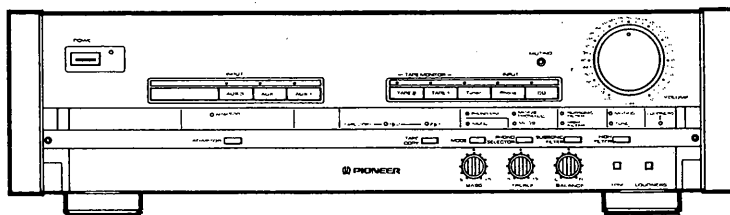


# Operating Instructions

# STEREO CONTROL AMPLIFIER C-90



Thank you for buying this Pioneer product. Please read through these operating instructions so you will know how to operate your model properly. After you have finished reading the instructions, put them away in a safe place for future reference. In some countries or regions, the shape of the power plug and power outlet may sometimes differ from that shown in the explanatory drawings. However, the method of connecting and operating the unit is the same.

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

## IMPORTANT NOTICE [For U.S. and Canadian models]

The serial number for this equipment is located on the rear panel. Please write this serial number on your enclosed warranty card and keep it in a secure area. This is for your security.

## [For Canadian model]

**CAUTION:** TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

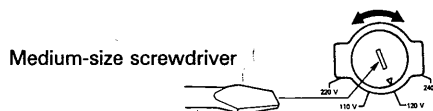
**ATTENTION:** POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

## LINE VOLTAGE SELECTOR SWITCH

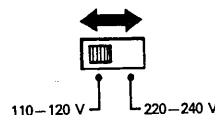
Only multi-voltage models are provided with this switch. U.S., Canadian, European, U.K., and Australian models are not provided with this switch.

The line voltage selector switch is on the rear panel. Before your model is shipped from the factory, this switch is set to the power requirements of the destination. Check that it is set properly before plugging the power cord into the AC outlet. If the voltage is not properly set or if you move to an area where the voltage requirements differ, adjust the selector switch as follows.

1. Provide yourself with a medium-size screwdriver.
2. Insert the screwdriver into the arrow on the voltage selector, and adjust so that the tip of the arrow points to the voltage value of your area.



Set the voltage selector switch for the voltage in your area.



## CONTENTS

Features .....	3	Operations .....	7
Connections .....	3	Troubleshooting .....	11
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# SAFETY INSTRUCTIONS

**READ INSTRUCTIONS** — All the safety and operating instructions should be read before the appliance is operated.

**RETAIN INSTRUCTIONS** — The operating instructions should be retained for future reference.

**HEED WARNING** — All warnings on the appliance and in the operating instructions should be adhered to.

**FOLLOW INSTRUCTIONS** — All operating and use instructions should be followed.

**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.

**LOCATION** — The appliance should be installed in a stable location.

**WALL OR CEILING MOUNTING** — The appliance should not be mounted to a wall or ceiling.

**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.

**HEAT** — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.

**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.

**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.

**POLARIZATION** — If your purchased product is provided with a polarized power plug, please read the following instructions. This product is equipped with a polarized alternating current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

**CLEANING** — The appliance should be cleaned only with a polishing cloth or a soft dry cloth. Never clean with furniture wax, benzene, insecticides or other volatile liquids since they may corrode the cabinet.

**POWER LINES** — An outdoor antenna should be located away from power lines.

**NONUSE PERIODS** — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

**OBJECT AND LIQUID ENTRY** — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**DAMAGE REQUIRING SERVICE** — The appliance should be serviced by Pioneer authorized service center or qualified 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.

**SERVICING** — The user should not attempt to service the appliance beyond that described in the operating instructions. For all other servicing, contact the nearest Pioneer authorized service center.

**OUTDOOR ANTENNA GROUNDING** — If an outside antenna is connected to the antenna terminal, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges.

In the U.S.A. section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Fig. A.

