

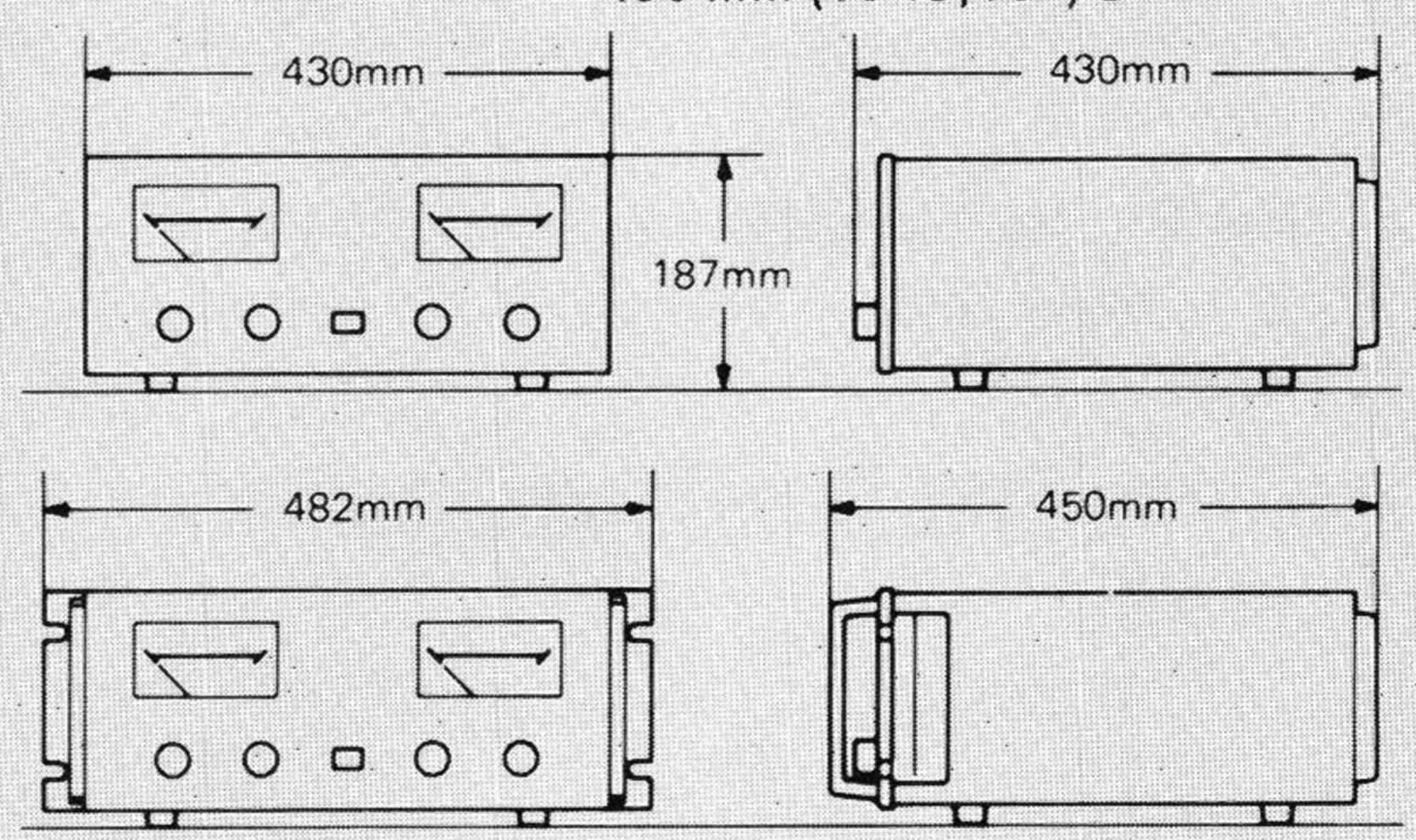
# SERVICE MANUAL

## STEREO POWER AMPLIFIER SANSUI BA-F1



### SPECIFICATIONS

- Power output**  
 Min. RMS, both channels driven, from 10 to 20,000 Hz,  
 with no more than 0.008 % total harmonic distortion  
 110 watts per channel into 8 ohms  
**Load impedance** . . . . . 8 ohms  
**Total harmonic distortion**  
 . . . . . less than 0.008 % at or below  
 . . . . . rated min. RMS power output  
**Intermodulation distortion** (70 Hz : 7 kHz = 4:1 SMPTE  
 method) . . . . . less than 0.008 % at or below rated  
 . . . . . min. RMS power output  
**Rise time** . . . . . 0.5  $\mu$ sec  
**Slew rate** . . . . .  $\pm 200$  V/ $\mu$ sec  
**Frequency response** (at 1 watt)  
 . . . . . DC to 600,000 Hz +0 dB -3 dB  
**Damping factor** (1 kHz, both channels driven)  
 . . . . . 100 into 8 ohms  
**Input sensitivity and impedance** (1 kHz, for rated power  
 output) . . . . . 1 V/25 kilohms  
**Hum and noise** (short-circuit, A-network)  
 . . . . . better than 125 dB  
**Channel separation** (1 kHz, at rated power output)  
 . . . . . better than 125 dB  
**Power requirements**  
**Power voltage** . . . . . 100, 120, 220, 240 V (50/60 Hz)  
 For U.S.A. and Canada  
 . . . . . 120 V (60 Hz)  
**Power consumption**  
**Rated consumption**  
 . . . . . 470 watts  
**Dimensions** . . . . . 430 mm (16-15/16") W  
 . . . . . 187 mm (7-3/8") H  
 . . . . . 430 mm (16-15/16") D



**Weight** . . . . . 20.4 kg (45.0 lbs) net  
 . . . . . 22.8 kg (50.3 lbs) packed

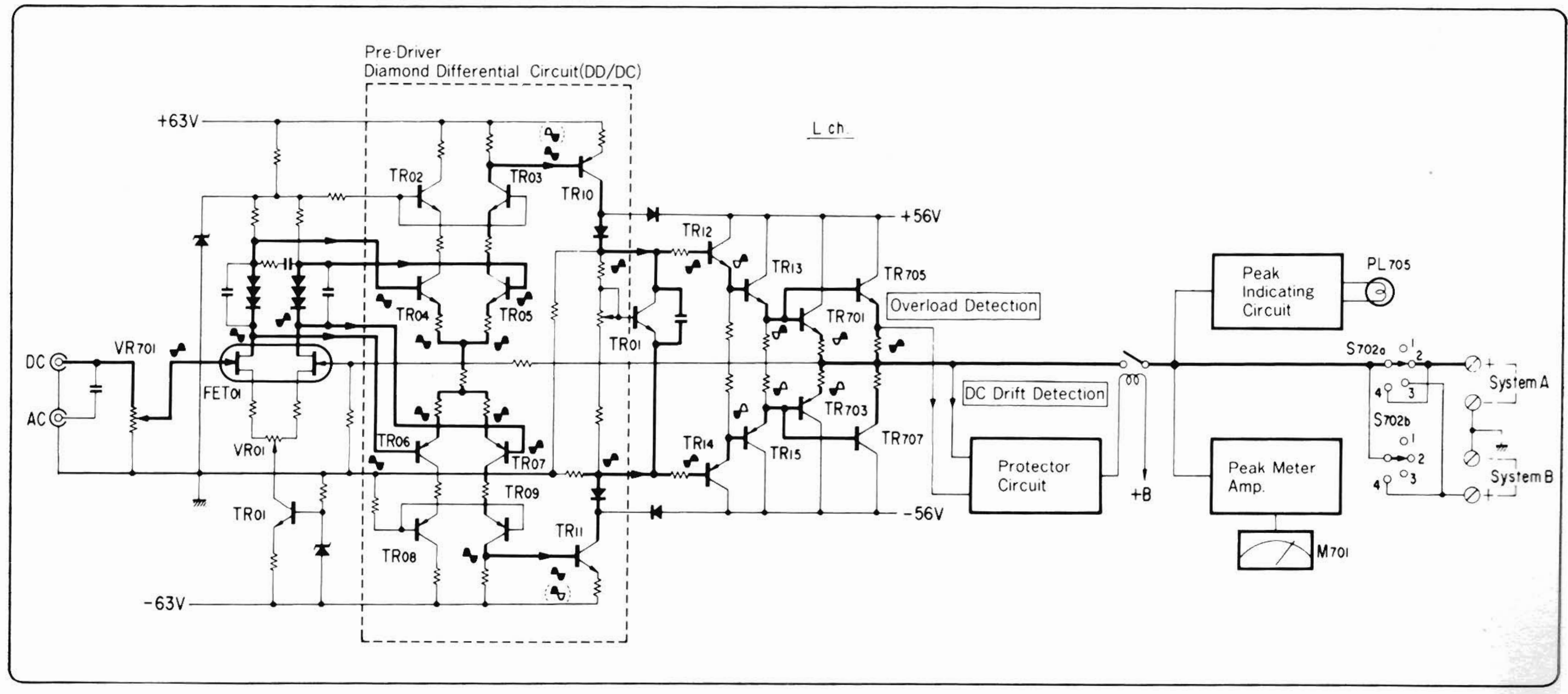
- Design and specifications subject to change without notice for improvements.
- In order to simplify the explanation illustrations may sometimes differ from the originals.



SANSUI ELECTRIC CO., LTD.



# 1. BLOCK DIAGRAM



# 2. OPERATION OF PROTECTOR CIRCUIT

In the protector circuit of BA-F1, IC/HA-12002 is adopted to prevent ① the damage on speakers caused by the DC-drift ② the overcurrent flowing the output stage due to the overload and ③ the pop-noise occurred at switching the power.

The configuration of the protector circuit and the interior schematic diagram of HA-12002 are shown in Figs. 2-1 and 2-2, respectively.

