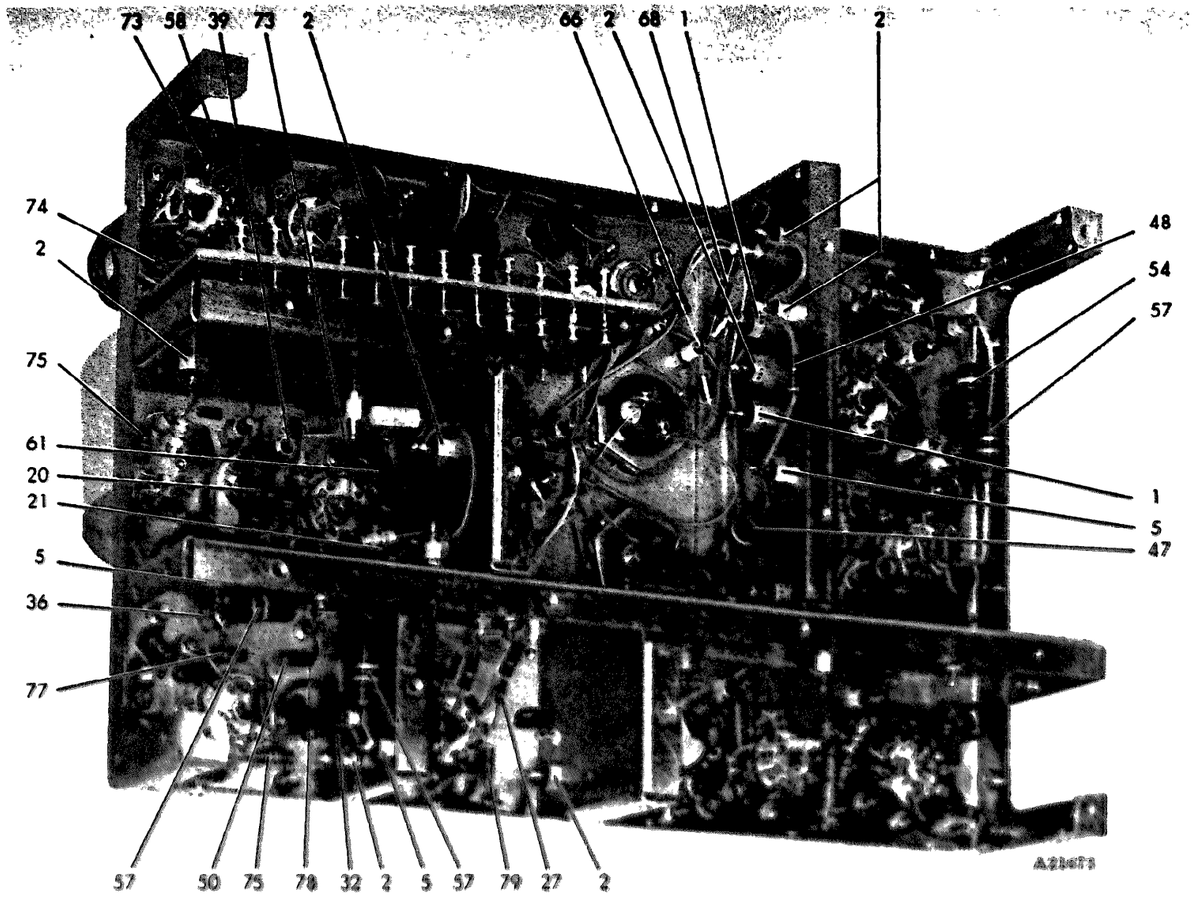


Figure 8-14(1). Deviator 1A17A2 (Sheet 1 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14	1A17A2		DEVIATOR (See fig. 8-11 for NHA)	Ref
- 1	C1,C14		CAPACITOR, Fixed, ceramic, feed-thru, 100 μμf	2
- 2	C2,C7 C12,C21 C42,C57, C67,C70 C72,C76, C79,C82 C88,C93 C96,C97		CAPACITOR, Fixed, ceramic, feed-thru, 1000 μμf	16
- 3	C3,C5, C15,C16, C100		CAPACITOR, Fixed, ceramic, 330 μμf, ±15%, 500 vdcw	5
- 4	C4,C22		CAPACITOR, Fixed, elect., 20 μf, 350 vdcw	2
- 5	C6,C10 C23,C27, C30,C36, C63,C74, C84,C86, C90,C91, C95		CAPACITOR, Fixed, ceramic, stand-off, 1000 μμf	13
- 6	C8,C29		CAPACITOR, Fixed, mica, 47 μμf, ±5%, 500 vdcw	2

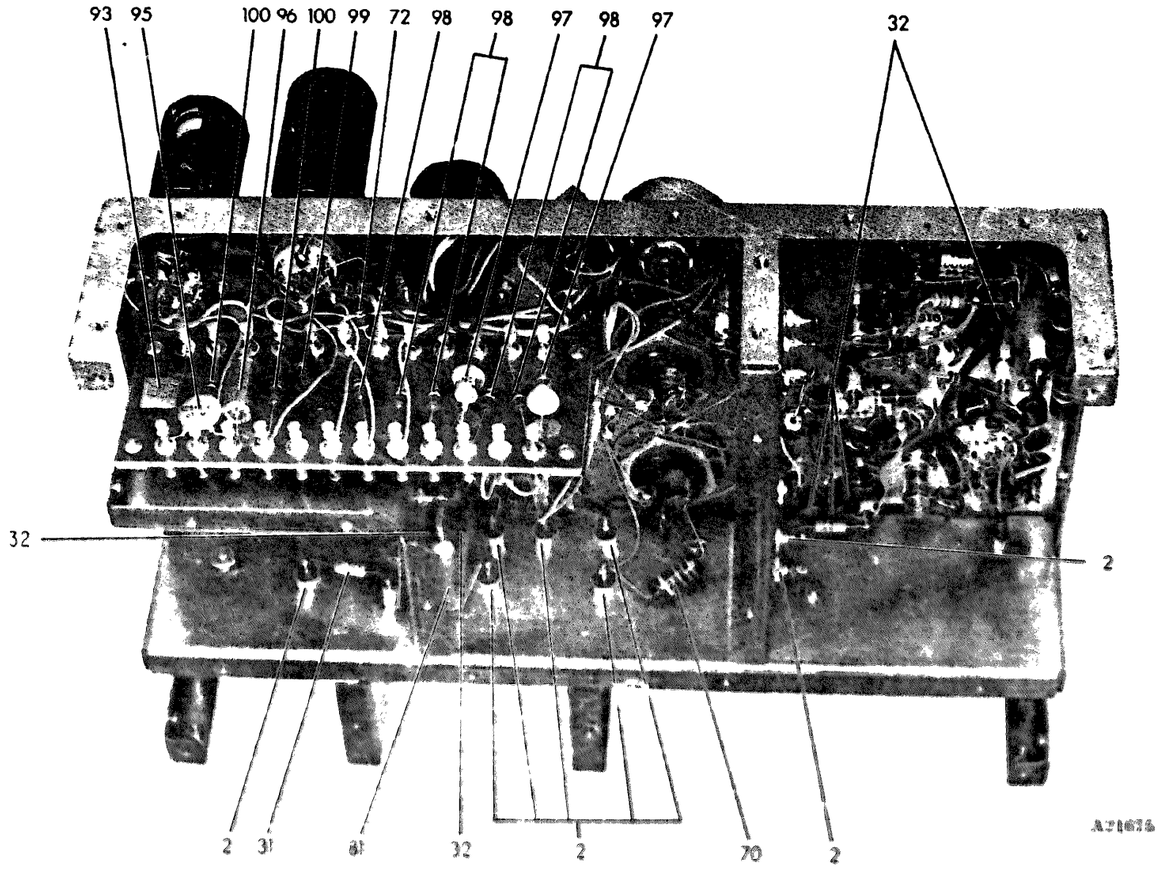


Figure 8-14(2). Deviator 1A17A2 (Sheet 2 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14- 7	C9,C17, C32,C40		CAPACITOR, Fixed, mica, 820 μμf, ±5%, 500 vdcw	4
- 8	C11,C18		CAPACITOR, Fixed, elect., 180 μf, ±20%, 25 vdcw	2
- 9	C13,C20, C69,C71, C73,C75, C77,C78, C80,C81, C85,C92, C98		CAPACITOR, Fixed, mica, 330 μμf, ±5%, 500 vdcw	13
-10	C19		CAPACITOR, Variable, 0.8—12 μμf, 750 vdcw	1
-11	C24,C26, C34,C35, C39,C41, C60,C61, C62,C83, C89		CAPACITOR, Fixed, mica, 500 μμf, ±5%, 500 vdcw	11
-12	C25,C31, C33,C37, C45,C66		CAPACITOR, Variable, ceramic, 0.5—12 μμf, 500 vdcw	6
-13	C28		CAPACITOR, Fixed, mica, 15 μμf, ±5%, 500 vdcw	1

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-14	C38		CAPACITOR, Variable, ceramic, 4.5 — 25 μμf	1
-15	C43		CAPACITOR, Fixed, 1.5 μμf, ±5%, 500V	1
-16	C44,C46		CAPACITOR, Fixed, elect., 1.5 μf, ±20%, 20 vdcw	2
-17	C52		CAPACITOR, Fixed, ceramic, 0.1 μf, ±20%, 500 vdcw	1
-18	C58,C59		CAPACITOR, Fixed, mica, 27 μμf, ±5%, 500 vdcw	2
-19	C64		CAPACITOR, Fixed, mica, 5 μμf, ±10%, 500 vdcw	1
-20	C65		CAPACITOR, Variable, ceramic, 1.5—7 μμf	1
-21	C68		CAPACITOR, Fixed, 10 μμf, ±5%, 500 vdcw	1
-22	C87		CAPACITOR, Fixed, mica, 82 μμf, ±5%, 500 vdcw	1
-23	C94		CAPACITOR, Fixed, mica, 100 μμf, ±10%, 500 vdcw	1
-24	C99		CAPACITOR, Fixed, mica, 3 μμf, ±10%, 500 vdcw	1

