TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)
FOR

PREAMPLIFIER, LOGARITHMIC AM-6681(V)1/U

(HEWLETT-PACKARD MODEL 8808A)

(NSN 6625-00-134-3557)

HEADQUARTERS, DEPARTMENT OF THE ARMY

12 MARCH 1981



5

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 **DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL**

2 **IF POSSIBLE, TURN OFF THE ELECTRICAL POWER**

3 **IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL**

4 **SEND FOR HELP AS SOON AS POSSIBLE**

5 **AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION**

TEHNICAL MANUAL
No. 11-6625-2872-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *12 March 1981*

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(HEWLETT-PACKARD MODEL 8808A)
(NSN 6625-00-134-3557)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help Improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. In either case, a reply will be furnished direct to you.

This manual is an authentication of the manufacturer's commercial literature which, through usage, has been found to cover the data required to operate and maintain this equipment. Since the manual was not prepared in accordance with military specifications, the format has not been structured to consider levels of maintenance.

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SECTION 0

INTRODUCTION

0-1. SCOPE.

This manual describes Logarithmic Preamplifier AM-6681(V)1/U and provides instructions for operation and maintenance. Throughout this manual, the preamplifier is referred to as Hewlett-Packard Model 8808A Log-Audio Preamplifier.

0-2. INDEXES 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 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

0-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

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

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

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

0-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. We'll send you a reply.

0-5. ADMINISTRATIVE STORAGE.

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

0-6. DESTRUCTION OF ARMY ELECTRONICS MATERIEL.

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

SECTION I
GENERAL INFORMATION

1-1. DESCRIPTION.

1-2 The 8808A is a Log Level Preamplifier which produces a dc output proportional to the logarithm of the ac input signal, over an extremely wide range of signal amplitudes. The input signal dynamic range can be up to 100 dB (100,000:1). In addition, a 50 dB (320:1) span is provided for greater signal resolution

1-3. The Preamplifier is designed for use with low output impedance accelerometers, as well as vibration and acoustic transducers, which have outputs in the frequency range of 5 Hz to 100 kHz. It is also useful for continuous monitoring or recording of signal output in dB during frequency analysis of amplifiers, filters, transmission networks, and similar devices.

1-4. The 8808A can be plugged into Sanborn direct writing recording systems. When used with recorders having 50 division chart paper, the calibrated output is 2 dB per division for the 100 dB span, or 1 dB per division for the 50 dB span. Also, the preamplifier can be benchtop or rack mounted, with the output connected to a monitoring instrument such as a voltmeter or oscilloscope. For recording, a strip chart recorder or magnetic tape recorder can be connected to the output.

1-5. The range switch provides nine bottom scale sensitivities in 10 dB steps from 0 dBV to -80 dBV (dBV = decibels referred to 1 volt RMS). For the 50 dB span, the full scale signal is 50 dB above the bottom scale level. For the 100 dB span, the full scale signal is 100 dB above the bottom scale level.

1-6. All nine RANGE switch positions can be used with the 50 dB span. The four switch positions outlined in red on the panel (-50, -60, -70, -80) are used for the 100 dB span only.

1-7. Specifications for the 8808A Log Level Preamplifier are given in Table 1-1.

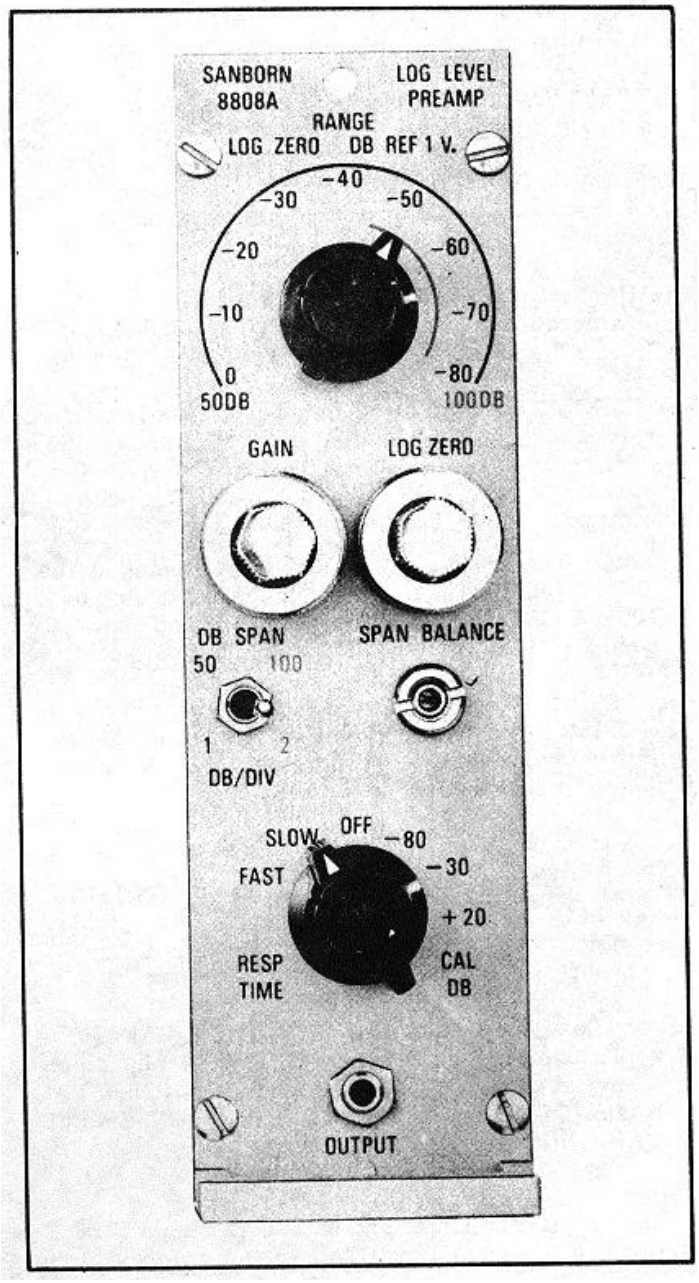

Figure 1-1. 8808A Log Level Preamplifier

Table 1-1. Specifications

ELECTRICAL SPECIFICATIONS

INPUT RESISTANCE: Single-ended to ground 1 megohm minimum.

SIGNAL DETECTION: Full-wave average. 50 dB or 100 dB span, switch selected from front panel.

DETECTION ACCURACY: ± 1 dB maximum error, sine wave input.

MAXIMUM SENSITIVITY: 100 μV rms of sine wave corresponds to bottom scale on most sensitive range.

GAIN STABILITY: Temperature: Less than 2 dB/10°C, 0° to 40°C. Line Voltage: Less than 0.5 dB, 103 to 127 volts.

ATTENUATION: 50 dB span ranges: 9 bottom scale ranges at -80 dBV to 0 dBV in 10 dB steps corresponding to 100 μV, 320 μV, 1 mV, 3.2 mV, 10 mV, 32 mV, 100 mV, 320 mV and 1 volt. Top scale is nominally 50 dB (320X) above bottom scale.

100 dB span ranges: 4 bottom scale ranges at -80 dBV to -50 dBV in 10 dB steps corresponding to 100 μV, 320 μV, 1 mV and 3.2 mV. Top scale is normally 100 dB (100,000X) above bottom scale.

ATTENUATION ACCURACY: ± 3% maximum error (0.25 dB) for -80 to -50 dBV attenuation ranges. For other ranges, detection error (± 1 dB) may add to attenuation error.

OUTPUT: Single-ended to ground, ± 2..5 V maximum or 0 to +5 volts across 1000 ohms minimum.

OUTPUT RESISTANCE: Approximately 10 ohms.

SIGNAL BANDWIDTH: 5 Hz to 100 kHz, less than 3 dB down from mid-band level on SLOW response range. 500 Hz to 100 kHz on FAST response range.

SIGNAL CREST FACTOR: 3 to 1 at full scale on 100 dB span, ±500 volts peak maximum allowed.

DETECTION RESPONSE TIME: For a step change in input amplitude with ratio of 40 dB (100:1) or greater, the time required for the output to increase or decrease between values corresponding to 105 and 90% of the maximum applied signal (i.e. , 20 dB below max. applied signal and 1 dB below max applied signal) is approximately 20 msec in FAST position and 2 sec in SLOW position. i. e. , average rate of change of output under these conditions corresponds to approximately 900 dB/ sec in FAST: 9 dB/sec in SLOW.

