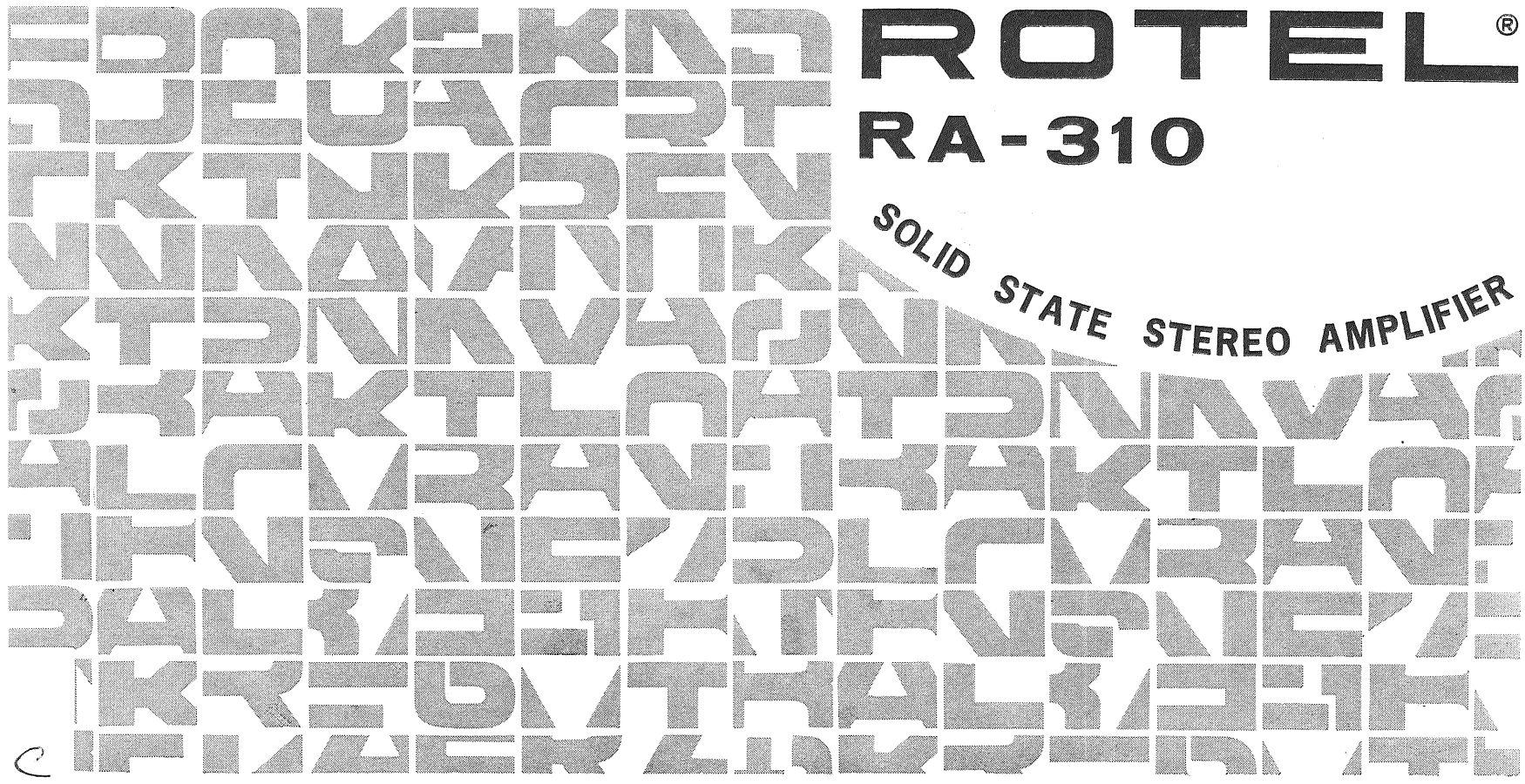


OPERATING MANUAL

**ROTEL**®

**RA-310**

**SOLID STATE STEREO AMPLIFIER**



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## **INTRODUCTION**

We would like to take this opportunity to thank you for purchasing our ROTEL RA-310 STEREO PRE-MAIN AMPLIFIER. We are confident of its quality and durability — we are sure that it will give you an unequalled excellence in trouble-free performance for many years to come.

