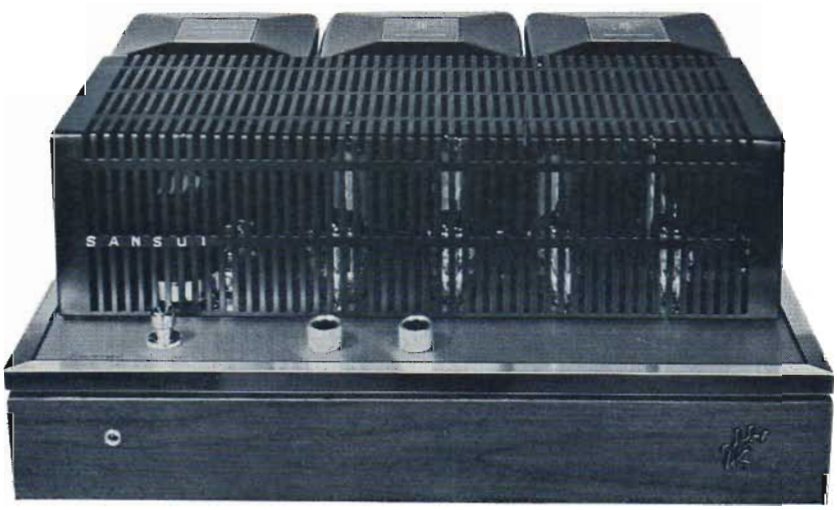
OPERATING INSTRUCTIONS & SERVICE MANUAL

STEREOPHONIC BASIC AMPLIFIER

SANSUI BA-202



Sansui®

SANSUI ELECTRIC COMPANY LIMITED

Congratulations on owning this high quality power amplifier manufactured by Sansui, the World's leading manufacturer of quality audio components.
Yours is the sister model of the BA-303 which has been acknowledged as a breakthrough in the audio history. Walnut case, nonglare satin black finish, select parts and many other features will give you many years of listening pleasure and satisfaction. The BA-202 can develop its outstanding performance as a power amplifier for mid-ranges and tweeters in the multi-channel system as well.
This manual has been prepared to guide you in proper operation and maintenance of your BA-202. Please read this carefully and keep it for future reference.

CONTENTS

FEATURES

6R-A8 Power Output Tubes Plus Super Wide-Range Output Transformer

Combined with a super wide-range output transformer having 30 watt class capacity, 6R-A8 power output tubes in the fixed bias arrangement of Class AB push-pull amplifier have set a new standard of stability in performance. The BA-202 assures you of the highest possible stability over extended periods of time.

HD Less Than 0.5% at Rated Output

Harmonic distorsion is less than 0.5% at rated output. IM distortion is less than 1.0% at rated output. The continuous power is 11 watts per channel and the music power is 26 watts.

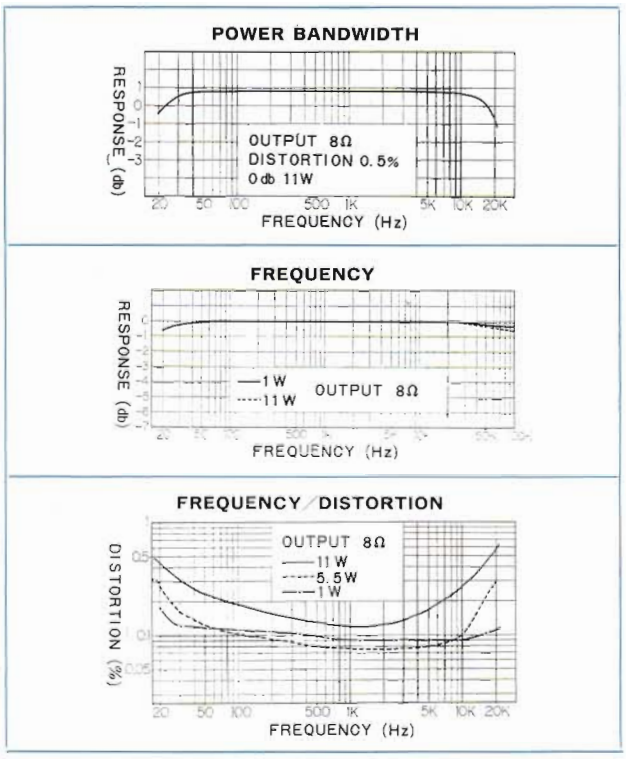
20 to 20,000 Hz Power Bandwidth

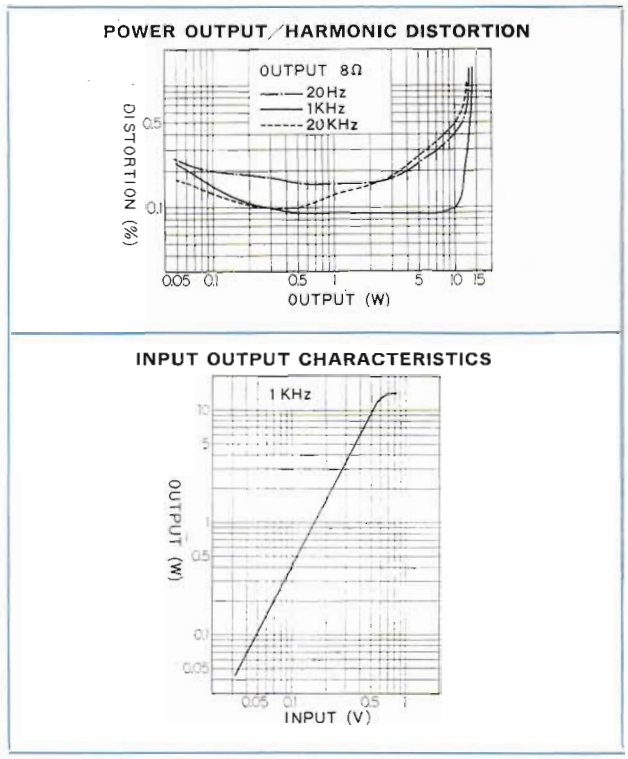
The power bandwidth is 20 to 20,000Hz −3db at 0.5% THD.

Damping Factor 20 for 16 Ohms

More than 16db negative feedback is applied for clear, clean tonal reproduction with the damping factor of 20.