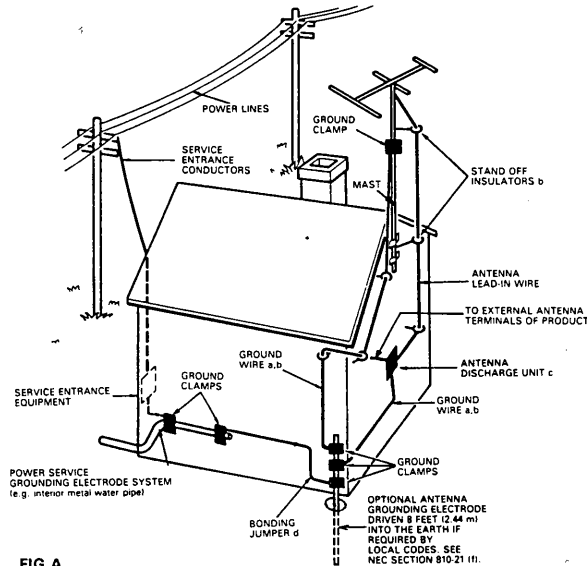


FIG. A

- a) Use No. 10 AWG (5.3 mm<sup>2</sup>) copper, No. 8 AWG (8.4 mm<sup>2</sup>) aluminum, No. 17 AWG (1.0 mm<sup>2</sup>) copper-clad steel, bronze wire, or larger as ground wire.
- b) Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.
- c) Mount antenna discharge unit as closely as possible to where lead-in enters house.
- d) Use jumper wire not smaller than No.6 AWG (13.3 mm<sup>2</sup>) copper or equivalent when separate antenna-grounding electrode is used.

## IMPORTANT 1



The lightning flash with arrowhead, 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.



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



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.

## IMPORTANT 2

If the apparatus is fitted with AC mains power outlet(s), see REAR PANEL FACILITIES for convenient connection of additional Hi-Fi component(s). Make all connections to the AC outlet(s) and the signal terminals first. Connect the plug to the wall socket last, make sure that the power switch is off. Disconnect the wall plug when the equipment is not in (regular) use, e.g. when on vacation.

## FOR USE IN THE UNITED KINGDOM

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

Blue: Neutral  
Brown: Live

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

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

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

Equipment sold in the U.K. is not supplied with a power plug.

# FEATURES

## SIMPLE design

Based on the fundamental design concept that "simple is best," the number of circuit elements from input to output has been made as small as possible.

## Independent left, right, and control mono-construction design.

The C-90 features a three power-transformer design with independent transformers for the left channel, right channel, and control system, thus eliminating sound deterioration due to mutual interference.

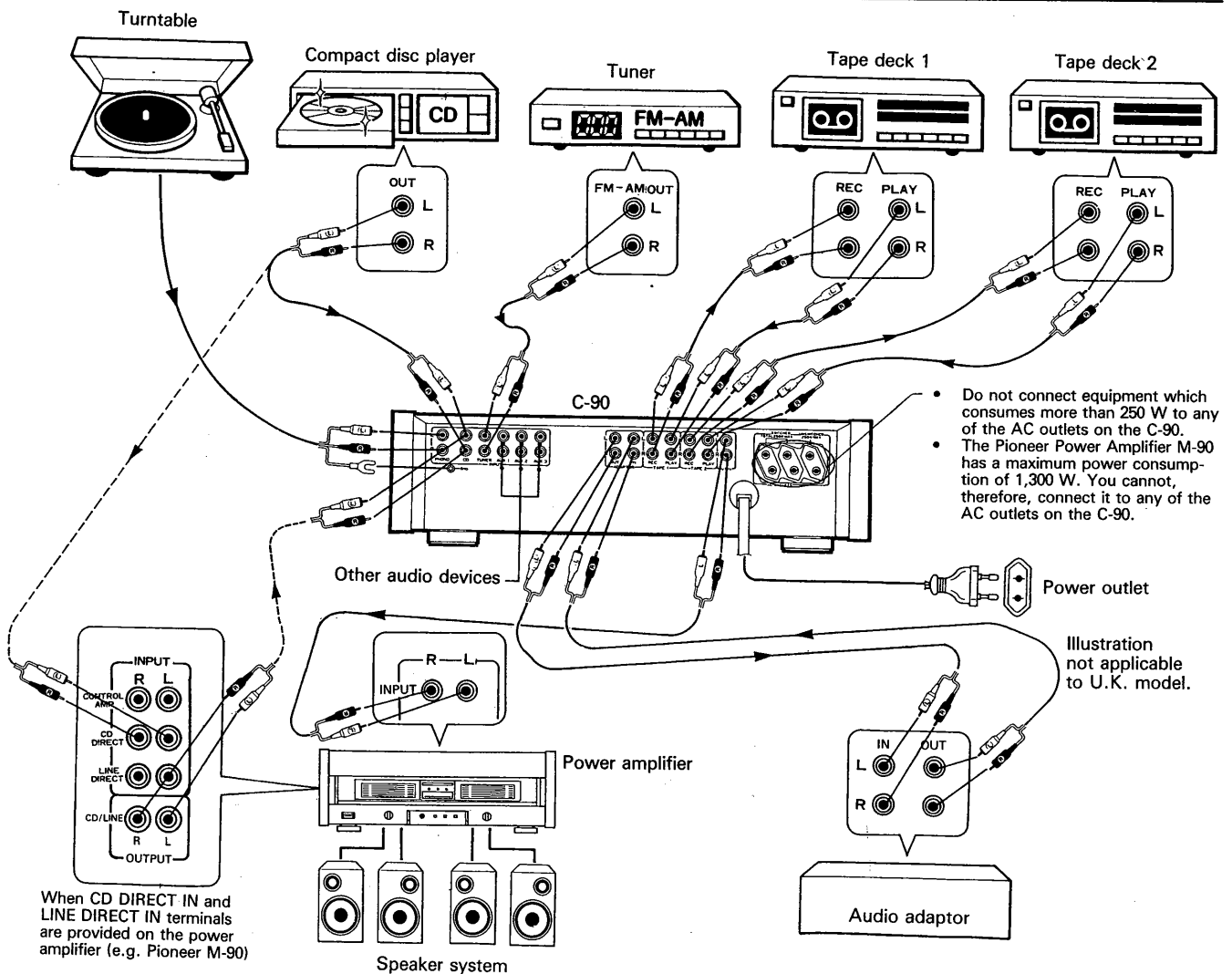
## Anti-vibration design.