OUTPUT NOISE: Maximum noise appears at bottom scale. 50 dB span: 80 mV pp: 100 dB span: 40 mV pp.

INTERNAL CALIBRATION: -80 and +20 dBV, internally adjustable; -30 dBV accurate to + 0.5 dB. Stability: less than 0.25 dB, 10° to 40°C or 103 to 127 volts; approximately 500 Hz.

GENERAL SPECIFICATIONS

Terminals: DC output on front panel. Input and auxiliary DC output on rear of mating power supply.

Front Panel Controls: RANGE switch; GAIN potentiometer locking; LOG ZERO, 10-turn potentiometer, locking; 50/100 dB SPAN switch; SPAN BALANCE, screwdriver adjust; RESPONSE TIME/CAL switch.

Internal Controls: Signal Board: Balance adjust; CAL adjust (2); Zero Suppression adjust; Attenuator compensation

trimmers (4). Detector Board: 100 dB span mid-scale adjust.

Weight: Approximately 5 lb. (2, 3 kg).

Front Panel Dimensions: 7" high, 2-1/16" wide (178 x 52 mm).

Note: When Preamplifier is used in a recording system, these specifications are affected by performance of the recorder and driver amplifiers. (Consult data sheet of appropriate system for details.)

All Sanborn 8800 Series Amplifiers are tested for performance under normal production environmental conditions: ambient temperature 20° to 30° C and relative humidity less than 80% unless otherwise noted.

SECTION II INSTALLATION

2-1. PORTABLE CASE OR RACK MOUNTING.

2-2. The 8808A is operated as a self-contained instrument using an 860-500 Power Supply to furnish operating power for the preamplifier. The preamplifier power supply combination operates on a 115/230 volt 50 or 60 Hz power line. See the power supply Operating and Service Manual, IM-860-500-3.

2-3. The preamplifier power supply combination can be mounted in the 860-1400 Case for single channel benchtop operation. For two channel operation, two preamplifiers and power supplies mount in an 860-200 Module, for benchtop or rack mounting.

2-4. When the 8808A is operated with the 860-500 Power Supply, preamplifier input and output signal connections are made on the rear panel of the power supply as follows:

Signal Input Jack J3:	Plus (+) signal pin A
	Signal ground pin B
	Mating connector is 10G3-34FW
Signal Output Jack J2:	Plus (+) signal pin A
	Signal ground pin E
	Mating connector is 10B9-5MW

For monitoring, connect the preamplifier output signal to a voltmeter, oscilloscope, or other voltage indicating instrument which has a signal range of 0 to +5 volts or 2.5 volts. The output signal can be recorded using a strip chart recorder, magnetic tape recorder, or other instrument which will operate with an input of 0 to +5 volts, or ± 2. 5 volts.

2-5. INSTALLATION IN SANBORN RECORDING SYSTEMS.

2-6. The 8808A can be installed in Sanborn Recording Systems 7701A, 7702A, 7704A, 7706A, 7708A, for 1, 2, 4, 6, or 8 channels of recording using the heated stylus recording technique. Operating power for the preamplifier is supplied by the recording system. See the recording system instruction manual for installation information.

2-7. The 7701A Recorder is supplied in a portable case. The 7702A Recorder is supplied either in a mobile cart, or for rack mounting. The 7706A, 7708A Recorders are rack mounted.

SECTION III OPERATION

3-1. OPERATING CONTROLS.

3-2. RANGE switch selects the bottom scale signal level. Scale is calibrated in dBV (decibels referred to a 1 volt rrns signal). Full scale signal for 50 Db span operation is 50 dB above bottom scale signal. For 100 dB span, full scale signal is 100 dB above bottom scale signal. Bottom scale and corresponding full scale signal levels for each setting of the RANGE switch are given in Table 3-1.

3-3. DB SPAN switch selects either 50 dB or 100 dB maximum span between the bottom scale and full scale input signal levels.

NOTE

On the 100 dB span, only the -50, -60, -70, -80 RANGE switch positions are used.

Switch also indicates recorder calibration: 1 dB/div for 50 dB span. 2 dB/div for 100 dB span.

50 DB SPAN Range Switch Setting	Bottom Scale dBV	Bottom Scale Volts rms	Full Scale dBV	Full Scale Volts rms
0	0	1 V	+50	316 V
-10	-10	.316V	+40	100 V
-20	-20	.100V	+30	31.6 V
-30	-30	31.6 mnV	+20	10 V
-40	-40	10 mV	+10	3.16 V
-50	-50	3.16 mV	0	1 V
-60	-60	1 mV	-10	.316 V
-70	-70	316 µV	-20	.1 V
-80	-80	100 µV	-30	31.6 mV
100 DB SPAN				
-50	-50	3.16 mV	+50	316 V
-60	-60	1 mV	+40	100 V
-70	-70	316 µV	+30	31.6 V
-80	-80	100 µV	+20	10 V

Table 3-1. Bottom and Full Scale Signal Levels

3-4. GAIN control sets the preamplifier output level for a full scale cal signal applied to the preamplifier input. For use in recording systems, full scale output corresponds to the top division on the recorder chart (approx. -2.5 volts preamp output). For use with a voltmeter or oscilloscope, full scale output is +5 volts.

3-5. LOG ZERO control sets the preamplifier output level for a bottom scale cal signal applied to the preamplifier input. For use in recording systems, bottom scale output-corresponds to the bottom division on the recording chart (approx. -2.5 volts preamp output). For use with a voltmeter or oscilloscope, bottom scale output is 0 volts.

3-6. SPAN BALANCE control balances the preamplifier, to obtain the same output on the 100 and 50 dB spans for a -80 dBV calibration signal level.

3-7. RESP TIME,/CAL DB switch selects the operating mode. FAST and SLOW response times are the use positions. OFF position disconnects the input signal from the preamplifier, and grounds the preamplifier input. -80, -30, +20 dB CAL positions select calibration voltage levels supplied by a 500 Hz oscillator in the preamp.

3-8. OUTPUT jack provides the preamplifier output signal at the front panel, for monitoring purposes. Mates with 10G2-22MW plug.

3-9. BALANCING

3-10. Allow preamplifier to warm up several minutes before balancing.

a. Set the RESP TIME/CAL DB and RANGE switches to the -80 position.
b. Adjust the LOG ZERO control for approximately bottom scale output.
c. Alternately set the DB SPAN switch to the 50 and 100 positions while adjusting the SPAN BALANCE control for minimum change in the preamp output.

NOTE

Approximately ± 20 mnV noise normally present at the preamplifier output will cause a slight fluctuation in the reading observed on a voltmeter or oscilloscope connected to the output.

3-11. CALIBRATION

a. Set the DB SPAN switch to 100.
b. Set the RANGE switch to 80.
c. Set the RESP TIME/CAL DB switch to -80.
d. Adjust the LOG ZERO control for bottom scale output.
e. Set the RESP TIME/CAL DB switch to +20 and adjust the GAIN control for full scale output.
f. Repeat steps 3-11 (c) through 3-11 (e) to eliminate the effects of control interaction.
g. Set the RESP TIME/CAL DB switch to OFF. With the switch OFF, a negative voltage is normally present at the preamp output, which will position the recorder stylus offscale.

NOTE

Preamp RANGE switch must be in the -80 position during the calibration procedure.

3-12. ALTERNATE CALIBRATION PROCEDURE.

3-13. To calibrate the preamplifier with the DB SPAN switch in the 50 dB position, use the below procedure:

a. Set the DB SPAN switch to 50.
b. Set the RANGE switch to -80.
c. Set the RESP TIME/CAL DB switch to -80.
d. Adjust the LOG ZERO control for bottom scale output.
e. Set the RESP TIME/CAL DB switch to -30 and adjust the GAIN control for full scale output.
f. Repeat steps 3-13 (c, d, e) to eliminate the effects of control interaction.
g. Set the RESP TIME/CAL DB switch to OFF. With the switch OFF, a negative voltage is normally present at the preamp output, which will position the recorder stylus offscale.

