



# Nakamichi

# CA-5AII/CA-5II

## Control Amplifier

## Owner's Manual

Nakamichi is producing Hi-Fi equipment for 52 countries of the world.

Many countries have safety regulations, to which Nakamichi has to comply during production.

The additional mentioning of "A" on your model means that this product has been produced according to the requirements in the United States of the Underwrites Laboratories (UL), as well as other applicable state and Federal safety standards.

Within the United States, Nakamichi has authorized its local distributors to offer warranties only on products which have been produced for the United States market in accordance with the foregoing standards.

**Notice to Purchasers of the Model CA-5II:**

Reference in the illustrations and the text is made to "CA-5AI," but operation and functions are completely identical to your model.



**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.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user of 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 of the presence of important operating and maintenance (servicing) instructions, in the literature accompanying the appliance.

### WARNING

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient the receiving antenna
- relocate this equipment with respect to the receiver
- move this equipment away from the receiver
- plug this equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

### Congratulations!

You have chosen a truly outstanding product. The Nakamichi CA-5AI is a control amplifier designed to provide superior performance and utterly pure signal transmission. It achieves this aim without relying on a large amount of negative feedback. The Multi-Regulated Power Supply and Isolated-Ground principle effectively eliminate crosstalk and interference arising in the power supply. Only strictly selected, high quality parts are used throughout, such as metal-film resistors and circuit boards with oxygen-free copper traces. Circuit design is simple and effective. The ultimate result is music reproduction without the slightest trace of coloration.

In order to take full advantage of this unit's superior performance, please read this manual in its entirety and retain it for future reference.

Thank you.  
Nakamichi Corporation.

Please record the Model Number and Serial Number in the space provided below and retain these numbers.

Model Number and Serial Number are located on the rear panel of the unit.

Model Number: CA-5AI/CA-5II

Serial Number: \_\_\_\_\_

## Safety Instructions

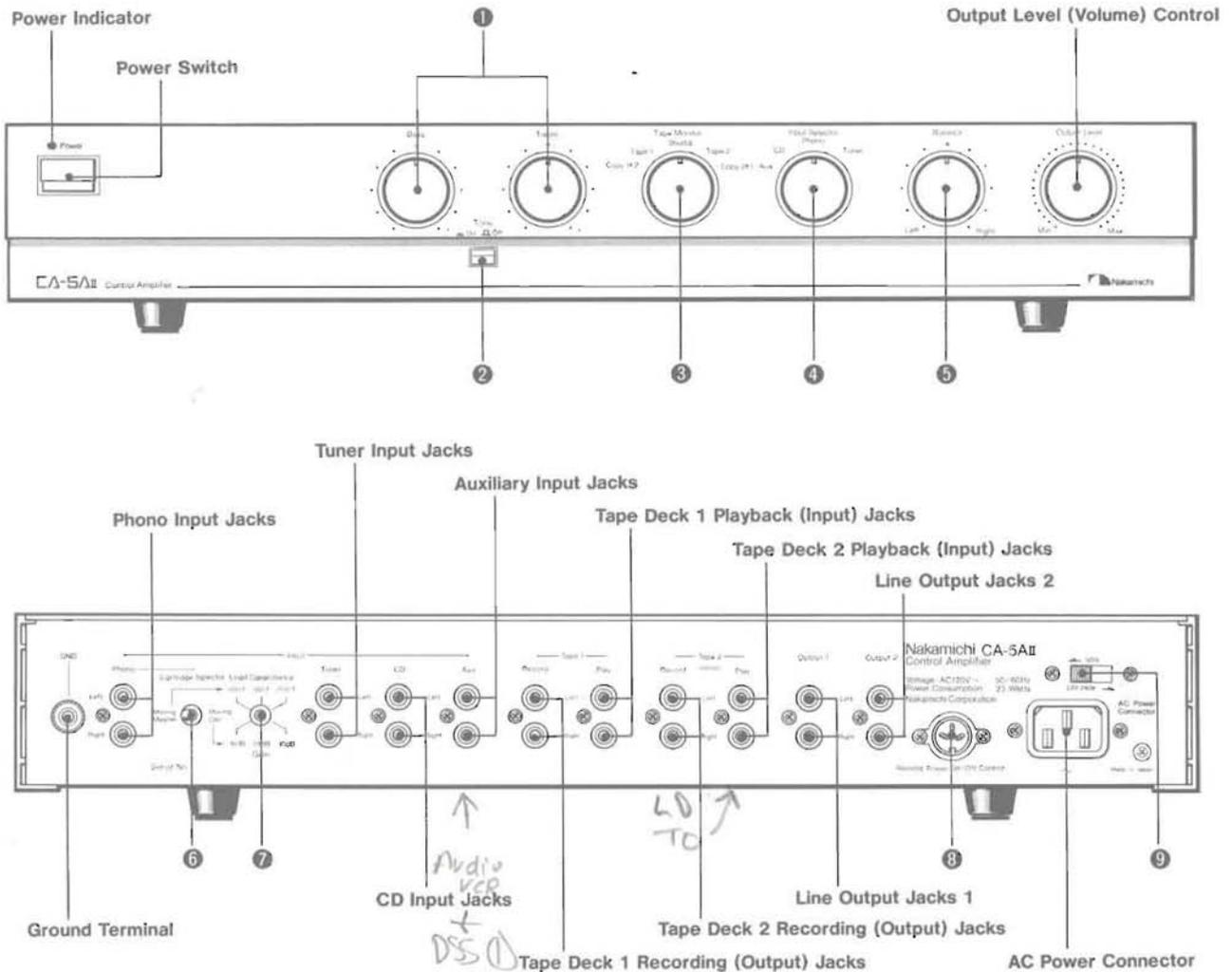
The following safety instructions have been included in compliance with safety standard regulations. Please read them carefully.

