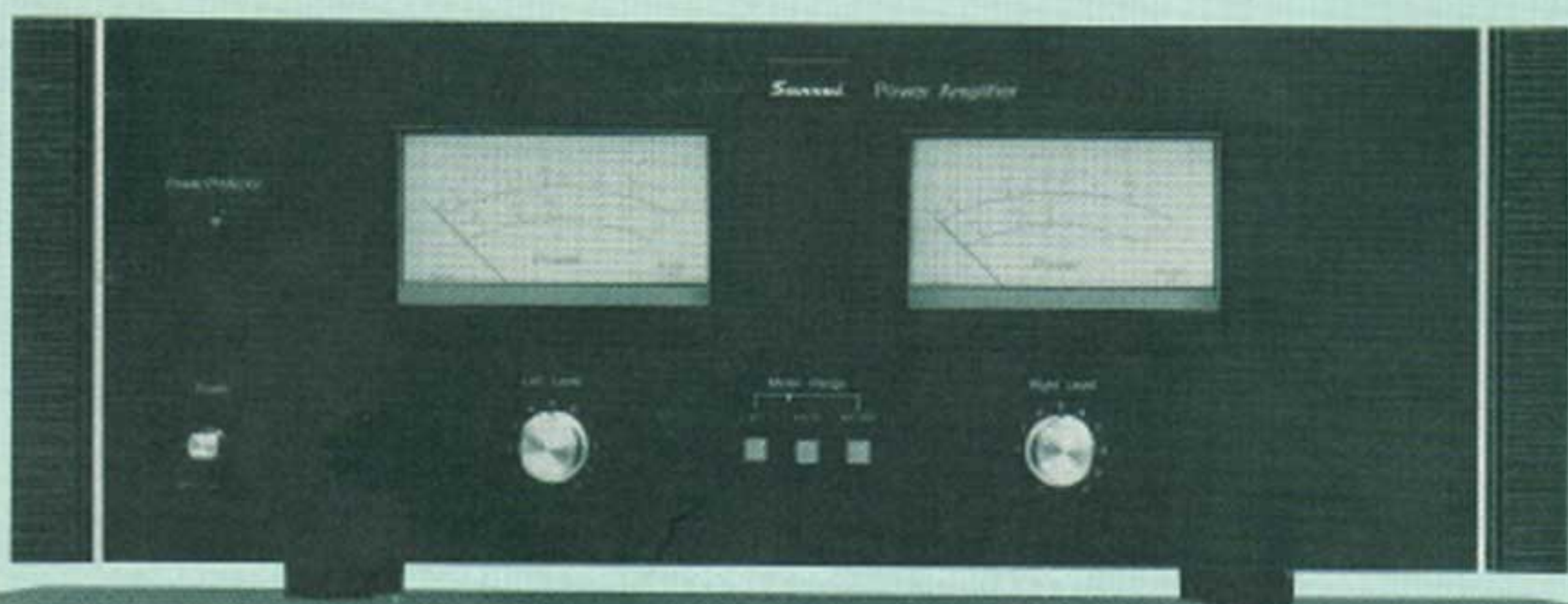


SERVICE MANUAL

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 IMPEDANCE8 ohms

POWER BANDWIDTH10 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 FACTORapproximately 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)

