

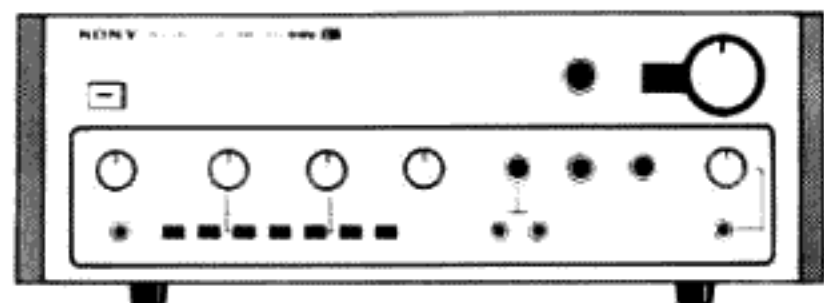
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**SONY®**

**INTEGRATED STEREO AMPLIFIER**

**TA-5650** **V FET**



**Owner's Instruction Manual**

1976 by Sony Corporation

To derive the utmost in pleasure and utility from your Sony TA-5650, please read this manual completely to become familiar with all its features and capabilities. Keep this manual handy for future reference.

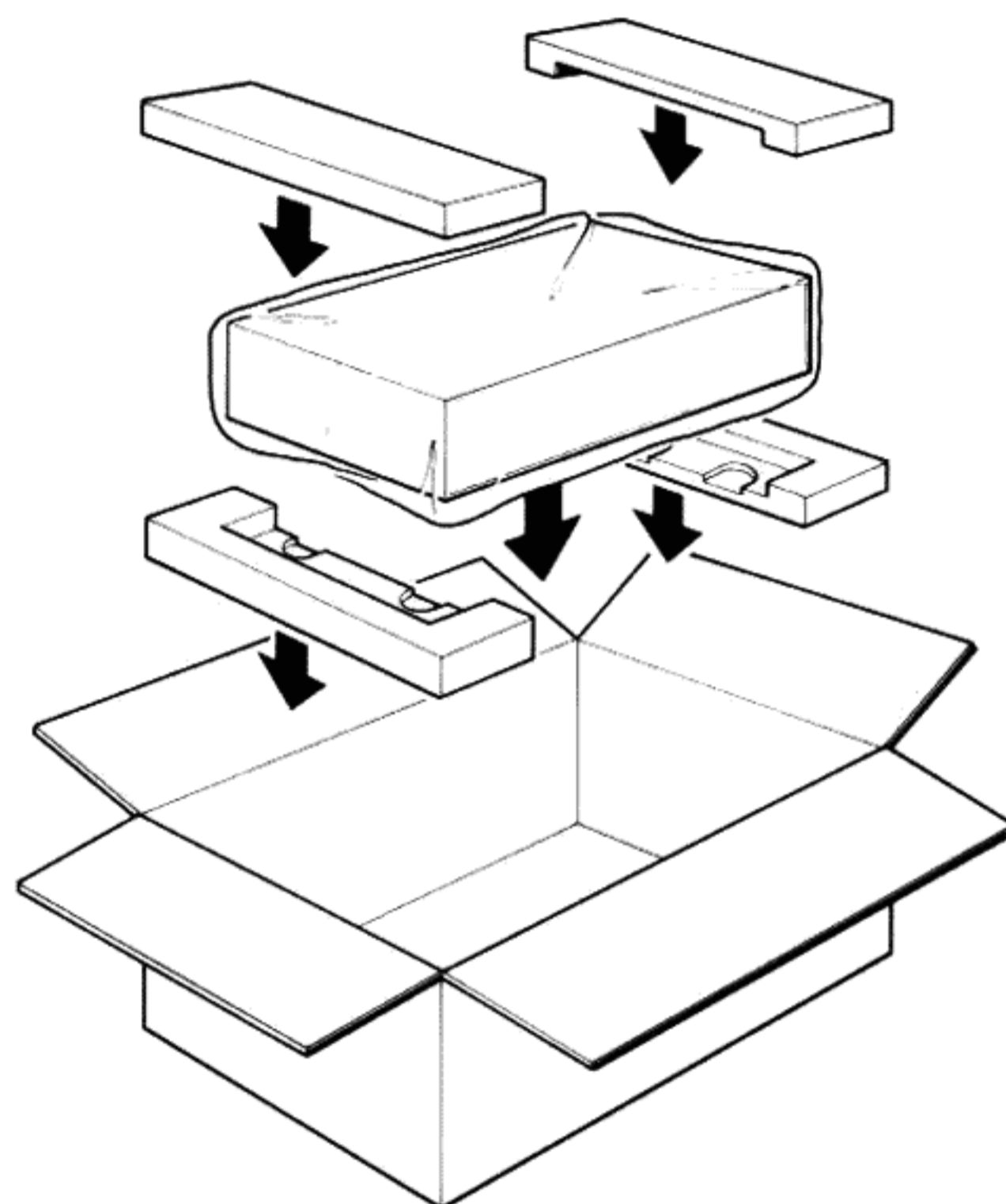
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## UNPACKING

Do not throw away the TA-5650 carton and the associated material; they will come in handy if you ever have to transport or ship your set. Inspect your TA-5650 immediately after unpacking.

If any sign of damage is found, consult your local Sony dealer. When shipping the set for repair work or to another location, the set should be repacked in the original carton and packing material just as before.



## WARNING

- To avoid electrical shock, do not open the cabinet.

Refer servicing to qualified personnel only.

- To prevent fire or shock hazard, do not expose the set to rain or moisture.

## PRECAUTIONS

Correct installation and proper operation contribute both to your safety and to the continued trouble-free operation of your TA-5650. Particular attention should be paid that your installation and operating procedures comply with the following requirements.

- Operate the amplifier only on 120 V ac 60 Hz.
- Do not overload the outlet from which your music system operates by simultaneously using high wattage devices such as electric irons or hair dryers.
- Good air circulation is essential to prevent internal heat build-up in the TA-5650. Place the set in a location with adequate air circulation. Don't place the set on soft surfaces such as a rug that would block the ventilation holes on the bottom.
- Don't place anything on top of the cabinet. The top ventilation holes must be unobstructed for the proper operation of the amplifier and to prolong the life of its components.
- Don't install the TA-5650 in a location near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Unplug the set from the wall outlet if it is not to be used for an extended period of time.
- To disconnect the cord, pull it out by grasping the plug. Never pull it by the cord.
- Before making connections, be sure to turn the power switch off.
- Should any liquid or foreign objects fall into the cabinet, turn off the power switch, unplug the set and have it checked by your Sony dealer before operating.
- When the set is not in use, turn the power off to conserve energy and to extend the useful life of your equipment.
- Do not attempt to test the protection circuits by blocking the ventilation holes or connecting improper loads.
- Never remove the jumper plugs between PRE OUTPUT and POWER INPUT jacks except when the TA-5650 is separately used as a preamplifier or a power amplifier.
- If any problem arises in the operation of this set, such as no sound from one or both channels, etc., first follow the procedures suggested in "TROUBLE CHECKS" on page 13. Most problems that arise are the result of a simple misconnection or incorrect operation and can be cleared up easily. If the difficulty still persists, contact your nearest Sony dealer.

