

SERVICE MANUAL

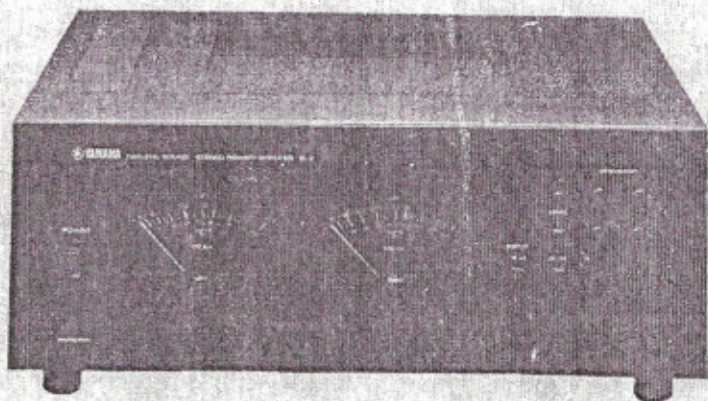
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B-2

STEREO POWER-AMPLIFIER



SINCE 1887



YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

ASM-40



01



Printed in Japan. 6 - 78

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SPECIFICATIONS

● POWER AMP SECTION

| | | |
|----------------------------|-----------------------------|---|
| Dinamic power (IHF) | 8Ω/1KHz/0.1% | 140W + 140W |
| Continuous RMS power | 8Ω/20 ~ 20,000Hz/0.08% | 100W + 100W |
| | 4Ω/20 ~ 20,000Hz/0.08% | 140W + 140W |
| Phase Characteristics | DC ~ 100KHz/10W | less than +0, -15 |
| Power Bandwidth | -3dB/0.1%/8Ω | .5Hz~100KHz |
| Damping Factor | 20Hz/8Ω | .70 |
| | 1KHz/8Ω | .70 |
| | 20KHz/8Ω | .50 |
| Total Harmonic Distortion | 8Ω/50W/20~20,000Hz | .001% Typ. 0.02% Max. |
| | 8Ω/10W/20~20,000Hz | .0008% Typ. 0.02% Max. |
| Intermodulation Distortion | 8Ω/50W/70Hz : 7KHz = 4 : 1 | less than 0.03% |
| | 4Ω/50W/70Hz : 7KHz = 4 : 1 | less than 0.03% |
| | 16Ω/50W/70Hz : 7LHz = 4 : 1 | less than 0.03% |
| Frequency Respons | 8Ω /1W/DC ~ 100KHz | +0, -1dB (at DC) |
| | 8Ω /1W/10Hz ~ 100KHz | +0, -1dB (NORMAL) |
| Input Impedance | | .25KΩ |
| Input Sensitivity | | .775mV |
| Signal-to-Noise Ratic | Input 4.7KΩ short | .025mV/100dB(FLAT) 250μV/115dB(IHF-A NET WORK) |
| Input Terminal | | 1.2 NORMAL, DC |
| Output Terminal | | A, B |

● PEAK METER SECTION

| | | |
|----------------------|-------------|--|
| Indicating Range | | -50~+50dB |
| | | 0dB = 8Ω /100W 0dB = 0dBm |
| Indication Errors | -20 ~ +5dB | ±1.0dB |
| | -20 ~ +40dB | ±2.0dB |
| | -40 ~ +50dB | ±3.0dB |
| Frequency Respons | 20~20,000Hz | ±1.0dB |
| Response Time | | .100μS |
| Restoration Time | | .1 sec. |
| Input Terminal | | EXTERNAL (RCA PIN JACK) |
| Indicator Changeover | REAR PANEL | INTERNAL/EXTERNAL |
| Response Changeover | INTERNAL | .0dB = 8Ω/100W |
| | EXTERNAL | .0dB = 8Ω/100W/100KΩ 0dB = 0 dBm/43KΩ |

● OTHERS

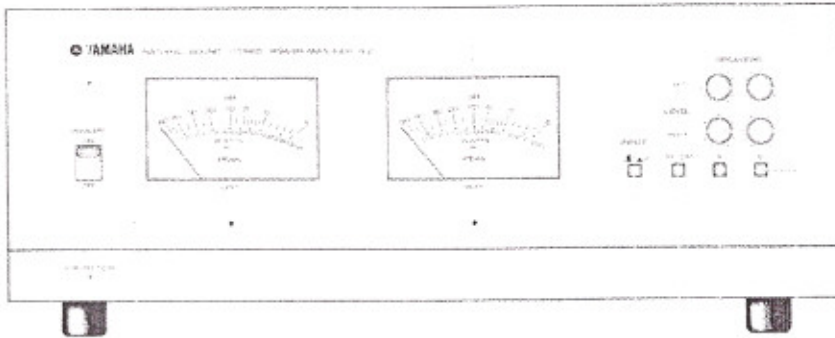
| | | |
|---------------------|-----------------|---------------------------|
| DIMENSIONS | m/m | .436(W) x 370(D) x 151(H) |
| WEIGHT | | .26Kg |
| POWER CONSUMPTION | AC 100V 50/60Hz | .290W (950W Max.) |
| Ambient Temperature | | -10 ~ +30C |
| SEMICONDUCTORS USED | VERTICAL FET | 8 FET .4 |
| | TRANSISTOR | .95 IC .2 } 175 |
| | DIODE/LED | 66 |

-57.2dB

Alterations in standards and external shape may be made for improvements without prior notice.

COMPONENTS LOCATION

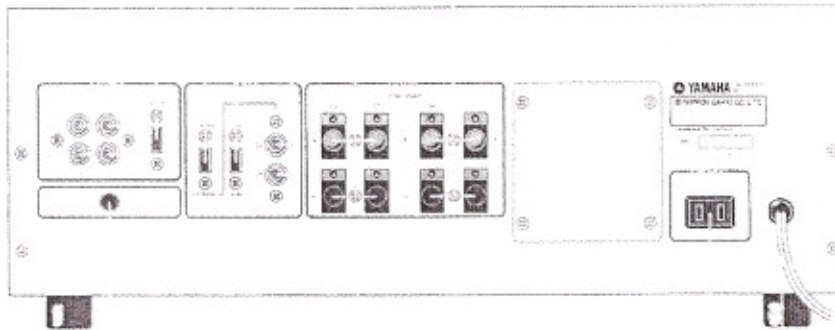
1. FRONT PANEL



- ① POWER INDICATOR (LED)
- ② POWER SWITCH
- ③ PROTECTION INDICATOR (LED)
- ④ PEAK METERS
- ⑤ INPUT SELECTOR SWITCH
- ⑥ SPEAKER SWITCH
- ⑦ SPEAKER SELECTOR SWITCH A
- ⑧ SPEAKER SELECTOR SWITCH B
- ⑨ SPEAKER LEVEL CONTROL A
- ⑩ SPEAKER LEVEL CONTROL B

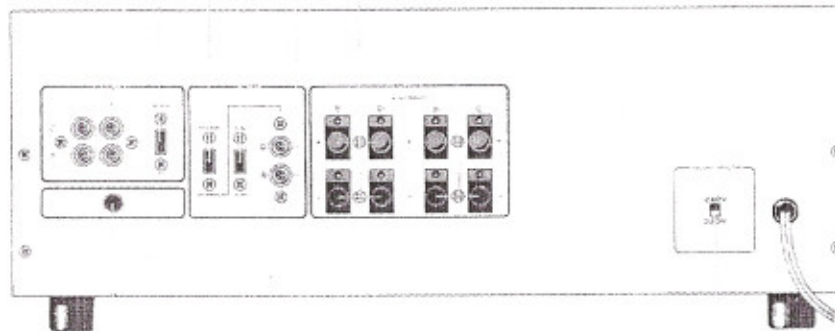
2. REAR PANEL

● U.S. & CANADIAN MODELS



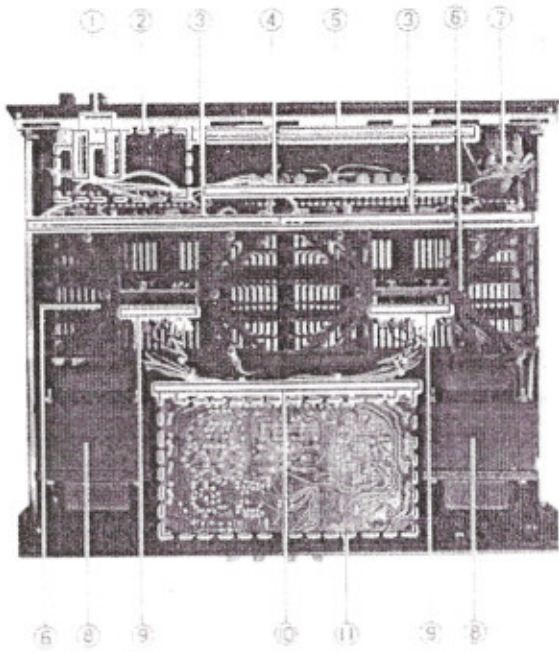
- ① INPUT JACKS-1
- ② GROUND TERMINAL
- ③ INPUT JACKS-2
- ④ SELECTOR SWITCH
- ⑤ METER SWITCH
- ⑥ METER INPUT SWITCH
- ⑦ METER INPUT JACKS
- ⑧ SPEAKER TERMINALS-B
- ⑨ SPEAKER TERMINALS-A
- ⑩ AC OUTLET
- ⑪ AC CORD

● EUROPEAN & GENERAL MODELS



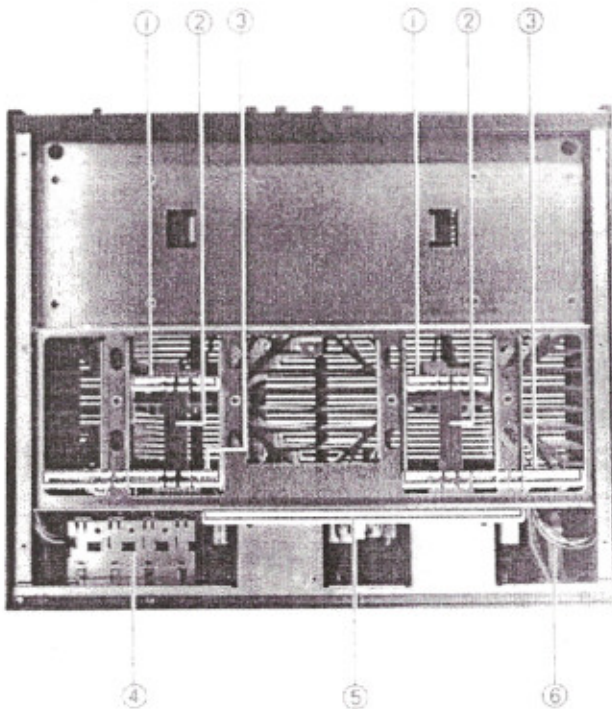
- ① INPUT JACKS-1
- ② GROUND TERMINAL
- ③ INPUT JACKS-2
- ④ SELECTOR SWITCH
- ⑤ METER SWITCH
- ⑥ METER INPUT SWITCH
- ⑦ METER INPUT JACKS
- ⑧ SPEAKER TERMINALS-B
- ⑨ SPEAKER TERMINALS-A
- ⑩ VOLTAGE SELECTOR
- ⑪ AC CORD

3.TOP VEIW



- ① VOLUME CONTROL CIRCUIT BOARD
- ② SELECTOR SWITCH CIRCUIT BOARD
- ③ DRIVE CIRCUIT BOARD
- ④ METER AMP CIRCUIT BOARD
- ⑤ LAMP CIRCUIT BOARD
- ⑥ HEAT SINK
- ⑦ POWER SWITCH
- ⑧ POWER TRANS FORMER
- ⑨ POWER FET CIRCUIT BOARD
- ⑩ ELECTROLYTIC CAPACITOR CIRCUIT BOARD
(NA06748: US & GENERAL MODELS)
(NA06750 : EUROPEAN MODEL)
- ⑪ POWER SUPPLY CIRCUIT BOARD

4.BOTTOM VIEW



- ① POWER FET CIRCUIT BOARD (NA06752)
- ② CONNECTOR CIRCUIT BOARD
- ③ DRIVE CIRCUIT BOARD
- ④ SELECTOR SWITCH CIRCUIT BOARD
- ⑤ METER LAMP CIRCUIT BOARD
- ⑥ POWER SWITCH

CIRCUIT DESCRIPTIONS

B-2 is composed of the "FET Differential Cascode Bootstrap Circuit" for its first stage, the "Current Miller Differential Push-Pull Amplifier Pre-Drive Stage", and a "Pure Complementary Symmetrical Push-Pull OCL ALL Stages Direct Coupled DC Amplifier" for its driver stage. (refer Figure 1)

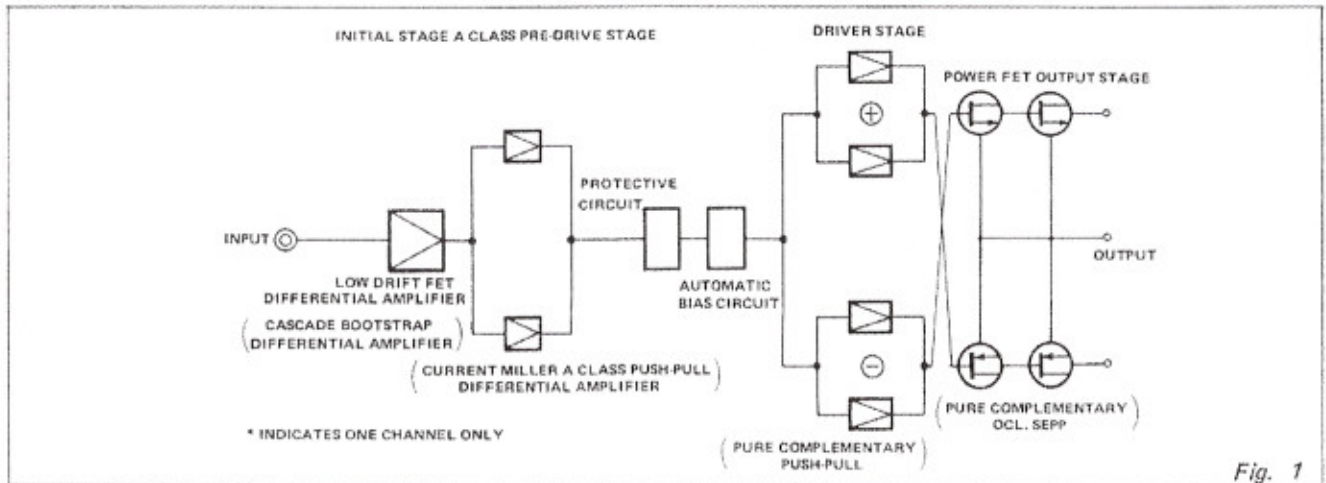


Fig. 1

1. CASCADE BOOTSTRAP CIRCUIT

As shown in Figure 2, the initial stage is composed of a horizontal type FET with a high gm which is thermally coupled to form a differential amplifier. A constant current bias is provided in the common source and a transistor connected to the drain side to form a cascade bootstrap circuit. (Initial stage approximately 29dB bare gain/1KHz) In actual practice, although variations may be expected in the impedance of the input volume of the amplifier to cause distortion, the differential FET in this circuit absorbs the fluctuations from the drain source by means of the input signal. For this reason, the voltage between the drain gates will vary and, as distortion will be prevented by variations in leakage current (Cdg) and feedback capacity (Crss), in this unit

- the impedance is lowered by connecting (cascade connection) the transistor emitter to the drain side,
- fluctuations in Vds are decreased by means of its bootstrap circuit to decrease fluctuations in feedback capacity.

