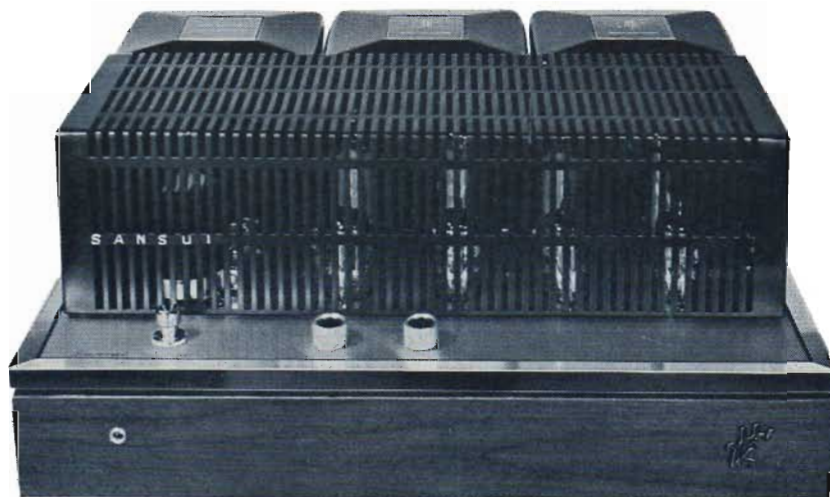


OPERATING INSTRUCTIONS & SERVICE MANUAL

STEREOPHONIC BASIC AMPLIFIER

SANSUI BA-202



Sansui[®]

SANSUI ELECTRIC COMPANY LIMITED

FEATURES

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.

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SERVICE MANUAL

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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 distortion 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.

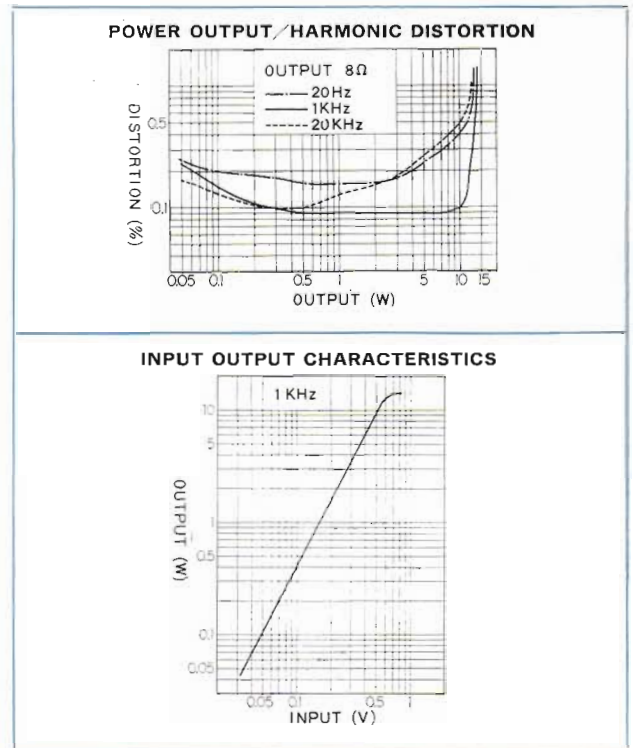
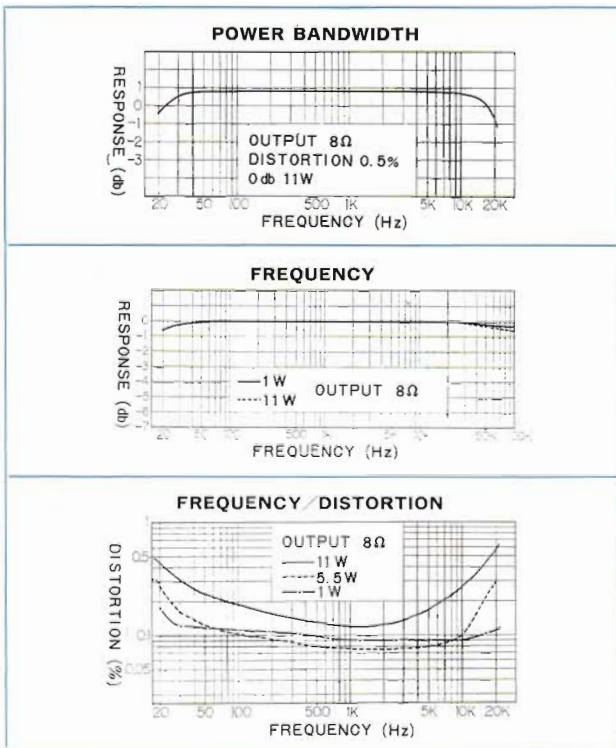
20 to 20,000 Hz Power Bandwidth

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 8 Ω or 16 Ω SPEAKER terminal on the rear of the amplifier and the (-) to the LEFT C SPEAKER terminal.