Special resin material is used in the base legs, aluminum in the volume control, and copper plating on screws, in order to eliminate any adverse influence of vibration on sound quality.

## High-sound-quality parts

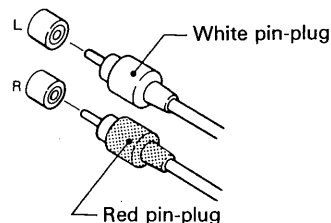
From circuit boards, resistors, and condensers, to semiconductors and wiring, the C-90 uses high-sound-quality parts specially developed for audio use.

# CONNECTIONS



## Input/output cord connections

- Use the red and white pin-plug cords.
- Connect the white pin-plug to the [L] channel, and the red pin-plug to the [R] channel. Be sure to insert the plugs securely into their terminals.



# PANEL FACILITIES AND FUNCTIONS

## FRONT PANEL

### POWER switch/indicator

Press this switch to turn this unit's power ON/OFF. When you switch the unit ON, the muting function will be activated, and the indicator will flash. Once the flashing indication changes to a steady indication, the unit will operate normally.

### VOLUME control

Use to adjust the sound volume. At the [ $\infty$ ] position, sound will not be heard, while at the [0] position, sound volume will be at its maximum.

### MUTING switch/indicator

Use to temporarily -20 dB audio signals. When this switch is pressed so that the indicator lights, the muting circuit operates to reduce the level of all audio signals by 20 dB. When set to the OFF position, the volume is returned to its previous level.

### INPUT SELECTOR switch/indicator

Use to select playback audio components (indicator lights).

[CD]— Compact disc player.

[Phono]— Stereo turntable.

[Tuner]— Tuner for listening to FM/AM broadcasts.

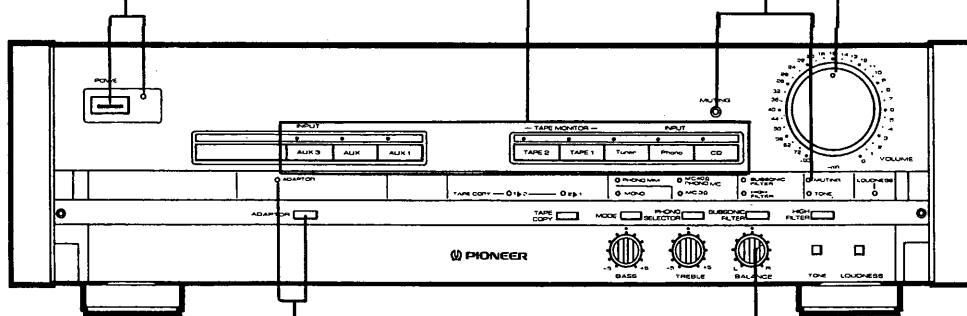
[TAPE 1]— The tape deck connected to the rear panel Tape 1 terminals.

[TAPE 2]— The tape deck connected to the rear panel Tape 2 terminals.

[AUX 1]— The audio component connected to the rear panel AUX 1 terminals.

[AUX 2]— The audio component connected to the rear panel AUX 2 terminals.

[AUX 3]— The audio component connected to the rear panel AUX 3 terminals.



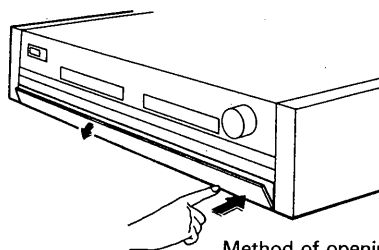
### ADAPTOR switch/indicator

Normally, set this switch OFF.

Set to ON when using a surround processor or graphic equalizer connected to the rear panel adaptor terminals AUDIO IN/OUT.