2. DIFFERENTIAL CIRCUIT

The second stage differential circuit is a differential amplifier formed of transistors. Also, signal-wise, it will be as shown in Figure 3. Local feedback is used to raise the input impedance of this stage, decrease the load in the initial stage, and to decrease the overall NF. On one hand, a base-grounded transistor is inserted in series on one side to eliminate distortion during large amplitude swings on the collector side. Further, to decrease secondary distortion in the pre-driver stage, a Current Miller class A push-pull circuit is incorporated.

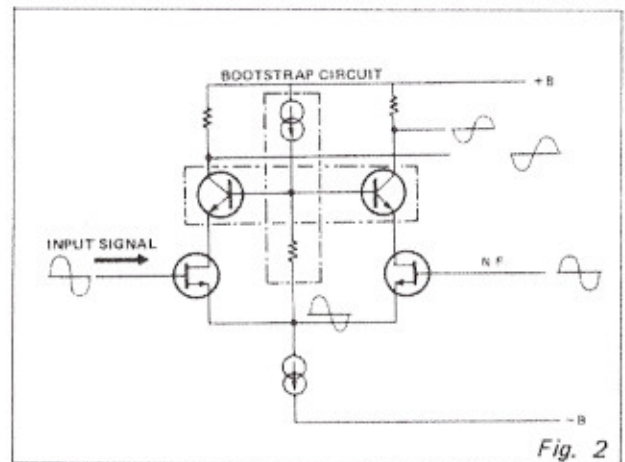


Fig. 2

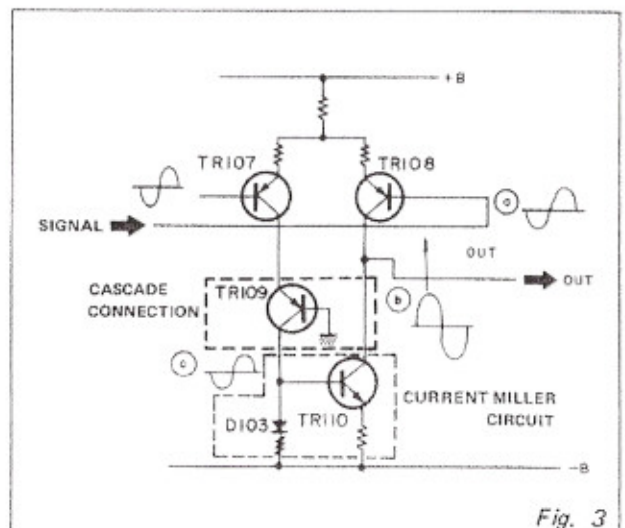


Fig. 3

3. PROTECTIVE CIRCUIT

*DC LIMITER

As this unit is composed of DC amplifiers, in the event that excessive DC voltage is applied to the input by error, the P channel, or N channel, in the FET side of the final stage will be set to ON condition and there will be fear of damage to the FET as PDmax (drain loss) will be exceeded.

To protect the FET when DC is applied, it will be necessary for TR112 to be in ON condition to short out the DC portion and prevent it from reaching the FET.

When DC is added to the signal, positive voltage develops at point "A" in the NF loop and the potential at point "B" rises to turn TR115 on. When TR115 is turned on, the potential at point "C" drops and TR111 is turned on. When TR111 is turned on, the potential at point "D" rises, TR112 is turned on, and the signal is shorted out. (When a negative voltage is applied, the same operation is carried out in the negative circuit.)

*PD LIMITER

When the load impedance is over 2 ohm, 50W, or when the output is in shorted condition, the potential between points "E" and "A", and at point "D" in Figure 4 increases. TR112 will therefore be set to ON condition to cut the input signal and thus protect the FET in the output stage by means of a limiter effect.

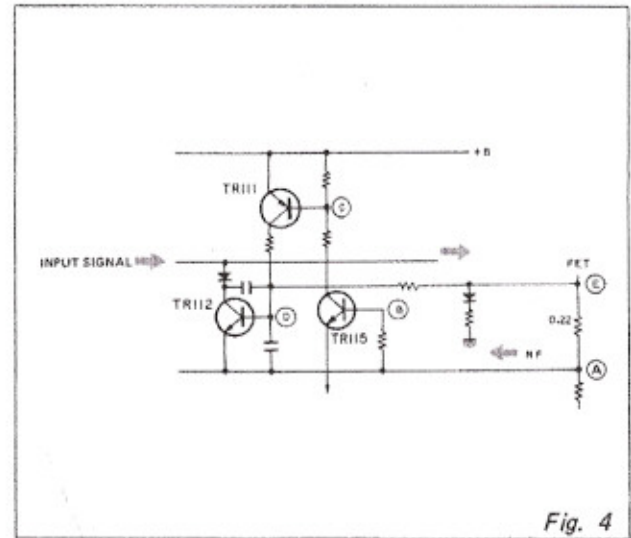


Fig. 4

4. AUTOMATIC BIAS CIRCUIT

Different from a transistor, the FET will be damaged if operated without a bias.

As the voltage in the $\pm B$ power supply rises in advance of that of the constant voltage circuit $\pm B2$ when the power switch is turned on, momentarily the $\pm B$ voltage may be considered $\pm 55V$ and $\pm B2$ as $0V$. Damage is prevented as the $\pm B$ potential is applied to [D116, R155, D114] [D117, R156, D115] and turns transistors TR117 and TR118 on; and the potential applied to (D112, R149) (D113, R150) is applied as a gate bias to each FET through transistors TR121 and TR124. (Figure 5)

Also, fluctuations (power supply voltage fluctuations) in the $+B$ voltage causes the voltage applied to the FET in the final stage to fluctuate thus varying the operating point of the FET and becoming a possible cause of distortion. For this reason, the bias applied to the FET gate is varied simultaneously to eliminate the distortion. For example, if the $+B$ potential ($+55V$) rises, since TR119 operates in the ON direction, the base potential of TR117 drops and operates in the ON direction; and the medium point potential of TR121 and TR122 rises causing the FET gate bias to rise. In other words, it operates in the OFF direction stabilizing the operating point and thus eliminating distortion.

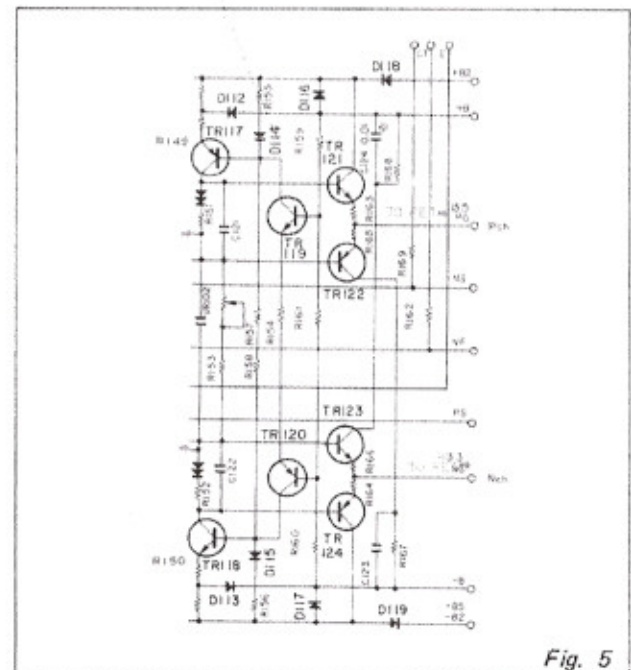


Fig. 5

5. PURE COMPLEMENTARY SYMMETRICAL PUSH-PULL DRIVER CIRCUIT

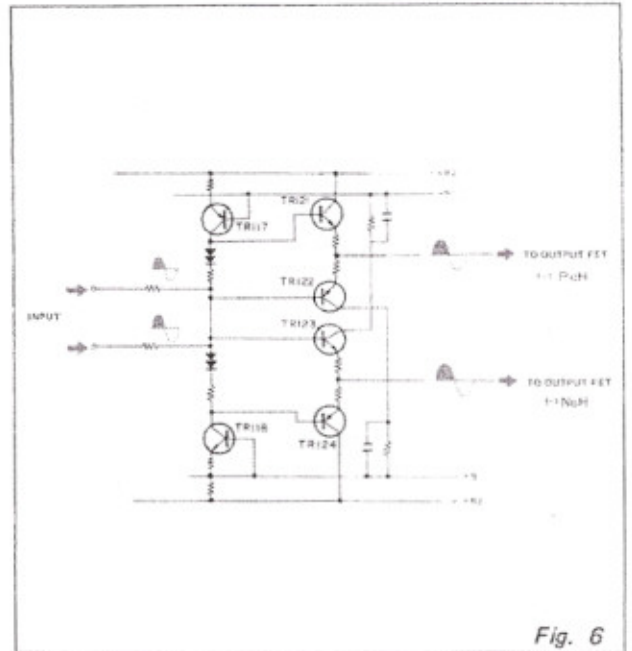
This circuit is to drive the FET in the final stage and is a Class A driver circuit that operates the Pch and Nch sides of the FET evenly by push-pull operation. (Figure 6)

(1) Compared to the emitter follower driver system, it is possible to equalize the driving impedance when FET is ON or OFF.

(2) Since the input impedance of the power FET is high in the frequencies near the au-ible rage, less current will be required in the driver stage. When the frequency becomes high, class B operation will result from the input strength but the feature in (1) will not be lost. (In the case of the emitter follower system, if it is desired to reduce the driving impedance during ON or OFF conditions, it will be necessary to reduce the emitter resistance and cause increased current to flow)

(3) Since less current is required in the drive stage, transistors with low P_c may be employed. In the "B-2", the transistors are the same as those used in the predriver stage and, as transistors with P_{cmax} of approximately 1 watt may be employed, it will be possible to select those with high h_{fe} and f_t .

For instance, when a positive signal is received in example (1), the base input voltage of TR121 rises, the impedance between the collector and emitter drops and increased current tends to flow. Also, since there is a potential difference in relation to TR122, the impedance in TR122 rises to enable high gain output values to be obtained.



6. SPEAKER PROTECTION CIRCUIT

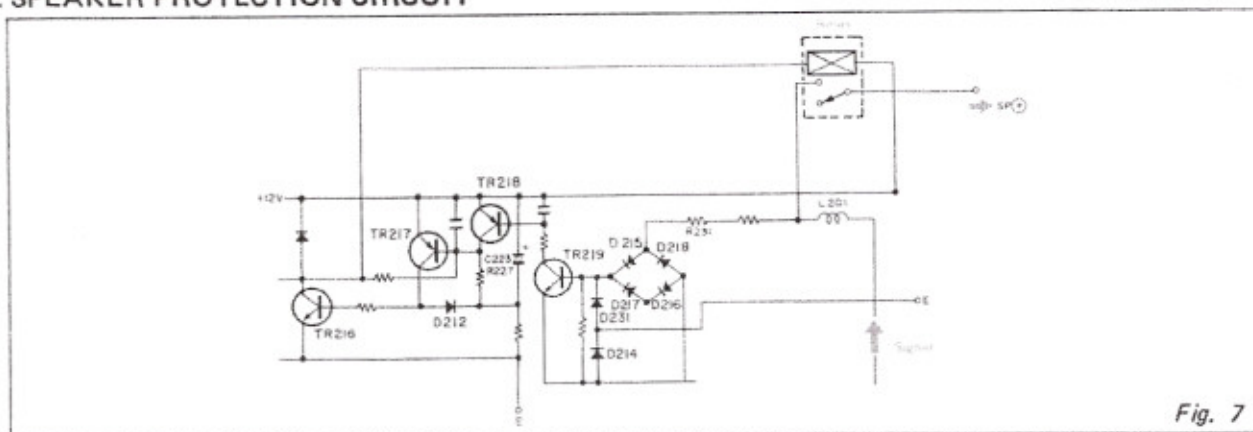


Fig. 7

- In the B-2, the relays operate approximately 3 seconds from the instant the power supply switch is turned on and the circuit will be in ON condition. As current (approximately 100ma) will not flow through the relays while the potential (0.6V) between the emitter and base of TR217 is varying, that is, while C223 is being charged, the relays will not be in ON condition and no sound will be emitted. Since TR217 will not turn ON at the instant that the power supply switch is entered (potential between base and emitter insufficient), the relays will not be in ON condition. However, when C223 is sufficiently charged to operate TR217, TR216 will operate in ON direction, current will commence to flow in the relays and the circuit will be in ON condition. (Figure 7)

7. INPUT CIRCUIT (PIN JACK SHEET)

- Input connections are possible through 2 paths and it is also possible to change over from NORMAL to DIRECT by means of a changeover switch. (Figure 8)
- FOR NORMAL operation, an input coupling condenser is connected and the unit is operated as a normal main amplifier by cutting off the current in the input.
- In DIRECT operation, as the input signal by passes the coupling condenser, the unit may be operated as a DC amplifier as the DC portion of the input signal is also amplified.
- PEAK METER, EXT. INPUT
The meter circuit in the B-2 may be used as a "0dBm Indicator" for preamplifiers etc. where direct reading of the output is possible and as a "W/Bohm Indicator" in which the output level may be read with an 8 ohm load in the main amplifier connected to the "0dBm Indicator". (Figure 9) This terminal enables the meter to be used independently and outputs from other pre-amplifiers and power amplifiers may be observed by connecting their output to the EXTERNAL terminal. Change over of the input is carried out by the SELECTOR sheet.

* THE RELAYS WILL BE IN OFF CONDITION IF DC PORTIONS ARE INCLUDED IN THE INPUT SIGNAL.

If (+) or (-) DC current appears in the signal system, the potential between the base and emitter of TR219 will rise causing TR219 to turn on. Next, the base potential of TR218 is lowered causing it to turn on. This, in turn, causes TR217 to turn off as the potential applied to its base rises. TR216 is also turned off and the speaker protected by cutting off the flow of current through the relay thus putting them in OFF condition and blocking the signal system.