In order to obtain the maximum use out of your unit, please read all of the following pages of this Operation Manual carefully.

Do not attempt to operate the unit until you have made all the connections as specified in this Manual.

## **SPECIAL FEATURES**

- 1) All silicon output transistors produce 60 watts of music power (IHF).
- 2) Speaker Selector Button for separate or simultaneous operation of two speaker systems.
- 3) Signal Source Indicator Lights.
- 4) Front Panel Headphone Output.
- 5) Tape Monitor Button for tape playback and recording.
- 6) Mode Button for stereophonic or monophonic sound reproduction.
- 7) Loudness Button to boost the extreme low frequency sounds during low volume operation.
- 8) Magnetic and Crystal Phono inputs.
- 9) Extra inputs for Cassette or 8-Track tape source.
- 10) Handsome Wood Cabinet.

# INSTALLATION

## IMPORTANT

Do not apply power to this unit without first making sure that both speakers are connected properly. Before attempting to operate the RA-310, please read the following instructions carefully. When all the necessary connections are made, the power may be applied.

## SPEAKER CONNECTIONS

The RA-310 has connections for two pairs of stereo speaker systems. Make sure that your main speakers are connected to the SP-1 terminals and the remote speakers to the SP-2 terminals.

Connect the left hand speaker leads to the terminals designated LEFT SPEAKERS and the right hand speaker leads to the RIGHT SPEAKERS.

With the RA-310, any speaker system of 4, 8 or 16 ohm impedance can be used.

NOTE: Be sure that all the speaker leads are fastened securely to the proper terminals and that there are no stray strands shorting one terminal with another.

## PHASING

In a stereophonic music reproducing system, the two speakers must be properly connected to assure complementary functioning. Make sure that the terminals on the speakers are connected to the corresponding terminals on the amplifier. If the two speakers are out of phase with each other, the stereophonic effect will suffer and the low frequency response will be particularly poor. Check to make sure that your speakers are in phase.

1. Push the MODE button "IN" for monophonic operation.
2. Play a monophonic source with solo singing or instrument.
3. If the speakers are in phase, the sound will appear to come from the exact center between the two speakers, and if the speakers are out of phase, the sound will appear to come from the two speakers separately.
4. If the speakers are out of phase, reverse the connections of the two speaker leads (from only one of the speakers, although it may be either one) at the RA-310's speaker terminals. The speakers will then be in phase with each other.

## TUNER CONNECTIONS

Connect the Right and Left leads from your tuner to the corresponding terminals on the RA-310. With a monophonic tuner the output lead may be connected to either one of the terminals, RIGHT or LEFT.

## RECORD PLAYER CONNECTIONS

The two shielded cables from your stereo record player should be terminated with RCA type phono plugs. To avoid loss in the high frequencies, the cables should not exceed 10 feet in length. The RA-310 accepts both the magnetic and crystal (or ceramic) type phono inputs; so simply connect the phono leads to the corresponding terminals marked MAG and X'TAL.

## TAPE RECORDER CONNECTIONS

Outputs from stereo tape recorders having their own pre-amplifiers should be connected to the high level input terminals marked TAPE IN. For recording purposes, use the output terminals marked TAPE OUT to connect the tape recorder with shielded cables.