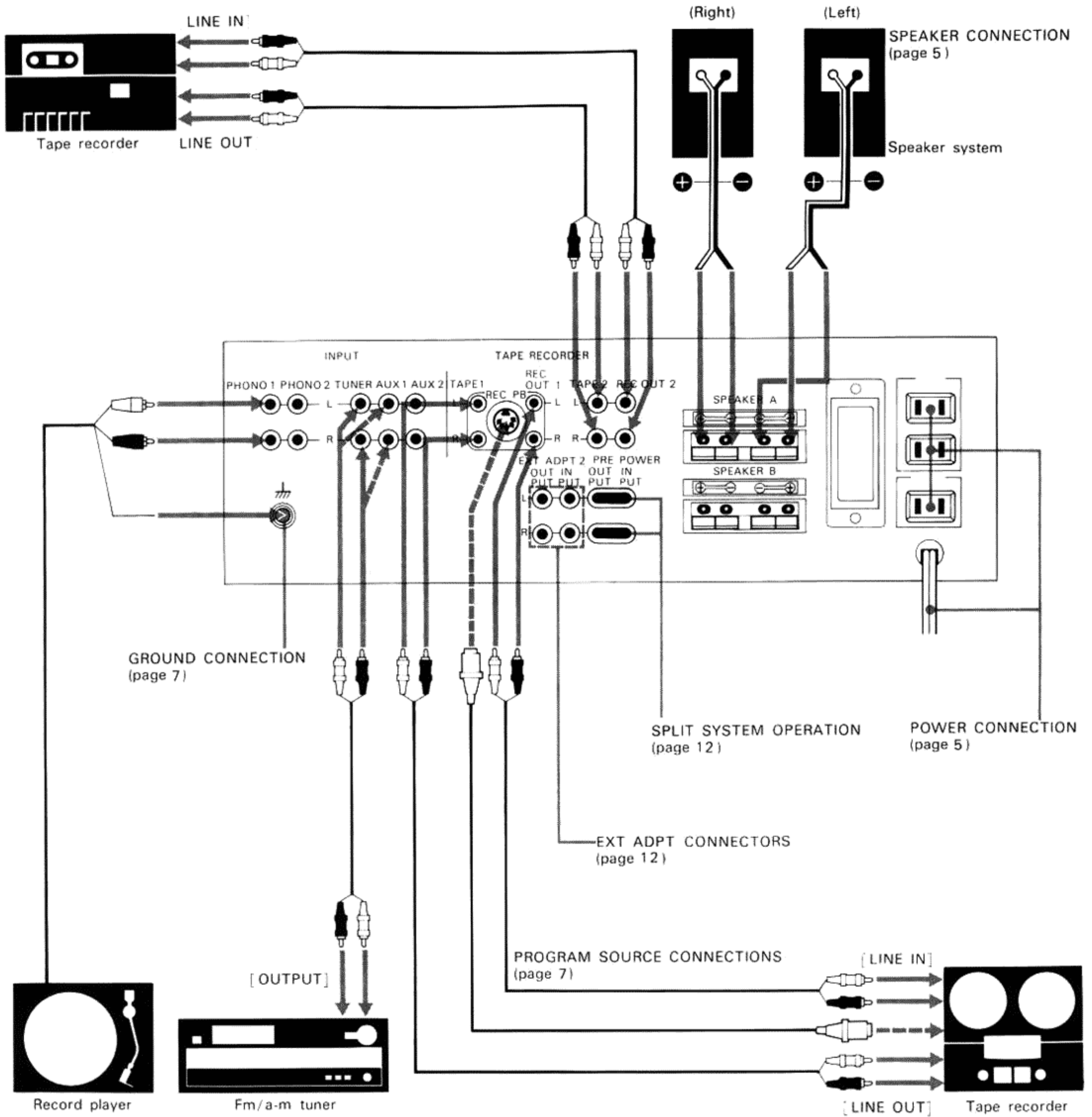
## SYSTEM CONNECTIONS

### CONNECTION NOTES

- To assure correct matching at the input and output terminals of your audio system, refer to the "SPECIFICATIONS" on page 13 and to the specifications given in the instruction manuals provided with the components you wish to connect to the TA-5650. Generally the output level of a signal source (phono cartridge, tape recorder, etc.) should be equal to or slightly greater than the sensitivity of the corresponding input. Also the output impedance of a signal source should be considerably lower than the impedance of the corresponding input. For example, a tape recorder having an output level and impedance of 250 millivolts and 10,000 ohms respectively can be connected to the TA-5650 TAPE inputs which are rated at 150 millivolts and 250,000 ohms.
- For all program source input and output connections, use a low-capacitance type shielded cable. Keep the cables as short as practicable, avoiding horizontal runs. Excessively-long runs of over 2 meters (6 feet) tend to reduce the high frequency response, while horizontal runs are susceptible to power line hum pickup.
- The cables should be fully inserted into the jacks. A loose connection may cause hum and noise.
- Before reconnections are made, be sure to lower all source level controls and turn off the TA-5650 to avoid possible speaker damage.

# CONNECTION DIAGRAM

For detailed information about the connection, refer to the page in the parentheses.



## POWER CONNECTION

Before making any form of power connection, make sure the TA-5650 POWER switch is OFF. Then plug the ac power cord into a wall outlet.

Receptacles on the TA-5650 rear panel provide a convenient source of ac power for other system components.

The two SWITCHED outlets are controlled by the front panel POWER switch, and the total power consumption of all equipment plugged into these outlets should not exceed 200 watts.

The UNSWITCHED outlet is not controlled by the POWER switch, and supplies ac power up to 200 watts.

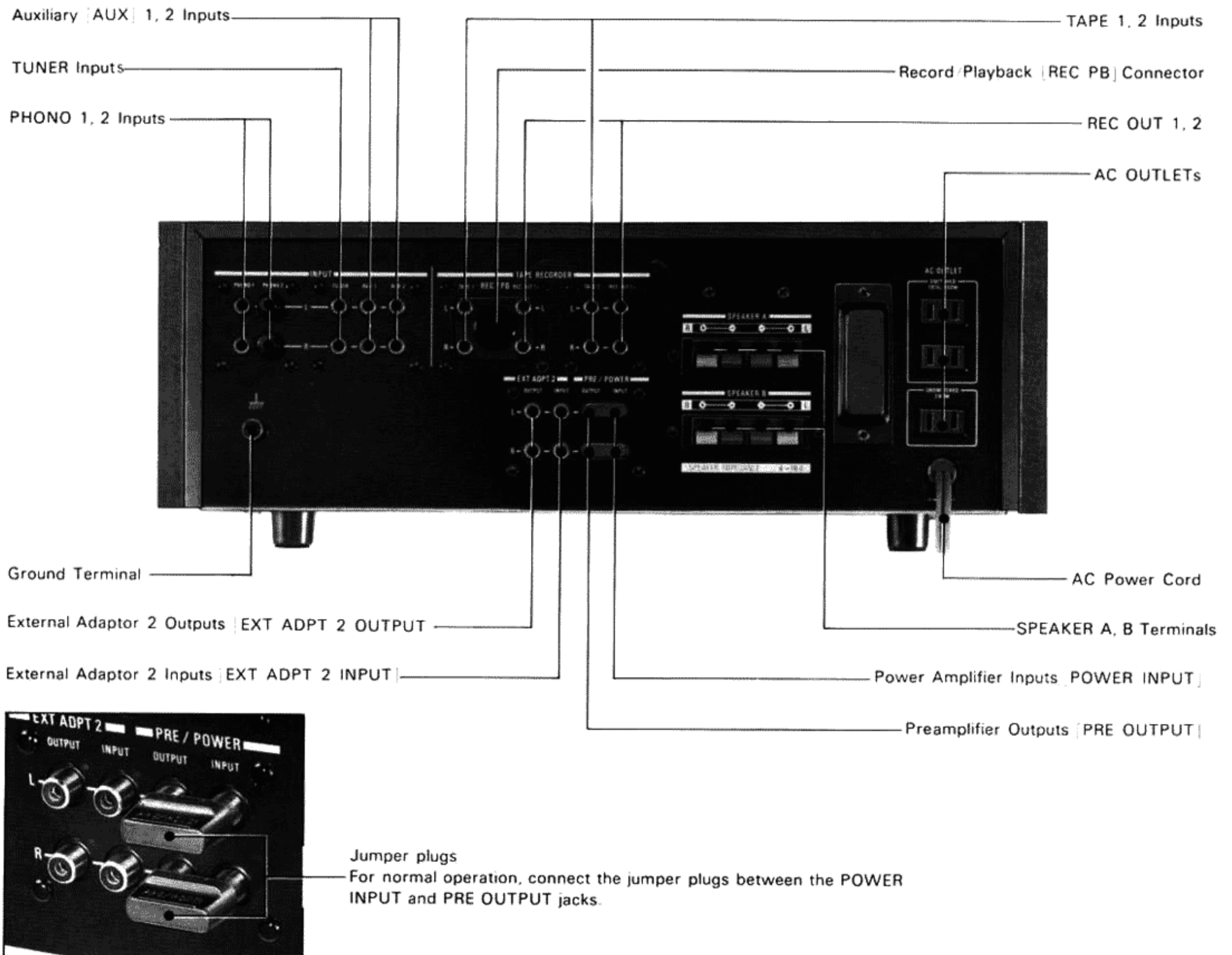
● Never run electrical home appliances such as an electric iron, fan, or TV from these outlets.

## SPEAKER CONNECTION

The TA-5650 has provision for two pairs of speaker systems—system A and system B, which can be selected either individually or simultaneously by means of the front panel SPEAKER selector. Note that the speaker systems A and B are series-connected. No sound will be heard if only one of the speaker systems is used with the SPEAKER selector at "A+B" position.

### Caution

The TA-5650 is rated at 50 watts minimum RMS per channel with an 8-ohm load from 20–20,000 Hz and may deliver an instantaneous peak power much greater than the rated power. Be sure to use speakers with adequate power handling capabilities. Always reduce the volume, when setting down or removing a tonearm, or when tuning an fm tuner across the band. Speaker damage may result if these precautions are not observed.



### Speaker Impedance

Care should be taken that the combined impedance of all speakers in use should not be less than the lowest indicated value on the TA-5650 rear panel—4 ohms.

In the usual connection, where only two speaker systems are used, this will present no problem, since speakers are usually either 4 or 8 ohms, and since they are connected in series, there is no possibility of an impedance lower than 4 ohms being connected to the set.

However, because the speakers are in series, it is essential for proper reproduction that all speakers used be either identical or similar, otherwise undesired power and frequency distribution characteristics may become evident.

### Speaker Cable Type

The type of wire used to connect the speakers to the amplifier is not critical in most home stereo systems.

Common 18-gauge lamp cord is fine for short runs. However, 16-gauge to 14-gauge may be needed for long runs to prevent excessive power losses in the wiring.

### Connecting Speaker Cord to the Amplifier

Connect each speaker to the corresponding speaker terminals i.e. right speaker to the  $\text{R}$  speaker terminals of the amplifier and left speaker to the  $\text{L}$  speaker terminals.