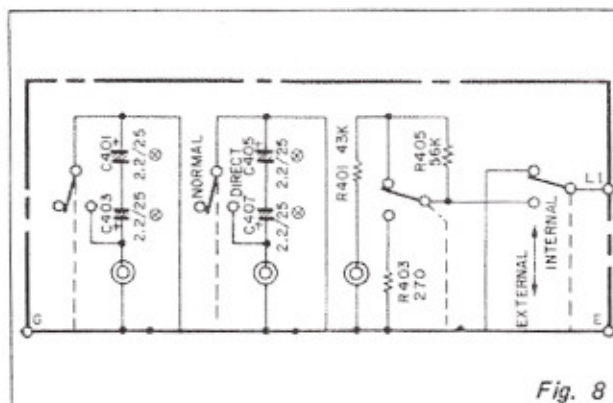


Fig. 8

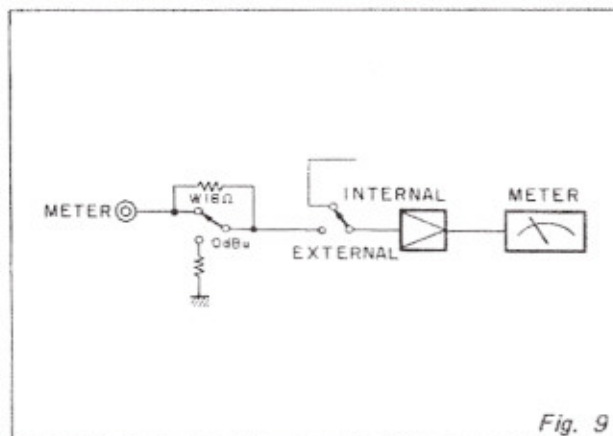
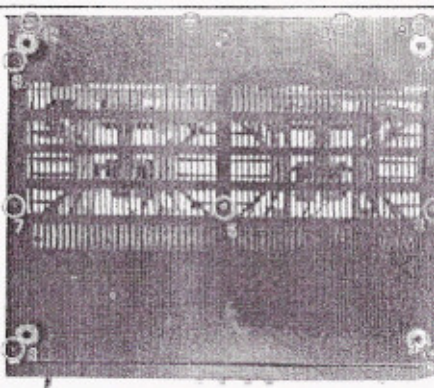


Fig. 9

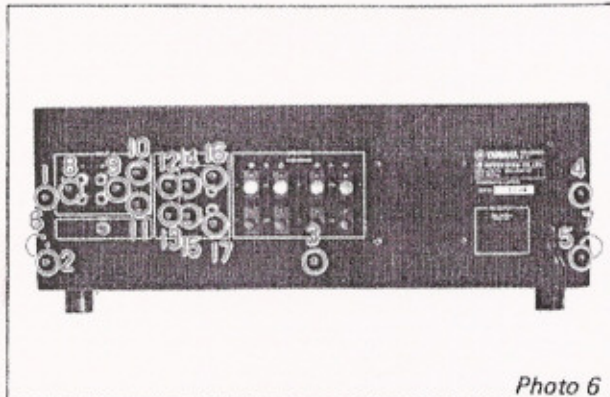


5. REMOVING THE DRIVE CIRCUIT BOARD

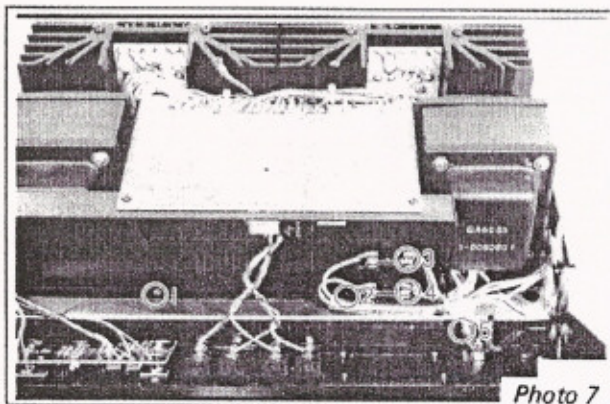
- a. Remove the connector circuit board. (refer Step 4-a,b)
- b. Unsolder terminal connections of the circuit board being removed.
- c. The "L" channel of the drive circuit board may be removed by removing screws (9) and (10) shown in Photo 3 and the "R" channel by removing screws (11) and (12).

6. REMOVING THE POWER SUPPLY TRANSFORMER

- a. Remove the top cover. (refer Step 1.)
- b. Remove rear panel screws (1) through (5) shown in Photo 6.
- c. Loosen screws (6) and (7) shown in Photo 6 and tilt back rear panel.



- d. Unsolder primary lead wires of the power transformer (gray and yellow). (No. (3) and (5) in Photo 7. Also unsolder secondary lead wires at this time.)



- e. The "L" channel power supply transformer may be removed by removing chassis screws (14) through (17) shown in Photo 3 and the "R" channel power supply transformer by removing

screws (18) through (21).

Caution: As the power supply transformer is fairly heavy, care must be taken to avoid damaging the other parts.

7. REMOVING THE ELECTROLYTIC CAPACITOR CIRCUIT BOARD

- a. Tilt back rear panel. [refer Step 6 (a) through (c)]
- b. Remove power supply circuit board. (refer Step 3. However, it will not be necessary to unsolder the lead wires)
- c. Remove screws (1) and (2) shown in Photo 7.
- d. Unsolder all terminals of the Electrolytic Capacitor circuit board.
- e. Remove Electrolytic Capacitor circuit board by removing screws (22) and (23) shown in Photo 3.

8. REMOVING THE PIN JACK CIRCUIT BOARD

- a. Tilt back rear panel. [refer Step 6 (a) through (c)]
- b. Remove screws (8) through (17) shown in Photo 6. Note: Screws (8), (9), (16), and (17) are secured by nuts from the rear side of the panel.
- c. Unsolder all terminal connections from the circuit board and remove the pin jack circuit board.

9. REMOVING THE METER AMPLIFIER AND LAMP CIRCUIT BOARD

- a. Remove the top cover. (refer Step 1)
- b. Remove screws (27) and (28) in Photo 3.
- c. Remove the lamp circuit board from the meter amplifier circuit board by removing screws (29) and (30) shown in Photo 3.

Note: When removing the lamp circuit board and meter amplifier circuit board, unclamp lead wires, lift out circuit board, and unsolder the leads.

10. REMOVING THE FRONT PANEL

- a. Remove the top cover. (refer Step 1)
- b. Remove the 4 knobs marked SPEAKER located on the front panel.
- c. Remove screws (24) through (26) shown in Photo 3.
- d. Remove front panel by removing screws (9) through (12) shown in Photo 2.

11. REMOVING THE LED CIRCUIT BOARD

- a. Remove front panel. (refer Step 10)
- b. As the LED circuit board (1) and (2) are bonded to the chassis with foam rubber as shown in Photo 8, lift off from the chassis after unsoldering the leads.

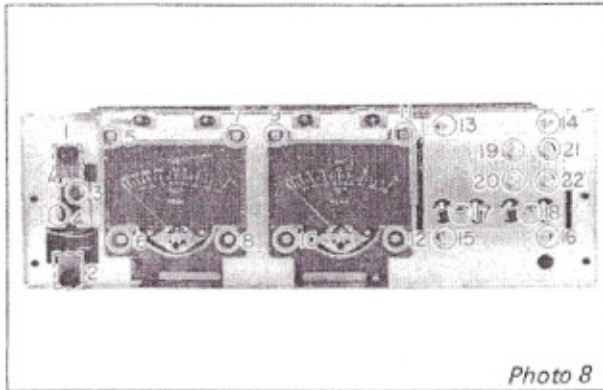


Photo 8

12. REMOVING THE POWER SWITCH

- a. Remove the front panel. (refer Step 10)
- b. Pull off lever. (refer Figure 1)

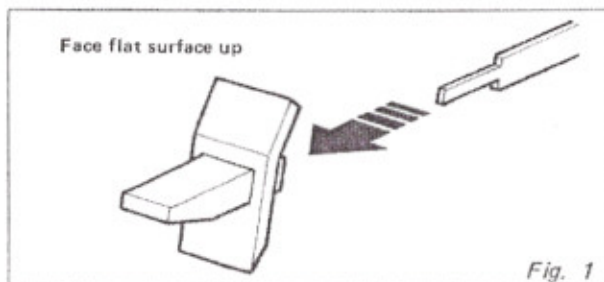


Fig. 1

- c. Remove power switch by removing screws (3) and (4) shown in Photo 8.

13. REMOVING THE PEAK LEVEL METER

- a. Remove meter by removing screws (5) through (8) and (9) through (12) shown in Photo 8.

Note: When removing the meter, unsolder the connections between the meter and meter amplifier circuit board.

Caution: When tightening the screws, care must be taken not to damage the meter by over-tightening.

14. REMOVING THE SELECTOR SWITCH CIRCUIT BOARD

- a. Remove screws (13) through (16) shown in Photo 8 and remove both the selector switch circuit board and mounting brackets.

Note: When installing the selector switch circuit board mounting brackets, position it to permit the front portion of the selector switch to slide smoothly through the switch hole in the front panel.

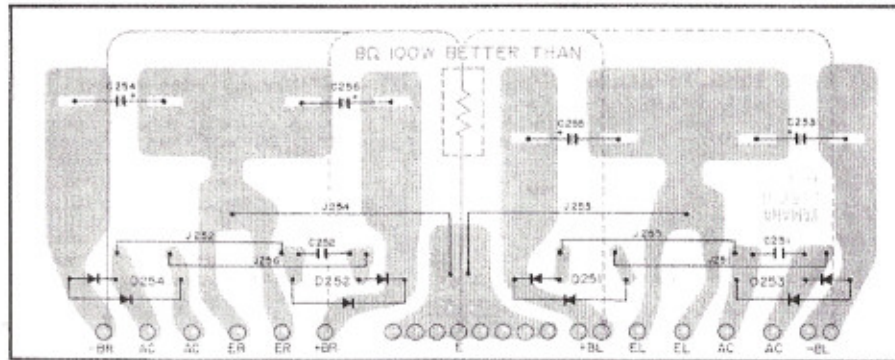
15. REMOVING THE VOLUME CIRCUIT BOARD

- a. Remove the selector switch circuit board. (refer Step 14)
- b. Remove volume control nuts (19) through (22) and screws (17) and (18) from the mounting bracket as shown in Photo 8 and remove volume circuit board from the selector switch circuit board connector.

MEASUREMENT AND ADJUSTMENT

PRE-ADJUSTMENT PROCEDURES

- Prior to commencing repairs, adjustments, or replacements of circuit board, always turn power switch to OFF and discharge power supply circuit as shown in the diagram below.
- Care is required as shocks will be experienced or FET and other parts damaged if discharging is not conducted.
- Carry out the following checks with the unit completely assembled.



1. OVERALL ADJUSTMENTS

- (1) Connect as shown in Figure 1 and, prior to turning on the power switch, turn drive circuit board BIAS VR (VR102) fully counter-clock-wise.
- (2) With no signal input, connect a VTVM between terminals NS and CT of the left and right channel drive circuit boards.
- (3) Turn amplifier power supply ON with the slidac in 0V position and adjust slidac to rated voltage (100V) while observing the VTVM connected to the left and right channels does not exceed 1.4V.

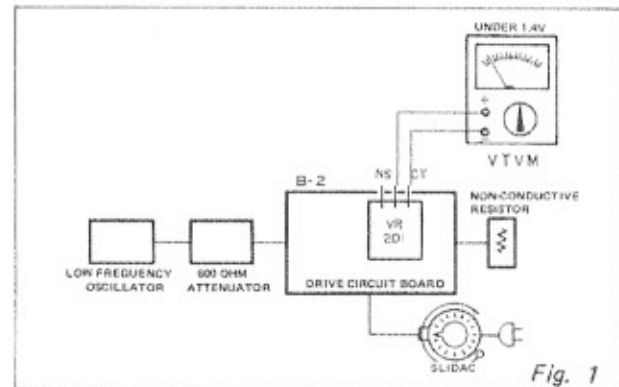


Fig. 1

2. ADJUSTING THE POWER SUPPLY VOLTAGE

| Step | Items to be Adjusted | Method of Adjustment | Place Adjusted | Adjusting Procedure | Voltage Values | Remarks |
|------|----------------------|---|----------------|--|-----------------|----------------|
| 2-1 | +85V | Connect DC voltmeter between the +85 and E terminals of the power supply circuit board. | VR201 | Adjust VR201 so the voltage between terminals +85 and E is $+85V \pm 0.5V$. | $+85V \pm 0.5V$ | Refer Figure 2 |
| 2-2 | -85V | Connect a DC voltmeter between the -85 and E terminals of the power supply circuit board. | VR202 | Adjust VR202 so the voltage between terminals -85 and E is $-85V \pm 0.5V$. | $-85V \pm 0.5V$ | Refer Figure 2 |

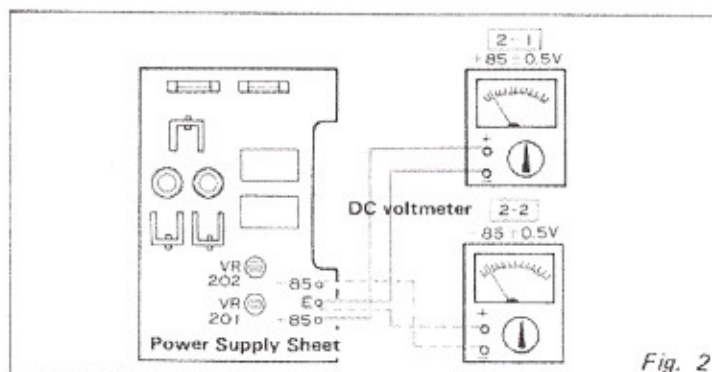


Fig. 2

3. ADJUSTMENTS OF THE MAIN AMPLIFIER

| Step | Items Adjusted | Method of Adjustment | Places Adjusted | Adjusting Procedures | Voltage Values | Remarks |
|------|----------------------------------|--|-----------------|---|-------------------------|----------------|
| 3-1 | Adjustment of the Idling Current | Connect a VTVM to test terminals NS and CT of the Drive circuit board | VR102 | Adjust VR102 so the voltage between terminals NS and CT is 40mV under no-load, no-signal input conditions. | 40mV | Refer Figure 3 |
| 3-2 | | Connect an 8 Ohm, 100-200W load resistor, a level meter, and a distortion meter capable of measuring residual distortion of under 0.005 % at 20KHz to the speaker terminals. | VR102 | Readjust VR102 for minimum distortion at 30W output with an 8 Ohm load and at 20KHz. (15.5V output and under 0.02% distortion at terminals 30W : 8 ohm) | Distortion under 0.02 % | Refer Figure 4 |
| 3-3 | | | | Voltage between terminals NS and CT under no-load, no-signal conditions to be under 0.1V subsequent to this. | Under 0.1V | |
| 3-4 | Adjustment of DC Balance | Connect a VTVM between test terminals E and CT of the drive circuit board. | VR101 | Adjust VR101 so voltage between E and CT is 0V \pm 10mV with the input volume control turned to minimum. | 0 \pm 10mV | Refer Figure 3 |