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

2. One Speaker (Monaural)

Connect the LEFT 16 Ω SPEAKER terminal to the RIGHT 16 Ω 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

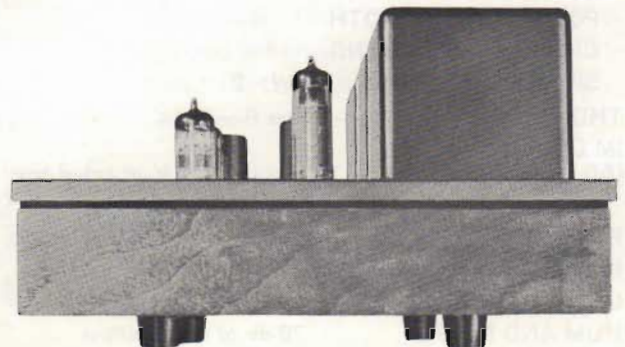
The red indicator lamp glows when the POWER switch is turned ON. It remains lit during the operation.

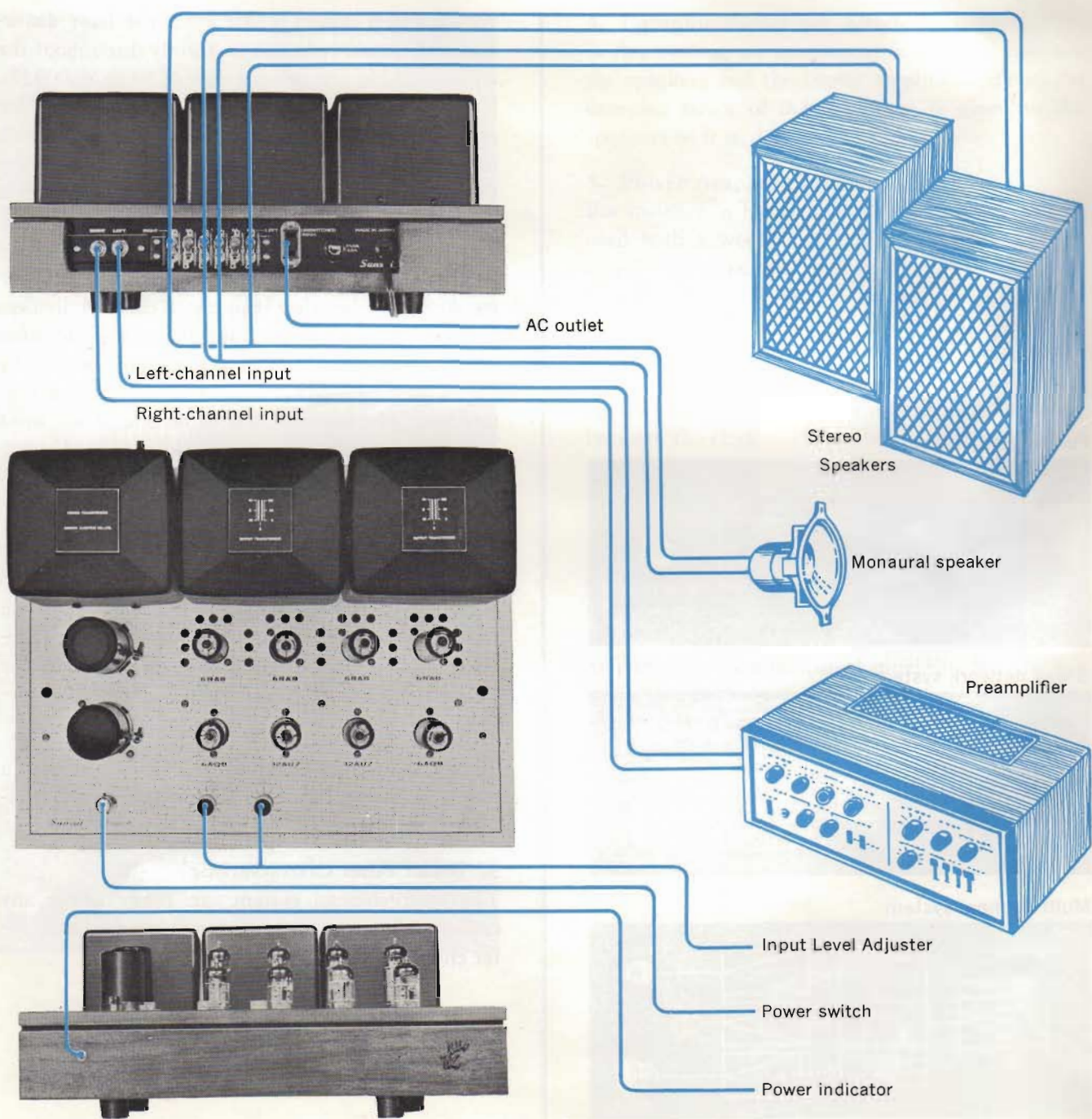
Volume Control

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.

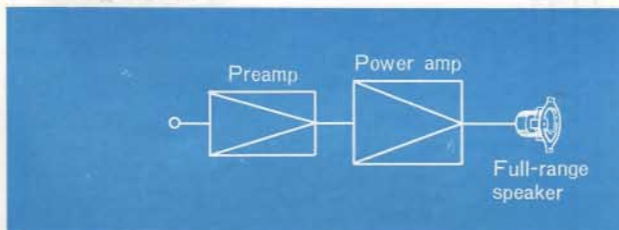