DIMENSIONS460 mm (18-1/8") W

160 mm (6-5/16") H

375 mm (14-13/16") D

WEIGHT18.3 kg (40.3 lbs) net

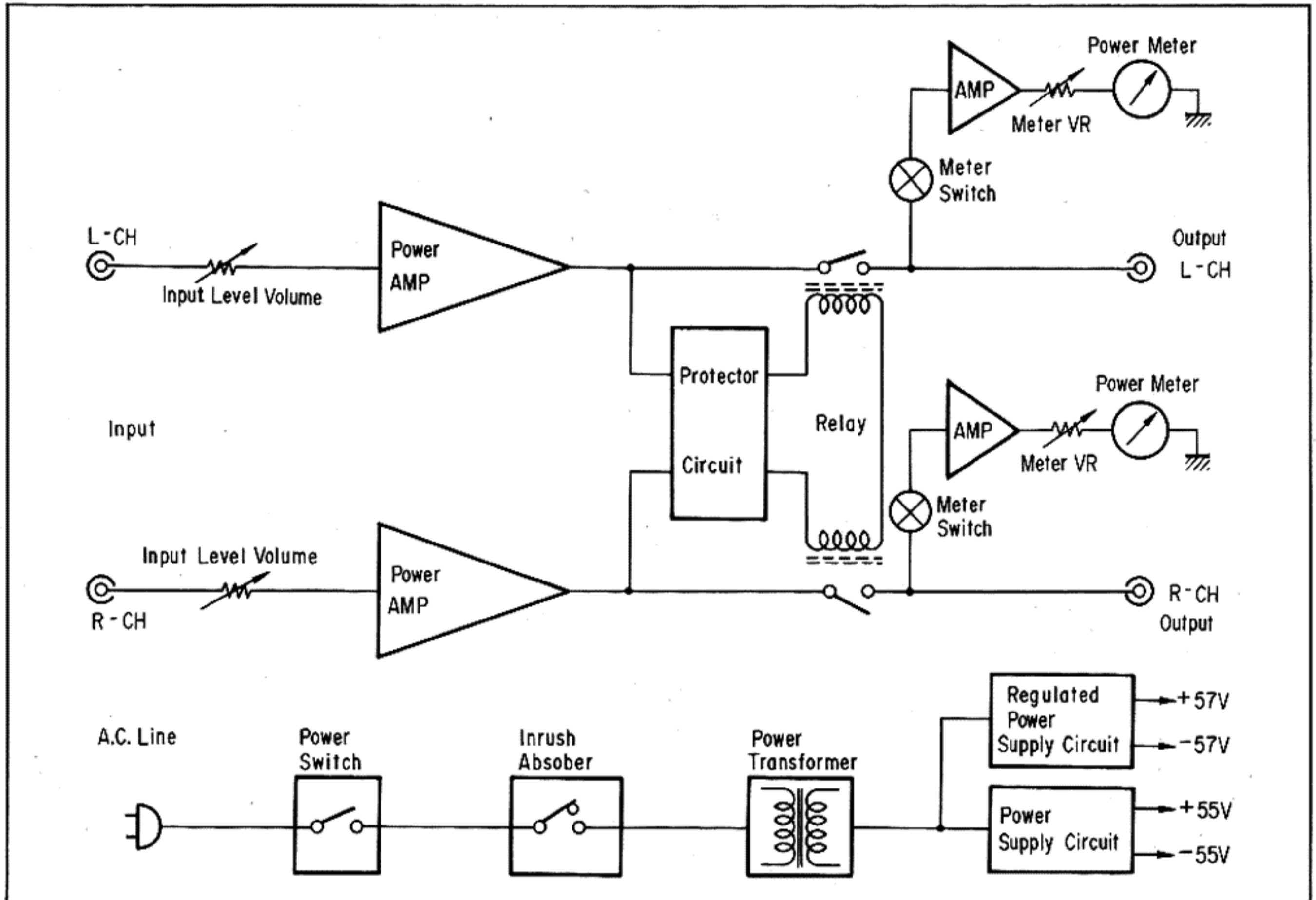
20.8 kg (45.0 lbs) packed

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

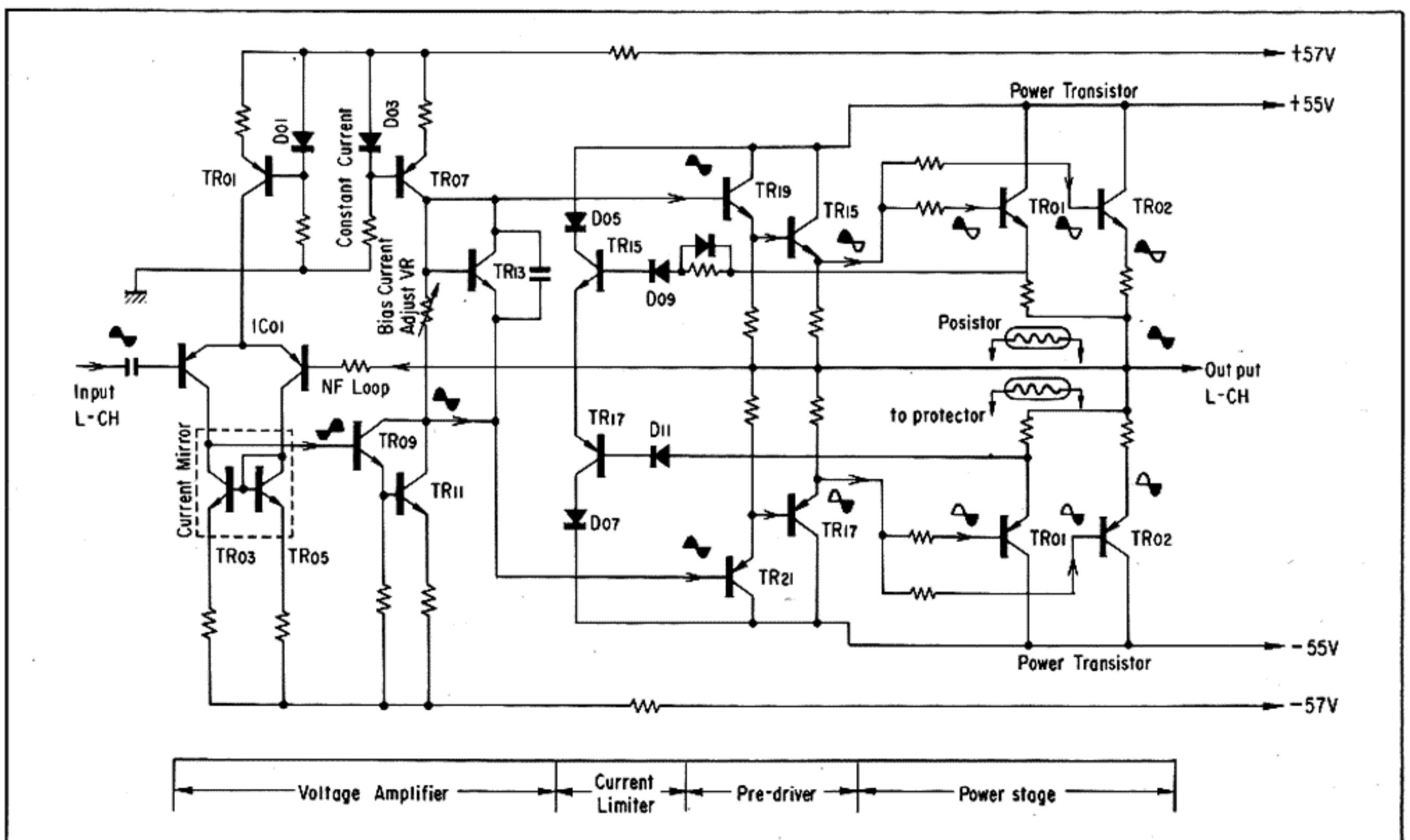
TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
1.	SPECIFICATIONS	1
2.	BLOCK DIAGRAM	2
3.	OPERATING DIAGRAM	2
4.	OPERATION OF NEW CIRCUIT	3
4-1.	Current Mirror Circuit	3
5.	ADJUSTMENTS	4
5-1.	Bias Current Adjustment	4
5-2.	Power Meter Adjustment	4
6.	PARTS LISTS & PARTS LOCATION	5
6-1.	F-2661 Driver Circuit Board	5
6-2.	F-2630 Power Supply Circuit Board for Driver Stage	6
6-3.	F-2629 Power Supply Circuit Board	7
6-4.	F-2631 Level Volume & Meter Circuit Board	7
6-5.	F-2514 Meter Lamp Circuit Board	8
6-6.	F-2581 Final Stage Circuit Board	8
6-7.	F-2506 Input Terminal Circuit Board	8
7.	OTHER PARTS	9
7-1.	Top & Bottom View	9
7-2.	Front View	10
7-3.	Figures.....	10
8.	SCHEMATIC DIAGRAM	11
9.	PACKING LIST	BACK COVER
10.	ACCESSORY PARTS LIST	BACK COVER

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.).
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.

$$* C.M.R.R. = \frac{\text{Differential Gain}}{\text{Common Mode Gain}}$$

◆ 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

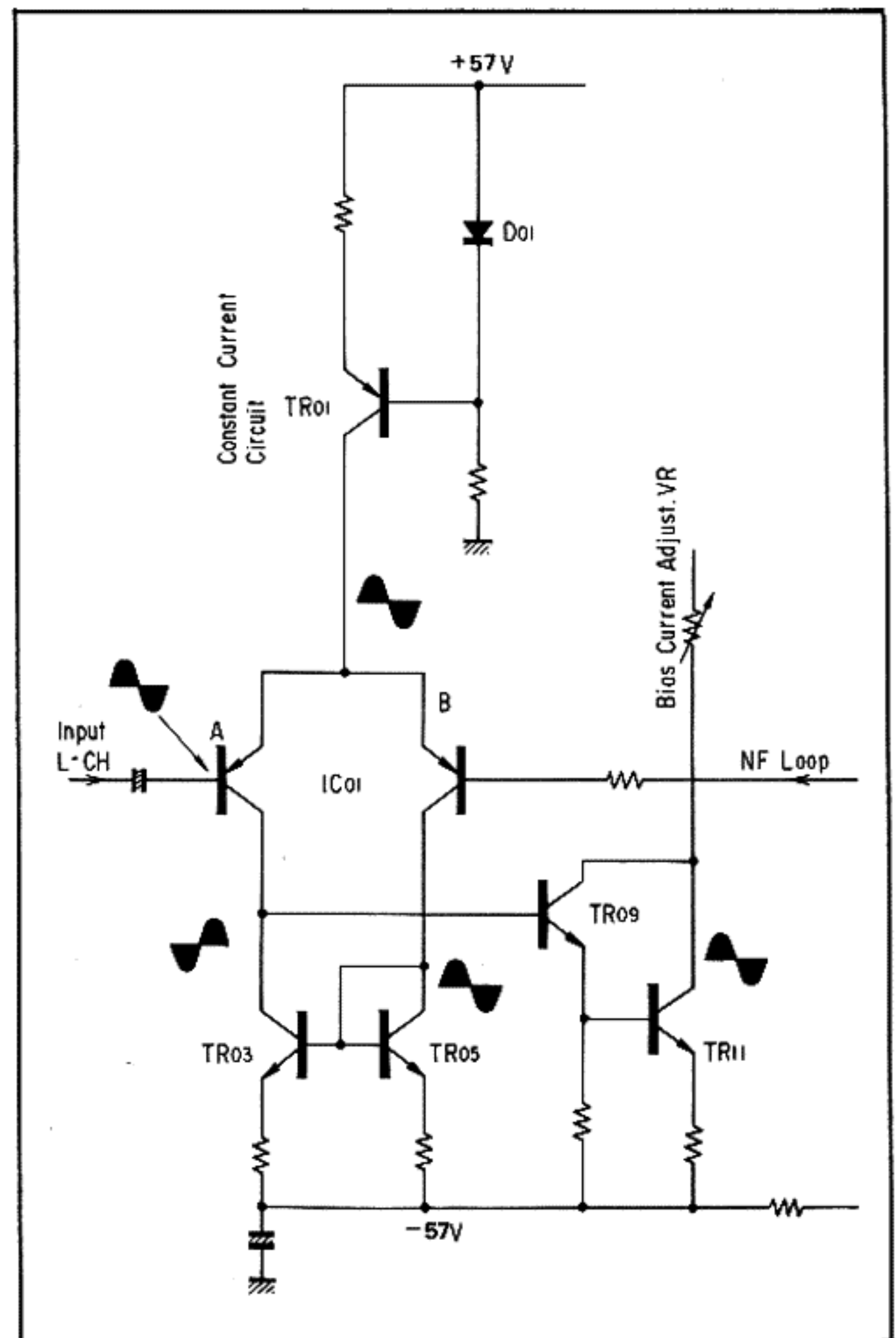
When input signal shown in Fig. is supplied to the base of the transistor A in the IC,

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 VolumeMaximum |
| 3. A.C. Supply VoltageRated 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 Oscilloscope 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.

