992609-0003

DATATAPE®

13-546 REPRODUCE HEAD PREAMPLIFIER

13-568-1 PREAMPLIFIER VOLTAGE REGULATOR

13-505-3 REPRODUCE HEAD PREAMPLIFIER HOUSING

OPERATION AND MAINTENANCE MANUAL

INSTRUMENTS DIVISION
360 Sierra Madre Villa, Pasadena, California 91109

BELL & HOWELL

This manual describes the operation and maintenance procedures for the Type 13-546 Reproduce Head Preamplifier, the Type 13-568-1 Preamplifier Voltage Regulator, and the Type 13-505-3 Reproduce Head Preamplifier Housing, with serial numbers 2001 through 3999.

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SECTION I

GENERAL DESCRIPTION

1-1. GENERAL.

1-2. This manual describes the Type 13-546 Reproduce Head Preamplifier Modules, the Type 13-568 Preamplifier Voltage Regulator, and the Type 13-505-3 Reproduce Head Preamplifier Housing.

1-3. The preamplifiers serve to improve the signal-to-noise ratio of the data signal and to increase the signal level from the reproduce heads to a sufficient level for the reproduce amplifiers. In order to minimize high frequency loss due to cable capacitance, the preamplifiers are located in close proximity to the reproduce heads. The preamplifier housing is mounted below and to the right of the capstan motor, on the back of the transport plate. Except for wiring, this housing is the same as the Type 13-505-4 Record Driver Housing located above and to the right of the capstan motor. Figure 1-1 shows location of the preamplifier housing on the transport.

1-4. EQUIPMENT DESCRIPTION.

1-5. The Type 13-505-3 Preamplifier Housing receives a maximum of four preamplifier plug-in modules and one module containing the voltage regulator. Each module plugs into a connector in the rear of the housing.

1-6. Data signals are received from the reproduce head through a plug-in connector and its cable assembly and distributed to the preamplifier modules through the housing connectors.

1-7. Each of the preamplifier module printed circuit cards contains four channels for a maximum of sixteen available. Fourteen channels are for data information and two are for voice annotation, although only one voice channel may be used at a time. The output for each channel is through a BNC connector mounted externally on the modules.

1-8. The voltage regulator receives the positive and negative voltages from the power supply. These voltages are regulated at the required positive and negative 15 vdc for the preamplifiers and also eliminate any excessive line noise that may be present.

1-9. ELECTRICAL CHARACTERISTICS.

1-10. Electrical characteristics of the preamplifier assembly are shown in table 1-1.

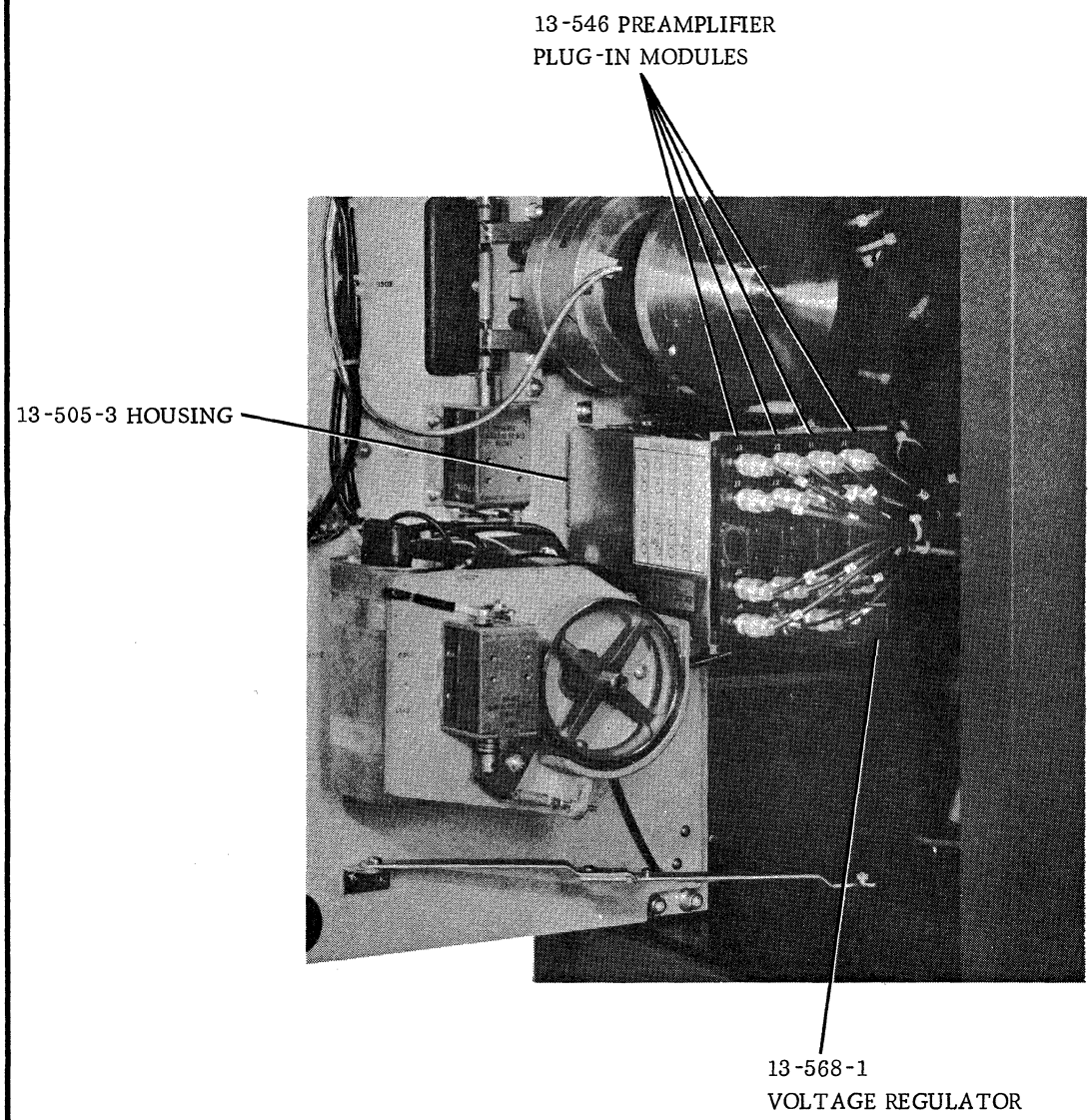


Figure 1-1. 13-505-3 Reproduce Head Preamplifier Housing with Plug-in Modules, Installed on Transport

ELECTRICAL CHARACTERISTICS		
13-546		
Frequency Response	-	DC to 2 MHz
Gain	-	34 db at 1 kHz
Signal Source	-	Reproduce head, double ended, center tapped
Power Required	-	+15 vdc, 42 ma -15 vdc, 45 ma
13-568-1		
Power Required	-	+20 vdc, 20 ma -20 vdc, 20 ma (plus power for 13-546 cards)
Output	-	+15 vdc regulated -15 vdc regulated

Table 1-1. Electrical Characteristics for Preamplifier Assembly

SECTION II

INSTALLATION

2-1. GENERAL.

2-2. The preamplifier housing is installed on the transport at the factory with all wiring connections complete.

2-3. SIGNAL DISTRIBUTION.

2-4. Signal input from the reproduce head to the preamplifier housing connectors, J1-J4, is through plug-in connector J6 and its cable assembly. Figure 2-1 shows an inside view of the housing with location of housing connectors. Pin allocation for each channel is shown in the wiring diagram in figure 7-3.

2-5. The modules plug into the housing connectors in the rear of the housing and are guided by slots in the top and bottom of the housing.

2-6. The output for each channel is through a BNC connector. The connectors on each module are numbered J1 to J4, counted from the top down. Channel identification is shown in figure 2-2.

2-7. POWER DISTRIBUTION.

2-8. A terminal board, TB1, mounted externally on the top of the housing, receives the ±20 vdc from the power supply and distributes it to the voltage regulator through housing connector J5. Power distribution and connections are shown in the wiring diagram figure 7-3.