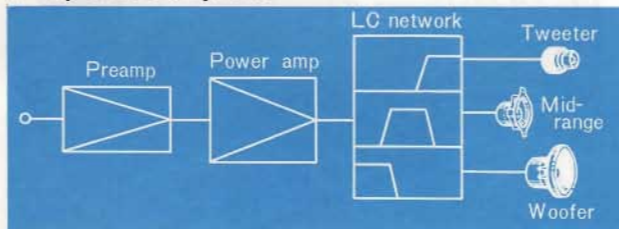
MULTI-CHANNEL SYSTEM



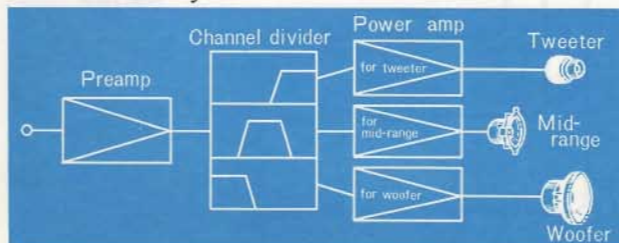
Full-range speaker



3-way network system



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 :

1. Any Speakers Selectable

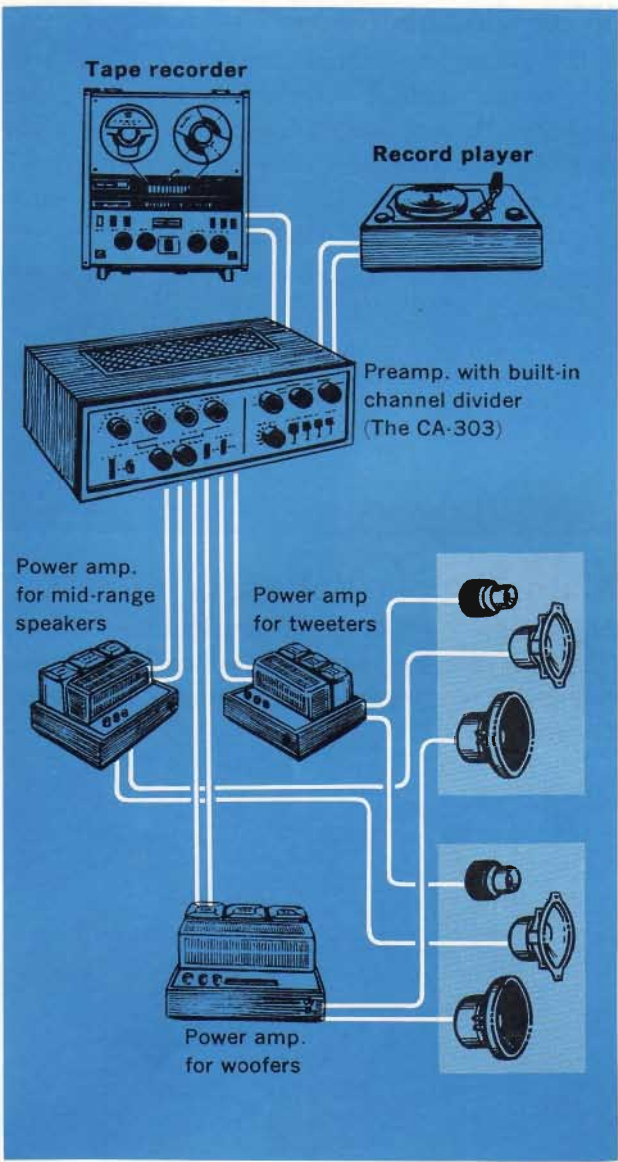
The use of individual power amplifiers combined with a woofer, mid-range and tweeter allows you to select the speakers from the standpoint of quality only. Difference in efficiency and impedance of the speakers don't concern you at all.