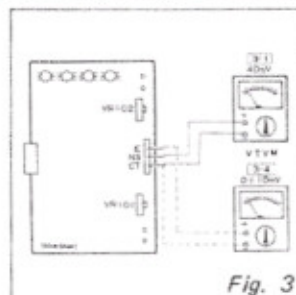


Fig. 3

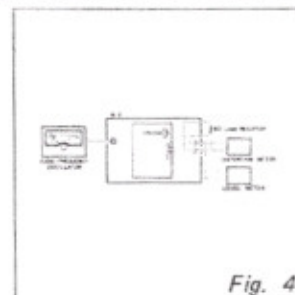


Fig. 4

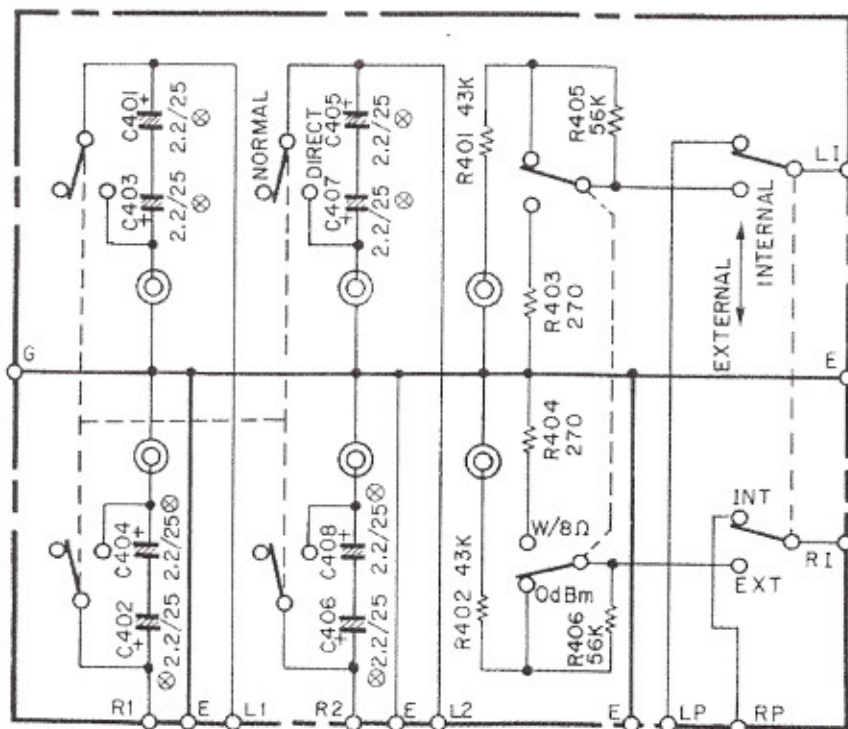
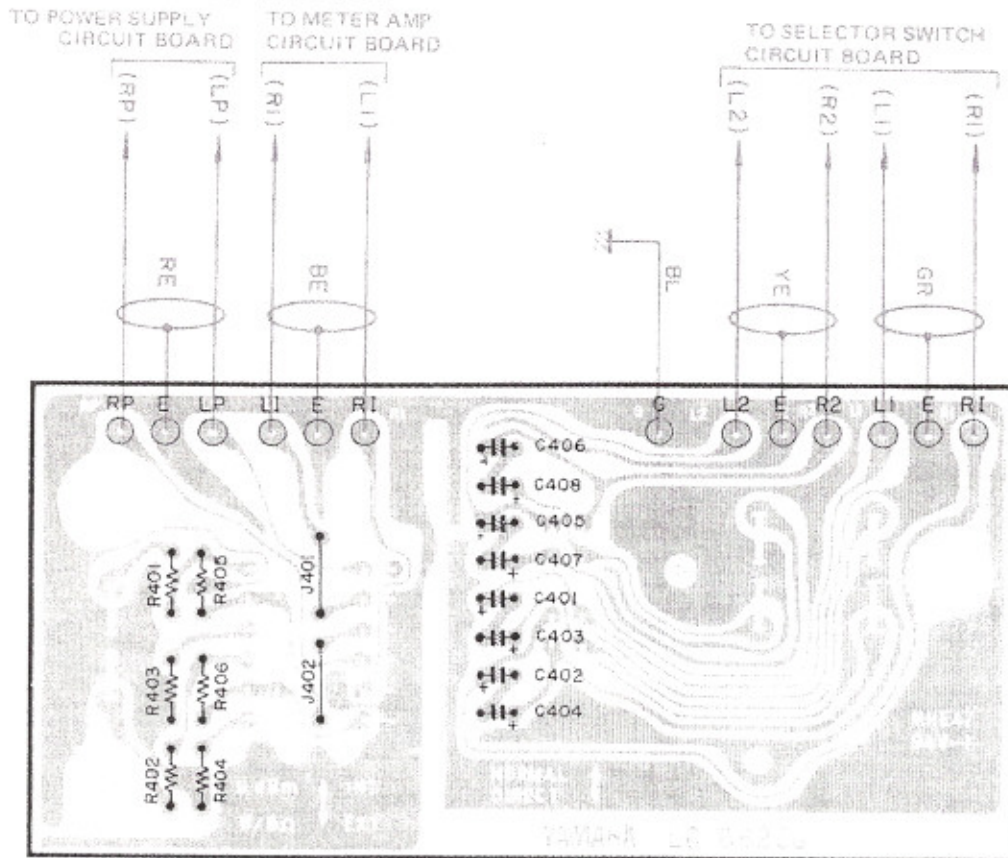
4. ADJUSTMENTS OF THE METER AMPLIFIER

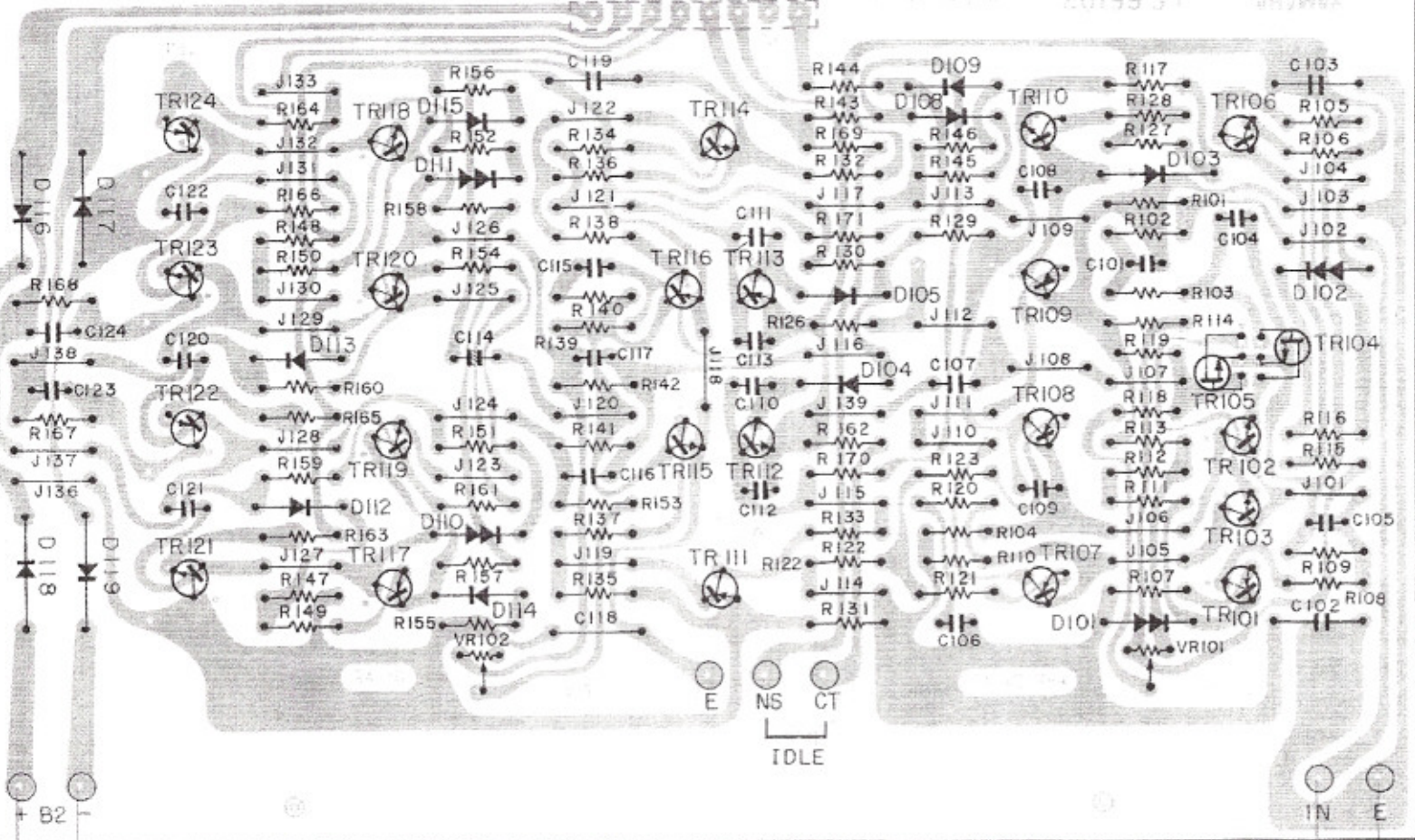
| Step | Items Adjusted | Method of Adjustment | Places Adjusted | Adjusting Procedure | Meter Indication Values. | Remarks |
|------|----------------------------|--|--------------------------------------|--|--------------------------|----------------|
| 4-1 | Meter Amplifier Adjustment | <ol style="list-style-type: none"> 1. Input Terminal: Connect low frequency oscillator (1KHz, 600 Ohm output) 2. Speaker Terminal: Connect 8 Ohm load resistor 3. Observe output level at both ends of the 8 Ohm load 4. Meter Changeover Switch: Set to INTERNAL 5. Set input volume to maximum. | VR307 (LCH) VR308 (RCH) -30 dB | Apply a 1KHz signal and adjust input for an output reading of 1.2dBm with an 8 Ohm load. Adjust VR307 and VR308 (-30 dB) so the meter indicates -30dB | -30 dB | Refer Figure 5 |
| 4-2 | | | VR301 (LCH) VR302 (RCH) -20 dB | Adjust input signal so the output reads 11.2dBm. Adjust VR301 and VR302 (-20dB) so the meter indicates -20dB. | -20 dB | |
| 4-3 | | | VR303 (LCH) VR304 (RCH) -10 dB | Adjust input signal so the output reads 21.2dBm. Adjust VR303 and VR304 (-10dB) so the meter indicates -10dB. | -10 dB | |
| 4-4 | | | VR305 (LCH) VR306 (RCH) 0 dB | Adjust input signal so the output reads 31.2dBm. Adjust VR305 and VR306 (0dB) so the meter indicates 0dB. | 0 dB | |
| 4-5 | Confirm | | | Vary output of the low frequency oscillator from 31.2dBm to -18.8dBm in steps of 10 dB and confirm that the reading is within the meter indication lines from the dial calibrations of 0 to -30dB and within \pm 2mm of the indicator lines between the dial calibrations of -40dB to -50dB. | | |