CHARACTERISTICS





SPECIFICATIONS

RATED POWER OUTPUT FOR 8-OHM LOAD	
MUSIC POWER (IHF):	26W
CONTINUOUS POWER:	11W/ch,
STEREO CONTINUOUS POWER WITH BOTH CHANNEL OPERATING SIMULTANEOUSLY:	9W × 2
THD:	less than 0.5%
IM DISTORTION (60 Hz : 7,000 Hz=4 : 1):	less than 1.0% at rated output
POWER BANDWIDTH:	20 to 20,000 Hz at 0.5% THD
FREQUENCY RESPONSE:	20 to 50.000 Hz ± 1 db
CHANNEL SEPARATION:	60 db at rated output
HUM AND NOISE:	70 db at rated output
INPUT SENSITIVITY (FOR RATED OUTPUT):	0.6 V ± 3 db (250 K ohms)
LOAD IMPEDANCE:	8, 16 ohms
DAMPING FACTOR:	20 for 16-ohm load
TUBES:	6R-A8 × 4, 6AQ8 × 2, 12AU7 × 2
DIODES:	SW-05-d × 4, SW-05-02
POWER REQUIREMENTS:	AC 100, 117, 220 or 240 volts (Pre-set 220 volts) 50/60 cycles
POWER CONSUMPTION:	150 VA at full power output
DIMENSIONS:	13 3/5″ × 10 3/5″ × 5 3/5″ high (excluding feet)
WEIGHT:	31 lbs

CONNECTIONS AND OPERATIONS

Speaker Connections

1. Two Speakers (Stereo)

Connect the (+) terminal of the left speaker (as viewed from the listening area) to the LEFT 8Ω or 16Ω SPEAKER terminal on the rear of the amplifier and the (−) to the LEFT C SPEAKER tenminal.

Connect the (+) terminal of the right speaker to the RIGHT 8Ω or 16Ω SPEAKER terminal on the rear of the amplifier and the (−) to the RIGHT C SPEAKER terminal.

2. One Speaker (Monaural)

Connect the LEFT 16Ω SPEAKER terminal to the RIGHT 16Ω SPEAKER terminal on the rear of the amplifier and then connect the (+) of the speaker to it.

Connect the LEFT C SPEAKER terminal to the RIGHT C SPEAKER terminal and then connect the (−) of the speaker to it.

Preamplifier Connections

Connect the left-channel output of the preamplifier to the LEFT input on the rear of the BA-202.

Connect the right-channel output of the preamplifier to the RIGHT input of the BA-202.

Power Switch

The power is applied to the amplifier when the POWER switch is pushed. The power to the amplifier is shut off when the POWER switch is pushed again.

Power Indicator

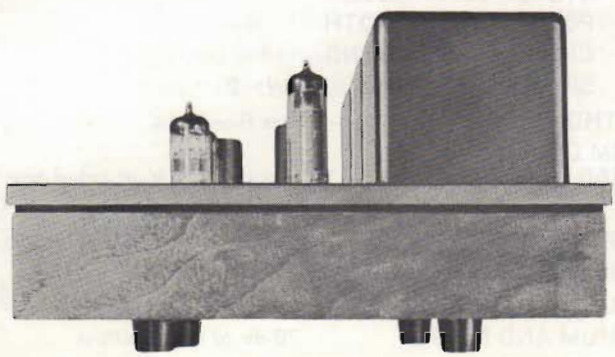
The red indicator lamp glows when the POWER switch is turned ON. It remains lit during the operation.

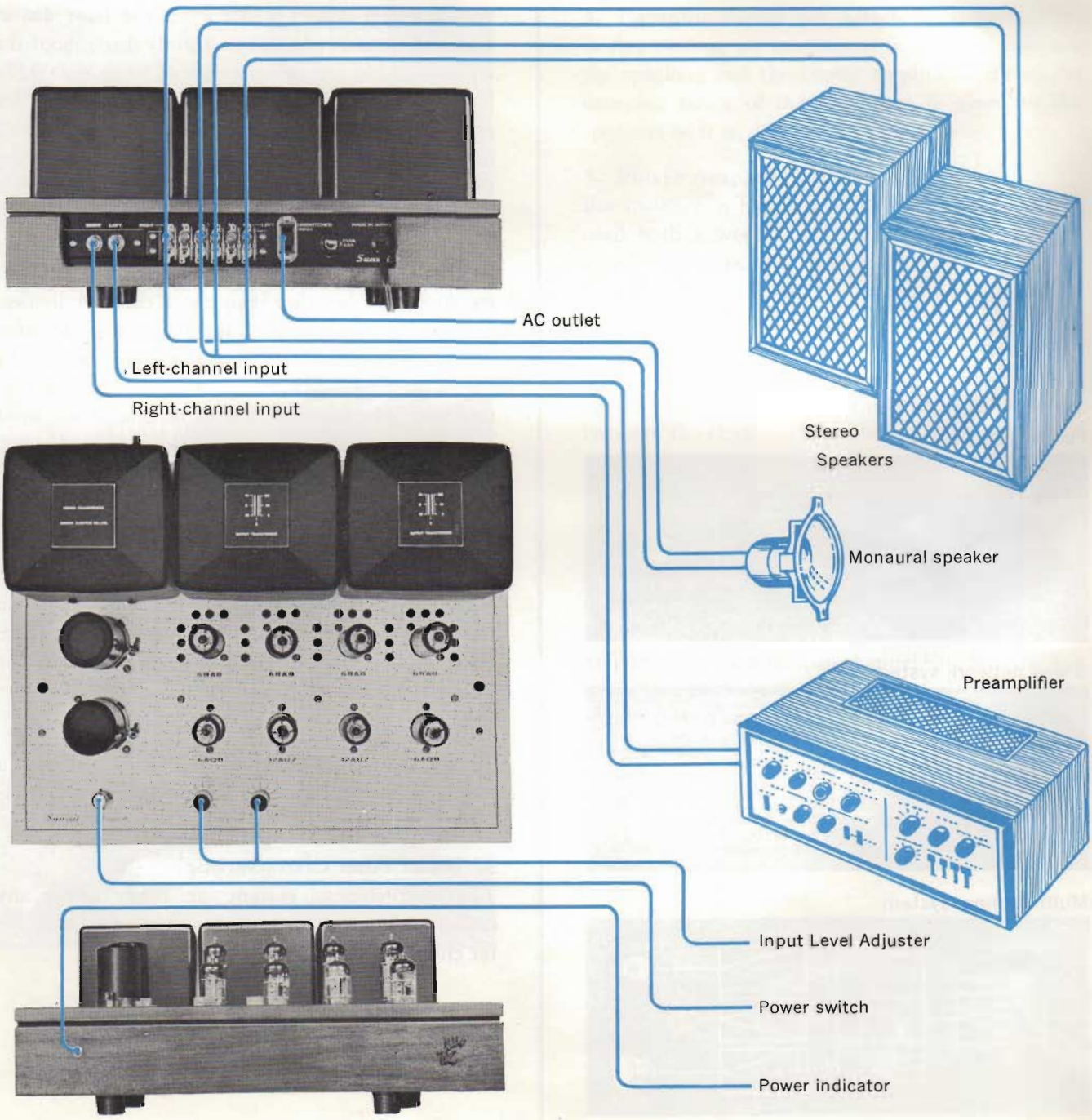
Valume Control

The Volume control adjusts the overall sound level of both channels. Turning the control clockwise increases the overall sound level. The Volume control consists of two separate knobs, one for each channel.