Fig. 2-1 Configuration of protector Circuit

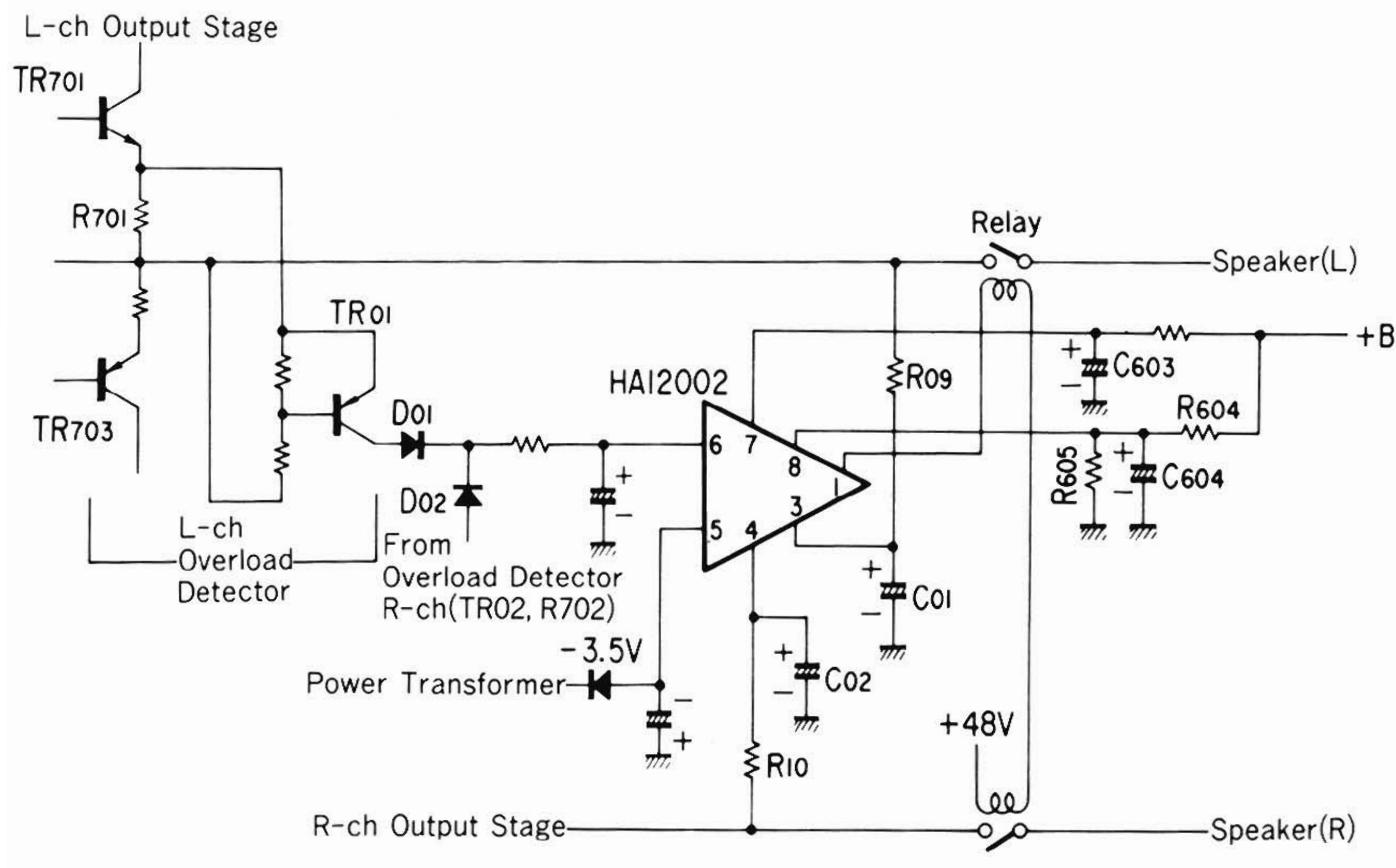
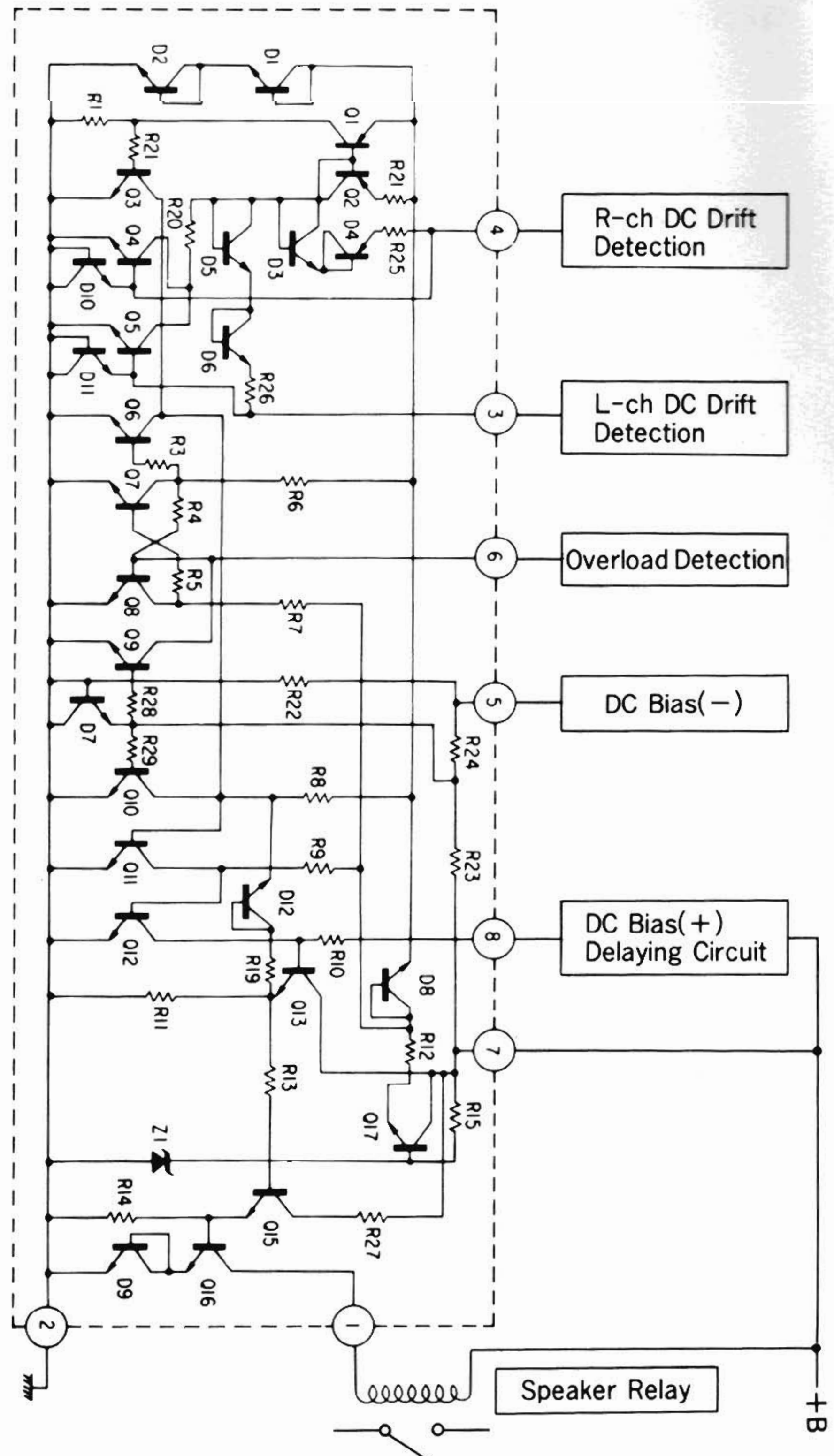


Fig. 2-2 Schematic Diagram of HA-12002





**Protector circuit with IC, HA-12002**

This protector IC provides the input terminals for detecting  $\pm$ DC drift, Overload, and pop-noise occurred at switching the power, and output terminal for switching the speaker relay. By the function above, when there are any disorder with amplifier, the output is immediately separated from speaker.

**\* Prevention against pop-noise at switching the power.**

Since the relay remains OFF for a certain period by the time constant of R604, R605 and C604 when power switch is turned ON, the pop-noise can be eliminated. When turning OFF the power switch, the voltage drop of pin No. 5 is faster than that of Pin No. 7, 8, therefore, the speaker relay turns OFF as soon as power is switched OFF. Resultly, the pop-noise occurred at switching the power OFF is eliminated.

**\*  $\pm$ DC drift detection**

When DC voltage over +1.6 V or under -1.86 V is applied to pin No. 3 (or No. 4) to be its voltage detected by R09 and C01 (or R10 and C02), the speaker relay is turned OFF.

**\* Detection against overload**

When speaker terminal of amplifier is shorted or over loaded, the excessive current flows into emitter resistor R701 (or R702) of power transistor and makes TR01 (or TR02) ON and if the DC voltage of pin No. 6 rises over +1.4 V by above phenomenon, the relay is turned OFF. The relay is kept OFF in spite of the DC voltage being dropped. In order to reset the relay, it is necessary to turn the power switch OFF.

**3. ADJUSTMENTS** (See Top View on page 5, and Bottom View on page 7.)

- Notes: 1. Room Temperature . . . 18°C ~ 28°C (65°F ~ 83°F)      2. For this adjustment, run the unit for more than 5 minutes after the power is switched ON with its level volumes minimum.

**3-1. F-2965, F-2966 DC-0V and Bias Current Adjustment**

Note: Before adjusting or confirming the bias current, avoid such a measurement that the power transistors are heated.

STEP	SUBJECT	MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARK
1.	DC-0V (L-CH) Adj.	Voltage between (+) and (-) of Speaker Terminal (L-CH)	VR01 on F-2965	DC 0V $\pm$ 10 mV	Before turning ON power switch, set VR01 to center position in case of replacing F-2965 or F-2966.
2.	DC-0V (R-CH) Adj.	Voltage between (+) and (-) of Speaker Terminal (R-CH)	VR01 on F-2966		
3.	Bias Current (L-CH) Adj.	Voltage between emitters of TR705 and TR707 (See Fig. 3-1.)	VR02 on F-2965	DC 20 mV $\pm$ 2 mV	Before turning ON power switch, turn VR02 fully counterclockwise in case of replacing F-2965, or F-2966. In this adjustment, the bias current is converted into the voltage.
4.	Bias Current (R-CH) Adj.	Voltage between emitters of TR706 and TR708 (See Fig. 3-1.)	VR02 on F-2966		

