

## owner's manual

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## INTRODUCTION

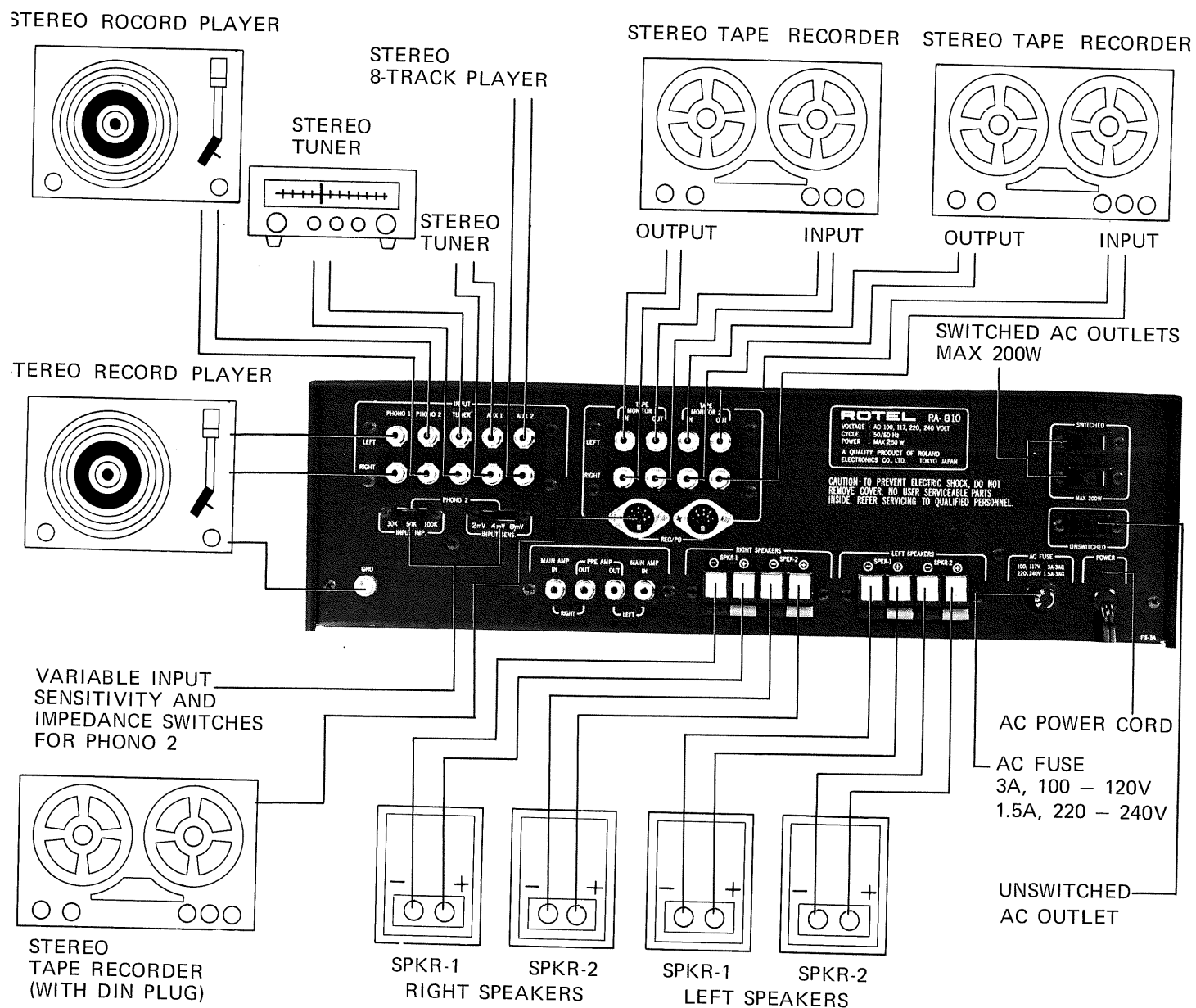
We would like to take this opportunity to thank you for purchasing our Stereo Amplifier. With the high quality design and workmanship that goes into making this equipment, you can be assured of its flawless performance for many years to come.