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 above 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

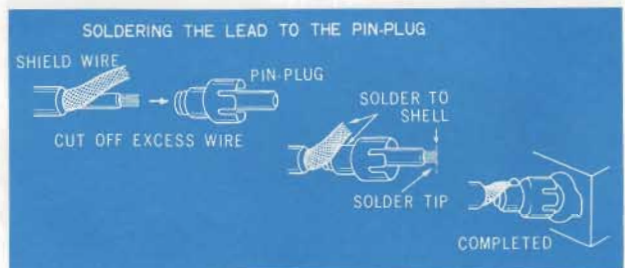
Adequate ventilation is essential for proper performance of your amplifier. Be sure that several inches of free space are kept between the amplifier and its enclosure. Nothing should be placed directly on the amplifier.

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

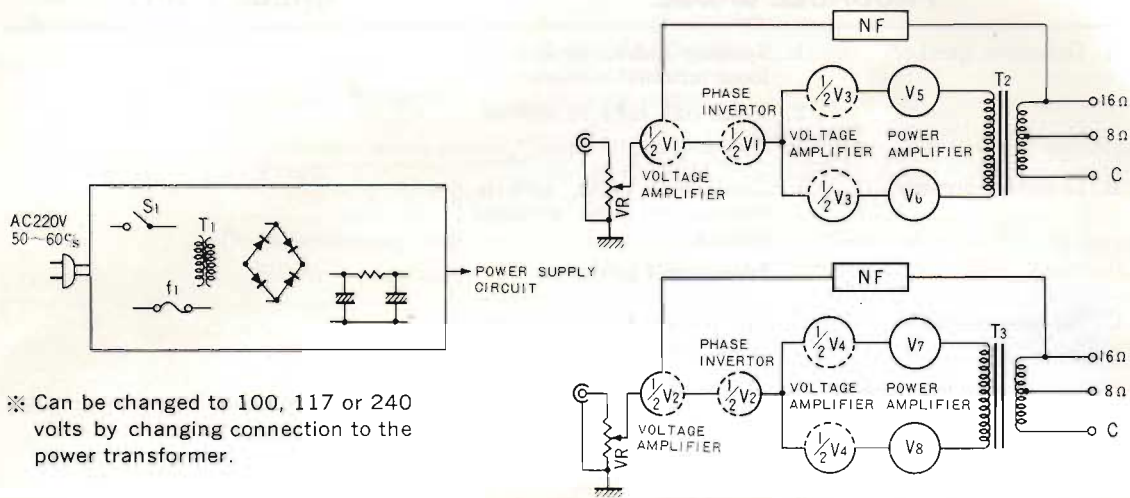
When connecting preamplifier to the BA-202, be sure to use shielded wire having little distributed capacity. Be sure that all leads between the power amplifier and components are properly connected. If the connections are loose or in touch with other parts, the amplifier will not function properly.