## EXTRA INPUT

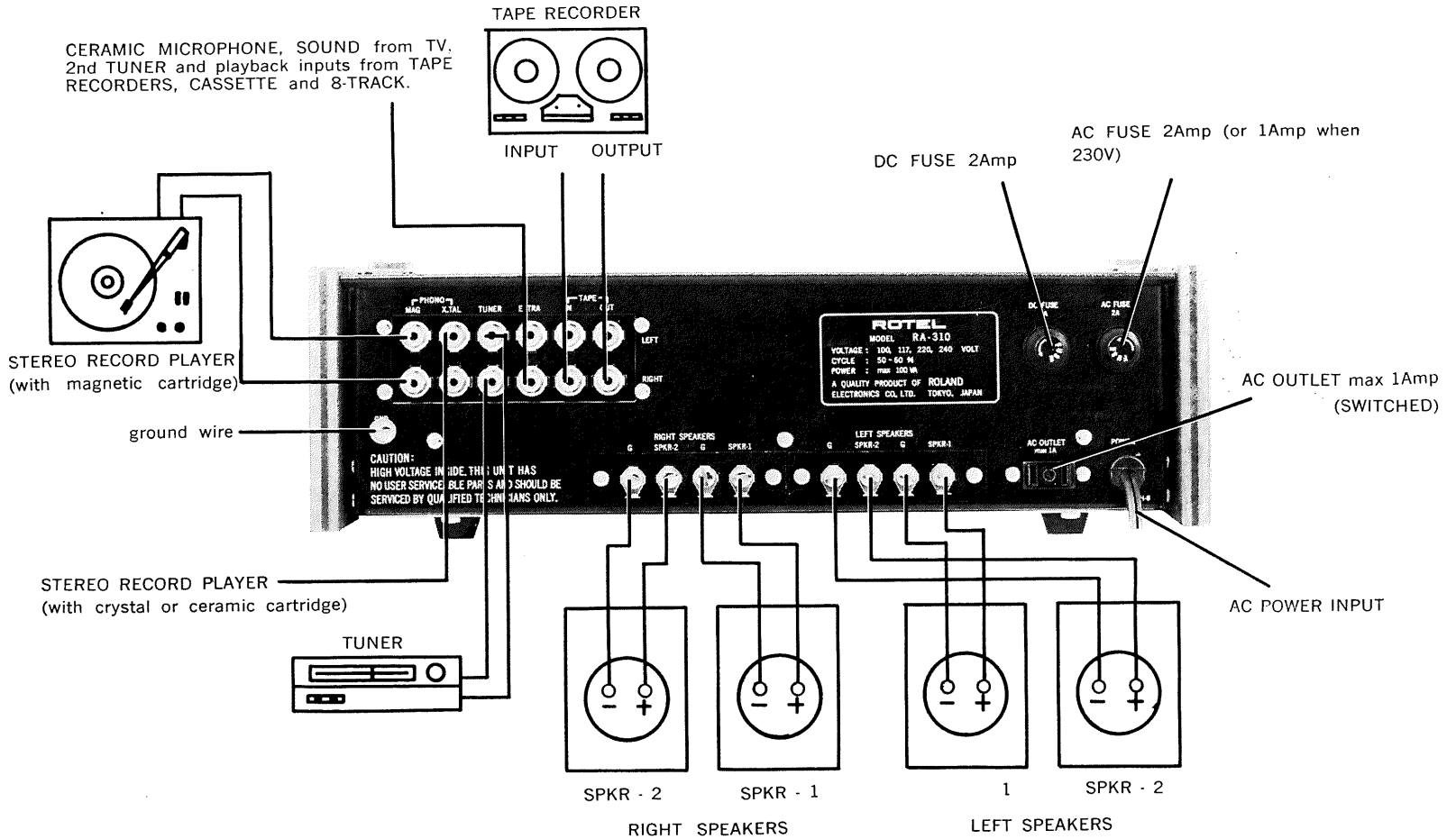
A set of terminals marked EXTRA is provided for any other high level source you wish to run off the RA-310. You may connect a tape recorder for playback, a ceramic microphone, a second tuner, a sound from a TV set, a cassette tape player or an 8-track tape player.

## VOLTAGE SELECTION

Your RA-310 comes pre-set at the proper voltage for use in your area; however, if you move to an area where the power supply voltage is different, simply change the voltage selector. The RA-310 is a variable voltage amplifier that can run on 100V, 117V, 220V and 240V power supplies.