We have fitted every control and feature you could conceivably need. Designed for both versatility and ease of operation, this piece of equipment will add professional studio flexibility to your Hi-Fi sound center. The performance is exceptional; it will allow you to experience

true high fidelity as never before. Its full and natural stereophonic reproduction offers you musical entertainment approaching that of live performances. We sincerely hope you will treasure this professional equipment. In order to obtain the maximum use out of your unit, please read the following pages of this Operating Manual carefully.

Do not attempt to operate the unit until you have made all the necessary connections.

## REAR PANEL CONNECTIONS



## INSTALLATION

**IMPORTANT:** Do not apply power to this unit without first making sure that speakers are connected properly and all the other necessary connections are made.

### SPEAKER CONNECTION

This unit is equipped with terminals for connecting two sets of speakers. Connect your main pair of speakers to the terminals marked SPKR-1. Ensure that your right speaker is connected to the terminal marked  $\oplus$  and that the ground (-) terminal on the right speaker is connected to the terminal marked  $\ominus$  on the extreme left of the terminal block. Similarly, connect your left speaker between the adjacent SPKR-1 terminals marked  $\oplus$  and  $\ominus$ . If you wish to connect a second pair of speakers, connect them to SPKR-2 terminals in the manner described above. **Caution:** Ensure that the speaker leads are fastened securely to the proper terminals, and that there are no stray strands which may cause shorting between terminals. If 2 sets of speakers are played simultaneously, the impedance of each unit should not be less than 8 ohms.

### Phasing:

When all connections have been made, and the unit is operating, a check on correct speaker phasing should be made. This is described in a later section.

### RECORD PLAYER CONNECTION

The 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 (3 m) in length.

Connect both leads from your record player to the LEFT and RIGHT PHONO input receptacles on the rear chassis. If your record player has a ground cable emerging besides two input cables, connect this ground cable to the ground terminal post marked GND on the rear chassis.

This amplifier has two sets of PHONO input receptacles to accommodate two record players. The PHONO 1 is suitable for record player with regular magnetic cartridge. The PHONO 2 is also for record player with magnetic cartridge, but it has the variable input sensitivity and impedance switches to match properly to characteristics of your particular cartridge. See the OPERATION section for using the switches.

If you wish to use ceramic cartridge, connect your record player to either of AUX input receptacles.

### TUNER CONNECTION

Connect the outputs of your stereo tuner to the LEFT and RIGHT TUNER input receptacles on the rear chassis with shielded cables. If you have another tuner, connect it to AUX 1 or AUX 2 receptacles.

### AUX CONNECTION

Your amplifier has two pairs of AUX input receptacles for use with high level program sources: tape recorder, tuner,

cassette recorder, 8-track cartridge player, TV sound or a ceramic microphone. It should be noted that AUX is used only for the playback purpose, and for recording see TAPE RECORDER CONNECTION below.

When connecting a stereo tape recorder, connect both output cables to the AUX LEFT and RIGHT input jacks on the rear chassis. For cassette or 8-track cartridge, similar procedure is followed. When connecting a monophonic equipment, connect the single output lead to either of the AUX LEFT or RIGHT input jack.

### TAPE RECORDER CONNECTION

Terminals are supplied for connecting two tape recorders (which incorporate playback preamplifier). Connect the right and left output cables of the tape recorders to the TAPE MONITOR terminals marked IN, and connect its right and left input cables to the TAPE MONITOR terminals marked OUT. If you have tape recorders with DIN-type plugs, connect it to the REC/PB DIN sockets.

### PRE AMP OUT AND MAIN AMP IN RECEPTACLES

There are pairs of terminals marked PRE AMP OUT and MAIN AMP IN, connected with a pair of jumper pins on the rear chassis. Normally with the pins in place, your receiver is the combined equipment of integrated pre-amplifier and main-amplifier sections. However, by removing the jumper pins, your unit in essence becomes two independent components consisting of one pre-amplifier and one main-amplifier.

These receptacles are intended for use with any necessary equipment designed to be installed between the pre-amplifier and the main-amplifier or for separate use of either section alone. Such equipment as electronic audio equalizer or reverberation unit can be used; or another pre-amplifier or main-amplifier may be hooked up. Simply disconnect the jumper pins and follow the instructions supplied with the accessory equipment. When no auxiliary equipment is being used, the jumper pins MUST be installed in place in order to use your amplifier.