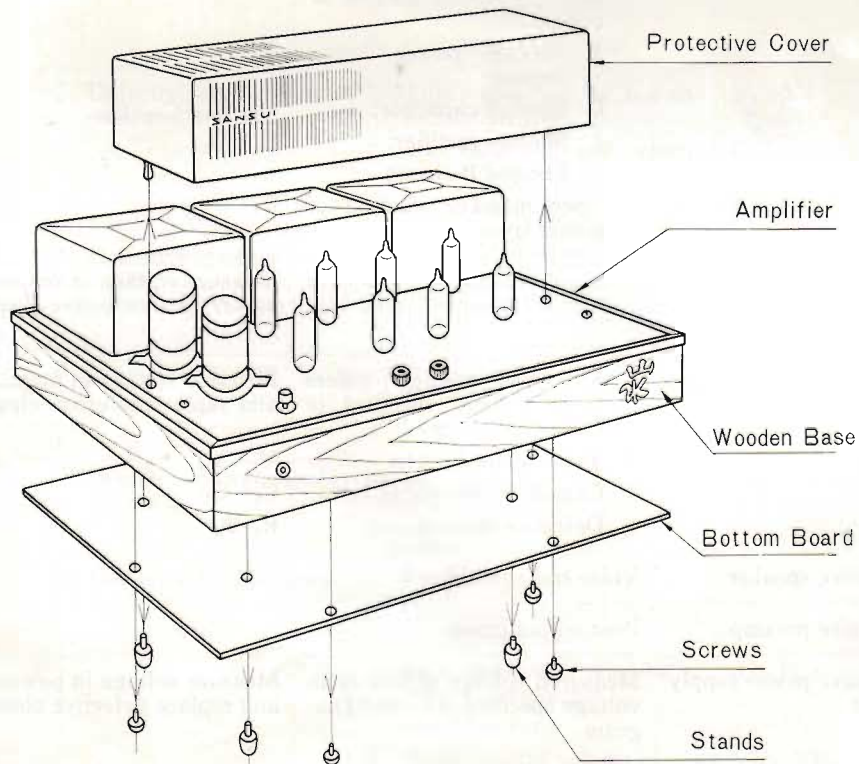
Mains Supply Voltage

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 according 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 3. Defective power cord 4. Power plug, defective or loose contact 5. Blown fuse * If the fuse should be blown again as soon as it is replaced, the trouble may be attributed to: a. Shorted power transformer; b. Shorted capacitor; c. Shorted rectifier; d. Shorted B-circuit. 6. Open primary winding of power transformer	S_1 f_1 T_1 $C_{24}, C_{25}, C_{26}, C_{27}$ $D_2 \sim D_5$ 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. 2. Tube heater broken 3. Capacitor, shorted or open 4. Defective resistor	Measure voltage in amplification circuit and replace defective element. $V_1 \sim V_8$ $C_3 \sim C_{12}$ 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.