Fig. 5-1

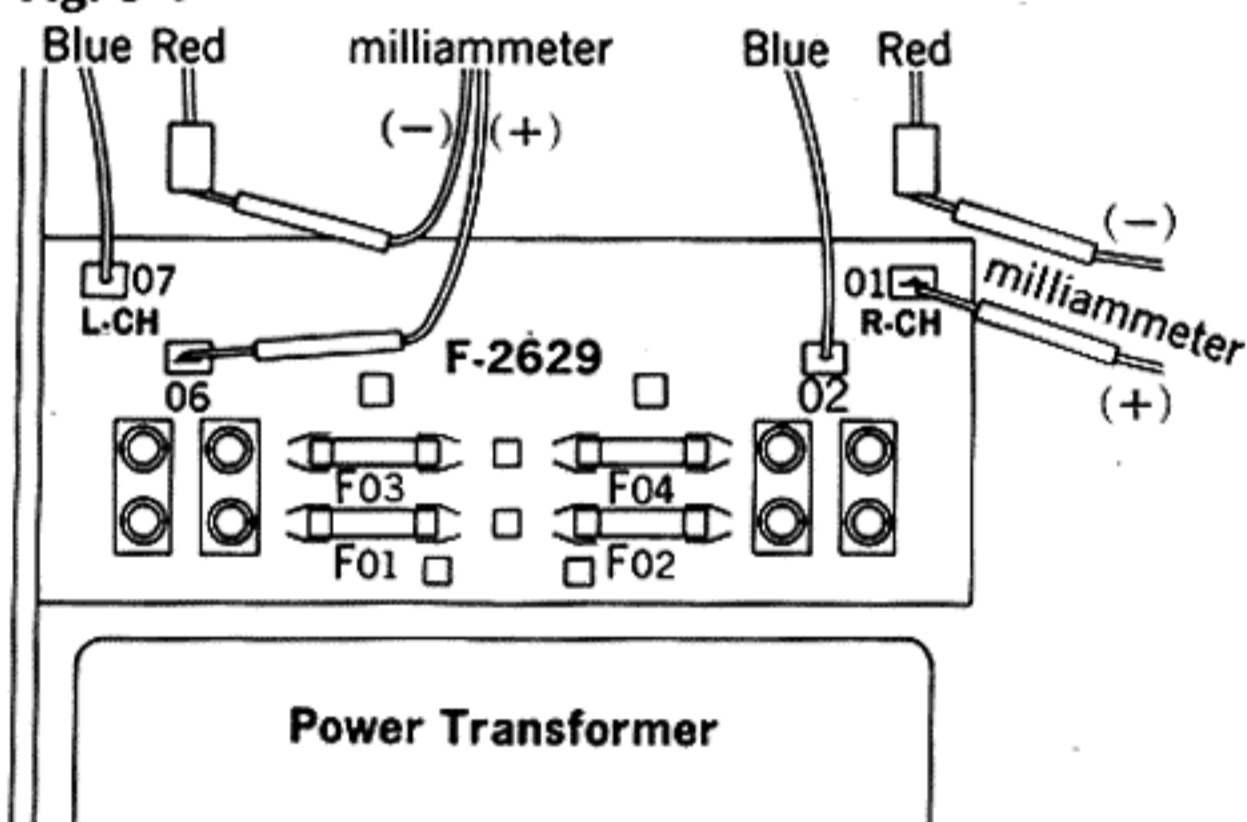
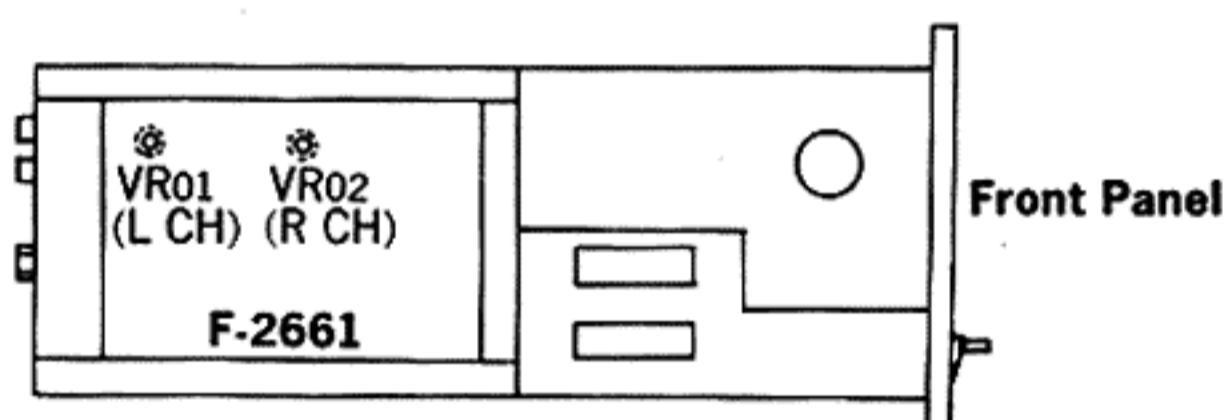


Fig. 5-2



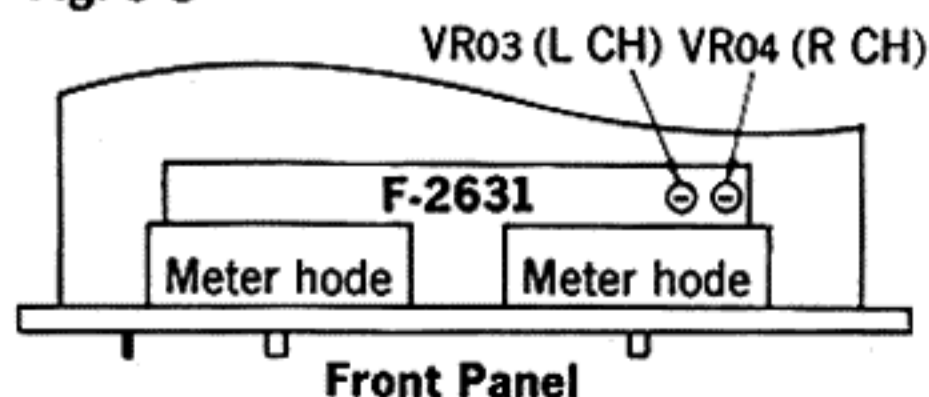
5-2. Power Meter Adjustments (See Fig. 5-3)

Condition:

