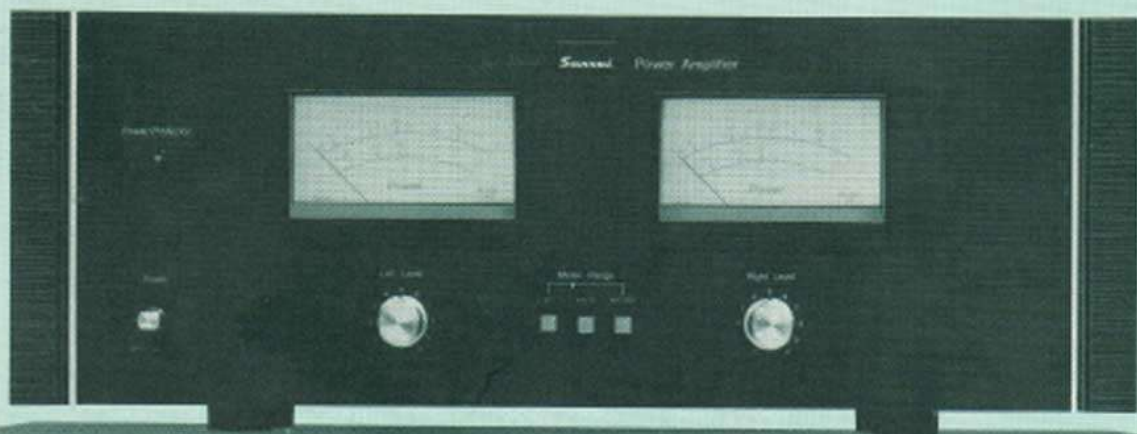


SERVICE MANUAL

POWER AMPLIFIER

SANSUI BA-2000



Sansui

SANSUI ELECTRIC CO., LTD.

1. SPECIFICATIONS

POWER OUTPUT

Min. RMS, both channels driven, from 10 to 20,000Hz, with no more than 0.03% total harmonic distortion.

110 watts per channel into 8 ohms

Min. RMS, both channels driven, at 1,000Hz, with no more than 0.03% total harmonic distortion in stereo operation.
115 watts per channel into 8 ohms

LOAD IMPEDANCE 8 ohms

POWER BANDWIDTH 10 to 20,000Hz at or below rated min. RMS power output and total harmonic distortion

TOTAL HARMONIC DISTORTION
..... less than 0.03% at or below rated min. RMS power output

INTERMODULATION DISTORTION
(70Hz:7,000Hz=4:1 SMPTE method)
..... less than 0.03%

FREQUENCY RESPONSE (at 1 watt)
..... 5Hz to 100kHz ± 1 dB

DAMPING FACTOR approximately 70 at 8 ohms load

CHANNEL SEPARATION (at rated output, 1kHz)
..... better than 75dB

HUM AND NOISE (IHF) better than 115dB

INPUT SENSITIVITY AND IMPEDANCE
(1kHz, for rated power output)
..... 1,000mV 50k Ω

GENERAL

POWER VOLTAGE 100, 120, 220, 240V 50/60Hz (U.S.A & Canada) 120V (Usable 110-130V) 60Hz

POWER CONSUMPTION .. 910 watts (max.)
480 watts 595VA (rated)

DIMENSIONS 460 mm (18-1/8") W
160 mm (6-5/16") H
375 mm (14-13/16") D

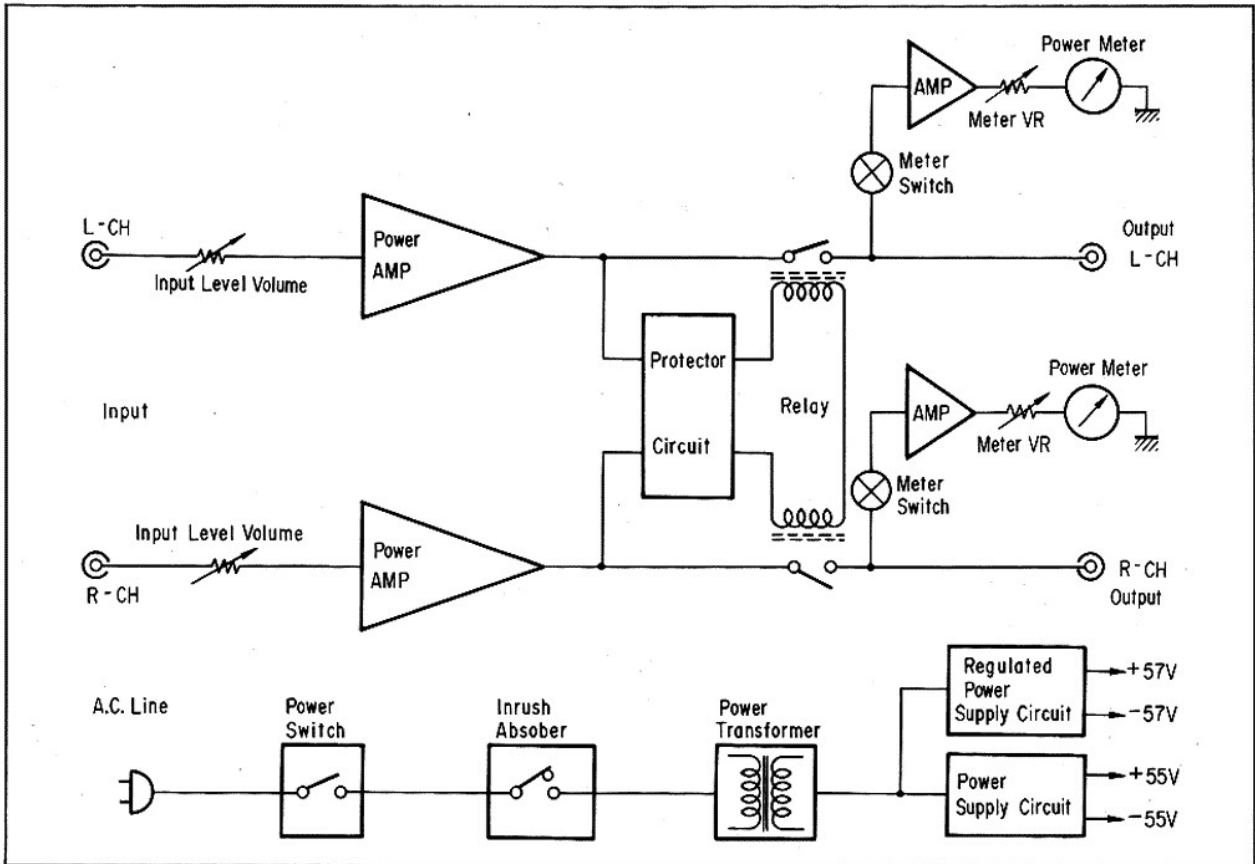
WEIGHT 18.3 kg (40.3 lbs) net
20.8 kg (45.0 lbs) packed

* Design and specifications subject to change without notice for improvements.