**3-2. F-2964 Peak Meter Level Adjustment and Lighting Level Adjustment on Peak Indicator**

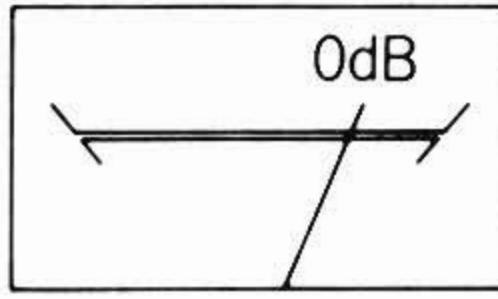
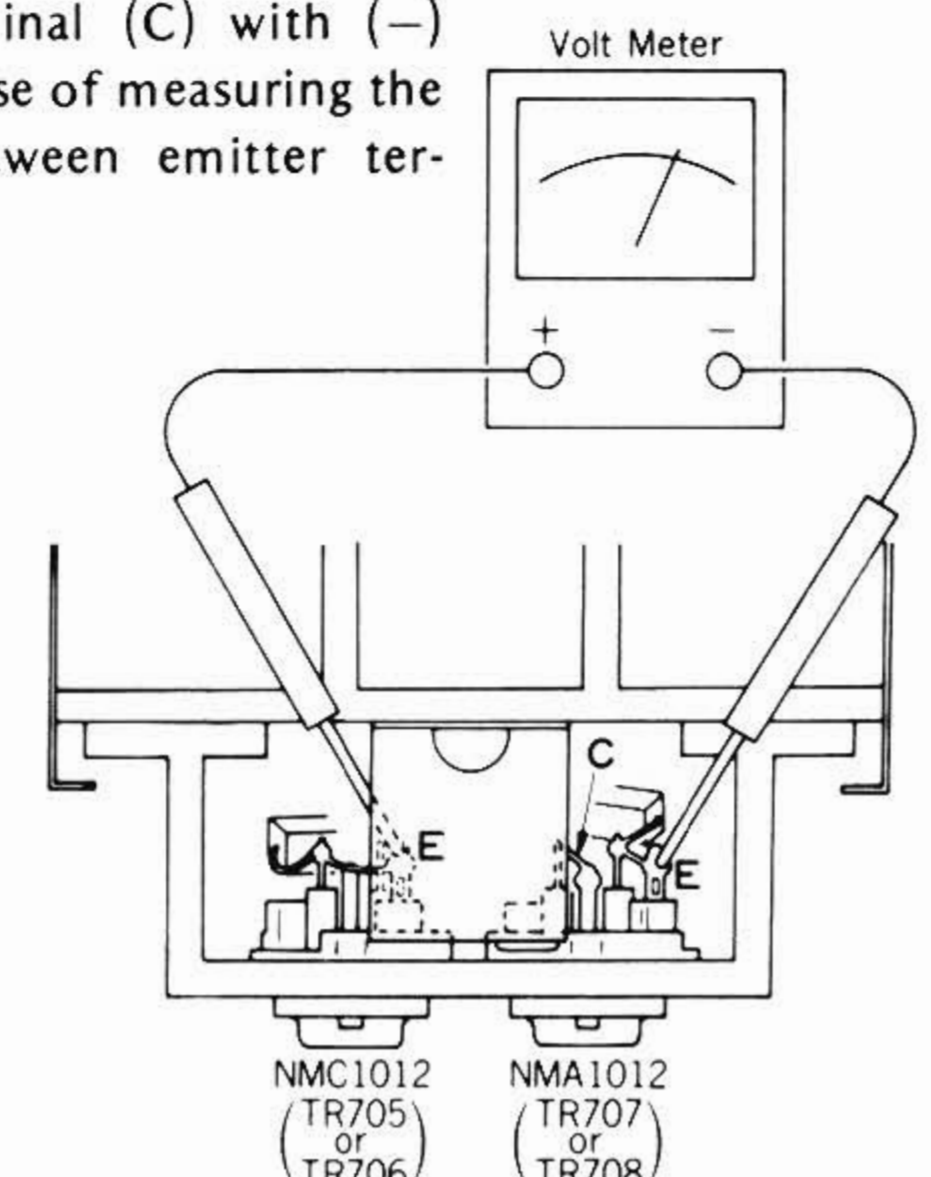
SETTING	STEP	SUBJECT	ADJUST	ADJUST FOR
1. Set level volumes of the unit maximum. 2. Feed 1 kHz sine-wave signal from audio oscillator to input terminals, L and R of the unit. 3. Set the output voltage of the unit 29.7V to adjust the output of oscillator.	1.	Peak meter level Adj. (L-CH)	VR01 on F-2964	Set the pointer of peak meter to 0 dB. 
	2.	Peak meter level Adj. (R-CH)	VR02 on F-2964	
	3.	Lighting level Adj. on peak indicator (L-CH)	VR03 on F-2964	Set VR03 and VR04 to the position where the peak indicator begins to light. Confirm that peak indicators become luminous at 0 dB $\pm$ 1 dB of the peak meter indication by varying the output of oscillator.
	4.	Lighting level Adj. on peak indicator (R-CH)	VR04 on F-2964	

Fig. 3-1 Bottom View of Heat Sink

\* Power transistors of each channel are arranged as shown in this fig.

\* Be careful not to touch a collector terminal (C) with (-) probe in case of measuring the voltage between emitter terminals (E).

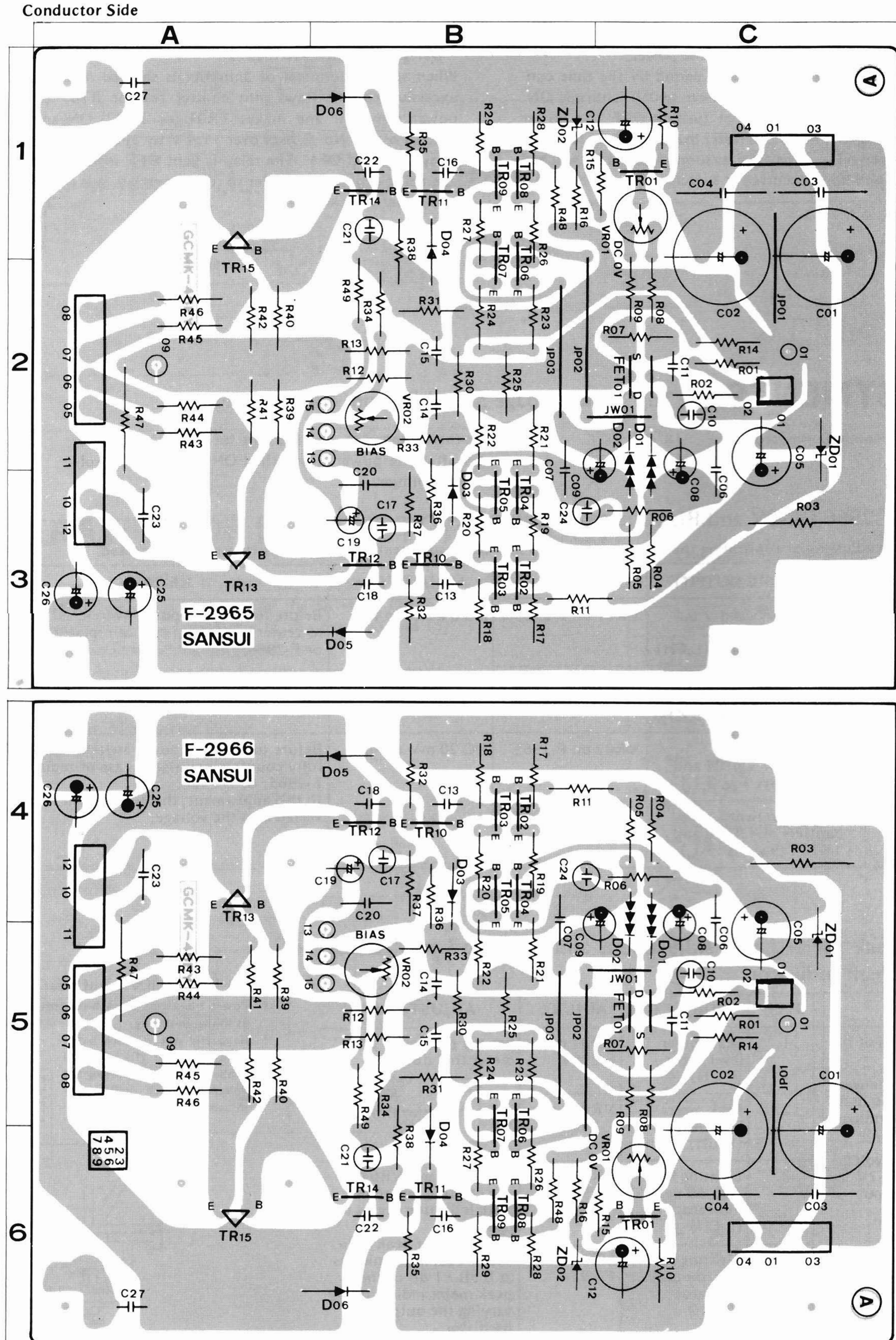




# 4. PARTS LOCATION & PARTS LIST

- 4-1. F-2965 Driver Amp. Circuit Board L-CH (Stock No. 7572271)  
 F-2966 Driver Amp. Circuit Board R-CH (Stock No. 7572281)

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.