### BALANCE control

Normally, leave in the center position; use it to adjust the right-left sound volume when it seems to be unevenly balanced. When the sound is too loud on the right side, turn the control in the LEFT direction; when too loud on the left side, turn the control in the RIGHT direction.



Method of opening cover

**TAPE COPY switch/indicator**

Use this switch when you are using two tape decks and copying one tape to another tape.

[1 ► 2]— When copying a tape in the tape deck connected to the TAPE 1 PLAY terminals to the tape deck connected to the TAPE 2 REC terminals.

[2 ► 1]— When copying a tape in the tape deck connected to the TAPE 2 PLAY terminals to the tape deck connected to the TAPE 1 REC terminals.

**HIGH FILTER switch/indicator**

When this switch is pressed to the ON position, the indicator lights and a high-cut filter (cutoff frequency 10 kHz) is activated.

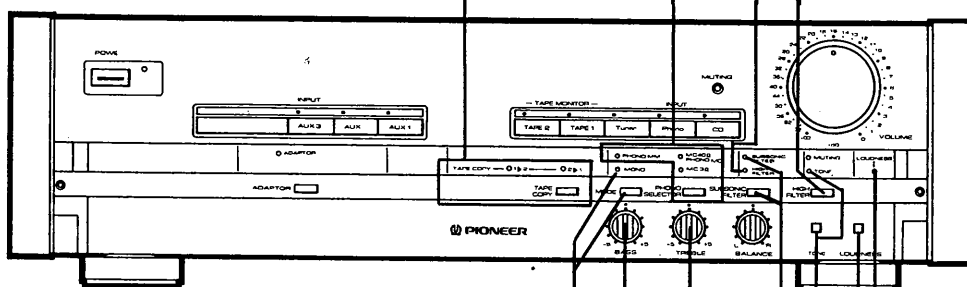
**PHONO SELECTOR switch/indicator**

Set in accordance with the type of cartridge used on your turntable (the corresponding indicator will light).

[MM]— Set here when using a moving magnet cartridge, or a high-output (1mV or more) moving coil (MC) cartridge.

[MC 40 Ω]— Set here when using a moving coil cartridge with impedance of 40 Ω.

[MC 3 Ω]— Set here when using a MC cartridge with impedance of 3 Ω.



**MODE switch/indicator**

Use to select the stereo or monaural audio playback mode. Normally, this switch is not used.

When the monaural playback mode is selected, press this switch; the MODE MONO indicator will light.

**SUBSONIC FILTER switch/indicator**

When this switch is pressed to the ON position, the indicator lights and a subsonic filter (cutoff frequency 7 Hz) is activated. Use to remove low-frequency noise due to warped records, etc.

**Tone controls**

These controls can be used only when the TONE indicator is lighted.

[BASS]— Use to adjust low-frequency sounds. The center indicates the standard (flat) position. When the control is rotated to the right, low-frequency sounds are augmented; when rotated to the left, low-frequency sounds are attenuated.

[TREBLE]— Use to adjust high-frequency sounds. The center indicates the standard (flat) position. When the control is rotated to the right, high-frequency sounds are augmented; when rotated to the left, high-frequency sounds are attenuated.

**TONE switch/indicator**

[ON]— The TONE indicator lights, and audio inputs from all components are played back after passing through the tone control circuits. In this condition, the tone controls (BASS, TREBLE) can be used to adjust sound quality.

[OFF]— The TONE indicator goes out, and signals are played back without passing through the tone control circuits.

**LOUDNESS switch/indicator**

Use this switch when you wish to listen at low volume. Normally, leave it OFF.

When you turn this switch ON (indicator lights), the bass and treble will be accentuated, providing dynamic reproduction even at low volume.

PANEL FACILITIES AND FUNCTIONS

REAR PANEL

**NOTE:**

The PHONO terminals are provided with shorting pin plugs (two). Before connecting equipment to these terminals, therefore, remove the shorting pin plugs and insert them into unused INPUT terminals.

**Ground (GND) terminal**

Connect to the ground terminal of your turntable.

**Playback component terminals**

- [PHONO]— Stereo turntable
- [CD]— Compact disc player
- [TUNER]— Tuner
- [AUX 1]
- [AUX 2] } Auxiliary terminals
- [AUX 3]

**ADAPTOR terminals**

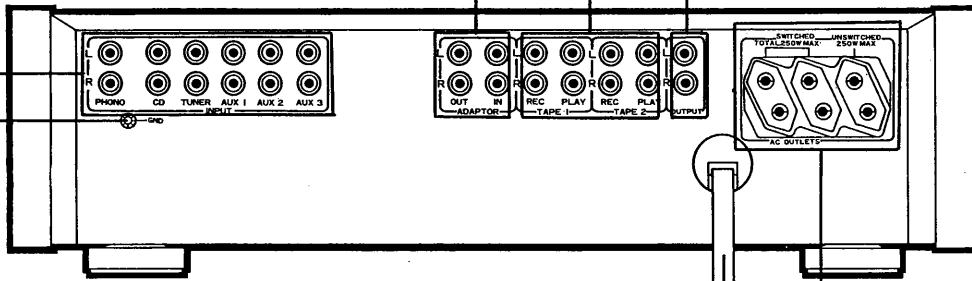
Use to connect a surround processor, graphic equalizer, or PCM adaptor.