AC Outlet

There is one AC outlet on the rear panel of the amplifier. This outlet has a maximum rating of 100 VA and is not switched by the POWER switch.



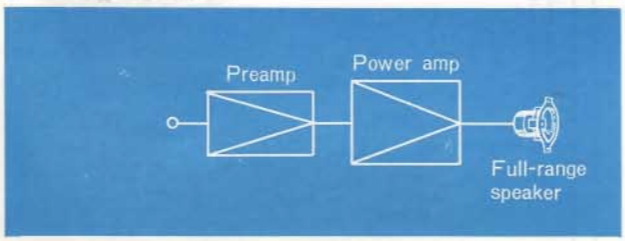

AC outlet
Left-channel input
Right-channel input
Stereo
Speakers
Monaural speaker
Preamplifier
Input Level Adjuster
Power switch
Power indicator

MULTI-CHANNEL SYSTEM

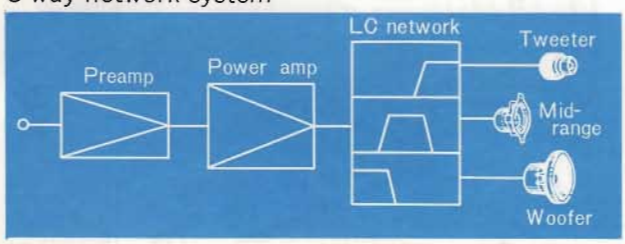
An ideal hi-fi system is that it has the least distortion and flattest response uniformly throughout the whole audible frequency range of 20 to 20,000 Hz. No system can meet these requirements yet. One of the approaches to such a hi-fi system is to divide frequencies into several ranges and to allot each of them to the speakers specializing in bass, mid-range and treble reproductions.

There are two dividing methods : one is to place LC networks between the power amplifier and the speakers and the other is to install channel dividers between the preamplifier and the power amplifier and to drive the woofer, mid-range and tweeter by use of their own power amplifiers as illustrated bottom left. The latter is said to be one of the most ideal hi-fi systems at present. Below are the outstanding features and advantages of the multi-channel system :

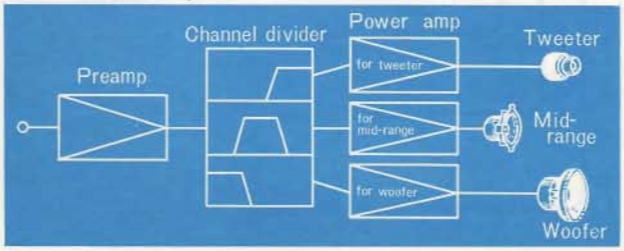
Full-range speaker



3-way network system



Multi-channel system



1. Any Speakers Selectable

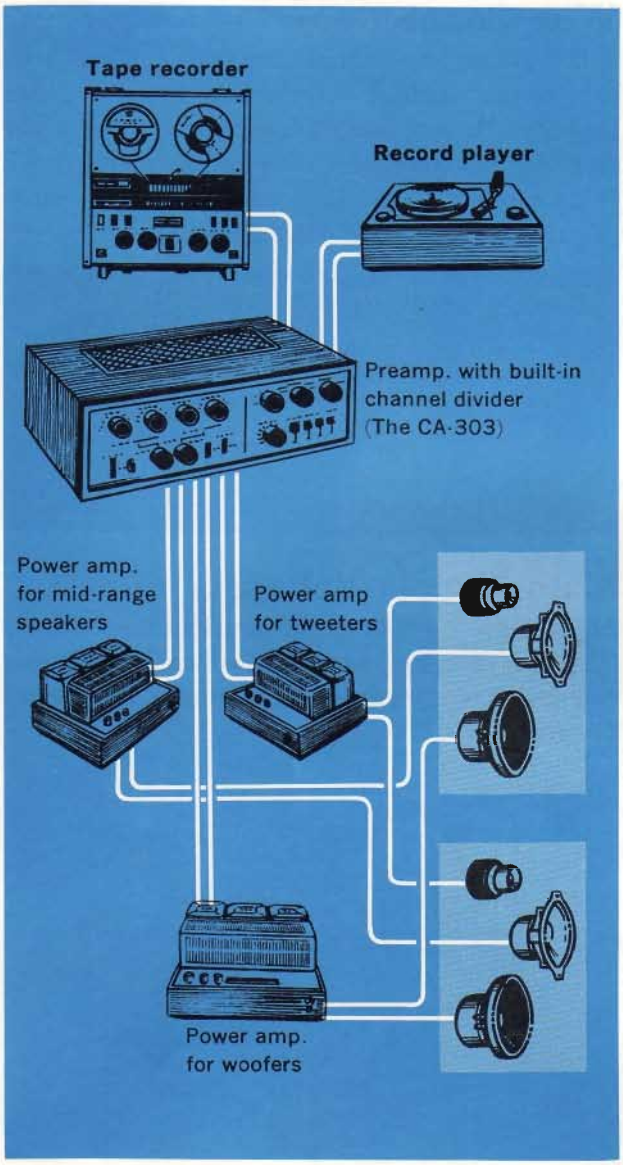
The use of individual power amplifiers combined with a woofer, mid-range and tweeter allows you to select the speakers from the standpoint of quality only. Difference in efficiency and impedance of the speakers don't concern you at all.

2. Lower IM Distortion

The separate connections of each speaker to its own power amplifier minimize the distortion which results from intermodulation.

3. Better Filter Characteristic

The multi-channel system can easily select any crossover frequencies and attenuation for better filter characteristic.



4. Damping Factor not Affected

In this system, no component is installed between the speakers and the power amplifiers. Thus, the damping factor of the amplifiers is given to the speakers as it is.