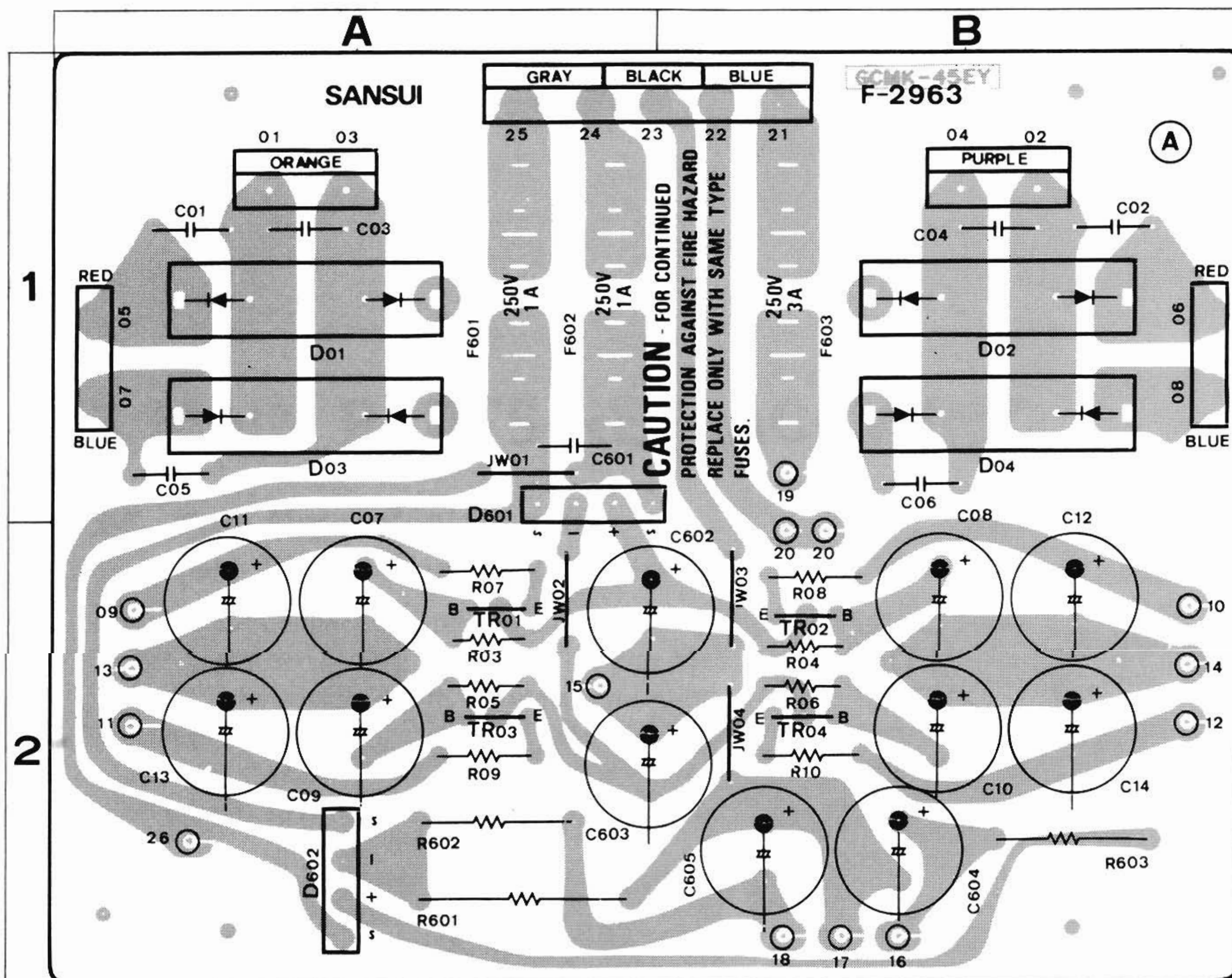


Parts List <F-2965/F-2966>

Parts No.	Stock No.	Description	Position	Parts No.	Stock No.	Description	Position	Parts No.	Stock No.	Description	Position
<b>•Transistor</b>				<b>F-2965 F-2966</b>							
TR01	0306680, 1	2SC2071 B, V	1C 6C	D 05, 06	0310350	10D2	3B, 1B 4B, 6B	C 22	0623330	33pF 125V P.C.	1B 6B
TR02 ~ 05	0306740, 1	2SC1845 F, E	3B 4B	ZD01	0317190	RD-27F	2C 5C	C 23	0681014	0.047μF 400V M.C.	3A 4A
TR06 ~ 09	0301090, 1	2SA992 F, E	1, 2B 6B	ZD02	0316290	RD12E	1B 6B	C 24	0622681	680pF 125V P.C.	3B 4B
TR10	0301030, 1	2SA939 B, V	3B 4B					C 27	0680049	0.1μF 100V M.C.	1A 6A
TR11, 12	0306680, 1	2SC2071 B, V	1B, 3B 6B, 4B	C 03, 04	0681018	0.22μF 400V M.C.	1C 6C	R 03	0212182	1.8kΩ 2W N.I.R.	3C 4C
TR13	0306930, 1	2SC2238 O, Y	3A 4A	C 06, 07	0681013	0.033μF 400V M.C.	2B, C 4B, C	R 47	0212100	10Ω 2W N.I.R.	2A 5A
TR14	0301030, 1	2SA939 B, V	1B 6B	C 10	0622201	200pF 125V P.C.	2C 5C				
TR15	0301240, 1	2SA968 O, Y	1A 6A	C 11	0623220	22pF 125V P.C.	2C 5C	VR01	1034150	100Ω (B) DC 0V Adj.	1C 6C
<b>•FET</b>											
FET01	0370311, 2	2SK129 L, M	2C 5C	C 13	0623209	2pF 125V P.C.	3B 4B	VR02	1034210	1kΩ (B) Bias Current Adj.	2B 5B
<b>•Diode</b>											
D 01, 02	0310480	SV-03	2, 3C 4, 5C	C 14, 15	0623309	3pF 125V P.C.	2B 5B				
D 03, 04	0311160	1S2473D	3B, 1B 4B, 6B	C 16	0623209	2pF 125V P.C.	1B 6B				
				C 17	0622102	1000pF 125V P.C.	3B 4B				
				C 18	0623330	33pF 125V P.C.	3B 4B				
				C 20	0681014	0.047μF 400V M.C.	3B 4B				
				C 21	0622102	1000pF 125V P.C.	1B 6B				

4-2. F-2963 Power Supply Circuit Board (Stock No. 7503381)

Conductor Side



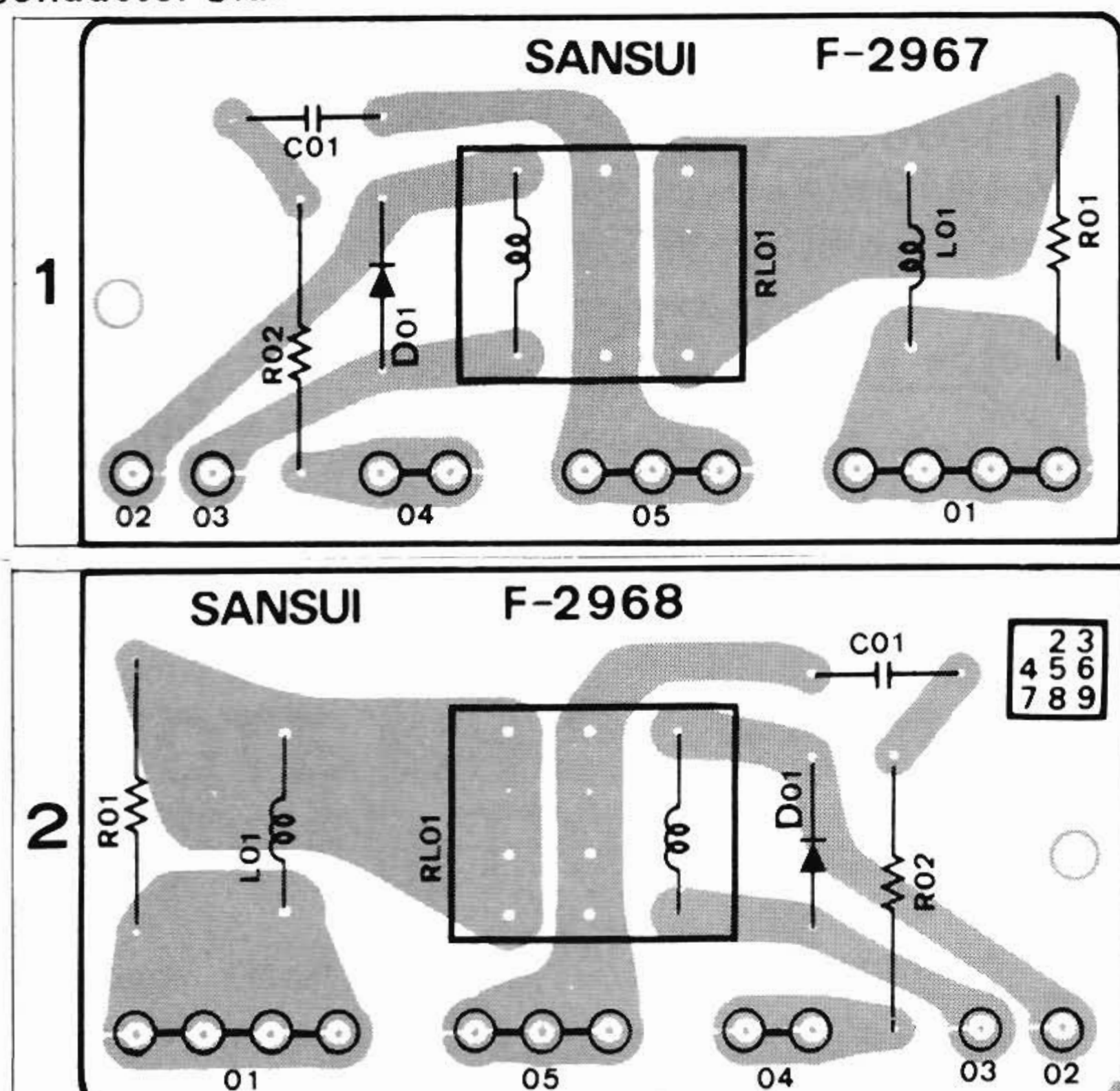
Parts List

Parts No.	Stock No.	Description	Position
<b>•Transistor</b>			
TR01, 02	0306281, 2	2SC1735 D, E	2A, 2B
TR03, 04	0300721, 2	2SA850 D, E	2A, 2B
<b>•Diode</b>			
D 01, 02	0311290	SS-3	1A, 1B
D 03, 04	0311300	SS-3R	1A, 1B
D 601, 02	0311700	RB-152	1A, 2A
C 01 ~ 06	0606108	0.1μF 250V M.C.	1A, B
C 601	0606108	0.1μF 250V M.C.	1A
C 602, 603	0519906	470μF 80V E.C.	2A, 2B
R 07 ~ 10	0191100	10Ω 1/4W F.R.	2A, B
R 601	0185152	1.5kΩ 5W Ce.R.	2A
R 602	0212181	180Ω 2W N.I.R.	2A
R 603	0212820	82Ω 2W N.I.R.	2B
F 603	0431260	AC Fuse 3A, 250V	1B
	0432260	AC Fuse 3A, 250V	1B

4-3. F-2967 Speaker Relay Circuit Board L-CH (Stock No. 7597811)

F-2968 Speaker Relay Circuit Board R-CH (Stock No. 7597821)