**OUTPUT terminals**

Connect to the control amplifier input terminals of power amplifier.

**Tape deck terminals**

- [TAPE 1]— Tape deck 1 (first deck)
  - PLAY: For playback (connect to the tape deck's PLAY terminals)
  - REC: For recording (connect to the tape deck's REC terminals)
- [TAPE 2]— Tape deck 2 (second deck)



**Power cord**

Connect to a household wall outlet, or the power outlet of an audio timer.

**AC OUTLETS (SWITCHED)**

Power supplied through these outlets is turned on and off by this equipment's POWER switch. Total electrical power consumption of connected equipment should not exceed 250 W.

**AC OUTLETS (UNSWITCHED)**

Power flows continually to this outlet, regardless of whether this equipment is switched ON or OFF. Electrical power consumption of connected equipment should not exceed 250 W.

sumption of connected equipment should not exceed 250 W.

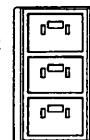
The equipment should be disconnected by removing the mains plug from the wall socket when not in regular use, e.g. when on vacation.

**NOTE:**

Do not connect appliances with high power consumption such as heaters, irons, or television sets to the AC OUTLETS in order to avoid overheating or fire risk.

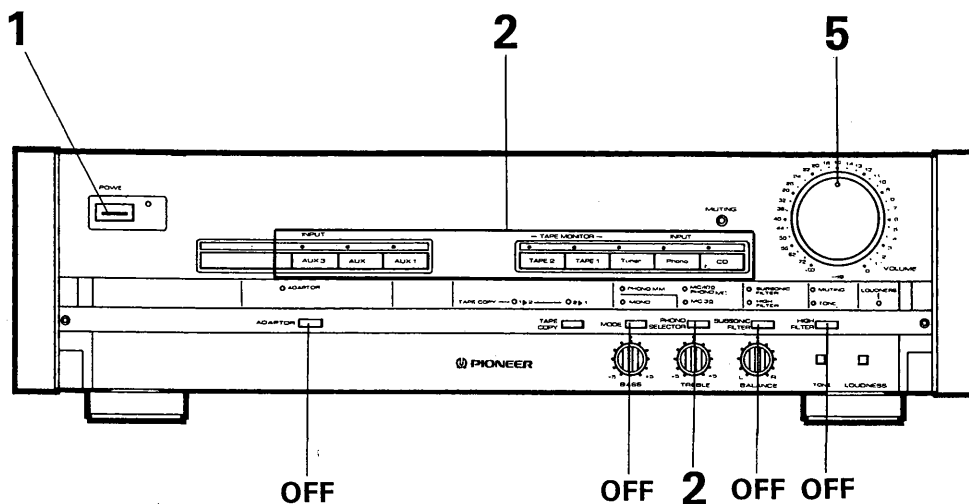
This can cause this equipment to malfunction.

The U.K. model is fitted with the AC outlet shown in the figure.



# OPERATIONS

## TO PLAY BACK CONNECTED COMPONENTS



- 1** Turn on the power switches to this unit and to your power amplifier.
- 2** Set the INPUT SELECTOR switch to the component you wish to play back. The indicator above the chosen switch will light.
  - To listen to FM/AM radio broadcasts Press [Tuner].
  - To listen to compact disc playback Press [CD].
  - To listen to record playback Press [Phono].  
Set the cartridge selector switch to match the kind of cartridge used on your turntable, MM, MC 40  $\Omega$ , or MC 3  $\Omega$ .
  - To play back tape deck 1 Press [Tape 1].
  - To play back tape deck 2 Press [Tape 2].
  - To use the component connected to the AUX 1 terminals Press [AUX 1].
  - To use the component connected to the AUX 2 terminals Press [AUX 2].
  - To use the component connected to the AUX 3 terminals Press [AUX 3].
- 3** Turn on the power to the components to be used.
- 4** Operate the component to begin playback.
- 5** Adjust the sound volume with the volume control.

### SUBSONIC FILTER

In the event of low-frequency noise arising from such causes as record warp, set the subsonic filter to the ON position. A 7 Hz filter will be applied to cut out the unwanted low-frequency noise.