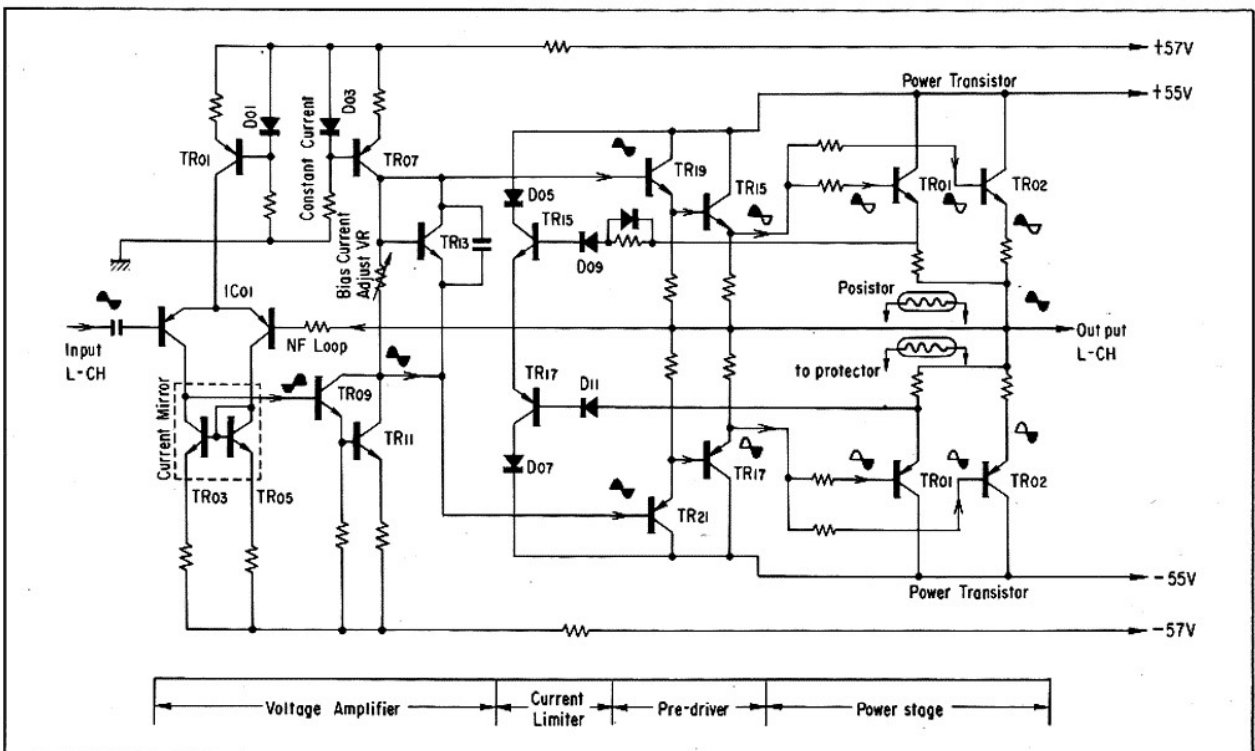
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2. BLOCK DIAGRAM



3. OPERATING DIAGRAM



4. OPERATION OF NEW CIRCUIT

4-1. Current Mirror Circuit

◇ Purpose of use in # BA-2000

By adding current mirror section to balanced-type signal amplifier as Fig., the current mirror circuit is effective to improve signal to noise ratio, distortion factor and direct current stability.

◇ Advantages

1. By operation of differential amplification in this driver stage, the current mirror circuit is efficient to reduce the influence of the power line voltage deviation and *Common Mode Rejection Ratio (C.M.R.R.).
* C.M.R.R. = $\frac{\text{Differential Gain}}{\text{Common Mode Gain}}$
2. By basic functions of push-pull amplifier in this circuit, lower distortion factor is obtained.
3. Since the output impedance of this circuit can be kept extremely high, considerable high gain is obtained.

◇ Operation

This Current Mirror Circuit is composed of two transistors, TR03 & TR05 as the current mirror section and a IC01 as the balanced-typed signal amplifier as shown in Fig. The transistor, TR03, and transistor A of first stage built in the IC operate as a push-pull amplifier.

◇ Phase Characteristics

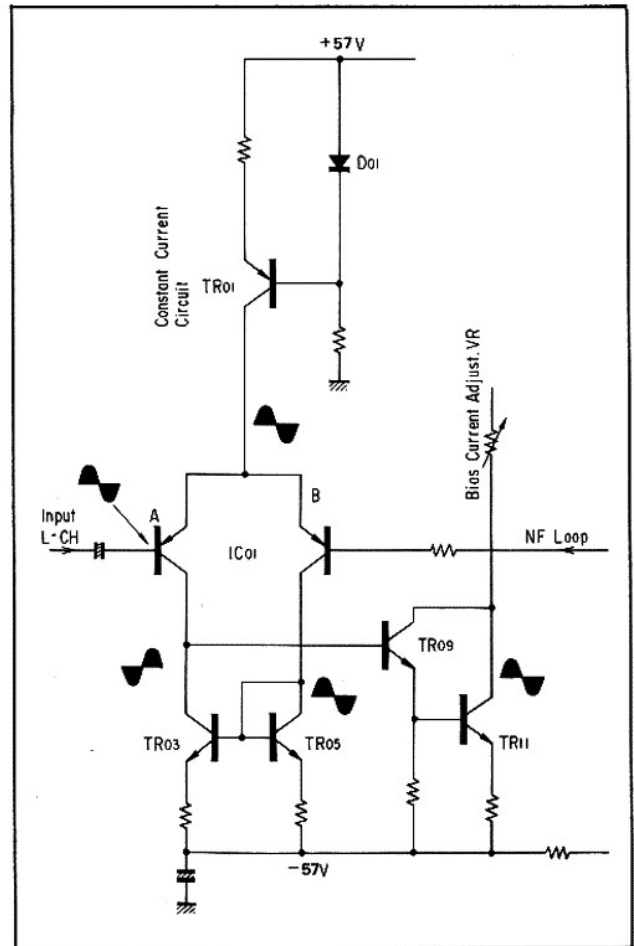
When input signal shown in Fig. is supplied to the base of the transistor A in the IC,

1. Out-of phase signal against the input signal appears at the collector of transistor A.
2. In-phase output signal against the input one appears at the emitter of transistor A.
3. Since the base of transistor B built in the IC is grounded in AC equivalent circuit, transistor B operates as the function of common -base circuit; therefore, the signal at collector of transistor B is in-phase signal against signal appeared at emitter of transistor B.
4. The signal appeared at collector of transistor B is given to the base of TR03. The signal appeared at collector of TR03 is out-of phase to the signal at collector of transistor B and is in-phase signal at collector of transistor A.