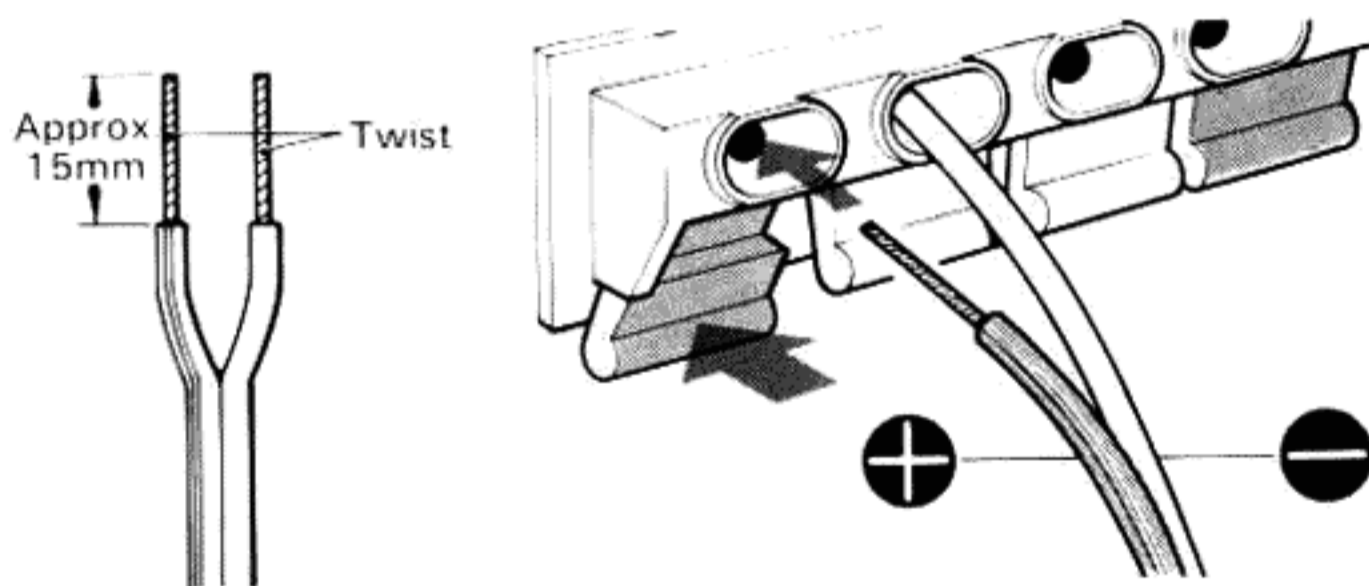
① Strip approx. 15 mm ( $9/16''$ ) of outer covering from the speaker cord.

② Twist the wire ends for easy insertion. Do not coat with solder.

③ While depressing the terminal button, fully insert the twisted wires into the slot, and then release the button.

Be sure that the colored or marked lead of a speaker cord goes to the  $\oplus$  terminal and the remaining one to the  $\ominus$  terminal, to avoid making any incorrect connections.

④ After these procedures are completed, pull the speaker cord lightly to see that the connection is secure.

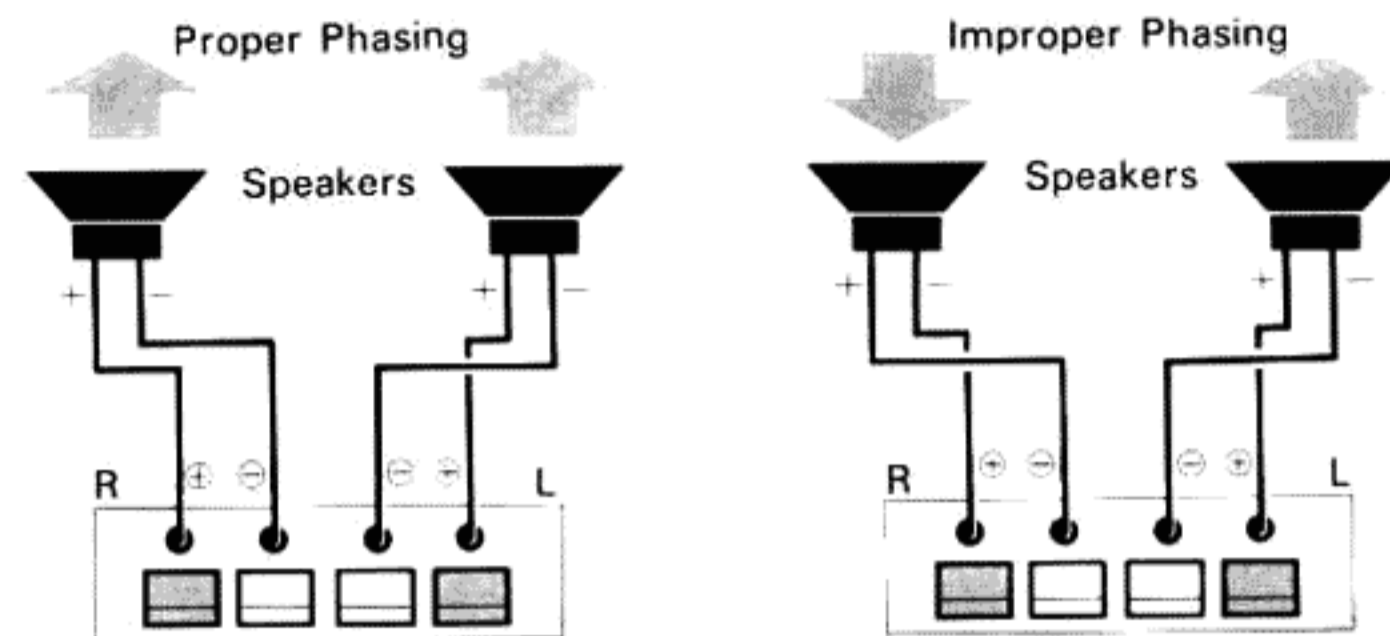


### Caution

Do not connect the speaker terminals of one channel in parallel (together) with those of the other channel.

### Speaker Phasing

One of the most important requirements for good stereo reproduction is correct speaker phasing (all speaker cones move in the same direction when similarly energized). For correct speaker phasing, all speakers must be connected correctly i.e. all  $\oplus$  terminals of the speakers should be connected to  $\oplus$  terminals of the amplifier, and  $\ominus$  to  $\ominus$ . If one connection is reversed, all others must also be changed. Otherwise the speaker phasing becomes reversed so that the bass tones seem to be missing and the position of the instruments becomes obscure.



Both speaker cones move in the same direction.

The  $\oplus -$  connection of right speaker are reversed, so two cones move in the opposite direction.

### Speaker Placement

Here are a few suggestions for speaker placement that will assist you in obtaining an installation with satisfactory stereo sound.

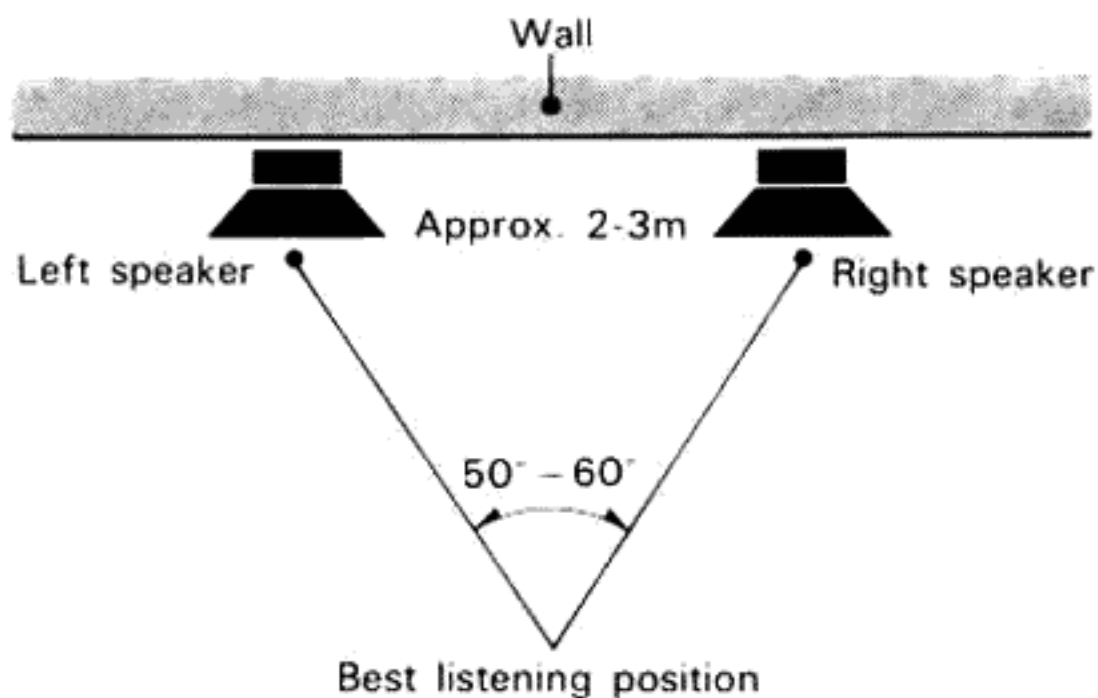
Normally, the speakers are placed on the floor against the narrower wall of a room. The bass sounds can then be increased by moving the speakers toward the corners, or decreased by raising the speakers off the floor on suitable pedestals, and/or moving them away from the wall a moderate distance. If the speakers are positioned above the floor, do not place them higher than ear-level while seated, since this produces an unnatural effect.