5. Power Amplifier Effectively Usable

For instance, a big output power amplifier can be used with a woofer and high-performance power amplifiers can be used with mid-range speakers and tweeter. If you'll start to build the multi-channel system, note the following :

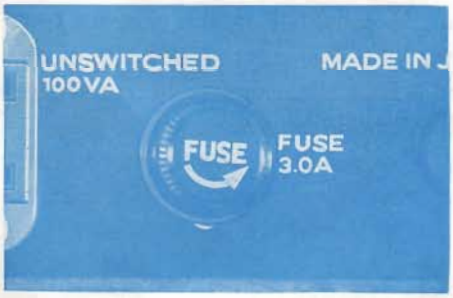
1. The output impedance of the pre-amplifier should be higher than the input impedance of the channel divider. This also applies to connection between the channel divider and power amplifier.
2. The output voltages of the preamplifier and the channel divider should be matched to the input voltage of the power amplifiers. Either channel divider or power amplifier should have a level control. To do the level control, use an oscillator or a test record for best results.

With the BA-202 used with the CA-303 control amplifier having a built-in channel divider, you can easily satisfy the avove conditions.

MAINTENANCE

Power Fuse

Should the amplifier fail to operate and the power indicator fail to light up when the POWER switch is turned on, the probable cause is either a power stoppage or a blown fuse. To check, remove the power cord from its outlet, turn the fuse holder on the rear panel counterclockwise, and remove the fuse. If it is blown, replace it with a new glass-tubed fuse of the same capacity (3 amperes) after determining and eliminating the trouble source that caused the fuse to blow.



Ventilation

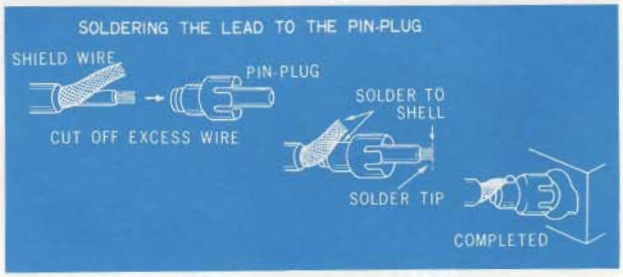
Adequate ventilation is essential for proper performance of your amplifier. Be sure that several inches of free spase are kept between the amplifier and its enclosure. Nothing should be placed directly on the amplifier.

Phasing of Speakers

Improper speaker phasing causes sound cancellation at some frequencies or in some listening locations. Particularly when listening to monophonic reproduction, this condition is noticeable by an absence of sound at a point midway between right and left speakers. To correct this, interchange the leads to one of the speakers only.

Wire Connections

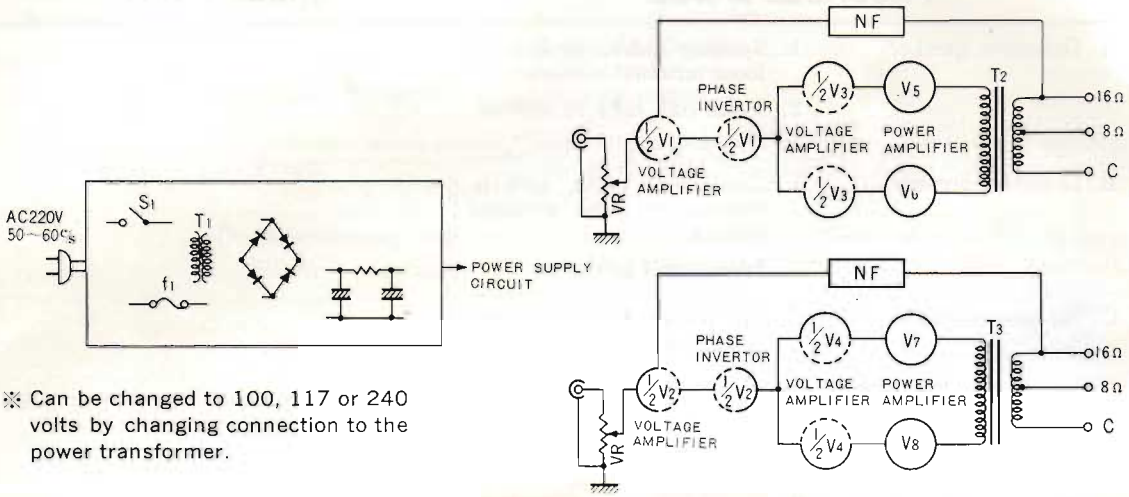
When connecting preamplifier to the BA-202, be sure to use shielded wire having little distributed capacity. Be sure that all leads between the power amplifier and components are properly connected. If the connections are loose or in touch with other parts, the amplifier will not function properly.



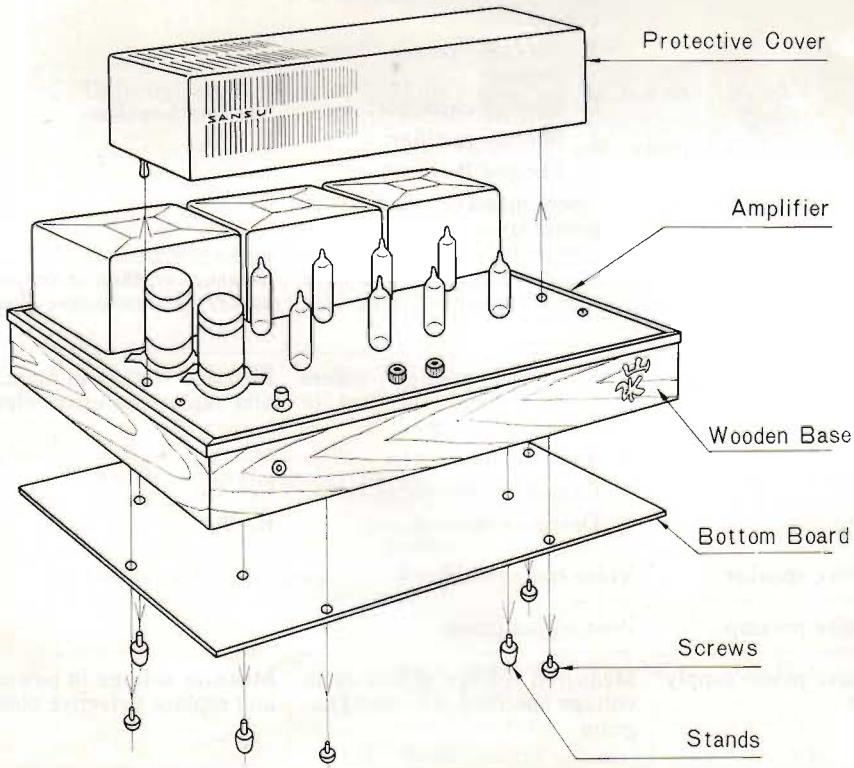
Mains Supply Voltage

Mains supply voltage of the amplifier is set to AC 220 volts. You can change the voltage by changing connection to the power transformer. (See circuit diagram a attached.)