Fig. 5

PRINTED CIRCUIT BOARD

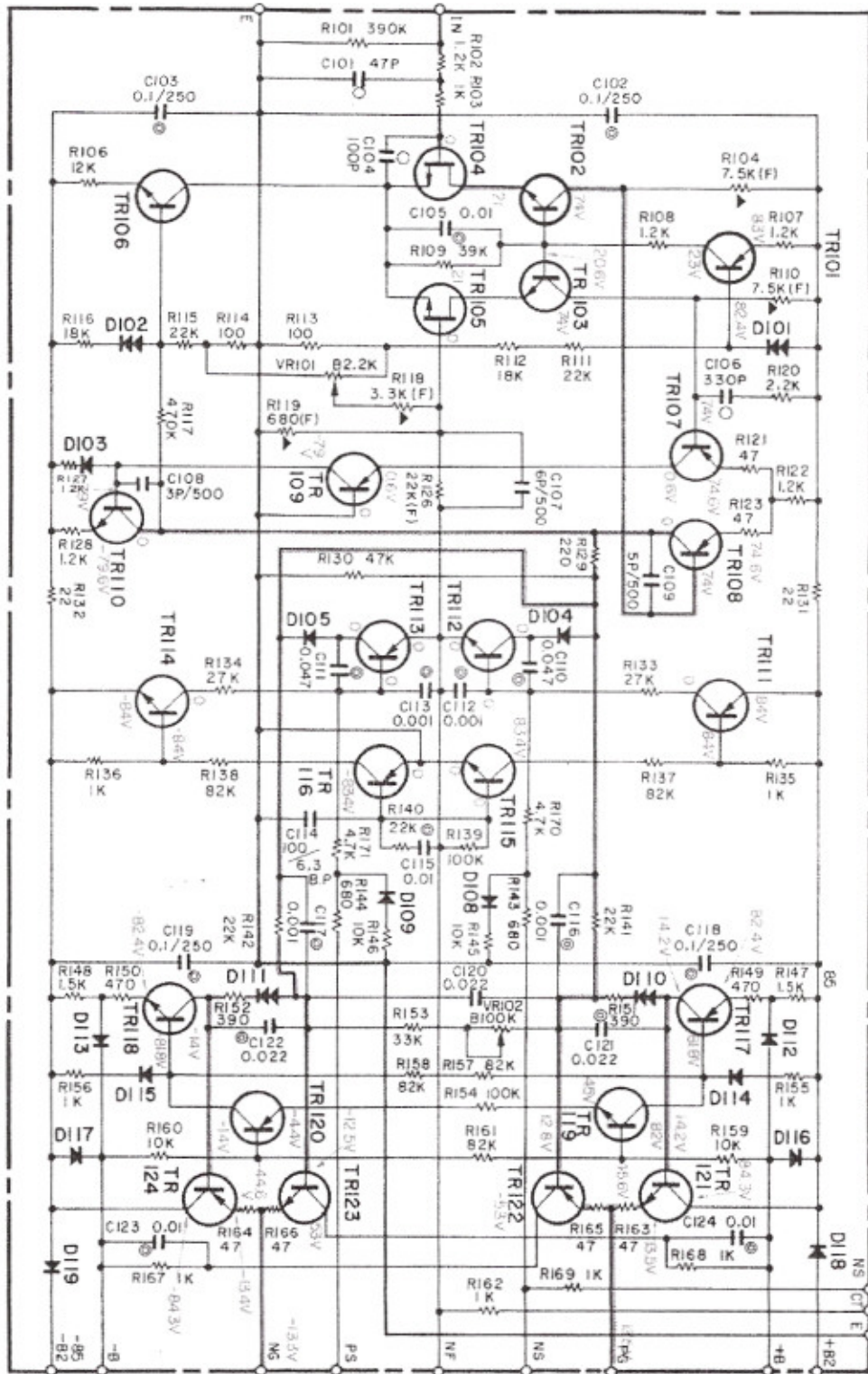
1. PINJACK CIRCUITBOARD NAO6756



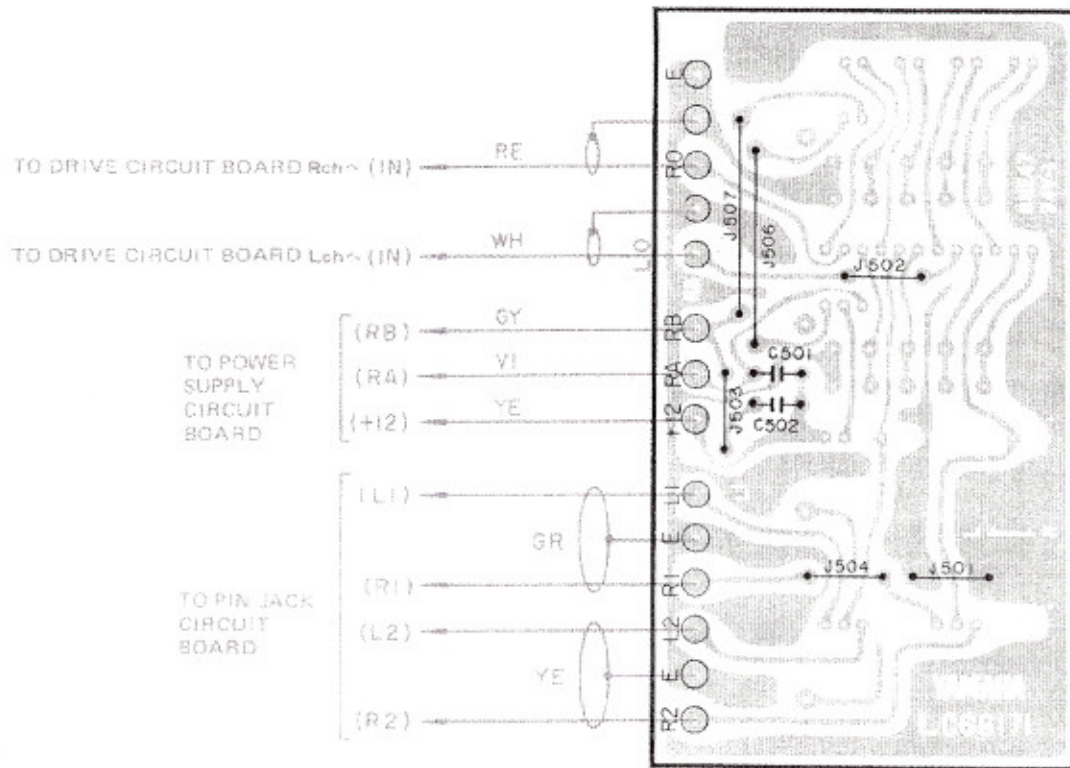


+ B2 -

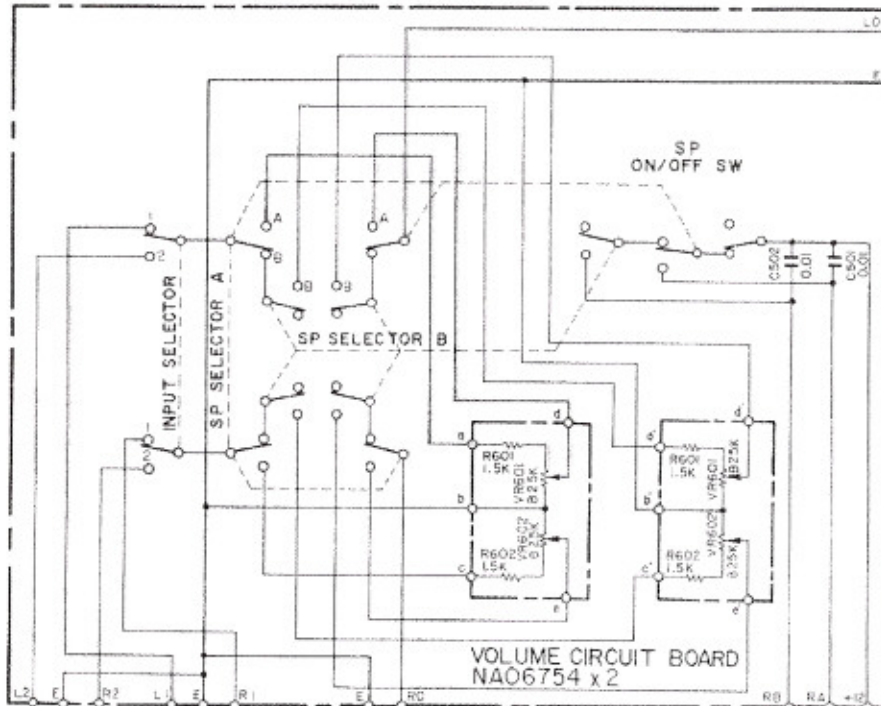
IN E



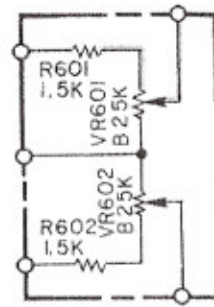
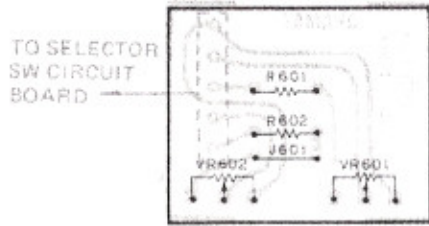
3. SELECTOR CIRCUIT BOARD NAO6755



SELECTOR SW CIRCUIT BOARD NAO6755



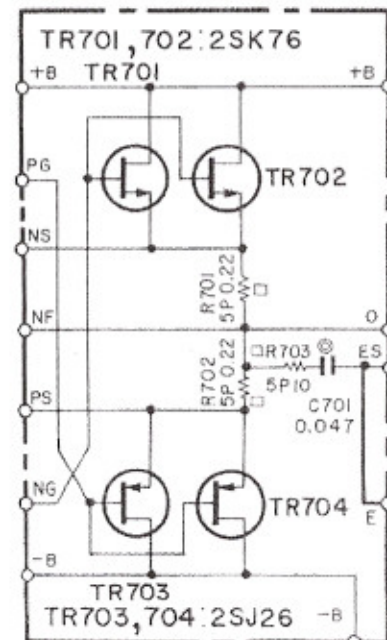
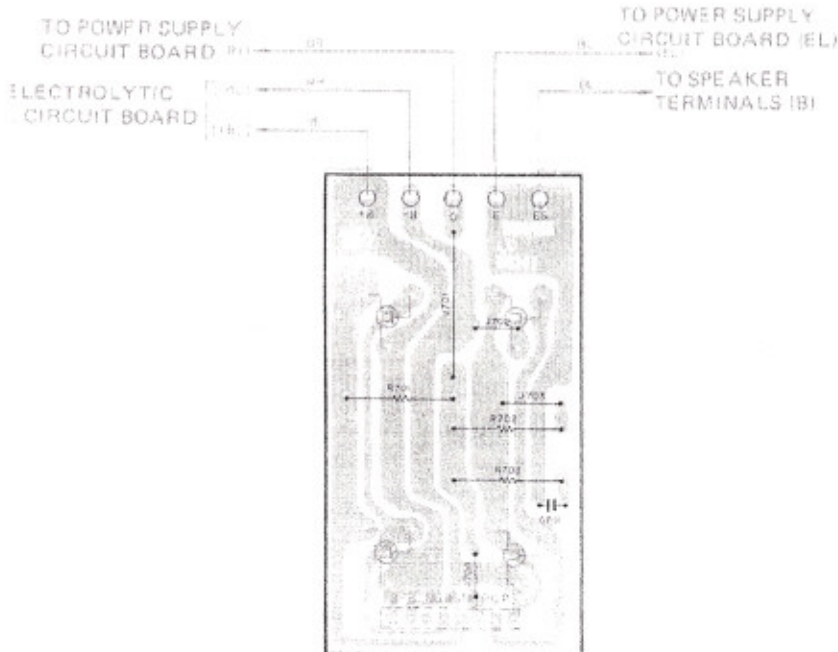
4.VOLUME CIRCUIT BOARD NAO6754



