INTRODUCTION

We would like to take this opportunity to congratulate you on your purchase of our audio component. With the latest technology and workmanship that goes into making this equipment, you can be assured of its high quality performance for many years to come.

We have fitted a comprehensive range of controls and features for your convenience. 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, allowing you to experience true high fidelity. Its full and natural sound reproduction offers you musical entertainment approaching that of live performances. We sincerely hope you will treasure this professional type component. In order to obtain the maximum use out of your equipment, we urge you to read the following pages of this Owner’s Manual carefully.

CONTENTS

2/3 SYSTEM CONNECTIONS
BEFORE ENJOYMENT
POWER SUPPLY CONNECTION
LOCATING THE UNIT
SPEAKERS PLACEMENT
SPEAKER CONNECTING GROUND
CONVENIENCE AC OUTLET
4/7 ALL ABOUT THE ROTEL RA-412
SPECIFICATIONS
BLOCK DIAGRAM
FUNCTIONS & CONTROLS
ADDITIONAL COMPONENTS
8 HUM AND NOISE
EXCLUSIVE NOTE FOR U.K.

WARNING – TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.
System Connections

**POWER SUPPLY CONNECTION**
For power the unit requires the normal house electrical current (AC). Simply plug the unit to a wall outlet. If in any doubt about connecting to the power source, consult a qualified electrician.

**CAUTION** — Do not apply power to the equipment without first making sure that speakers are connected properly and that the unit’s VOLUME control is set to minimum. If you live in U.K. and your unit comes with 3-core cord without a plug, be sure to read the last page of this manual before connecting to power.

**LOCATING THE UNIT**
Although the unit normally does not develop high heat, it should be placed in such a way that its ventilation system will not be impeded. Place the unit on a hard surface - any convolutely located shelf or table where not affected by heat or moisture. Leave at least 5 cm (2 inches) clearance on each side and in the rear of the unit, and about 10 cm (4 inches) above the unit. Never directly place an object on the top of the unit.

**SPEAKERS PLACEMENT**
NOTE — Check speakers’ rated impedance as instructed on this page.

1. **MAIN SPEAKERS** — Referred to a pair of speakers connected to the SPEAKER 1 terminals on the unit’s rear panel. Place the main speakers against a wall or on a shelf so that they face your selected listening position and are equal distance from you. For optimum stereo effect, they should be 3 to 4 meters (10 to 15 feet) apart and, if possible, at about ear level height. You may determine best locations to suit your personal tastes and listening conditions.

2. **REMOTE SPEAKERS** — If you wish to enjoy stereo sound in another room, you can connect another pair of speakers to the SPEAKER 2 terminals. Though you may require long cables between the unit and the remote speakers, make sure they are not longer than 15 to 20 meters (50 to 60 feet) in length and that they are of heavy duty shielded type in order to prevent loss of volume level. Following the procedure described in the item 1 above for placing the remote speakers.

**SPEAKER CONNECTION**
Caution: Do not apply power to the unit until the speakers are connected properly as described above.

As shown in Fig. 2, the speaker terminals are quick-connect push-insert type, and are arranged into two boards, one for SPEAKER 1 (main) and the other for SPEAKER 2 (remote). Push back the tab on each terminal, slip the bare wire at the free end of the speaker lead into the opened jaw of the terminal, and release the tab to grip the bare wire in the jaw. (Note: if necessary, after stripping each end of speaker leads to obtain a bare wire, twist the bare strands together so it will be easy to insert and also prevent shorting among stray strands.) Make sure the positive (+) lead of each speaker is connected to the (+) terminal and the ground (−) lead to the (−) terminal, right to RIGHT and left to LEFT.

**GROUND (EARTH)**
The GROUND screw terminal is provided on the rear panel to provide means for all equipment chassis to be at the same potential in Hi-Fi installations.

**CONVENIENCE AC OUTLET**
The outlets marked SWITCHED on the rear panel provide power and switching control to whatever component you may wish to connect to the unit. For example, if you connect the power cord of your record player to the outlet, the record player will be activated and deactivated by the power switch on the unit.

Caution: Do not connect components whose total power consumption exceeds maximum power rating marked on the outlets.
All about the ROTEL RA-412

Specifications

POWER AMPLIFIER SECTION:
Continuous Power Output: 25 watts per channel, min. RMS, both channels driven into 8 ohms from 20 to 20,000 Hz with no more than 0.5% total harmonic distortion.

30 watts per channel, min. RMS, both channels driven into 8 ohms at 1 kHz, with no more than 0.5% total harmonic distortion.

Intermodulation Distortion: Less than 0.1% at rated output.

Frequency Response: 5 to 80,000 Hz, 3 dB at 1 kHz.