However, moving the speakers toward the corners in a large room, while increasing the bass, results in a "hole in the middle" effect which can be partially counteracted by angling the front of the speakers toward the center of the room.

The speakers should be nearly equidistant from the center of the selected wall, and spaced 2-3 meters (6-10 feet) apart as illustrated.

Place the right and left speakers in similar acoustic environments, otherwise you will obtain unbalanced sound. For example, placing one speaker near an open door or archway will decrease the apparent bass from that speaker.

Best sound is usually obtained in a room with carpeting on the floor, and having heavy draperies and upholstered furniture. Since each room has its own individual acoustic characteristics, which are a function of its size, construction and furnishings, some experimentation with speaker placement is generally necessary before the correct balance of stereo image and bass response is obtained. This will be time well spent, resulting in your enjoyment of the maximum capabilities of your music system.



**PROGRAM SOURCE CONNECTIONS**

**Record Players**

The TA-5650 features dual phono inputs. These are convenient for comparing two types of cartridges or record players.

PHONO 1, 2 : Accept cartridges having a low-to-medium output. Its phono input sensitivity is 2.5 millivolts and the input impedance is a standard load of 50,000 ohms.

- Insert the shorting plugs (supplied) for muting the phono terminals when these inputs are not in use to reduce residual noise. Never insert the shorting plugs in any output or input jacks other than the PHONO.



**Tuner**

Connect the line outputs of your tuner to the TUNER inputs. The AUX inputs also accept tuner outputs. (TUNER inputs and AUX inputs are identical in sensitivity and input impedance.)

**Tape Recorders**

Two pairs of TAPE RECORDER connectors (1 and 2) are provided. They can be used for direct tape duplication or for making two recordings simultaneously.

TAPE 1 and 2 : These are designed for playing back taped programs.

Connect the tape recorder line outputs to the TAPE inputs.

REC OUT 1 and 2 : These are designed for tape recording.

Connect the REC OUT jacks to the tape recorder line inputs. REC/PB : If your tape recorder has the same type DIN 5-pin connector (indicated REC/PB) as that on the amplifier, the recording and playback connections can be made with a single record/playback connecting cable such as the Sony RC-2H (optional).

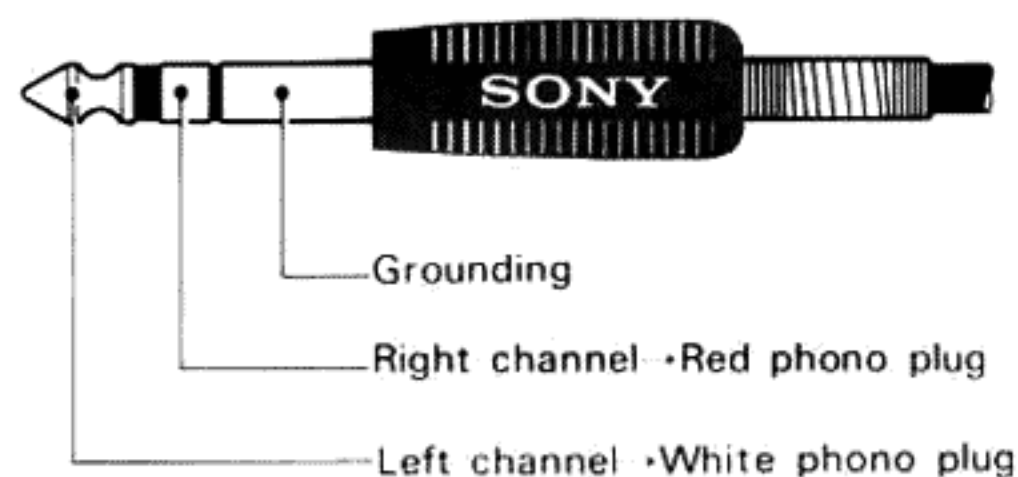
Be sure to disconnect all cables from the TAPE 1 and REC OUT 1 jacks when the REC/PB connector is used.

- The signals which are routed to the REC OUT jacks are determined by the front panel TAPE COPY selector described on page 11.

**Other Input Sources**

The AUX (1 and 2) inputs are provided for connecting various input sources such as a cassette player, additional tuner, record player equipped with a ceramic cartridge, and so forth. The AUX 3 jack on the front panel is convenient for connecting an input source for temporary use.

For this purpose, use the binaural-plug cord (RK-81H), optional.



**GROUND CONNECTION**

To prevent hum, be sure to connect the ground wire of the record player to the amplifier ground terminal. If hum still exists, it may be helpful to connect the ground terminal to a good ground such as the plate screw of an ac outlet, a clamp on cold water pipe, or directly to earth via a ground rod.



# OPERATING INSTRUCTIONS

## INITIAL OPERATION

As a preliminary to initial operation, check that the POWER switch is released (OFF) and plug the TA-5650 into a suitable power outlet.

Before proceeding to any type of operation, set the controls and switches as shown below:

- 1 Set the VOLUME control at minimum position (fully counter-clockwise).
- 2 Select the desired program source.

Program	MONITOR	FUNCTION	PHONO 2/AUX
Fm/a-m tuner	SOURCE	TUNER	—
Record playing		PHONO 1	—
		PHONO 2/AUX	PHONO 2
Auxiliary sources		PHONO 2/AUX	AUX 1-3
Taped program	TAPE 1 or 2	—	—

- 3 Depress the POWER switch to ON.  
(The muting circuit activates a relay which provides a 5-6 second delay after switch-on to avoid any annoying "thump" noises when the set is first turned on.)

## SOUND ADJUSTMENTS

Now your TA-5650 is ready for operation.

### Sound Volume

Adjust the VOLUME control to produce the desired level by turning it clockwise.

Volume presetting is available with the use of the PRESET knob for quick access to your desired level. Refer to page 10.

### Stereo Balance

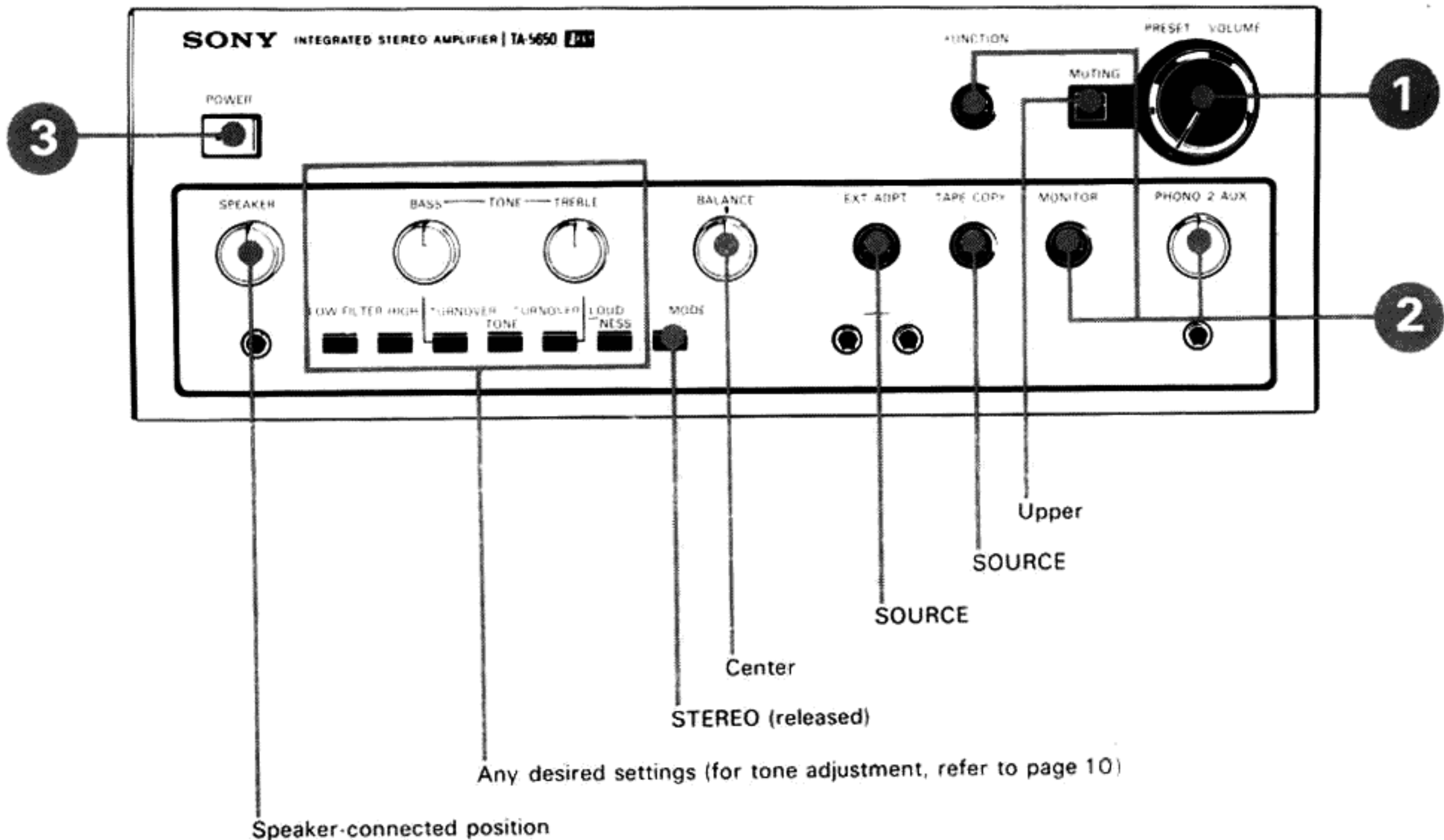
The feeling of direction and depth that stereophonic sound produces is greatly diminished if the levels of both channels are not balanced. Set the MODE selector to MONO and adjust the BALANCE control for equal output from the right and left speakers.