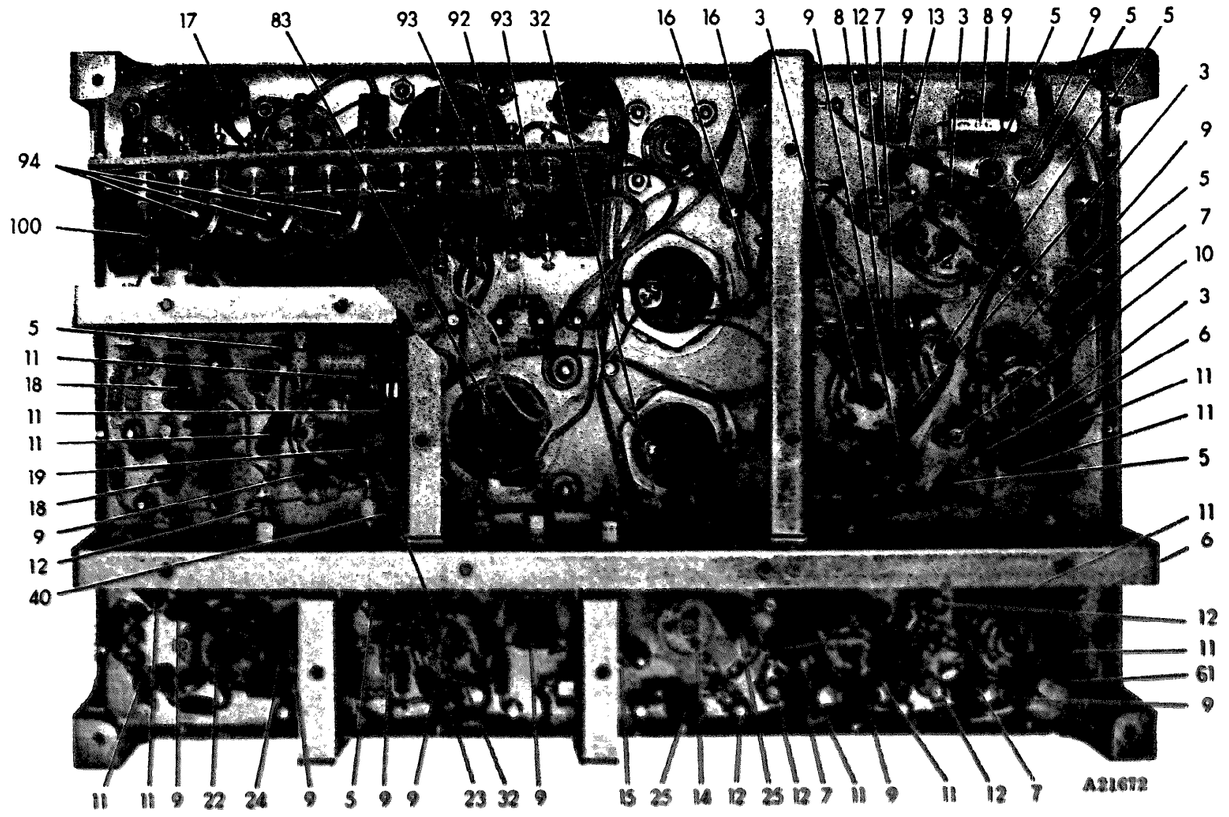


Figure 8-14(3). Deviator 1A17A2 (Sheet 3 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-25	C101, C102		CAPACITOR, Fixed, mica, 5 μμf, ±10%, 500 vdcw	2
-26	CR3,CR4	1N903	SEMICONDUCTOR DEVICE, Diode	2
-27	CR5,CR6	FD200	SEMICONDUCTOR DEVICE, Diode	2
-28	J1		CONNECTOR, Receptacle, electrical	1
-29	J2		CONNECTOR, Receptacle, electrical	1
-30	L1		COIL, Radio frequency, 0.68 μh	1
-31	L2,L3, L5,L17, L20,L35, L37		COIL, Radio frequency, 4.7 μh	7
-32	L4,L6, L21,L22, L23,L24, L25,L26, L27,L28, L29,L30, L31,L32, L33		BEAD, Ferrite (4 beads ea)	60
-33	L7		COIL, Radio frequency, 0.382 mh	1
-34	L8,L14		COIL, Radio frequency, 0.68 mh	2
-35	L9		COIL, Radio frequency, 0.82 mh	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-36	L10		COIL, Variable, 0.38 — 0.51 μh	1
-37	L11		COIL, Radio frequency, 1.32 mh	1
-38	L12,L13		COIL, Radio frequency, 0.20 mh	2
-39	L15		COIL, Variable, rf, 0.41 — 0.56 mh	1
-40	L18		COIL, Variable, 0.18 — 0.22 mh	1
-41	L19		COIL, Variable, 0.36 — 0.38 mh	1
-42	L34		COIL, Radio frequency, 0.85 mh	1
-43	L36		COIL, Radio frequency, 0.19 mh	1
-44	P1		CONNECTOR, Plug, electrical	1
-45	R1,R10		RESISTOR, Fixed composition, 33 ohms, ±10%, 1/2 w	2
-46	R2,R8		RESISTOR, Fixed, composition, 33 ohms, ±5%, 1/2 w	2
-47	R3,R7		RESISTOR, Fixed, film, 4700 ohms, ±5%, 2 w	2
-48	R4,R14		RESISTOR, Fixed, composition, 47 ohms, ±10%, 1/2 w	2
-49	R5,R9, R25,R68, R69		RESISTOR, Fixed, composition, 10 ohms, ±10%, 1/2 w	5

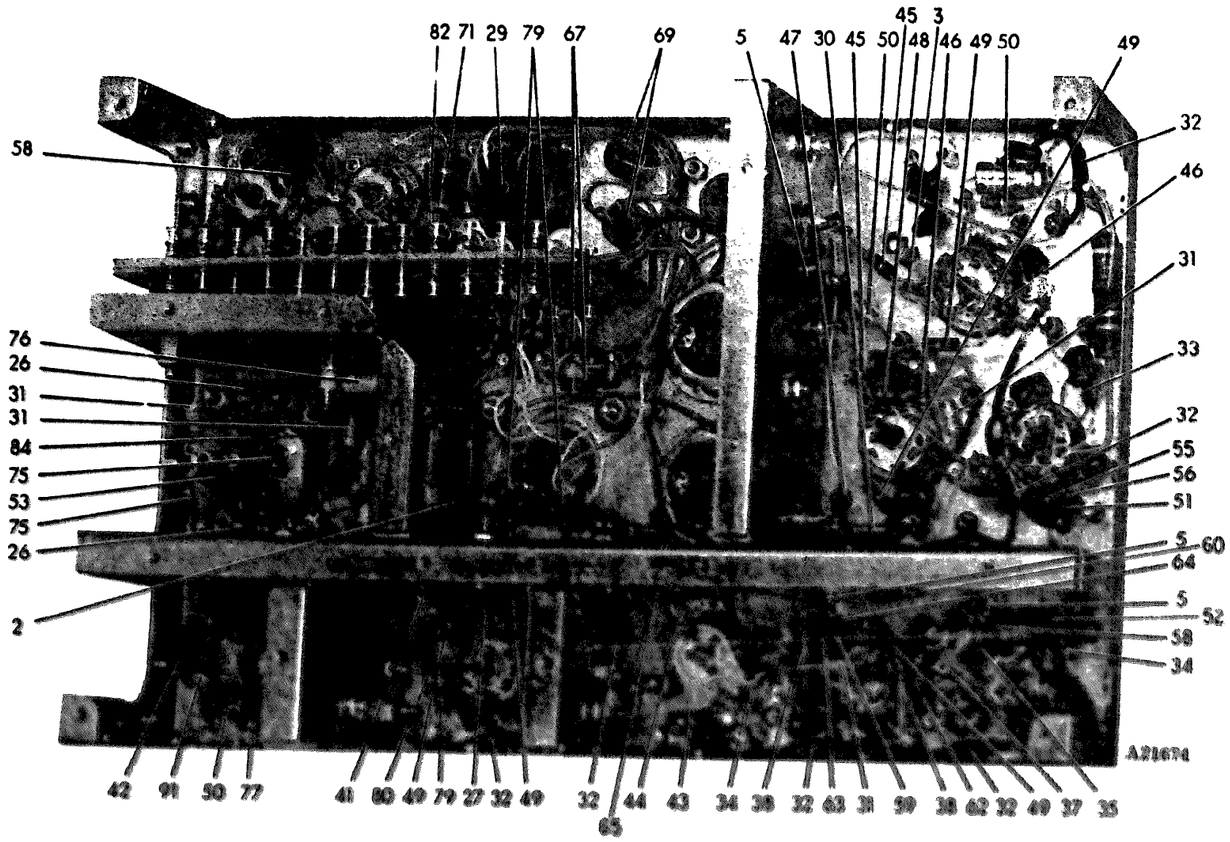


Figure 8-14(4). Deviator 1A17A2 (Sheet 4 of 5)

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-50	R6,R11, R59,R64		RESISTOR, Fixed, composition, 680 ohms, ±10%, 1/2 w	4
-51	R12		RESISTOR, Fixed, composition, 1000 ohms, ±10%, 1/2 w	1
-52	R13		RESISTOR, Fixed, composition, 330 ohms, ±5%, 1/2 w	1
-53	R15		RESISTOR, Fixed, composition, 12,000 ohms, ±10%, 1/2 w	1
-54	R16		RESISTOR, Fixed, film, 3300 ohms, ±5%, 500 vdcw, 2 w	1
-55	R18		RESISTOR, Fixed, composition, 220 ohms, ±5%, 1/2 w	1
-56	R19		RESISTOR, Fixed, composition, 68 ohms, ±10%, 1/2 w	1
-57	R20,R60, R61		RESISTOR, Fixed, composition, 15,000 ohms, ±10%, 2 w	3
-58	R21,R48, R50		RESISTOR, Fixed, composition, 2200 ohms, ±10%, 1/2 w	3
-59	R22		RESISTOR, Fixed, composition, 330 ohms, ±10%, 1/2 w	1
-60	R23		RESISTOR, Fixed, composition, 100 ohms, ±10%, 1 w	1

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-61	R24,R55		RESISTOR, Fixed, composition, 56 ohms, ±10%, 1/2 w	2
-62	R26		RESISTOR, Fixed, composition, 270 ohms, ±5%, 1/2 w	1
			RESISTOR, Fixed, composition, 300 ohms, ±5%, 1/2 w	1
			RESISTOR, Fixed, composition, 330 ohms, ±5%, 1/2 w	1
-63	R27		RESISTOR, Fixed, composition, 1000 ohms, ±10%, 1/2 w	1
-64	R28		RESISTOR, Fixed, wirewound, 100 ohms, 3 w	1
-65	R29		RESISTOR, Fixed, wirewound, 350 ohms, 5 w	1
-66	R31		RESISTOR, Fixed, composition, 56 ohms, ±5%, 1/2 w	1
-67	R32,R37		RESISTOR, Fixed, composition, 0.12 megs, ±10%, 1/2 w	2
-68	R34		RESISTOR, Fixed, composition, 20 ohms, ±5%, 1/2 w	1