Square Wave Rise Time: 5 microseconds.

Damping Factor: 50 at 1 kHz.

Signal-to-Noise Ratio (IHF, 'A' closed circuit network):

Phone 1, 2: 70 dB

Tape, Aux, Tuner: 90 dB

Input Sensitivity/Impedance (plate output at 1 kHz):

Phone 1, 2: 2.5 mV/47 ohms

Tape: 150 mV/1500 ohms

Aux, Tuner: 150 mV/600 ohms

Output Level:

Tape out (RCA jack): 280 mV/150 ohms

Tape out (pin jack): 105 mV/75 ohms

Phone Overload: 120 dB

Phone Equalization: R.L.A.A. 50 ± 1.0 dB

Bass Control: ± 10 dB at 100 Hz

Treble Control: ± 10 dB at 10 kHz

Loudness Control: ± 7 dB at 100 Hz, + 3 dB at 10 kHz

High Filter: 5 dB/oct at 10 kHz

Mid Filter: 6 dB/oct at 10 kHz

Low Filter: 15 dB/oct at 100 Hz

Audio Muting: – 15 dB

Cross talk: – 40 dB (Overall)

GENERAL INFORMATION

Power Consumption: MAX 200W

Dimensions (overall): 400(W) x 110(H) x 240(D) mm

Weight (net): 6.5 Kg/14 lbs

Features & Function Controls

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 speaker systems connected to SPKR 2 terminals on the rear chassis. 

SPKR 1 and SPKR 2 Systems.

BASS CONTROL — regulates low frequency sounds, as desired, to suit personal taste, speaker characteristics, etc. The center position gives normal (flat) frequency response. Rotating clockwise increases the bass, and counterclockwise reduces the bass.

You may adjust the bass control for each channel simultaneously or individually. The outer ring adjusts the left channel and the inner knob adjusts the right channel. In order to adjust both channels together, simply hold one knob while turning the other.

MODE SWITCH — selects between stereophonic and monophonic operation depending upon the program source. In ON position the program will be heard stereophonically and in OFF position it will be monophonic. Normally, leave the switch in OFF position.

BALANCE CONTROL — regulates the relative sound outputs from each channel. Normally, the control is adjusted to provide the effect of mono signal coming from a point midway between the speakers. When balanced in this way, the optimum stereo effect will be achieved. Rotate clockwise for increase in sound level from the right channel, and counter-clockwise for the left channel.

TREBLE CONTROL — regulates high frequency sounds, and operates in the same manner as the BASS CONTROL.

POWER SWITCH — performs the function as its name denotes. It supplies power to the unit and to any switched AC outlets. When the switch is ON the pilot light will be illuminated.

HEADPHONES JACK — simple plug-in connection for headphones to be used.

Block Diagrams

DUBBING SWITCH: allows you to dub (duplicate) one tape recording by the other tape recorder, both connected to TAPE MONITOR terminals on the rear panel. Read ADDITIONAL COMPONENTS Section below for its operation.

TAPE SWITCH: allows you to play back and monitor tape recorders. Set to 1 when you wish to play the tape recorder connected to TAPE MONITOR 1 terminals, and set to 2 for tape recorder connected to TAPE MONITOR 2. Leave at SOURCE position whenever tape recorder is not being played but other material is being played.

NOTE: You will not obtain any sound if the monitor switch is set at 1 or 2 unless the tape recorder has a separate playback head. Also, volume, bass, treble and balance controls of this unit will have no effect upon the recording, so you should use the controls on the tape recorder.
COMPONENTS CONNECTIONS
This unit is designed to handle two record players with magnetic cartridges, two stereo tape recorders and two additional auxiliary components such as 8-track cartridge deck.
We recommend that you familiarize yourself with basic operations before connecting any such units. Refer to the ADDITIONAL COMPONENTS section provided in this manual for connections and operations of these components.

TURNTABLE
Connection
Make sure your turntable comes with a regular magnetic cartridge.
If your turntable comes with RCA-type plugs on output cables, connect them correctly to corresponding RIGHT and LEFT jacks of PHONO inputs. If there is ground (earth) cable emerging from the turntable besides the output cables, connect it to the ground screw terminal marked GND or 0.
If your turntable comes with DIN plug on output cable, simply plug into the DIN socket marked REC/PH at TAPE MONITOR 1.
NOTE: To avoid loss of high frequency response due to excessively long output cables, shielded cables not exceeding 10 feet (3 meters) in length should be used to connect your turntable. Usually, cables supplied with your turntable are sufficient.

Operation
Turn the function selector control to PHONO 1 if you wish to operate the turntable connected to the PHONO 1 terminal, or to PHONO 2 if you wish to operate the turntable connected to the PHONO 2 terminal.