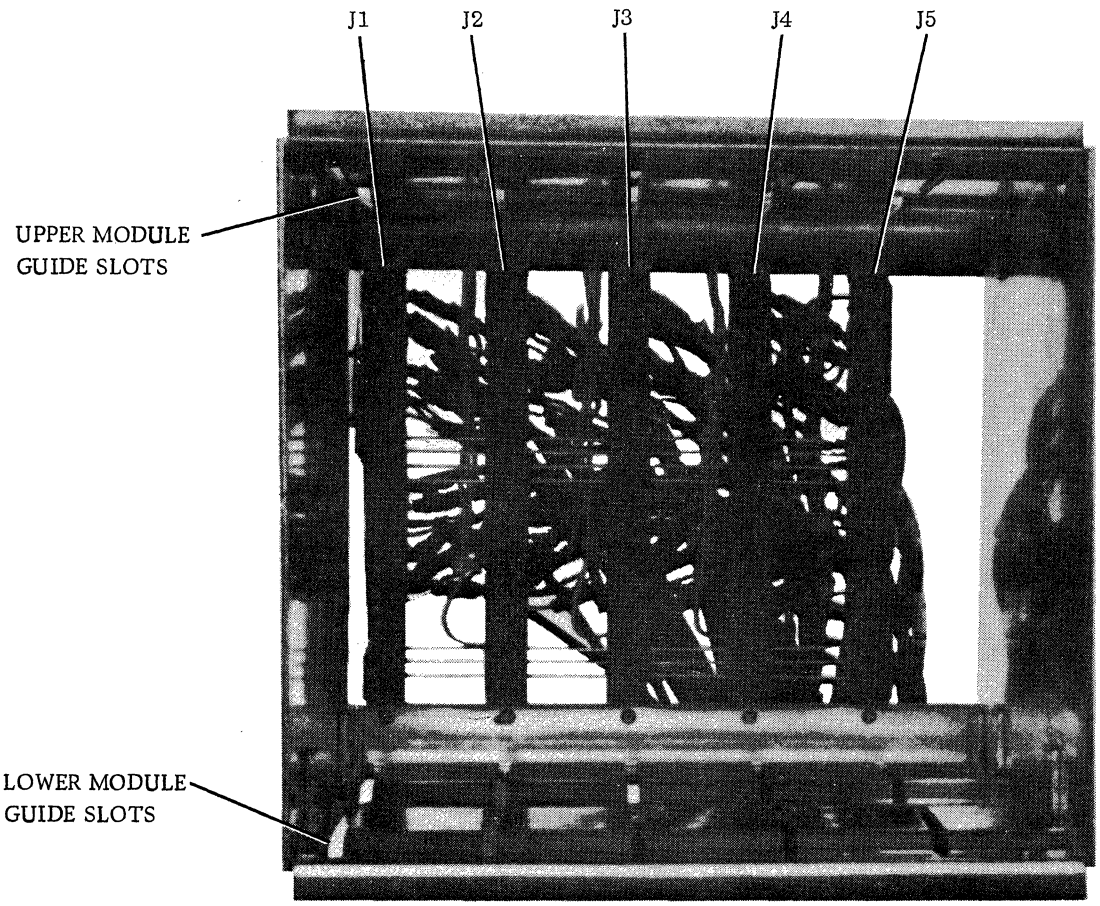


Figure 2-1. 13-505-3 Housing, Interior View

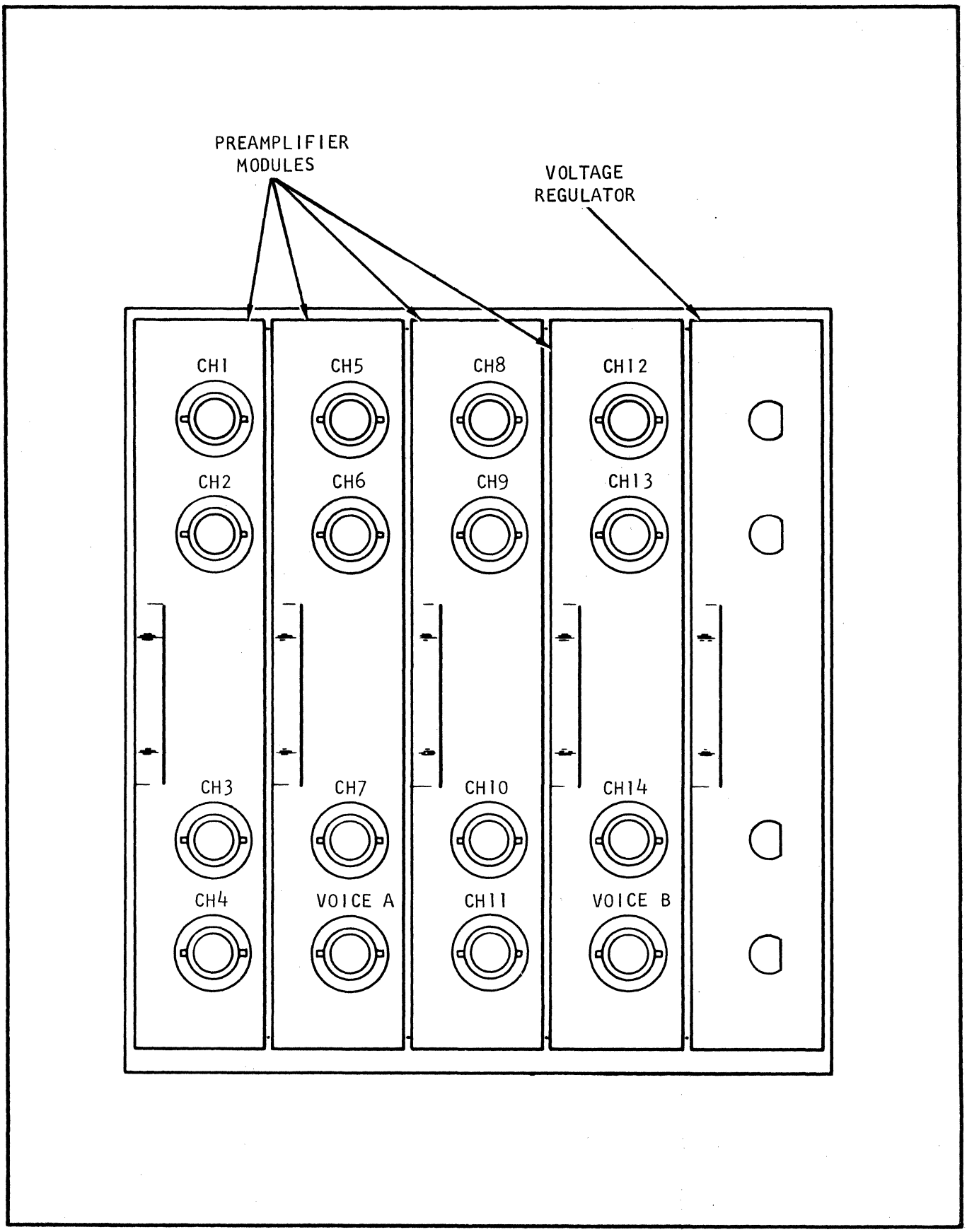


Figure 2-2. Channel Designation on Preamplifier Modules

SECTION III

OPERATION

3-1. GENERAL.

3-2. The preamplifiers and the regulator are energized when the system is turned on. There are no controls on either unit, therefore no adjustments or operating procedures are required.

SECTION IV

THEORY OF OPERATION

4-1. GENERAL.

4-2. This section discusses the Type 13-546 Reproduce Head Preamplifier and the Type 13-568-1 Reproduce Head Preamplifier Voltage Regulator.

4-3. The preamplifier recovers the data information from the reproduce head and amplifies it to a sufficient level for the reproduce amplifier. It also improves the signal-to-noise ratio of the reproduced signal. To prevent loss of signal through cable capacitance, the preamplifier is mounted as close as is practical to the reproduce head.

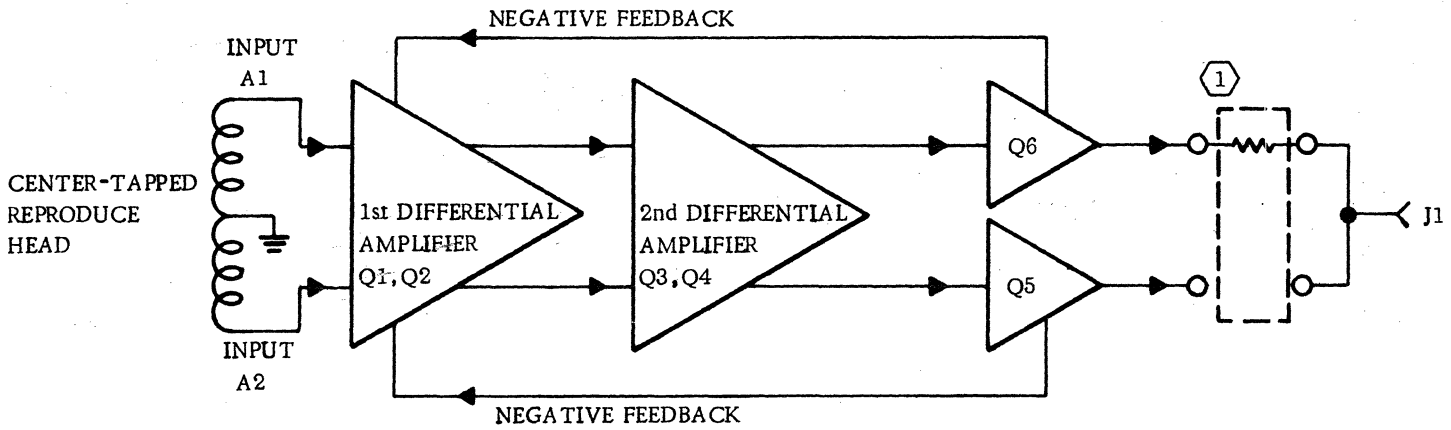
4-4. The regulator has a positive and a negative section to receive the +20 vdc and the -20 vdc from the transport power supply. A voltage divider network in the input of each section reduces the voltage level to +15 vdc and -15 vdc, the operating voltage for the preamplifier. Besides regulation of the input voltage to the preamplifier, excessive line noise is removed by the regulator.

4-5. CIRCUIT DESCRIPTION, REPRODUCE HEAD PREAMPLIFIER.