To change the voltage setting, remove the bonnet cover and locate the Voltage Selector. (CAUTION: Be sure to disconnect your unit from the power source before attempting to remove the bonnet cover.) The Voltage Selector Plug has a white arrow on its top. Reinsert the Voltage Selector Plug so that the arrow lines up with the Pointer Line of the voltage you desire.

# INTERCONNECTING DIAGRAM



## OPERATION

When all the connections have been made according to the preceding instructions, you may apply the power by pushing "IN" the POWER button. Select the speaker system you wish to activate by pushing "IN" either the SP-1 or SP-2 button, or if you wish to operate both the main and remote speaker systems simultaneously, push "IN" both the SP-1 and SP-2 buttons.

NOTE: If the Signal Indicator Light fails to light, remove and check the AC Fuse. If no sound can be heard, when all the buttons and controls are placed at their correct positions, remove and check the DC Fuse. If the Fuse is blown, check for possible reasons for the blow-out (e.g., short at the speaker leads and etc.), and replace the fuse.

### RECORD PLAYER

Set the SELECTOR to PHONO position, noting the Signal Indicator Light, and push the MODE button "IN" for monophonic listening or leave the button "OUT" in its normal position for stereophonic listening.

Set the BASS and TREBLE tone controls to your personal preference.

Adjust the BALANCE control to ensure proper balance between the speakers. Play a monophonic program source and adjust the control until, seated at your normal listening position, the sound seems to come out from the center between the two speakers.

### TUNER

Set the SELECTOR to "TUNER" position, noting the Signal indicator Light, and set the MODE button to either "IN" for mono or "OUT" for stereo depending upon your program source.

Set the BASS and TREBLE tone controls to your personal preference.

### PLAYBACK OF TAPE RECORDING

To listen to a playback of pre-recorded tape, push the TAPE MON. button "IN." The setting of the SELECTOR control is irrelevant in this case and may be left at any position. The VOLUME, BASS, TREBLE and BALANCE controls may be adjusted to suit your taste.

### MAKING TAPE RECORDINGS

To make off-the-air recordings, set the SELECTOR to "TUNER", and to record off phono records, set the SELECTOR to "PHONO." To record off another tape recorder, set the SELECTOR to "EXTRA" (The back panel connections should be made to connect the "recording" tape recorder to the TAPE IN and TAPE OUT terminals and the "playback" tape recorder to the EXTRA terminal.) Same procedure applies for recording off cassette or 8-track tape.

If your tape recorder is equipped with a separate playback head, pushing "IN" the TAPE MON. button will cause the input source to be bypassed and will permit you to listen to the recording being made on the tape, and leaving the TAPE MON. button "OUT" will permit you to listen to the input source. Thus, with the TAPE MON. button you may "monitor" or compare the recording being made with the source being recorded.

### HEADPHONES

To listen through a pair of headphones, simply plug the headphone lead into the PHONES jack on the front panel and leave the SP - 1 and SP - 2 buttons "OUT" to de-activate the external speakers.

### LOUDNESS SWITCH

Whenever your system is operated at low levels, the sound will not seem as full as it is at higher levels. This is because the human ear does not perceive as well the low frequency sounds when the volume is low. The LOUDNESS button is used to compensate for this deficiency. Whenever the volume is reduced, push this button "IN," and the extreme low frequency sounds will be effectively boosted.

