

# ROTEL *hi fi*

## RA 970BX

Stereo Integrated Amplifier

## Owners Manual

English/French/German section included.

Please write the serial number purchase date and ROTEL *hi fi* AUTHORIZED DEALER for your records in the space provided.

Serial Number \_\_\_\_\_.

Purchase date \_\_\_\_\_.

ROTEL *hi fi* AUTHORIZED DEALER \_\_\_\_\_.

# SAFETY INSTRUCTIONS

**WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

## Explanation of Graphical Symbols

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the appliance.



1. **Read Instructions** - All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** - The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** - All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** - All operating and use instructions should be followed.
5. **Water and Moisture** - The appliance should not be used near water - for example, near a bathtub, kitchen sink, laundry tub, in a wet basement or near a swimming pool, etc.
6. **Carts and Stands** - The appliance should be used only with a cart or stand that is recommended by the manufacturer.
- 6A. An appliance and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the appliance and cart combination to overturn.
7. **Wall or Ceiling Mounting** - The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** - The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or placed in a built-in installation, such as a bookcase or cabinet that may that may impede the flow of air through the ventilation openings.
9. **Heat** - The appliance should be situated away from heat sources such as radiators, heat registers, stoves or other appliances (including amplifiers) that produce heat.

**PORTABLE CART  
WARNING**



10. **Power Sources** - The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** - The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection** - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles and the point where they exit from the appliance.
13. **Cleaning** - The appliance should be cleaned only as recommended by the manufacturer.
14. **Nonuse Periods** - The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. **Object and Liquid Entry** - Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through the openings.
16. **Damage Requiring Service** - The appliance should be serviced by qualified factory-authorized service personnel when:
  - The power-supply cord or the plug has been damaged; or
  - Objects have fallen, or liquid has been spilled into the appliance; or
  - The appliance has been exposed to rain; or
  - The appliance does not appear to operate normally or exhibits a marked change in performance; or
  - The appliance has been dropped, or the enclosure damaged.
17. **Servicing** - The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified factory-authorized service personnel.

APPLICABLE FOR U.S.A., CANADA OR WHERE  
APPROVED TO THE USAGE.

**CAUTION:** TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

**ATTENTION:** POUR ÉVITER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU'AU FOND.

## A WORD FROM ALL OF US AT ROTEL

We thank you for purchasing our RA 970BX Stereo Integrated Amplifier. We have been designing and manufacturing high quality, high performance audio electronics for more than 30 years. This integrated amp was designed to offer lifelike sound and is a natural extension of our love for music. Our passion for good sound and our love of music is well known. We believe that the music played through the RA 970BX will be a source of enjoyment to you for many years to come.

Rotel is committed to making quality products to enhance your life. We have designed this amp to be durable, easy to use and to have *high fidelity to the original sound*. Please read the owners manual to ensure that the amp is properly installed and able to offer optimum performance. We appreciate being a part of your life.

## INSTALLATION OF THE RA 970BX

Please place the unit on a **DRY**, level surface away from direct sunlight. *Avoid placing objects on top of the RA 970BX that will block the cooling vents, as they may cause the amplifier to overheat.* If the amplifier is mounted inside a cabinet, then please be certain that there is adequate air flow to ensure proper cooling. *Do not allow water or objects to fall into the RA 970BX as these will damage the circuitry.* Avoid installing the amplifier in a location where excessive humidity, vibration or moisture will be a problem.

We recommend installing the RA 970BX in furniture designed to house Hi Fi components. This will allow the amp to be on its own shelf with nothing stacked on top of it. This will minimize heat and potential interference from other components in your system. Component furniture will also reduce or suppress vibration and all audio components will provide improved sound when free from vibration. Ask your **ROTEL hi fi Authorized Dealer** for advice about component furniture and proper installation of audio components.