4-6. The preamplifier receives a differential input from the center-tapped reproduce head. Because of the center-tapped reproduce head, for each positive signal there will also be a negative one. The preamplifier has two symmetrical circuits to receive the dual, or differential input. Each circuit has two stages of amplification and an emitter follower output. However, corresponding amplifiers in each circuit together comprise a differential amplifier. Refer to figure 4-1 for a block diagram. The channel 1 configuration is shown and referred to as an example. The use of differential amplifiers help to eliminate any signal noise present. The output from only one of the circuits is used; however, it is possible to invert the phase of the signal by connecting the opposite circuit to the output jack by making the appropriate resistor change. For more detailed information, refer to schematic diagram figure 7-1. In the following circuit descriptions, channel 1 is referred to for explanatory purposes.

4-7. FIRST DIFFERENTIAL AMPLIFIER. The first amplifier of each circuit is also half of the first differential amplifier, which consists of transistors Q1 and Q2. Due to the differential input, with a negative half cycle felt at the base of Q1, the same signal inverted, is also felt at the base of Q2. While Q1 is conducting, path of current flow is through emitter resistors R1 and R5 and the emitter-to-base circuit of Q2. As conduction of Q1 increases, its collector voltage becomes more positive, which results in a positive half cycle being applied to the following stage. During this same period of time, the conduction of Q2 will decrease due to the positive half cycle applied to its base. This positive base voltage, in effect, offers a lowered impedance for the current flow of Q1. As Q2 conducts less, its collector voltage becomes more negative, resulting in a negative half cycle applied to the following stage. As the phase of the input signal reverses, just the opposite of the above will take place.

4-8. SECOND DIFFERENTIAL AMPLIFIER. The second amplifier of each circuit is also half of the second differential amplifier, consisting of Q3 and Q4. This circuit operates the same as the first differential amplifier.



1. IN STANDARD CONFIGURATION, OUTPUT CONNECTED AS SHOWN; FOR COMPLEMENTARY OUTPUT AT J1, RESISTOR CONNECTS Q5 TO J1.
2. CHANNEL 1 OF 4 IDENTICAL CHANNELS SHOWN.

Figure 4-1. Block Diagram, 13-546 Reproduce Head Preamplifier

4-9. EMITTER FOLLOWER OUTPUT. The output of circuit one is emitter follower Q6 and the output of circuit two is emitter follower Q5. Both Q5 and Q6 furnish degenerative feedback to their respective inputs. The output at the emitter of Q6 is in phase with the input to Q1; however, if the input to Q1 is negative, a high impedance is felt between the base and emitter of Q1, resulting in degenerative feedback. During the same half cycle, a positive in-phase relationship exists between the emitter of Q5 and the input to Q2. This offers a lower impedance between base and emitter of Q2, and is the conduction path for Q1.

4-10. CIRCUIT DESCRIPTION, VOLTAGE REGULATOR, POSITIVE SECTION.

4-11. This section receives the +20 vdc from the power supply and drops it to +15 vdc. After being regulated at +15 vdc, the voltage is applied to the preamplifiers. This section is discussed in detail in the following paragraphs. Refer to the block diagram in figure 4-2a and the detailed schematic, figure 7-2.

4-12. REFERENCE VOLTAGE CIRCUIT. A voltage divider consisting of R1 and R21 drops the applied input to +15 vdc. This is used as the reference voltage for the reference amplifier, Q1.

4-13. DIFFERENTIAL AMPLIFIER. This circuit is comprised of reference amplifier Q1 and comparison amplifier Q5. The reference voltage, applied to the base of Q1, maintains a stable bias condition. Therefore, the emitter voltage of Q1 is unaffected by changes in the load. The emitters of Q1 and Q5 are directly connected. The reference voltage is also felt on the emitter of Q5. In this way, any change in collector voltage or conduction of Q5 will be determined by its base voltage. Transistor Q5 is biased by the regulated output voltage. If the output voltage decreases, bias on Q5 increases, causing less conduction and an increase of positive voltage on the collector.

4-14. CURRENT AMPLIFIER. The base of transistor Q7 is connected to the collector of transistor Q5. Any variation in the collector voltage of transistor Q5, will, therefore, affect the bias of transistor Q7. If the bias voltage should increase, becoming more positive, then the emitter voltage will also go more positive. The emitter of transistor Q7 is connected to the base of the series regulator.

4-15. SERIES REGULATOR. The +20 vdc from the power supply is connected to the collector of the series regulator transistor Q8. Any change of bias on transistor Q8 will have an effect on the output taken off the emitter which is the regulated voltage for the preamplifier voltage regulator.

4-16. CIRCUIT DESCRIPTION, VOLTAGE REGULATOR, NEGATIVE SECTION.

4-17. This section receives the -20 vdc from the power supply and drops it to -15 vdc. After being regulated at -15 vdc the voltage is applied to the preamplifiers. This section is discussed in detail in the following paragraphs. Refer to the block diagram in figure 4-2b and the detailed schematic, figure 7-2.

4-18. REFERENCE VOLTAGE CIRCUIT. A voltage divider consisting of R3 and R22 drops the applied input to -15 vdc. This is used as the reference voltage for the reference amplifier, Q2.

4-19. DIFFERENTIAL AMPLIFIER. This circuit is comprised of reference amplifier Q2 and comparison amplifier Q6. The base of comparison amplifier Q6 is connected to the output of the regulator. The bias of Q6 corresponds to any variation of the regulated output. Assume that the regulated output becomes less negative. Bias of Q6 decreases, collector

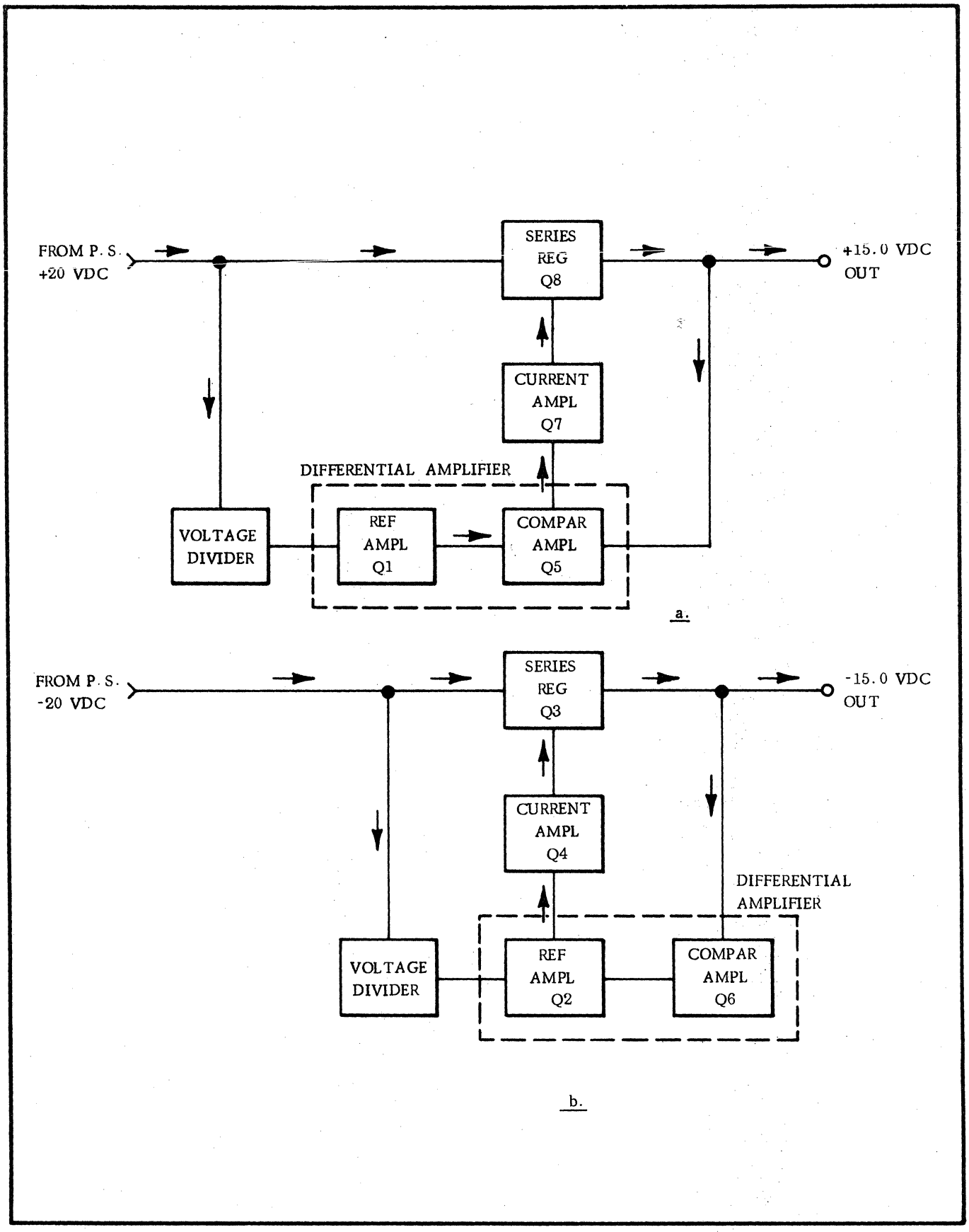


Figure 4-2. Block Diagram, 13-568-1 Voltage Regulator

voltage goes more negative as a result of less conduction through Q6, and emitter voltage is less negative due to less voltage drop across R14. The emitters of Q6 and Q2 are connected together. Therefore as emitter voltage becomes less negative, effectively, the bias on Q2 increases even though the reference voltage does not change. Transistor Q2 conducts harder, causing the collector voltage to go less negative.