- Level VolumeMaximum
- 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

Fig. 5-3

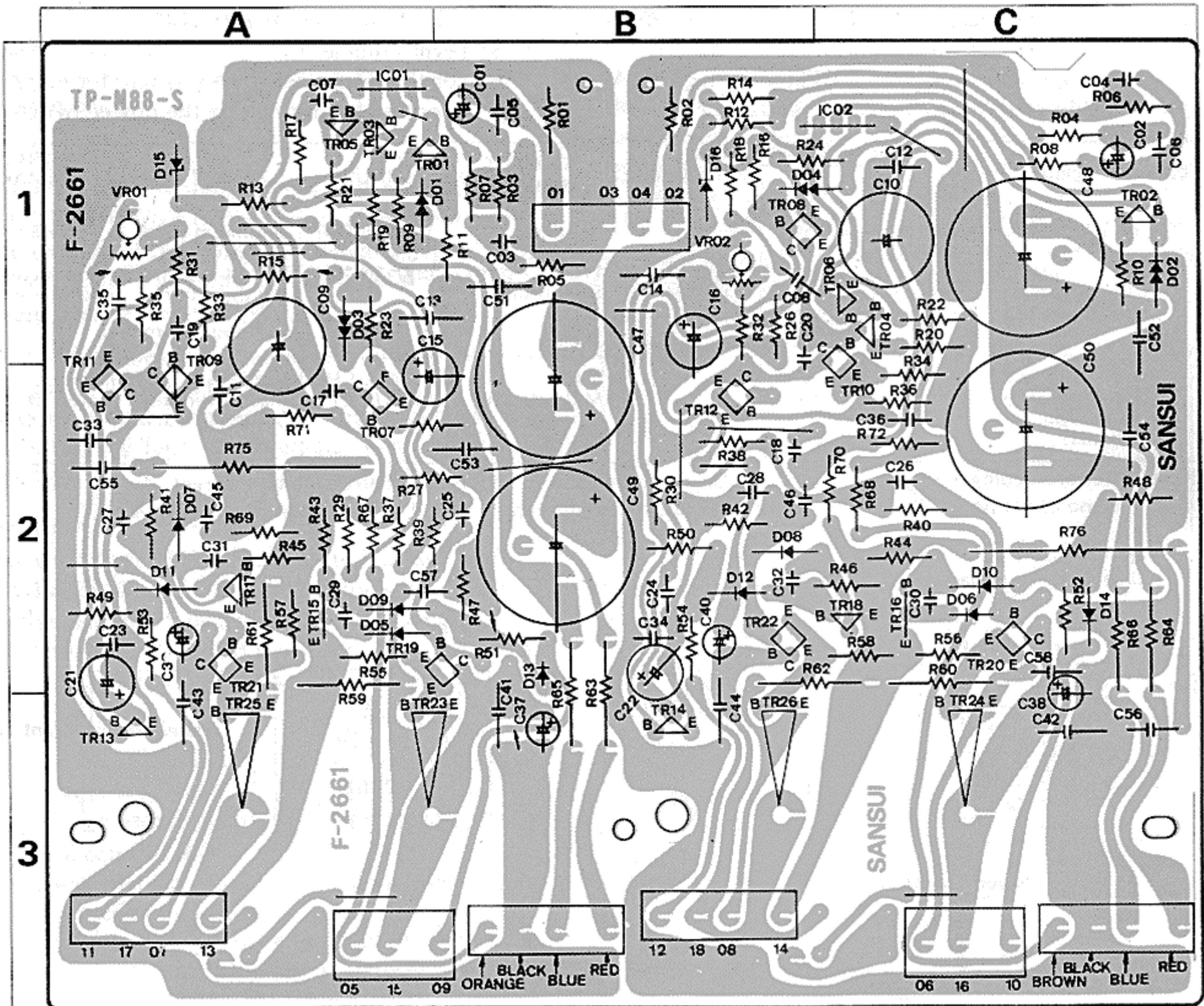


6. PARTS LISTS & PARTS LOCATION

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.

Conductor Side



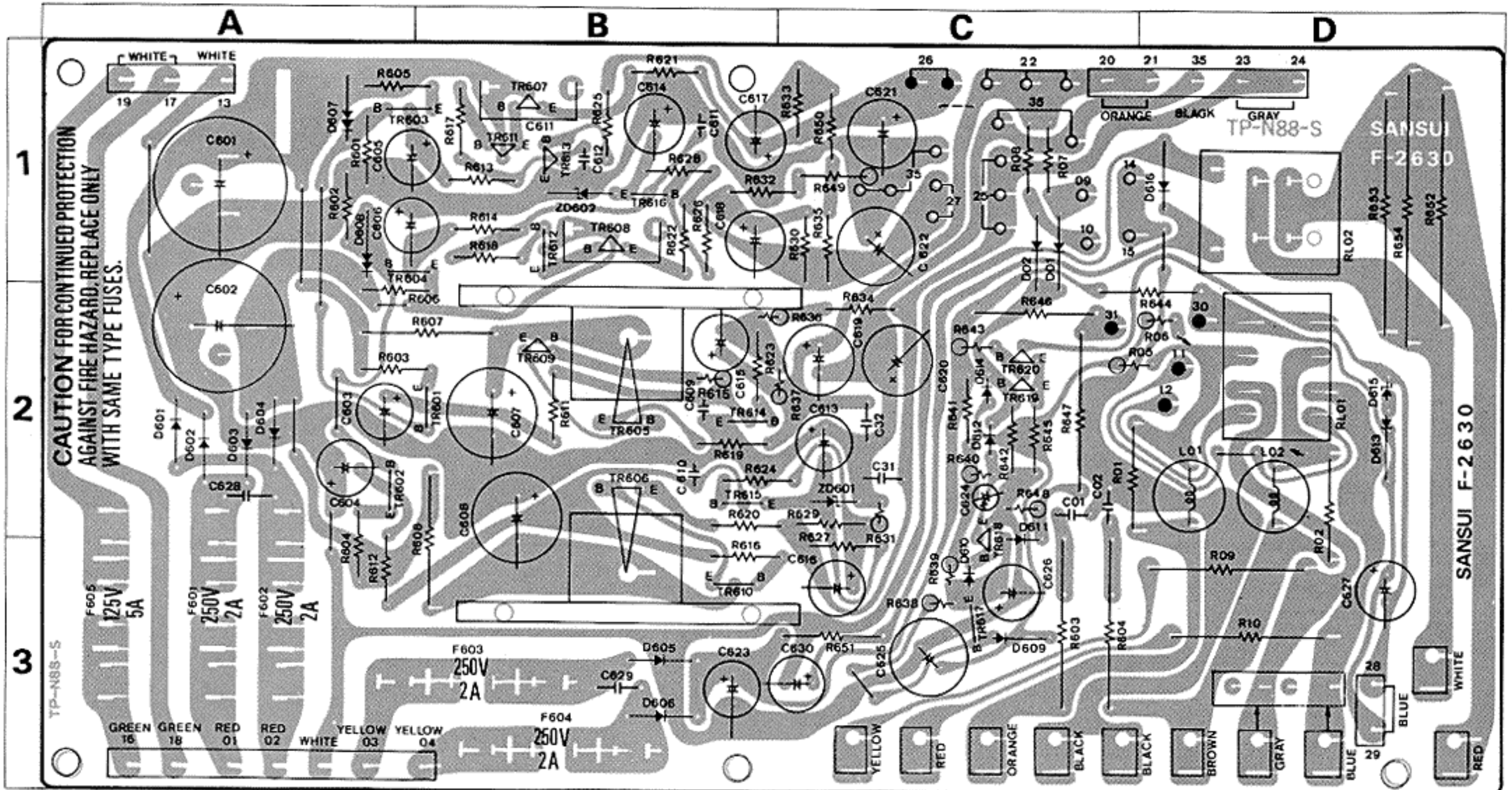
Parts List

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	2SB537 (M, L)	2A, 2C
IC01, 02	0360370, 1	2SA798 (F, G) IC	1A, 1C
D01, 02	{0311160 0311180}	1S2473D 1S1588	Diode
D03, 04	0340120	VD1212	Varistor
D05, 06	{0311160 0311180}	1S2473D 1S1588	Diode

Parts No.	Stock No.	Description	Position
D07, 08	{0311160 0311180}	1S2473D 1S1588	Diode
D09, 10	{0311160 0311180}	1S2473D 1S1588	
D11, 12	{0211160 0311180}	1S2473D 1S1588	Diode
D13, 14	0340120	VD1212	Varistor
C11, 12	0661250	25pF 50V C.C.	2A, 1C
C47-50	0549301	470µF 80V E.C.	1, 2B, C
R55, 56	0103560	56Ω	1/2W C.R.
R57, 58	0103560	56Ω	
R59, 60	0103221	220Ω	
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