### AC OUTLET

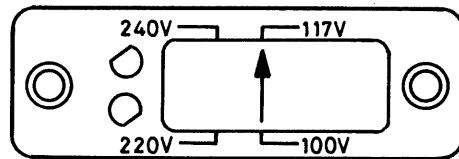
Your amplifier is equipped with two switched AC Outlet to provide power and switching control to whatever component you may wish to connect to the unit. However, the total load of equipment connected to the AC Outlets must not exceed 200 watts. In addition, one unswitched AC Outlet is supplied but without switching control by the POWER switch.

### VOLTAGE SELECTION

The amplifier is a variable voltage equipment that can run on 100V, 117V, 220V or 240V power supply. Your unit comes already preset at the proper voltage for use in your area; however, if you move to an area where the power supply voltage is different, the voltage setting can be

manually changed. BE SURE THAT YOUR UNIT IS NOT CONNECTED TO THE POWER SOURCE BEFORE ATTEMPTING TO MAKE THIS CHANGE.

To change the voltage setting, remove the cabinet and locate the VOLTAGE SELECTOR (see figure below). Pull up the Voltage Selector plug which has a white arrow on its top. Reinsert the Plug to the Selector Base so that the head of the arrow lines up with the pointer line of the voltage you desire.



#### CONNECTING TO POWER SUPPLY

Before connecting up ensure that the voltage selector is set correctly for your supply, and a suitable plug fitted. If you need to fit a plug, ensure live, neutral and (where appropriate) earth leads are connected to the proper terminals. Ensure the terminals are screwed down firmly, and no loose strands of wire are present.

The unit is protected with a 3 amp fuse in the AC input circuit. In addition, the DC circuits and the speaker circuits are protected by the automatic recoverable circuit breaker and four 3 amp fuses inside the chassis. The circuit breaker will keep deactivating and activating the amplifier, so if this happens disconnect the power source and find causes of trouble. When replacing a fuse, be sure to use a fuse of the same rating. DO NOT replace with a fuse of higher rating. Protection will be lost, and severe damage to the unit may result.

If in any doubt about connecting to the power supply, consult a qualified electrician.

**VOLUME CONTROL:** regulates the sound level of any program material fed into the receiver. The control affects both channels equally, eliminating regular balancing. Rotate clockwise for increase in sound level.

**BALANCE CONTROL:** regulates the relative outputs from the two channels. Normally the balance control is adjusted to provide the effect of a mono signal coming from a point midway between the speakers. When balanced in this way, the maximum stereo effect will be achieved. Slide to right for increase in sound level from the right channel, and to left for the left channel.

**TREBLE CONTROL:** regulates high frequency sounds, as desired, to suit personal taste, speaker characteristics, etc. The center position gives normal (flat) frequency response. Sliding upward increases the treble, and downward reduces the treble.

**BASS CONTROL:** regulates low frequency sounds, and operates in the same manner as the treble control.

**INPUT SELECTOR:** enables you to select the function you desire from PHONO 1, PHONO 2, TUNER, AUX 1 and AUX 2.

**SPEAKERS CONTROL:** allows you to select your speaker systems for activation. "OFF" to deactivate all speaker systems when such as listening to your headphones privately; "1" to activate your speaker systems connected to SPKR-1 terminals on the rear chassis; "2" to activate your systems connected to SPKR-2; "1+2" to activate both systems SPKR-1 and SPKR-2.

**MONITOR CONTROL:** allows you to playback, monitor, and dub (record each other) two tape recorders. TAPE 1 and TAPE 2 receptacles on the rear chassis each has a pair of output and input RCA jacks and one DIN connector jack. "1 → 2" to dub the tape recorder connected to TAPE 1 by the tape recorder connected to TAPE 2; "2 → 1" to dub the other way around. "1 PLAY" to playback the tape recorder connected to TAPE 1, and "2 PLAY" to playback the tape recorder connected to TAPE 2. Set to "SOURCE" position whenever tape recorder is not being played but other material is being played; also set to this position when you wish to hear the program source during recording by tape recorder.