3-14. OPERATION

3-15. Set RESP TIME/CAL DB switch to OFF. Connect input signal to preamplifier. For applications where preamplifier is installed in Sanborn recorder, the output signal is displayed on recorder chart paper. For applications where the preamplifier output is to be monitored with an oscilloscope or voltmeter, the output is available from the preamplifier front panel OUTPUT jack, or from a rear connector on the preamplifier power supply.

3-16. Set the DB SPAN switch to the 50 dB or 100 dB position, depending on the expected range of input signal amplitudes.

3-17. 50 dB SPAN OPERATION.

3-18. Set the RANGE switch to the position which corresponds to the minimum expected signal level. See examples 1 and 2.

EXAMPLE 1: Minimum expected signal level 10 mnV rms. This corresponds to a -40 dBV signal level (see Table 3-1). Set the RANGE switch to the -40 dBV position. The full scale signal level is 50 dB higher:

-40 dBV
add +50 dB
+10 dBV = Full scale input signal = 3.16 volts rms

EXAMPLE 2: Minimum expected signal level .5 volt rms. This corresponds to a -6 dBV signal level. Since there is no -6 dBV switch position, set the switch to the next lower step, which is -10 dBV. The full scale signal level is 50 dB higher:

-10 dBV
add +50 dB
-40 dBV Full scale input signal = 100 volts rms

3-19. Set the RESP TIME/CAL DB switch to the FAST or SLOW position, depending on the signal bandwidth, and the detection response) time desired. (For FAST response, the preamp) bandwidth is 500 to 100,000 Hz. For SLOW response, bandwidth is 5 to 100,000 Hz.)

3-20. For 50 division chart paper, the calibration is 1 dB/div. The bottom division on the chart represents the bottom scale signal level in dB indicated on the RANGE switch.

3-21. 100 dB SPAN OPERATION.

3-22. Only the four RANGE switch positions outlined in red (-80, -70, -60, -50) are used for the 100 dB span. Set the RANGE switch to the position which corresponds to the expected minimum signal level.

EXAMPLE 1: Minimum expected signal is 1 mV rms. This corresponds to a -60 dBV level (see Table 3-1). Set RANGE switch to the - 6OdBV bottom scale position. The full scale signal level is l00dB higher:

- 60 dBV
add +100 dB
+ 40 dBV = Full scale input signal = 100 volts rms

EXAMPLE 2: Minimum expected signal is
500 μV rms. This corresponds to a -66 dBV level. Set the RANGE switch to the next lower step, which is the -70 dBV bottom scale position. The full scale signal level is 100 dB higher:

- 70 dBV
add +100 dB
+ 30 dBV = Full scale input signal = 31.6 volts rms

3-23. Set the RESP TIME/CAL DB switch to the FAST or SLOW position, depending on the signal blind bandwidth, and the detection response time desired. (For FAST response, the preamp bandwidth is 500 to 100,000 Hz. For SLOW response, bandwidth is 5 to 100,000 Hz.)

3-24. For 50 division chart paper, the calibration is 2 dB/div. The bottom division on the chart represents the bottom scale signal level in dBV indicated on the RANGE switch.

3-25. OPERATION WITH MONITORING INSTRUMENTS.

3-26. When the preamplifier output is connected only to a monitoring instrument such as a dc voltmeter or oscilloscope, perform the balancing (Section 3-9) and calibration (Section 3-11) procedure as indicated. Bottom scale output refers to 0 volts preamplifier output. Full scale output is -5 volts preamplifier output. The 50 dB span calibration is .1 volts/dB. The 100 dB span calibration is .05 volts/dB.

3-27. SIMULTANEOUS RECORDING AND MONITORING OF 8808A OUTPUT.

3-28. To simultaneously record and monitor the 8808A output signal, perform the balancing and calibration procedure using the recorder. The dc voltmeter, oscilloscope, or other monitoring instrument connected to the output of the preamp will read approximately -2.5 volts for a bottom scale input signal, and approximately +2.5 volts for a full scale input signal. The monitor instrument calibration is .1 V/dB on the 50 dB span, and .05 V/dB on the 100 dB span.

SECTION IV
PRINCIPLES OF OPERATION

4-1. The 8808A Log Level Preamplifier is designed to produce a logarithmic output (in decibel units) on a linear scale for a wide dynamic range (100 dB) of input signals. The wide dynamic range is achieved by the use of a combination of series and shunt successive detector stages. The block diagram (Figure 4-1) shows a simple series of successive detector stages with logarithmic compression networks, similar to those used in the 8808A.

4-2. Each stage consists of a linear amplifier having a gain of 16-2/3 dB. Limiting diodes at the input of each stage prevent amplifier saturation. The full-wave detector output drives a logarithmic response shaping network. The outputs of all stages are connected to a summing resistor. This series of stages handles the first 50 dB of amplifier signal input. For 100 dB span operation, a second series of successive detectors covers the remaining 50 dB of signal range.

4-3. Signal flow as shown in Figure 4-1 is as follows: A small ac signal appearing at the input is amplified by stage 3, but not sufficiently to provide detector output. The signal is further amplified by stage 2, but is still not sufficient amplitude to detect. The signal is amplified by stage 1 to a level sufficient to operate the first detector. The output of the fullwave detector is compressed by a three-line segment logarithmic compression network. All compression network outputs are connected to the summing resistor. As the input level increases, successive compression in stages 2 and 3 perform a similar function, feeding their output to the summing junction.

4-4. The very wide dynamic range of the 8808A is made possible by the progressive summing of the outputs of each of the detector stages, which by themselves operate linearly over a 16-2/3dB range.

4-5. The overall block diagram for the 8808A is shown in Figure 4-2. A signal at the input sees the input Attenuator which is followed by a differential, low noise operational amplifier using field effect transistors. The amplifier output is connected to a series of detector and compressor networks to provide the first 50 dB of operating range. A shunt signal path with a hybrid emitter follower drives the lower series of detector networks for the remaining, 50 dB of signal level.

4-6. The detector outputs are summed into a balanced dc amplifier. The SPAN BALANCE, control and zero suppression circuit outputs are also summed into the balanced amplifier. The action of the SPAN BALANCE control is to produce the same bottom scale output from the dc amplifier on the 50 dB and 100 dB spans. The zero suppression circuit works in conjunction with the input Attenuator.

4-7. The DB SPAN switch circuit is located in the feedback loop of the balanced dc amplifier to produce a 2:1 gain change in the amplifier output, depending on the setting of the SPAN switch.

4-8. The output of the balanced amplifier is fed to a shunt gain control, followed by the output differential to single-ended dc amp which has a dc signal summed in from the LOG ZERO control to set log zero level.

ELECTRICAL SAFETY

The electrical safety of this product has been considered in its design and production, and its construction has employed techniques and components in accordance with the National Electrical Code and Underwriters Laboratories, Inc. These safety features apply only if the product is connected to a primary power distribution system which provides adequate grounding and is installed and maintained in accordance with the National Electrical Code. When this product is interconnected with other electrical appliances in its normal operation, it is important that these other appliances also be provided with adequate grounding protection, where required, if they are, in turn, connected to a primary power source. Faults occurring in any interconnected appliance can degrade the safety of this product by means of the electrical interconnections necessary for its normal systems operation. Recommendations indicating some of the accessory appliances which may be used with this product are given elsewhere in this publication.