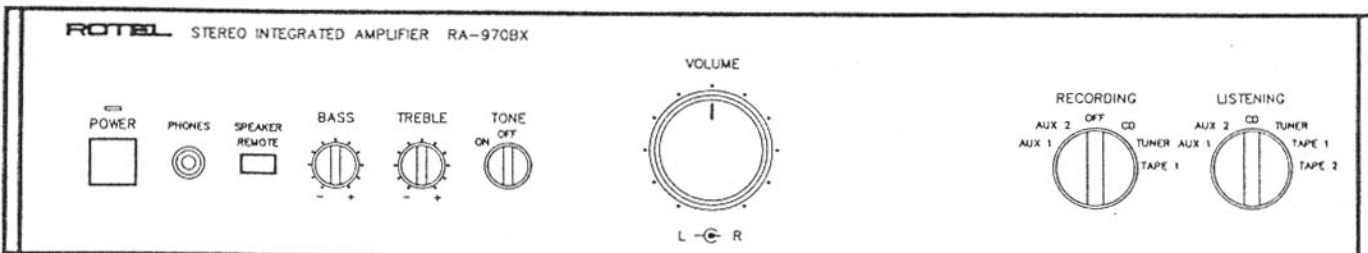
## ELECTRICAL REQUIREMENTS

This amplifier is designed to work on AC voltage and the correct voltage is displayed on the Back Panel. **Do not attempt to operate the amplifier on incorrect voltage as this will damage the circuitry and will void your warranty.** If you are in doubt about the correct voltage for this amplifier we suggest that you please read the label on the back panel or consult your **ROTEL hi fi Authorized Dealer** for confirmation of the correct voltage.

Connect the **Power Cord** to your wall socket for AC power. When you wish to disconnect the power cord from the wall always hold the plug firmly and then pull it out of the wall socket. *Do not unplug the power cord from the wall by pulling the cord only. This may damage the power cord and create a hazardous condition.* We strongly recommend that the amplifier be connected to the mains wall socket, not an extension cord.

If you wish to clean the cabinet on the RA 970BX we suggest that you clean it with a soft, DRY cloth. *Never use cleaning compounds or solvents to clean the cabinet as they may damage the finish or remove the labels.* They could also damage the circuitry if any residue falls inside the amplifier.

There are **NO** user serviceable parts inside the RA 970BX. **Please do not open the cabinet as this will expose you to the risk of potentially dangerous high voltage and the risk of shock.** This could also damage the circuits and possibly void your warranty.



Please refer to this drawing of the Front Panel when reading the section about Controls on the RA 970BX.

## CONTROLS ON THIS INTEGRATED AMPLIFIER

We have designed this integrated amplifier to be a no compromise design. The controls are simple but comprehensive, well labeled and easy to use. For example; the amplifier is able to send music to a tape recorder

that is independent of the music being heard. This is possible because we have incorporated separate Recording and Listening controls on the Front panel.

The **POWER** button will turn the amplifier **ON** and **OFF**. Push it in and the amplifier will turn ON. The **Power Indicator Light** will illuminate at the same time. If you push the Power button again the power will go OFF and the power indicator light will extinguish.

To adjust the bass and treble content of the music, set the **Tone** switch to the **ON** position. This will allow the **Bass** and **Treble** controls to function. When the Tone switch is set to the **OFF** position, the tone controls are *bypassed* inside the amplifier. We have incorporated this switch to allow for adjustment of the music's tonal balance OR to allow for the shortest circuit path for those people who choose not to use the Bass and Treble controls.

Our Bass and Treble controls also work over a less extreme range than many other designs. We design our tone controls to adjust only the low bass or the high treble range of the music. We do not allow our tone controls to *color* the all important middle ranges (Vocal range) of the music. That is why we rate them for only 6 dB of boost (+) or cut (-) at 100 Hz or 10 kHz, not the 10 or 12 dB common in many other designs. Turning the Bass or Treble controls *Clockwise* will *increase* the amount of Bass or Treble. Turning the controls *Counterclockwise* will *decrease* the amount of Bass or Treble.

We have included Speaker Switching on this amplifier and the label **Speaker Remote** refers to the way this switch operates. The Speaker Remote switch will turn the **REMOTE** labeled Speaker Terminals ON or OFF. If you listen with Headphones and would like to be able to turn your speakers OFF *when* using headphones then we suggest they be connected as the REMOTE pair of speakers. The Speaker Remote switch will NOT turn the **DIRECT** labeled Speaker Terminals OFF. (See note below in the Connections section.)

The **HEADPHONE** jack will provide a convenient connection for your headphones. If you have headphones with a 3.5 mm mini plug you should ask your **ROTEL hi fi Authorized Dealer** for an adapter plug to convert them for use with the headphone jack on the RA 970BX.

The **VOLUME** control will allow you to turn the Left (L) and Right (R) channels of music up or down in level at the same time. This is a dual concentric design and is adjustable for individual Volume levels as well. Merely hold the volume control still for the front OR rear section and rotate the other section to raise or lower the volume in the channel you wish to adjust. Once the relative volume level between the two channels has been adjusted you will be able to raise or lower the volume in both channels simultaneously. Rotation **Clockwise** will **increase the volume**, rotation **Counterclockwise** will **decrease the volume**.

The **RECORDING** Selector Switch will send the signal FROM the Input of your choice TO the TAPE OUT connections on the back panel of the RA 970BX. The Recording selector may be set to the same Input as the music you are listening to OR it may be set to a different Input while you listen to music. *As an example*, you might wish to listen to your CD player while making a recording of a radio program. To do this, choose the source Input **TUNER** on the RECORDING selector and the CD Input on the LISTENING selector.