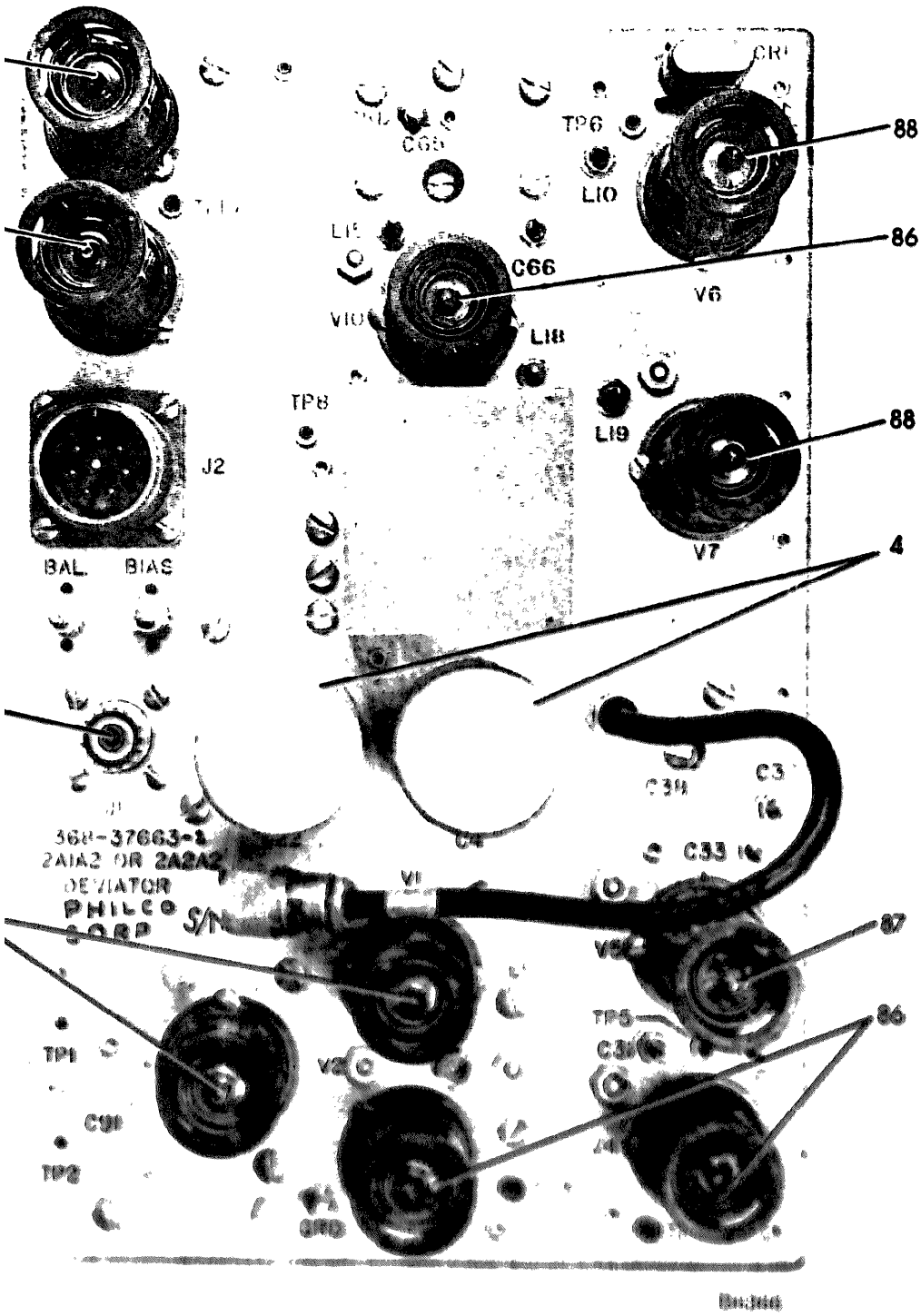


Figure 8-15(5). Deviator 1A17A2 (Sheet 5 of 5)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-69	R35,R38	RV6LAYSA103A	RESISTOR, Variable, composition, 10,000 ohms, ±10%	2
-70	R36		RESISTOR, Fixed, film, 33,000 ohms, ±5%, 500 vdcw, 2 w	1
-71	R44		RESISTOR, Fixed, composition, 470 ohms, ±10%, 2 w	1
-72	R45		RESISTOR, Fixed, composition, 0.47 mego, ±10%, 1/2 w	1
-73	R47,R56		RESISTOR, Fixed, composition, 56,000 ohms, ±10%, 1/2 w	2
-74	R51		RESISTOR, Fixed, composition, 1 mego, ±10%, 1/2 w	1
-75	R52,R53, R54,R63		RESISTOR, Fixed, composition, 15,000 ohms, ±10%, 1/2 w	4
-76	R57		RESISTOR, Fixed, wirewound, 7500 ohms, ±5%, 3-1/4 w	1
-77	R58,R65		RESISTOR, Fixed, composition, 10,000 ohms, ±10%, 1/2 w	2
-78	R62		RESISTOR, Fixed, composition, 150 ohms, ±10%, 1/2 w	1
-79	R66,R67,		RESISTOR, Fixed, composition, 4700 ohms, ±10%, 1/2 w	2

TABLE 8-1. COMPONENT IDENTIFICATION (Cont)

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-80	R70		RESISTOR, Fixed, composition, 120 ohms, ±10%, 1/2 w	1
-81	R71		RESISTOR, Fixed, wirewound, 9000 ohms, ±5%, 5 w	1
-82	R75		RESISTOR, Fixed, composition, 100 ohms, ±10%, 1/2 w	1
-83	T1		TRANSFORMER	1
-84	T2		TRANSFORMER	1
-85	V1,V2	5842	ELECTRON TUBE	2
-86	V3,V4, V10	JAN6688	ELECTRON TUBE	3
-87	V5	6216	ELECTRON TUBE	1
-88	V6,V7	JAN6922	ELECTRON TUBE	2
-89	V8	6677-6CL6	ELECTRON TUBE	1
-90	V9		ELECTRON TUBE	1
-91	Y1	CR54AU	CRYSTAL	1
			BOARD, Terminal	1
-92	C47		CAPACITOR, Fixed, elect., 68 µf, ±20%, 15 wdcw	1
-93	C48,C49, C56		CAPACITOR, Fixed, ceramic, 1 µf, ±20%, 25 wdcw	3

FIG. AND INDEX NO.	REF DESIG	MFR PART NUMBER	DESCRIPTION	QTY
8-14-94	C50,C51, C53		CAPACITOR, Fixed, film, 1 μf, ±10%, 200 vdcw	3
-95	C54		CAPACITOR, Fixed, ceramic, 0.03 μf, +80 -20%, 200 vdcw	1
-96	C55		CAPACITOR, Fixed, elect., 330 μf, ±20%, 6 vdcw	1
-97	CR1,CR2		SEMICONDUCTOR DEVICE, Diode	2
-98	R33,R39, R40,R41, R42		RESISTOR, Fixed, composition, 0.12 mego, ±10%, 1/2 w	5
-99	R43		RESISTOR, Fixed, wirewound, 1600 ohms, 6.5 w	1
-100	R46,R49, R74		RESISTOR, Fixed, composition, 0.1 mego, ±10%, 1/2 w	3

APPENDIX A

REFERENCES

The following publications contain information applicable to the operator end repairman of the Maintenance Test Facility:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	Index of Modification Work Orders.
TM 11-6625-1517-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, Signal Generator 8614A (Hewlett-Packard).
TM 11-6625-1537-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, Wide-Range Oscillator 200CD (Hewlett-Packard).
TM 11-6625-1538-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, AC Voltmeter 400E (Hewlett-Packard).
TM 11-6625-1568-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, White Noise Test Set OA 2090 (Marconi).
TM 11-6625-1614-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, Electronic Voltmeter 410C (Hewlett-Packard).
TM 11-6625-1615-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, Oscilloscope 130C (Hewlett-Packard).
TM 11-6625-1616-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual, VHF Oscillator 3200B (Hewlett-Packard).
Instruction Manual	Power Meter, Hewlett-Packard 431B.
Instruction Manual	Sweep Generator, Telonic 2000.
Instruction Manual	Plug-in Oscillator, Telonic L-6M.
Instruction Manual	Plug-in Oscillator, Telonic S-2M.

Instruction Manual	Frequency Selective Voltmeter, Sierra 125B.
Calibration chart	Test Receiver Filter.
Calibration Chart	Test Exciter Filter.
TM 38-750	**The Army Maintenance Management Systems (TAMMS)**

APPENDIX B

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature. It authorizes categories of maintenance for specific maintenance functions on repairable Items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. TEST. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices

c. SERVICE. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. ADJUST. To rectify to the extent necessary to bring into proper operating range.

e. ALIGN. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. INSTALL. To set up for use in an operational environment such as an encampment, site, or vehicle,

h. REPLACE. To replace unserviceable items with serviceable like Item.

i. REPAIR. To restore an item to serviceable condition through correction of a specific failure of unserviceable condition This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. OVERHAUL. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. REBUILD. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. SYMBOLS. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

B-3. Explanation of Format.

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

b. Column 2, functional group. Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

c. Column 3, maintenance functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	Maintenance Category
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Column 4, tools and test equipment. Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in Table I.

e. Column 5, Remarks. Self-explanatory.

4. Explanation of Format of Table I, Tool and Test Equipment Requirements.

The column in Table I, Tool and Test Equipment Requirements are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the applicable tool for the maintenance function.

b. Maintenance Category The codes In this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance required to perform the maintenance functions.

d. Federal Stock Number.

e. Tool Number. Not used.

SECTION II MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1	MAINTENANCE TEST FACILITY 367-1693-1 THRU 9	F	F										None 1, 2	Visual. Voltage and continuity.
			H										1 thru 5	
				F									2	
										F			1, 2	Repair by replacement of defective test set.
										H			1 thru 5	
1A	FREQUENCY SELECTIVE VOLTMETER, SIERRA, 125B													Refer to TM-11-6625-1609-15.
1B	A. C. VOLTMETER, HEWLETT-PACKARD, 400E													Refer to TM-11-6625-1538-15.
1C	ELECTRONIC VOLTMETER, HEWLETT-PACKARD, 410C													Refer to TM-11-6625-1614-15.
1D	SIGNAL GENERATOR, HEWLETT-PACKARD, 8614A													Refer to TM-11-6625-1517-15.
1E	OSCILLOSCOPE, HEWLETT-PACKARD, 130CR													Refer to TM-11-6625-1615-15.
1F	NOISE TEST SET, MARCONI, 2090													Refer to TM-11-6625-1568-15.
1G	SWEEP GENERATOR, TELONICS, SM2001-003 AND SWEEP CONTROLS, L-6M AND E-2M.													Refer to TM-11-6625-1619-15.
1H	AUDIO OSCILLATOR, HEWLETT-PACKARD, 200CD													Refer to TM-11-6625-1537-15.
1I	THERMISTOR MOUNT HEWLETT-PACKARD, 478A													Refer to TM-11-6625-1540-15.
1J	RF OSCILLATOR, HEWLETT-PACKARD, 3200B													Refer to TM-11-6625-1616-15.
1K	POWER METER, HEWLETT-PACKARD, 431B													Commercial literature only.
1L	TEST RECEIVER, PHILCO, 368-41298-1 THRU -6													Refer to TM-11-5820-720-15.
1M	TEST TRANSMITTER, PHILCO, 368-42046-1 THRU -6													Refer to TM-11-5820-719-15.