### HIGH FILTER

In the event that high-range sounds of the playback are too strong, set the high-cut filter to the ON position. A 10 kHz filter will be applied to attenuate the high-range emphasis.

### TONE CONTROL

To adjust the tone of the playback sound, press the TONE switch so that the TONE indicator lights. Then use the BASS, TREBLE controls to adjust the tone as desired.

### ADAPTOR SWITCH

Turn this switch ON when using a device (adaptor device) connected to the ADAPTOR IN/OUT terminals at the rear of the unit.

When not using an adaptor device, be sure to turn this switch OFF. (If you leave it ON, no sound will be emitted.)

## OPERATIONS

### RECORDING ONTO AUDIO TAPE

#### To record sounds being listened to at present

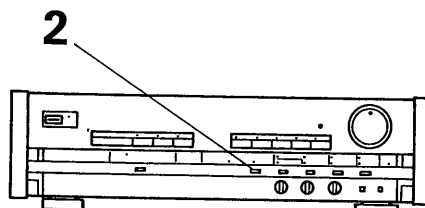
Sounds from FM/AM broadcasts, record or compact disc playback, or the audio components connected to the AUX 1, AUX 2, AUX 3 terminals can be recorded merely by setting your tape deck to the recording mode.

(Consult your tape deck's operating instructions regarding proper operating procedures).

### COPYING A PRE-RECORDED TAPE

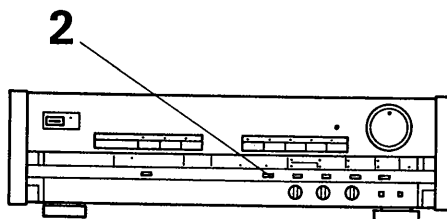
By using two tape decks, you can easily copy the contents of a pre-recorded tape onto another tape.

- **Recording from tape deck 1 onto tape deck 2**



- 1** Load the pre-recorded tape into tape deck 1, and a non-recorded tape into tape deck 2.
- 2** Press the TAPE COPY switch to light the TAPE COPY 1 ► 2 indicator.
- 3** Set tape deck 1 to the playback mode, and tape deck 2 to the recording mode.

- **Recording from tape deck 2 to tape deck 1**



- 1** Load the pre-recorded tape into tape deck 2, and a non-recorded tape into tape deck 1.
- 2** Press the TAPE COPY switch to light the TAPE COPY 2 ► 1 indicator.
- 3** Set tape deck 2 to the playback mode, and tape deck 1 to the recording mode.

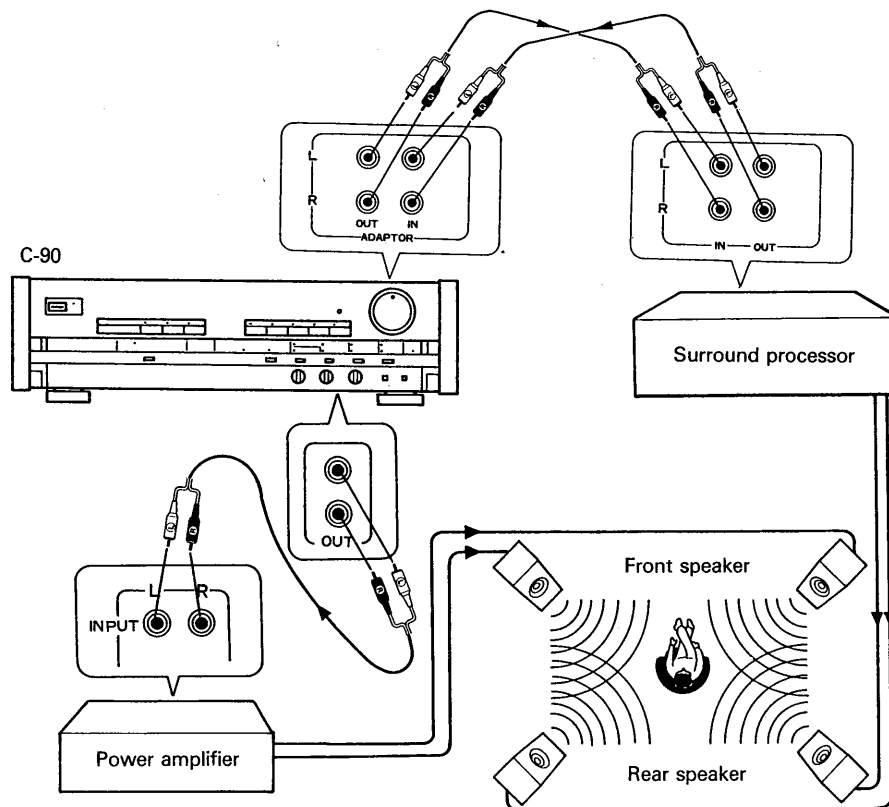


## EXPANSION TO A SURROUND SOUND SYSTEM

Normal stereo playback is premised on the production of three-dimensional sound from the front direction only. In reality, however, — for example in a concert hall — music is heard not from the front direction only, but the body is enveloped with sound reflected from the high ceiling and wide wall areas as well. Such reflected sound forms important elements of the sense of “presence” and “breadth” of sound which we normally associate with such live concerts. It is these elements of presence and breadth of sound which the surround system attempts to duplicate.