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—Adhere to all warnings on the appliance and in the operating instructions.
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, washbowl, 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.
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 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) which produce heat.
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—Precautions 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 at 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 openings.
16. Damage Requiring Service—The appliance should be serviced by qualified service personnel when:
  - A. The power-supply cord or the plug has been damaged; or,
  - B. Objects have fallen, or liquid has been spilled into the appliance; or,
  - C. The appliance has been exposed to rain; or,
  - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or,
  - E. 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 instruction. All other servicing should be referred to qualified service personnel.

#### Caring for the Exterior Panels

Caring for the exterior panels of the unit should be limited to wiping with a soft, dry cloth. Avoid using solvents or alcohol-based cleaners.

# Controls and Features



## 1 Tone Controls

Serve to adjust the tonal balance. By turning a knob clockwise, the respective range is emphasized, and by turning it one way the frequencies are attenuated. To activate the tone control circuits, set the Tone switch to "On."

**Bass :** From the center clickstop position, adjustment is possible within the range of  $\pm 10$  dB (at 20 Hz).

**Treble:** From the center clickstop position, adjustment is possible within the range of  $\pm 10$  dB (at 20 kHz).

## 2 Tone Switch

Setting this switch to "On" activates the tone control circuits. When the switch is set to "Off," the circuits are bypassed and the signal is routed directly to the power amplifier section, to further enhance sonic purity.

## 3 Tape Monitor Switch

**Tape 1 :** For playback of a tape deck connected to the Tape 1 jacks.

**Tape 2 :** For playback of a tape deck connected to the Tape 2 jacks.

**Source :** To listen to the program source chosen with the Input selector.

**Copy 1  $\blacktriangleright$  2:** For tape dubbing from tape deck 1 to tape deck 2.

**Copy 2  $\blacktriangleright$  1:** For tape dubbing from tape deck 2 to tape deck 1.

## 4 Input Selector

Serves to select one of the program sources connected to the CA-5AII: tuner, turntable, CD player, etc.

## 5 Balance Control

Serves to adjust left/right speaker balance.

## 6 Cartridge Selector

Set this switch to the correct position for the type of phono cartridge in use.

## 7 Cartridge Load/Gain Selector

When a moving-magnet cartridge is used, this switch selects the termination capacitance. With moving-coil cartridges, the switch controls the gain of the head amplifier.