4-20. CURRENT AMPLIFIER. The current amplifier Q4 is biased by the output voltage of reference amplifier Q2. If the voltage applied to the base of Q4 decreases, or becomes less negative, the bias decreases and allows Q4 to conduct harder. This, in turn, causes the emitter voltage to decrease.

4-21. SERIES REGULATOR. Series regulator transistor Q3 controls the output voltage of the regulator at -15 volts dc. Transistor Q3 is controlled by the action of Q4. If the emitter of Q4 becomes less negative, transistor Q3 will conduct harder and the voltage dropped across the series regulator will decrease. This will result in the restoration of the regulator output voltage to its proper level.

SECTION V

CALIBRATION AND MAINTENANCE

5-1. GENERAL.

5-2. This section of the manual is presented in three parts: preventive maintenance, calibration, and troubleshooting and corrective maintenance.

5-3. PREVENTIVE MAINTENANCE.

5-4. The reproduce head preamplifier housing assembly should be periodically inspected to prevent accumulation of dust, dirt, grit, and/or grease. The interval between inspections will be determined by the particular operating environment. Remove all modules and inspect printed circuit boards for breaks or loose connections. When cleaning boards, use a soft brush, low pressure air, or a suitable solvent, such as DuPont Freon TF. Clean all connectors with a clean rag and solvent. Use care during handling to prevent damage to printed circuitry.

5-5. CALIBRATION.

5-6. There are no calibration procedures necessary for the components covered by this manual.

5-7. TROUBLESHOOTING AND CORRECTIVE MAINTENANCE.

5-8. Before attempting the repair of a unit suspected of malfunction, first, visually inspect the unit for obvious damage such as burned resistors, improper connections, or poor seating of connectors. Next, verify that the symptom is not caused by an associated component such as the power supply, or the reproduce head.

5-9. The following test equipment is required for troubleshooting the reproduce head preamplifier assembly. The circuit extender card listed below is also shown in figure 7-4.

Oscilloscope, Tektronix Type 545B/1A1, or equivalent.

VTVM, Hewlett-Packard 400FL, or equivalent.

Circuit Extender Card, part number 472155-1.

5-10. With the VTVM, check the input power. This may be done at TB1. Also by using the extender card, voltages can be checked at the input to the modules. A wiring diagram of the housing showing voltage points is shown in figure 7-3.

5-11. If the input voltages are correct, check the signal input to the suspected preamplifier channel with the oscilloscope. Compare this with an input from a channel that is known to be operating correctly. If the input is correct, it will be necessary to trace the signal through the suspected circuit. To check dc voltages within a suspected channel, disconnect the input signal from the channel being tested, and remove the load from the output. The dc voltages for the transistors in the preamplifier and the voltage regulator are listed in tables 5-1 and 5-2.

CHANNEL	TRANSISTOR	EMITTER	COLLECTOR	BASE
CH 1	Q1	(R1/R4) +0.62	(R2) -6.0	(R57) 0.0
	Q2	(R5/R10) +0.62	(R6) -6.0	(R57) 0.0
	Q3	(R8) -6.5	(R7) +0.5	(R2) -5.9
	Q4	(R8) -6.5	(R9) +0.5	(R6) -5.9
	Q5	(R10/R11/E2) +1.5	(C2/R36) -15.0	(R9) -0.45
	Q6	(R4/R12/E1) +1.5	(C2/R36) -15.0	(R7) -0.45
CH 2	Q7	(R15/R18) +0.62	(R10) -6.0	(R58) 00
	Q8	(R19/R24) +0.62	(R20) -6.0	(R58) 00
	Q9	(R22) -6.5	(R21) +0.5	(R16) -5.9
	Q10	(R22) -6.5	(R23) +0.5	(R20) -5.9
	Q11	(R24/R25/E8) +1.5	(R20/R22) -15.0	(R23) +0.45
	Q12	(R18/R26/E7) +1.5	(R20/R22) -15.0	(R21) +0.45
CH 3	Q13	(R30/R31) +0.62	(R29) -6.0	(R59) 00
	Q14	(R34/R38) +0.62	(R33) -6.0	(R59) 00
	Q15	(R36) -6.5	(R35) +0.5	(R29) -5.9
	Q16	(R36) -6.5	(R37) +0.5	(R33) -5.9
	Q17	(R38/R39/E13) +1.5	(C2/R36) -15.0	(R37) +0.45
	Q18	(R31/R40/E14) +1.5	(C2/R36) -15.0	(R35) +0.45
CH 4	Q19	(R44/R45) +0.62	(R43) -6.0	(R60) 00
	Q20	(R48/R52) +0.62	(R47) -6.0	(R60) 00
	Q21	(R50) -6.5	(R49) +0.5	(R43) -5.9
	Q22	(R50) -6.5	(R51) +0.5	(R47) -5.9
	Q23	(R52/R53/E19) +1.5	(R47/R50) -15.0	(R51) +0.45
	Q24	(R45/R54/E20) +1.5	(R47/R50) -15.0	(R49) +0.45

Table 5-1. Typical DC Voltages for the 13-546 Preamplifier (Sheet 1 of 2)

CONDITIONS FOR MEASUREMENTS:

1. Amplifier card on extender card in 13-505-3 Housing.
2. Transport REC/TEST SELECTOR in TEST position.
3. Input, no signal.
4. Output open.
5. Reference Schematic: Figure 7-1.
6. Points which are common to the emitter, base, or collector being measured are listed in parentheses.
7. Measurements were taken using a Hewlett-Packard Type 3439A Digital Voltmeter with a Type 3442A Plug-in.

Table 5-1. Typical DC Voltages for the 13-546 Preamplifier (Sheet 2 of 2)

TRANSISTOR	EMITTER	COLLECTOR	BASE
Q1	(R8) +14.7	(R7) +20.0	(C3/R4) +15.0
Q2	(R14) -14.0	(R10) -19.0	(C4/R2) -15.0
Q3	(R3/R10) -20.0	(R19/C2) -15.0	(Q4-E) -19.5
Q4	(Q3-B) -19.5	(R19/C2) -15.0	(R10) -19.0
Q5	(R8) +14.5	(R9) +16.0	(R20) +15.0
Q6	(R14) -14.3	(R3/R10) -20.0	(R19/C2) -15.0
Q7	(Q8-B) +15.5	(R7/R9) +20.0	(R9) +16.0
Q8	(R20/C1) +15.0	(R7/R9) +20.0	(Q7-E) +15.5

CONDITIONS FOR MEASUREMENTS:

1. Regulator on extender card in 13-505-3 Housing.
2. Transport REC/TEST SELECTOR in TEST position.
3. Input, no signal.
4. Output open.
5. Reference Schematic: Figure 7-2.
6. Points which are common to the emitter, base, or collector being measured are listed in parentheses.
7. Measurements were taken using a Hewlett-Packard Type 3439A Digital Voltmeter with a Type 3442A Plug-in.

Table 5-2. Typical DC Voltages for 13-568-1 Voltage Regulator

5-12. REPAIR.

5-13. Repair of the unit should be attempted only by personnel experienced in printed wiring techniques. It is recommended that repair be limited to replacement of defective parts. When removing and replacing defective parts, care should be exercised so as not to damage contiguous parts of the circuit board itself. Replacement parts must be of the correct type and value, as listed in the parts list in Section VI of this manual. When installing a new part, place it in the exact position of the replaced part. After replacement, carefully inspect the circuit board for evidence of cold solder joints, solder splashes, and insecurity of mounting. If the equipment is repaired, the amplifiers should be checked.

5-14. PARTS IDENTIFICATION. Components of each assembly described in this manual are illustrated in Section VI of this manual, showing locations and part designations. The parts list in Section VI itemizes the component parts in the assembly and provides a Bell & Howell part number for each.

5-15. FIELD REPAIR SERVICE.

5-16. Regular scheduled maintenance service is available from the Bell & Howell Instruments Division Sales and Service Office on a contract basis. If immediate service is required, it may be obtained on an emergency basis. Every effort is made to furnish the needed repair as soon as possible. For a complete description of Bell & Howell's maintenance service plans and their costs, contact the Instruments Division Sales and Service Office.

5-17. FACTORY REPAIR SERVICE.

5-18. If desired, instruments (or major assemblies) may be returned to the factory for repair. When an instrument or assembly is returned:

a. Indicate the symptom of defect. State as completely as possible, both on an instrument tag and on the order form, the nature of the problem encountered. Too much information is far better than too little. If the trouble is intermittent, please be specific in describing the instrument's performance history.

b. Give special instructions. If any changes in the instrument or assembly have been made, and it is desired to retain the modified form, please indicate this specifically.

c. State the desired invoicing procedure. In the first correspondence, indicate whether repair work may begin immediately with billing in accordance with the standard pricing system or whether Bell & Howell should secure prior approval of the price before proceeding with the repair. The price will be the same in both cases, but any delay will be minimized by permission to start work immediately. The order acknowledgment copy will, of course, always show the price.

d. Pack securely and label. Proper packaging saves money. The small amount of extra care and time it takes to cushion a part or instrument properly may prevent costly damage while in transit. Make certain that the address is both legible and complete; failure to do so often results in needless delay. Address all shipments and correspondence to:

Bell & Howell
Instruments Division
360 Sierra Madre Villa
Pasadena, California 91109
Attention: Repair Department

e. Show return address on repair correspondence. Please indicate clearly the exact address to which the equipment should be returned after repair is completed. All shipping costs will be borne by the owner of the equipment, not by Bell & Howell.