BLOCK DIAGRAM/EXPLODED VIEW OF BA-202



※ Can be changed to 100, 117 or 240 volts by changing connection to the power transformer.



TROUBLESHOOTING CHART

If a trouble should occur in your hi-fi system, pinpoint the trouble to a particular unit or part as indicated below:

1. In the chart below, troubles are classified acording to the results heard. Find out the trouble you are confronted with from the items in the column under SYMPTOM.
2. To isolate the trouble to a particular unit or part, refer to the columns under PROBABLE CAUSE and CHECK POINT.
3. If the part number or numbers are given in the column under CHECK POINT, look up the PARTS LIST given later in this manual. It tells you the position of the part or parts in both PART LAYOUT and CIRCUIT DIAGRAM of the amplifier.
4. Check the part or parts and, if they are at fault, repair or replace them.

SYMPTOM	PROBABLE CAUSE		CHECK POINT
No sound	A. Defective speaker	1. Speaker cable, broken or loose terminal contact	
		2. Voice coil, open or shorted	
	B. Defective preamp.	1. Connecting cable, broken, shorted or loose terminal contact	
		2. Poor output power	
	C. No power supply	1. No power comes to the power source	
		2. Defective power switch	S_1
		3. Defective power cord	
		4. Power plug, defective or loose contact	
		5. Blown fuse	f_1
		* If the fuse should be blown again as soon as it is replaced, the trouble may be attributed to:	
		a. Shorted power transformer;	T_1
		b. Shorted capacitor;	C_{24}, C_{25}, C_{26}, C_{27}
		c. Shorted rectifier;	$D_2 \sim D_5$
		d. Shorted B-circuit.	
		6. Open primary winding of power transformer	T_1
	D. Defective power supply circuit	Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in power supply circuit and replace defective element.
	E. Defective amplification circuit	1. Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in amplification circuit and replace defective element.
		2. Tube heater broken	$V_1 \sim V_8$
		3. Capacitor, shorted or open	$C_5 \sim C_{12}$
		4. Defective resistor	R_1, R_2
Weak sound	A. Defective speaker	Voice coil shorted	
	B. Defective preamp.	Poor output power	
	C. Defective power supply circuit	Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in power supply circuit and replace defective element.

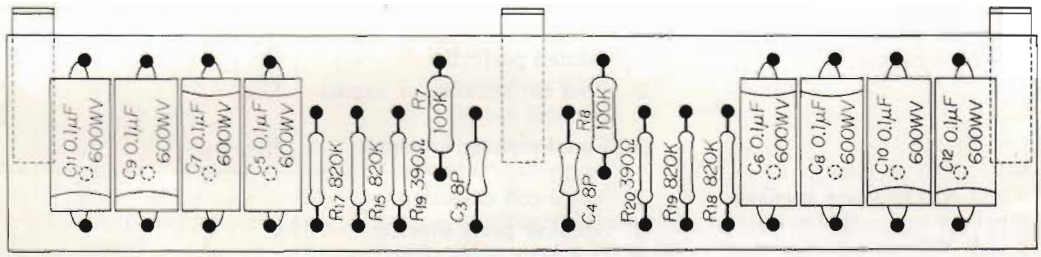
SYMPTOM	PROBABLE CAUSE		CHECK POINT
	D. Defective amplification circuit	1. Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in amplification circuit and replace defective element.
		2. Output transformer shorted	T_2, T_3
		3. Capacitor, shorted or poor capacitance	C_5~C_{12}
		4. Weak tube	V_1~V_8
Distortion	A. Defective speaker	1. Voice coil defective	
		2. Cone or damper defective	
	B. Defective preamp.	Distorted output	
	C. Defective power supply circuit	Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in power supply circuit and replace defective element.
	D. Defective amplification circuit	1. Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in amplification circuit and replace defective element.
		2. Weak tube	V_1~V_8
		3. Output transformer shorted	T_2, T_3
Hum	A. Defective power supply circuit	1. Hum balance not adjusted properly	VR_7
		2. Poor capacitance of capatitor	C_{19}, C_{20}, C_{21}, C_{22}, C_{26}, C_{27}
	B. Defective preamp.	1. Pre-and main amplifiers not connected properly	
		2. Hum-induced preamp.	
		3. Humming in preamp.	
	C. Defective amplification circuit	1. Tube, defective or not insulated perfectly	V_1~V_8
		2. Poor capacitance of capacitor	C_{15}
		3. Fixed resistor broken	R_{11}, R_{12}
Noise	A. Defective speaker	1. Voice coil defective	
		2. Speaker parts shorted	
		3. Defective cone or damper	
	B. Defective preamp.	1. Pre-and main amplifiers not connected properly	
		2. Defective preamp.	
	C. Defective power supply circuit	Measured voltage differs from voltage specified in Circuit Diagram.	Measure voltage in power supply circuit and replace defective element.
	D. Defective amplification circuit	1. Fixed resistor defective	R_{21}~R_{24}
		2. Capacitor, shorted or not insulated properly	C_{19}
		3. Shorted primary winding of output transformer	T_2, T_3
		4. Defective tube	V_1~V_8
		5. Weak master volume	VR_1, VR_2

BIAS ADJUSTMENT/PARTS LAYOUT

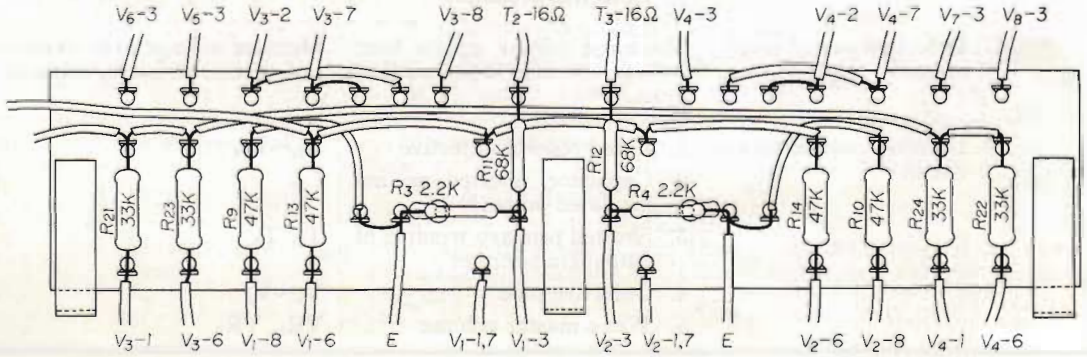
Before adjustment, be sure to turn the master volume to the minimum counterclockwise position and to connect load to the amplifier. The test points are indicated in the PARTS LAYOUT on the opposite page.
Instrument necessary for adjustment: DC amperemeter with range of 100 milliamperes