SECTION II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS										TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD	
1N	R. F. DETECTOR, XD-23A	F											2
			F										1, 2
										F			2
													Repair by replacement of item only.
1P	MAIN POWER SUPPLY, DELTRON, 1819 AND 2390A	F											2
			F										1, 2, 7
			H										1, 2, 6, 7, 8
					F								1, 2, 7
										F			2
													Repair by replacement of defective assembly.
										H			1, 2, 6, 7, 8
1Q	POWER SUPPLY ASSEMBLY, DELTRON, 1820	F											2
			H										1, 2, 7
			W										1, 2, 6, 7, 8
					F								1, 2, 7
										F			2
													Repair by replacement of defective assembly.
										H			1, 2, 6, 7, 8
1R	POWER SUPPLY ASSEMBLY, DELTRON, A6-15	F											2
			F										1, 2, 7
									P				2
													See note 1.
1S	POWER SUPPLY ASSEMBLY, DELTRON, A20-.95	F											2
			F										1, 2, 7
									P				2
													See note 1.
1T	POWER SUPPLY ASSEMBLY, DELTRON, A144-.4	F											2
			F										1, 2, 7
									P				2
													See note 1.
1U	POWER SUPPLY ASSEMBLY, DELTRON, A192-.5	F											2
			F										1, 2, 7
									P				2
													See note 1.

SECTION II MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	NOTE 1: Return to Depot for further disposition.													

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE Recommended in Manual	NOMENCLATURE Available on Site	FEDERAL STOCK NUMBER	TOOL NUMBER
1	F,H		Multimeter, Simpson, 260		
2	F,H		Site Tool Kit		
3	H	Frequency Counter, Hewlett-Packard, 5245L	Frequency Counter, Hewlett-Packard, 5245L		
4	H	Noise Figure Meter, Hewlett-Packard, 342A	Noise Figure Meter, Hewlett-Packard, 342A		
5	H	UHF Noise Source, Hewlett-Packard, 349A			
6	H		Variable Transformer, Superior Electronic, VS3PN116B		
7	F,H		RMS Voltmeter, Hewlett-Packard, 3400A		
8	H		Oscilloscope, Tektronix, 502A		
			w/Plug-in Units,		
			Time Base, 2B67		
			Dual Trace, 3A72		
			Probe, P6028		

APPENDIX C

POWER SUPPLIES

This appendix contains specifications, operation and adjustments for the power supplies used in the Maintenance Test Facility.

Section I

Main Power Supply

(Deltron Model 2390A and 1819)

C-1. DESCRIPTION

The Model 2390A is a highly sophisticated limited range power supply having an output of 6.5 to 7.5 volts and a maximum current of 8 amperes.

The front panel contains a control for the adjustment of voltage, and if it is desirable, the voltage can be remotely adjusted by means of a variable resistor, allowing 667 ohms per volt of adjustment range.

SUMMARY OF SPECIFICATIONS

INPUT	105 - 125 volts AC, 47 - 420 cps
LOAD REGULATION	Less than 0.03% or 5 mv
LINE REGULATION	Less than 0.03% or 5 mv
RIPPLE & NOISE	Less than 1 mv RMS
RECOVERY TIME	Less than 50 Micro Seconds
STABILITY	Less than 0.05% or 10 mv
TEMPERATURE COEFFICIENT	Less than 0.05%
OPERATING TEMPERATURE	71°C Max.
REMOTE PROGRAMMING	Nominally 667 ohms per volt
OVERLOAD & SHORT CIRCUIT	Electronic overload and short circuit protection

Pin Number	Designation	Function
1	AC	AC Line
2	AC	AC Line
3	S-	Negative Output
4	V-	Remote Voltage
5	S-	Sense Negative
6	S+	Sense Positive
7	S+	Positive Output
8	GND	Chassis Ground

C-2. OPERATING PROCEDURE

CAUTION: IT IS IMPERATIVE THAT POSITIVE AND NEGATIVE SENSING CONNECTIONS BE MADE BEFORE ENERGIZING THE POWER SUPPLY,

VOLTAGE REGULATING MODES

(1). Local Sense, Local Control

For this mode of operation, shorting links must be placed between terminals S+ & B+, B- & V-, V- & S-. Output is taken from B+ & B-.

(2). Local Control, Remote Sense

Links must be connected between terminals V- & S-. Two light guage wires must be connected; one from S+ to the positive side of the load, and the other from S- to the negative side of the load.

(3). Remote Control, Local Sense

Programming resistors are connected between terminals S- & V- and a one volt change will occur per each 667 ohms added in this circuit. Links must be in place between terminals B- & V-, and S+ & B+. The voltage control is rotated fully counter-clockwise.

(4). Remote Control, Remote Sense

The external programming resistors are connected between terminals S- & V-. Two light gauge wires must be connected, one from S+ to the positive side of the load and one from S- to the negative side of the load. The voltage control rotated fully counter-clockwise.

C-3. CIRCUIT DESCRIPTION

The supply consists of three basic parts, an unregulated DC supply, a series regulator, and an error amplifier. The unregulated DC supply is of the full wave rectifier configuration with a capacitance filter. The unregulated DC feeds regulator consists of two sets of power pass transistors connected in a dissipation sharing configuration, with each set having a Darlington connected driver transistor.

The output is monitored by a type ARC error amplifier (fig. C-2).

The amplifier consists of an unregulated DC source which supplies a two stage zener regulator (CR6 and CR7) plus a zener used to develop a biasing voltage (CR4). The second stage zener (CR7) is connected in an impedance cancelling bridge and acts as the reference. A fraction of the output is sampled by means of a voltage divider and is compared against the reference voltage in a differential amplifier (Q1 and Q2) connected as a long tail pair. The output of the long tail pair is direct coupled into a differential amplifier, one half of which is connected as an emitter follower (Q5). The other half (Q4) controls one driver transistor of the series regulator directly and the other through the zener diode, CR5.

In the event of an overload or short circuit at the output, the circuit goes int a current limit mode of operation. Sensing of the current causes transistor Q4 on the amplifier to by pass the drive to the power pass transistor driver and operation with the removal of the overload.

C-4. MAINTENANCE AND ADJUSTMENT

If for any reason the output range adjustment shifts slightly due to aging or other cause, it can be brought back to normal by adjusting R11 on the A20 error amplifier, (fig. C-2).

Should the current limiting on the series regulators require reset which may be evidenced by the fact that the unit goes out of regulation before full load can be drawn from it, the procedure is to use an external ammeter and rotate potentiometer R12 on the A20 error amplifier until the output just begins to drop from its regulated point with the unit drawing a load current 5% in excess of full load.

C-5. SERVICE AND MAINTENANCE

These power supplies require no periodic maintenance, and should operate satisfactory for extended periods of time. Should a failure develop, it must invariably can be traced to a semi-conductor device.

Symptoms of malfunction are lack of regulation in either voltage or current mode, or degraded performance outside of the limits specified for the particular model.

Troubleshooting should consist primarily in checking every semi-conductor with a suitable tester.

Once a defective component is located it should be replaced with an exact equivalent.

One other type of malfunction occasionally takes place. Its symptoms are that the primary fuse will blow each time the power supply is energized. This can be traced to one of three possible causes.

The first is a short in one of the rectifier diodes. The second is a short in a filter capacitor and the third is an internal grounding situation caused by a non-intentional cable short. Any of these faults can be detected with simple ohmmeter methods.

ELECTRICAL PARTS LIST
FOR
MODEL 2390A POWER SUPPLY

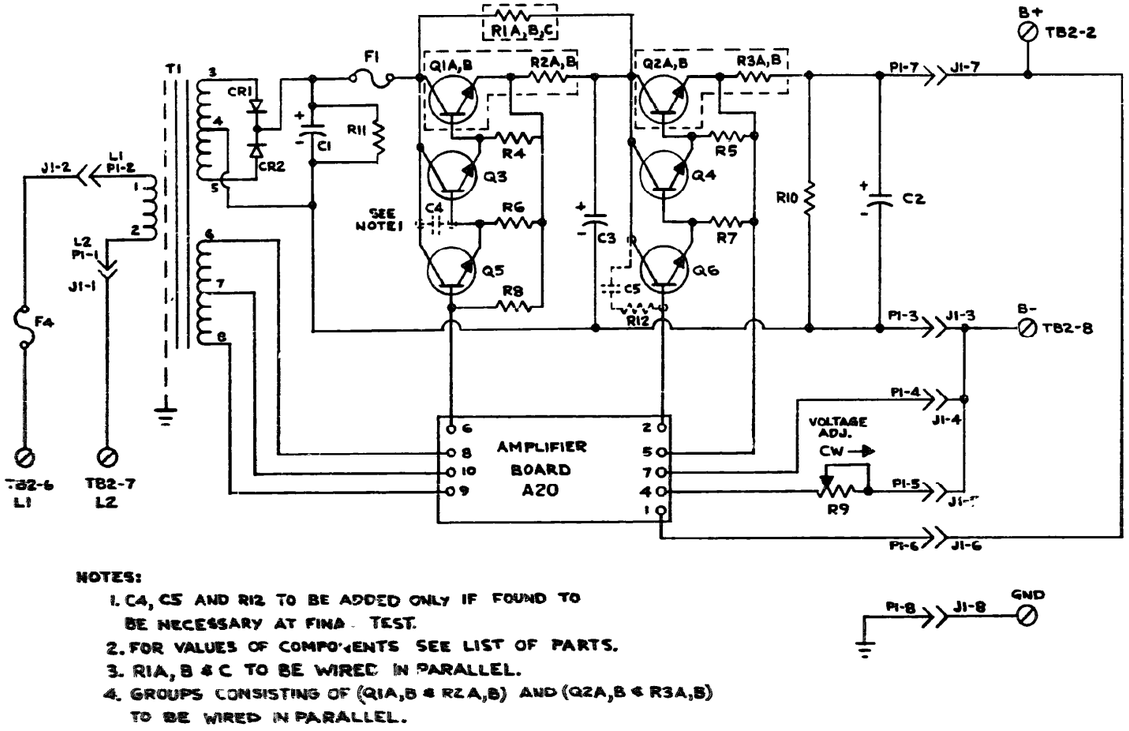
REF. NO.	DESCRIPTION
B12582	SCHEMATIC
C1	CAPACITOR, 29000 uf, 25V
C2	CAPACITOR, 2000 uf, 10V
C3	CAPACITOR, 100 uf, 30V
C4	CAPACITOR, .047 uf, 200V
C5	S/A C4
CR1	RECTIFIER, 368B
CR2	S/A CR1
F1	FUSE, 8A
F4	FUSE, 5A
Q1A	TRANSISTOR, 40251
Q1B	S/A, Q1A
Q2A	S/A Q1A
Q2B	S/A Q1A
Q3	TRANSISTOR, 40250
Q4	S/A Q3
Q5	TRANSISTOR, 2N3053
Q6	S/A Q5
R1A	RESISTOR, 4.5Ω, 50W
R1B	S/A R1A
R1B	S/A R1A
R2A	RESISTOR, .2Ω, 5W
R2B	S/A R2A
R3A	S/A R2A
R3C	S/A R2A
R4	RESISTOR, 39Ω, 10%, 1/2W
R5	S/A R4
R6	RESISTOR, 330Ω, 10%, 1/2W
R7	S/A R6
R8	RESISTOR, 2.2K, 10%, 1/2W
R9	POTENTIOMETER, 1K, 2W
R10	RESISTOR, 100Ω, 10%, 2W
R11	RESISTOR, 560Ω, 10%, 2W
R12	RESISTOR, ____, 10%. 1/2W
T1	TRANSFORMER, T60092
A20	AMPLIFIER ASSEMBLY