Thus, the combination of transistor A and TR03 is used as operation of push-pull amplifier.

◇ Open Loop Gain

The open loop gain of conventional differential amplifier itself is approximately 30dB to 35dB in normal operation; furthermore, by adding the current mirror circuit in series to conventional differential amplifier, it is possible to obtain high open loop gain, approximately 70db to 80dB. Consequently, the gain 40db to 50dB, is able to add to negative feedback loop by using the current mirror circuit in order to improve distortion factors.



5. ADJUSTMENTS

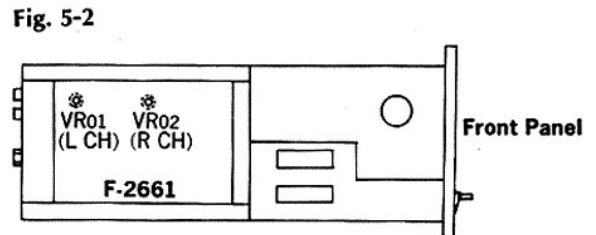
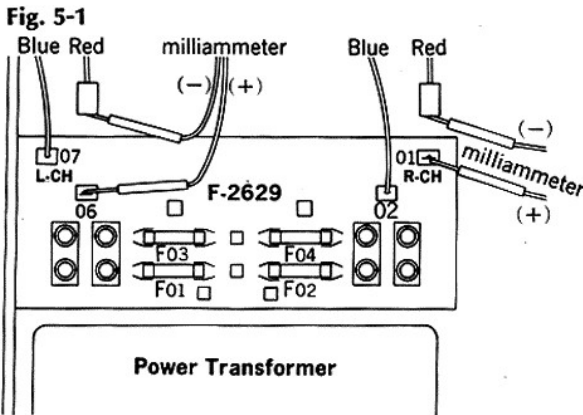
5-1. Bias Current Adjustment (See Fig. 5-1, 5-2)

Condition:

- | | |
|--|--|
| 1. Room Temperature18°C~28°C (65°F~83°F) | minimum (counterclockwise) |
| 2. Output Load (Speaker) 8 ohms | 5. Level Volume Maximum |
| 3. A.C. Supply Voltage Rated Voltage $\pm 2\%$ | 6. For this adjustment, run this unit for more than 3 minutes after turning on the power switch. |
| 4. Turn down the volumes, VR01, VR02 on F-2661 till | |

| STEP | SUBJECTS | AUDIO OSCILLATOR | | OUTPUT TERMINAL | ADJUST | ADJUST FOR | REMARKS |
|------|--|---|-----------------------------|--|---|--|--|
| | | OUTPUT | CONNECTING POINT | | | | |
| 1 | Distortion factors & Switching distortion adjustment | At 40kHz, Set the amplifier-output to 15V on both Channels by adjusting O.S.C. output level | Input terminal of amplifier | Speaker terminal 8Ω Osilloscope Distortion Meter VTVM | VR01 (L-CH) VR02 (R-CH) on F-2661 | Minimum point of Distortion factors & Switching distortion | To avoid temperature rise, complete the adjustment in a short time |
| 2 | Bias Current confirmation (no input signal) | | | D.C. Milliammeter | VR01 (L-CH) VR02 (R-CH) on F-2661 | Confirm bias current to be within 100mA | Only being it over 100mA, Set it to 100mA |

Note: After proceeding with Step 1, have a cooling off period, 5 to 10 minutes, to confirm the bias current.
In case of not having a distortion meter, complete the adjustment by Step 2 to obtain bias current 100mA.

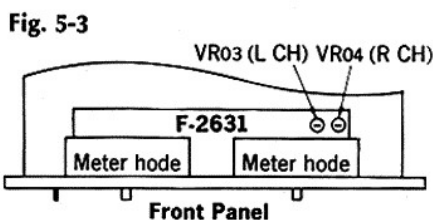


5-2. Power Meter Adjustments (See Fig. 5-3)

Condition:

- Level Volume Maximum
- For this adjustment, run the unit for more than 2 minutes after turning on the power switch.