### [Connections]

Connect components as shown in the diagrams.



### [Operation]

Set the ADAPTOR switch on this unit to ON.  
Refer to the operating instructions for your surround processor.

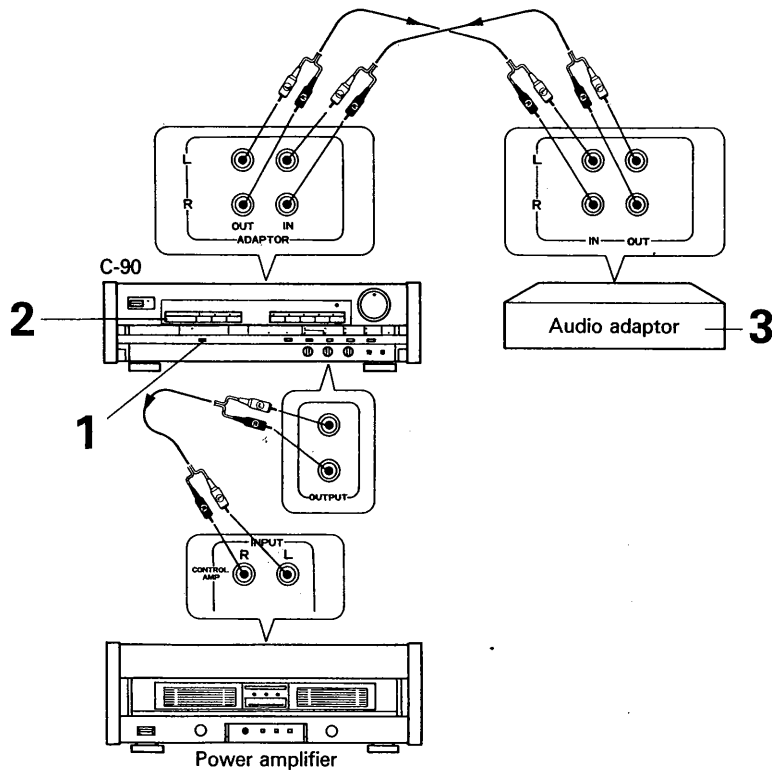
#### NOTE:

When using the surround processor, set the INPUT LEVEL switch to 0.15 V.

## OPERATIONS

### Using an adaptor component (graphic equalizer)

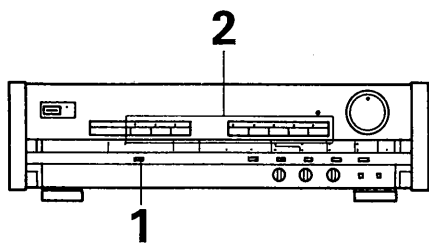
#### [Connections]



#### [Operation]

- 1 Set the ADAPTOR switch to ON.
- 2 Use the INPUT SELECTOR to select the playback component.
- 3 Operate the selected component to begin playback.
- 4 Operate the graphic equalizer to adjust the tone quality as desired.

(Consult your graphic equalizer's operating instructions regarding proper operating procedures.)


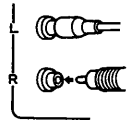


\* Record tone-compensated sound using TAPE 2. You cannot do this using TAPE 1.

# TROUBLESHOOTING

Incorrect operations are often mistaken for trouble and malfunctions. If you think that there is something wrong with this component, check the points below. Sometimes the trouble may lie in another component. Investigate the other components and electrical appliances being used.

If the trouble cannot be rectified even after exercising the checks listed below, ask your nearest PIONEER authorized service center or your dealer to carry out repair work.