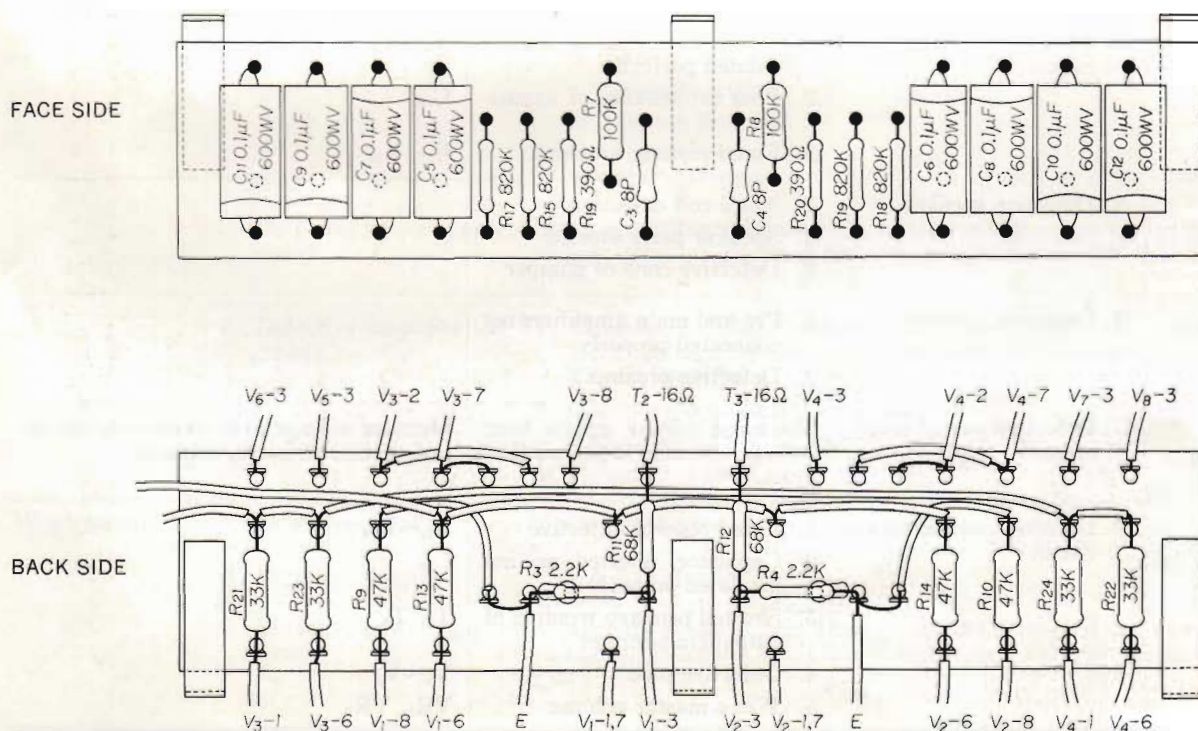
SYMPTOM	PROBABLE CAUSE	CHECK POINT	
	D. Defective amplification circuit	1. Measured voltage differs from voltage specified in Circuit Diagram. 2. Output transformer shorted 3. Capacitor, shorted or poor capacitance 4. Weak tube	Measure voltage in amplification circuit and replace defective element. T_2, T_3 $C_5 \sim C_{12}$ $V_1 \sim V_8$
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. 2. Weak tube 3. Output transformer shorted	Measure voltage in amplification circuit and replace defective element. $V_1 \sim V_8$ T_2, T_3