Notice: S/A - Same as

ELECTRICAL PARTS LIST
FOR
A20 AMPLIFIER USED WITH 2390A POWER SUPPLY

REF. NO.	DESCRIPTION
C1	CAPACITOR, 20 uf, 150V
C2	CAPACITOR, 100uuf, 1000V
C3	CAPACITOR, 2 uf, 200V
C4	CAPACITOR, SELECT IN TEST
CR1	RECTIFIER, G100G
CR2	S/A CR1
CR3	DIODE, T156
CR4	DIODE, ZENER, 1N706
CR5	S/A CR3
CR6	DIODE, ZENER, ZA20A
CR7	S/A CR4
CR8	S/A CR4
CR9	DIODE, G100D
E2	LINK, AWG, #22
E3	S/A E2
Q1	TRANSISTOR, 2N3638
Q2	S/A Q1
Q3	TRANSISTOR, 40232
Q4	S/A Q3
Q5	S/A Q3
R 1	RESISTOR, 4K, 5W
R 2	RESISTOR, 1.78K, 1%, 1W
R3	RESISTOR, 6.8K, 10%, 1/2W
R 4	RESISTOR, 17.8K, 1%, 1W
R 5	RESISTOR, 215Ω, 1%, 1W
R 6	RESISTOR, 1.5K, 10%, 1/2W
R 7	RESISTOR, 18K, 10%, 1/2W
R 8	S/A R6
R 9	RESISTOR, 2.87K, 1%, 1W
R10	RESISTOR, 4.32K, 1%, 1W
R11	POTENTIOMETER, 2K, 1.5W
R12	POTENTIOMETER, 5K, 1.5W
R13	RESISTOR, 10K, 1%, 1W
R14	RESISTOR, 10K, 10%, 1/2W
R15	S/A R14
R16	RESISTOR, ____, 10%, 1/2W
R17	RESISTOR, 1.2K, 10%, 1/2W
R18	RESISTOR, 680Ω, 10%, 1/2W
R19	S/A R3
R20	RESISTOR, 0Ω, (LINK AWG #22)
R21	RESISTOR, SELECT IN TEST, 1/2W, 10%

Note: S/A - Same as



NOTES:

1. C4, C5 AND R12 TO BE ADDED ONLY IF FOUND TO BE NECESSARY AT FINAL TEST.
2. FOR VALUES OF COMPONENTS SEE LIST OF PARTS.
3. R1A, B & C TO BE WIRED IN PARALLEL.
4. GROUPS CONSISTING OF (Q1A,B & R2A,B) AND (Q2A,B & R3A,B) TO BE WIRED IN PARALLEL.

FIGURE C-1. MAIN POWER SUPPLY (MODEL 2390A) SCHEMATIC DIAGRAM

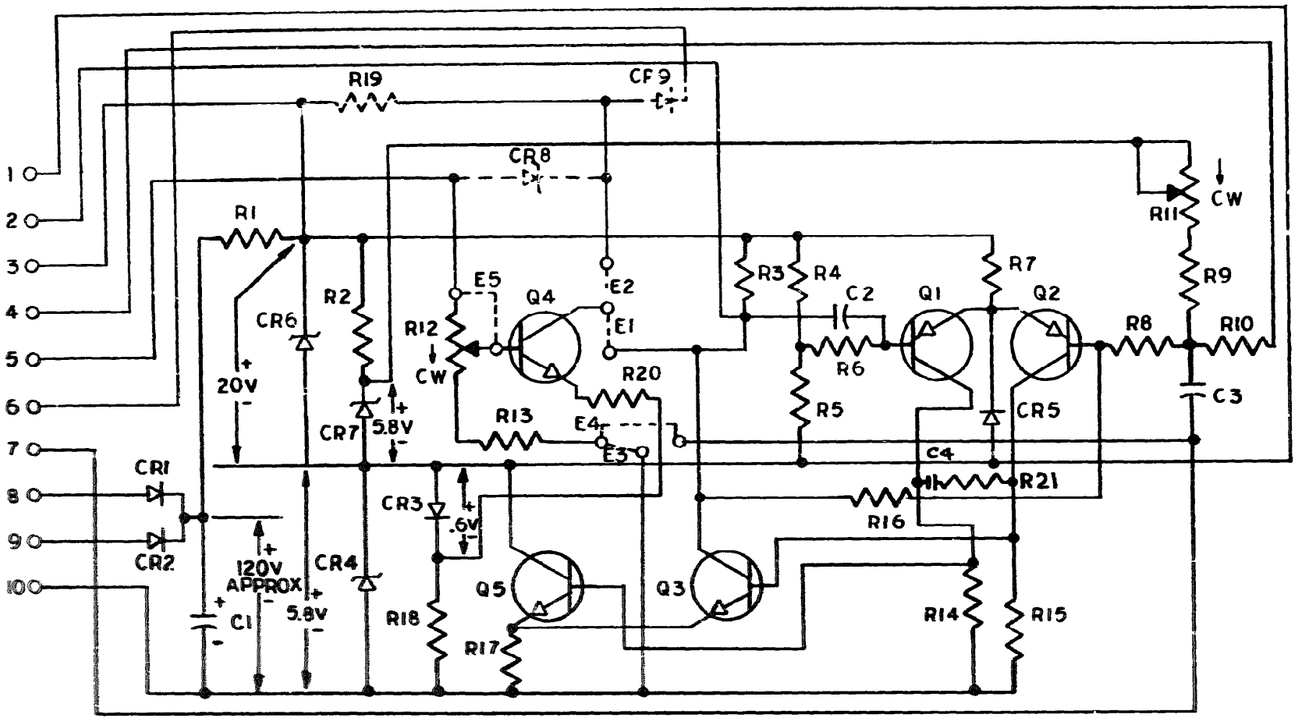


FIGURE C-2. AMPLIFIER BOARD A20, SCHEMATIC DIAGRAM.

ELECTRICAL PARTS LIST
FOR
MODEL 1819 POWER SUPPLY

REF. NO.	DESCRIPTION
C5724	SCHEMATIC
C1	CAPACITOR, 40 uf, 450V
C 2	S/A C1
C3	S/A C1
C4	CAPACITOR, 4 uf, 250V
C5	CAPACITOR, .25 uf, 400V
C6	CAPACITOR, .luf, 400V
C7	S/A C5
C8	CAPACITOR, 1500 uf, 50V
C9	CAPACITOR, 25 uf, 50V
C10	CAPACITOR, 250 uf, 50V
C11	S/A C9
C12	CAPACITOR, .01 uf, 400V
C13	S/A C1
CR1	RECTIFIER, 1N547
CR2	S/A CR1
CR3	S/A CR1
CR4	S/A CR1
CR5	RECTIFIER, 1N538
CR6	S/A CR5
CR7	S/A CR5
CR8	RECTIFIER, 1N706
F1	FUSE, 5 AMP'
F2	FUSE, 3/4 AMP
F3	FUSE, 1 AMP
Q1	TRANSISTOR, 2N1536
Q2	TRANSISTOR, 2N1183
Q3	TRANSISTOR, 2N3638
R1	RESISTOR, 22Ω ±10%, 1W
R2	S/A R1
R3	RESISTOR, 1K ±10%, 1/2W
R4	S/A R3
R5	RESISTOR, 4.7M ±10%, 1W
R6	RESISTOR, 100K ±10%, 1/2W
R7	RESISTOR, 39K ±10%, 1W
R8	RESISTOR, 82K ±1%, 1/2W
R9	RESISTOR, 91K ±1%, 1/2W
R10	S/A R6
R11	RESISTOR, 1M ±10%, 1/2W
R12	S/A R11
R13	RESISTOR, 220K ±10%, 1/2W
R14	RESISTOR, 47K ±1%, 1/2W
R15	RESISTOR, 130K ±1%, 1/2W
R16	SELECT AT TEST
R17	POTENTIOMETER, 50K, 3W, WW
R18	RESISTOR, 470K ±10%, 1/2W

Note: S/A - Same as

ELECTRICAL PARTS LIST
FOR
MODEL 1819 POWER SUPPLY

REF. NO.	DESCRIPTION
R19	S/A R6
R20	S/A R14
R21	RESISTOR, 11OK ±1%, 1/2W
R22	POTENTIOMETER, 5K, 1.5W, WW
R23	RESISTOR, 4.7K ±10%, 1/2W
R24	RESISTOR, 3.3K ±10%, 1/2W
R25	RESISTOR, 1.5K ±10%, 1W
R26	RESISTOR, 1.2K ±1%, 1W
R27	RESISTOR, 1500 ±1%, 1/2W
R28	POTENTIOMETER, 300Ω, 1.5W
R29	RESISTOR, SELECT AT TEST
R30	RESISTOR, 10K, 25W, WW
S1	SWITCH, TOGGLE, SPST
S2	S/A S1
T1	TRANSFORMER, SPECIAL
V1	TUBE, CK6528
V2	TUBE, 6GT5
V3	TUBE, 5751
V4	TUBE, 5651
V5	S/A V3
V6	S/A V3
V 7	TUBE, 0A2
I 1	LAMP, NEON, NE51