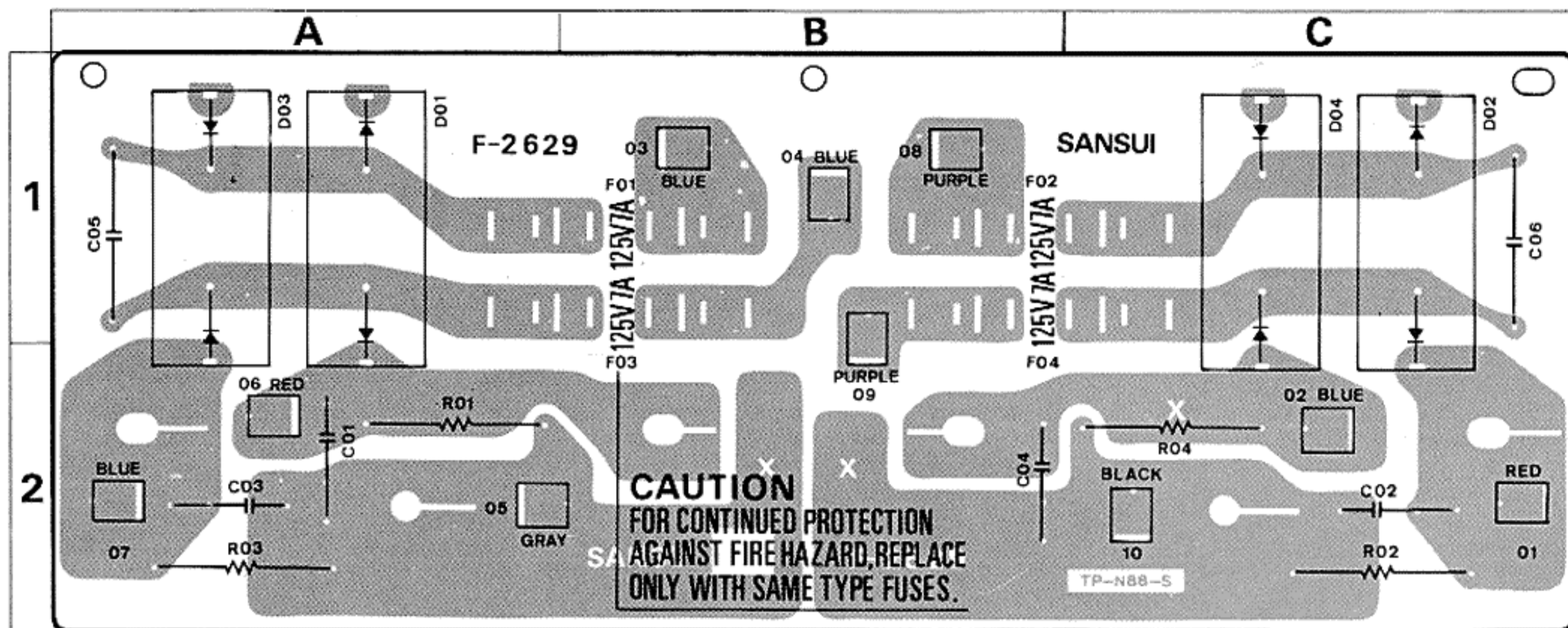


Parts List

Parts No.	Stock No.	Description	Position	Parts No.	Stock No.	Description	Position	
TR603	0300720, 1	2SA850 (C, D)	} Transistor	D612	{0311160 1S2473D 0311180 1S1588	} Diode	2 C	
TR604	0306280, 1	2SC1735 (C, D)		1 A, B				
TR607	{0308450, 1 0308611, 2	{2SD356 (C, D) 2SD357 (D, E)		1 B	D613	0310340	10D1	2 D
	TR608	{0303280, 1 0303441, 2		{2SB526 (C, D) 2SB527 (D, E)	1 B	D614	{0311160 1S2473D 0311180 1S1588	2 C
TR611	0306280, 1	2SC1735 (C, D)		1 B	D615	0316530	RD27E (B)	2 D
TR612	0300720, 1	2SA850 (C, D)		1 B	D616	0310340	10D1	1 D
TR613	0306290, 1	2SC1400 (E, U)		1 B	ZD602	0316310	RD-13E (B) Zener Diode	1 B
TR616	0300470, 1	2SA726 (W) (F, G)		1 B	C601	0549301	470µF } 80V E.C.	1 A
TR617	0300511, 2	2SA733 (Q, R)		3 C	C602	0549301	470µF } 80V E.C.	1, 2 A
TR618	0306131, 2	2SC1364 (6, 7)		2, 3 C	C628	0655103	10000 pF } 500V C.C.	2 A
TR619	0306131, 2	2SC1364 (6, 7)		2 C	C629	0655472	4700 pF } 500V C.C.	3 B
TR620	0306131, 2	2SC1364 (6, 7)		2 C	R01, 02	0104479	4.7Ω 1 W C.R.	2 C, 2 D
D01, 02	{0311160 1S2473D 0311180 1S1588	} Diode		1 C	R03, 04	0203100	10Ω 3 W M.R.	3 C
D601	0310350			10D2	2 A	R605, 606	0191471	10Ω } ¼W F.R.
D602	0310350		10D2	2 A	R621, 622	0191100	470Ω } ¼W F.R.	1 B
D603	0310350		10D2	2 A	R644	0211471	470Ω 1 W M.R.	2 C, D
D604	0310350		10D2	2 A	R646	0202151	150Ω 2 W M.R.	2 C
D605	0310340		10D1	3 B	R647	0183471	470Ω 3 W Ce.R.	2 C
D606	0310340		10D1	3 B	R651	0211391	390Ω 1 W M.R.	3 C
D607	0340120		VD1212	} Varistor	R652, 653	0137829	8.2Ω 7 W Ce.R.	1 D
D608	0340120		VD1212		1 A	R655	0103182	1.8kΩ ½W C.R.
D609	0310490		SV-02	3 C	L01, 02	4210290	Filter Coil	2 D
D610	{0311160 1S2473D 0311180 1S1588	} Diode	3 C	RL01	1150310	Relay	2 D	
D611	{0311160 1S2473D 0311180 1S1588		2 C	RL02	1150310	Relay	1 D	
				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

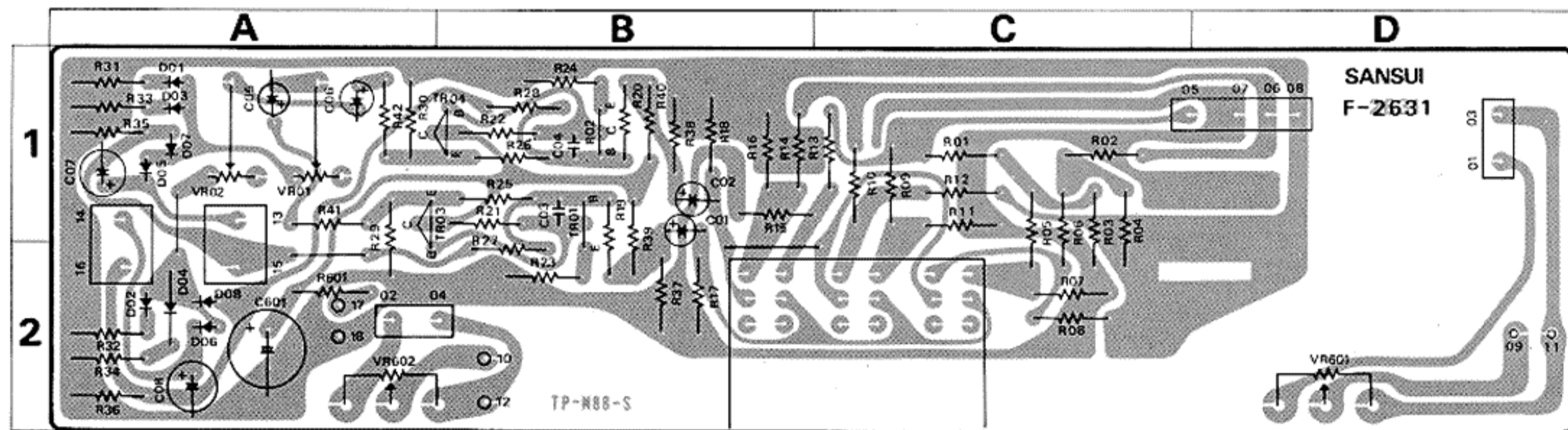


Parts List

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						
D02	{ 0311310	SS-5	1 C	C03, 04	0602109	1.0 μ F	100WV M.C.
	{ 0311540						
D03	{ 0311320	SS-5R	1 A	C05, 06	0605477	0.047 μ F	250V M.C.
	{ 0311550						
D04	{ 0311320	SS-5R	1 C	R01, 02	0202332	3.3k Ω	2 W I.N.R.
	{ 0311550						
				R03, 04	0202332	3.3k Ω	2 W I.N.R.
				F01-04	0432500	AC Fuse	1, 2 B