Conductor Side



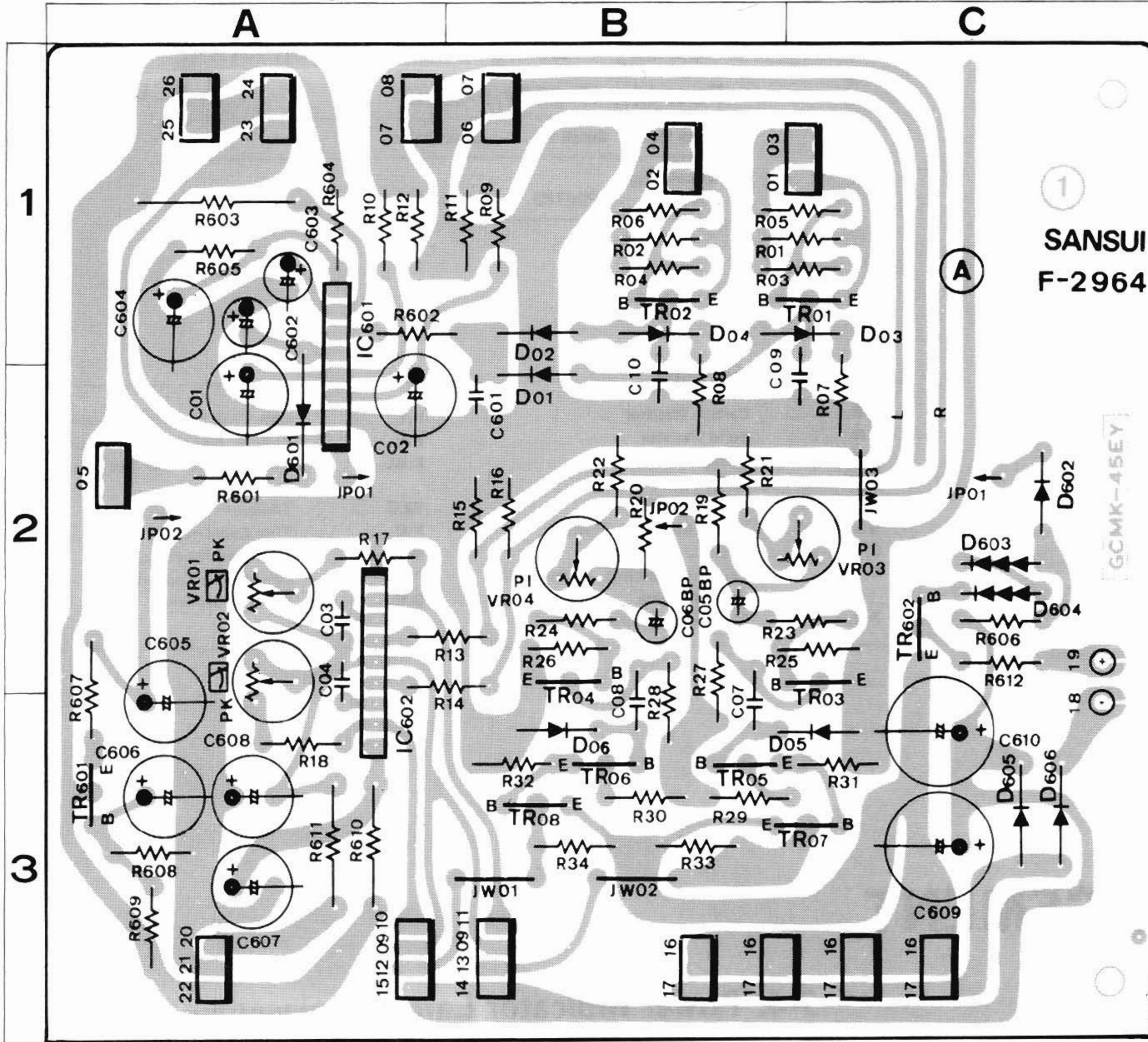
Parts List <F-2967/F-2968>

Parts No.	Stock No.	Description	Position
<b>•Diode</b>			
D 01	0310340	10D1	F-2967 F-2968 1 2
C 01	0681014	0.047μF 400V M.C.	1 2
R 01	0212229	2.2Ω 2W N.I.R.	1 2
R 02	0212100	10Ω 2W N.I.R.	1 2
L 01	4290370	1μH Coil	1 2
RL01	1150400	Relay	1 2



4-4. F-2964 Protector and Meter Amp. Circuit Board (Stock No. 7597801)

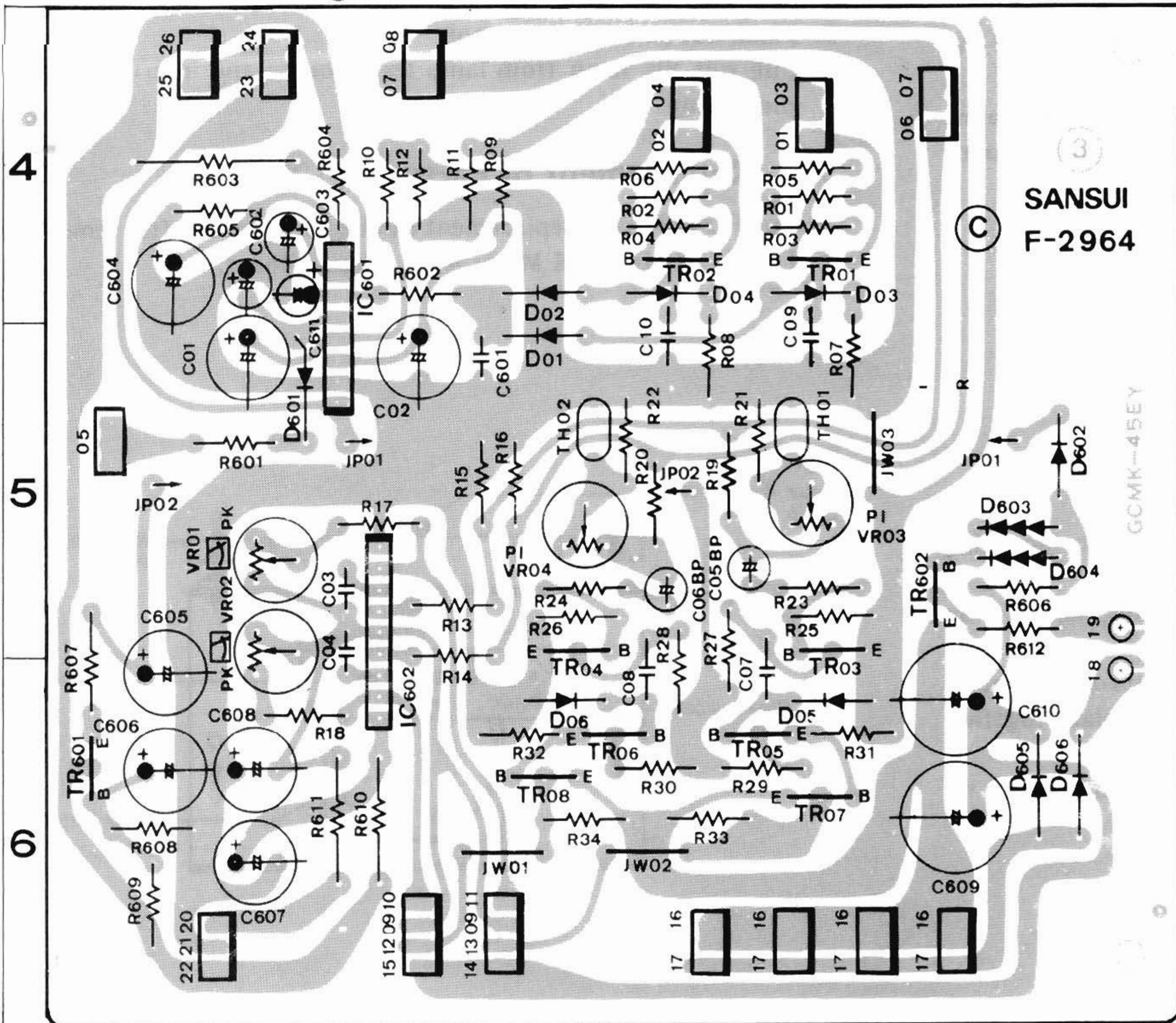
Conductor Side <F-2964 (A)>



Parts List

Parts No.	Stock No.	Description	Position
			F-2964 A F-2964 C
●Transistor			
TR01, 02	0301090, 1	2SA992 F, E	1C, 1B 4C, 4B
TR03 ~ 06	0305951, 2	2SC945 Q, P	2, 3BC 5, 6BC
TR07, 08	0306281, 2	2SC1735 D, E	3C, 3B 6C, 6B
TR601 ~ 03	0306740, 1	2SC1845 F, E	2C, 3A 5C, 6A
●IC			
IC 601	0360900	HA12002	1, 2A 4, 5A
IC 602	0361000	TA7318P	2A 5A
●Diode			
D 01, 02	0310340	10D-1	2B, 1B 5B, 4B
D 03, 04	0310340	10D1	2B, 1B 5B, 4B
D 05, 06	0311160	1S2473D	1C, 1B 4C, 4B
D 601	0310350	10D2	3C, 3B 6C, 6B
D 602	0311160	1S2473D	2A 5A
D 603, 604	0340170	MV-103	2C 5C
D 605, 606	0310340	10D1	3C 6C
C 09, 10	0680041	0.047μF 100V M.C.	2C, 2B 5C, 5B
R 603	0212222	2.2kΩ 2W N.I.R.	1A 4A
R 607	0191100	10Ω 1/4W F.R.	3A 6A
R 610, 611	0211272	2.7kΩ 1W N.I.R.	3A 6A
VR01, 02	1035040	330Ω (B) Peak Meter Level Adj.	2A 5A
VR03, 04	1035090	2.2kΩ (B) Peak Indicator Adj.	2C, 2B 5C, 5B
TH01, 02	0320150	Thermistor	5C, 5B