STEP	ITEM	CONNECTION	PART TO BE ADJUSTED	ADJUSTMENT
1	Left-channel bias adjustment	Connect (+) of DC amperemeter to B_1 and (−) to TP_1.	VR_3	Adjust VR_3 to 36 to 38 milliamperes.
2	Left-channel bias adjustment	Connect (+) of DC amperemeter to B_1 and (−) to TP_2.	VR_4	Adjust VR_4 to 36 to 38 milliamperes.
3	Repeat Steps 1 and 2.			
4	Right-channel bias adjustment	Connect (+) of DC amperemeter to B_1 and (−) to TP_3.	VR_5	Adjust VR_5 to 36 to 38 milliamperes.
5	Right-channel bias adjustment	Connect (+) of DC amperemeter to B_1 and (−) to TP_4.	VR_6	Adjust VR_6 to 36 to 38 milliamperes.
6	Repeat Steps 1 and 2.			
7	Repeat Steps 4 and 5.			

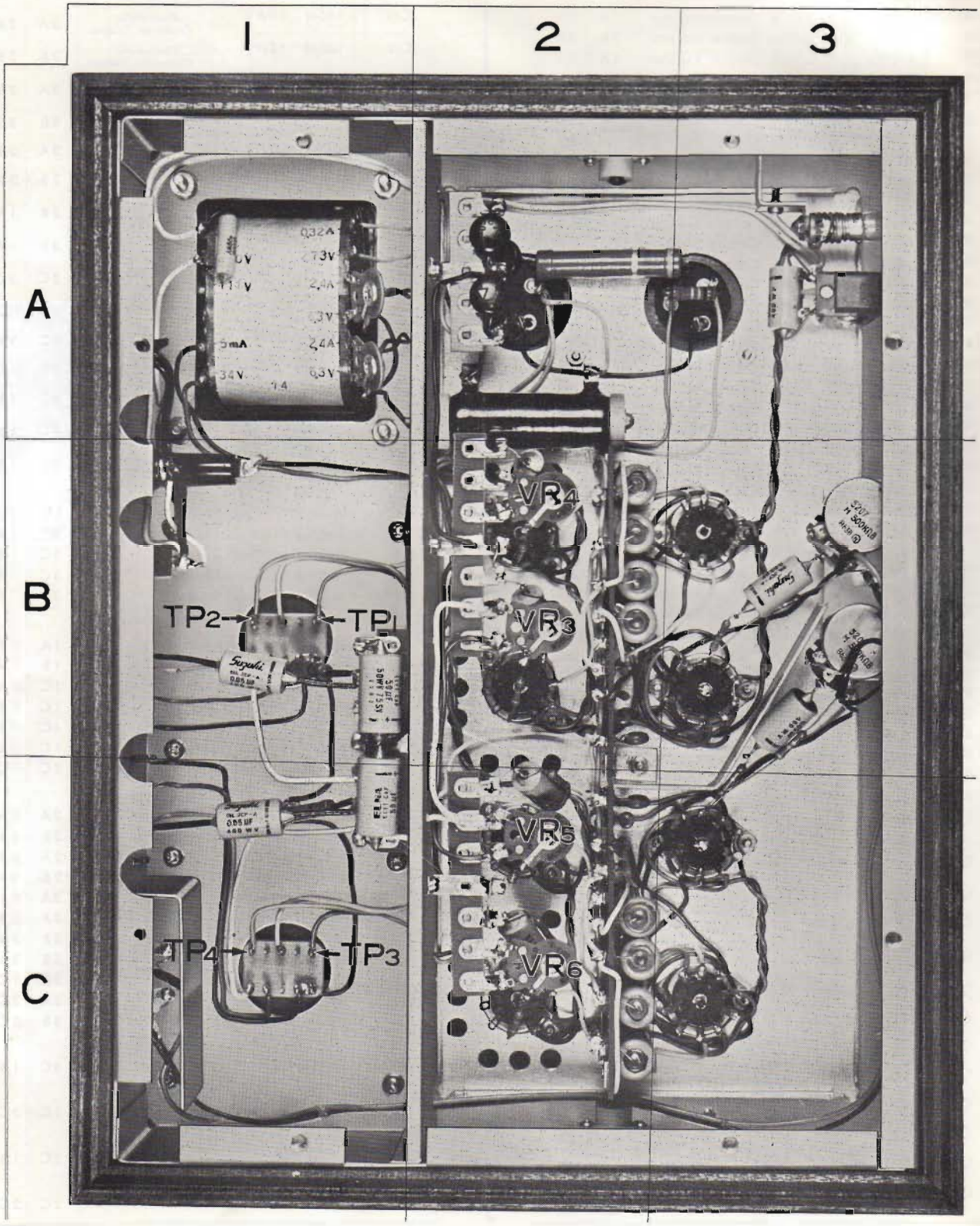
FACE SIDE



BACK SIDE



PARTS LAYOUT/TEST POINT



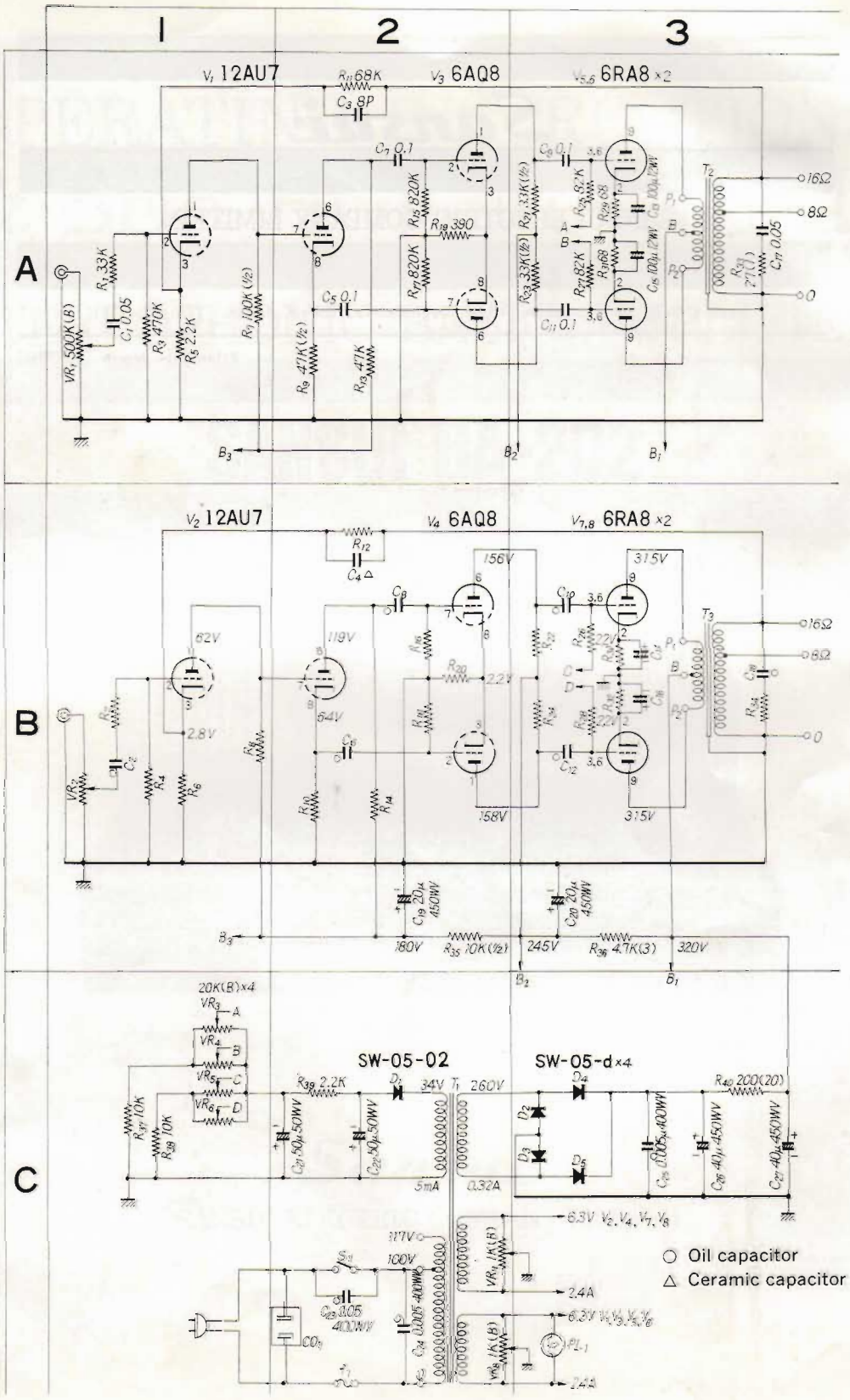
PARTS LIST

A: Part No.
B: Part Name
C: Position of Part in Circuit Diagram
D: Position of Part in Part Layout

A	B	C	D
R1	33KΩ ¼W ±10% Carbon Resistor	1 A	2 A
R2	33KΩ ¼W ±10% Carbon Resistor	1 B	3 A
R3	470KΩ ¼W ±10% Carbon Resistor	1 A	2 A
R4	470KΩ ¼W ±10% Carbon Resistor	1 B	3 A
R5	2.2KΩ ¼W ±10% Carbon Resistor	1 A	2 B
R6	2.2KΩ ¼W ±10% Carbon Resistor	1 B	3 B
R7	100KΩ ½W ±10% Carbon Resistor	1 A	2 B
R8	100KΩ ½W ±10% Carbon Resistor	1 B	3 B
R9	47KΩ ½W ±10% Carbon Resistor	2 A	2 B
R10	47KΩ ½W ±10% Carbon Resistor	2 B	3 B
R11	68KΩ ¼W ±10% Carbon Resistor	2 A	2 B
R12	68KΩ ¼W ±10% Carbon Resistor	2 B	3 B
R13	47KΩ ½W ±10% Carbon Resistor	2 A	2 B
R14	47KΩ ½W ±10% Carbon Resistor	2 B	3 B
R15	820KΩ ¼W ±10% Carbon Resistor	2 A	2 B
R16	820KΩ ¼W ±10% Carbon Resistor	2 B	3 B
R17	820KΩ ¼W ±10% Carbon Resistor	2 A	2 B