Balance variations with different program sources are then due to differences in the recording levels. Stereo balance is also influenced by the acoustics of the room. Carpets, furniture placement, and room size and shape have a definite effect upon sound quality and balance.

### Tone

The manipulation of the tone control section does not interrupt the signal path in the amplifier.

However, its overuse may adversely affect amplifier tone quality. For proper use, refer to "TONE CONTROL SECTION" on page 10.



## FRONT PANEL FACILITIES

### TAPE RECORDING

- ① Set the MONITOR selector to SOURCE.
  - ② Select the recording program with the FUNCTION and PHONO 2/AUX selectors.
  - ③ Set the TAPE COPY selector to SOURCE.
  - ④ Adjust the recording level at the recorder and start it in record mode.
- The VOLUME, BALANCE, TONE controls, FILTER switches and LOUDNESS switch have no effect upon the recording.

### Monitoring of 3-head Tape Recorder

If your tape recorder has separate record and playback heads, you can monitor the recording results by setting the MONITOR selector to TAPE position.

In this case, the recorder should be connected to the TAPE and REC OUT jacks and its tape monitor should be at the TAPE position.

This section describes the operation and function of each facility on the front panel of the TA-5650.

For clarity, these are grouped into four functionally related sections.

### GENERAL CONTROL SECTION

#### POWER Switch

This turns the operating power on or off. A built-in lamp will light with a soft green glow when the amplifier is turned on.

#### SPEAKER Selector

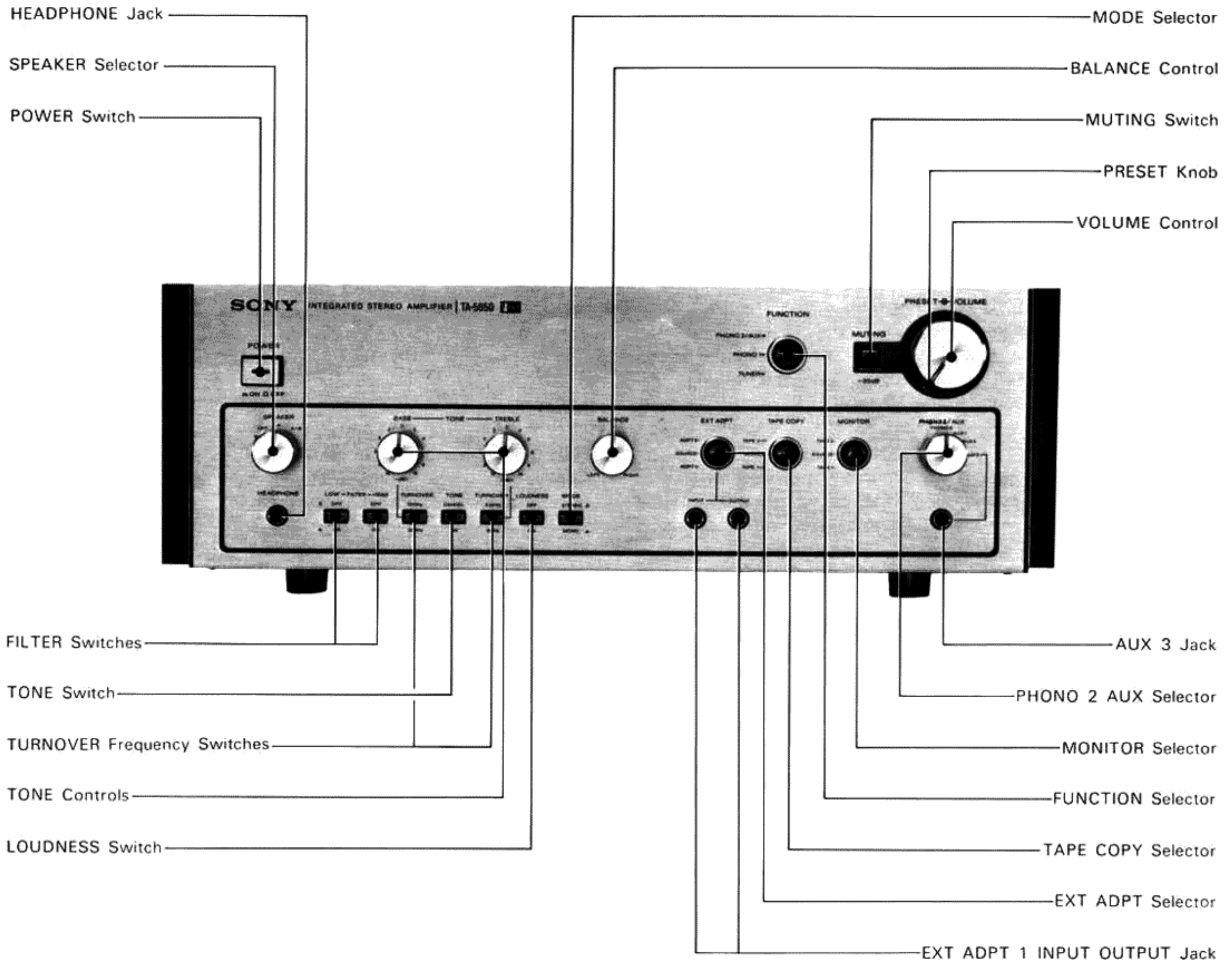
Selects speaker system A or B, or both.

A+B: To drive speaker systems A and B simultaneously.

A: To drive speaker system A.

OFF: To cut off the speaker sound or to monitor through the headphones.

B: To drive speaker system B.



### HEADPHONE Jack

This jack accepts any low and high impedance stereo headphones. For headphone monitoring only, set the SPEAKER selector to OFF.

### MODE Selector

Determines the mode of the program reproduced at the speaker and headphone output.

For normal operation, set the MODE selector to STEREO  (released) position.

For listening to any input program monophonically, or for balancing right and left channel sound levels, set the MODE selector to MONO  (depressed) position.

### BALANCE Control

Governs the amount of sound coming from each paired speaker to get optimum stereo effect.

When you turn the BALANCE control to the right, left channel volume is decreased, and vice versa.

For normal operation, set the BALANCE control to the center position.

### MUTING Switch

When the MUTING switch is set to -20 dB, overall listening sound level is reduced by that amount.

This feature is useful when you lower the tonearm onto the disc or when you answer the telephone. By setting it back afterwards, you can restore exactly the same listening level as before.

For normal operation set the MUTING switch to the upper position.

### VOLUME Control (with PRESET Knob)

Regulates the overall sound level.

Clockwise rotation of the VOLUME control increases the sound level and counterclockwise rotation decreases the volume.

Adjust the volume to your preferred level.

### Volume presetting

The use of the volume PRESET knob is convenient when you turn down the volume and then wish to restore the original sound level or when you make listening tests with speakers or cartridges of differing efficiency or output level.

① Turn down the VOLUME control and volume PRESET knob fully to their minimum (counterclockwise) position.

② Lightly press a finger on the PRESET knob and turn it to your preferred sound level.

This allows the VOLUME control to be friction-driven at the same time. This is the presetting.

③ Next, when turning down (up) the volume again, only turn the VOLUME control.

④ When it is desired to return to the preset level, turn the VOLUME control toward its original position until a click occurs.

● To prevent inadvertent speaker damage, lower the volume whenever you turn the TA-5650 on or off, or make system connections.

## TONE CONTROL SECTION

### FILTER Switches

The purpose of a filter is to attenuate selected portions of the audio frequency spectrum. The LOW and HIGH FILTER switches of the TA-5650 have an attenuation slope of 12 dB per octave for eliminating unwanted noise components created by the program source. If there is no need for the use of a filter, keep the FILTER switches released ( OFF).

LOW: Low frequency noise such as the rumble created by a turntable, record changers, or warped records is reduced.

HIGH: High frequency noise such as the surface noise of records, or tapes when reproducing old and poor quality recordings, or high frequency distortion in records or tapes is reduced.