If your tape recorders have separate playback heads, "1 PLAY" and "2 PLAY" positions can be used as monitors when recording; setting to either of this position will allow you to listen to program as actually being recorded.

So you can compare while recording program being playing ("SOURCE" position) with same program being actually recorded (monitoring).

**MODE CONTROL:** "L" to operate only the sound from the left channel coming out from both speaker systems; "R" for the right channel only. "STEREO" for stereophonic operation, and "REV" for reversing the left and right channels of stereophonic sound. "L+R" to activate monophonic operation.

"L" and "R" positions allow you to test each channel or compare each other. "REV" position allows you to change listening effect. "STEREO" and "L+R" positions depend upon program source — stereophonic or monophonic.

**POWER INDICATOR LIGHT:** allows visual indication that power is activated.

*The push button switches used are all of the PUSH/PUSH type; that is push in to activate the circuit and push again to release or de-activate the circuit. In describing these switches we will consider the "IN" position to be "ON" and the "OUT" position to be "OFF".*

**MUTING SWITCH:** allows you to reduce the level of volume by -20db for momentary quieting when you do not wish to change the volume setting but must lower volume temporarily.

**LOUDNESS SWITCH:** in "ON" position activates a circuit which boosts low and high sounds at low volume control settings. This compensates for the ears loss of sensitivity to bass and treble notes at low listening levels.

**HIGH FILTER:** allows you to reduce the high frequency response of your amplifier whenever you wish to reduce annoying record scratches, tape hiss, FM background noise, etc.

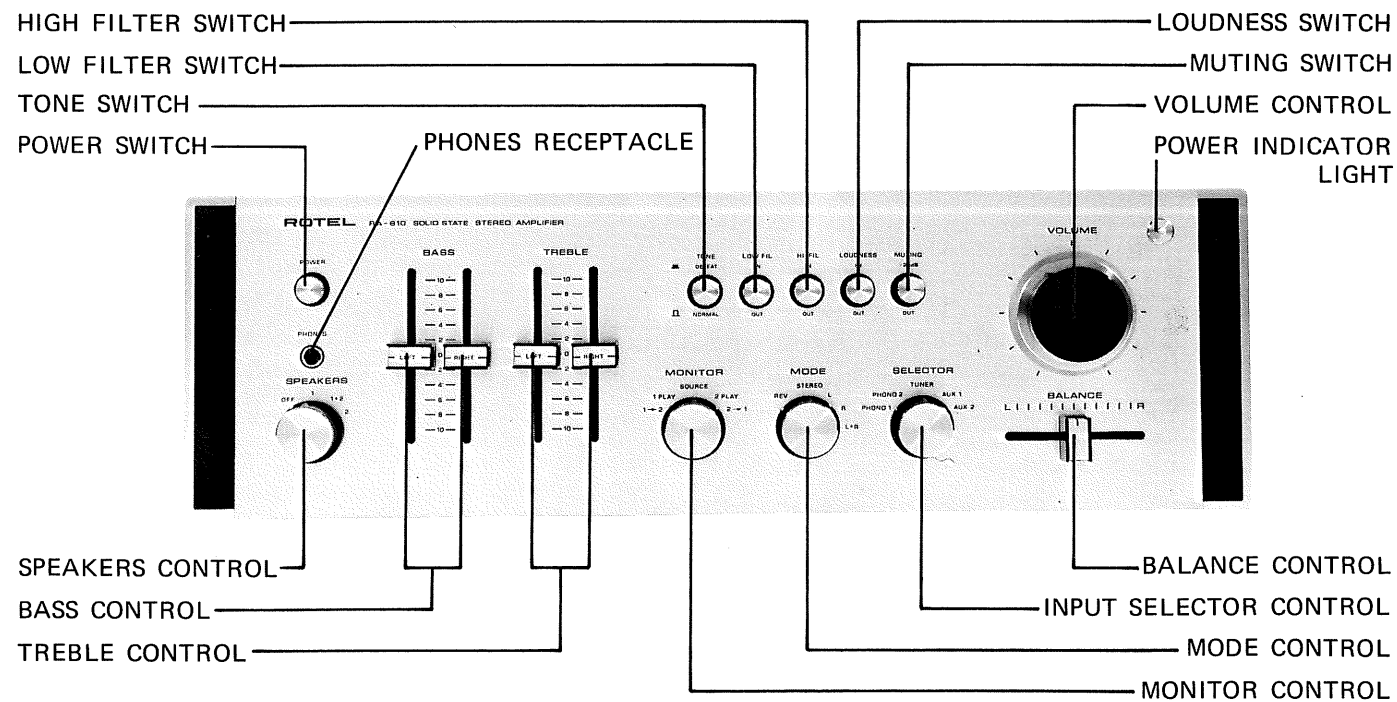
**LOW FILTER:** allows you to reduce the low frequency response of your amplifier whenever you wish to reduce annoying record and tape rumbles, etc.