R18	820KΩ ¼W ±10% Carbon Resistor	2 B	3 B
R19	390Ω ¼W ±10% Carbon Resistor	2 A	2 B
R20	390Ω ¼W ±10% Carbon Resistor	2 B	3 B
R21	33KΩ ½W ±10% Carbon Resistor	3 A	2 B
R22	33KΩ ½W ±10% Carbon Resistor	3 B	3 B
R23	33KΩ ½W ±10% Carbon Resistor	3 A	2 B
R24	33KΩ ½W ±10% Carbon Resistor	3 B	3 B
R25	82KΩ ¼W ±10% Carbon Resistor	3 A	2 B
R26	82KΩ ¼W ±10% Carbon Resistor	3 B	3 B
R27	82KΩ ¼W ±10% Carbon Resistor	3 A	2 B
R28	82KΩ ¼W ±10% Carbon Resistor	3 B	3 B
R29	68Ω ¼W ±10% Carbon Resistor	3 A	2 B
R30	68Ω ¼W ±10% Carbon Resistor	3 B	3 B
R31	68Ω ¼W ±10% Carbon Resistor	3 A	2 B
R32	68Ω ¼W ±10% Carbon Resistor	3 B	3 B
R33	27Ω 1 W ±10% Carbon Resistor	3 A	2 B
R34	27Ω 1 W ±10% Carbon Resistor	3 B	3 B
R35	10KΩ ½W ±10% Carbon Resistor	2 B	1 A
R36	4.7KΩ 3 W ±10% Carbon Resistor	3 B	1 B
R37	10KΩ ¼W ±10% Carbon Resistor	1 C	2 B
R38	10KΩ ¼W ±10% Carbon Resistor	1 C	3 B
R39	2.2KΩ ¼W ±10% Carbon Resistor	2 C	2 C
R40	200Ω 20W ±10% Carbon Resistor	3 C	1 B
C1	0.05μF 400WV ±20% Oil Capacitor, Tubular	1 A	2 A
C2	0.05μF 400WV ±20% Oil Capacitor, Tubular	1 B	2 A
C3	8PF 250WV ±10% Ceramic Capacitor, Tubular	2 A	2 B
C4	8PF 250WV ±10% Ceramic Capacitor, Tubular	2 B	3 B
C5	0.1μF 600WV ±20% Oil Capacitor, Tubular	2 A	2 B
C6	0.1μF 600WV ±20% Oil Capacitor, Tubular	2 B	3 B
C7	0.1μF 600WV ±20% Oil Capacitor, Tubular	2 A	2 B
C8	0.1μF 600WV ±20% Oil Capacitor, Tubular	2 B	3 B
C9	0.1μF 600WV ±20% Oil Capacitor, Tubular	3 A	2 B
C10	0.1μF 600WV ±20% Oil Capacitor, Tubular	3 B	3 B
C11	0.1μF 600WV ±20% Oil Capacitor, Tubular	3 A	2 B
C12	0.1μF 600WV ±20% Oil Capacitor, Tubular	3 B	3 B