## 8 Terminal for Remote Power On/Off Switching

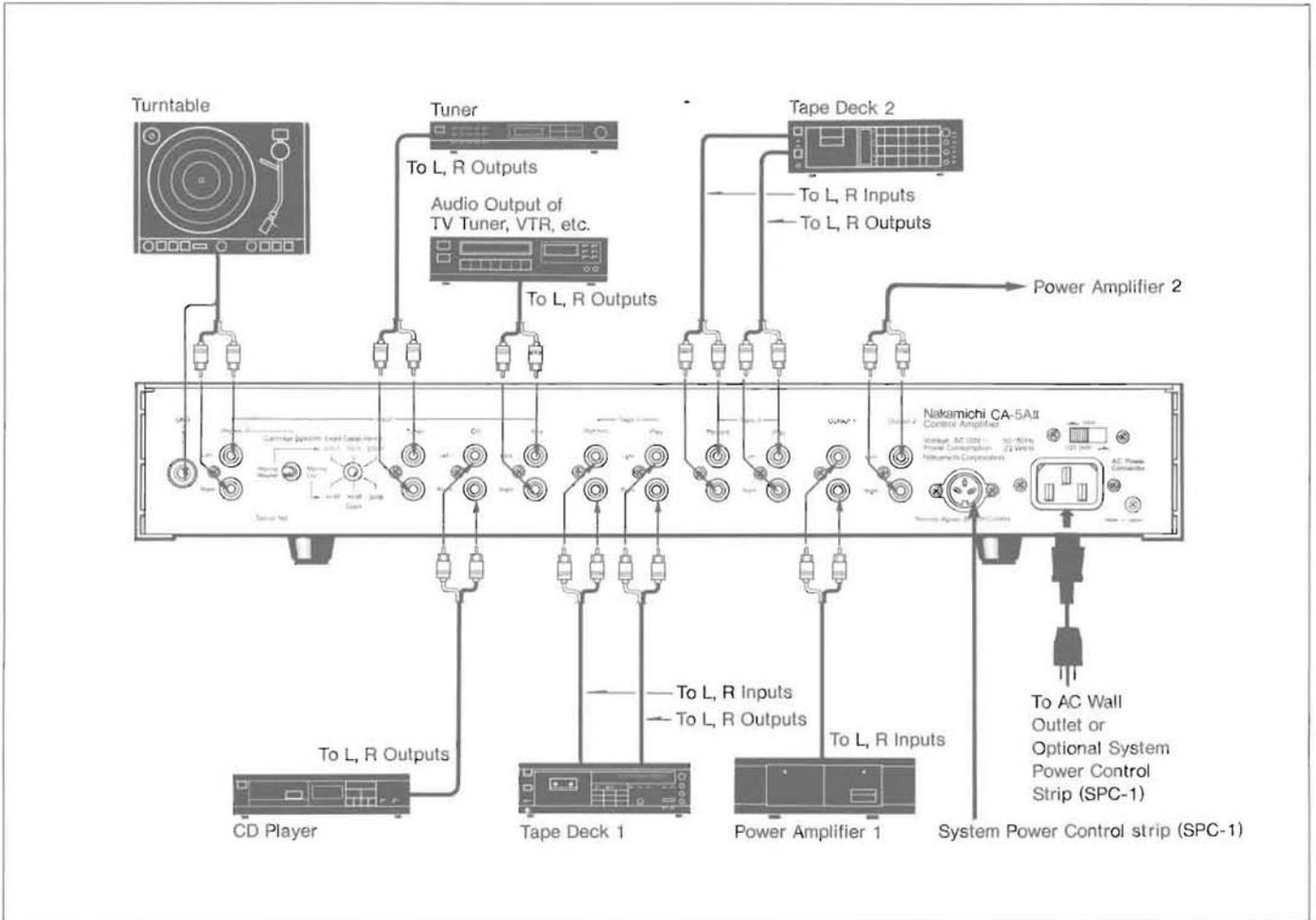
Connect the optional System Power Control strip (SPC-1) to this terminal.