Hum	A. Defective power supply circuit	1. Hum balance not adjusted properly 2. Poor capacitance of capacitor	VR_7 $C_{19}, C_{20}, C_{21}, C_{22}, C_{26}, C_{27}$
	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 2. Poor capacitance of capacitor 3. Fixed resistor broken	$V_1 \sim V_8$ C_{15} 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 2. Capacitor, shorted or not insulated properly 3. Shorted primary winding of output transformer 4. Defective tube 5. Weak master volume	$R_{21} \sim R_{24}$ C_{19} T_2, T_3 $V_1 \sim V_8$ 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.

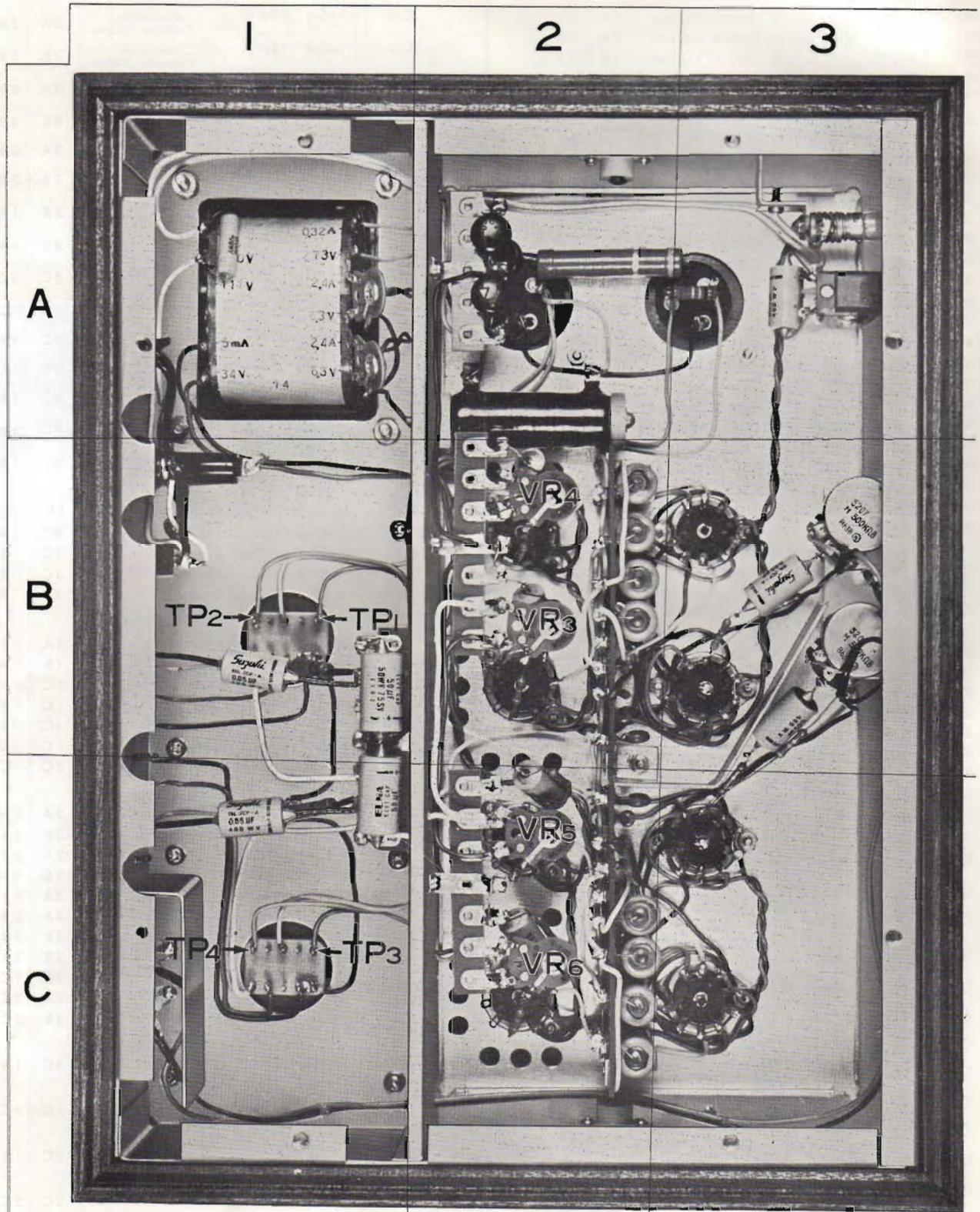
Instrument necessary for adjustment: DC amperemeter with range of 100 milliamperes