Note: S/A - Same as

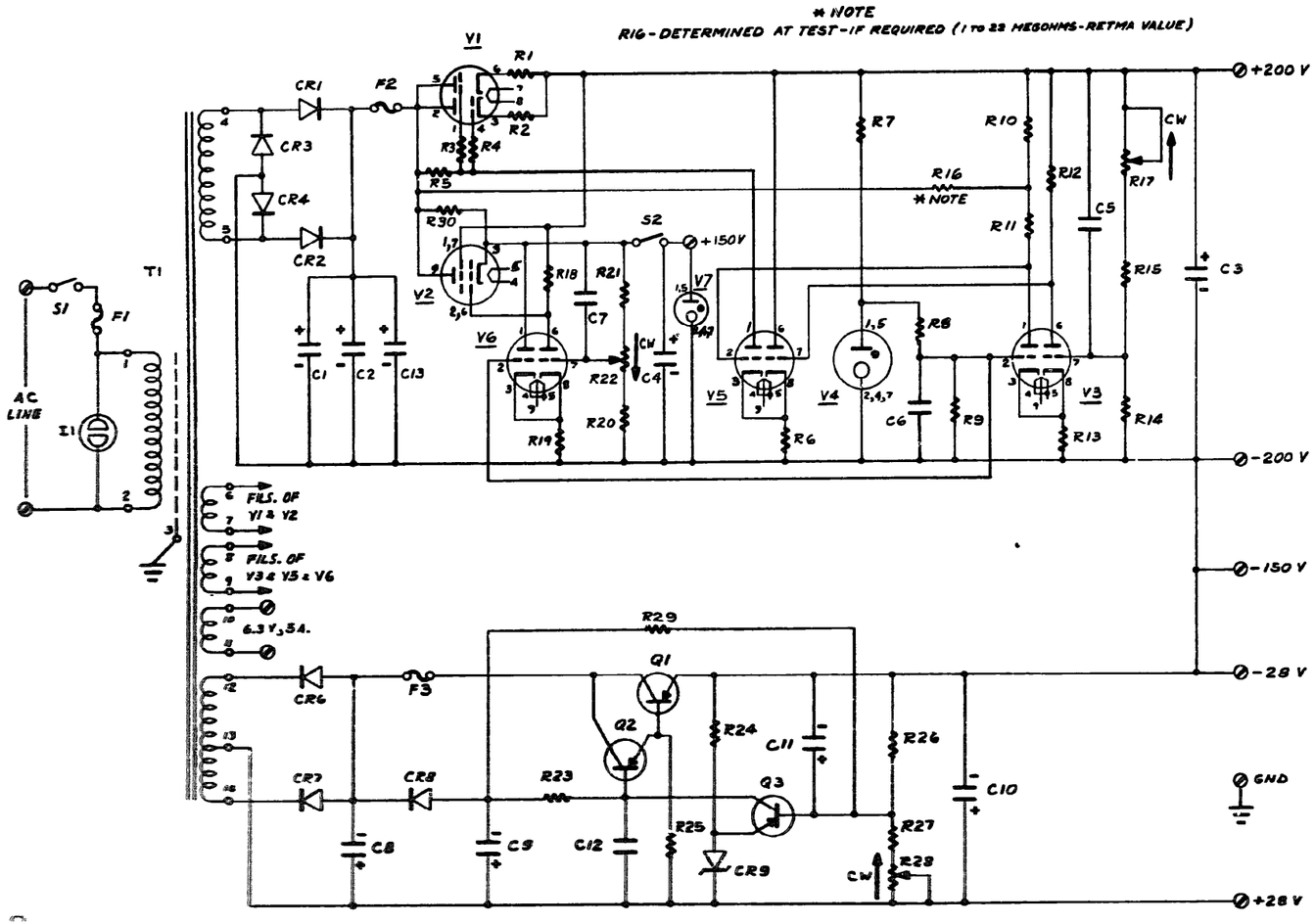


FIGURE C-3. MAIN POWER SUPPLY (MODEL 1819) SCHEMATIC DIAGRAM.

Section II

Combiner Power Supply

(Deltron Model 1820)

ELECTRICAL PARTS LIST
FOR
1820 POWER SUPPLY

REF. NO.	DESCRIPTION
C5735	SCHEMATIC
C 1	CAPACITOR, 80 uf, 450V
C2	S/A Cl
C3	S/A Cl
C4	S/A Cl
C5	CAPACITOR, 40 uf, 450V
C6	S/A C5
C7	S/A Cl
C8	S/A C5
C9	CAPACITOR, 20 uf, 150V
C10	CAPACITOR, .25 uf, 400v
C11	S/A C10
C12	S/A C10
C13	CAPACITOR, .1 uf, 400V
C14	S/A C13
CR1	RECTIFIER, 1N547
CR2	S/A CR1
CR3	S/A CR1
CR4	S/A CR1
CR5	S/A CR1
CR6	S/A CR1
CR7	
CR8	
F 1	
F2	
F 3	
F 4	
R1	
R2	
R3	
R4	

ELECTRICAL PARTS LIST
F O R
1820 POWER SUPPLY (CONTINUED)

REF. NO.	DESCRIPTION
R5	**S/A R3**
R6	RESISTOR, 22 uf,±10%,1W
R7	S/A R6
R8	RESISTOR, 1K ±10%, 1/2W
R9	S/A R8
R10	RESISTOR, 1M ± 10%, 1/2W
R11	RESISTOR, 100K ± 10%, 1/2W
R12	S/A R11
R13	RESISTOR, 82K ± 10%, 1W
R14	RESISTOR, 220K ± 10%, 1/2W
R15	S/A R12
R16	S/A F14
R17	S/A R10
R18	S/A R10
R19	S/A R14
R20	S/A R10
R21	RESISTOR, 56K ± 10%, 1W
R22	S/A R10
R23	S/A R10
R24	RESISTOR, 61.9K ± 1%, 1/2W
R25	RESISTOR, 110K ± 1%, 1/2W
R26	S/A R24
R27	S/A R25
R28	RESISTOR, 47K ± 1%, 1/2W
R29	RESISTOR, 180K ± 1%, 1/2W
R30	RESISTOR, 56K ± 1%, 1/2W
R31	RESISTOR, 220K ± 1%, 1/2W
R32	POTENTIOMETER, **5OK,** 3W, WW
R33	POTENTIOMETER, 15K, 1/4W
R34	S/A R33
R35	RESISTOR, 249K ± 1%, 1/2W
R36	RESISTOR, 95.3K ± 1% 1/2w
R37	RESISTOR, 80Ω, 25W, WW
R38	S/A R37
T1	TRAMSFORMER, RECTIFIER
V1	TUBE, **6528**
V2	TUBE, **7868**
V3	TUBE, 6GT5
V4	TUBE, **5751**
V5	S/A **V4**
V6	S/A **V4**
V7	S/A **V4**
V8	S/A V4
V9	S/A V4
V10	TUBE, 5651
V11	S/A V10
S 1	SWITCH, TOGGLE, DPST CARLING 2GK53-73
I 1	PILOT LIGHT, NEON NE51

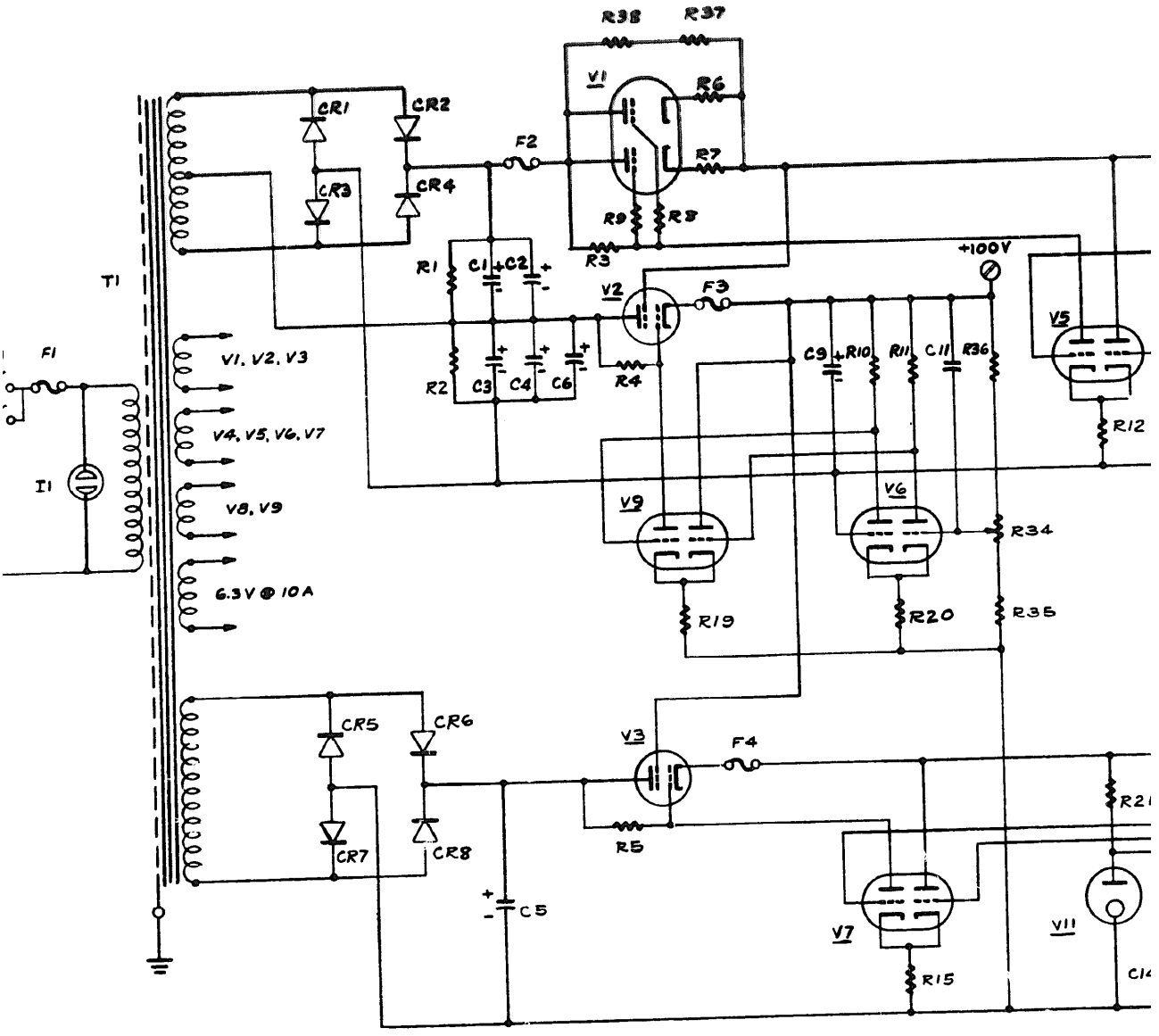


FIGURE C-4. COMBINER POWER SUPPLY (MODEL 1820) SCHEMATI

Section III

Power Supplies A6-15, A28-.95,

A144-.4, and Al92-.3 (Deltron)

C-6. INTRODUCTION

This section contains a description, operating instructions, circuit analysis and maintenance instructions for the A Series of regulated power supplies. The ratings available in this comprehensive group of supplies as well as complete specifications are listed in the appendix of this manual. Schematic diagrams make up the last pages of this booklet.

C-7. DESCRIPTION

The Deltron A Series of power supplies are all silicon, transistorized, highly regulated modular DC power sources. Each model, is continuously variable over the range specified. The maximum allowable output current listed for the specific unit can be drawn over the full adjustment range. They are furnished in varying case sizes, depending upon the amount of power delivered with larger case sizes applying to units having greater output power. For each voltage range there are several models having different output currents. All A units incorporate their own cooling so that external heat sinking is unnecessary.

These supplies feature remote programming capability over their adjustment range as well as remote sensing to compensate for voltage drops in the load feeder lines. Four threaded studs are provided for permanently mounting the supplies to a suitable chassis, if this is desired. A mechanical drawing showing the bottom view of the supply and giving the orientation and dimensions of these mounting studs as well as the terminals is given as the appendix of this manual.

The voltage adjustment control is accessible from the top of the supply without removing the protective cover.

C-8. OPERATION

INSTALLATION: The units operate from 105 to 125 volts, 50 - 400 cycles, single phase. The output of the power supply is completely floating with respect to the case.

Either positive or negative terminal can be grounded, if desired.

C-9. EXTENDED CURRENT RATING

If the 20% additional current rating is to be used then the current limiting will require readjustment. Set the output at the new minimum voltage of the restricted range and adjust th current limit control to start limiting action at 125% of the nominal rating. See paragraph C-13 for further details.

C-10. TERMINAL DESIGNATION

Pin Number	Function
1	L1 (Line)
2	L2 (Line)
3	B+ (Positive output)
4	B+ (Positive output)
5	S+ (Sense Positive)
6	S- (Sense Negative)
7	B- (Negative output)
8	B- (Negative output)

C-11. TERMINAL CONNECTIONS

(1) LOCAL CONTROL - LOCAL SENSE A link is placed between pins and 5 and another link is placed between pins 6 and 7.