### TONE Switch

CANCEL (, released)

Bass and treble tone control circuits are disconnected from the signal path and an absolutely flat frequency response is obtained, regardless of the BASS and TREBLE controls settings.

ON (, depressed)

The BASS and TREBLE controls work normally.

### TURNOVER Frequency Switches

These switches select the "turnover frequency" point, or the frequency at which the BASS (or TREBLE) tone control begins to take effect. You can thereby change the bass (or treble) at the spectrum extremes with a varying degree of effect on the midrange.

BASS (left one):

(released) . . . . 500 Hz turnover frequency

(depressed) . . . . 250 Hz turnover frequency

TREBLE (right one)

(released) . . . . 2.5 kHz turnover frequency

(depressed) . . . . 5 kHz turnover frequency

### TONE Controls

TONE controls are useful for correcting any deficiency in your speaker system or listening room acoustics, as well as improperly equalized program source material, and so forth. These two controls each alter a response range of  $\pm 10$  dB in 2 dB steps. When both are in their center position, a flat response results, the same as when the TONE switch is at CANCEL.

BASS: Clockwise rotation boosts and counterclockwise rotation reduces bass frequencies above and below a turnover point (250 Hz or 500 Hz) respectively.

TREBLE: Clockwise rotation boosts and counterclockwise rotation reduces treble frequencies above and below a turnover point (2.5 kHz or 5 kHz) respectively.

### LOUDNESS Switch

Human ears are less sensitive in their response to very low and very high notes at low volume levels. This LOUDNESS switch compensates for this characteristics of the ear and provides an apparently uniform response at such low volume levels.

● The LOUDNESS switch is automatically disconnected when the set is operated at high volume levels.

## INPUT SELECTION SECTION

### AUX 3 Jack

Accepts a binaural phone plug to permit a front panel connection of any suitable auxiliary signal source.

### PHONO 2/AUX Selector

When this selector is used, the FUNCTION selector should be set at PHONO 2/AUX position.

PHONO 2: For disc programs from record player 2.

AUX 1-3: For up to three auxiliary programs, set the selector to the corresponding numbered position.

### MONITOR Selector

TAPE 2: For playback of taped programs connected to the TAPE RECORDER 2 connector.

SOURCE: For all other program sources (AUX, PHONO, TUNER), set the selector to this position.

TAPE 1: For playback of taped programs connected to the TAPE RECORDER 1 connector.

### FUNCTION Selector

PHONO 2/AUX: For disc programs from record player 2 (connected to the PHONO 2 inputs) or for an auxiliary program, set the selector to this position, and set the PHONO 2/AUX selector (located just below the VOLUME control) to the proper position.

PHONO 1: For disc programs from a record player 1 (connected to the PHONO 1 inputs), set the selector to this position.

TUNER: For off-the-air programs (connected to the TUNER inputs), set the selector to this position.

## ADD-ON ACCESSORY SECTION

### TAPE COPY Selector

For normal operation, keep this selector at SOURCE position.

By positioning this selector to TAPE 2→1 or TAPE 1→2, you can dub from one tape recorder to another, while still listening to the program source selected with the FUNCTION selector.

TAPE 2→1: For dubbing from tape recorder 2 (for playback) to tape recorder 1 (for recording).

SOURCE: For normal use. In this position, a PHONO, TUNER, or AUX program signal selected by the FUNCTION selector is applied to both REC OUT 1 and 2, and allows you to record onto two tape recorders simultaneously.

TAPE 1→2: For dubbing from tape recorder 1 (for playback) to tape recorder 2 (for recording).

### EXT ADPT Selector (External Adaptor Selector)

For normal operation, keep this selector at SOURCE position.

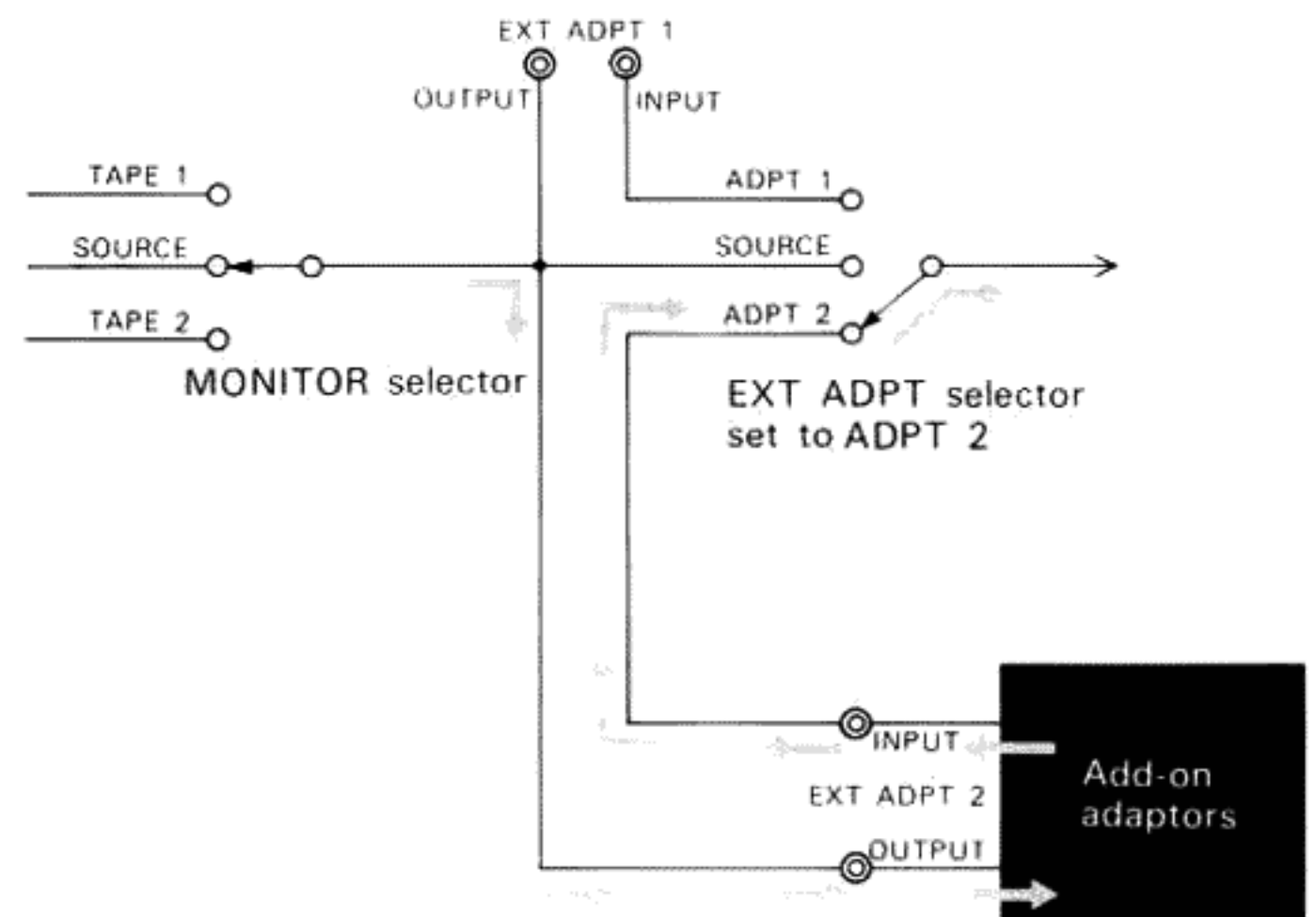
By placing it to either the ADPT 2 or ADPT 1, add-on adaptors (such as a graphic equalizer, SQ adaptor or a third tape recorder, etc.) can be used.

ADPT 2: For the use of add-on adaptors connected to the EXT ADPT 2 jacks on the rear panel.