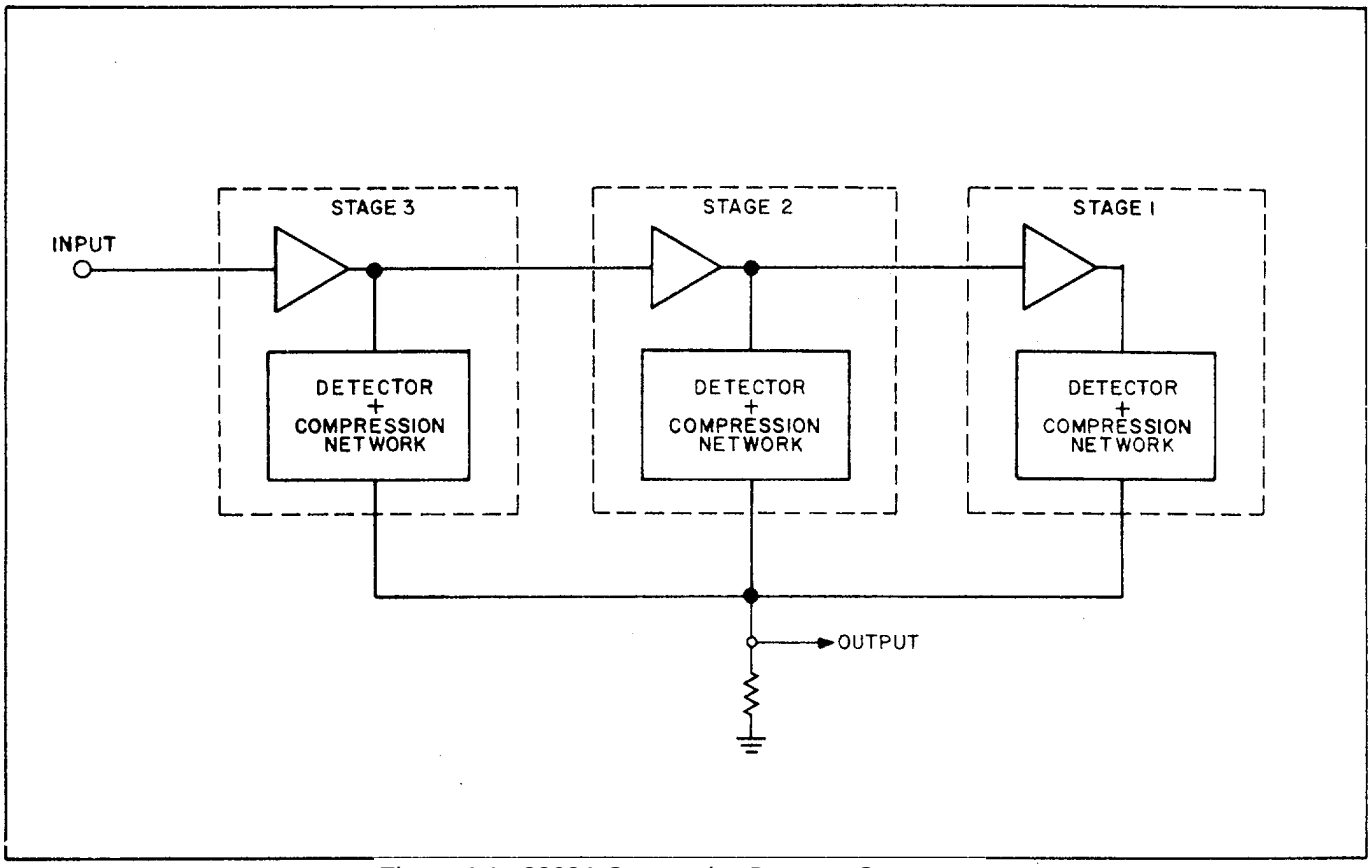

Figure 4-1. 8808A Successive Detector Stages

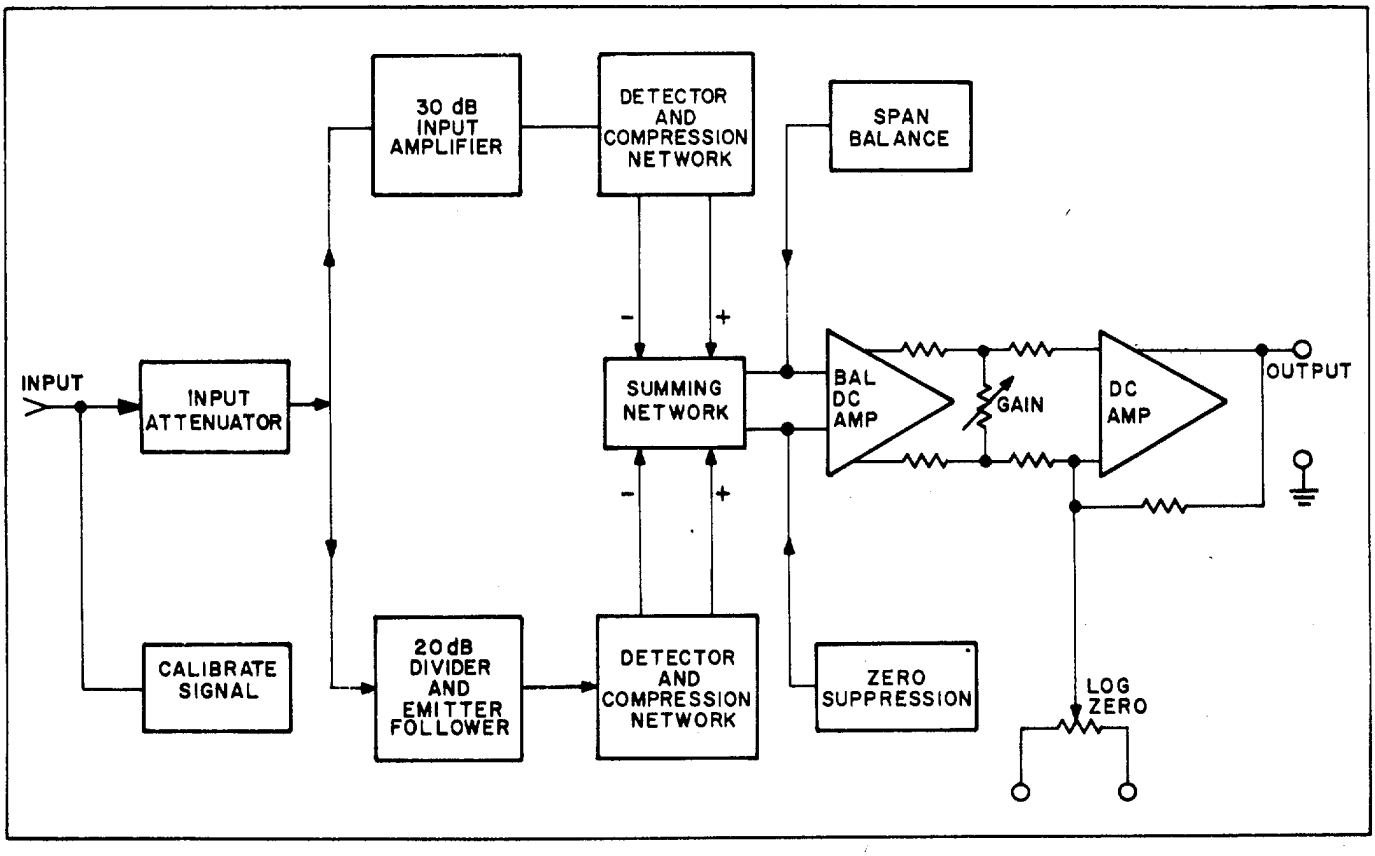

Figure 4-2. 8808A Block Diagram

SECTION V
REPLACEABLE PARTS

5-1. INTRODUCTION.

5-2. This section contains information for locating and ordering replacement parts. Table 5-1 provides the following information for each item.

a. Lists electrical parts in alpha-numeric order of their reference designators.
b. The Sanborn stock number.
c. The part description.
d. Lists miscellaneous parts in numerical order

5-3. ORDERING INFORMATION.

5-4. To order a replacement part, note the part number and then cross reference that part number to the National Stock Number in table 5-2; then order through normal ordering channels. If the part number does not have a National Stock Number, then order the part through normal ordering channels using the commercial part number. Specify the following information for each part:

a. Model and s/n of the instrument.
b. Sanborn stock number.
c. Circuit reference designator.
d. Description.

5-5. To order a part not listed in the tables, give a complete description of the part and include its function and location.