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

Conductor Side

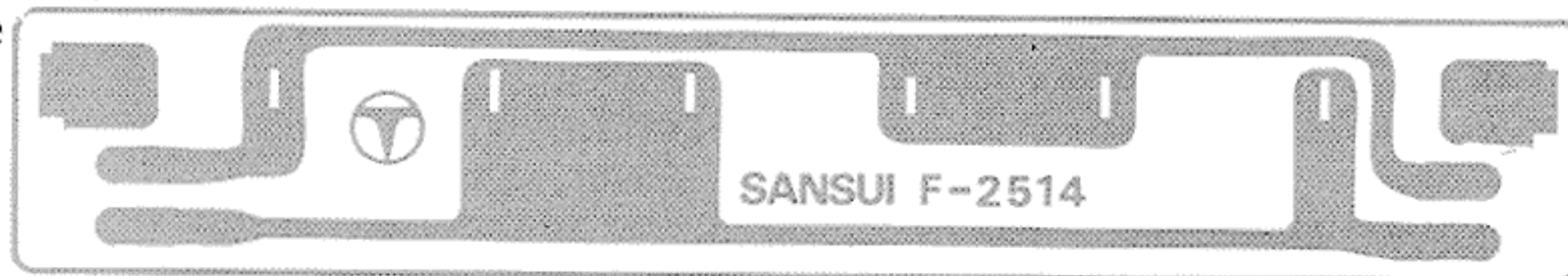


Parts List

Parts No.	Stock No.	Description	Position	Parts No.	Stock No.	Description	Position
TR01, 02	0306070, 1	2SC1313 (F, G)	1 B	R601	0210102	1.0k Ω 1/2W M.R.	2 A
TR03, 04	0306070, 1	2SC1313 (F, G)	1 A, 1 B				
D01, 02	0311160	1S2473D	1 A, 2 A	VR01, 02	1000330	100k Ω (B)	Volume
D03, 04	0311160	1S2473D	1 A, 2 A				
D05, 06	0311160	1S2473D	1 A, 2 A	VR03, 04	1032410	200 Ω (B)	Volume
D07, 08	0311160	1S2473D	1 A, 2 A				
				S01	1131390	Push Switch	
					2410910	2P Pin Ass'y Type E	

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

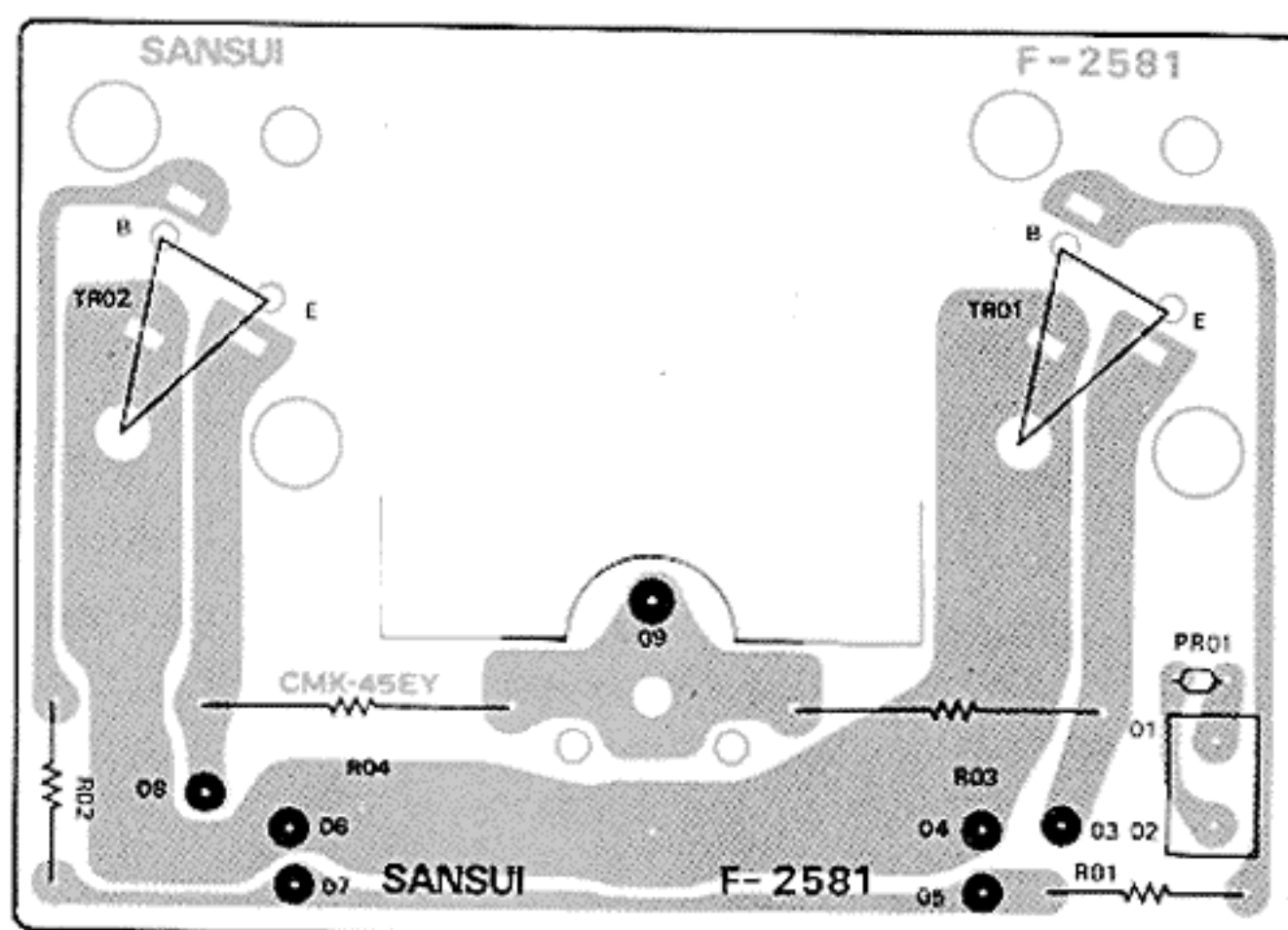
Conductor Side



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>

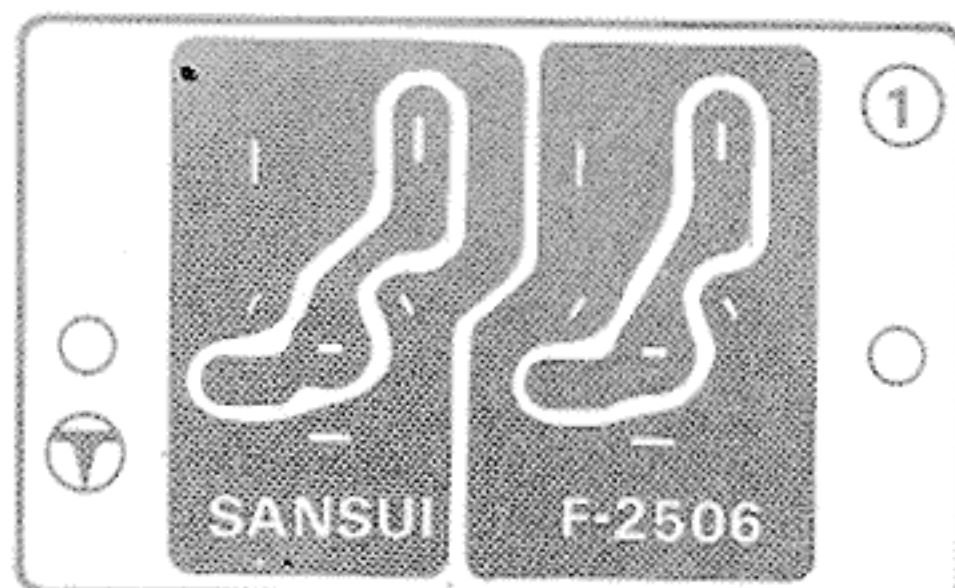
Parts No.	Stock No.	Description
TR01	0306451, 2	2SC1403A (O, Y) } Transistor
TR02	0306451, 2	2SC1403A (O, Y) }
R01	0103829	8.2Ω } 1/2W C.R.
R02	0103829	8.2Ω }
R03	0135338	0.33Ω } 5W Ce.R.
R04	0135338	0.33Ω }
	2030040	Transistor Socket
	2030040	Transistor Socket