**POWER SWITCH:** performs the function as its name denotes. It supplies power to the receiver and to the switched AC outlets. When the switch is "ON", power indicator will be illuminated.

**TONE SWITCH:** permits you to deactivate the tone control circuit and provide an absolutely linear flat response when in "DEFEAT" position. Leave at "NORMAL" position when wish to use tone controls.

**PHONES RECEPTACLE:** Simply plug in your headphone lead and switch off unwanted speakers for private listening.

#### FRONT PANEL CONTROLS



## OPERATION

Having made all connections according to the preceding instructions and become familiar with the functions of the amplifier, you are ready to operate the equipment. Apply power by plugging into the power source and pushing "IN" the POWER button. Select the speakers you wish to use by turning "ON" either SPKR-1 or SPKR-2 switch, or both according to requirements.

### PRELIMINARY CHECKS:

- If the dial light has failed to illuminate, remove and check the AC fuse.
- If no sound is heard when all switches and controls are correctly positioned, or if sound comes on and goes out repeatedly (due to automatic recoverable circuit breaker) check if speaker leads are not shorting each other. If the circuit breaker is not working and no sound at all, remove and check the DC fuses inside the chassis (BE SURE POWER SOURCE IS DISCONNECTED). If a fuse or fuses are blown, check possible reasons for the blowout and replace the fuse.
- The phasing of the speakers should be checked. If the two speakers are out of phase, the stereophonic effect will suffer. Check as follows:
  - Set the MODE control to L+R(mono).
  - Tune in a program with a distinct solo part (e.g. voice).
  - If the speakers are in phase (correct connection) the solo will appear to come from the center point between the speakers. If they are not in phase, the sound will appear to come from the two speakers separately.
  - If the phasing is wrong, reverse the ⊕ and ⊖ speaker connections.

### TUNER

Turn the input selector control to the TUNER position, and set the mode control to STEREO or L+R depending upon the program selected. Use all other controls and switches according to taste and listening conditions. Set to the AUX 1 or AUX 2 if your tuner is connected to either receptacles. Note: Before operating your tuner, be sure to read the operating manual or information of the tuner.

### RECORD PLAYER

Turn the input selector control to PHONO 1 or PHONO 2, depending on the record player you wish to operate. Set the mode control to STEREO or L+R depending upon the mode of the record disc selected. PHONO 2 has two rear chassis switches to choose 3 different input sensitivities (2, 4 and 8mV) and impedances (30k, 50k and 100k ohms) to match the characteristics of your magnetic cartridge. Set the switches accordingly to obtain the optimum performance

out of the cartridge. The characteristics list should be attached with the cartridge.

### PLAYBACK OF TAPE RECORDING

#### 1. When using AUX inputs

Turn the input selector control to the AUX position, and set the MODE to your choice.

#### 2. When using TAPE MONITOR inputs

To listen to a playback of pre-recorded tape, turn the mode control to 1 PLAY or 2 PLAY depending on which tape recorder you wish to use. The setting of the input selector control is irrelevant in this case and may be left at any position.

### MAKING TAPE RECORDINGS

To make off-the-air recordings, turn the input selector control to TUNER or AUX depending on which your tuner is connected, and to record off record discs set to PHONO 1 or PHONO 2. To record off the equipments such as cassette recorder connected to AUX 1 or AUX 2, turn to AUX 1 or AUX 2.