REFERENCE DESIGNATORS

A	= assembly	F	= fuse	Q	= transistor	V	= vacuum tube photocell, etc.
B	= motor	FL	= filter	R	= resistor		
BT	= battery	HR	= heater	RT	= thermistor	W	= cable
C	= capacitor	J	= jack	S	= switch	X	= socket
CP	= coupler	K	= relay	T	= transformer	XDS	= lampholder
CR	= diode	L	= inductor	TB	= terminal board	XF	= fuseholder
DL	= delay line	M	= meter	TC	= thermocouple	Y	= crystal
DS	= device signaling (lamp)	MP	= mechanical part	TP	= test point	Z	= network
E	= miscellaneous electronic part	P	= plug				

ABBREVIATIONS.*

A	= amperes	fil hd	= fillister head	n	= nano (10^{-9})	rot	= rotary
ACC	= accessories	flm	= film	NC	= normally closed		
AFC	= automatic frequency control	FR	= front	Ne	= neon	s-b	= slow-blow
Al	= aluminum	fwd	= forward	NETWRK	= network	scon	= semiconductor
AMP	= amplifier	fxd	= fixed	Ni Pl	= nickel plate	Se	= selenium
as ord	= as ordered			NO	= normally open	sect	= section(s)
		G c/s	= gigacycles per second (see G Hz)	NPN	= negative positive negative	SEMS	= machine screw with washer
Be Cu	= beryllium copper			NPO	= negative positive zero (zero temperature coefficient)	SEQ	= sequential
BFO	= beat frequency oscillator	Ge	= germanium			Si	= silicon
bh	= binder head	GEN	= generator			sil	= silver
bp	= bandpass	G Hz	= gigacycles per second	nsr	= not separately replaceable	sl	= slide
brs	= brass	gl	= glass			SPDT	= single-pole double-throw
		grd	= ground(ed)	obd	= order by description		
c/s	= cycles/second (see Hz)			od	= outside diameter	spl	= special
CALIB	= calibration	h	= henry(ies)	ov hd	= oval head	SPST	= single-pole single-throw
ccw	= counterclockwise	hex	= hexagonal	ox	= oxide		
cd pl	= cadmium plate	Hg	= mercury			sst	= stainless steel
cer	= ceramic	Hz	= cycle per second	pc	= printed circuit board	SWTCH	= switch
ch	= channel			PEMS	= circular press fitted nut		
cmo	= cabinet mount only	impg	= impregnated	pF	= picofarad (10^{-12} farads)		
coef	= coefficient	incd	= incandescent	PH	= phone	Ta	= tantalum
com	= common	ins	= insulation(ed)	ph brz	= phosphor bronze	td	= time delay
comp	= composition	ips	= inches per second	Phl hd	= Phillips head	Ti	= titanium
conn	= connector			piv	= peak inverse voltage	tog	= toggle
CRT	= cathode-ray tube	k, K	= kilo (1000)	pk	= peak	tol	= tolerance
cw	= clockwise	Kc, k c/s	= kilocycles (see k Hz)	PNL	= panel	trim.	= trimmer
		KEPS	= hex nut with lockwasher	PNP	= positive negative positive	twt	= traveling wave tube
dB	= decibel	k Hz	= kilocycles/second	poly	= polystyrene		
dep C	= deposited carbon			por	= porcelain	μor U	= micro (10^{-6})
DISP	= display	lin	= linear taper	pos	= position(s)	μA	= microamperes
DPDT	= double-pole double-throw	lkwash	= lockwasher	pot	= potentiometer	μF	= microfarads
DPST	= double-pole single-throw	log	= logarithmic taper	pp	= peak-to-peak	μV	= microvolts
		lp flt	= low-pass filter	PREAMP	= preamplifier		
EIA	= tubes or transistors meeting Electronic Industries Association standards will normally result in instrument operating within specifications; tubes and transistors selected for best performance will be supplied if ordered by stock numbers			prec	= precision (temperature coefficient, long term stability, and/or tolerance)	V	= volt(s)
		m	= milli (10^{-3})			vac	= vacuum
		mA	= milliamperes			Vacw	= volt(s) alternating current working
		mam	= milliammeter				
		M	= mega (10^{6})			var	= variable
		M c/s	= megacycles (see M Hz)	pt	= point	Vdcw	= volt(s) direct current working
		met flm	= metal film				
		mfr	= manufacturer	rec	= recorder		
		mH	= millihenry	rect	= rectifier	W	= watt(s)
elect	= electrolytic	M Hz	= megacycles/second	rev	= reverse	w/	= with
encap	= encapsulated	minat	= miniature	rf	= radio frequency	w/o	= without
		mom	= momentary	rh	= round head	wiv	= reverse working voltage
F	= farad(s)	mtg	= mounting	rmo	= rack mount only		
fet	= field effect transistor	mV	= millivolt	rms	= root-mean-square	ww	= wirewound
fh	= flat head	mW	= milliwatt			Ω	= ohm
FIG	= figure	my	= mylar® (Dupont de Nemours)				

* Electric Accounting Machines (EAM) capitalize all abbreviations

Table 5-1. Reference Designation Index

Circuit Reference	Part Number	Description	Assembly Location
END ITEM	8808A	LOG LEVEL PREAMPLIFIER	A1
	08808-60020	PRINTED CIRCUIT BOARD ASSY.	A2
	08808-60030	PRINTEID CIRCUIT BOARD ASSY.	A3
	08808-60050	SWITCH ASSEMBLY	A4
		ACCESSORY	Page 15
		MISCELLANEOUS	Page 16
C1	8PA-6	Capacitor, 100 pF	A2
C2	8PA-6	Same, as C1	A2
C3	0121-0163	Capacitor, 7-45 pF	A2
C4	0160-2388	Capacitor, 47 MFD 400V	A2
C5	8PA-35	Capacitor, 1000 pF 5%	A2
C6	0160-2386	Capacitor, 470 pF	A2
C7	0121-0160	Capacitor, 210-1000 pF	A2
C8	0160-2384	Capacitor, 120 pF	A2
C9	0121-0160	Same as C7	A2
C10	0160-2383	Capacitor, 100 pF 1%	A2
C11	8C-61	Capacitor, 20 MFD 20V	A2
C12	8C-61	Same as C11	A2
C13	0160-2387	Capacitor, 1000 pF 1%	A2
C14	8B-201	Capacitor, .0047 MFD 10%	A2
C15	8B-213	Capacitor, .0033 MFD	A2
C16	8B-145	Capacitor, .005 MFD 5%	A2
C17	0180-0374	Capacitor, 10 MFD 20V	A3
C18	8B-68	Capacitor, .01 MFD	A3
C19	0180-0022	Capacitor, 3.9 MFD 35V	A3
C20	8T-31	Capacitor, .22 MFD	A3
C21	0180-0374	Same as C17	A3
C22	0180-0195	Capacitor, .33 MFD	A3
C23	0180-0022	Same as C19	A3
C24	8T-31	Same as C20	A3
C25	0180-0374	Same as C17	A3
C26	0180-0195	Same as C22	A3
C27	0180-0022	Same as C19	A3
C28	8B-68	Same as C18	A3
C29	8B-68	Same as C18	A3
C30	0121-0163	Capacitor, 7-45 pF	A2
C31	0160-2385	Capacitor, 150 pF	A2
C32	8B-68	Same as C18	A3
C33	0180-0022	Same as C19	A3
C34	0180-0374	Same as C17	A3
C35	8B-68	Same as C18	A3
C36	0180-0022	Same as C19	A3
C37	8T-31	Same as C20	A3
C38	0180-0374	Same as C17	A3
C39	8B-68	Same as C18	A3
C40	0180-0022	Same as C19	A3
C41	8T-31	Same as C20	A3
C42	0180-0374	Same as C17	A3
C43	8B-68	Same as C18	A3
C44	0180-0022	Same as C19	A3

Table 5-1. Reference Designation Index (Cont.)