(2) LOCAL CONTROL - REMOTE SENSE A link is placed between pins 4 and 5. An external resistor is placed between pins 6 and 7 and the internal voltage adjust is rotated to its most counter-clockwise position. The programming constant is 1000 ohms per volt.

(3) LOCAL CONTROL - REMOTE SENSE The output of the power supply feeds the load from pins 3, 4, and 7, 8. Pin 6 is connected to the negative end of the output at the load. Pin 5 is connected to the positive end of the output at the load. These leads coming from the sensing terminals may be light gauge wire, since the sensing current is in the milliampere range.

(4) REMOTE CONTROL - REMOTE SENSE The hook up is the same as under procedure (3); except that the lead from Pin 6 to the negative side of load is opened and the external potentiometer is placed between those two points. Again the internal control is set to its most counter-clockwise position.

C-12. CIRCUIT INSCRIPTION

The supply consists of three basic parts, an unregulated DC supply, a series regulator, and an error amplifier. The unregulated DC supply is of the full wave rectifier configuration with a capacitance filter. The unregulated DC feeds the series regulator located in the positive leg of the output. The series regulator consists of a power pass transistor with Darlington connected driver transistors.

The output is monitored by the error amplifier which is a type A-20 Amplifier, (Fig. C-2).

The amplifier consists of an unregulated DC source which supplies a two stage zener regulator (CR6 and CR7) plus a zener used to develop a biasing voltage (CR4). The second stage zener (CR7) is connected in an impedance cancelling bridge and acts as the reference. A fraction of the output is sampled by means of a voltage divider and is compared against the reference voltage in a differential amplifier (Q1 and Q2) connected as a long tail pair. The output of the long tail pair is direct coupled into a differential amplifier, one half of which is connected as an emitter follower (Q5). The other half (Q3) controls the driver transistor that is in the series regulator.

In the event of an overload or short circuit at the output of A3 - the circuit goes into a current limit mode of operation. Sensing of the current causes transistor Q4 on the amplifier to by pass transistor Q3 causing the series regulator to regulate the current in the event of an overload. The circuit will return to normal operation with the removal of the overload.

In the event of an overload or short circuit at the output of all other A models the circuit goes into a linear current shutdown mode of operation. Sensing of the current and the output voltage causes transistor Q4 to by pass transistor, Q3 causing the series regulator to be driven toward cut-off in the event of an overload, The circuit will return to normal operation with the removal of the overload.

C-13. MAINTENANCE AND ADJUSTMENT

If for any reason the output range adjustment shifts slightly due to aging or other cause, it can be brought back to normal by adjusting R11 on the A-20 error amplifier (fig. C-2).

Should the current limiting on the series regulators require reset which may be evidenced by the fact that the unit goes out of regulation before full load can be drawn from it, the procedure is to use an external ammeter and rotate potentiometer R12 on the A-20 error amplifier until the output just begins to drop from its regulated point with the unit drawing a load current 5% in excess of full load.

C-14. SERVICE AND MAINTENANCE

The majority of failures that occur can be traced to a faulty semi-conductor component. One of the most common failures is a collector to emitter short in one of the passing transistors.

The collector to emitter shorting of a pass or driver transistor is evident in the series regulator by a loss of regulation. A large increase in ripple and a rise in output voltage above the normal regulated value. To remedy this fault the shorted transitor should be located and replaced with an equivalent type.

In the case of parallel pass transistors, it is usual that only one will short. A shorted pass transistor can usually be found by the use of an ohmmeter on the low ohms range.

Where there are parallel transitors and it is desired to locate the shorted one, a small current should be drawn from the supply equal to approximately 10% of full rating. The voltage across each equalizing resistor should be measured with a suitable voltmeter. The shorted unit will be carrying all of the current and is therefore easily localized.

A second type of failure occurs occasionally. This usually takes place after a long period of time under high ambient conditions and is characterized in the series regulator by a gradual rise in output voltage particularly at high input line conditions. This Is generally caused by a transitor which develops an excessive leakage current.

To check if this is the cause, the usual procedure is to parallel the resistor which draws off the leakage current with a resistor equal to it in resistance and to see if the output then returns to normal value.

Sometimes in the series regulator the voltage will rise above regulated values for high inputs and this can be caused by excessive leakage current between collector and emitter. This condition would be noted under lightly loaded outputs and can be checked by determining if regulation is restored by increasing the output load current.

When a malfunction occurs, it can sometimes cause follow-up damage in the error amplifier so that it is a wise practice to check the error amplifier as well. In most cases the error amplifier can be checked by using an ohmmeter to check transistors and diodes utilized in the circuit.

As far as routine maintenance is concerned, it is advisable periodically to dust or blow out the heat sink regions with an air hose to remove accumulations of oils, dust, and dirt, which affect the heat radiating properties of the heat sinks, when they become excessive.

ELECTRICAL PARTS LIST
FOR
A 6-15 POWER SUPPLY

REF. NO.	DESCRIPTION
C1	CAPACITOR, 35,000 ufd, 20V
C2	CAPACITOR, 7,000 ufd, 10V
C3	CAPACITOR, .01 uf, 400v
CR1	RECTIFIER, A40A, 100V
CR2	S/A CR1
CR3	S/A CR1
CR4	S/A CR1
Q1A	TRANSISTOR, 2N3055, 80V
Q1B	
Q1C	S/A Q1A
Q1D	S/A Q1A
Q1E	S/A Q1A
Q1F	S/A Q1A
Q1G	S/A Q1A
Q1H	S/A Q1A
Q1I	S/A Q1A
Q1J	S/A Q1A
QlK	S/A Q1A
Q1L	S/A Q1A
Q2	S/A Q1A
Q3	TRANSISTOR, 40250, 50V
R1A	RESISTOR, .67Ω, 5W
R1B	S/A R1A
R1C	S/A R1A
R1D	S/A R1A
R1E	S/A R1A
R1F	S/A R1A
R1G	S/A R1A
R1H	S/A R1A
R1I	S/A R1A
R1J	S/A R1A
R1K	S/A R1A
R1L	S/A R1A
R 2	RESISTOR, 5Ω, 5W
R3A	RESISTOR, 20Ω, 10W
R4	POTENTIOMETER, 3K, 2W
R5	RESISTOR, 47Ω, 1/2W, 10%
R6	RESISTOR, SELECT IN TEST, 15Ω to 1K, 10%, 1/2W
T1	TRANSFORMER, TEKTRAN, T58132
A20	AMPLIFIER
R10	RESISTOR, 4.22K, 1%, 1/2W
R13	RESISTOR, 9.09K, 1%, 1W
S 1	THERMOSTAT, STEMCO, TYPE A510, CLOSE ON RISE 284°F ± 8°F AND OPEN AT 255°F ± 8°F WITH EXPOSED METAL
R 6	RESISTOR, 15Ω, 10%, 1/2W

Note: S/A - Same as

ELECTRICAL PARTS LIST
FOR
A28-.95 POWER SUPPLY

REF. NO.	DESCRIPTION
C1	CAPACITOR, 1,500 uf, 50V
C2	CAPACITOR, 500 uf, 50V
C3	CAPACITOR, .01 uf, 400V
CR1	RECTIFIER, G100D
CR2	S/A CR1
CR3	S/A CR1
CR4	S/A CR1
Q1A	TRANSISTOR, 2N3055
Q1B	S/A Q1A
Q2	TRANSISTOR, 40250
R1A	RESISTOR, 1.67Ω, 5W
R1B	S/A R1A
R2	RESISTOR, 39Ω, 10%, 1/2W
R3	RESISTOR, 680Ω, 10%, 2W
R4	POTENTIOMETER, 5K, 2W
R6	RESISTOR, 15Ω, 10%, 1/2W
S1	THERMOSTAT, STEMCO, TYPE A510 CLOSE ON RISE 284°F ± 8°F AND OPEN AT 255°F ± 8°F WITH EXPOSED BIMETAL
T1	TRANSFORMER, TEKTRAN T58103
A20	AMPLIFIER
R10	RESISTOR, 26.1K, 1%, 1/2W
R13	RESISTOR, 51.1K, 1%, 1W

Note: S/A - Same As

ELECTRICAL PARTS LIST
FOR
A144-.4 POWER SUPPLY

REF. NO.	DESCRIPTION
C1	CAPACITOR, 400 uf, 250V
C2	CAPACITOR, 60 uf, 250V
C3	CAPACITOR, .01 uf, 400v
CR1	RECTIFIER, 366H, 400V
CR2	S/A CR1
CR3	RECTIFIER, 366D, 200V
CR4	S/A CR3
CR5	S/A CR1
CR6	S/A CR1
Q1A	TRANSISTOR, DTS-423
Q1B	S/A Q1A
Q2	TRANSISTOR, 40313
R1A	RESISTOR, 4.17Ω, 5W
R1B	S/A R1A
R2	RESISTOR, 82Ω, 10%, 1/2W
R3	RESISTOR, 8,000Ω, 5W
R4	POTENTIOMETER. 15K. 2W. 1/4LG. 1/16 LG. SHAFT W/3/64 X 1/16 SLOT
R6	RESISTOR, 15Ω, 10%, 1/2W
S1	THERMOSTAT, STEMCO, TYPE A510 CLOSE ON RISE 230°F ± 7°F AND OPEN AT 206°F ± 7°F WITH EXPOSED BIMETAL
Text	TRANSFORMER, TEKTRAN, T58269
Text	AMPLIFIER
Text	RESISTOR, 4.22k, 1%, 1/2W
Text	RESISTOR, 121K, 1%, 1/2W
Text	RESISTOR, 261K, 1%, 1W

Note: S/A - Same As

ELECTRICAL PARTS LIST
FOR
A192 POWER SUPPLY

REF. NO.	DESCRIPTION
C1	CAPACITOR, 300 uf, 300V
C2	CAPACITOR, 60 uf, 250V
C3	CAPACITOR, .01 µf, 400V
CR1	RECTIFIER, (400V) 366H
CR2	S/A CR1
CR3	S/A CR1
CR4	S/A CR1
CR5	S/A CR1
CR6	S/A CR1
Q1A	TRANSISTOR, DTS-423
Q1B	S/A Q1A
Q 2	S/A Q1A
R1A	RESISTOR, 5Ω, 5W
R1B	S/A R1A
R 2	RESISTOR, 330Ω, 10%, 1/2W
R3	RESISTOR, 10,000Ω, 5W
R4	POTENTIOMETER, 15K, 2W, 1/4 LG. 1/16 LG. SHAFT W/3/64 X 1/16 SLOT
R 6	RESISTOR, 15Ω, 10%, 1/2W
S 1	THERMOSTAT, STEMCO, TYPE A510 CLOSE ON RISE 230°F ± 7°F AND OPEN AT 206°F ± 7°F WITH EXPOSED BIMETAL
T 1	TRANSFORMER, TEKTRAN, T58272
A20	AMPLIFIER
R 9	RESISTOR, 4.22K, 1%, 1/2W
R 10	RESISTOR, 162K, 1%, 1/2W
R13	RESISTOR, 348K, 1%, 1W
C 3	CAPACITOR, 1 µf, 300V