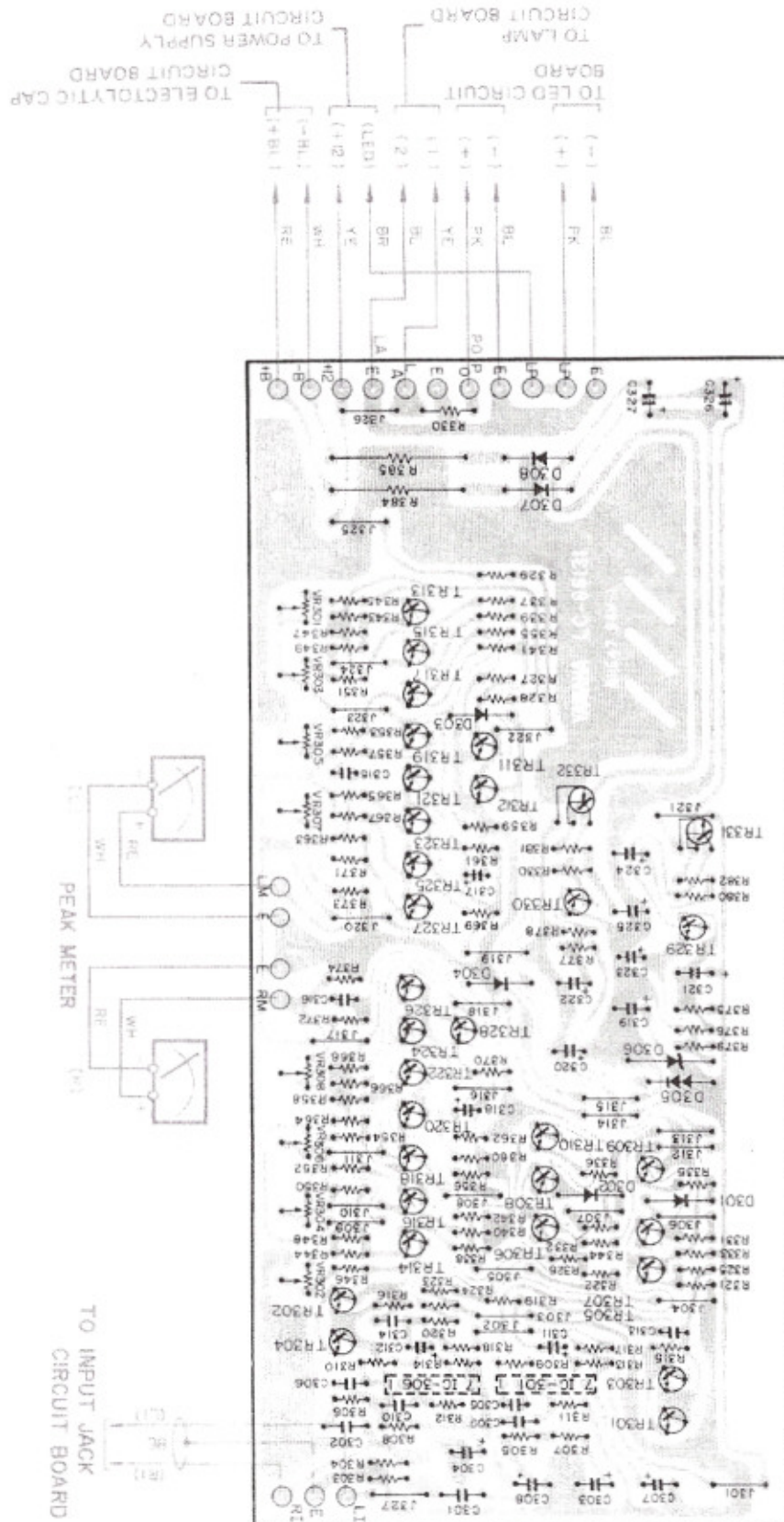
5.CONNECTOR CIRCUIT BOARD NAO6753

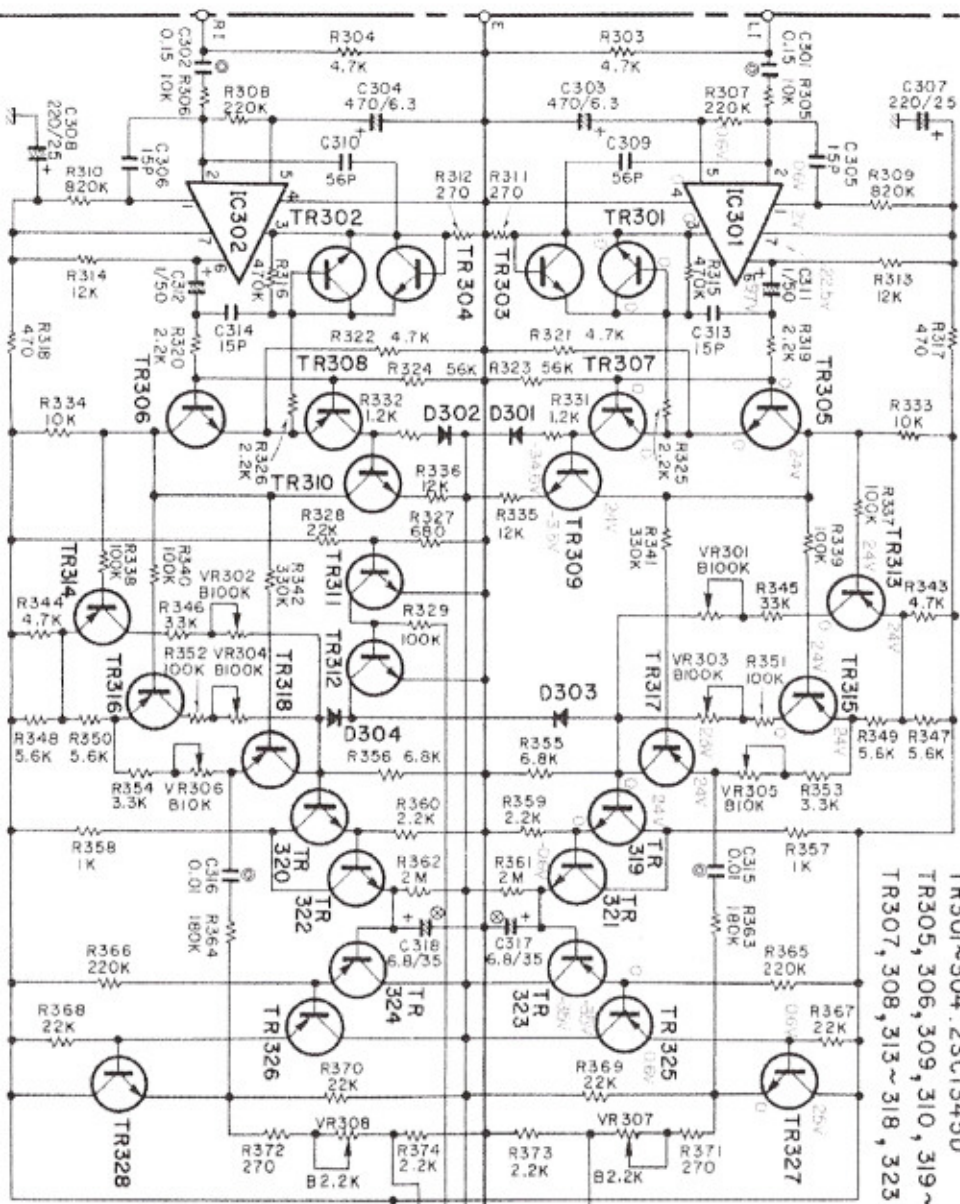


6.POWER FET CIRCUIT BOARD NAO6752



7.METER AMP CIRCUIT BOARD NAO6751





TR301~304:2SC1345D

TR305, 306, 309, 310, 319 ~ 322:2SC458B or C

TR307, 308, 313 ~ 318, 323 ~ 326:2SA763W L 4 or 5

TR311, 312:2SC458C

TR327, 328:2SC1345D

TR329:2SC734 O or Y

TR330:2SA561 O or Y

TR331:2SC10615 B or C or D

TR332:2SA6715 B or C

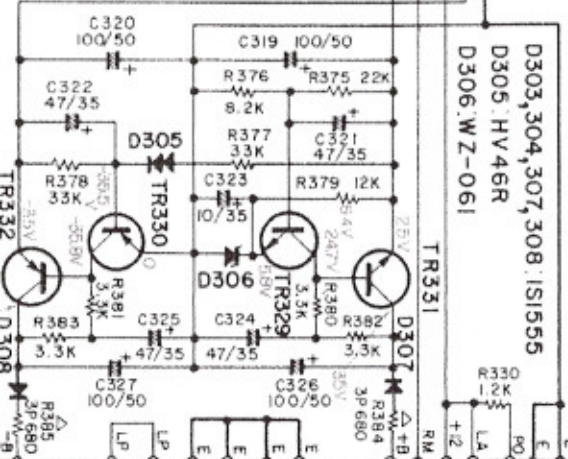
IC301, 302:TA7129AP

D301, 302:HV23GY

D303, 304, 307, 308:1S1555

D305:HV46R

D306:W-Z-061



TR331

D307

R384

R382

R380

R379

R377

R376

C327

C325

C324

C323

C322

LM

RM

LA

PA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

EA

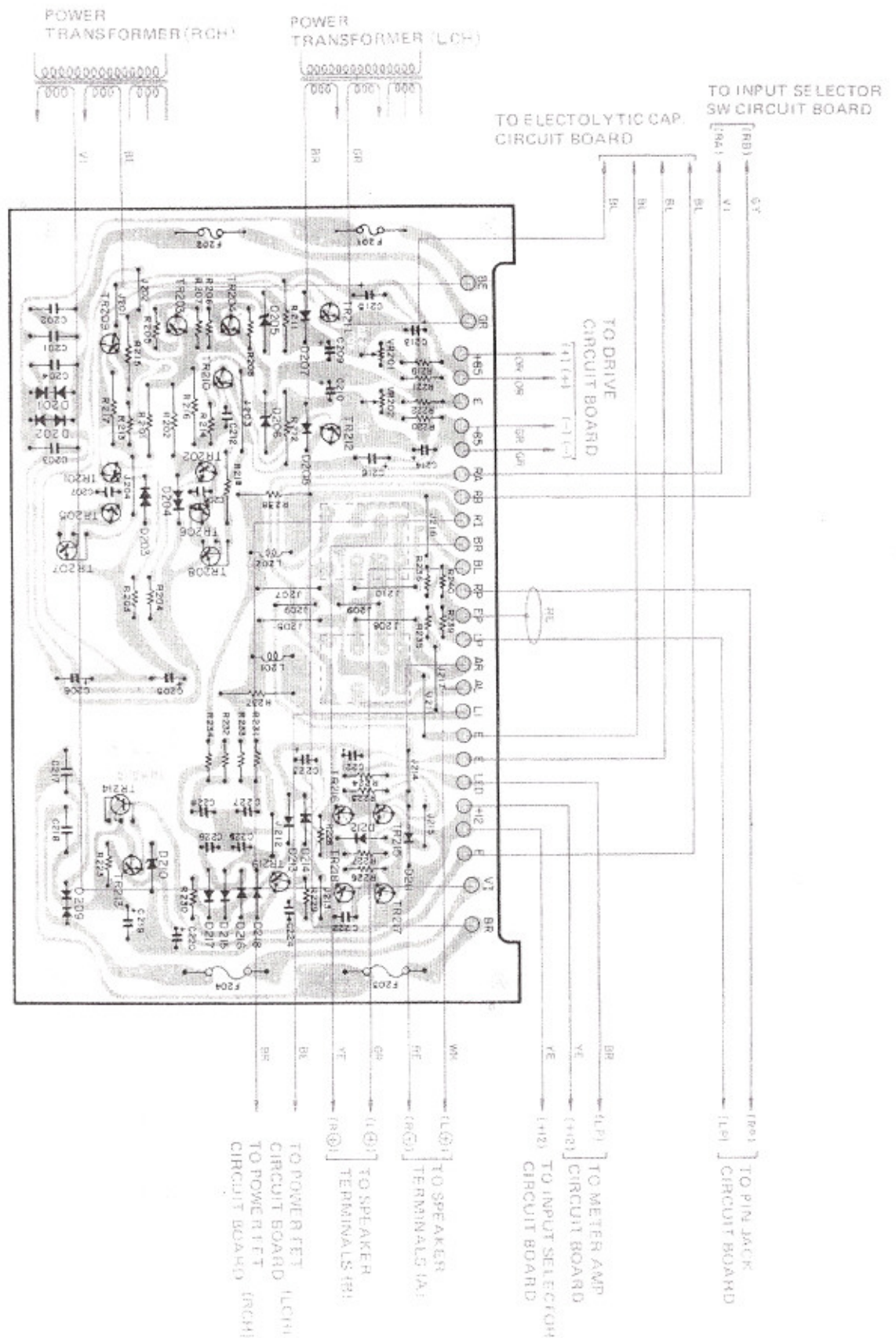
EA

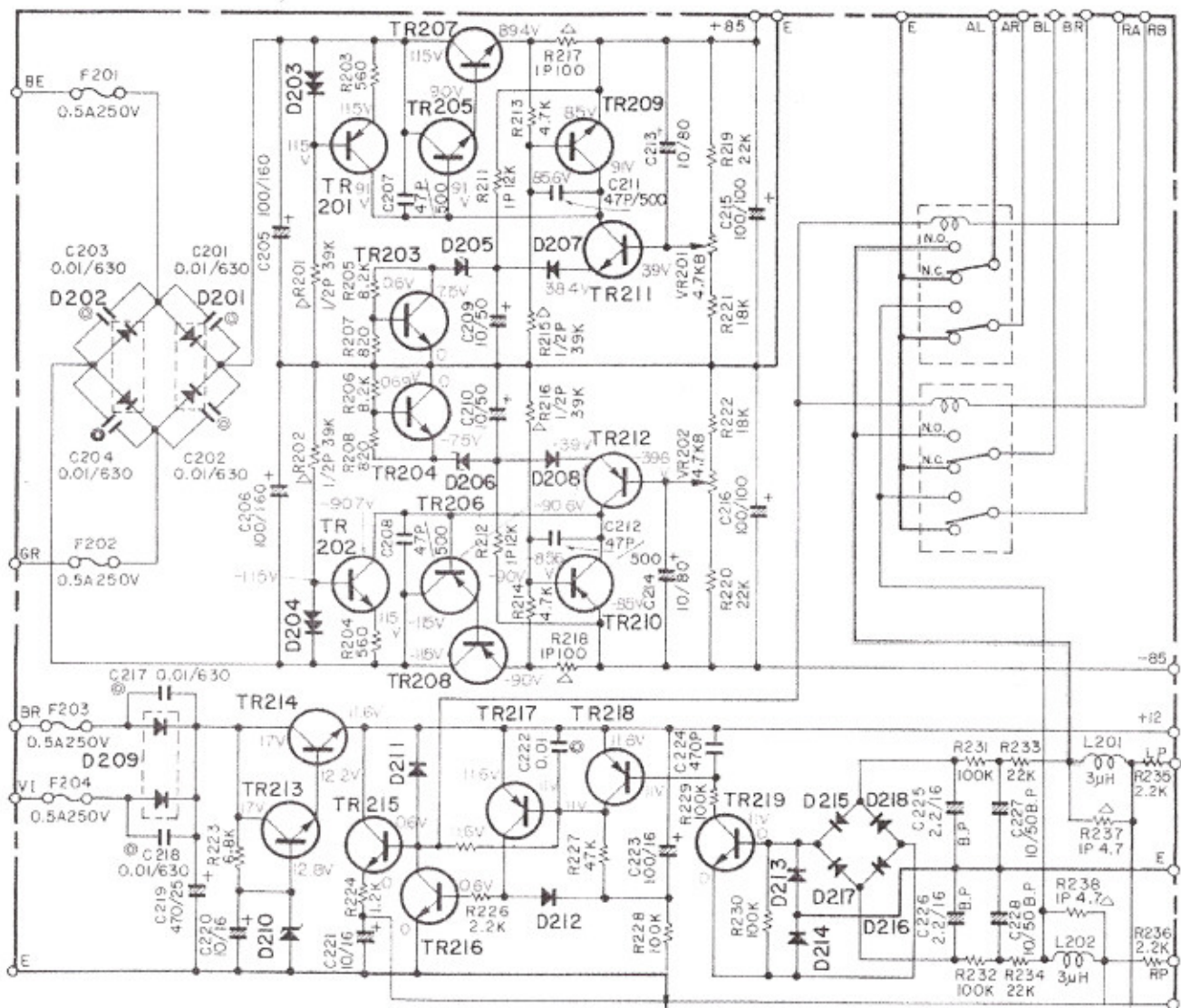
EA

EA

EA

**8. POWER SUPPLY CIRCUIT BOARD NAO6749 :U.S & CANADIAN MODELS NAO6750
:EUROPEAN MODEL**

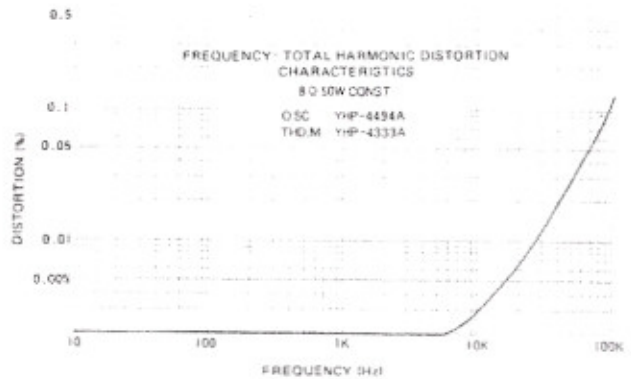
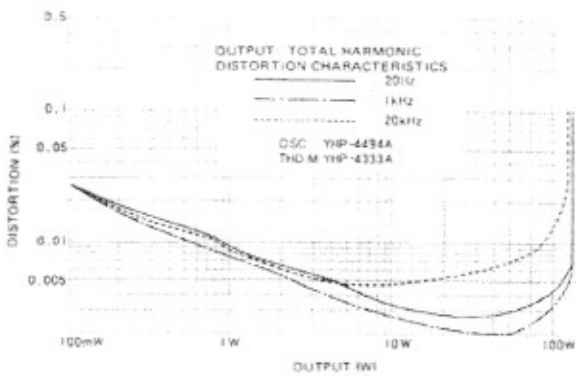
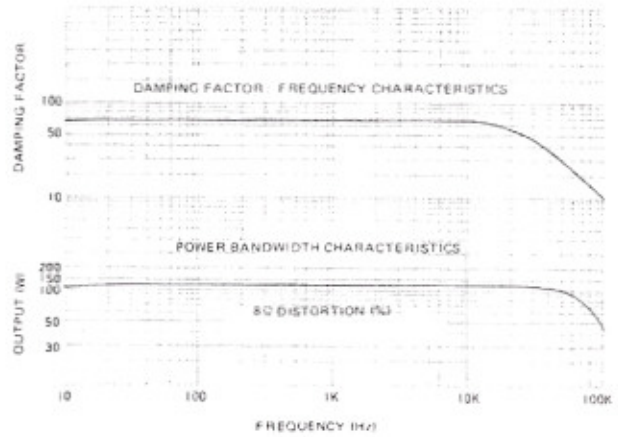
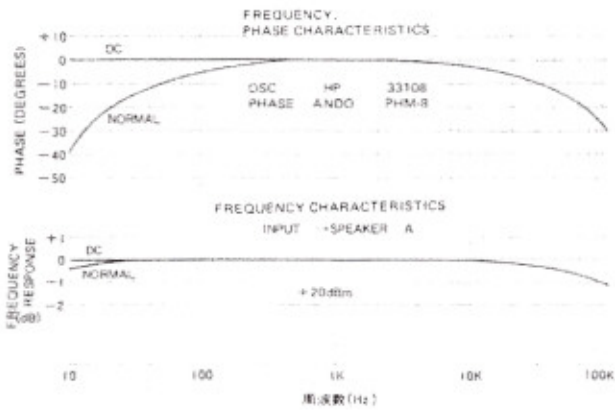


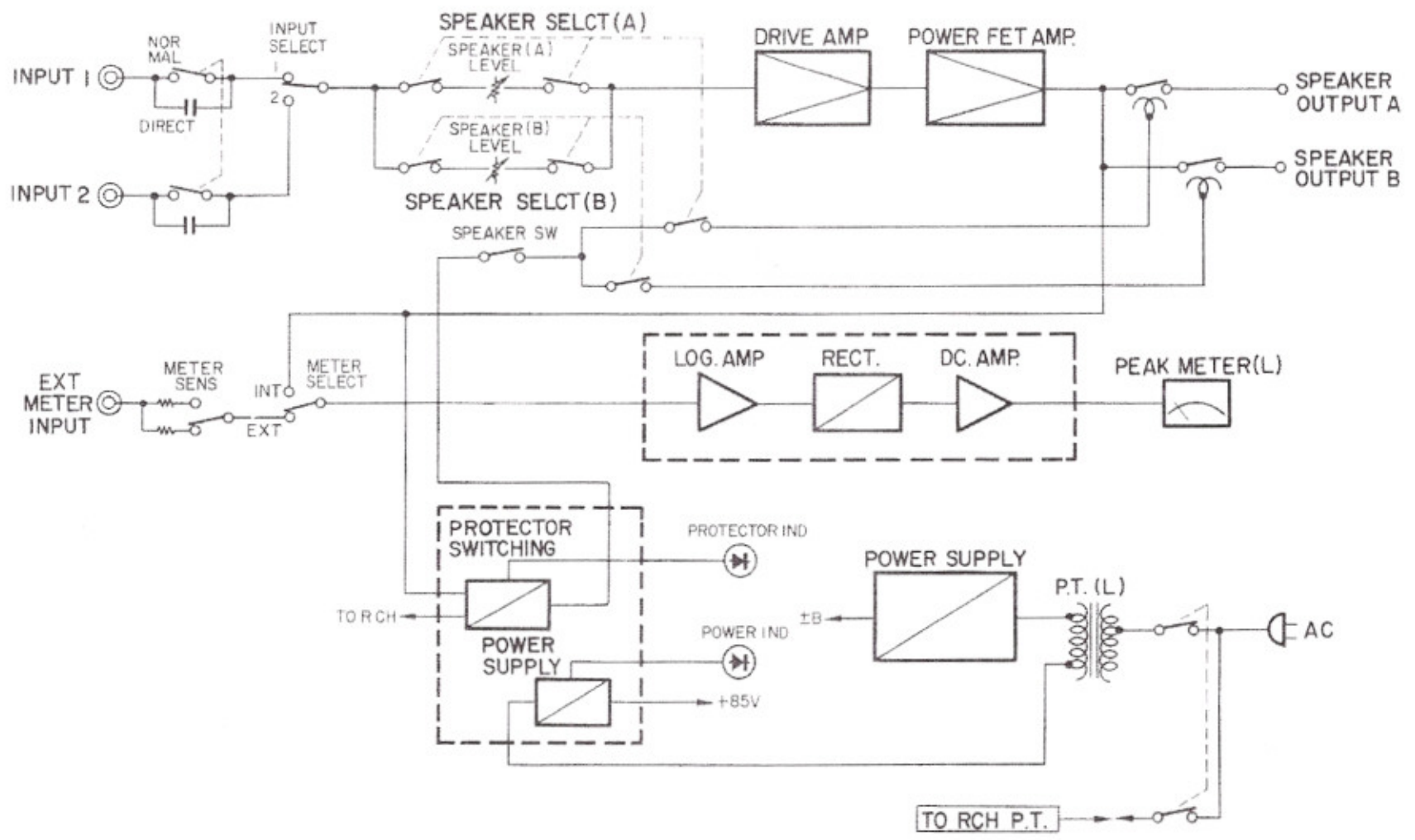


FET AND NEW PARTS SYMBOLS

| | | | | | | | | |
|--|---------------------------|--|--|---------|--|--|---------|--|
| | 2SC177BV 2SC1439B or V | | | 2SC1452 | | | 2SK76 | |
| | 2SA872A 2SA858B or V | | | 2SA810 | | | HV-46R | |
| | 2SK43 | | | 2SJ26 | | | HV-230Y | |