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.			



PARTS LAYOUT / TEST POINT

PARTS LIST



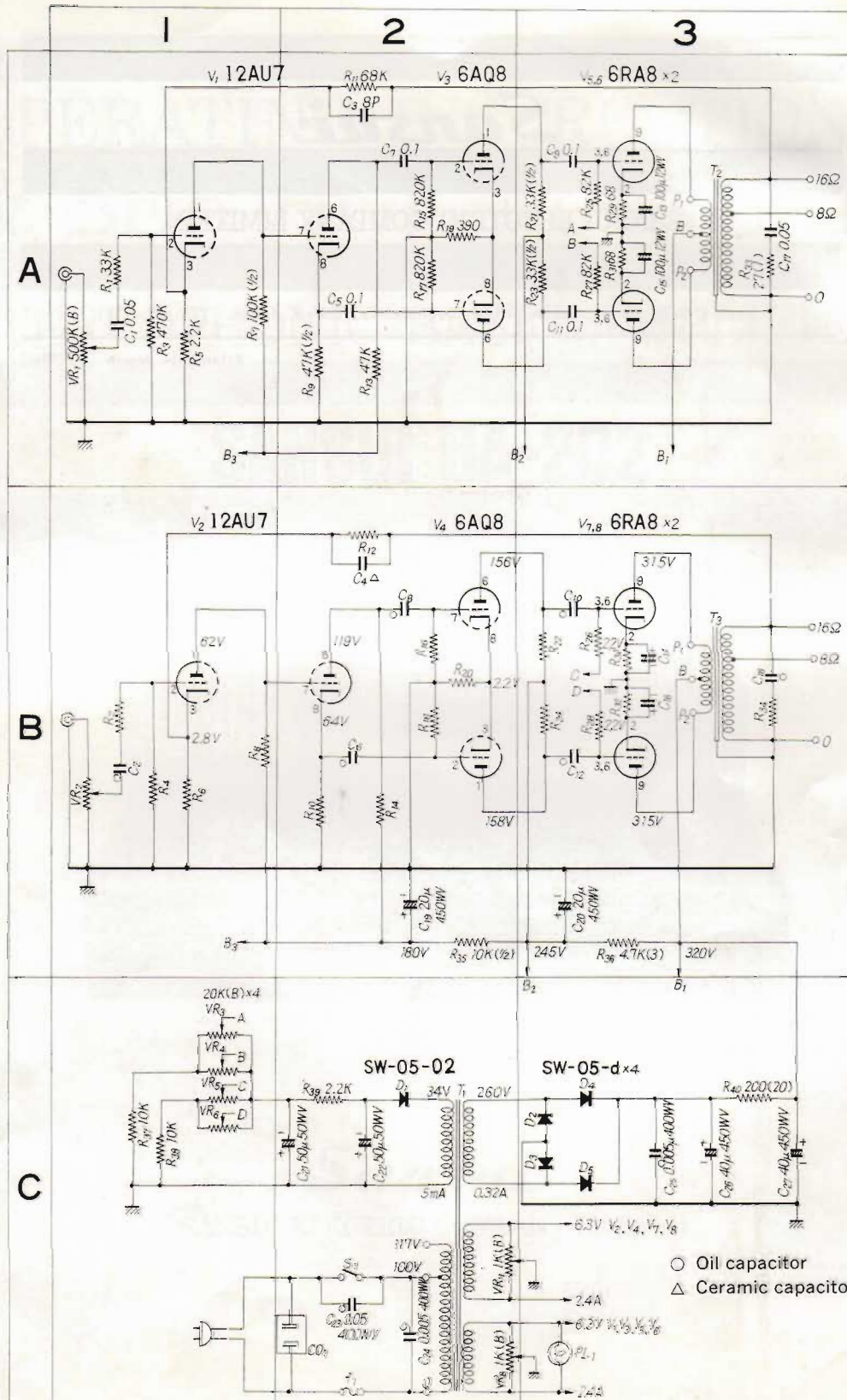
PARTS LIST

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


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

CIRCUIT DIAGRAM






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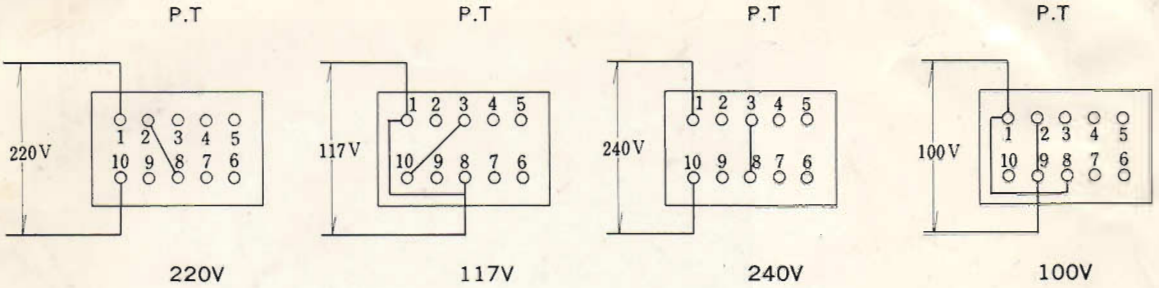


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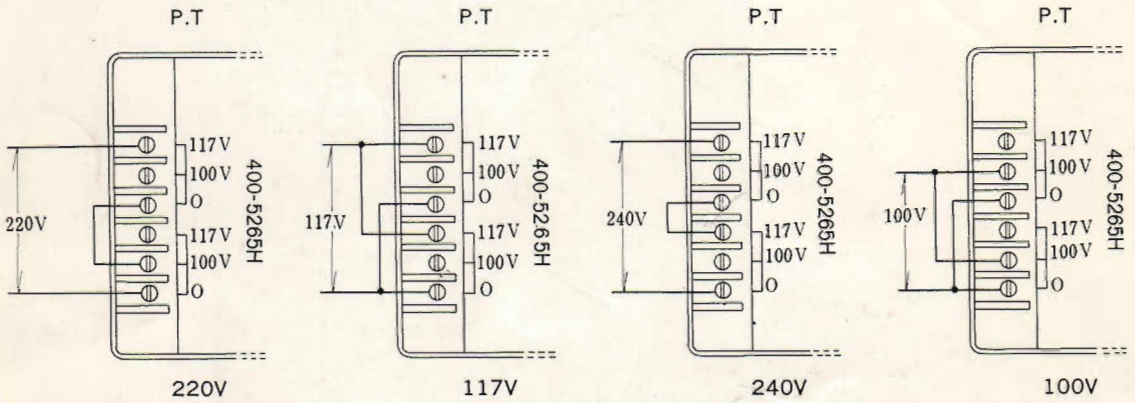
Printed in Japan (78500M)

POWER SUPPLY CONNECTION

CA-303



BA-303



BA-202