## 9 Voltage Selector

AC voltage is factory set for the country in which you purchased your unit. The voltage selector permits re-setting of mains voltage in case the unit is to be used in a different country.

**Note:** Safety regulations in certain countries prohibit inclusion of a voltage selector. This feature, therefore, may be absent from your unit.

# Connections



Establish connections to other system components as shown in the above example. While making connections, be sure to set the power switches of all components to Off.

- For easy identification, the upper row of all input and output jacks of this unit serves the left channel and the lower row the right channel.

## Turntable Connections

Connect the ground lead from the turntable to the Ground (GND) terminal of this unit.

### ■ Cartridge Selector

The Cartridge selector switch on the rear panel of this unit must be set to the correct position, depending on the type of phono pickup used.

**Moving Magnet:** For moving-magnet (MM) type cartridges (including the so-called MI, IM and VM types), as well as for high-output moving-coil cartridges with a rated output voltage of 1.0 mV or more.

**Moving Coil:** For moving-coil type cartridges with a rated output voltage of less than 1.0 mV

- Never use a moving-magnet cartridge with the selector set to the "Moving Coil" position, as this will result in severe distortion and possible damage to this unit and to the loudspeakers.

### ■ Cartridge Loading

This unit incorporates a Cartridge Load/Gain selector to ensure optimum termination and gain for best results with a wide range of phono cartridges.

When the Cartridge selector is set to "Moving Magnet," a choice of three different load capacitance values is provided (100 pF, 200 pF, or 300 pF). When the Cartridge selector is set to "Moving Coil," the head amplifier gain can be switched in three steps (24, 30, or 36 dB).

When determining the capacitance setting for moving-magnet cartridges, the so-called floating capacitance added by the connecting cables between the cartridge and this unit's Phono inputs must also be taken into consideration. As a rule of thumb, the desired capacitance can be found by subtracting the

cable capacitance (approx. 100 pF for ordinary cables) from the recommended capacitance loading for your cartridge (usually listed in the spec sheet).

However, as the floating capacitance can vary considerably depending on the type and length of cable involved (including tonearm wiring etc.), a final decision on the optimum position of the Cartridge Load/Gain selector should be made by ear.

The Cartridge Load/Gain selector permits switching of the moving-coil preamplifier gain in three steps, to accommodate cartridges with different rated outputs. (Information regarding the output level is given in the specification sheet accompanying the cartridge.)

Rated output of cartridge	Load/Gain selector setting
1.0–0.4 mV	24 dB
0.5–0.2 mV	30 dB
0.3 mV or less	36 dB
More than 1.0 mV	Set Cartridge selector to the "MM" position.

- The load impedance for the moving-coil input of this unit is factory-set to 100 ohms. This value is suitable for the vast majority of MC cartridges. However, a few cartridge types will perform best with lower impedance settings. For such cases, the impedance can be changed to 50, 30, 20, 10, or 3 ohms by adding internal resistors. (The optimum load impedance for a cartridge is usually listed in its specification sheet.) The resistors to be used for altering the impedance are supplied with the control amplifier. **When wishing to make this alteration, be sure to contact your dealer. Never attempt to install the resistors yourself, as opening the unit involves a considerable risk of electric shock.**

Always turn the Volume control fully down before operating the Cartridge selector or the Load/Gain selector, to protect the loudspeakers from damage.

### Tape Deck Connections

This unit provides two sets of recording outputs and playback inputs for connection of two tape recorders. Connect the output terminals of a tape deck to this unit's Tape Playback jacks (1 or 2), and the input terminals of a tape deck to this unit's Tape Recording jacks (1 or 2).

### Power Amplifier Connections

This unit provides two sets of line outputs, so that two power amplifiers can be driven simultaneously, if desired. Since exactly the same signal is supplied at these outputs, either set can be chosen when only one power amplifier is used. **Never** insert any shorting plugs or the like into the other set of line output jacks, as this can cause damage to the unit.

### Power Supply Connections

Confirm that this unit's Power switch is set to "Off". Then insert the supplied power cord into the AC Power connector on the rear panel of this unit and plug the other end into an AC wall outlet.