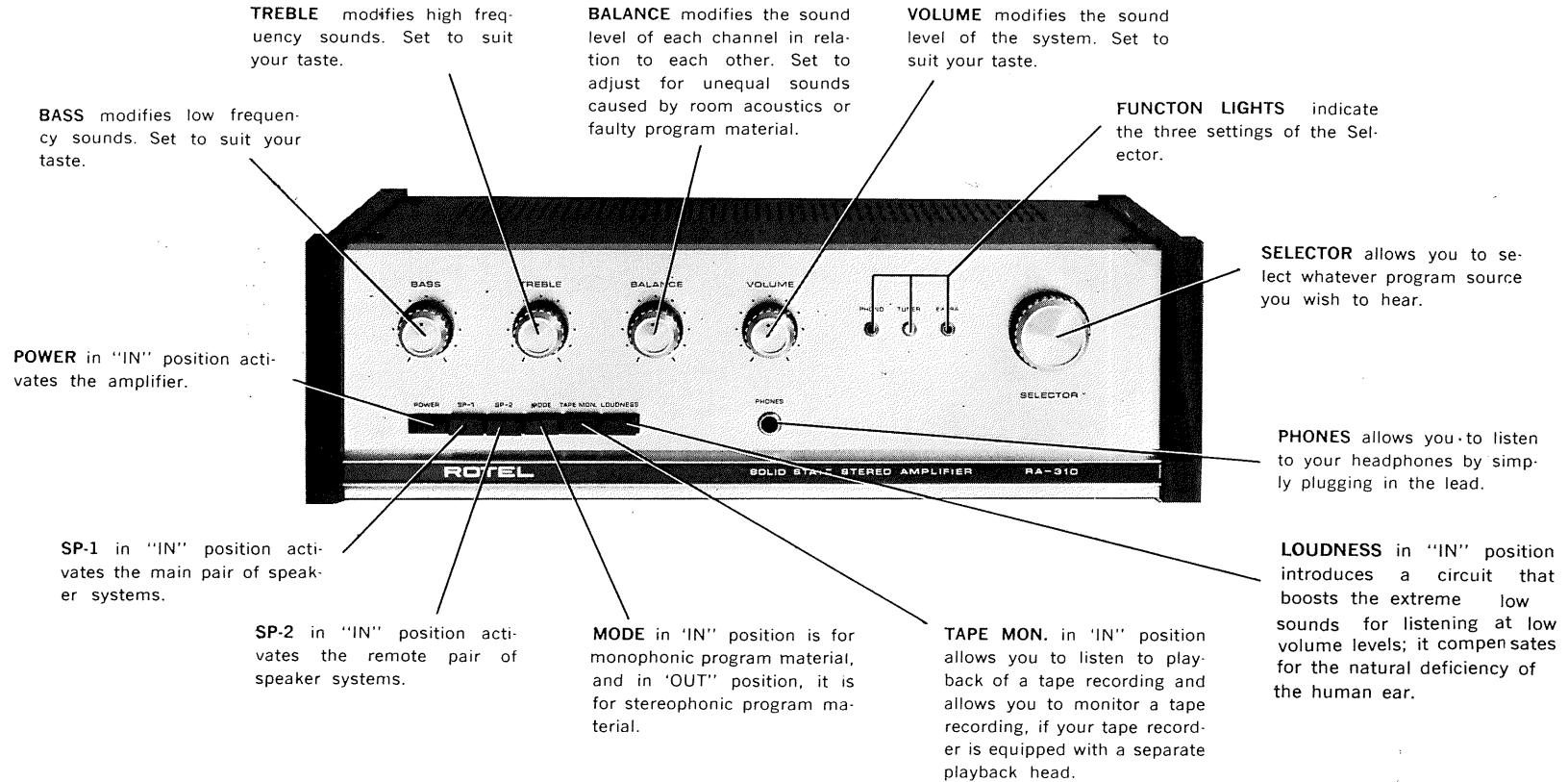
### GROUNDING

With turntables, changers or tape recorders that must be grounded to reduce hum to unobjectionable levels, connect any grounding wire to screw marked "G" on the rear panel.