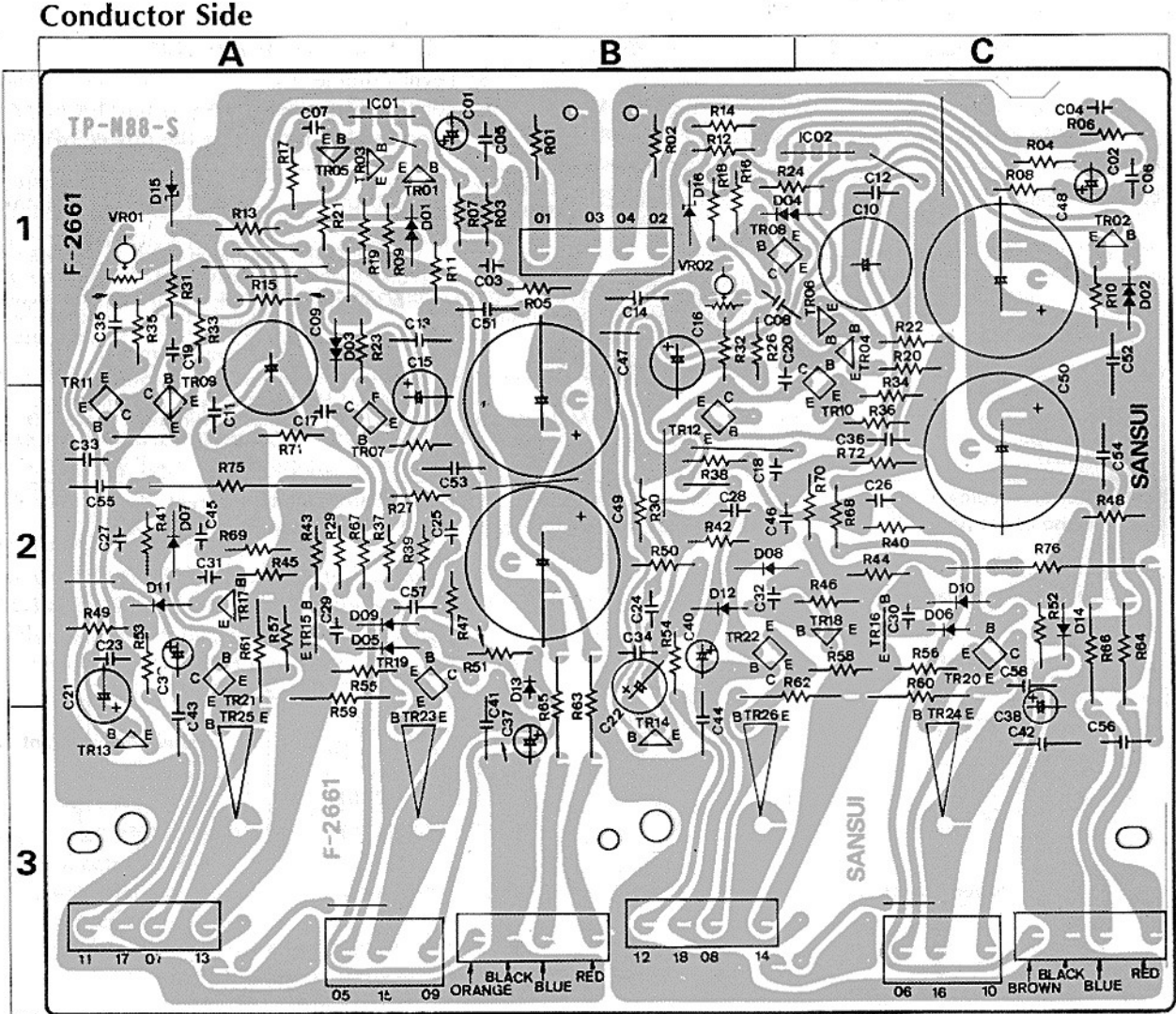
| AUDIO OSCILLATOR | | OUTPUT TERMINAL | ADJUST | ADJUST FOR |
|--|-----------------------------|---|---|---|
| OUTPUT | CONNECTING POINT | | | |
| At 1kHz Sine wave, set the amplifier-output to 29.7V on both channels by adjusting O.S.C.-output level | Input terminal of Amplifier | Speaker terminal 8Ω VTVM Oscilloscope | VR03 (L-CH) VR04 (R-CH) on F-2631 | Set the pointer of power meter to 0dB (110W) on both channels |



6. PARTS LISTS & PARTS LOCATION

6-1. F-2661 Driver Circuit Board (Stock No. 7571501)

Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the common parts list for capacitors & resistors which was appended previously to each Sansui Manual.



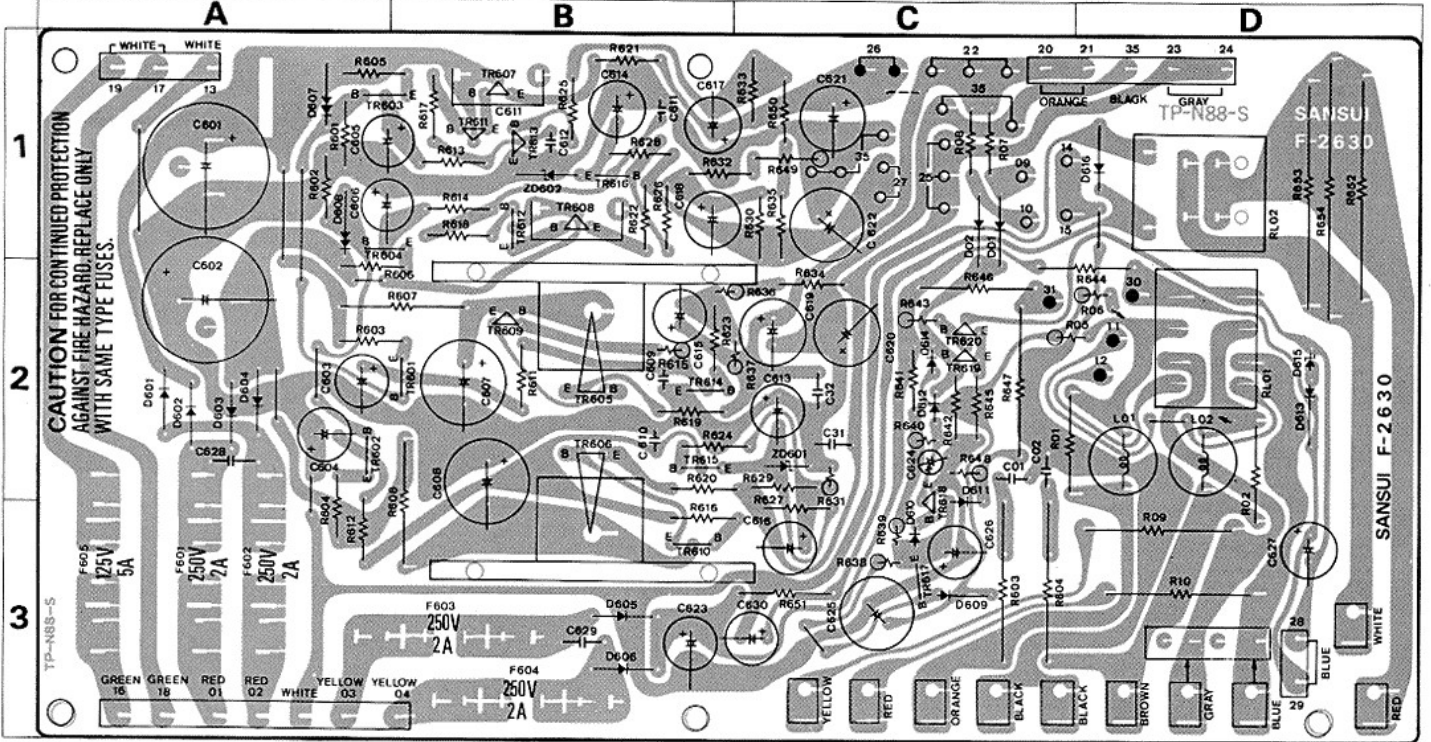
Parts List

| Parts No. | Stock No. | Description | Position |
|-----------|----------------------|-------------------------|-----------|
| TR01, 02 | 0300680, 1 | 2SA733 (2) (P, Q) | 1A.B, 1C |
| TR03, 04 | 0306260, 1 | 2SC1628 (O, Y) | 1A, 1C |
| TR05, 06 | 0300700, 1 | 2SA818 (O, Y) | 1A, 1C |
| TR07, 08 | 0306401, 2 | 2SC1904 (B, V) | 2A, 1B |
| TR09, 10 | 0305640, 1 | 2SC735 (O, Y) | 2A, 1, 2C |
| TR11, 12 | 0300220, 1 | 2SA562 (O, Y) | 2A, 2B |
| TR13, 14 | 0306260, 1 | 2SC1628 (O, Y) | 3A, 3B |
| TR15, 16 | 0300700, 1 | 2SA818 (O, Y) | 2C, 2C |
| TR17, 18 | 0308441, 2 | 2SD382 (M, L) | 2A, 2C |
| TR19, 20 | 0303271, 2 | 2S8537 (M, L) | 2A, 2C |
| IC01, 02 | 0360370, 1 | 2SA798 (F, G) IC | 1A, 1C |
| D01, 02 | {0311160 0311180} | 1S2473D 1S1588 Diode | 1A, 1C |
| D03, 04 | 0340120 | VD1212 Varistor | 1A, 1B, C |
| D05, 06 | {0311160 0311180} | 1S2473D 1S1588 Diode | 2A, 2C |