Symptom	Probable Cause	Remedy
Power not furnished to the unit.	<ul style="list-style-type: none"> <li>Power plug is disconnected.</li> <li>If power plug is connected to the auxiliary outlet of another component, power is not being supplied to that component.</li> </ul>	<ul style="list-style-type: none"> <li>Connect power plug securely to wall outlet.</li> <li>Turn on power to other component.</li> </ul>
No sound.	<ul style="list-style-type: none"> <li>Connecting cords are disconnected from their terminals, or connected improperly.</li> </ul>  <ul style="list-style-type: none"> <li>Terminals or connecting cord pin-plugs are dirty.</li> <li>The ADAPTOR switch is not in the correct position.</li> <li>The MUTING switch is ON.</li> </ul>	<ul style="list-style-type: none"> <li>Fasten connecting cords correctly and securely.</li> </ul>  <ul style="list-style-type: none"> <li>Clean terminals and pin-plugs.</li> <li>When using an adaptor device, turn this switch ON; when not using an adaptor device, turn it OFF.</li> <li>Turn the switch OFF (MUTING indicator will go out).</li> </ul>
<p>[When playing tapes]:</p> <p>[In other cases]:</p>	<ul style="list-style-type: none"> <li>Incorrect tape deck operation.</li> <li>The input selector switch is not set to the playback component.</li> <li>Incorrect operation of other components.</li> </ul>	<ul style="list-style-type: none"> <li>Consult the operating instructions for your tape deck.</li> <li>Set switch correctly.</li> <li>Consult the operating instructions for your other components.</li> </ul>
No sound from one speaker.	<ul style="list-style-type: none"> <li>Connecting cords or speaker cords are disconnected on one side.</li> <li>The balance control is set too far to one side.</li> </ul>	<ul style="list-style-type: none"> <li>Connect cords securely.</li> <li>Set the control in the center position.</li> </ul>
Cannot record audio tapes.	<ul style="list-style-type: none"> <li>Incorrect tape deck operation.</li> </ul>	<ul style="list-style-type: none"> <li>Consult the operating instructions for your tape deck.</li> </ul>
Cannot perform tape copying.	<ul style="list-style-type: none"> <li>Incorrect tape deck operation.</li> </ul>	<ul style="list-style-type: none"> <li>Consult the operating instructions for your tape deck.</li> </ul>

# SPECIFICATIONS

## Amplifier section

Rated power	
20 Hz—20 kHz, 0.01% .....	8 V
Harmonic distortion	
20 Hz—20 kHz, 1 V .....	0.002%
Cross modulation distortion (50 Hz: 7 kHz = 4 : 1)	
1 V .....	0.002%
Input terminals (sensitivity/impedance)	
PHONO MM .....	2.5 mV/50 k $\Omega$
PHONO MC .....	250 $\mu$ V/40 $\Omega$
	125 $\mu$ V/3 $\Omega$
TUNER, CD, TAPE PLAY, ADAPTOR .....	150 mV/50 k $\Omega$
Output terminals (output level/output impedance)	
TAPE REC .....	150 mV/1 k $\Omega$
PRE OUT .....	1 V/600 $\Omega$
Frequency response	
PHONO MM 20 Hz—20 kHz .....	$\pm$ 0.2 dB
TUNER, CD, AUX, 20 Hz—20 kHz .....	+0 dB
	-0.2 dB
Tone control	
BASS .....	$\pm$ 9 dB, 100 Hz
TREBLE .....	$\pm$ 9 dB, 10 kHz
Filter	
LOW (SUBSONIC) .....	7 Hz, 6 dB/oct
HIGH .....	10 kHz, 6 dB/oct
MUTING .....	-20 dB
SN ratio (short-circuit, A network)	
PHONO MM .....	96 dB
PHONO MC .....	86 dB
TUNER, CD, TAPE PLAY, ADAPTOR .....	109 dB

## Power section, etc.

Power requirements	
European model .....	AC 220 V $\sim$ , 50/60 Hz
U.K., Australian models .....	AC 240 V $\sim$ , 50/60 Hz
Power consumption .....	26 W
AC outlets	
Linked to power switch (x2) .....	250 W
Unlinked to power switch (x1) .....	250 W
External dimensions .....	457 (W) x 405 (D) x 125 (H)
Weight .....	9.0 kg

## Accessories

Operating Instructions .....	1
Pin-plug cord .....	1

*The specifications and appearance noted above may change without notice due to improvements.*

## Precautions for installation

To ensure optimum sound quality, observe the following precautions.

- This unit is heavy. Be sure to install it on a firm base which can support its weight. Also, to prevent the flow of cooling air from being blocked off, do not place the unit on soft material such as a carpet or cushion, or install it in a confined space. When installing the unit in a rack, provide adequate space around it to allow heat to dissipate.
- To prevent the control amplifier from picking up noise due to leakage flux from the power amplifier when the control amplifier and power amplifier are installed adjacent to each other, install the control amplifier on the right of the power amplifier. Also, if you install the control amplifier above or below the power amplifier, place a partition between them to separate them by at least 10 cm from each other.
- Install the unit on a level surface so that the feet of the unit are all touching the installation surface.

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