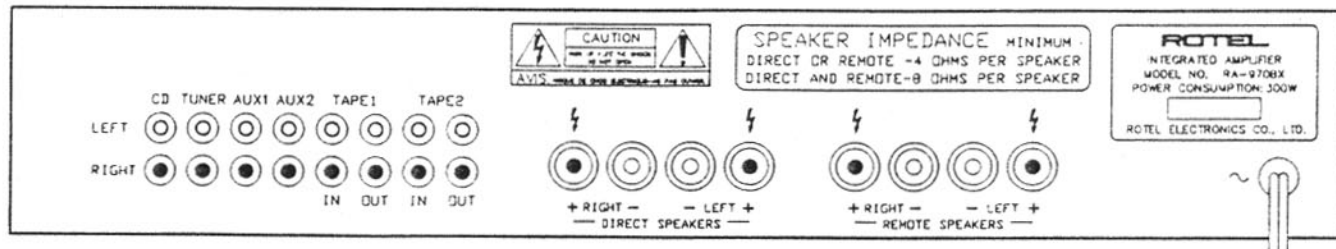
We suggest the RECORDING control be set to the OFF position if you are not recording. This setting ensures maximum fidelity and freedom from interference for the RA 970BX. When you are **DUBBING** (copying Recorder to Recorder) from one recorder to another the signal will be able to come FROM *Tape 1* and may be RECORDED by *Tape 2*.

**NOTE: The Tape 2 Tape OUT CANNOT be recorded by the Tape Deck connected to Tape1.** The Tone Controls have NO effect on a recording while it is being made. They will, of course, adjust the tonal balance during playback.

The **LISTENING** Selector Switch will select the source that you wish to hear. We have provided Inputs for Aux 1, Aux 2, Tuner, CD, Tape 1 and Tape 2. If you wish to use a Turntable and an external phono stage, we suggest the RQ 970BX Phono Equalizer. This may be connected to Aux 1 or Aux 2.

The Tuner, CD, Tape 1 and Tape 2 positions are all labeled for your convenience. *The Tape 2 position should be used for the Recorder you intend to record with the most, as it is capable of Dubbing Tape 1 playback as well.* The Tape 1 position may be used for the audio outputs (L and R) of a Hi Fi VCR if you wish to play movies or TV shows through your stereo. This is an increasingly popular way to view TV and movies at home. If your VCR is monophonic then you will need to have a "Y" connector to adapt it to play through both channels of your amplifier.





Please refer to this drawing of the Rear panel of the RA 970BX when connecting components or speakers.

## CONNECTING COMPONENTS TO THIS INTEGRATED AMPLIFIER

The back panel has the **RCA Input** connections and the **Speaker Terminals** for connection to the other components and speakers in your stereo system. The Inputs are clearly labeled and the Channels are also designated. Please be certain that the Left channel and Right channel connections are not reversed. This will not harm anything but it will make the orchestra sound backwards for classical music fans.

Auxiliary 1 and 2 will be ideal for the connection of an external phono stage, a stereo monitor TV with audio output jacks, a video game, your personal computer audio output jacks or a Laser Disc player. The CD and TUNER connections are clearly labeled for your convenience.

The TAPE 1 and 2 connections have IN and OUT connections. These are to send a signal to (OUT) the recorder and then to receive a signal back from (IN) the recorder.

The labels of various brands of recorders are different but the usual labels are Tape In, REC IN, or Input and Tape Out, REC OUT or Output. The labeling can be confusing sometimes but the idea is to go **From** the RA 970BX to the recorder and then **Return** to the RA 970BX. Check all connections and read the owners' manual for your recorder if you are in doubt about the labels.

The Speaker Terminals will accept two pairs of speakers. The **DIRECT** connection has the shortest signal path for the clearest possible sound. If you listen to headphones we suggest the use of the **REMOTE** speaker terminals for your convenience. (CONNECTION NOTE: The DIRECT speaker terminals are ALWAYS ON and will NOT be turned OFF by the SPEAKER REMOTE SWITCH OR the HEADPHONE jack on the Front panel.)

You may connect the speakers with bare wire, Banana plugs or 4 mm speaker plugs. Please be certain to observe the correct Polarity of the wires as well as the Channel Left and Right connections. The **RED (+)** Speaker Terminals are to be connected to the RED or Positive terminals on your speakers. The **BLACK (-)** Speaker Terminals are to be connected to the BLACK or Negative terminals on your speakers. If you incorrectly make these connections you will have a vague image and very little bass response from your system.