| Parts No. | Stock No. | Description | Position |
|-----------|----------------------|-------------------------|-----------|
| D07, 08 | {0311160 0311180} | 1S2473D 1S1588 Diode | 2A, 2B |
| D09, 10 | {0311160 0311180} | 1S2473D 1S1588 Diode | 2A, 2B |
| D11, 12 | {0211160 0311180} | 1S2473D 1S1588 Diode | 2A, 2B |
| D13, 14 | 0340120 | VD1212 Varistor | 3A, 3B |
| C11, 12 | 0661250 | 25pF 50V C.C. | 2A, 1C |
| C47-50 | 0549301 | 470µF 80V E.C. | 1, 2B, C |
| R55, 56 | 0103560 | 56Ω | 2A, 2C |
| R57, 58 | 0103560 | 56Ω | 2A, 2C |
| R59, 60 | 0103221 | 220Ω | 2A, 2C |
| R61, 62 | 0103221 | 220Ω | 2A, 2B, C |
| VR01, 02 | 1035290 | 470Ω(B) Volume | 1A, 1B |
| | 2410590 | 4P Pin Ass'y Type D | |
| | 2410680 | 4P Pin Ass'y Type F | |
| | 2410920 | 3P Pin Ass'y Type E | |

6-2. F-2630 Power Supply Circuit Board for Driver Stage (Stock No. 7502091)

Conductor Side

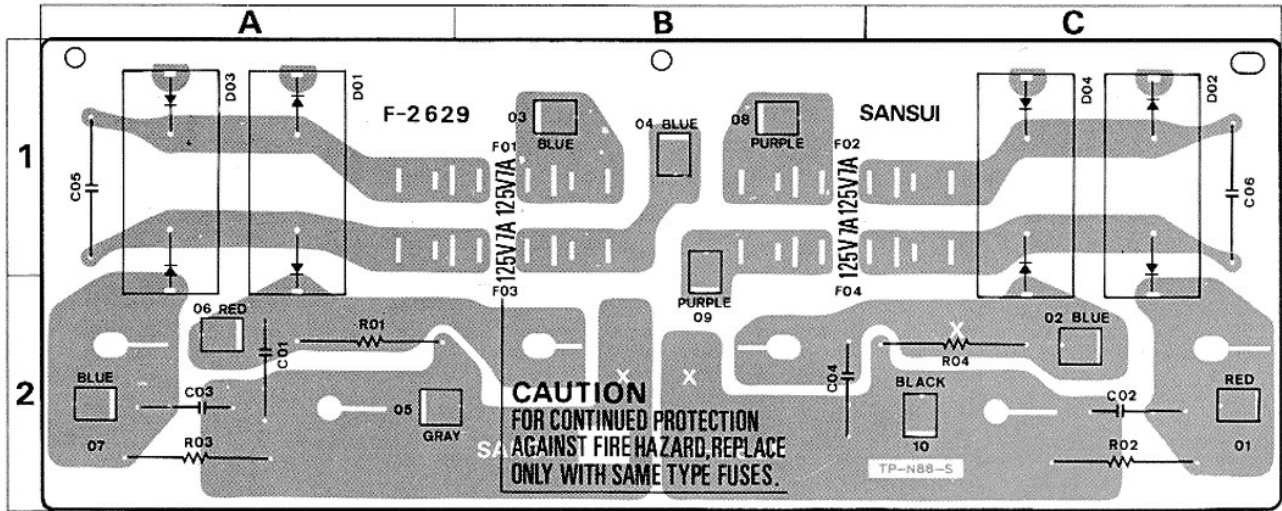


Parts List

| Parts No. | Stock No. | Description | Position | Parts No. | Stock No. | Description | Position | | |
|-----------|----------------------------|--------------------------------|------------|-------------------|----------------------|---------------------|-------------|-------------|--------------------------------|
| TR603 | 0300720, 1 | 2SA850 (C, D) | 1 A, B | D612 | {0311160 0311180} | 1S2473D 1S1588 | 2 C | | |
| TR604 | 0306280, 1 | 2SC1735 (C, D) | | 1 A, B | D613 | 0310340 | | 10D1 | 2 D |
| TR607 | {0308450, 1 0308611, 2} | 2SD356 (C, D) 2SD357 (D, E) | 1 B | D614 | {0311160 0311180} | 1S2473D 1S1588 | Diode | 2 C | |
| | TR608 | {0303280, 1 0303441, 2} | | | | | | | 2SB526 (C, D) 2SB527 (D, E) |
| TR611 | 0306280, 1 | 2SC1735 (C, D) | Transistor | D616 | 0310340 | 10D1 | 1 D | | |
| TR612 | 0300720, 1 | 2SA850 (C, D) | | 1 B | ZD602 | 0316310 | RD-13E (B) | Zener Diode | 1 B |
| TR613 | 0306290, 1 | 2SC1400 (E, U) | | 1 B | C601 | 0549301 | 470µF | 80V E.C. | 1 A |
| TR616 | 0300470, 1 | 2SA726 (F, G) | | 1 B | C602 | 0549301 | 470µF | 80V E.C. | 1, 2 A |
| TR617 | 0300511, 2 | 2SA733 (Q, R) | | 3 C | C628 | 0655103 | 10000 pF | 500V C.C. | 2 A |
| TR618 | 0306131, 2 | 2SC1364 (6, 7) | | 2, 3 C | C629 | 0655472 | 4700 pF | 500V C.C. | 3 B |
| TR619 | 0306131, 2 | 2SC1364 (6, 7) | | 2 C | R01, 02 | 0104479 | 4.7Ω | 1 W C.R. | 2 C, 2 D |
| TR620 | 0306131, 2 | 2SC1364 (6, 7) | | 2 C | R03, 04 | 0203100 | 10Ω | 3 W M.R. | 3 C |
| D01, 02 | {0311160 0311180} | 1S2473D 1S1588 | | 1 C | R605, 606 | 0191471 | 10Ω | 1/4 W F.R. | 1 A, 2 A |
| | D601 | 0310350 | | | 10D2 | R621, 622 | 0191100 | 470Ω | 1/4 W F.R. |
| D602 | 0310350 | 10D2 | Diode | R644 | 0211471 | 470Ω | 1 W M.R. | 2 C, D | |
| D603 | 0310350 | 10D2 | | R646 | 0202151 | 150Ω | 2 W M.R. | 2 C | |
| D604 | 0310350 | 10D2 | | R647 | 0183471 | 470Ω | 3 W Ce.R. | 2 C | |
| D605 | 0310340 | 10D1 | | R651 | 0211391 | 390Ω | 1 W M.R. | 3 C | |
| D606 | 0310340 | 10D1 | | R652, 653 | 0137829 | 8.2Ω | 7 W Ce.R. | 1 D | |
| D607 | 0340120 | VD1212 | | Varistor | R655 | 0103182 | 1.8kΩ | 1/2 W C.R. | |
| D608 | 0340120 | VD1212 | 1 A | | L01, 02 | 4210290 | Filter Coil | 2 D | |
| D609 | 0310490 | SV-02 | 3 C | RL01 | 1150310 | Relay | 2 D | | |
| D610 | {0311160 0311180} | 1S2473D 1S1588 | Diode | RL02 | 1150310 | Relay | 1 D | | |
| | D611 | {0311160 0311180} | | 1S2473D 1S1588 | F601-604 | 0432240 | A.C. Fuse | 3 A, B | |
| | | | | F605 | 0432290 | A.C. Fuse | 3 A | | |
| | | | | | 2410590 | 4P Pin Ass'y Tpey D | | | |