After all system connections are completed, make sure that this unit's Output Level control is turned to minimum. Then set this unit's Power switch to "On" and finally turn on the power amplifier. Leave the Output Level control of the CA-5AII at minimum until the switch-on muting interval of the power amplifier is terminated.

#### ■ Use of the System Power Control strip SPC-1

By connecting the optional System Power Control strip (SPC-1) to the terminal for Remote Power On/Off Switching on the rear panel of this unit, AC power to other system components can be controlled by the Power switch of the CA-5AII. For details, please refer to the instructions supplied with the SPC-1.

## Operation

Before operating the unit, make sure that the Output Level control is fully turned to minimum. For a brief period (approx. 4 seconds) after power to this unit is switched on, the output of the CA-5AII remains muted and no sound will be heard, until all internal circuits to stabilize. After all system connections are completed, make sure that this unit's Output Level control is turned to minimum. Then set this unit's Power switch to "On" and finally turn on the power amplifier. Leave the Output Level control of the CA-5AII at minimum until the switch-on muting interval of the power amplifier is terminated.

### Phono Playback

Set the Input selector to "Phono" and the Tape Monitor switch to "Source." Then operate the turntable. After the stylus was lowered onto the record, turn up the Output Level control of this unit to obtain the desired listening volume. If required, adjust the sound with the Balance and Tone controls.

- To protect the loudspeakers from possible damage, always turn the Output Level control fully to minimum before lowering or lifting the stylus.

### Listening to Other Program Sources (CD Player, Tuner, etc.)

Set the Input selector to "CD", "Tuner" or "Aux" as required and set the Tape Monitor switch to "Source." Then operate the CD player, tuner or other component. Adjust the volume level, balance and tonal character with the respective controls of the CA-5AII.

### Recording and Playback With a Tape Deck

For playback of a tape, set the Tape Monitor switch to "Tape 1" or "Tape 2," as required. For recording on a tape deck, select the desired program source with the Input selector and set the Tape Monitor switch of the CA-5AII to "Source." Then set the tape deck to the record mode. The signal supplied to the tape deck is completely unaffected by the volume, tone control and balance settings of the CA-5AII.

- The signal from the program source chosen by the Input selector is always present at both sets of tape recording outputs. Recording can therefore also be carried out on two tape decks simultaneously.

- If the connected tape deck possesses three heads and monitoring capability, the quality of the actual recorded signal can be checked by setting the Tape Monitor switch of the CA-5AII to "Tape 1" (or "Tape 2") during recording.

### Tape Dubbing

When two tape recorders are connected, dubbing in both directions can be carried out easily.

To play back a tape on tape deck 1 and record it on tape deck 2, set the Tape Monitor switch to "Copy 1 ▶ 2." To reverse the process, choose the "Copy 2 ▶ 1" position. In these switch positions, the output signal of the recording deck is present at the preamplifier output jacks 1 and 2. If the recording deck has three heads, monitoring can therefore be carried out, to check the quality of the actual recorded signal.

The signal supplied to the tape input terminals of the tape recorder during dubbing is completely unaffected by the volume, tone control and balance settings of the CA-5AII.

# Troubleshooting

Condition	Probable Cause	Remedy
No power.	1. AC cord not plugged properly into AC Power connector of this unit or AC wall outlet. 2. Internal AC line fuse has blown.	1. Plug in AC cord firmly. 2. Contact an authorized service station.
No sound.	3. Faulty connections of RCA-type plugs, shielded cables between components, or speaker cables. 4. Input selector or Tape Monitor switch not set correctly. 5. Power amplifier at fault (protection circuits are operating, etc.)	3. Check connections. 4. Select correct positions. 5. Refer to Owner's Manual of Power amplifier.
Left/right channels reversed, no sound from one channel.	6. Faulty connections of RCA-type plugs, shielded cables between components, or speaker cables. 7. Balance control turned fully to one side.	6. Check connections. 7. Adjust Balance control.
Hum noise is heard during record playback.	8. Faulty or incomplete connections of RCA-type plugs. 9. Faulty or incomplete connection of ground cable. 10. Output cable from turntable routed close to AC power cord.	8. Insert plugs firmly. 9. Check ground connection. 10. Route AC power lines as far as possible from output cables and cartridge.
Low volume levels when using moving-coil cartridge.	11. Moving-coil cartridge with rated output of less than 1.0 mV used at "Moving Magnet" position. 12. Load impedance setting incorrect.	11. Set Cartridge selector to "Moving Coil." 12. Select proper load impedance for cartridge in use.