*If you are in doubt about the sound when listening then you should reverse the Positive and Negative connections on the back of ONE SPEAKER ONLY. If the image becomes more specific and the bass improves then the speaker connections should be rechecked to ensure correct connection of both speakers. You may also confirm this by placing the speakers face to face 75 mm apart (3") and playing music with strong bass content as a source. The connection that has the most bass output is the correct connection. The incorrect connection will have very little sound output as each of the two speakers will attempt to cancel the sound the other is making due to the opposite polarity of the drivers.*

If you connect your speakers to the RA 970BX with bare wire, strip approximately 1 1/2 mm (1/2") of the insulation from the end of the wire and connect to the terminal of the amplifier by turning it around the center post of the speaker terminal. The RED or BLACK terminal knob should be turned Counterclockwise to extend the terminal for connecting. When you have wrapped the wire around the post, tighten the terminal by turning the Red or Black knob Clockwise to grasp the wire FIRMLY.

Ensure that **NO LOOSE WIRE** is outside the terminal housing. Repeat this operation for all of the terminals. If you use Banana plugs or 4 mm plugs they may be connected to the end of the Speaker Terminals by pushing them into the holes provided.

## FEATURES OF THE RA 970BX STEREO INTEGRATED AMPLIFIER

This stereo integrated amplifier has been designed for high performance. It has **Symmetrical Circuit Paths**; something we have been doing for over a decade. These are utilized to ensure absolutely identical timing

between the two channels of the amplifier. If the music is swirling around in the room it is because the artist has chosen this effect, not the RA 970BX.

The **Power Supply** derives from a large, powerful ROTEL Designed **Toroidal Power Transformer** and ROTEL Custom Designed **Slit Foil Capacitors** to improve the speed and damping factor of the amplifier. We believe in **Highly Regulated Power Supplies** and build these into all of our products. Some companies design their amplifiers to have high *peak* power ratings and *poor continuous* power ratings. *This does allow them to build in low cost parts BUT it doesn't give the amplifier the control and power it needs for a large tympani drum bass note while having the ability to recreate the delicate sounds of a triangle being played at the same time. We feel the extra expense of building in an excellent power supply is worthwhile because IT IS GOOD FOR THE MUSIC.*

## HUM AND NOISE IN A STEREO SYSTEM

*In any high fidelity stereo installation it is possible for noise to be created by the physical location of some of the components. If your system has hum or excessive noise it is possible to diagnose this before trying to have repairs made to a properly functioning component. If the system only hums with one source component then it should be unplugged from the system. Turn the Volume Down or turn the Power OFF before you unplug the suspected component.*

If the system still hums after the suspected component has been removed, you may require service. First though, you should disconnect all of the other components, EXCEPT the speakers. If there is no hum after this then something in the system is either in need of relocation or repair. Connect the components one by one until the problem reappears. If you are unable to locate the source of the problem then you should consult your **ROTEL hi fi AUTHORIZED DEALER** for advice or service.

## A FINAL WORD FROM ROTEL ABOUT THIS INTEGRATED AMPLIFIER

We have designed this amplifier for high performance using test equipment and the human ear. We believe that both methods are useful in the design of audio electronics. *This is time consuming but we feel that the music benefits from this care and attention to detail.*

We realize that there are many choices available in the market today and we thank you again for choosing our RA 970BX Stereo Integrated Amplifier to amplify your music. *Enjoy the music!*

## SPECIFICATIONS

### RA 970BX STEREO INTEGRATED AMPLIFIER

Rated power, RMS, FTC* specs (Both channels driven, 20-20,000 Hz, 0.03% THD)	60 watts (8 ohms) 90 watts (4 ohms)
DIN Output (1 kHz, 1% THD)	80 watts (8 ohms) 100 watts (4 ohms)
Total Harmonic Distortion (rated power)	0.03%
Intermodulation Distortion (rated power)	0.03%
Damping factor	150 (20-20,000 Hz, 8 ohms)
Input sensitivity / Impedance (all inputs)	160 mV / 8 kohms
Signal to Noise ratio (all inputs)	> 95 dB (IHF, A network)
Frequency response	10-100,000 Hz +1 dB, -3 dB
Tone control response:	
Bass	± 6 dB (100 Hz)
Treble	± 6 dB (10 kHz)
Input overload level (all inputs)	5 volts
Power requirement	115 volts AC 50/60 Hz 230 volts AC 50/60 Hz
Power consumption	300 watts
Weight	6.2 kgs/ 13.6 lbs
Dimensions	440 (w) x 92 (h) x 347 (d) mm 17-3/8" (w) x 3-5/8" (h) x 13-11/16" (d)

All specifications are accurate at the time of printing. Rotel reserves the right to improvement without notice.

\* Measured pursuant to the Federal Trade Commission's Trade Regulation Rule or, Power