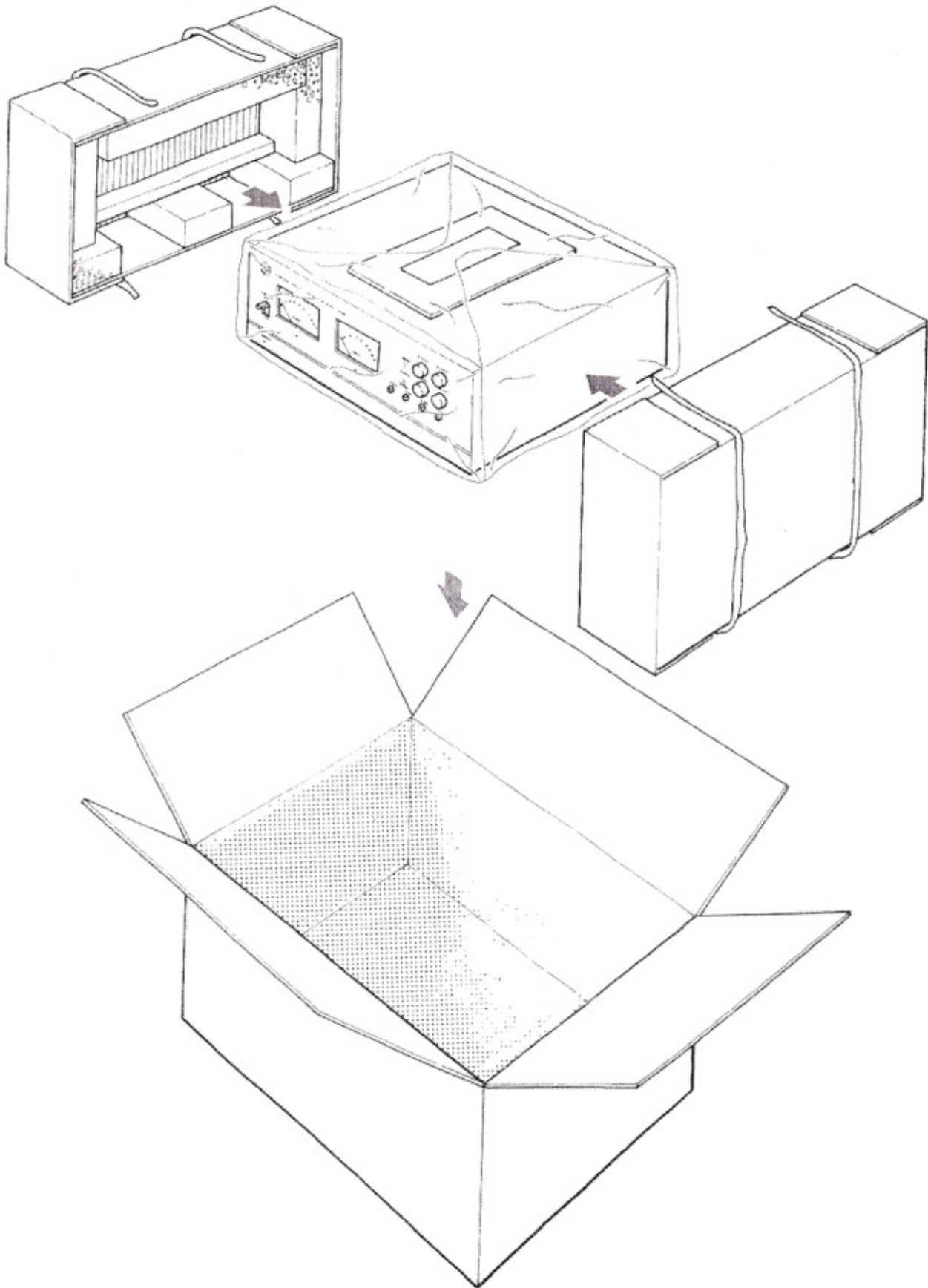
PRINTED SPECIAL CHARACTERISTIC



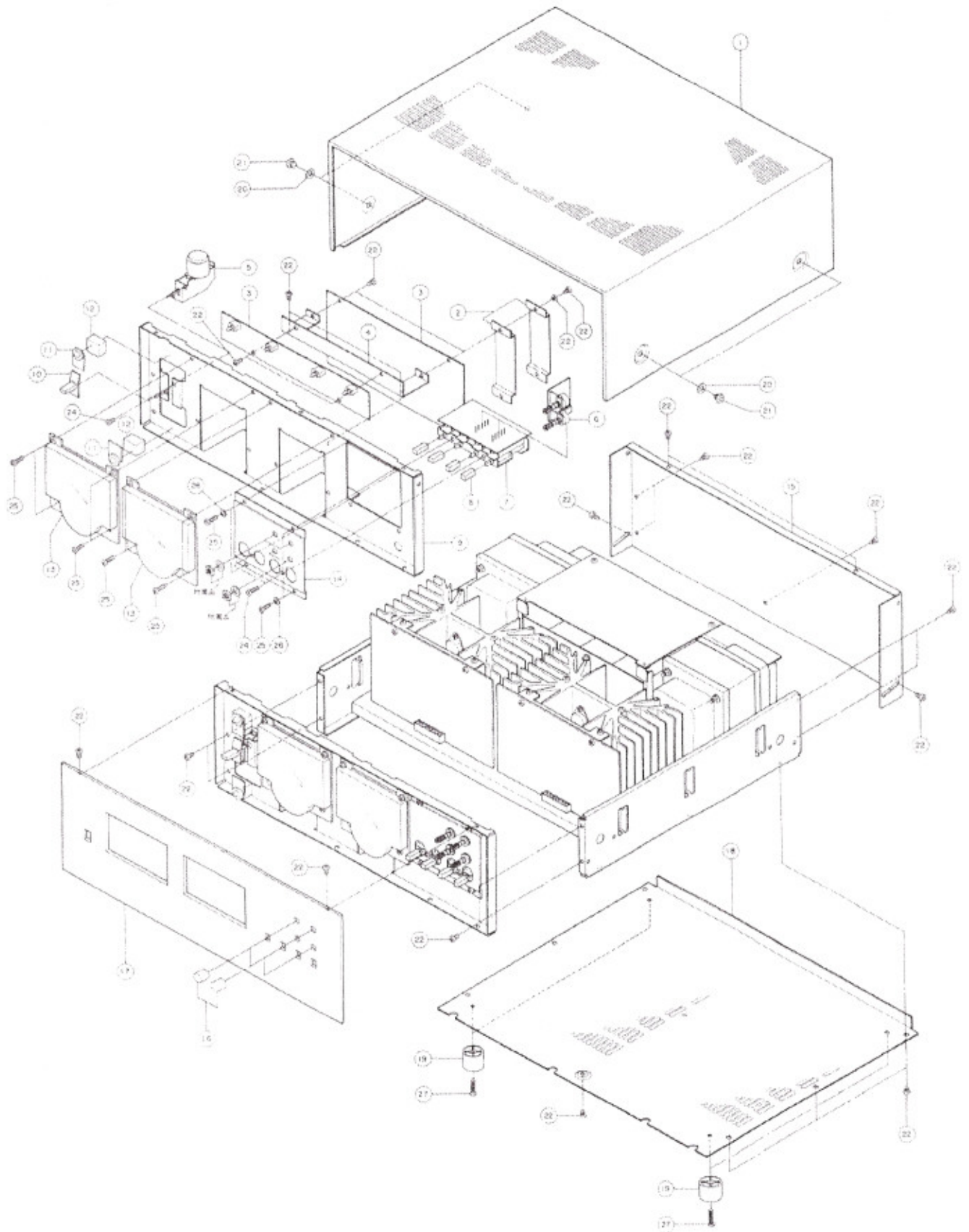


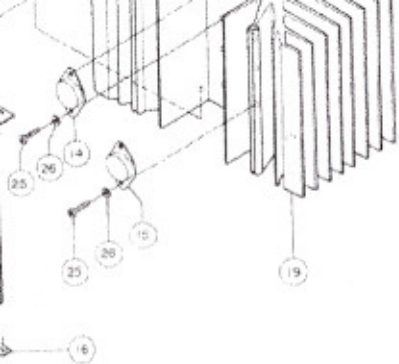
BLOCK DIAGRAM

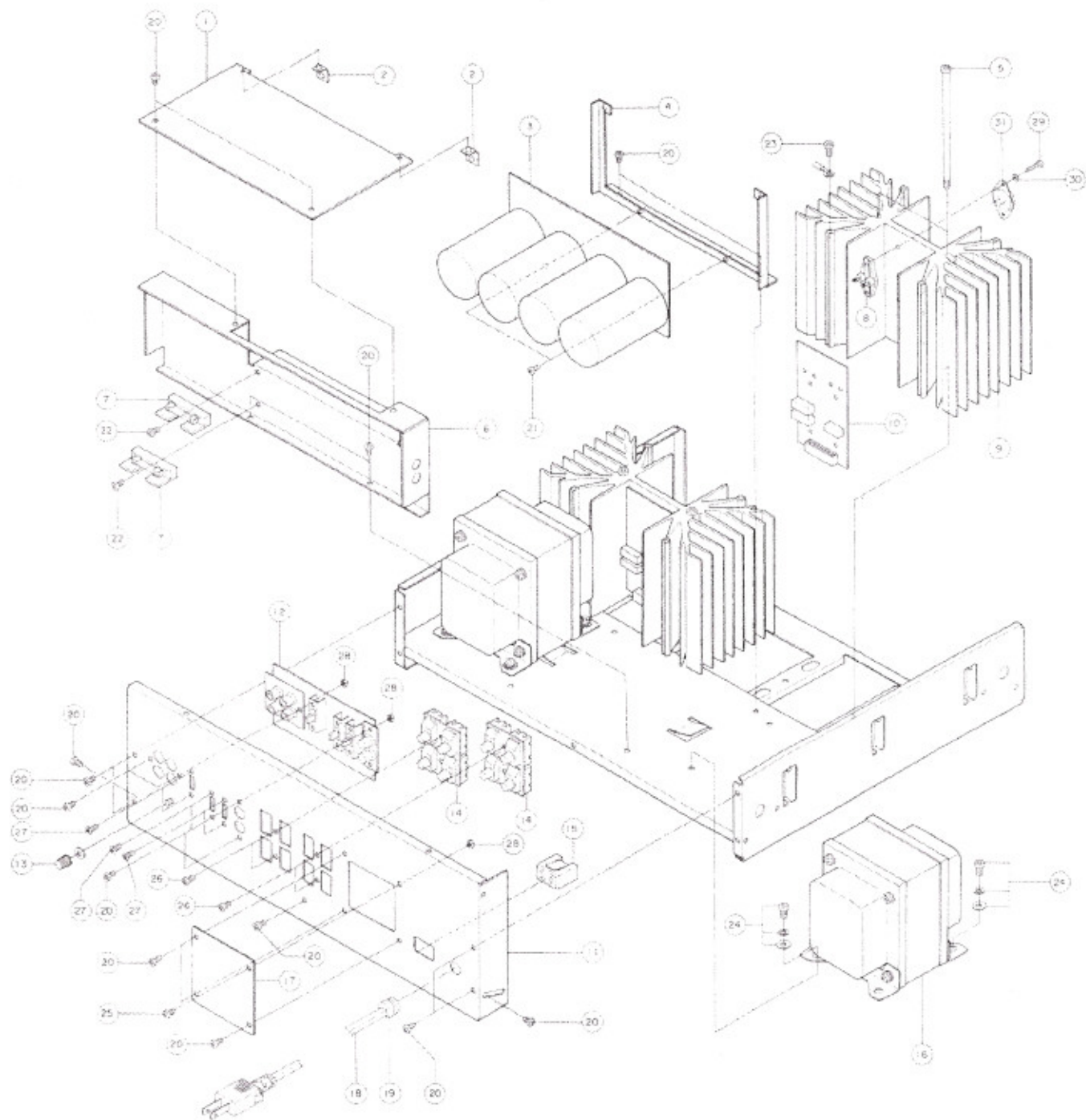
PACKEAGE



PARTS LIST







| Ref. No. | Part No. | Description | Remarks | Common models |
|----------|----------------------|---------------------------------------|-------------------|---------------------------------|
| 1 | 32:00:00:NA:06:74:90 | Power Supply C.B. | 電源シート | General & U.S. models |
| 2 | 32:00:00:NA:06:75:00 | -do.- | 電源シート | European model |
| 2 | 32:00:00:CB:07:56:50 | Hinge Clip #27B | ヒンジクリップ | B-2 |
| 3 | 32:00:00:NA:06:74:80 | Electrolytic Capacitor C.B. | ケミコンシート | B-2 |
| 4 | 32:00:00:AA:06:07:40 | Circuit Board Holder | ケミコンシートホルダー | |
| 5 | 42:00:00:EZ:00:03:20 | Pan Head Screw 5 x 135 FCM3-BL | ナベ小ネジ 5 x 135 | B-2 |
| 6 | 32:00:00:AA:06:07:30 | Shield Cover | シールドカバー | |
| 7 | 42:00:00:LB:20:08:40 | Fuse Holder (Except European model) | ヒューズホルダー I P F H | General, U.S. & Canadian models |
| 7 | 42:00:00:LB:20:09:40 | -do.- | * | European model |
| 8 | 42:00:00:LB:30:02:70 | Transistor Socket | トランジスタソケット | B-1 |
| 9 | 32:00:00:BA:06:74:20 | Heat Sink | メインラジエーター | B-2 |
| 10 | 32:00:00:NA:06:75:20 | Power FET Circuit Board | パワーFETシート | B-2 |
| 11 | 32:00:00:AA:08:06:70 | Rear Panel | リアパネル | U.S. & Canadian models |
| 11 | 32:00:00:AA:08:06:80 | -do.- | * | European & General models |
| 12 | 32:00:00:NA:06:75:60 | Input Pinjack Circuit Board | 入力ピンジャックシート | B-2 |
| 13 | 42:00:00:LA:00:10:70 | Earth Terminal | アース端子ツマミ式 | CA-1000 |
| 14 | 42:00:00:LA:00:14:10 | Speaker Terminal | スピーカー端子4P | |
| 15 | 42:00:00:LB:20:07:10 | AC Socket S16429 Spring-type | ACソケットバネ式 | CA-400 |
| 16 | 42:00:00:GA:60:85:10 | Power Transformer | 電源トランス | U.S. model |
| 16 | 32:00:00:AA:60:85:20 | -do.- | * | General & European models |
| 16 | 32:00:00:GA:60:85:40 | -do.- | * | Canadian model |
| 17 | 32:00:00:AA:06:07:40 | Fuse Cover | ヒューズカバー | B-2 |
| 18 | 42:00:00:MG:00:03:50 | Power Cable | 電源コード | General & U.S. models |
| 18 | 42:00:00:MG:00:04:50 | -do.- | * | European model |
| | 42:00:00:MZ:06:78:40 | -do.- | * | B.S model |
| 19 | 42:00:00:CB:07:26:90 | Cord Stopper | コードストッパー | European & General models |
| 19 | 42:00:00:CB:06:86:30 | -do.- | * | U.S. model |
| 20 | 42:00:00:ED:33:00:60 | Binding Head Screw 3 x 6 FCM3-BL | バインド小ネジ M3 x 6 | |
| 21 | 42:00:00:EJ:33:00:80 | Binding Tapping Screw 3.0 x 8 ZMC2-BL | バインドタッピング 3 x 8 | |
| 22 | 42:00:00:EJ:33:01:00 | Pan Tapping Screw 3 x 10 FCM3-BL | ナベタッピング 3 x 10 | |
| 23 | 42:00:00:ED:34:00:80 | Binding Screw 4 x 8 CR | バインド小ネジ 4 x 8 | |
| 24 | 42:00:00:EH:35:01:00 | Double Sems Screw 4 x 16 ZMC3-BL | ナベ類ダブルカムネジ 5 x 10 | |
| 25 | 42:00:00:ED:33:01:60 | Binding Head Screw 3 x 16 FCM3-BL | バインド小ネジ 3 x 16 | |
| 26 | 42:00:00:ED:33:00:80 | Binding Screw 3 x 8 ZMC2-BL | バインド小ネジ 3 x 8 | |
| 27 | 42:00:00:EC:32:00:40 | Truss Head Screw 2.6 x 4 FCM3-BL | トラス頭ネジ 2.6 x 4 | |
| 28 | 42:00:00:EV:10:03:00 | Hexagonal Nut 3.0 ZMC2Y | 六角ナット M3 | |
| 29 | 42:00:00:EA:13:01:60 | Pan Head Screw | ナベ小ネジ 3 x 16 | |
| 30 | 42:00:00:EV:30:13:00 | Spring Washer 3mm FNM3-3G | スプリングワッシャー 3mm | |
| 31 | 32:00:00:IE:30:04:00 | FET 2SK76 | パワーFET 2SK-76 | |
| 32 | 32:00:00:IE:40:02:00 | FET 2SJ26 | パワーFET 2SJ-26 | |

| Ref. No. | Part No. | Description | Remarks | Common models |
|----------|----------------------|--|----------------------|------------------------|
| | 32:00:00:NA:06:74:70 | Drive Circuit Board | ドライブシート | |
| | 42:00:00:FZ:00:06:80 | Metalized Mylar Cap. 250V 0.1 μ F | メタライズドフィルム 0.1 μ | |
| | 42:00:00:FH:61:03:00 | Ceramic Capacitor 500V 3PF | セラコン 3 P | |
| | 42:00:00:FH:61:06:00 | --do.-- 500V CH6PF | " 6 P | |
| | 42:00:00:FH:61:05:00 | --do.-- 500V CH5PF | " 5 P | |
| | 42:00:00:FM:10:81:00 | Bipolar Electrolytic Cap.6.3V 100 μ F VERT | バイポーラコン100 μ | |
| | 42:00:00:HW:10:44:70 | Fuse Resistor 100MA 47 Ω | ヒューズ抵抗 47 Ω | |
| | 42:00:00:HW:19:53:90 | --do.-- 25MA | " 390 Ω | |
| | 42:00:00:HW:10:42:20 | --do.-- 150MA 22 Ω | ヒューズ抵抗 22 Ω | |
| | 42:00:00:HL:42:61:00 | Metal Oxide Film Resistor 2W 1K Ω | 酸化抵抗 1 K Ω | |
| | 42:00:00:HL:62:61:20 | --do.-- | " 1.2K Ω | |
| | 42:00:00:HU:87:56:80 | Metal Film Resistor RP42A F680 Ω | 金属薄膜抵抗 680 Ω | |
| | 42:00:00:HU:87:63:30 | --do.-- RP42A F3.3K Ω | " 3.3K Ω | |
| | 42:00:00:HU:87:67:50 | --do.-- RP42A F7.5K Ω | " 7.5K Ω | |
| | 42:00:00:HU:87:72:20 | --do.-- RP42A F22K Ω | " 22K Ω | |
| | 42:00:00:HY:00:03:80 | Variable Resistor B2.2K CR29R | メタルグレース V R B 2.2K | |
| | 42:00:00:HY:00:03:50 | --do.-- CR29R B100K | " B100K | |
| | 42:00:00:IA:05:51:20 | Transistor 2SA561 | トランジスター | |
| | 42:00:00:IA:08:58:00 | --do.-- 2SA858 | " | |
| | 42:00:00:IA:08:72:10 | --do.-- 2SA872A | " | |
| | 42:00:00:IA:08:72:20 | --do.-- 2SA872BV | " | |
| | 42:00:00:IA:08:10:00 | --do.-- 2SA810 | " | |
| | 42:00:00:IC:07:34:20 | --do.-- 2SC734 | " | |
| | 42:00:00:IC:14:39:00 | --do.-- 2SC1439 | " | |
| | 42:00:00:IC:14:52:00 | --do.-- 2SC1452BV | " | |
| | 42:00:00:IC:17:75:10 | --do.-- 2SC1775A | " | |
| | 42:00:00:IC:17:75:20 | --do.-- 2SC1775B | " | |
| | 42:00:00:IF:00:00:40 | Diode 1S-1555 | ダイオード 1S-1555 | |
| | 42:00:00:IH:00:02:40 | Diode 1S1885 Servicing 420000IH000060 | " 1S-1885 | |