# Specifications

## Input Sensitivity/Impedance

Phono MC (36 dB Gain)	45 $\mu$ V/100 ohms
(30 dB Gain)	85 $\mu$ V/100 ohms
(24 dB Gain)	165 $\mu$ V/100 ohms
Phono MM	2.5 mV/50 kohms
Tuner/CD/Aux/Tape	150 mV/12.5 kohms

## Input Sensitivity (New IHF)

Phono MC (36 dB Gain)	11.3 $\mu$ V
(30 dB Gain)	21.3 $\mu$ V
(24 dB Gain)	41.3 $\mu$ V
Phono MM	0.63 mV
Tuner/CD/Aux/Tape	37.5 mV

## Maximum Input Level (1 kHz, Non-Clipping Level, New IHF)

Phono MC (36 dB Gain)	4.5 mV
(30 dB Gain)	8.5 mV
(24 dB Gain)	16.5 mV
Phono MM	270 mV

## Output Level/Impedance

Pre Out	2 V/1 kohms
Rec Out	150 mV/1 kohms

## Maximum Output Level

(20–20,000 Hz, 1% THD, Pre Out, New IHF)	7 V
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## Total Harmonic Distortion (20–20,000 Hz)

Phono MC to Rec Out, 1V	
(36 dB Gain)	Less than 0.005%
(24 dB Gain)	Less than 0.004%
Phono MM to Rec Out, 1 V	Less than 0.002%
Tuner/CD/Aux/Tape to	
Pre Out, 2 V	Less than 0.002%

## Frequency Response

Tuner/CD/Aux/Tape	1–100,000 Hz +0, –3 dB
	1–20,000 Hz +0, –0.2 dB

## RIAA Deviation

Phono MC	20–20,000 Hz $\pm$ 0.3 dB
Phono MM	20–20,000 Hz $\pm$ 0.25 dB

## Signal-to-Noise Ratio (IHF A-WTD)

Phono MC (0.5 mV Input, 0.5 V Pre Out, Input Shorted)	
(36 dB Gain)	Better than 81 dB
(30 dB Gain)	Better than 80 dB
(24 dB Gain)	Better than 78 dB
Phono MM (5 mV Input, 0.5 V Pre Out, Input Shorted)	
	Better than 88 dB
Tuner/CD/Aux/Tape (0.5 V Input, 0.5 V Pre Out, Input Shorted)	
	Better than 95 dB

## Stereo Separation (100 Hz/1 kHz/10 kHz)

Phono MC (0.5 mV Input, 1 V Pre Out, Input Shorted)	
(36 dB Gain)	93/85/65 dB
(24 dB Gain)	90/84/64 dB
Phono MM (5 mV Input, 1 V Pre Out, Input Shorted)	
	100/84/64 dB
Tuner/CD/Aux/Tape (0.5 V Input, 1 V Pre Out, Input Shorted)	
	110/95/75 dB

## Tone Control Characteristics

Bass	20 Hz $\pm$ 10 dB
Treble	20 kHz $\pm$ 10 dB

## Remote Power On/Off Control Output

	24 V DC
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## Power Source

	120, 120/220-240, 220 or 240 V AC;
	50/60 Hz (According to country of sale)

## Power Consumption

	23 W max.
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## Dimensions

	435(W) $\times$ 63(H) $\times$ 287(D) mm
	17-1/8(W) $\times$ 2-1/2(H) $\times$ 11-5/16(D) inches

## Approximate Weight

	5.1 kg, 11 lbs. 4 oz.
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\*Specifications and design are subject to change for further improvement without notice.

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