SECTION VI

PARTS LISTS

6-1. GENERAL.

6-2. Appropriate parts lists and illustrations for the applicable hardware covered by this manual follow the instructions given below. The parts lists include the Bell & Howell Instruments Division part number, description, figure and index and/or schematic reference symbol, and where applicable, the manufacturer's or military part number for each component. Manufacturers are identified in the parts lists by code number in accordance with the Federal Supply Code for Manufacturers, Cataloging Handbook H4-2, and as listed in table 6-1. The components are illustrated in figures 6-1, 6-2, and 6-3.

6-3. ORDERING REPLACEMENT PARTS.

6-4. Parts should be ordered through the nearest Bell & Howell Instruments Division Sales and Service Office. Price and delivery information on parts or complete instruments may be obtained there also. To assist in making this contact, a list of Sales and Service Offices is included in the front of this manual. Bell & Howell recommends that whenever possible, and particularly when an instrument is used in a critical application, the user maintain a minimum stock of spare parts. Instruments Division has specialized personnel ready to assist the user in making a selection of spares at any time. The same personnel are also ready and able to prepare or quote on the preparation of illustrated parts breakdowns (IPB's), provisioning parts breakdowns (PPB's), and other parts documentation that might be required.

6-5. When ordering parts, the following information should always be supplied to the field office engineers:

a. A description of the part or assembly, obtained from the parts list.

b. The Bell & Howell part or assembly number, also on the parts list, or on the component itself.

c. The figure and index, and/or reference symbol, given on the applicable diagram and on the parts list.

d. The part or type number of the major assembly, shown on the instrument nameplate.

e. The production serial number, also on the nameplate.

f. The Bell & Howell register number applying to the complete system or order.

CODE	MANUFACTURER
00779	AMP, Incorporated Harrisburg, Pennsylvania
04713	Motorola Semiconductor Products, Incorporated Phoenix, Arizona
05397	Union Carbide Corporation Materials Systems Division Cleveland, Ohio
14028	Bell & Howell Instruments Division Pasadena, California
24546	Corning Glass Works Bradford, Pennsylvania
42451	Union Carbide Corporation Carbon Products Division New York, New York
56289	Sprague Electric Company North Adams, Massachusetts
72136	Electro Motive Manufacturing Company, Incorporated Willimantic, Connecticut
81312	Winchester Electronics Division, Litton Industries Oakville, Connecticut
83330	Herman H. Smith, Incorporated Brooklyn, New York
92528	H. B. Fuller Company St. Paul, Minnesota
95238	Continental Connector Corporation Woodside, New York
96918	Kings Electronic Company, Incorporated Microwave Division Tuckahoe, New York

Table 6-1. List of Manufacturers

PART NO.	TYPE NO.	DESCRIPTION	PAGE NO.
471723-1	13-546	2 MHz Reproduce Head Preamplifier	6-5
471739-1	13-568-1	Reproduce Head Preamplifier Voltage Regulator	6-7
472120	13-505-3	Reproduce Head Preamplifier Housing	6-9

Table 6-2. Parts List Index

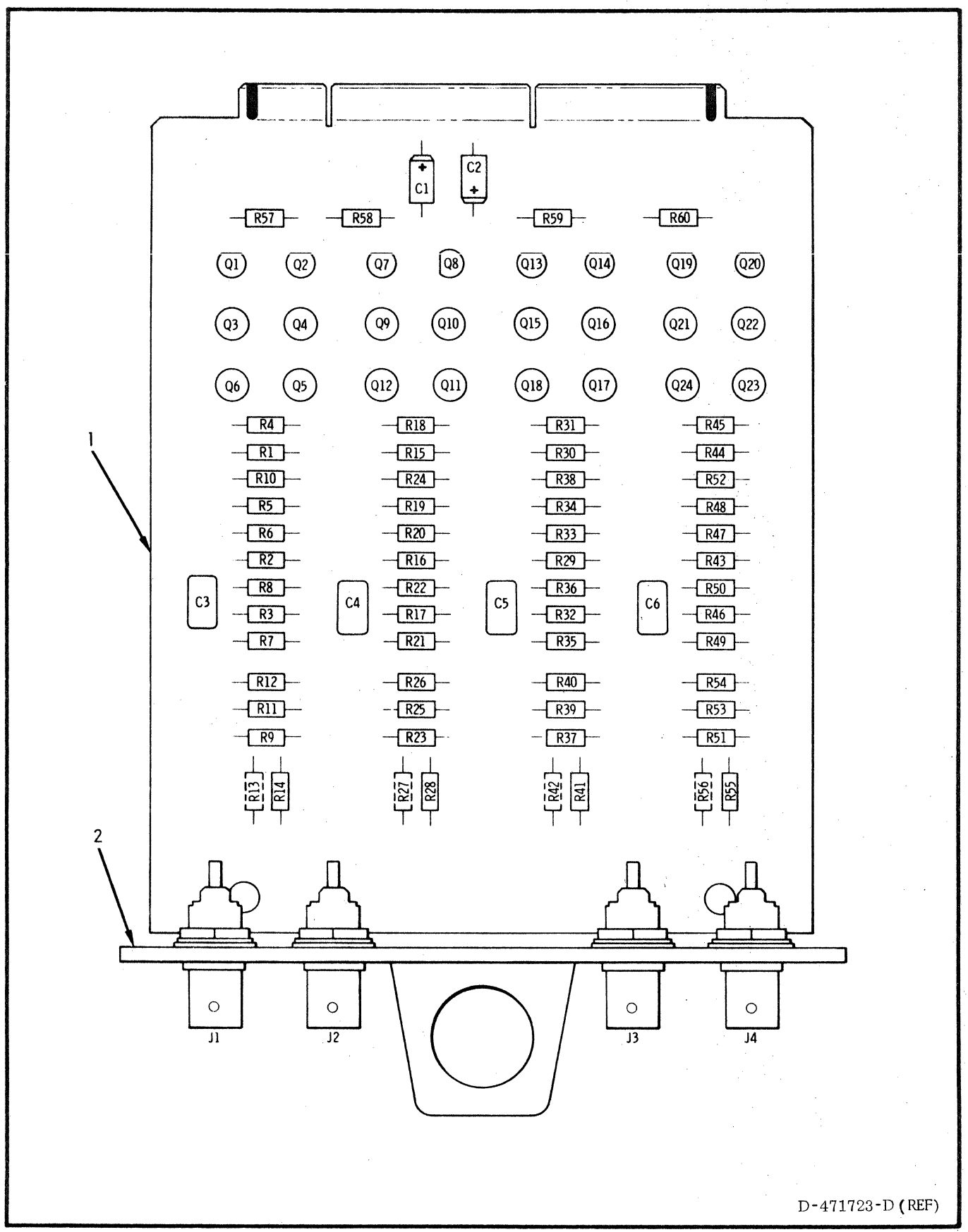


Figure 6-1. 13-546 Preamplifier Circuit Card

Table 6-3. Parts List for the 13-546 Preamplifier

ITEM NO.	B&H PART NO.	DESCRIPTION 0 1 2 3 4 5	QTY	FIG./INDEX OR REF SYM	MFR CODE	MFR OR MIL PART NO.
1	471723-1	Preamplifier, 2 MHz	1	6-1		
2	471723	Printed Wiring Board	1	6-1/1		
3	471922-5102	Res, 51 ohms ±2%, 1/4 w	4	R14, 28, 41, 55	24546	C4-510G
4	471922-3032	Res, 30K ±2%, 1/4 w	12	R2, 3, 6, 29, 32, R16, 17, 20, 43, R46, 47, 33	24546	C4-303G
5	471922-1012	Res, 100 ohms ±2%, 1/4 w	8	R1, 5, 15, 19, R30, 34, 44, 48	24546	C4-101G
6	471922-1032	Res, 10K ±2%, 1/4 w	8	R4, 10, 18, 24, R31, 38, 45, 52	24546	C4-103G
7	471922-5122	Res, 5.1K ±2%, 1/4 w	16	R7, 9, 11, 12, R21, 23, 25, 26, R35, 37, 39, 40, R49, 51, 53, 54	24546	C4-512G
8	471922-1522	Res, 1.5K ±2%, 1/4 w	4	R8, 22, 36, 50	24546	C4-152G
9	471922-5132	Res, 51K ±2%, 1/4 w	4	R57, 58, 59.60	24546	C4-513G
10	471863-4	Cap, 10 μf ±20%, 20 vdc	2	C1, 2	42451	T320B106-M20AS
11	199985-39	Cap, 300 pf ±5%, 300 vdc	4	C3, 4, 5, 6	72136	DM10-301
12	471931	Transistor	8	Q5, 6, 11, 12, Q17, 18, 23, 24	04713	2N3251
13	364752-1	Transistor	8	Q3, 4, 9, 10, Q15, 16, 21, 22	04713	2N5089
14	252501-4	Transistor	8	Q1, 2, 7, 8, 13, Q14, 19, 20	04713	2N3906
15	471727	Bracket, electrical connector	1	6-1/2		
16	8742-3	Rivet, tubular	2			
17	9916-22	Wire, elec, solid, 22 AWG	A/R			
18	70078-2209	Insulation Sleeving, elec, teflon	A/R			
19	128253-7	Connector, BNC	4	J1, 2, 3, 4	96918	KC-79-46