| | 42:00:00:IF:00:05:40 | Varistor HV23GY | バリスタ HV 23 | |
| | 42:00:00:IF:00:05:30 | --do.-- HV46R | " HV 46 | |
| | 42:00:00:IZ:00:01:00 | FET 2SK43 | 2SK43 ベア | |
| | 42:00:00:LB:60:04:20 | Connector Housing 2145-8A | コネクタ コンハウジング | |
| | 42:00:00:LB:30:03:00 | Connector 5036-A6 | コネクタ コンハウジング | |
| | 32:00:00:BA:06:85:60 | Heat Sink | 放熱器 | |
| | 32:00:00:BB:06:45:50 | Thermo-Coupler | サーモカップラ | |
| | 32:00:00:NA:06:74:80 | Electrolytic Capacitor C.B. | ケミコンシート | Canadian & B.S. models |
| | 42:00:00:IH:00:02:10 | Diode S5151 | ダイオード | |
| | 42:00:00:IH:00:02:20 | --do.-- S5151R | " | |
| | 42:00:00:FZ:00:01:90 | Electrolytic Cap. 63V 18000 μ F LUG | ケミコン 18000 μ | |
| | 42:00:00:FZ:00:05:50 | Mylar Capacitor 630V MMH(M) 0.01 μ F | マイラーコン 0.01 μ | |

| Ref. No. | Part No. | Description | Remarks | Common models |
|----------|----------------------|--|--------------------------------|-----------------------|
| | 32 00 00 NA 06 74 90 | Power Supply C.B. | 電源シート | General & U.S. models |
| | | | | |
| | 42 00 00 FZ 00 06 50 | Mylar Capacitor 630V MMH(M) 0.01 μ F | マイラーコン0.01 μ | |
| | 42 00 00 FH 51 14 70 | Ceramic Capacitor 500V CH47PF | セラコン47P | |
| | 42 00 00 FM 09 62 20 | Bipolar Electrolytic Cap. 16V 2.2 μ F VERT | バイポーラコン2.2 μ | |
| | 42 00 00 FM 11 71 00 | -do.- 50V 10 μ F VERT | - 10 μ | |
| | | | | |
| | 42 00 00 GD 90 00 50 | Air Core Coil 3 μ H | 空芯コイル3 μ H | |
| | | | | |
| | 42 00 00 HL 40 73 90 | Metal Oxide Resistor 1/2W 39K Ω | 酸化抵抗39K Ω | |
| | 42 00 00 HL 41 51 00 | -do.- 1W 100 Ω | - 100 Ω | |
| | 42 00 00 HL 41 71 00 | -do.- 1W 10K | - 12K Ω | |
| | 42 00 00 HY 00 03 70 | Variable Resistor CR19R B4.7K | メタルクレーズ V R B 4.7K Ω | |
| | 42 00 00 HZ 00 02 10 | Fire-Proof Resistor 1P 4.7 Ω | 不燃性抵抗4.7K Ω | |
| | 42 00 00 HV 87 81 00 | Metal Film Resistor RP42A F100K Ω | 金属被膜抵抗100K Ω | |
| | 42 00 00 HV 87 52 70 | -do.- RP42A F27K Ω | - 270K Ω | |
| | | | | |
| | 42 00 00 JA 07 40 00 | Transistor 2SA740 | トランジスター | |
| | 42 00 00 JA 07 63 00 | -do.- 2SA763 | - | |
| | 42 00 00 JA 08 58 00 | -do.- 2SA858 | - | |
| | 42 00 00 JC 04 58 80 | -do.- 2SC458 | - | |
| | 42 00 00 JC 07 34 20 | -do.- 2SC734 | - | |
| | 42 00 00 JC 07 89 10 | -do.- 2SC789 (LB, O, Y) | - | |
| | 42 00 00 JC 11 68 10 | -do.- 2SC1166 (GRY, O) | - | |
| | 42 00 00 JC 14 39 00 | -do.- 2SC1439 | - | |
| | 42 00 00 JC 14 48 00 | -do.- 2SC1448 | - | |
| | 42 00 00 JF 00 00 40 | Diode 1S1555 | ダイオード | |
| | 42 00 00 JH 00 00 80 | -do.- 10DC-1 | - | |
| | 42 00 00 JH 00 01 40 | -do.- 10DC-4 | - | |
| | 42 00 00 JH 00 01 50 | -do.- 10DC-4R | - | |
| | 42 00 00 JH 00 02 40 | -do.- 1S1885 Servicing 420000IH000060 | - | |
| | 42 00 00 JF 00 05 30 | Varistor HV46R | バリスタ | |
| | 42 00 00 JF 00 03 50 | Zener Diode WZ-130 | シェナーダイオード | |
| | 42 00 00 JF 00 06 00 | -do.- BQB01-30 | - | |
| | | | | |
| | 42 00 00 LB 20 05 70 | Fuse Holder Pin SN5053 KA6065 | ヒューズホルダーピン | |
| | | | | |
| | 42 00 00 KC 00 02 70 | Relay LY-2-0-05 | リレーLY-2-0-05 | YP-1000 |
| | | | | |
| | 32 00 00 BA 06 47 40 | Heat Sink | 放熱板 | B-2 |
| | | | | |
| | | | | |
| | 32 00 48 NA 06 75 10 | Meter Lamp Circuit Board | メーター& ランプシート | |
| | | | | |
| | 42 00 00 FP 15 66 80 | Tantalum Capacitor 35V 6.8 μ F | メタルコンデンサ 6.8 μ | |
| | | | | |
| | 42 00 00 HL 43 56 80 | Metal Oxide Film Resistor 3W 680 Ω | 酸化抵抗680 Ω | |

| Ref. No. | Part No. | Description | Remarks | Common models |
|----------|-------------|----------------------------------|--------------------------|---------------|
| 42:00:00 | HY:00:03:80 | Variable Resistor B2.2K CR29R | メタルグレース V R B 2.2KΩ | |
| 42:00:00 | HY:00:03:60 | -do.- CR29R B10K | ~ B10KΩ | |
| 42:00:00 | HY:00:03:50 | -do.- CR29R B100K | ~ B100KΩ | |
| 42:00:00 | CA:05:61:20 | Transistor 2SA561 | トランジスター | |
| 42:00:00 | IA:05:71:90 | 2SA671 Servicing 420000IA048910 | ~ | |
| 42:00:00 | IA:07:63:00 | Transistor 2SA763 | ~ | |
| 42:00:00 | IC:04:58:80 | -do.- 2SC458 | ~ | |
| 42:00:00 | IC:07:34:20 | -do.- 2SC734 | ~ | |
| 42:00:00 | IC:10:51:80 | 2SC1061 Servicing 420000IC078910 | ~ | |
| 42:00:00 | IC:13:45:40 | Transistor 2SC 1345 (D, E) | ~ | CA-1000 |
| 42:00:00 | IF:00:00:40 | Diode 1S1555 | ダイオード1S-1555 | CR-1000 |
| 42:00:00 | IF:00:03:20 | Zener Diode WZ-061 | ツェナーダイオード W Z - 0 6 1 | |
| 42:00:00 | IF:00:05:40 | Varistor HV23GY | バイスターHV23 | |
| 42:00:00 | IF:00:05:30 | -do.- HV46R | ~ HV46 | |
| 42:00:00 | IG:00:09:70 | IC TA7129P | T A 7 1 2 9 A P | |
| 32:00:00 | NA:06:75:20 | Power Fet Circuit Board 8-2 | パワーFETシート | |
| 42:00:00 | HM:55:22:20 | Cement Holder Resistor 5W 0.22Ω | セメント抵抗0.2Ω | |
| 42:00:00 | HM:55:41:00 | -do.- 5W 10Ω | ~ 10Ω | |
| 42:00:00 | LB:60:04:20 | Connector Housing 2145-8A | コネクタ コンハウジング | |
| 32:00:00 | NA:06:75:30 | Connector Circuit Board | コネクタシート | |
| 42:00:00 | LB:60:04:10 | Connector Wafer | コネクタコンウェハー | |
| 32:00:00 | NA:06:75:40 | Volume Circuit Board | V R シート | |
| 42:00:00 | HS:11:01:40 | Variable Resistor B25K 16mm | V R 16φ B2.5KΩ | |
| 42:00:00 | LB:50:01:30 | Connector Socket SD5119-5A5MM | ミニチュア コネクタソケット | |
| 32:00:00 | NA:06:75:50 | Selector Circuit Board | セレクターシート | |
| 42:00:00 | KA:70:08:30 | 4 Multi Push Switch SPU046A11 | 4 連プッシュSW | |

SINCE 1887



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