6-3. F-2629 Power Supply Circuit Board (Stock No. 7502081)

Conductor Side

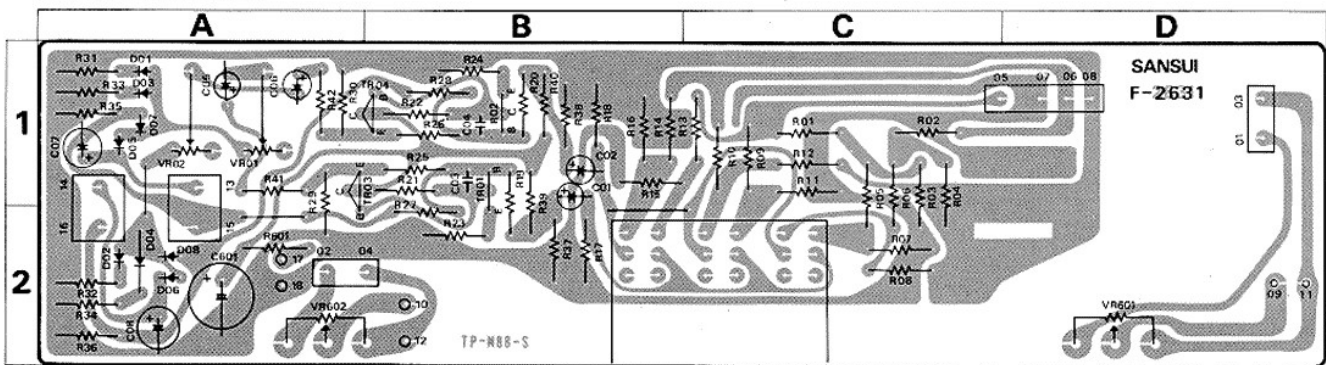


Parts List

| Parts No. | Stock No. | Description | Position | Parts No. | Stock No. | Description | Position |
|-----------|-----------|-------------|----------|-----------|-----------|---------------|------------|
| D01 | {0311310 | SS-5 | 1 A | C01, 02 | 0602109 | 1.0 μ F | 100WV M.C. |
| | {0311540 | S5151 | | | | | |
| D02 | {0311310 | SS-5 | 1 C | C03, 04 | 0602109 | 1.0 μ F | 100WV M.C. |
| | {0311540 | S5151 | | | | | |
| D03 | {0311320 | SS-5R | 1 A | C05, 06 | 0605477 | 0.047 μ F | 250V M.C. |
| | {0311550 | S5151R | | | | | |
| D04 | {0311320 | SS-5R | 1 C | R01, 02 | 0202332 | 3.3k Ω | 2 W I.N.R. |
| | {0311550 | S5151R | | | | | |
| | | | | F01-04 | 0432500 | AC Fuse | 1, 2 B |

6-4. F-2631 Level Volume & Meter Circuit Board (Stock No. 7594521)

Conductor Side

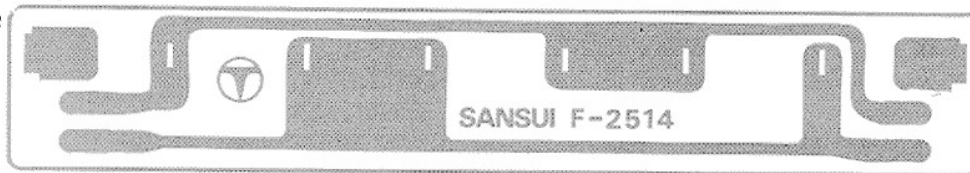


Parts List

| Parts No. | Stock No. | Description | Position | Parts No. | Stock No. | Description | Position |
|-----------|------------|----------------|------------|-----------|-----------|-------------------------|---------------------|
| TR01, 02 | 0306070, 1 | 2SC1313 (F, G) | Transistor | R601 | 0210102 | 1.0k Ω 1/2W M.R. | 2 A |
| TR03, 04 | 0306070, 1 | 2SC1313 (F, G) | | | | | |
| D01, 02 | 0311160 | 1S2473D | Diode | VR01, 02 | 1000330 | 100k Ω (B) | Volume |
| D03, 04 | 0311160 | 1S2473D | | | | | |
| D05, 06 | 0311160 | 1S2473D | | | | | |
| D07, 08 | 0311160 | 1S2473D | | | | | |
| | | | | S01 | 1131390 | Push Switch | 2P Pin Ass'y Type E |
| | | | | | 2410910 | | |

6-5. F-2514 Meter Lamp Circuit Board (Stock No. 7594531)