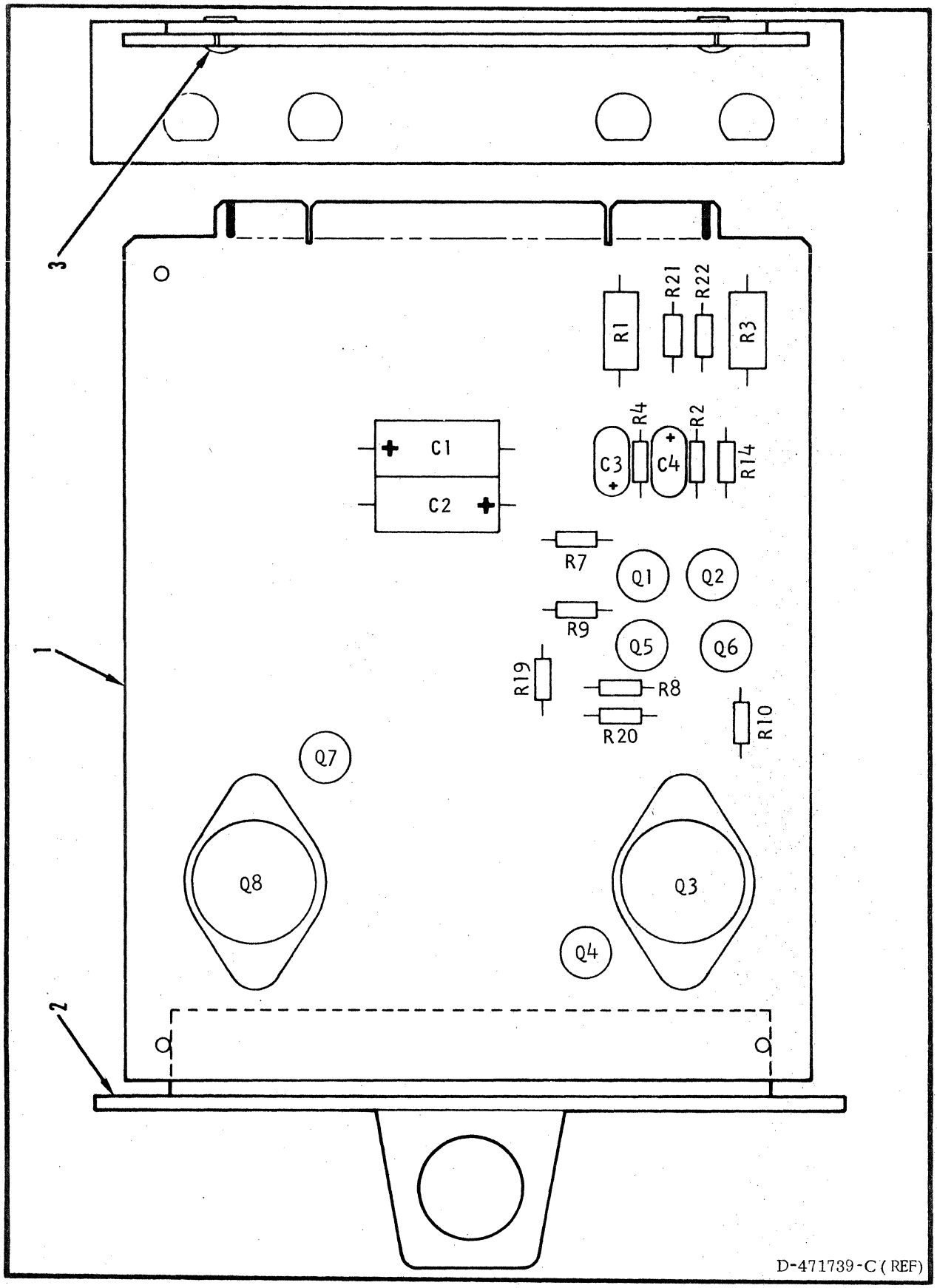


Figure 6-2. 13-568-1 Preamplifier Voltage Regulator Circuit Card

Table 6-4. Parts List for the 13-568-1 Preamplifier Voltage Regulator

ITEM NO.	B&H PART NO.	DESCRIPTION 0 1 2 3 4 5	QTY	FIG./INDEX OR REF SYM	MFR CODE	MFR OR MIL PART NO.
1	471739-1	Regulator Voltage, 15 v preamplifier	1	6-2		
2	471739	Printed Wiring Board	1	6-2/1		
3	471922-7502	Res, 75 ohms ±2%, 1/4 w	2	R2,4	24546	C4-750G
4	471922-5112	Res, 510 ohms ±2%, 1/4 w	2	R1,3	24546	C4-511G
5	471922-1522	Res, 1.5K ±2%, 1/4 w	4	R9,10,21,22	24546	C4-152G
6	471922-3622	Res, 3.6K ±2%, 1/4 w	4	R8,14,19,20	24546	C4-362G
7	471922-1012	Res, 100 ohms ±2%, 1/4 w	1	R7	24546	C4-101G
8	471927	Transistor	4	Q1,4,5,7	04713	2N2219
9	471925	Transistor	2	Q2,6	04713	2N2905
10	246014-4	Transistor	2	Q3,8	04713	2N3055
11	471930-0003	Cap, 100 μf +75 -10%, 16 v	2	C1,2	56289	500D1076016DC7
12	471920-1	Cap, 68 μf ±20%, 15 v	2	C3,4	05397	T362C686M015AS
13	471727	Bracket, elec connector	1	6-2/2		
14	8742-3	Rivet, tubular	2	6-2/3		