### FUSE

The RA-310 is protected with a 2-amp fuse in the AC primary and another 2-amp fuse in the DC output circuits. Replacing with a fuse of higher rating will not protect the unit any more effectively, rather it may result in severe damage to the unit. (In 230V areas the AC fuse will be of 1-amp rating)

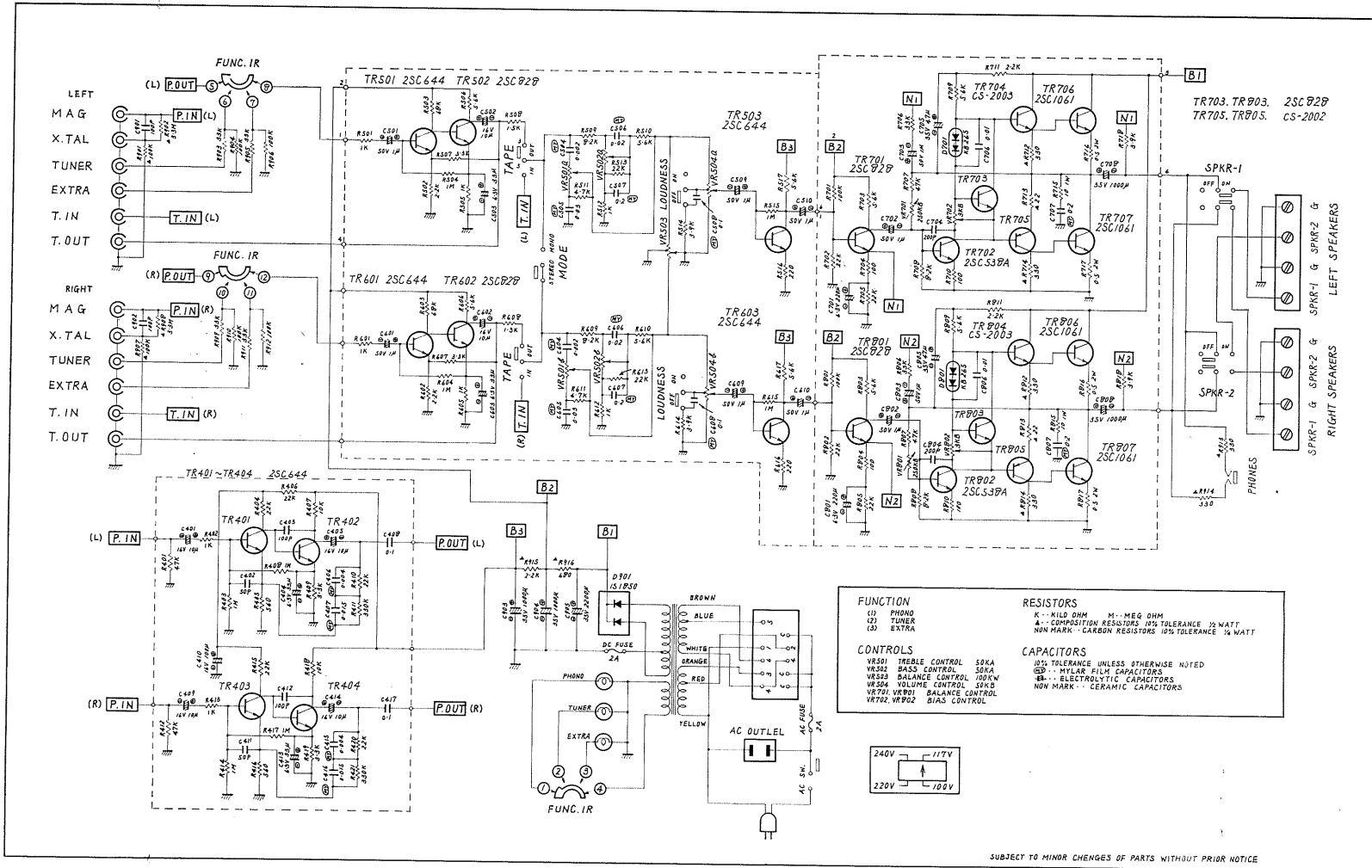
# CONTROLS AND THEIR FUNCTIONS



## SPECIFICATIONS

Total Music Power (IHF):	60 watts at 4 ohms, 40 watts at 8 ohms.
Continuous Power (RMS), Each Channel Driven:	20 watts at 4 ohms, 15 watts at 8 ohms.
Distortion, IM: Harmonic:	less than 0.5% at rated output, less than 0.2% at rated output.
Frequency Response:	20 — 30,000 Hz at +0 — — 1.5 watts.
Power Bandwidth (IHF):	25 — 30,000 Hz.
Input Sensitivity, at Rated Output:	MAG 3 mV, AUX 200 mV, X'TAL 100 mV, TAPE MONITOR 300 mV.
Hum and Noise:	PHONO 60 dB, AUX 65 dB, TUNER 65 dB.
Residual Noise:	1 mV.
Square Wave Rise Time:	3 Microseconds.
Damping Factor:	30 at 8 ohms.
Speaker Impedance:	4, 8, 16 ohms.
Bass Control:	+14 — — 12 dB at 50 Hz.
Treble Control:	+12 — — 12 dB at 10,000 Hz.
Power Voltage:	AC 100, 120, 200, 240V, 50/60 Hz.
Dimensions:	14" W, 4½" H, 7½" D.
Weight:	11 lbs.

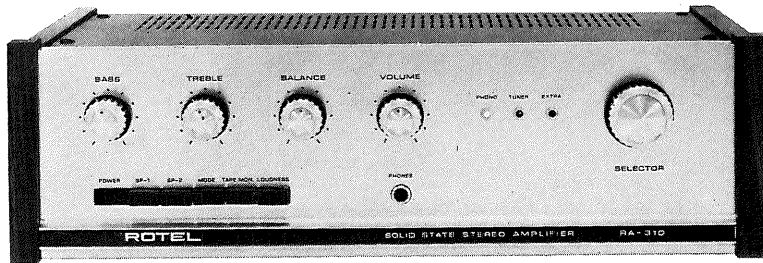
# SCHEMATIC DIAGRAM



SUBJECT TO MINOR CHANGES OF PARTS WITHOUT PRIOR NOTICE