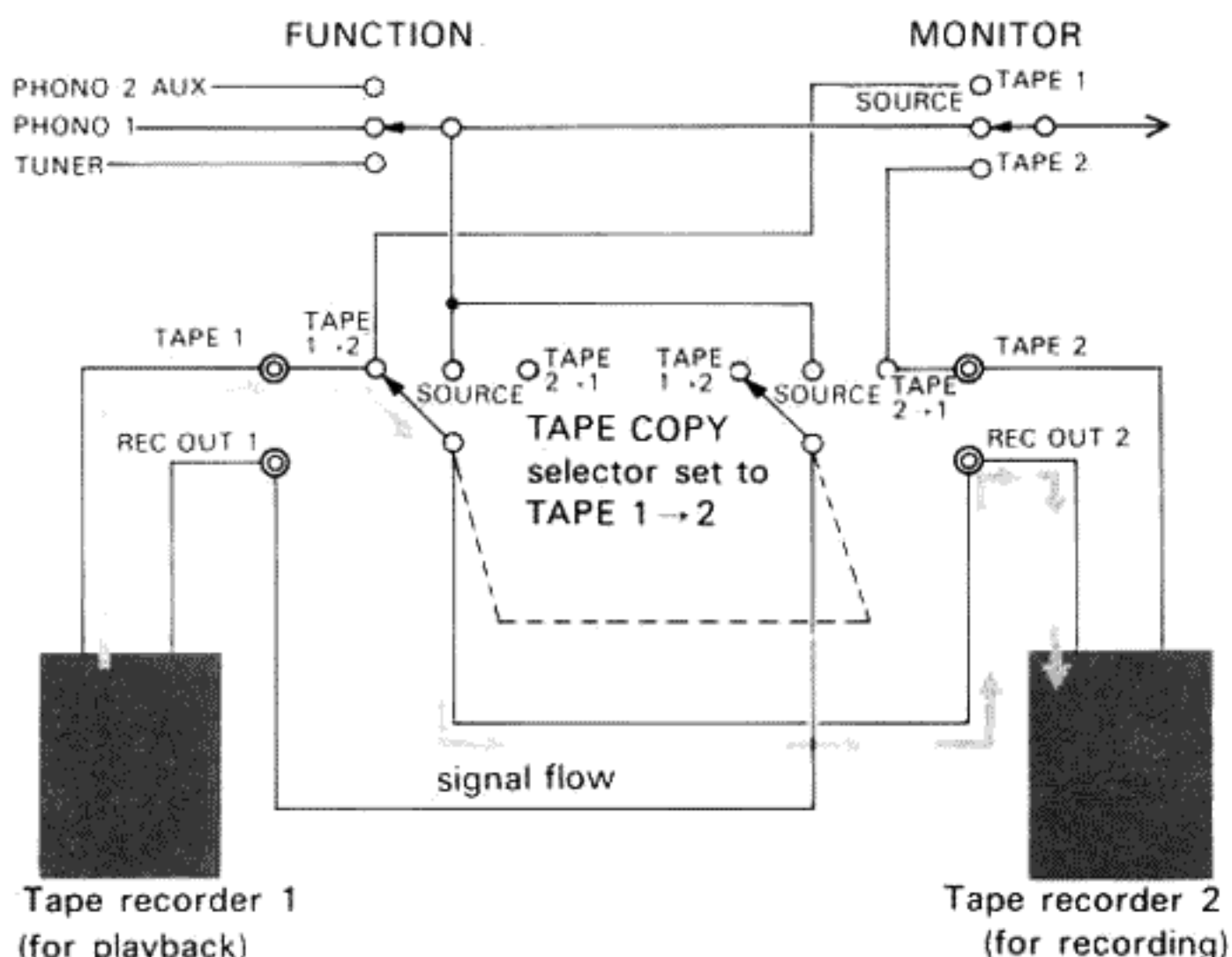
SOURCE: For normal use.

ADPT 1: For the use of add-on adaptors connected to the EXT ADPT 1 jacks on the front panel. Use a binaural-plug cord for this connection.

For using EXT ADPT 2



For dubbing from tape recorder 1 to tape recorder 2



## ADD-ON SYSTEM

### SPLIT SYSTEM OPERATION

By removing the jumper plugs the signal path is opened at an intermediate level point and the TA-5650 is divided into two separate units—preamplifier and power amplifier.

This allows you to connect other power amplifiers, preamplifiers and add-on components.

**PRE OUTPUT :** Accepts channel filter amplifiers or various power amplifiers.

**POWER INPUT :** Accepts various preamplifiers.

● When this feature is not in use, be sure to connect the jumper plugs between the PRE OUTPUT and POWER INPUT jacks, otherwise the entire system will be inoperative.

### EXTERNAL ADAPTOR CONNECTORS

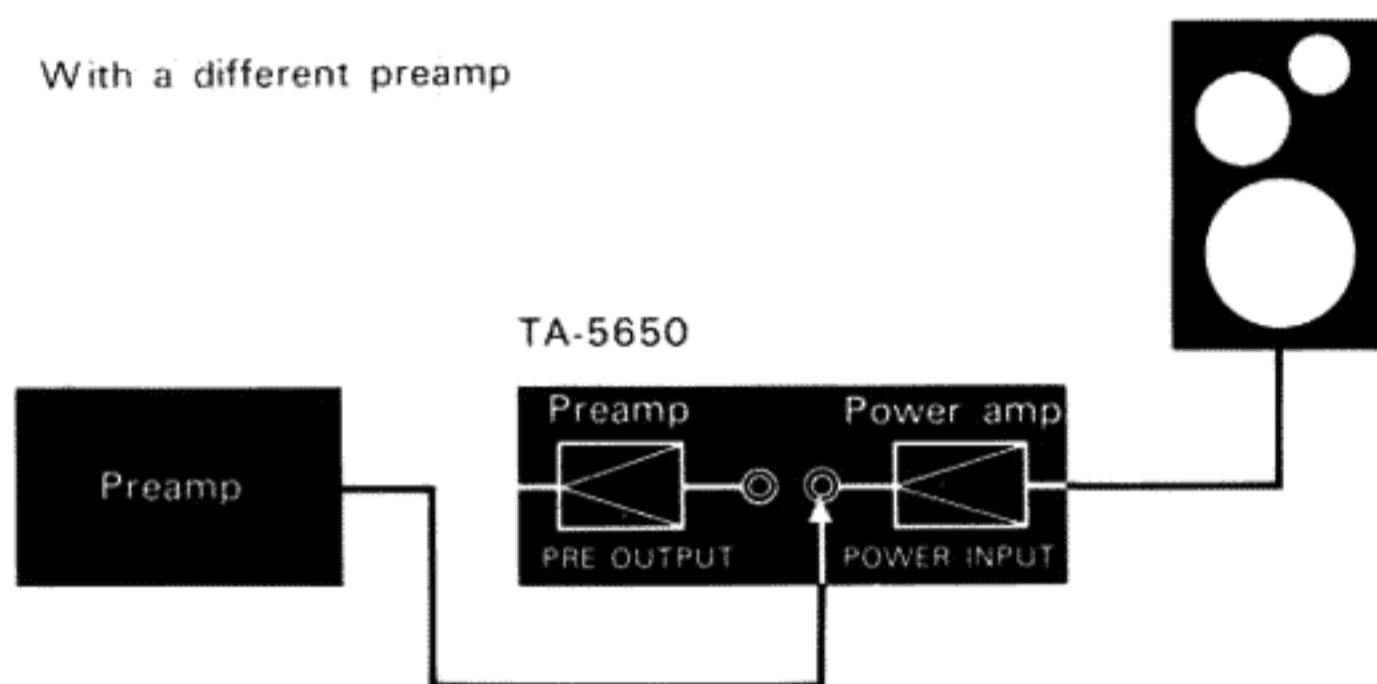
Two pairs of EXT ADPT jacks are provided—EXT ADPT 1 on the front panel and EXT ADPT 2 on the rear panel.

These jacks accept an add-on adaptor such as a graphic equalizer, speaker equalizer, SQ adaptor (for a quadraphonic sound setup), or a third tape recorder.

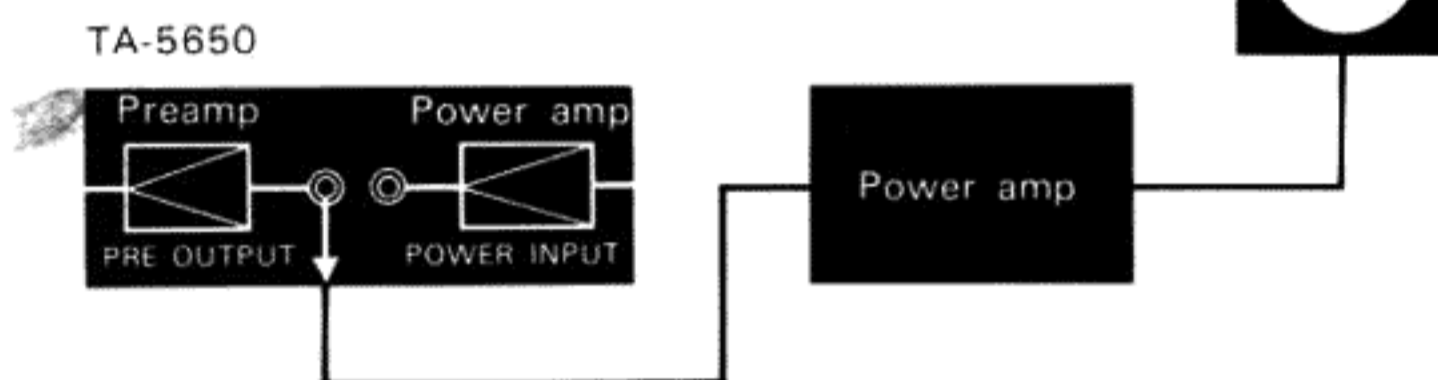
Connect the EXT ADPT OUTPUT jacks to the inputs of the add-on equipment and the EXT ADPT INPUT jacks to the outputs of the equipment.

● When using these jacks, be sure to set the front panel EXT ADPT selector to its proper position. When not in use, set it to SOURCE. If these precautions are not observed, the signal path is not completed and no sound will be heard.