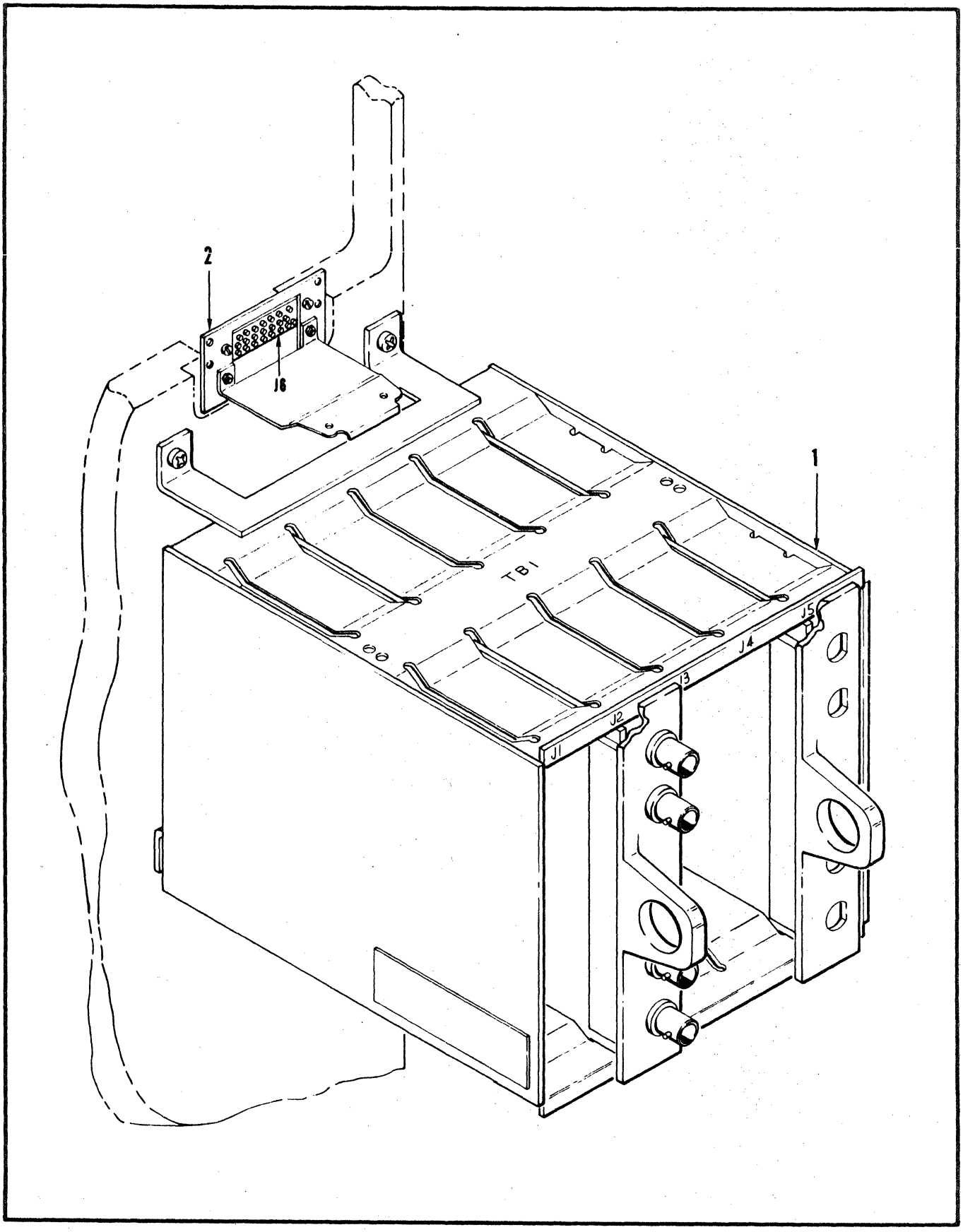


Figure 6-3. 13-505-3 Preamplifier Housing

Table 6-5. Parts List for the 13-505-3 Housing

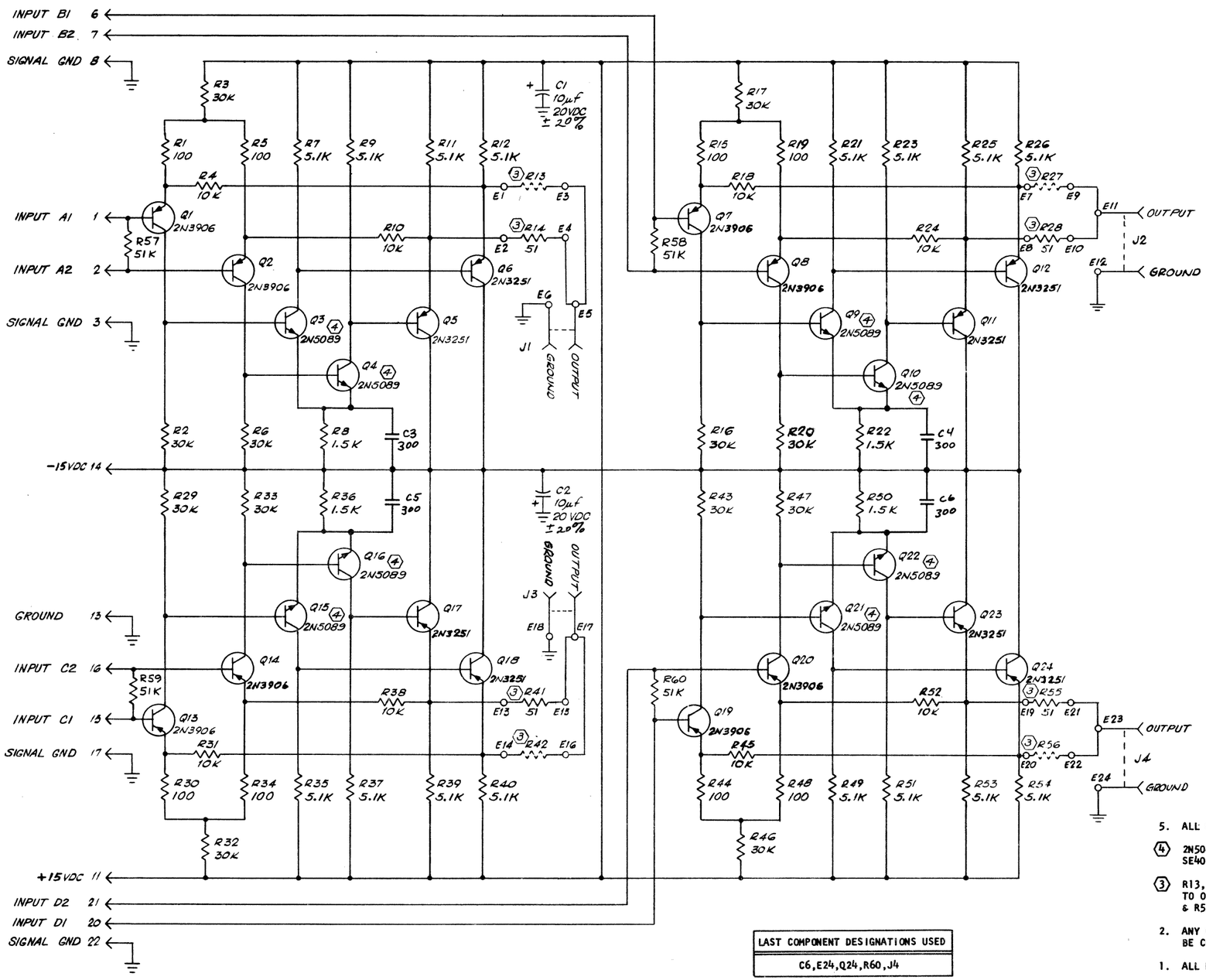
ITEM NO.	B&H PART NO.	DESCRIPTION 0 1 2 3 4 5	QTY	FIG./INDEX OR REF SYM	MFR CODE	MFR OR MIL PART NO.
1	472120	Housing, preamplifier	1	6-3		
2	379037	Chassis, electrical equipment	1	6-3/1		
3	471872	Connector, receptacle, elec	5	J1 thru J5	95238	K600-12B-28XA
4	371763	Terminal Bd - Barrier	1	TB1	83330	410-19
5	371979	Bracket, connector mounting	1	6-3/2		
6	475210	Label, channel identification	1			
7	472127-9	Clamp, strain relief, short	1	(J6)	00779	201237-1
8	372889-1	Connector (Pin Contacts)	1	J6	81312	SRE-44-PN
9	471876-1899	Wire, elec, 18 AWG	A/R			
10	156071-1	Lug, terminal, insulated	3		00779	324603
11	9916-18	Wire, elec, solid, 18 AWG	A/R			
12	126716-174	Cable, RG 174/U	A/R			
13	471876-2499	Wire, elec, strd, 24 AWG	A/R			
14	475213	Spacer, insulation	1			
15	17484-0117	Resiweld #7004	A/R		92528	7004
16	472152-1	Cable, power, electrical -20 vdc	1			

SECTION VII

DRAWINGS AND SCHEMATICS

7-1. GENERAL.

7-2. This section contains schematic diagrams for the 13-546 Reproduce Head Preamplifier and 13-568-1 Reproduce Head Preamplifier Voltage Regulator, a wiring diagram for the 13-505-3 Reproduce Head Preamplifier Housing, and a diagram for the circuit extender card.



LAST COMPONENT DESIGNATIONS USED
C6, E24, Q24, R60, J4

5. ALL CAPACITORS ARE IN pf ±5%, 300 VDC.

(4) 2N5089 MAY BE REPLACED WITH 2N3904, 2N3947, OR SE4022.

(3) R13, R27, R42, & R56 ARE NOT PART OF STANDARD UNIT. TO OBTAIN COMPLEMENTARY OUTPUT, REMOVE R14, R28, R41, & R55 AND INSTALL R13, R27, R42, & R56.

2. ANY CHANGES TO LEGENDS OR CONTACT DESIGNATIONS MUST BE COORDINATED WITH WIRING DIAGRAM E-472129.

1. ALL RESISTORS ARE IN OHMS ±2%, 1/4 W.

NOTES: UNLESS OTHERWISE SPECIFIED.

D-471726-C(REF)