Conductor Side <F-2964 (C)>

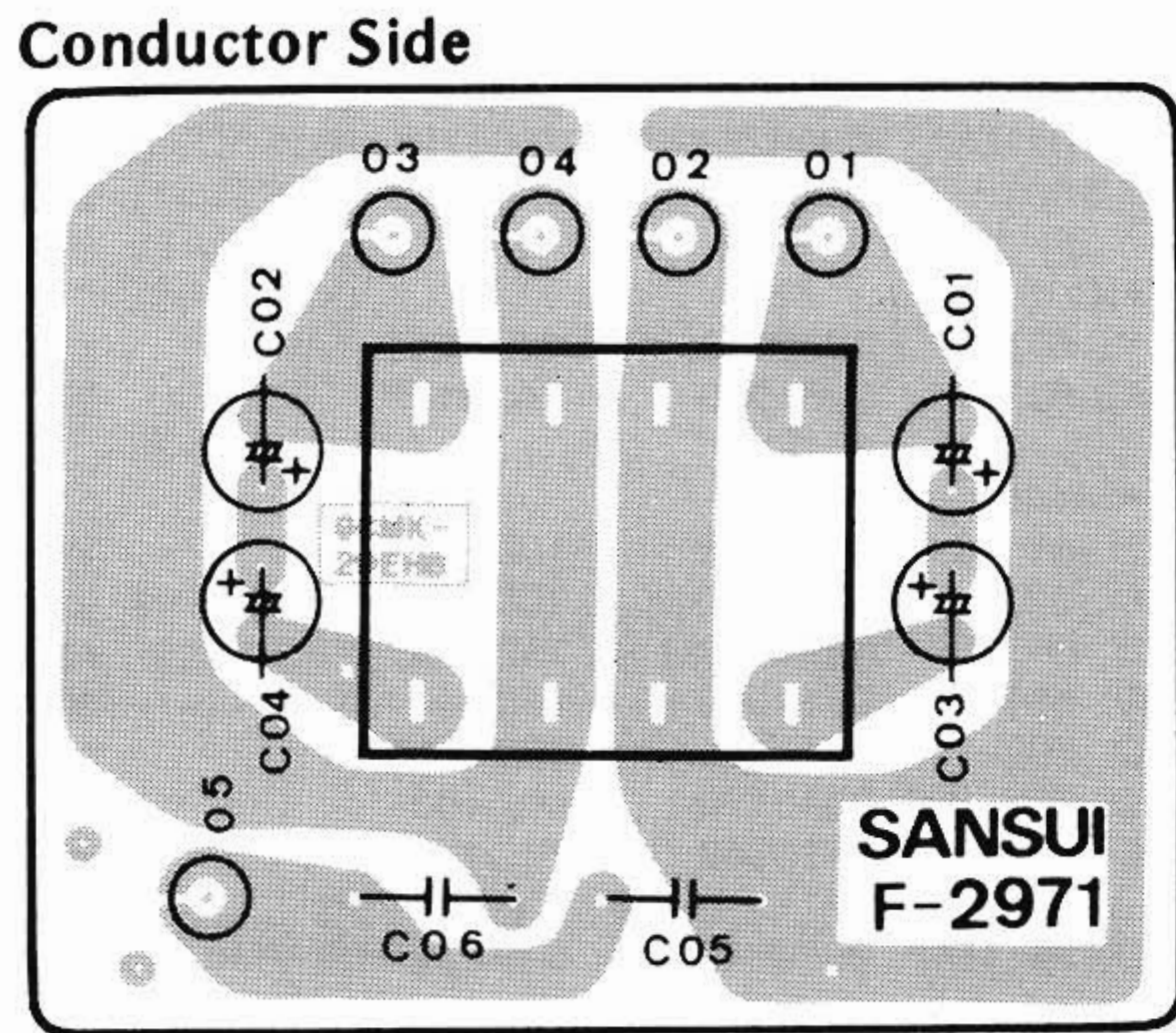


Note: There are 2 types of conductor pattern for F-2964 as shown above.



- The circuit boards, F-2971, F-2970 and F-2969 are not supplied as the assembled, the individual parts on the circuit boards, however, are provided for orders.

#### 4-5. F-2971 Input Terminal Circuit Board



##### Parts List

Stock No.	Description
2200580	4P Input Terminal

#### 4-6. F-2969, F-2970 Bias Compensating Circuit Board

##### Parts List <F-2969/F-2970>

Parts No.	Stock No.	Description
•Transistor TR01	0306740	2SC1845F

##### • Abbreviations

C.R. . . . . . Carbon Resistor	E.L. . . . . . Low Leak Electrolytic Capacitor
S.R. . . . . . Solid Resistor	E.B. . . . . . Bi-Polar Electrolytic Capacitor
Ce.R. . . . . . Cement Resistor	E.BL. . . . . . Low Leak Bi-Polar Electrolytic Capacitor
M.R. . . . . . Metal Film Resistor	Ta.C. . . . . . Tantalum Capacitor
F.R. . . . . . Fusing Resistor	F.C. . . . . . Film Capacitor
N.I.R. . . . . . Non-Inflammable Resistor	M.P. . . . . . Metalized Paper Capacitor
C.C. . . . . . Ceramic Capacitor	P.C. . . . . . Polystyrene Capacitor
C.T. . . . . . Ceramic Capacitor, Temperature Compensation	G.C. . . . . . Gimmic Capacitor
E.C. . . . . . Electrolytic Capacitor	

## 5. MAIN PARTS REPLACEMENT

### 5-1. Peak Meter Replacement

(See Figs. 5-1 and 7-2, Top View)

1. Pluck out connectors which join the peak meter to F-2964.
2. Remove 2 screws (A) shown in 7-2, Top View, and take off the peak meter together with the meter mounting board.
3. Remove 2 screws (B) fixing lump mounting board to peak meter.
4. Remove 2 screws (C) fixing the peak meter to the meter mounting frame that the peakmeter can be taken off.

### 5-2. Peak Indicator Lamp Replacement

1. Remove the lamp mounting board, following to procedures 1 ~ 3 of 5-1.
2. Pull out the lamp from the lamp mounting board.

### 5-3. Meter Illumination Lamp Replacement

(See Fig. 5-1)

1. Take off the peak meter together with the meter mounting frame, following to procedures 1 ~ 2 of 5-1.
2. Disconnect wires of the meter illumination lamp, soldered on the lamp mounting board.
3. Remove 2 screws (D) fixing the illumination plate to the meter mounting board, and take off the illumination plate together with the meter illumination lamp.
4. Pull out the lamp from the illumination plate and insert a replacement lamp.

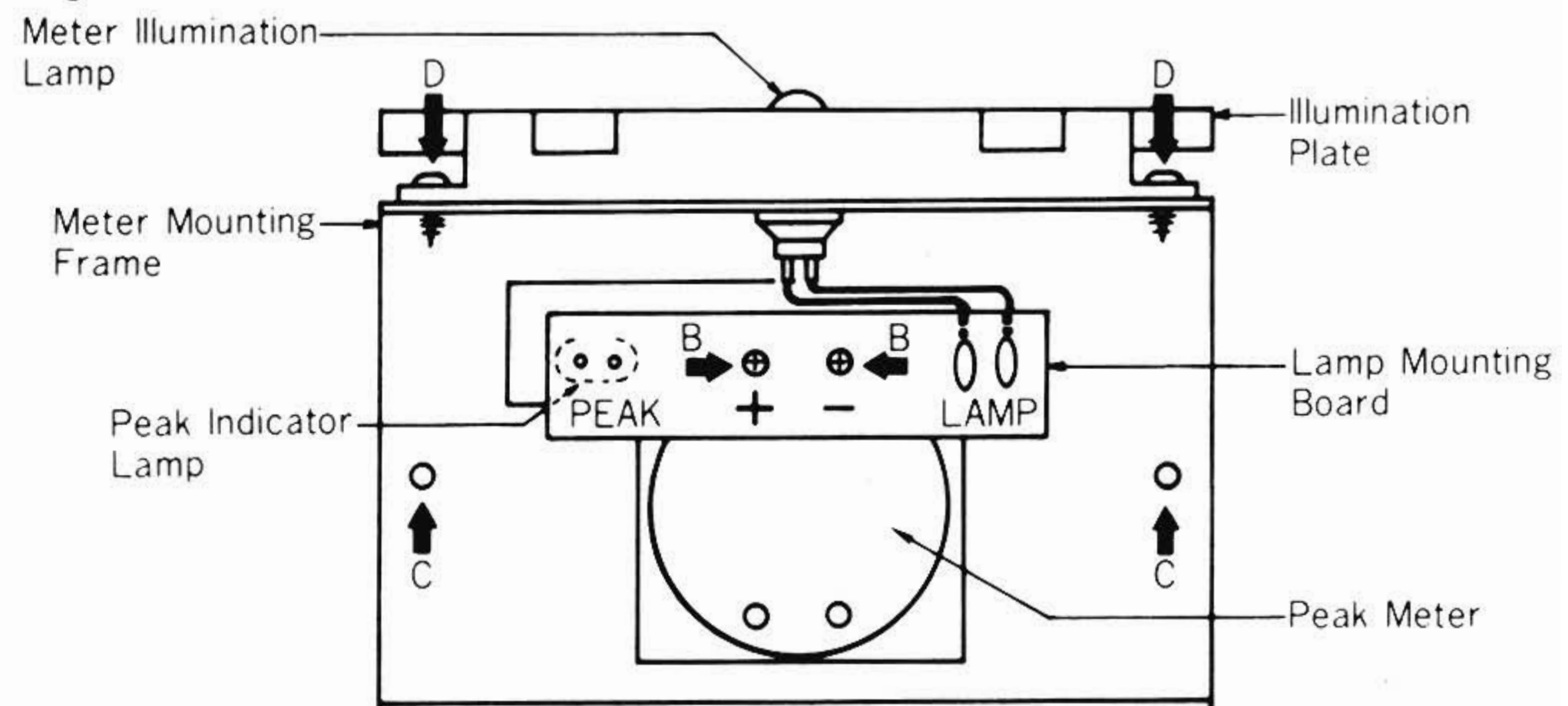
### 5-4. Power Indicator Lamp Replacement

1. Take off front panel to remove 4 screws fixing the front panel to chassis.
2. Pluck out power switch knob.
3. Pull out the lamp from lamp fixing board and insert a replacement lamp.

### 5-5. Replacement of Parts on F-2963

1. For F-2963, parts replacement can be easily made after removing F-2964, Protector & Meter Amp. Circuit Board.

Fig. 5-1



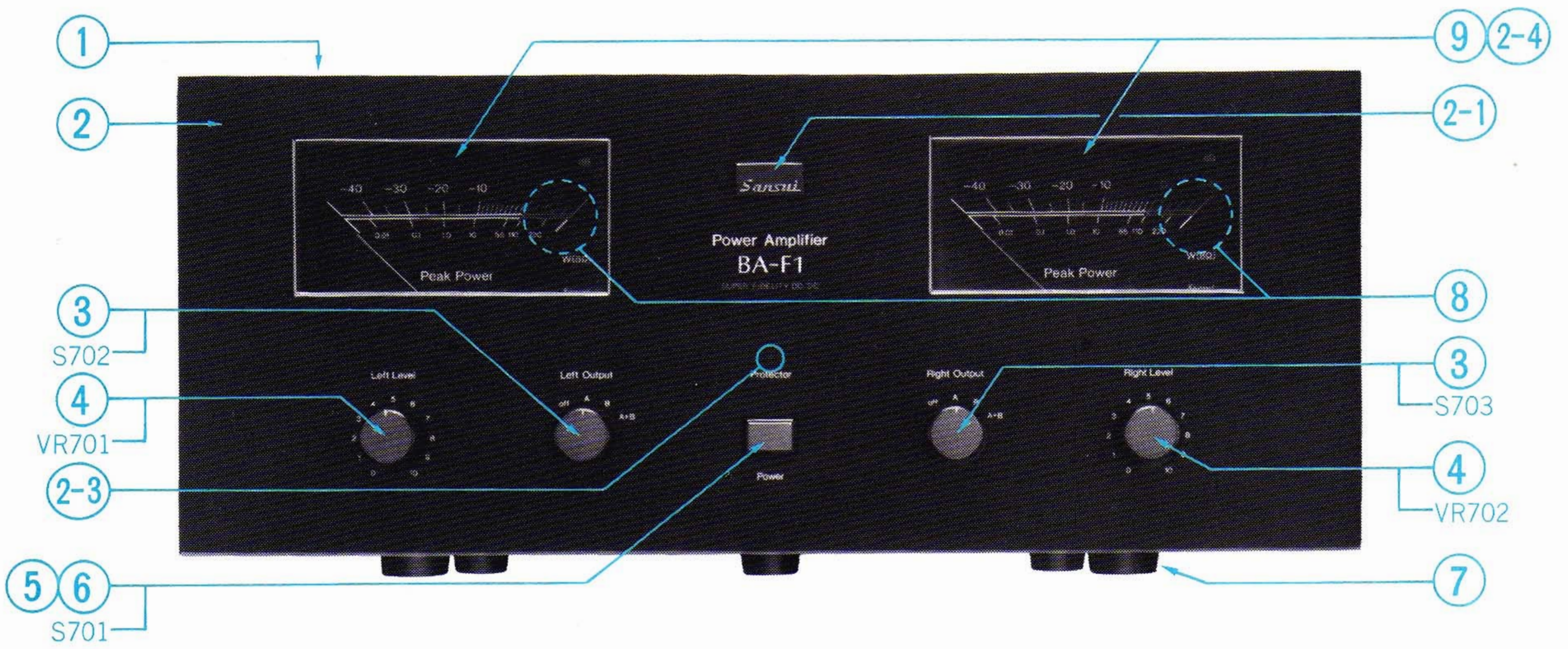
## 6. NOTE WHEN HANDLING POWER TRANSISTORS