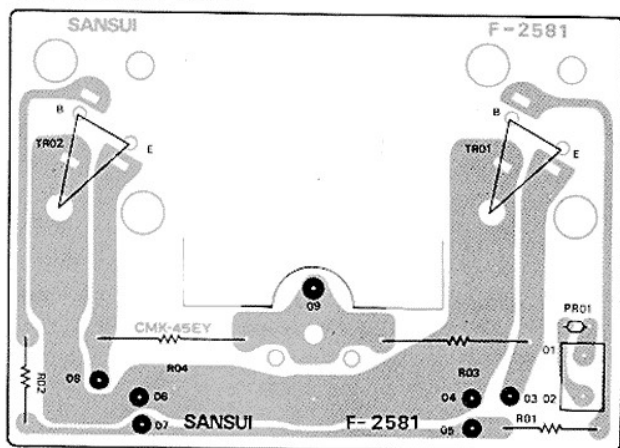
Conductor Side



| Parts No. | Stock No. | Description |
|-----------|-----------|---------------|
| PL01-03 | 0420050 | 7V 0.3MA Lamp |

6-6. F-2581 Final Stage Circuit Board (Stock No. (+) Side 7571491) (Stock No. (-) Side 7571511)

Conductor Side



Parts List <+ Side>

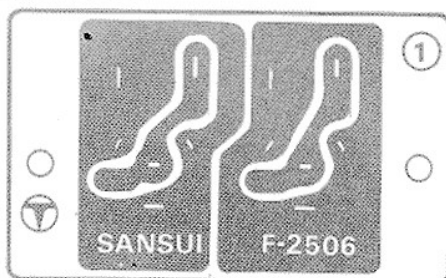
| Parts No. | Stock No. | Description |
|-----------|------------|------------------------------|
| TR01 | 0306451, 2 | 2SC1403A (O, Y) } Transistor |
| TR02 | 0306451, 2 | 2SC1403A (O, Y) } |
| R01 | 0103829 | 8.2Ω } 1/2W C.R. |
| R02 | 0103829 | 8.2Ω } |
| R03 | 0135338 | 0.33Ω } 5W Ce.R. |
| R04 | 0135338 | 0.33Ω } |
| | 2030040 | Transistor Socket |
| | 2030040 | Transistor Socket |

Parts List <- Side>

| Parts No. | Stock No. | Description |
|-----------|------------|-----------------------------|
| TR01 | 0300831, 2 | 2SA745A (O, Y) } Transistor |
| TR02 | 0300831, 2 | 2SA745A (O, Y) } |
| PR01 | 0320130 | Thermistor |
| R01 | 0103829 | 8.2Ω } 1/2W C.R. |
| R02 | 0103829 | 8.2Ω } |
| R03 | 0135338 | 0.33Ω } 5W Ce.R. |
| R04 | 0135338 | 0.33Ω } |
| | 2030040 | Transistor Socket |
| | 2030040 | Transistor Socket |
| | 2410910 | 2P Pin Ass'y Type E |

6-7. F-2506 Input Terminal Circuit Board (Stock No. 7594511)

Conductor Side



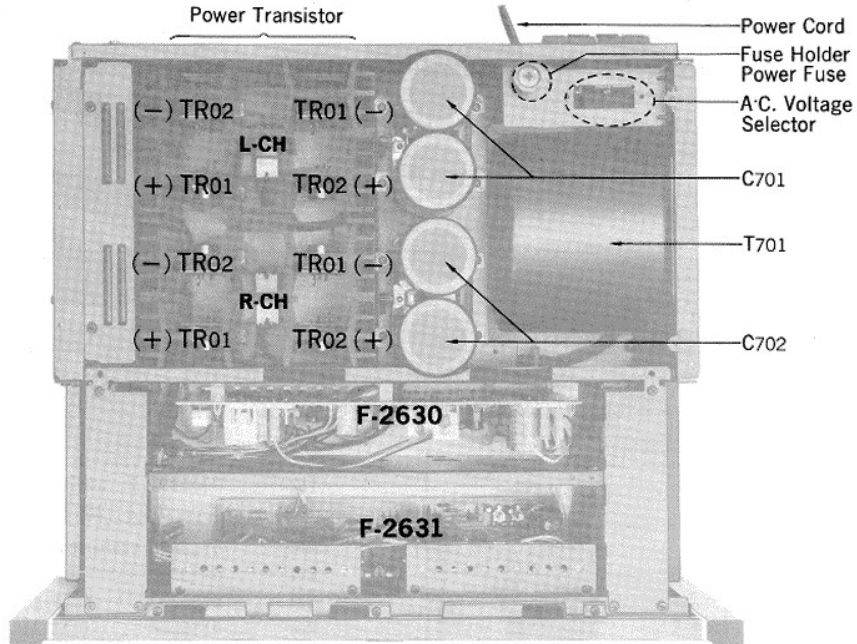
Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|-------------|
| | 2430260 | Jack |
| | 2430270 | Jack |