A	B	C	D
C13	100μF 15WV Electrolytic Capacitor, Tubular	3 A	2 B
C14	100μF 15WV Electrolytic Capacitor, Tubular	3 B	3 B
C15	100μF 15WV Electrolytic Capacitor, Tubular	3 A	2 B
C16	100μF 15WV Electrolytic Capacitor, Tubular	3 B	3 B
C17	0.05μF 400WV ±20% Oil Capacitor, Tubular	3 A	2 B
C18	0.05μF 400WV ±20% Oil Capacitor, Tubular	3 B	3 B
C19	20μF 450WV +100% Electrolytic Capacitor, Tubular	2 B	1 A
C20	20μF 450WV +100% Electrolytic Capacitor, Tubular	3 B	1 A
C21	50μF 50WV +100% Electrolytic Capacitor, Tubular	2 C	3 C
C22	50μF 50WV +100% Electrolytic Capacitor, Tubular	2 C	2 C
C23	0.05μF 400WV ±20% Oil Capacitor, Tubular	2 C	1 A
C24	0.005μF 400WV ±20% Oil Capacitor, Tubular	2 C	1 C
C25	0.005μF 400WV ±20% Oil Capacitor, Tubular	3 C	1 B
C26	40μF 450WV +100% Electrolytic Capacitor, Block	3 C	1 B
C27	40μF 450WV +100% Electrolytic Capacitor, Block	3 C	1 B
D1	SW-05-02 Silicon Diode	2 C	2 C
D2	SW-05-d Silicon Diode	3 C	1 B
D3	SW-05-d Silicon Diode	3 C	1 B
D4	SW-05-d Silicon Diode	3 C	1 B
D5	SW-05-d Silicon Diode	3 C	1 B
VR1	500KΩ(B) Main Adjustment	1 A	2 A
VR2	500KΩ(B) Main Adjustment	1 B	2 A
VR3	20KΩ(B) Bias Adjustment	1 C	2 B
VR4	20KΩ(B) Bias Adjustment	1 C	2 B
VR5	20KΩ(B) Bias Adjustment	1 C	3 B
VR6	20KΩ(B) Bias Adjustment	1 C	3 B
VR7	1KΩ(B) Hum Balancer	2 C	1 C
V1	12AU7 Low-Frequency Amp. & Phase Invertor	1.2 A	2 A
V2	12AU7 Low-Frequency Amp. & Phase Invertor	1.2 B	3 A
V3	6AQ8 Voltage Amp.	2 A	2 A
V4	6AQ6 Voltage Amp.	2 B	3 A
V5	6R-A8 Power Amp.	3 A	2 B
V6	6R-A8 Power Amp.	3 A	2 B
V7	6R-A8 Power Amp.	3 B	3 B
V8	6R-A8 Power Amp.	3 B	3 B
T1	Power Transformer	2 C	1 C
T2	Output Transformer	3 A	2 C
T3	Output Transformer	3 B	3 C
PL1	Pilot Lamp	3 C	1 A
f1	Fuse 3A	2 C	2 C
S1	AC Power Switch	2 C	1 A
CO1	AC Outlet	2 C	2 C

CIRCUIT DIAGRAM



Sansui®

SANSUI ELECTRIC COMPANY LIMITED

Head Office; 14-1, 2-chome, Izumi, Suginami-ku, Tokyo, Japan. TEL. 323-1111

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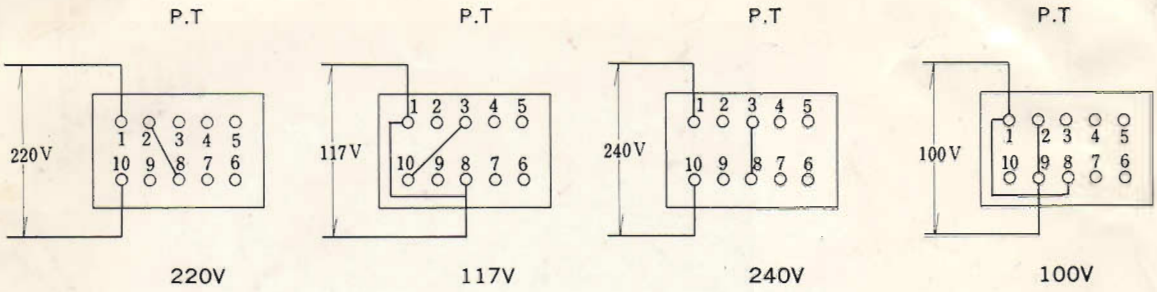
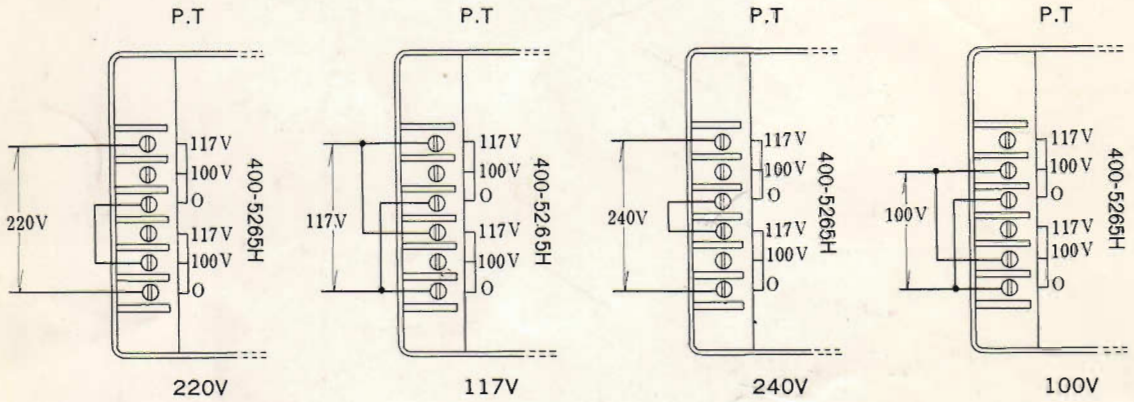
POWER SUPPLY CONNECTION

CA-303



BA-303



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