For power transistors NMA1012 and NMC1012, the glass seal between emitter (or base) lead and metal header (collector) might be cracked, if the emitter (or base) lead is bended or shocked.

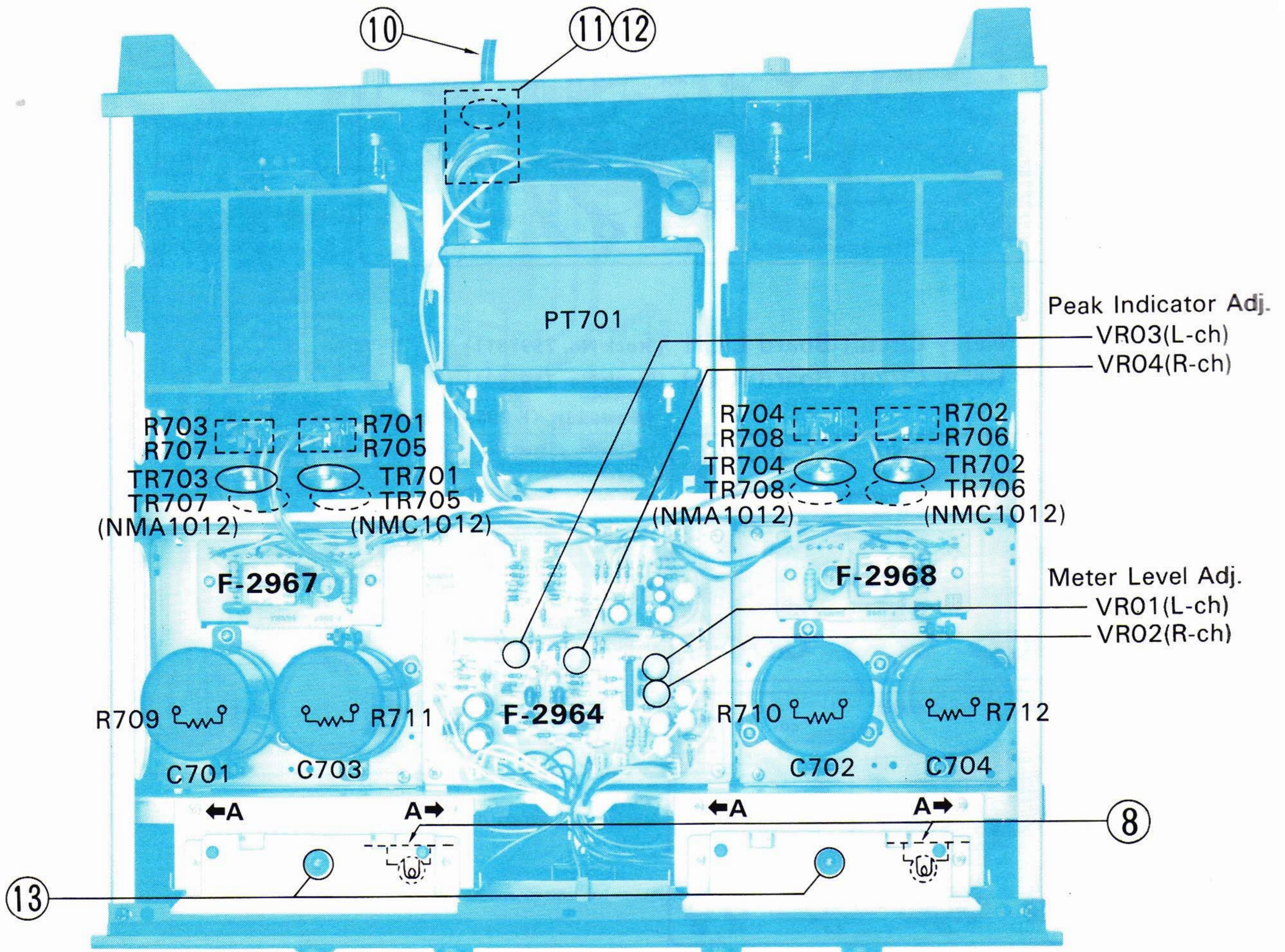


# 7. OTHER PARTS

7-1. Front View

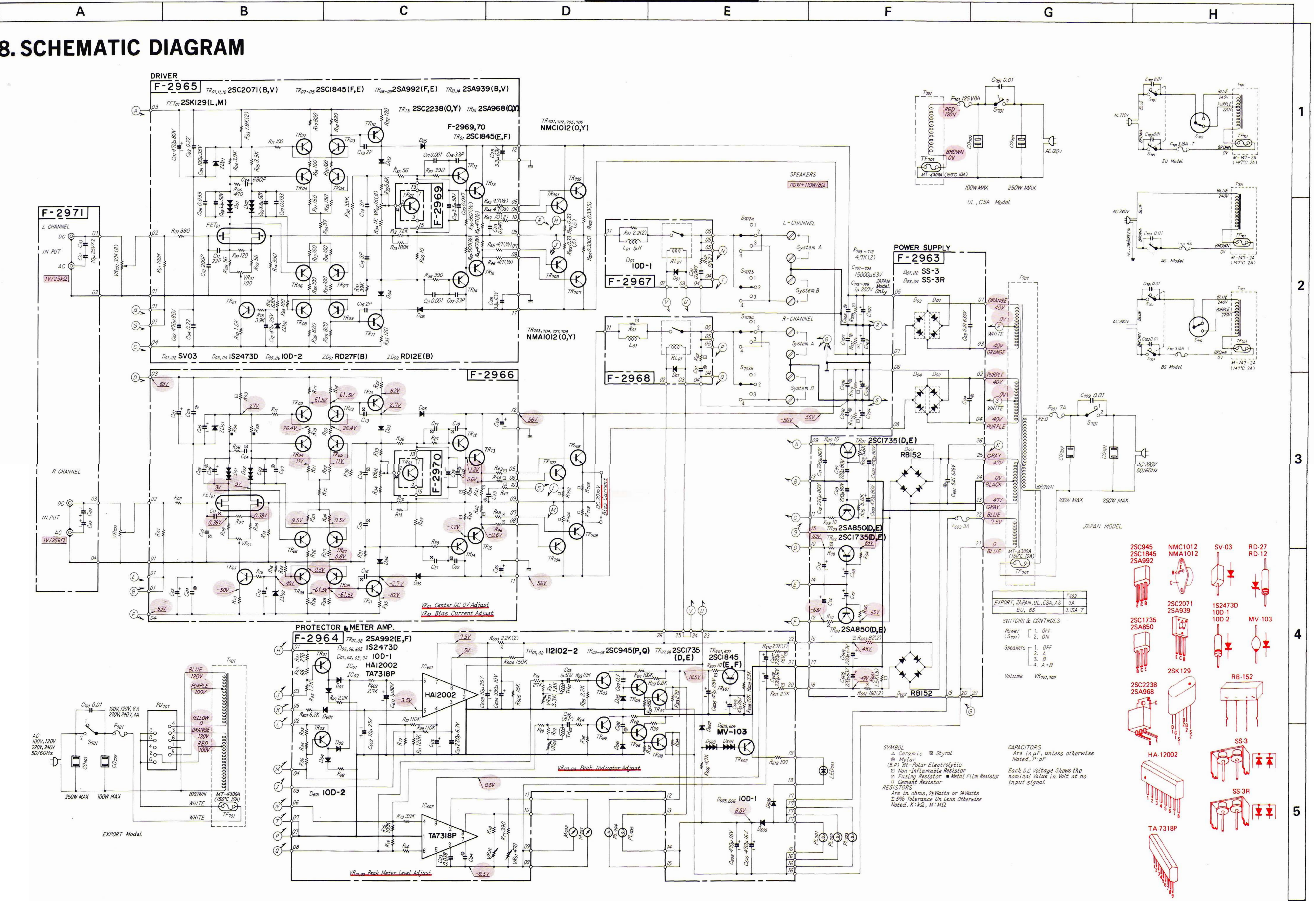


7-2. Top View





# 8. SCHEMATIC DIAGRAM



- 2SC945
- 2SC1845
- 2SA992
- NMC1012
- NMA1012
- SV 03
- RD 27
- RD 12
- 2SC2071
- 2SA939
- 2SC1735
- 2SA850
- IS2473D
- 10D-1
- 10D-2
- MV-103
- 2SC2238
- 2SA968
- 2SK129
- RB-152
- SS-3
- SS-3R
- HA-12002
- TA-7318P

**SWITCHES & CONTROLS**  
 Power [ 1. OFF (30W) 2. ON ]  
 Speakers [ 1. OFF 2. A 3. B 4. A+B ]  
 Volume VR<sub>01,02</sub>

**SYMBOLS**  
 □ Ceramic □ Styrol  
 ⊗ Mylar  
 (B.P) Bi-Polar Electrolytic  
 ⊕ Non-Inflamable Resistor  
 ⊕ Fusing Resistor  
 ⊕ Metal Film Resistor  
 ⊕ Cement Resistor