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



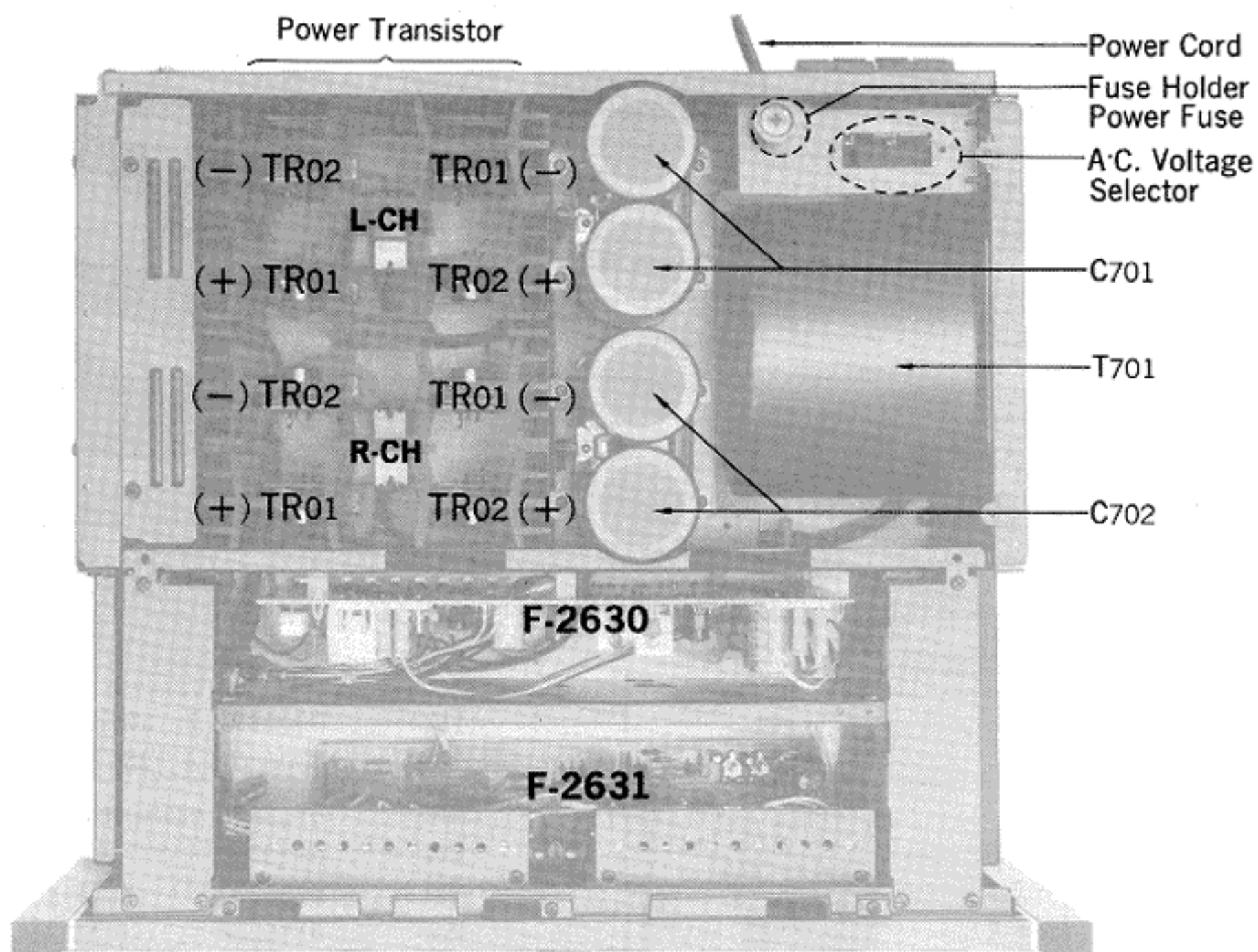
Parts List

Parts No.	Stock No.	Description
	2430260	Jock
	2430270	Jock

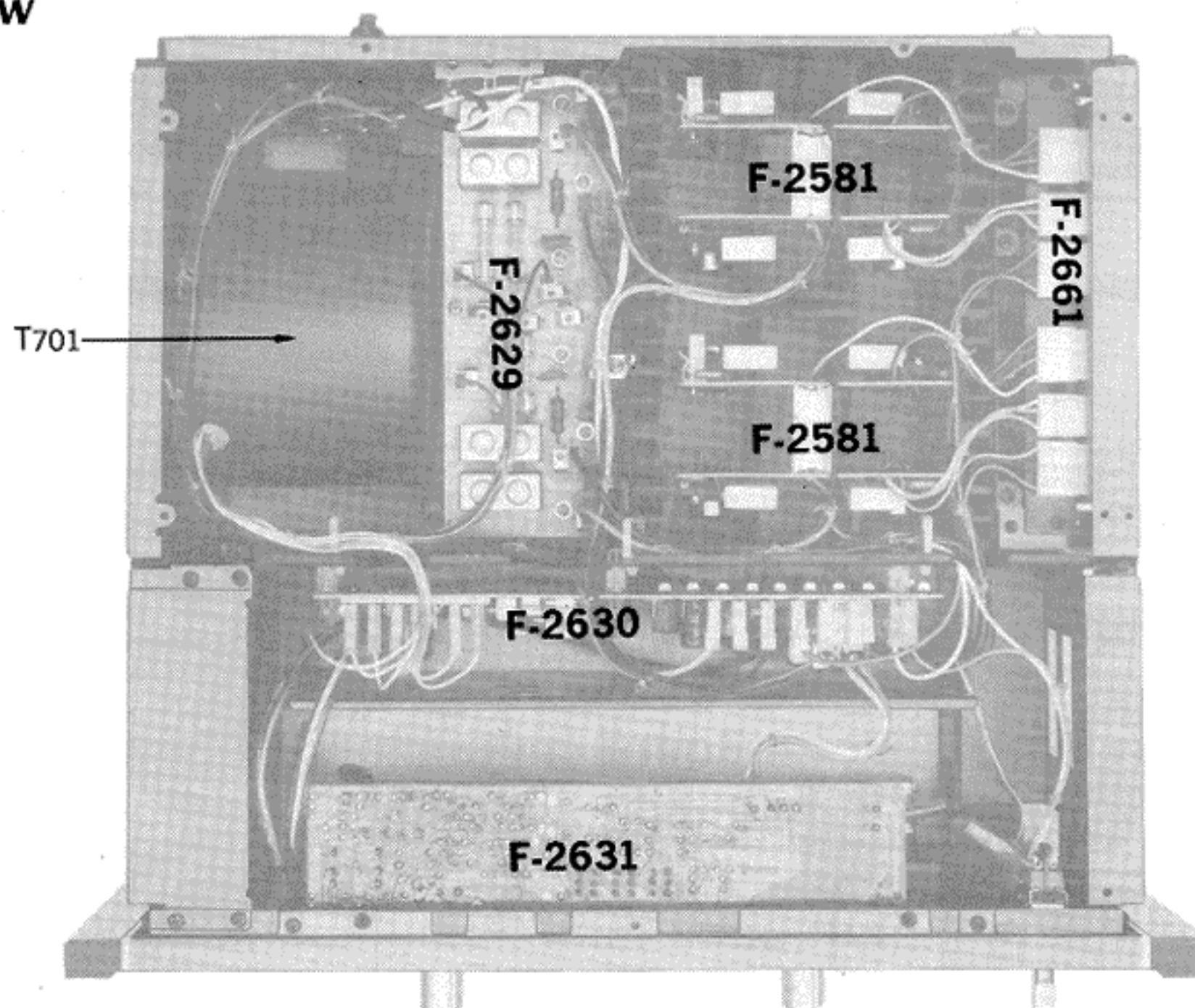
7. OTHER PARTS

7-1. Top & Bottom View

Top View



Bottom View

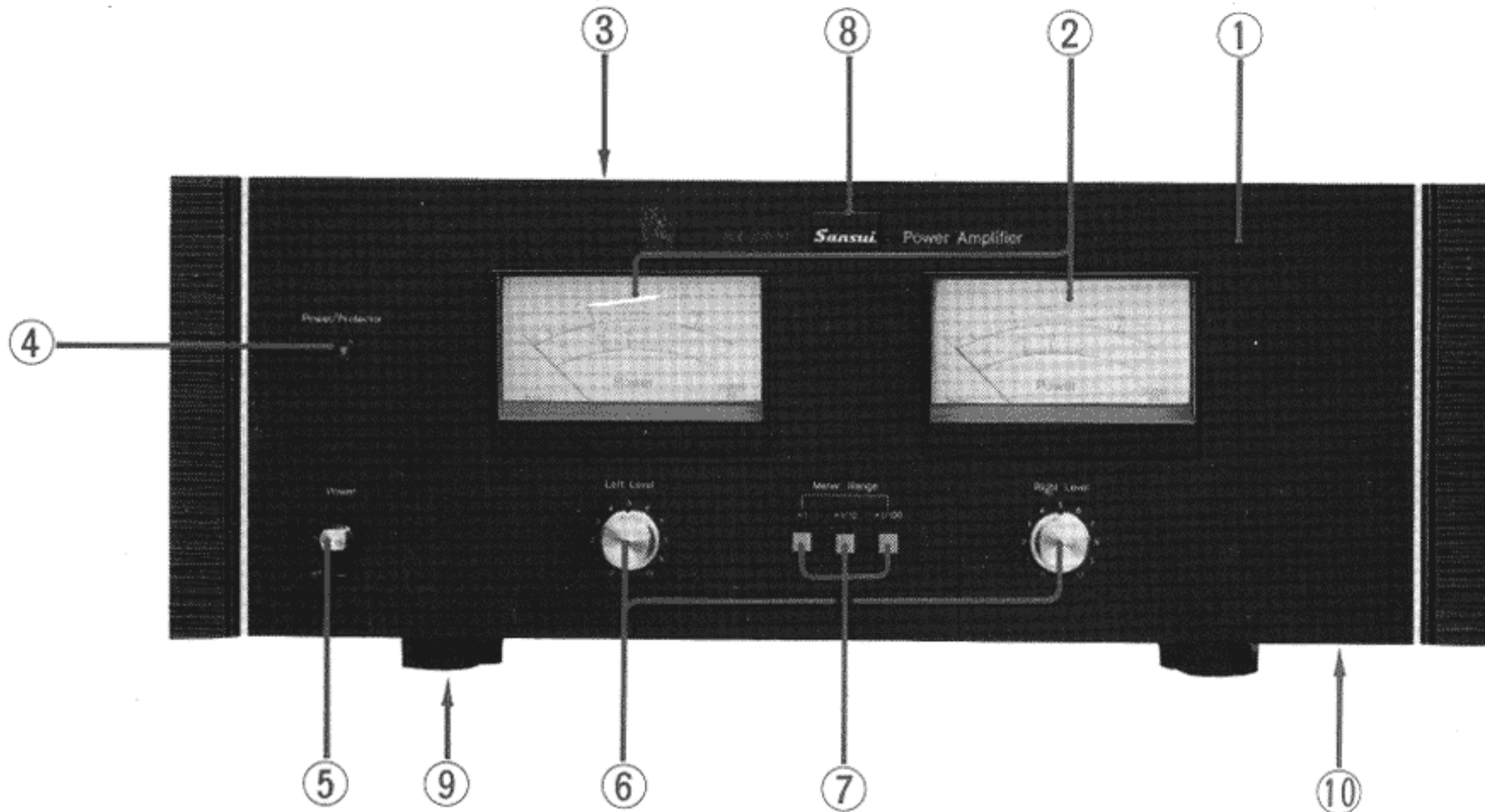


Parts List

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	
	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 M701, 702	4301040	Power Meter
	5446230	Illumination Plate
	5496030	Meter glass
	5496040	Meter hode
3	5006620	Bonnet
4 LD701	7726140	LED Ass'y Power protector Indicator
5 S701	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	SANSWI Mark
9	5517050	Leg
10	5058492	Bottom Plate

7-3. Figures Connectors & Pin Ass'y

Connectors

Type A (3~10 pins)	Type B (2~6 pins)	Stock No.