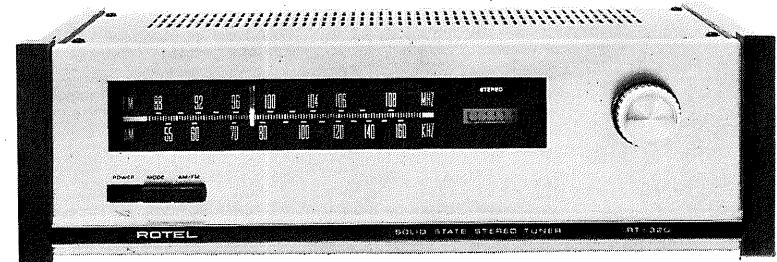


**. . . AND A FINE SUGGESTION FROM ROTEL:**



**RA-310 STEREO PRE-MAIN AMPLIFIER**

In RA-310 you have made an excellent choice of pre-main integrated amplifier from today's proliferating, often confusing, variety of Hi-Fi components that are available to the consumer. But if it is difficult to distinguish a fine amplifier, it is even more difficult to select a tuner that is not only superior in itself but is truly suited to the amplifier. Every amplifier, including the RA-310, has its own unique characteristic, and for the RA-310 we cannot suggest to you a more fitting tuner than the ROTEL RT-320 AM/FM Stereo Tuner. The RA-310 and RT-320 were designed specifically to complement each other's characteristics and, hence, enhance each other's performance as no other combination of components can.



**RT-320 AM/FM STEREO TUNER**

Some of RT-320's outstanding features:

- FM section with FET Front-End
- 3-Gang Variable Capacitor
- 4-Stage IF
- IHF Sensitivity of . . . 2.5 V
- IHF Selectivity of . . . 35 dB
- Harmonic Distortion of . . . less than 1%
- AM section with 2-Gang Variable Capacitor
- IHF Sensitivity of . . . 30 V
- IHF Selectivity of . . . better than 30 dB



**ROTEL<sup>®</sup> RA-310**

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