**RESISTORS**  
 Are in ohms, 1/8 Watts or 1/4 Watts  
 ±5% Tolerance Unless Otherwise Noted. K:kΩ, M:MΩ

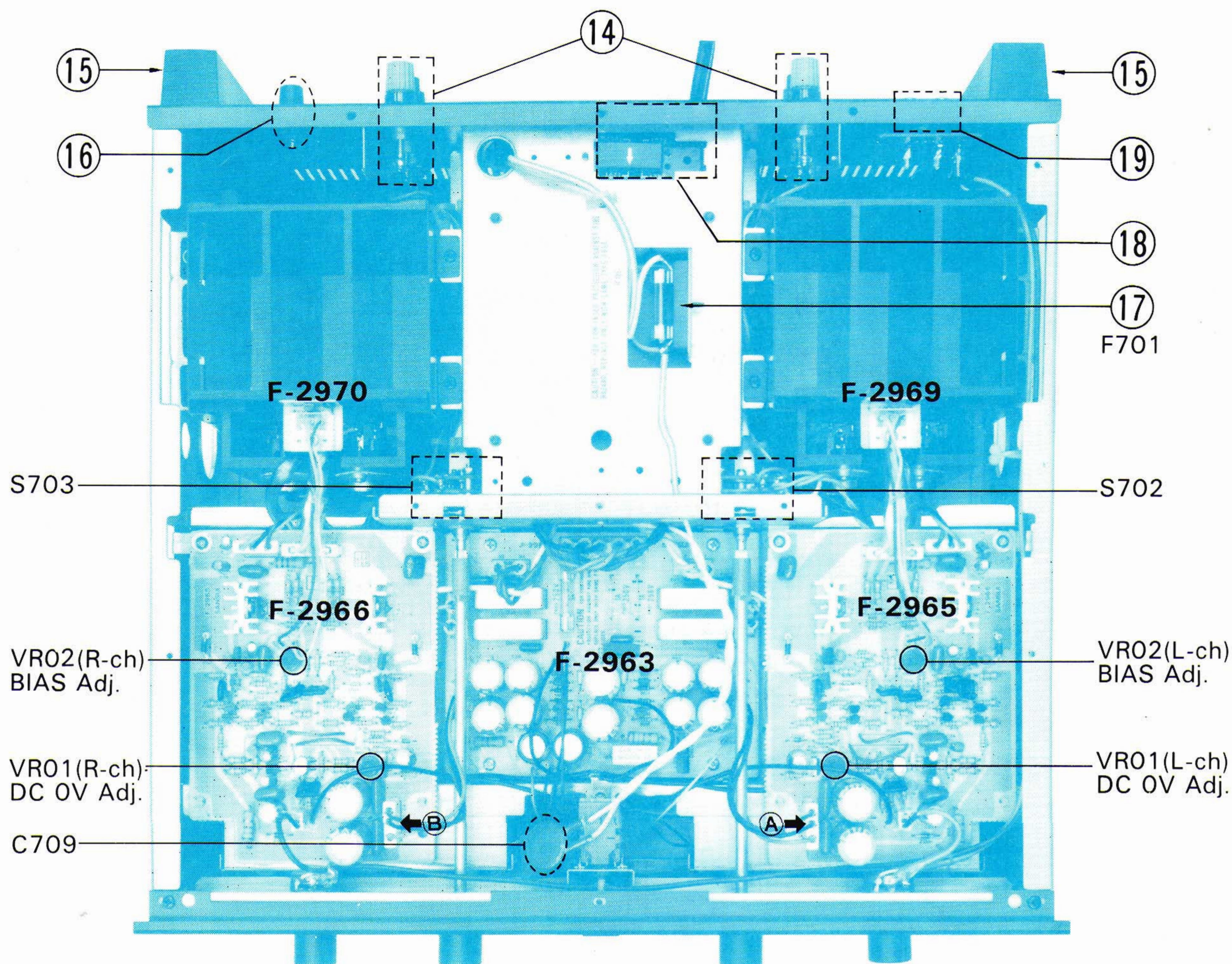
**CAPACITORS**  
 Are in μF, unless otherwise Noted. P:pF

Each DC Voltage Shows the nominal value in Volt at no input signal

1  
2  
3  
4  
5  
6



7-3. Bottom View



Parts List <Front View, Top View and Bottom View >

Parts No.	Stock No.	Description
1	5006960	Bonnet
2	7008280	Front Panel Ass'y
2-1	5336600	Sansui Badge
2-2	5152210	CS Washer
2-3	0319170	LED
2-4	5296730	Glass, Peak Meter
3	5319250	Knob, output selector
S 702, 703	1102790	Rotary Switch, output selector
4	5319250	Knob, level volume
VR701, 702	1000370	Level Volume, 30kΩ (B)
5	7106370	Knob Ass'y, power switch
6	7726230	Power Indicator Ass'y
S 701	1131890	Push Switch, power switch
7	5507350	Leg
8	7726280	Lamp Ass'y, peak indicator
9	4301350, 1	Peak Meter
10	3800490	Power Cord
11	3910490	Strain Relief
12	2450070	AC Outlet
13	0400560	Lamp, 8V 0.3A
14	2230220	1P Output Terminal (Red)
	2230230	1P Output Terminal (Black)

Parts No.	Stock No.	Description
15	5216100	Back Stand
16	2230190	Ground Terminal
17	2310250	Fuse Holder
F 701	0432280	AC Fuse 4A, 125V
	0432560	AC Fuse 8A, 125V
18	2410830	Voltage Selector, socket
	2410091	Voltage Selector, plug
19	2200580	4P Input Terminal
●Transistor		
TR701, 702	0306710, 1	NMC1012 O, Y
TR703, 704	0301060, 1	NMA1012 O, Y
TR705, 706	0306710, 1	NMA1012 O, Y
TR707, 708	0301060, 1	NMA1012 O, Y
C 701, 702	0559523	15000μF 63V E.C.
C 703, 704	0559523	15000μF 63V E.C.
C 709	0659801	0.01μF 150V C.C.
R701 ~ 708	0159130	0.33Ω 5W Ce.R.
R709 ~ 712	0202472	4.7kΩ 2W N.I.R.
PT 701	4003070	Power Transformer

※CAUTION: If the power is switched ON with the connector (A) ( B ). (See 7-3 Bottom View) plucked out from F-2965 (F-2966), TR01, 03 (TR02, 04) on F-2963 might be damaged due to the terminal 13 (14) on F-2963 being separated from earth line.

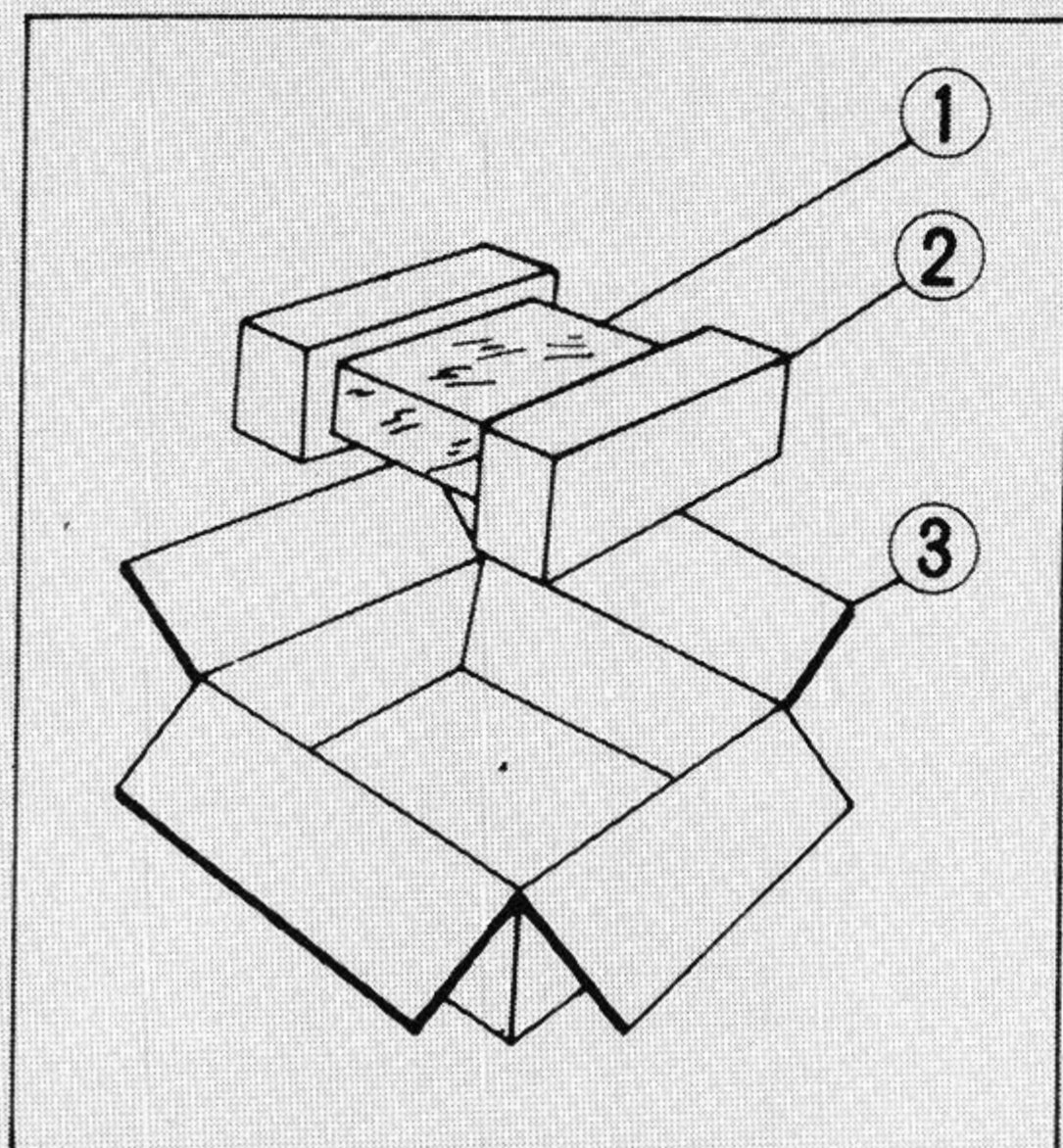


## 9. PACKING LIST

Parts No.	Stock No.	Description
1	9116790	Vinyl Cover
2	9028340	Styrofoam Packing
3	9001850	Carton Case

## 10. ACCESSORY PARTS LIST

Stock No.	Description	Q'ty
9204080	Operating Instruction	1
5396740	Rack Mounting Adaptor	2
9238190	Schematic Diagram	1



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**Sansui**