To record off (dubbing) the tape recorder connected to TAPE 1 by the tape recorder connected to TAPE 2, turn the monitor control to 1→2. Set to 2→1 if the other way around.

If your tape recorder is equipped with a separate playback head, turning the monitor control to 1 PLAY or 2 PLAY will cause the input source to be bypassed and will permit you to listen to the recording being made on the tape. Setting at the SOURCE position will permit you to listen to the input source. Thus, with the monitor control you may monitor or compare the recording being made with the source being recorded. When dubbing, only the tape recorder that is recording will be monitored.

### WHERE TO PLACE

Since transistors are extremely susceptible to heat, the amplifier has been designed to diffuse heat through the top and rear of its case. Therefore, special consideration should be given to where it will be used before installing the system. It should not be operated in a place where it is exposed directly to the sun, near radiators or other heat-generating sources, and it should never be mounted in an air-tight cabinet. Finally nothing should be placed on top of it.

### GROUNDING

Connect one end of vinyl or enameled wire to the terminal screw marked GND on the rear of the amplifier, attach a copper plate to the other end, and bury it underground.

### HUM AND NOISE

In any high fidelity installation, hum may be caused by the interconnection of a record player, tuner and ampli-

fier, as a result of the cables and different grounds. If hum is experienced with your amplifier, disconnect everything but the speakers from the unit. If hum persists, reverse the AC line cord. Plug in the record player and if hum appears, reverse the record player power plug and connect a single lead from the record player chassis to the ground

post on the rear chassis. Connect your other devices in this manner.

**Caution:** Hum may also be induced by defective connecting cables or by running these cables too close to a strong AC field.

## SPECIFICATIONS

### Power Amplifier Section

#### Power Output:

Total Music Power (IHF) .....	180 watts at 4 ohms 125 watts at 8 ohms
Continuous Power (RMS) .....	60 watts/channel at 4 ohms 40 watts/channel at 8 ohms
(both channels driven, THD less than 0.5%)	
Harmonic Distortion .....	less than 0.3%, 20 to 20,000Hz at 40w/ch
Intermodulation Distortion .....	0.1% at 40w/ch
Frequency Response .....	4 to 75,000Hz, +0db -3db
Power Bandwidth (IHF) .....	5 to 50,000Hz at 8 ohms
Input Sensitivity/Impedance .....	1V/30k ohms
Damping Factor .....	35 at 8 ohms
Speaker Impedance .....	4 to 16 ohms

### Pre-Amplifier Section

Output Voltage .....	1V (rated), 3V (maximum)
Harmonic Distortion .....	less than 0.1% at rated output voltage
Frequency Response .....	3 to 50,000Hz, +0db -3db
Hum and Noise:	
PHONO 1, PHONO 2 .....	65db
TUNER, AUX1, AUX2, TAPE IN .....	75db
Residual Noise .....	1.5mV
Input Sensitivity/Impedance:	
PHONO 1 .....	2mV/100K ohms
PHONO 2 .....	2, 4, 8mV/30k, 50k, 100k ohms
TUNER, AUX1, AUX2, TAPE IN .....	200mV/45 ohms
TAPE DIN .....	330mV/100k ohms
Phono Equalizer .....	EEF type, RIAA ±0.5db 50 to 15,000Hz
Phono Overload .....	125mV
Loudness Switch .....	+10db at 50Hz, +6db at 10,000Hz

High Filter .....	-10db at 10KHz
Low Filter .....	-10db at 50Hz
Muting Switch .....	-20db at 1,000Hz
Bass Control .....	±10db at 50Hz
Treble Control .....	±10db at 10,000Hz
Crosstalk .....	43db at 1,000Hz
Square Wave Risetime .....	5 microseconds

### Miscellaneous

Power Requirements .....	100, 117, 220, 240V 50/60Hz
Power Consumption .....	150 watts (maximum)
Dimensions .....	420mm(W) x 304mm(D) x140mm(H), 16½" x 12" x 5½"
Weight .....	10kg/22lbs

Note: features and specifications subject to changes for improvement without prior notice.

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