Circuit Reference	Part Number	Description	Assembly Location
C45	5080-3722	Capacitor, 27 MFD 10V	A2
C46	5080-3723	Capacitor, .22 MFD	A2
C47	5080-3722	Same as C45	A2
C48	5080-3723	Same as C46	A2
C49	8B-68	Capacitor, .01 MFD	A2
C50	8B-68	Same as C49	A2
C51	8B-68	Same as C49	A2
C52	8B-213	Same as C15	A2
C53	0180-1862	Capacitor, 120 MFD 15V	A3
C54	0180-1862	Same as C53	A3
C55	0180-1862	Capacitor, 120 MFD 15V	A2
C56	0180-1862	Same as C55	A2
C57	8B-181	Capacitor, .22 MFD	A2
C58	8E-28	Capacitor 0033 MFD	A2
C59	8E-28	Same as C58	A2
C61	8E-21	Capacitor, 68 pF	A2
CR1	16A-79	Diode	A2
CR2	16A-79	Same as CR1	A2
CR3	16A-79	Same as CR1	A2
CR4	16A-79	Same as CR1	A2
CR5	16A-79	Same as CR1	A2
CR6	16A-83	Diode (3 Pellet)	A2
CR7	16A-83	Same as CR6	A2
CR8	16A-79	Diode	A3
CR9	16A-79	Same as CR8	A3
CR10	16A-79	Same as CR8	A3
CR11	16A-79	Same as CR8	A3
CR12	1901-0378	Diode, Silicon Stabistor (2 Pellet)	A3
CR13	1901-0378	Same as CR12	A3
CR14	1910-0016	Diode, Germanium	A3
CR15	1910-0016	Same as CR14	A3
CR16	16A-45A	Diode	A3
CR17	1901-0378	Same as CR12	A3
CR18	1901-0377	Diode, Silicon Stabistor (3 Pellet)	A3
CR19	16A-79	Same as CR8	A3
CR20	16A-79	Same as CRR	A3
CR21	16A-79	Same as CR8	A3
CR22	16A-79	Same as CR8	A3
CR23	1901-0378	Same as CR12	A3
CR24	1901-0378	Same as CR12	A3
CR25	1910-0016	Same as CR14	A3
CR26	1910-0016	Same as CR14	A3
CR27	16A-45A	Same as CR16	A3
CR28	1901-0378	Same as CR12	A3
CR29	1901-0377	Same as CR18	A3
CR30	16A-79	Same as CR8	A3
CR31	16A-79	Same as CR8	A3
CR32	16A-79	Same as CR8	A3
CR33	16A-79	Same as CR8	A3
CR34	1901-0378	Same as CR12	A3
CR35	1901-0378	Same as CR12	A3
CR36	16A-45A	Same as CR16	A3
CR37	16A-45A	Same as CR16	A3
CR38	16A-45A	Same as CR16	A3
CR39	1901-0378	Same as CR12	A3

Table 5-1. Reference Designation Index (Cont.)

Circuit Reference	Part Number	Description	Assembly Location
CR40	1901-0377	Same as CR18	A3
CR41	1910-0016	Same as CR14	A3
CR42	1910-0016	Same as CR14	A3
CR43	16A-45A	Same as CR16	A3
CR44	1901-0378	Same as CR12	A3
CR45	16A-79	Same as CR8	A3
CR46	16A-79	Same as CR8	A3
CR47	16A-79	Same as CR8	A3
CR48	16A-79	Same as CR8	A3
CR49	1901-0378	Same as CR12	A3
CR50	1901-0378	Same as CR12	A3
CR51	1910-0016	Same as CR14	A3
CR52	1910-0016	Same as CRI4	A3
CR53	16A-45A	Same as CR16	A3
CR54	1901-0378	Same as CR12	A3
CR55	1901-0377	Same as CR18	A3
CR56	16A-79	Same as CR8	A3
CR57	16A-79	Same as CR8	A3
CR58	16A-79	Same as CR8	A3
CR59	16A-79	Same as CR8	A3
CR60	1901-0378	Same as CR12	A3
CR61	1901-0378	Same as CR12	A3
CR62	1910-0016	Same as CR14	A3
CR63	1910-0016	Same as CR14	A3
CR64	16A-45A	Same as CR16	A3
CR65	1901-0378	Same as CR12	A3
CR66	1901-0377	Same as CR18	A3
CR67	16A-79	Same as CR8	A3
CR68	16A-79	Same as CR8	A3
CR69	16A-79	Same as CR8	A3
CR70	16A-79	Same as CR8	A3
CR71	1901-0378	Same as CR12	A3
CR72	1901-0378	Same as CR12	A3
CR73	1910-0016	Same as CR14	A3
CR74	1910-0016	Same as CR14	A3
CR75	16A-45A	Same as CR16	A3
CR76	1901-0378	Same as CR12	A3
CR77	1901-0377	Same as CR18	A3
CR78	16A-45A	Diode	A2
CR79	16A-45A	Same as CR78	A2
CR80	16A-45A	Same as CR78	A2
J1	10G16-IMX	Connector, 16-pin	A1
J2	10G2-22FX	Mini-Jack	A1
Q1A, 1B	1855-0031	Transistor, Field Effect	A2
Q2	1854-0202	Transistor, 2N3390	A2
Q3	1854-0202	Same as Q2	A2
Q4	16T-81	Transistor, SM9143	A2
Q5	16T-81	Same as Q4	A2
Q6	16T-79	Transistor, 2N3391	A3
Q7	16T-50	Transistor, 2N1309	A3
Q8	16T-79	Same as Q6	A3
Q9	16T-50	Same as Q7	A3
Q10	16T-79	Same as Q6	A3
Q11	16T-50	Same as Q7	A3

Table 5-1. Reference Designation Index (Cont.)

Circuit Reference	Part Number	Description	Assembly Location
Q12	16T-78	Transistor, 2N3393	A2
Q13	16T-76	Transistor, 53-10	A2
Q14	16T-79	Same as Q6	A3
Q15	16T-50	Same as Q7	A3
Q16	16T-79	Same as Q6	A3
Q17	16T-50	Same as Q7	A3
Q18	16T-79	Same as Q6	A3
Q19	16T-50	Same as Q7	A3
Q20	5080-3724	Transistor, 54-23	A2
Q21	5080-3724	Same as Q20	A2
Q22	16T-76	Same as Q13	A2
Q23	16T-76	Same as Q13	A2
Q24	16T-78	Same as Q12	A2
Q25	16T-78	Same as Q12	A2
Q26	16T-81	Same as Q4	A2
Q27	16T-61	Transistor, 2N3053	A2
Q28	16T-61	Same as Q27	A2
Q29	16T-61	Same as Q27	A2
R1	50AB-155J	Resistor, 1.5 Meg ±5%	A4
R2	50AB-335J	Resistor, 3.3 Meg ±5%	A4
R3	0698-4981	Resistor, 32.4K 1%o	A2
R4	50E-124F	Resistor, 120K 1%	A2
R5	50E-825-3F	Resistor, 825K 1'%	A4
R6	50E-976-3F	Resistor, 976K 1%	A2
R7	50E-205F	Resistor, 2 Meg 1%	A2
R8	50AB-472J	Resistor, 4.7K 5%	A2
R9	50E-503F	Resistor, 50K 1%	A2
R10	56PA-17	Potentiometer, 250 Ohm	A2
R11	50E-403F	Resistor, 40K 1%	A2
R12	50E-503F	Same as R9	A2
R13	50AB-472J	Same as R8	A2
R14	0757-0309	Resistor, 61.9K 1%	A2
R15	50E-104F	Resistor, I00K%	A2
R16	50E-104F	Same as R15	A2
R17	50E-204F	Resistor, 200K 1%	A2
R18	50AB-472J	Same as R8	A2
R19	50AB-222J	Resistor, 2.2K 5%	A2
R20	50AB-471J	Resistor, 470 Ohm *5%*	A2
R21	50E-316-2F	Resistor, 31.6K 1%	A2
R22	50AB-331J	Resistor, 330 Ohm 5%	A2
R23	50AB--221J	Resistor, 220 Ohm 5%	A2
R24	50E-101F	Resistor, 100 Ohm 1%	A2
R25	50AB-223J	Resistor, 22K ±5%	A3
R26	50AB-472.J	Resistor. 4.7K ±5%	A3
R27	50E-133-2F	Resistor, 13.3K ±1%	A3
R28	50E-202F	Resistor, 2K ±1%	A3
R29	50AB-472J	Same as R26	A3
R30	50AB-332J	Resistor, 3.3K ±5%	A3
R31	50E-153F	Resistor, 15K ±1%	A3
R32	50E-153F	Same as R31	A3
R33	50E-104F	Resistor, 100K ±1%	A3
R34	50E-104F	Same as R33	A3
R35	50AB-152J	Resistor, 1. 5K 5%	A2
R36	50E-504F	Resistor, 500K ±1%	A3
R37	50E-353F	Resistor, 35K ±1%	A3

Table 5-1. Reference Designation Index (Cont.)