Figure 7-1. Schematic, 13-546 Reproduce Head Preamplifier

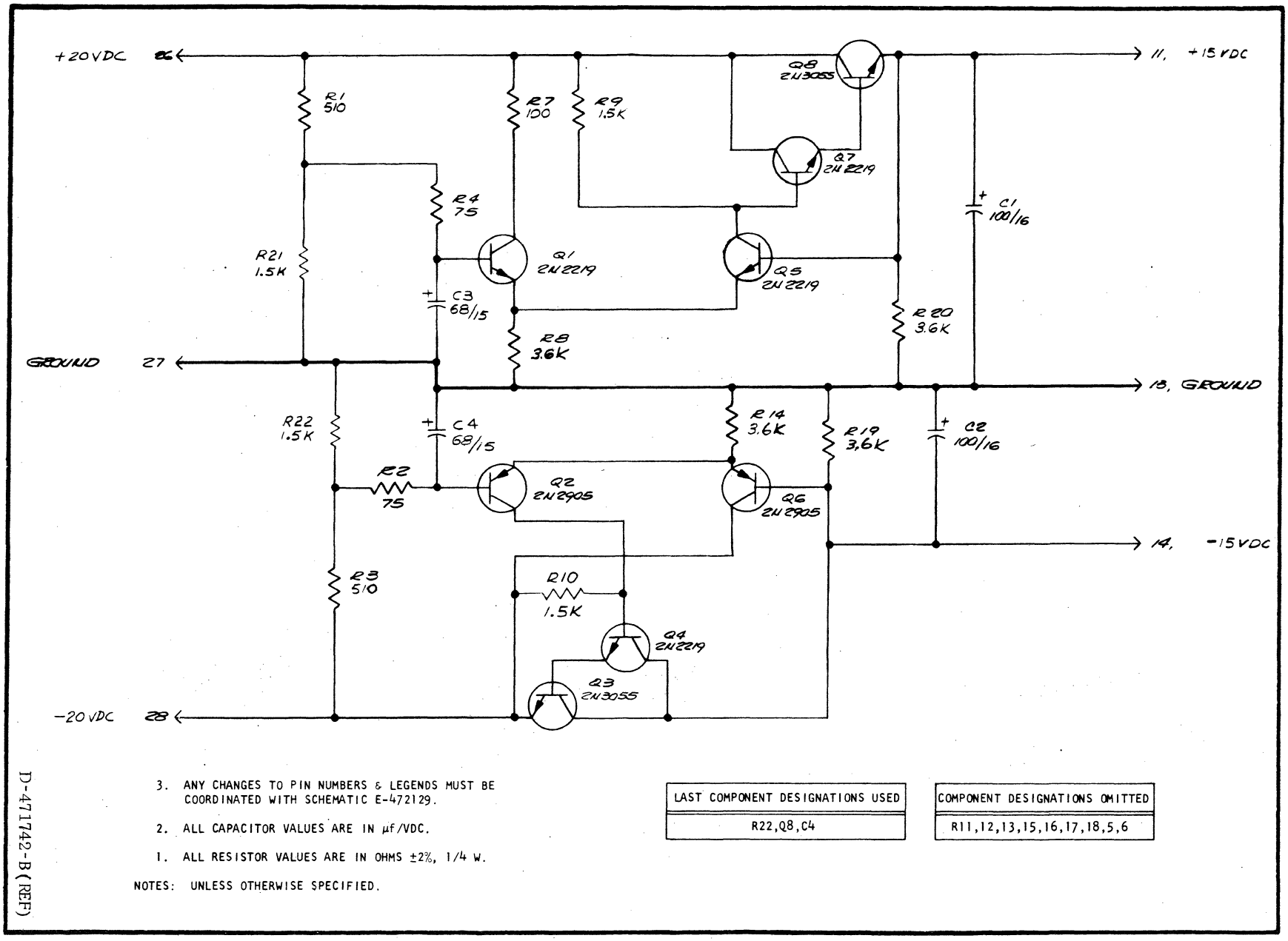


Figure 7-2. Schematic, 13-568-1 Preamplifier Voltage Regulator

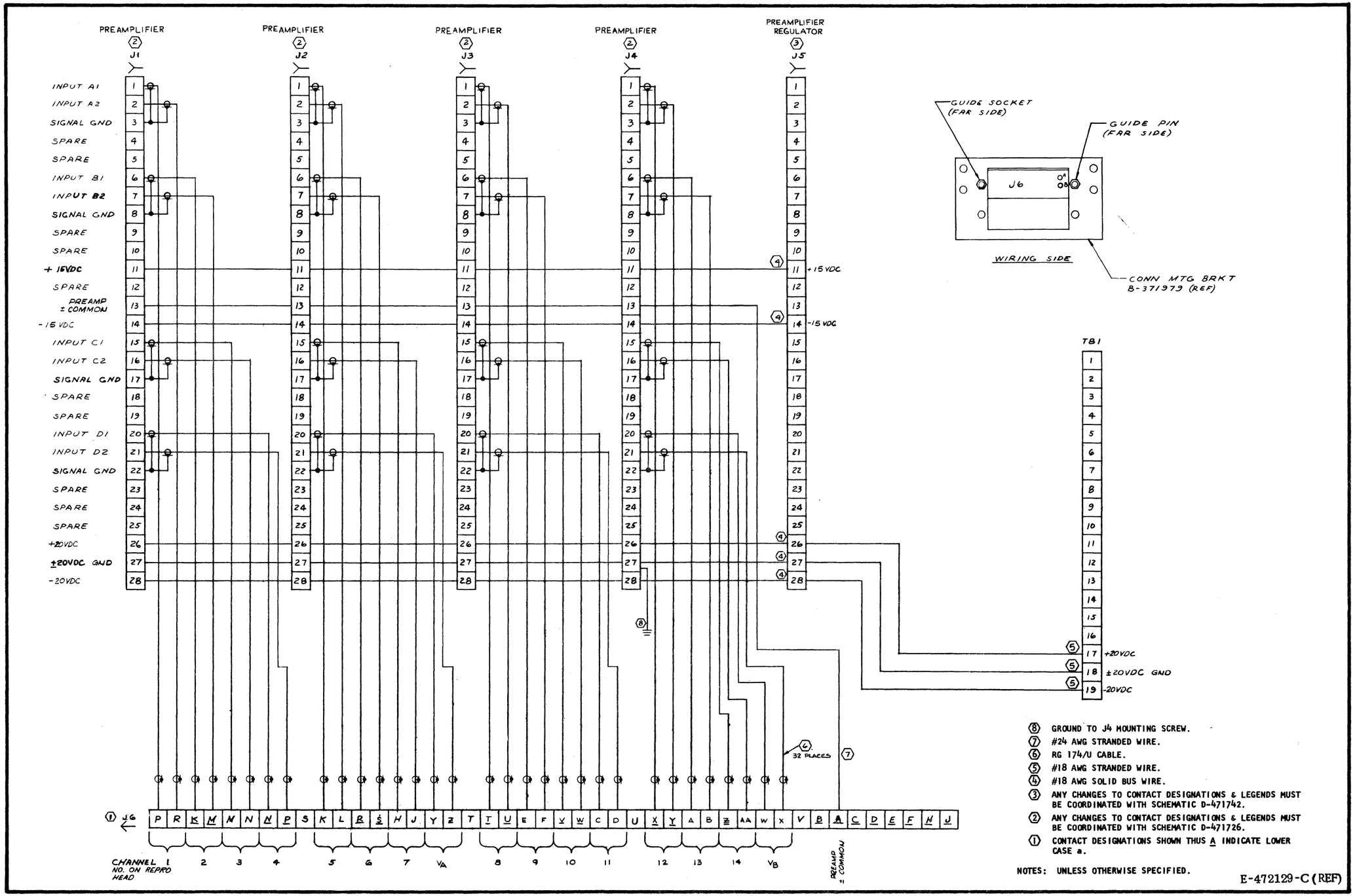


Figure 7-3. Wiring Diagram, 13-505-3 Reproduce Head Preamplifier Housing

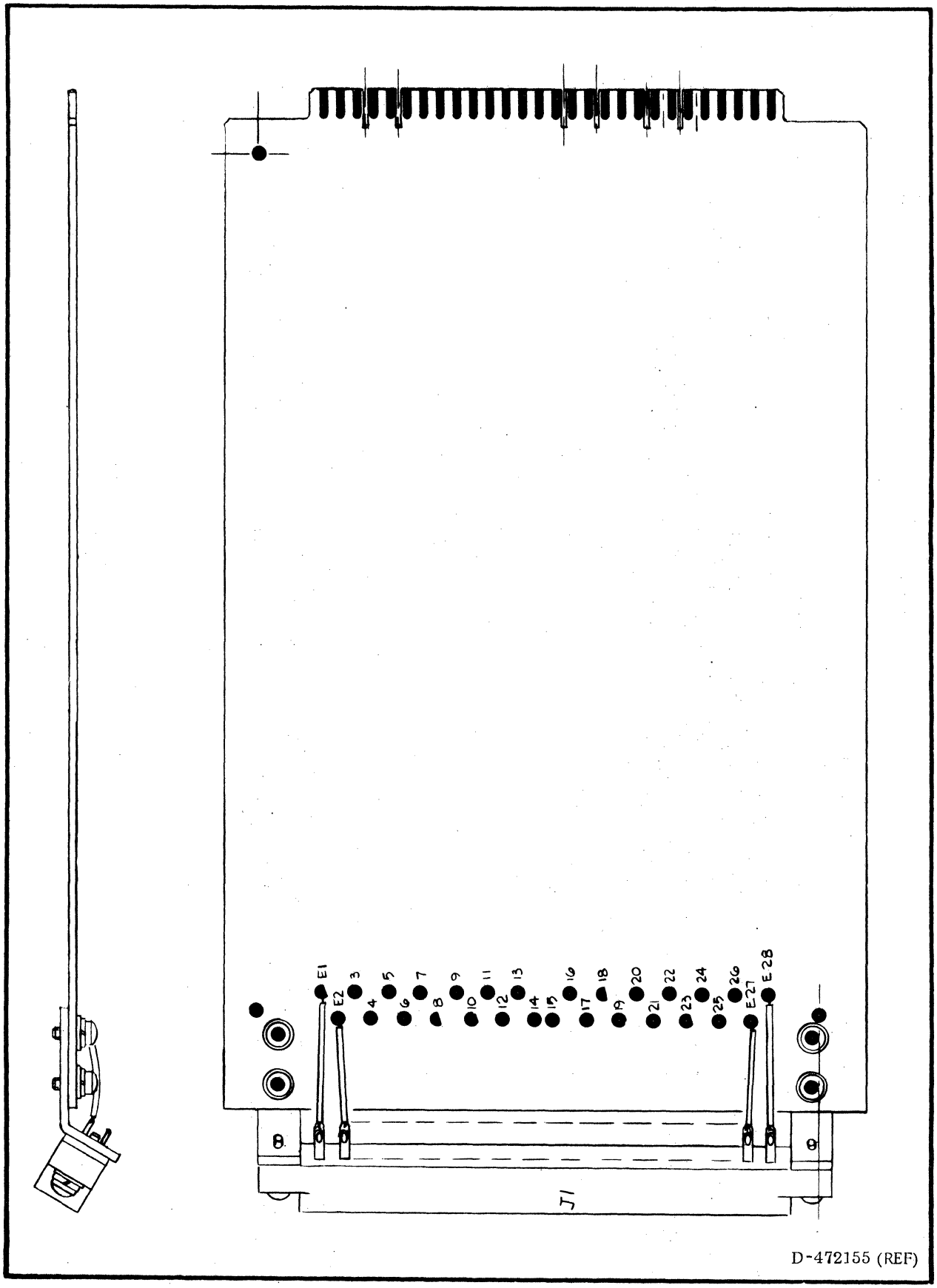


Figure 7-4. Circuit Extender Card