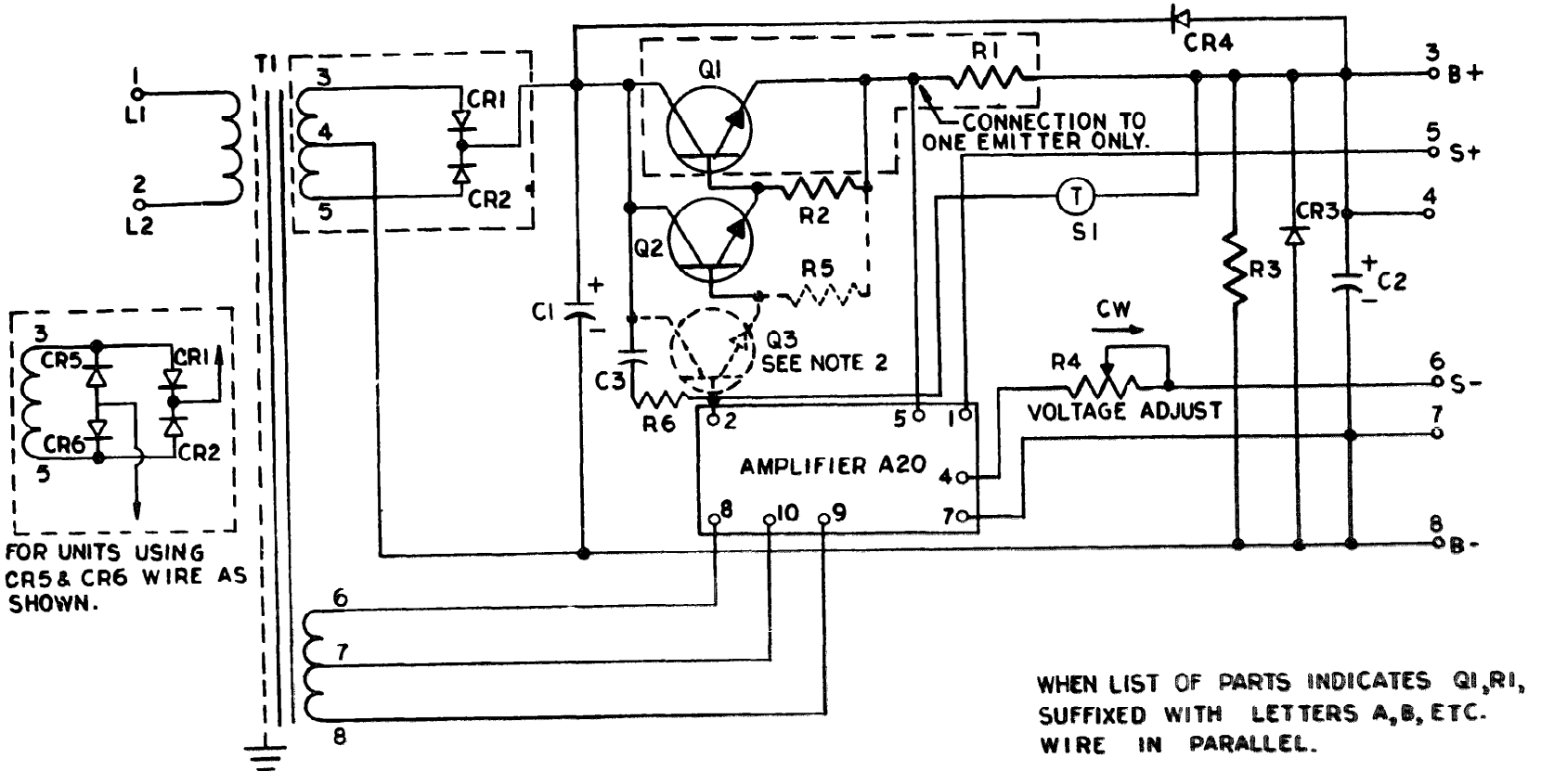
Note: S/A - Same As

ELECTRICAL PARTS LIST
FOR
A20 AMPLIFIER USED WITH A SERIES POWER SUPPLIES

REF. NO.	DESCRIPTION
C1	CAPACITOR, 20 uf, 150V
C2	CAPACITOR, 100 uuf, 1000V
C3	CAPACITOR, 2 uf, 200V
C4	CAPACITOR, SELECT IN TEST
CR1	RECTIFIER, G100G
CR2	S/A CR1
CR3	DIODE, T156
CR4	DIODE, ZENER, 1N706
CR5	S/A CR3
CR6	MODE, ZENER, ZA20A
CR7	S/A CR4
E1	LINK, AWG #22
E4	S/A E1
Q1	TRANSISTOR, 2N3638
Q2	S/A S1
Q3	TRANSISTOR, 40232
Q4	S/A Q3
Q5	S/A Q3
R1	RESISTOR, 4K, 5W
R2	RESISTOR, 1.78K, 1%. 1W
R3	RESISTOR, 4.7K, 10%, 1/2W
R4	RESISTOR, 17.8K, 1%, 1W
R5	RESISTOR, 215Ω, 1%, 1W
R6	RESISTOR, 1.5K, 10%, 1/2W
R7	RESISTOR, 18K, 10%, 1/2W
R8	S/A R6
R9	RESISTOR, 4.75K, 1%, 1W
R10	RESISTOR, 1%, 1W (Note 1)
R11	POTENTIOMETER, 2K, 1.5W
R12	POTENTIOMETER, 5K, 1.5W
R13	RESISTOR, 1%, 1W (Note 1)
R14	RESISTOR, 10K, 10%, 1/2W
R15	S/A R14
R16	RESISTOR, 10%, 1/2W, (SLLECT IN TEST)
R17	RESISTOR, 820Ω, 10%, 1/2W
R18	RESISTOR, 680Ω, 10%, 1/2W
R20	RESISTOR, 0Ω, (LINK AWG #22) (Note 2)
R21	RESISTOR, SELECT IN TEST, 1/2W, 10%

Notes:

1. Refer to power supply basic parts list for value.
2. Select in test when required.
3. S/A - Same as.



NOTES:
1. FOR VALUES OF COMPONENTS SEE LIST OF PARTS.
2. FOR UNITS THAT DO NOT USE Q3 & R5 CONNECT BASE OF Q2 TO TERMINAL 2 OF A20 AMPLIFIER

FIGURE C-5. POWER SUPPLIES A6-15, A28-.95, A144-.4, AND A192-.3 SCHEMATIC DIAGRAM.

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1st Sig Bde (10)
Sig FLDMS (PAC) (1)
SAAD (10)
TOAD (10)
LEAD (7)
USACSA (2)
USATECOM (2)
USAESC (25)
USA Ascom Depot (3)
USA Cp Carroll Depot (3)
USASTRATCOM Comm Op Bn, Korea (2)
USA Depot, Cam Rahn Bay (3)
USA Depot, Long Binh (3)
USA Depot, Qui Nhon (3)
Units org under fol TOE:
(2 cys each)
11-15
11-45
11-97
11-98
11-158
11-302
11-303
11-347
11-357
11-367
11-368
11-377
11-500(AA-AC)
29-118
29-134
29-136
29-137

NG: None

USAR: None

For explanation of abbreviation used, see AR 310-50

END

12-25-82

DATE

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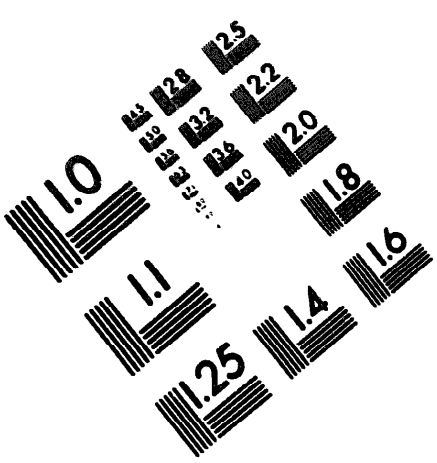
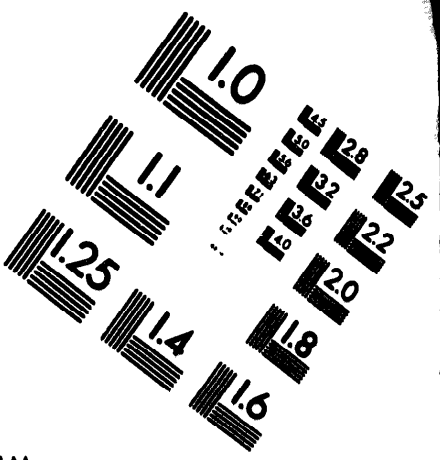
MICROFORM
TEST TARGET





150 MM

10 mm (e= 81 mm)

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15 mm (e= 109 mm)

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abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

20 mm (e= 137 mm)

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abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

2.5 mm (e= 1.77 mm)

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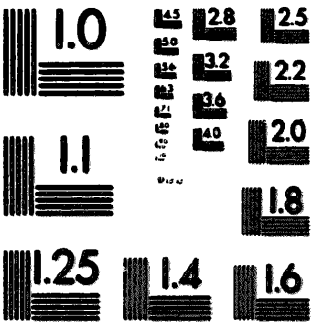
1234567890$¢£/%#½¼¾—=+×&@*



10 mm (e= 81 mm)

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abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

15 mm (e= 109 mm)

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abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

2.0 mm (e= 1.37 mm)

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abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

2.5 mm (e= 1.77 mm)

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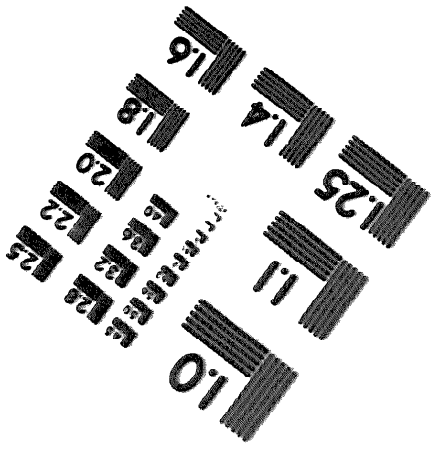
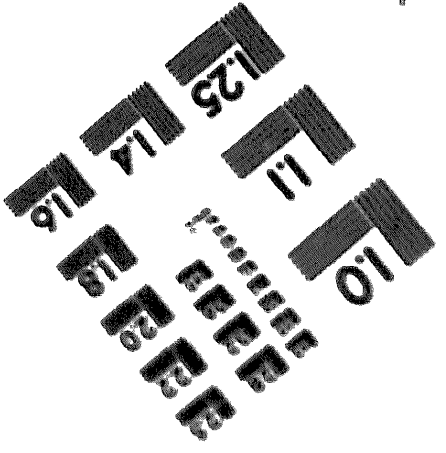
abcdefghijklmnopqrstuvwxyz
1234567890$¢£/%#½¼¾—=+×&@*

200 MM





250 MM