Circuit Reference	Part Number	Description	Assembly Location
R38	50E-105F	Resistor, 1 Meg ±1%	A3
R39	50E-105F	Same as R38	A3
R40	50AB-223J	Sane as R25	A3
R41	50AB-472J	Same as R26	A3
R42	50E-133-2F	Same as R27	A3
R43	50E-202F	Same as R28	A3
R44	50AB-472J	Same as R26	A3
R45	50AB-332J	Same as R30	A3
R46	50E-153F	Same as R31	A3
R47	50E-153F	Same as R31	A3
R48	50E-104F	Same as R33	A3
R49	50E-104F	Same as R33	A3
R50	50E-504F	Same as R36	A3
R51	50E-353F	Same as R37	A3
R52	50E-105F	Same as R38	A3
R53	50E-105F	Same as R38	A3
R54	50AB-223J	Same as R25	A3
R55	50AB-472J	Same as R26	A3
R56	50E-133-2F	Same as R27	A3
R57	50E-202F	Same as R28	A3
R58	50AB-472J	Same as R26	A3
R59	50AB-332J	Same as R30	A3
R60	50E-153F	Same as R31	A3
R61	50E-153F	Same as R31	A3
R62	50E-104F	Same as R33	A3
R63	50E-104F	Same as R33	A3
R64	50E-105F	Same as R38	A3
R65	50E-104F	Same as R33	A3
R66	50E-105F	Same as R38	A3
R67	50E-105F	Same as R38	A3
R68	50E-185F	Resistor, 1.8 Meg 1%	A2
R69	50E-204F	Same as R17	A2
R70	50AB-224J	Resistor, 220K 5%	A2
R71	50E-153F	Same as R31	A3
R72	50E-153F	Same as R31	A3
R73	50E-104F	Same as R33	A3
R74	50E-104F	Same as R33	A3
R75	50E-504F	Same as R36	A3
R76	50E-204F	Resistor, 200K ±1%	A3
R77	50E-105F	Same as R38	A3
R78	50E-105F	Same as R38	A3
R79	50AB-223J	Same as R25	A3
R80	50AB-472J	Same as R26	A3
R81	50E-133-2F	Same as R27	A3
R82	50E-202F	Same as R28	A3
R83	50AB-472J	Same as R26	A3
R84	50AB-332J	Same as R30	A3
R85	50E-153F	Same as R31	A3
R86	50E-153F	Same as R31	A3
R87	50E-104F	Same as R33	A3
R88	50E-104F	Same as R33	A3
R89	50E-504F	Same as R36	A3
R90	50E-353F	Same as R37	A3
R91	50E-105F	Same as R38	A3
R92	50E-105F	Same as R38	A3
R93	50AB-223J	Same as R25	A3
R94	50AB-472J	Same as R26	A3

Table 5-1. Reference Designation Index (Cont.)

Circuit Reference	Part Number	Description	Assembly Location
R95	50E-133-2F	Same as R27	A3
R96	50E-202F	Same as R28	A3
R97	50AB-472J	Same as R26	A3
R98	50AB-332J	Same as R30	A3
R99	50E-153F	Same as R31	A3
R100	50E-153F	Same as R31	A3
R101	50E-104F	Same as R33	A3
R102	50E-104F	Same as R33	A3
R103	50E-504F	Same as R36	A3
R104	50E-353F	Same as R37	A3
R105	50E-105F	Same as R38	A3
R106	50E-105F	Same as R38	A3
R107	50AB-223J	Same as R25	A3
R108	50AB-472J	Same as R26	A3
R109	50E-103F	Resistor, 10K 1%	A3
R110	50E-202F	Same as R28	A3
R111	50AB-472J	Same as R26	A3
R112	56PA-47	Potentiometer, 10K	A3
R113	50AB-332J	Same as R30	A3
R114	50E-153F	Same as R31	A3
R115	50E-153F	Same as R31	A3
R116	50E-104F	Same as R33	A3
R117	50E-104F	Same as R33	A3
R118	50E-504F	Same as R36	A3
R119	50E-353F	Same as R37	A3
R120	50E-105F	Same as R38	A3
R121	50E-105F	Same as R38	A3
R122	50AB-221J	Same as R23	A2
R123	50AB-123J	Resistor, 12K 5%	A2
R124	5OAB-474J	Resistor, 470K 5%	A2
R125	50AB-474J	Same as R124	A2
R126	50AB-123J	Same as R123	A2
R127	50E-103F	Resistor, 10K l%	A2
R128	50AB-682J	Resistor, 6.8K 5%	A2
R129	56PA-47	Potentiometer, 10K	A2
R130	50E-503F	Same as R9	A2
R131	50E-503F	Same as R9	A2
R132	50E-1O1F	Same as R24	A2
R133	50E-158-OF	Resistor, 158 Ohm 1%	A2
R134	56PA-17	Same as R10	A2
R135	56PA-37	Potentiometer, 2. 5K	A2
R136	50E-202F	Resistor, 2K 1%	A2
R137	0757-1011	Resistor, 18K 1%	A2
R138	50E-50OF	Resistor, 50 Ohm 1%	A4
R139	50E-252F	Resistor, 2. 5K 1%	A2
R140	50E-50OF	Same as R138	A4
R141	50E-50OF	Same as R138	A4
R142	50E-50OF	Same as R138	A4
R143	50E-500F	Same as R138	A4
R144	0811-1797	Resistor, 50K 3%	A2
R145	56S-8	Potentiometer, 1000 Ohm (SPAN BAL)	A1
R146	50E-254F	Resistor, 250K 1%	A2
R147	50AB-153J	Resistor, 15K 5%	A2
R148	50AB-153J	Same as R147	A2
R149	50E-254F	Same as R146	A2
R150	50E-253F	Resistor, 25K 1%	A2
R151	50AB-124J	Resistor, 120K 5%	A2

Table 5-1. Reference Designation Index Cont.

Circuit Reference	Part Number	Description	Assembly Location
R152	50E-253F	Same as R150	A2
R153	50AB-103J	Resistor, 10K 5%	A2
R154	50AB-392J	Resistor, 3.9K 5%	A2
R155	0811-1797	Same as R144	A2
R156	50E-303F	Resistor, 30K 1%	A2
R157	50AB-123J	Same as R123	A2
R158	50E-303F	Same as R156	A2
R159	0811-1797	Same as R144	A2
R160	0811-1797	Same as R144	A2
R161	50E-104-2F	Resistor, 10.4K 1%	A2
R162	50E-752F	Resistor, 7.5K 1%	A2
R163	50E-503F	Same as R9	A2
R164	50E-103F	Same as R127	A2
R165	50E-103F	Same as R127	A2
R166	56S-35	Potentiometer, 250K (GAIN)	A1
R167	50E-253F	Same as R150	A2
R168	50E-103F	Same as R127	A2
R169	50E-103F	Same as R127	A2
R170	50E-316-2F	Same as R21	A2
R171	50AB-472J	Same as R8	A2
R172	50AB-123J	Same as R123	A2
R173	50AB-272J	Resistor, 2.7K 5%	A2
R174	50AB-121J	Resistor, 120 Ohm 5%	A2
R175	50E-403F	Same as R11	A2
R176	56E-7	Potentiometer, 50K (LOG ZERO)	A1
R177	50E-403F	Same as R11	A2
R178	50AB-1OOJ	Resistor, 10 Ohm s5%	A3
R179	50AB-1OOJ	Same as R178	A3
R180	50E-154F	Resistor, 150K 1%	A2
R181	50AB-562J	Resistor, 5.6K 5%	A2
S1	62B-219	Switch, Rotary	A1
S2	62B-220	Switch, Wafer 3-Section, 9-Position	A4
S3	62D-48	Switch, Toggle DPDT	A1
T1	56T-11	Thermister, 20K	A2
		ACCESSORY	
	10G2-22MW	Phone Plug	A1

Table 5-1. Reference Designation Index (Cont.)