		2 Pins 2420450
		3 Pins 2420460
		3 Pins (RED) 2420650
		4 Pins 2420470
		5 Pins 2420480
		6 Pins 2420490

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

Type A (3~10 pins) 	Type B (3~10 pins) 	Type C (3~10 pins)
Type D (2~6 pins) 	Type E (2~6 pins) 	Type F (2~6 pins)

Abbreviations

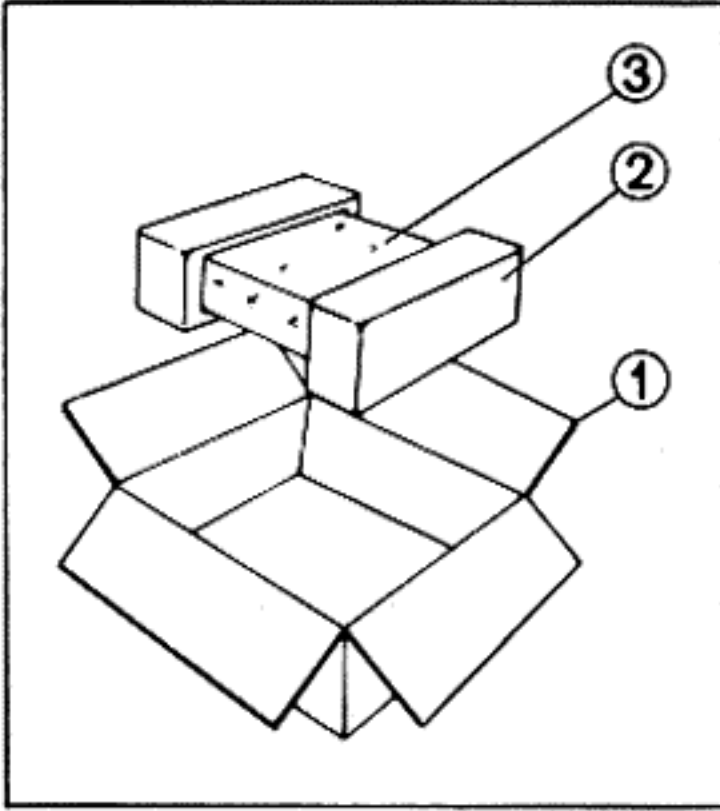
C.R. : Carbon Resistor	E.C. : Electrolytic Capacitor
S.R. : Solid Resistor	BP.E.C.: Bi-Polar Electrolytic Capacitor
Ce.R. : Cement Resistor	C.C. : Ceramic Capacitor
M.R. : Metallized Film Resistor	Mi.C. : Mica Capacitor
F.R. : Fusing Resistor	O.C. : Oil Capacitor
N.I.R. : Non-Inflammable Resistor	P.C. : 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 ELECTRIC CO., LTD.
14-1 Izumi 2-Chome, Suginami-ku, TOKYO 168 JAPAN
TELEPHONE: (03) 323-1111/TELEX. 232-2076