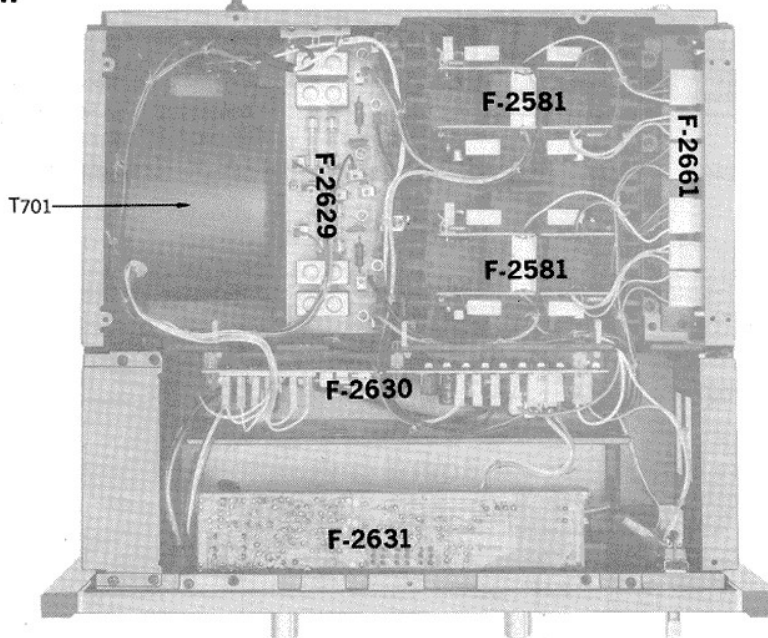
7. OTHER PARTS

7-1. Top & Bottom View

Top View



Bottom View

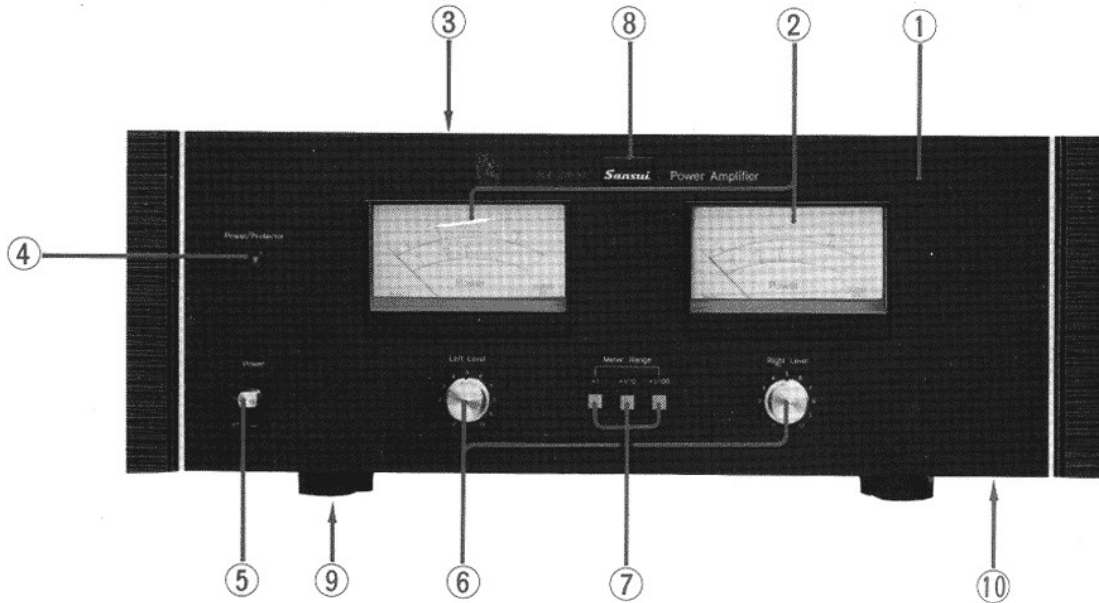


Parts List

| Parts No. | Stock No. | Description |
|-----------|-----------|------------------------|
| C701.702 | 0559519 | E.C. 12000 μ F 63V |
| C703 | 0659801 | C.C. 0.01 μ F 150V |
| R701 | 0203100 | M.R. 10 Ω 3W |
| R702 | 0203100 | |
| T701 | 4002520 | Power Transformer |

| Parts No. | Stock No. | Description |
|-----------|-----------|---------------------------------|
| F701 | 0434060 | Fuse 10A (100V/120V) |
| | 0432290 | Fuse 5A (220V/240V) |
| | 2300060 | Fuse Holder |
| | 2410091 | 6P, AC Voltage Selector Plug |
| | 2410830 | 10P, AC Voltage Selector Socket |
| | 5268601 | A.C. Voltage Adaptor Cover |
| | 3800240 | A.C. Power Cord |

7-2. Front View



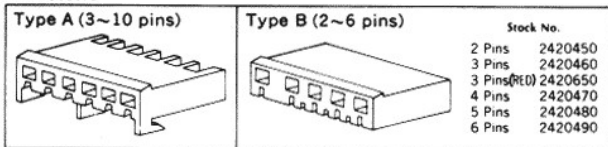
| Parts No. | Stock No. | Description |
|-----------|-----------|-------------------------------------|
| 1 | 7007410 | Panel Ass'y |
| 2 | 4301040 | Power Meter |
| | 5446230 | Illmination Plate |
| | 5496030 | Meter glass |
| | 5496040 | Meter hode |
| 3 | 5006620 | Bonnet |
| 4 | LD701 | LED Ass'y Power protector Indicator |
| 5 | 1170510 | Lever Switch, power |
| | 5326510 | Knob Type E, Power Switch |
| | 5286731 | Lever Guide, Power |

| Parts No. | Stock No. | Description |
|-----------|-----------|-----------------------------------|
| 6 | VR01, 02 | 1000330 Level Volume 100kΩ (B) |
| | | 5318253 Knob Type B, Level volume |
| 7 | S06 | 1131390 Push Switch |
| | | 5326531 Push Knob |
| | | 5286721 Knob Guide, Push Switch |
| | | 6906480 Spring |
| 8 | 5336581 | SANSUI Mark |
| 9 | 5517050 | Leg |
| 10 | 5058492 | Bottom Plate |

7-3. Figures

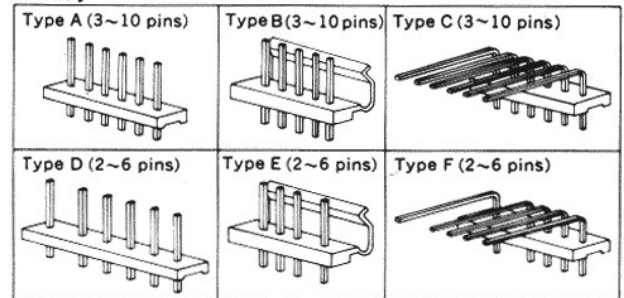
Connectors & Pin Ass'y

Connectors



NOTE: Since stock number of female connectors (type B) with wires are not shown in each parts list of Complete circuit board, please refer to the above parts list when ordering the connector.

Pin Ass'y

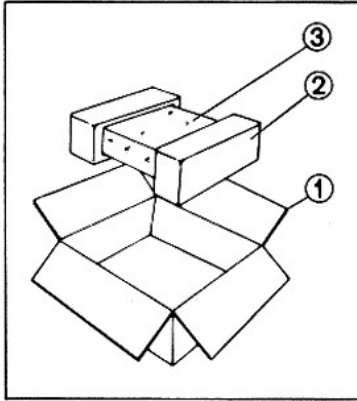


Abbreviations

| | |
|--|---|
| C.R. : Carbon Resistor | E.C. : Electrolytic Capacitor |
| S.R. : Solid Resistor | BP.E.C.: Bi-Polar Electrolytic Capacitor |
| Ce.R. : Cement Resistor | C.C. : Ceramic Capacitor |
| M.R. : Metallized Film Resistor | Mi.C. : Mica Capacitor |
| F.R. : Fusing Resistor | O.C. : Oil Capacitor |
| N.I.R. : Non-Inflammable Resistor | P.C. : Polystyrene Capacitor |
| M.C. : Mylar Capacitor | T.C. : Tantalum Capacitor |

9. PACKING LIST

| Parts No. | Stock No. | Description |
|-----------|-----------|-------------------|
| 1 | 9009300 | Carton Case |
| 2 | 9027911 | Stylofoam Packing |
| 3 | 9116051 | Vinyl Cover |



10. ACCESSORY PARTS LIST

| Stock No. | Description |
|-----------|-----------------------|
| 9202240 | Operating Instruction |
| 9237470 | Schematic Diagram |

Sansui

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