Additional Components
TAPE RECORDER
Connection
A facility for tape recorder is referred to as TAPE MONITOR and is used in conjunction with the monitor switch on the front panel. It is also used when your tape recorder has a separate playback head (i.e., tape recorder normally equipped with three heads).
Your tape recorder can be a reel-to-reel deck, a cassette recorder deck or an 8-track cartridge deck.
If the tape recorder comes with RCA-type plugs, connect input cables to corresponding TAPE MONITOR jacks marked OUT and output cables to the jacks marked IN. Input jacks are for playing back pre-recorded tapes and output jacks are for recording programs such as broadcasts, records and live sounds.
If the tape recorder comes with DIN plug, simply connect it to the DIN socket marked REC/PH at TAPE MONITOR 1.

TAPE PLAYBACK
To listen to a playback of pre-recorded tape, flip the monitor switch to 1 or 2, depending on which TAPE MONITOR terminal the tape recorder is connected. The setting of the function selector control is irrelevant in this case and may be left at any position.

TAPE RECORDING
You may record with your tape recorder any program materials that can be played through this unit. Turn the function selector control to TUNER, PHONO 1, PHONO 2, or AUX depending on which program you wish to record, and operate the tape recorder while listening to the program.
Always leave the monitor switch at SOURCE if your tape recorder has no separate playback head (look up its instruction manual to see if the tape recorder is equipped with separate playback and recording heads).
If your tape recorder is equipped with a separate playback head, flipping the monitor switch to 1 or 2 will cause the input source to be bypassed and will permit you to listen to the recording being made on the tape. Setting the SOURCE position will not affect the input source. Thus, with the monitor switch 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.
CAUTION — never operate two tape recorders simultaneously unless the DUBBING switch is IN.

TAPE DUBBING
Be sure to flip the DUBBING switch to IN position when dubbing. To record off the tape recorder 1 by the tape recorder 2, flip the TAPE SWITCH to 1, flip the TAPE SWITCH to 2 if the other way around. Note when dubbing only the tape recorder that is recording will be monitored.

AUXILIARIES
1. Connection
One set of AUX input terminals is provided for connection of equipment such as tape deck without recording facility (e.g., 8-track player deck). Connect the output cables of such equipment to input terminals in the same manner as the TAPE RECORDER section.

2. Operation
Turn the function selector control to AUX. Adjust volume, balance, bass and treble controls to suit your personal taste and listening conditions.

They are referred to as the FRONT speakers. Placement of the other pair of speakers connected to the SPEAKER 2 speakers, referred to as the BACK speakers, will vary with your room size, seating arrangement and acoustic condition. It may be convenient to provide allowance on the length of speaker cables as later on you may wish to relocate the BACK speakers differently from the initial position. We have suggested a common way of placing the BACK speakers as illustrated in Fig. 3, but you may arrange them in any way that suits your tastes and listening conditions. Try some experimentation to locate optimum positions for best sound dispersion and ambience.
HUM AND NOISE

In any high fidelity installation, hum may be caused by the interconnection of a record player, tuner and amplifier, and speakers as result of the cables, different grounds or locations of components. If hum is experienced with your unit, disconnect everything but the speakers from the unit. If the hum persists, reverse the power plug at the power source. Plug in the record player and if hum or howling appears, reverse the record player power plug or re-mount the record player away from the speakers as much as possible. Note hum may also be induced by defective connecting cables or by running these cables too close to a strong AC field.

When your unit picks up noises during the reception of broadcasts, causes are mostly due to external objects such as fluorescent lamps and house appliances using motor or thermostat, or others that may induce the noises. Either relocating the unit away from the noise sources or using an improved outdoor antenna may readily solve the problem. In the event you cannot find causes, consult your dealer or a qualified electrician.

EXCLUSIVE NOTE FOR U.K.

If your unit comes with a 3-core cable without a plug, make certain live, neutral and (where appropriate) earth leads are connected to the proper terminals. Check that the terminals are screwed down firmly and no loose strands of wire are present.

WARNING: THIS APPARATUS MUST BE EARTHED

IMPORTANT: The wires in this mains lead are coloured in accordance with the following code:

GREEN/YELLOW: EARTH
BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows.

The wire which is coloured GREEN/YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⚡, or coloured GREEN or GREEN/YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLUE or BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured BROWN or RED. The apparatus must be protected by a 3 Amp fuse if a 13 Amp (BS 1363) plug is used. If another type of plug is used a 5 Amp fuse or lower must be used, either in the plug or adapter or at the distribution board.

Note:
- Features and specifications are subject to change without notice.
- When production design improvements are made there may be case(s) that having slightly different photographs and/or illustrations.