Quantity	Part Number	Description	Assembly Location
		MISCELLANEOUS	
2	0370-0077	Knob	A1
1	652-65	Nameplate (08808-00020)	A1
1	816-64	Plate, Connector	A1
1	833-5 P1	Stand-Off	A1
1	833-6 P1	Nut	A1
1	860-3002	Chassis, Upper	A1
1	860-3003	Chassis, Lower	A1
2	860-4005	Plate, Side	A1
1	08800-20010	Handle	A1
1	08808-00010	Panel, Front	A1
1	08808-00050	Bracket, Printed Circuit Board	A1
1	752-427	Printed Board	A2
1	01260-20501	Heat Sink, Bottom	A2
1	01260-20601	Heat Sink, Top	A2
1	752-428	Printed Board	A3
		SHAFT LOCK (1/8 SHAFT)_817-C1	
1	817-5	Bushing, Shaft Lock	
1	817-2	Knob, Shaft Lock	
1	7-7	Washer, Shaft Lock (Lower)	
1	817-6	Washer, Shaft-Lock (Upper)	
1	817-1	Nut, Shaft-Lock	
1	81D-4-3/2Z	3/32 x 4-40 Allen Head Set Screw	
1	81D-4-2Z	1/8" x 4-40 Allen Head Set Screw	
		SHAFT LOCK (1/4" SHAFT) 817-C2	
1	817-4	Bushing, Shaft-Lock	
1	817-3	Knob, Shaft-Lock	
1	817-7	Washer, Shaft-Lock (Lower)	
1	817-6	Washer, Shaft-Lock (Upper)	
1	817-1	Nut, Shaft-Lock	
1	81D-4-3/2Z	3/32 x 4-40 Allen Head Set Screw	
1	81D-4-2Z	1/8" x 4-40 Allen Head Set Screw	

Table 5-2.

PART NUMBER - NATIONAL STOCK NUMBER CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NO.	PART NUMBER	FSCM	NATIONAL STOCK NO.
0180-0022	28480	5910-00-538-3597			
0180-0195	28480	5910-00-444-6642			
0180-0374	28480	5910-00-931-7050			
0370-0077	28480	5355-00-767-9444			
0370-1107	28480	5355-01-011-4975			
0698-3420	28480	5905-00-931-4067			
0757-0309	28480	5905-00-632-5238			
0757-0837	28480	5905-00-850-2180			
0757-0843	28480	5905-00-830-6751			
1910-0016	28480	5961-00-954-9182			
5080-3724	28480	5961-00-105-4694			
8808A	28480	6625-00-134-3557			

Foldout figure 5-1 is located in back of the manual.

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Publications: Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
TB 11-6625-2751-35	Calibration Procedures for Dual Channel Recorder RO-460(V1)/U (HP Model 7702B) and Oscillographic Recorder (HP Model 7418A); Preamplifier Power Supply (HP 8848A); Preamplifier Plug-In Unit PL-1306A/U (HP Model 8803A); and Preamplifier Plug-In Units (HP Models 8801A, 8802A, 8805A, and 8808A).
TB 43-180	Calibration Requirements for the Maintenance of Army Materiel.
TB 385-4	Safety Precautions for Maintenance of Electrical/Electronic Equipment.
TM 11-6625-537-14-1	Operator's, Organizational, Direct Support and General Support Maintenance Manual: Electronic Voltmeters.ME-202A/U (NSN 6625-00-709-0288) and ME-202B/U (NSN 6625-00-972-4046).
TM 11-6625-654-14	Operator's, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools List) for Multimeter AN/USM-223.
TM 11-6625-683-15	Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual: Signal Generator AN/URM-127 (NSN 6625-00-783-5965).
TM 11-6625-2658-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for Oscilloscope AN/USM-281C (NSN 6625-00-106-9622).
TM 38-750	The Army Maintenance Management System (TAMMS)

TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX D

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for the AM-6681 (V)/U. 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.

D-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating conditions, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

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

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

D-3. Column Entries

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

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, ,and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

D-4. Tool and Test Equipment Requirement (sect III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specified tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

D-5. Remarks (sect IV)

Not applicable.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
PLUG-IN AMPLIFIER AM-6681(V)1/U

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	PLUG-IN AMPLIFIER AM-6681(V)1/U	Inspect	0.5					Visual only	
		Service		0.5				6	
		Adjust				0.5		1,2,3	
		Test				1.0		1 thru 4	
		Repair				1.0		5	
		Overhaul					2.0	5	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
PLUG-IN AMPLIFIER AM-6681(V) 1/U

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	H,D	VOLTMETER, ELECTRONIC ME-202	6625-00-972-4046	
2	H,D	OSCILLOSCOPE AN/USM-281C	6625-00-106-9622	
3	H,D	GENERATOR. SIGNAL AN/URM-127	6625-00-783-5965	
4	H,D	MULTIMETER AN/USM-223	6625-00-999-7465	
5	H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-00-605-0079	
6	0	TOOL AND TEST EQUIPMENT AVAILABLE TO THE ORGANIZATIONAL REPAIRPERSON BECAUSE OF ASSIGNED MISSION.		

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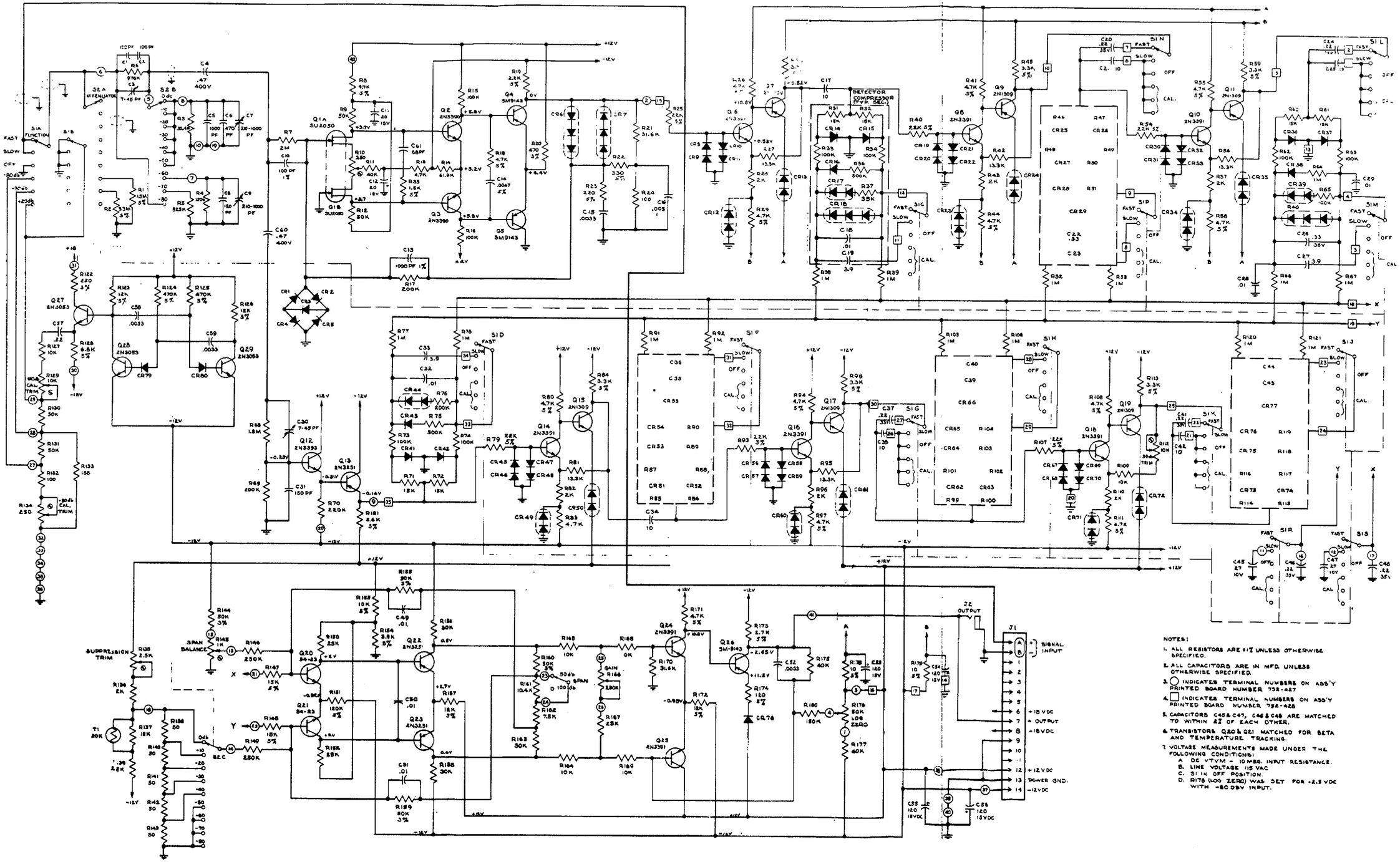

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