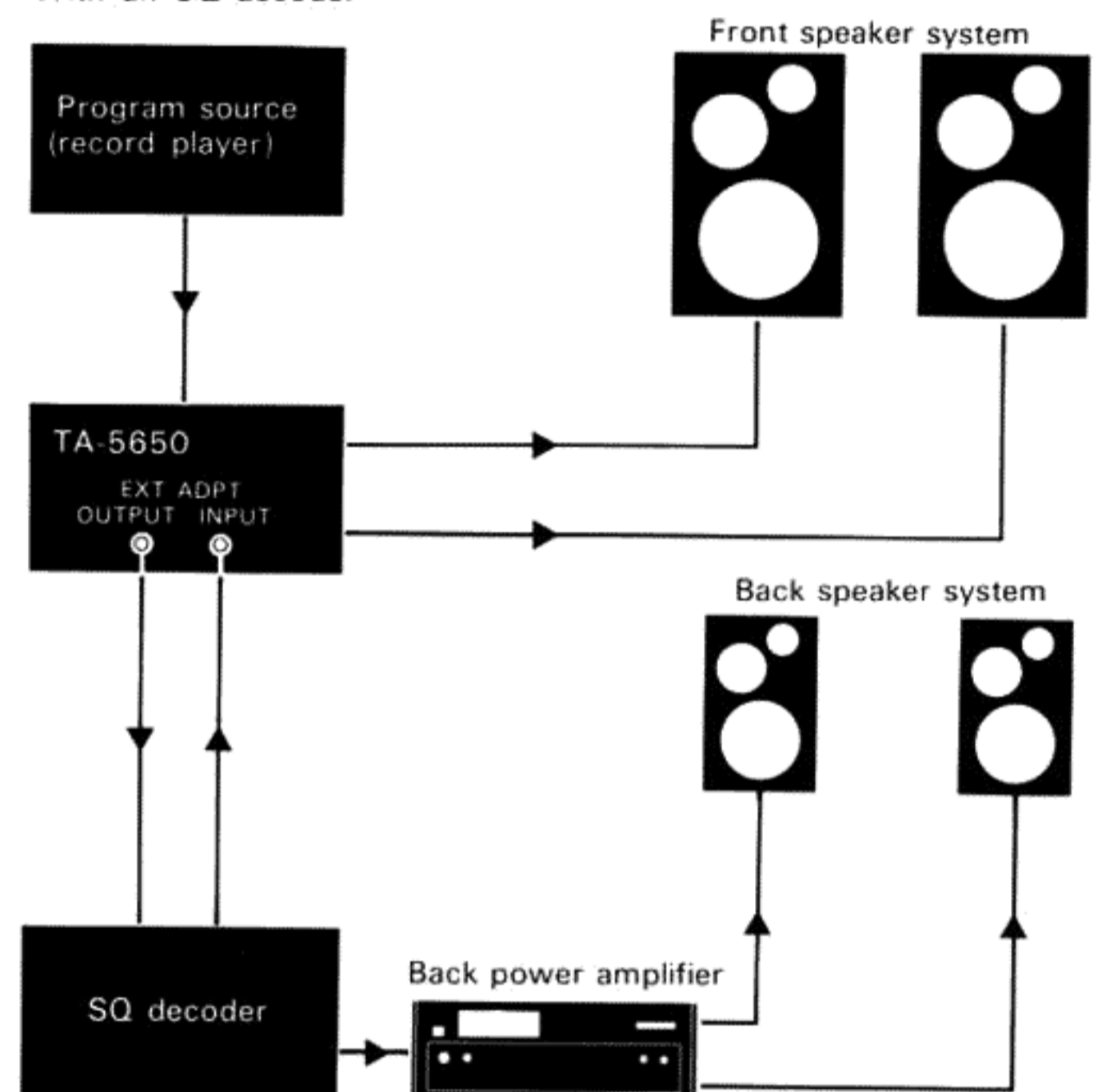
With a different preamp



With a different power amp



With an SQ decoder



## CARE OF YOUR EQUIPMENT

### TROUBLE CHECKS

If any problem arises with the operation of the TA-5650, check the following chart to help in isolating the trouble. If the trouble persists after you have made these checks, consult your Sony dealer.

#### No audio and the POWER lamp not lit

Check that the ac power cord is plugged into a working outlet.

#### No audio but the POWER lamp lights

Turn up the volume.

Check speaker cord connections.

Set the MONITOR selector to SOURCE for program sources other than TAPE inputs.

Check the settings of FUNCTION and PHONO 2/AUX selectors.

Check the speaker selector setting.

Check the jumper plugs on the rear panel.

Check the EXT ADPT selector to see if it is correctly set.

#### Low sound level

Set the MUTING switch to upper position.

#### Unbalanced left and right volume

Adjust the BALANCE control.

Check the level or balance controls of the signal source.

#### Abrupt loss of sound from one or both speakers\*

Check the speaker terminals or speaker cord for a short.

Check for a connected audio component which might generate a dc content that affects the TA-5650.

#### Abrupt loss of sound from both speakers and unit is extremely hot\*

Remove any object on the top of the cabinet which might prevent normal air circulation.

#### No tone control adjustment

Set the TONE switch to ON.

#### No tape copying

Check the TAPE COPY selector to see if it is correctly set.

#### Reversed left and right sound

Check the speaker cord connection and speaker location.

#### Lack of bass sound or obscure instrument position

Check the speaker connections for proper phasing.

#### Severe hum or noise

Use the shielded connecting cords.

Keep the connecting cord away from transformers or motors and at least 3 meters (10 feet) from TV sets and fluorescent lights.

#### Rustling noise

Make secure connections.

Wipe the plugs and jacks with a cloth lightly dampened with methanol.

\* These symptoms may be caused when the protection circuits activate.

### CLEANING

Cleaning the cabinet, panel and knobs periodically with a soft cloth. If finger prints, food and beverage stains, etc. are difficult to remove, use a cloth moistened with a mild detergent solution. Do not use any type of scouring powder, abrasive pad or solvent, since these will damage the cabinet.

## SPECIFICATIONS

### AUDIO POWER SPECIFICATIONS

#### POWER OUTPUT AND TOTAL HARMONIC DISTORTION

With 8 ohm loads, both channels driven, from 20 - 20,000 Hz; rated 50 watts per channel minimum RMS power, with no more than 0.1% total harmonic distortion from 250 milliwatts to rated output.

### OTHER SPECIFICATIONS

#### Power Amplifier Section

Harmonic distortion Less than 0.1% at rated output  
Less than 0.08% at 1 watt output

Intermodulation (IM) distortion  
(60 Hz : 7 kHz = 4 : 1) Less than 0.1% at rated output  
Less than 0.08% at 1 watt output

Frequency response 2 Hz - 100,000 Hz  $\pm 0$  dB  
(at 1 W output)  $-2$

Signal-to-noise ratio Greater than 110 dB, short-circuited input

Residual noise Less than 0.02 microwatt

Damping factor 50 (8 ohms, at 1,000 Hz)

#### Inputs

#### POWER INPUT

Sensitivity 1.0 volt (for rated output)

Impedance 50,000 ohms

SPEAKER terminals A, B

Accept speakers of 4 - 16 ohms

HEADPHONE jack

Accepts low- and high-impedance stereo headphones

#### Outputs

#### Preamplifier Section

Harmonic distortion Less than 0.05% at rated output

Intermodulation (IM) distortion

(60 Hz : 7 kHz = 4 : 1) Less than 0.05% at rated output

Frequency response PHONO 1, 2 RIAA equalization  $\pm 0.5$  dB

#### TUNER

AUX 1 - 3

TAPE 1, 2

REC/PB (input)

EXT ADPT 1, 2

(input)

10 Hz - 100,000 Hz  $\pm 0$  dB  
 $-2$

(TONE canceled)

#### Tone controls

#### BASS

$\pm 10$  dB at 100 Hz (TURNOVER 500 Hz)

$\pm 10$  dB at 50 Hz (TURNOVER 250 Hz)

#### TREBLE

$\pm 10$  dB at 10,000 Hz (TURNOVER 2,500 Hz)

$\pm 10$  dB at 20,000 Hz (TURNOVER 5,000 Hz)

#### Filters

#### LOW

12 dB/octave attenuation below 30 Hz

#### HIGH

12 dB/octave attenuation above

9,000 Hz

#### Loudness

+10 dB at 50 Hz

(att. 30 dB)

+3 dB at 10,000 Hz

#### Residual noise

Less than 0.15 microvolt (VOLUME set to minimum; TONE flat; FILTER off)

## V-FET AND LEC TRANSISTORS

### Inputs

	Sensitivity	Impedance	Maximum input capability (0.05% distortion)	S/N (weighting network, input level)
PHONO 1, 2	2.5 millivolts	50,000 ohms	300 millivolts	70 dB (B, 2.5 millivolts)
TUNER AUX 1 - 3 TAPE 1, 2 REC/PB EXT ADPT 1, 2	150 millivolts	250,000 ohms	—	90 dB (A, 150 millivolts)

### Outputs

	Voltage	Impedance
REC OUT 1, 2	150 millivolts	4,700 ohms
EXT ADPT 1, 2	150 millivolts	4,700 ohms
REC/PB	17 millivolts	82,000 ohms
HEADPHONE	300 millivolts	470 ohms
PRE OUTPUT	1.0 volt	1,000 ohms

### General

System	Power amplifier section : direct-coupled V-FET pure complementary symmetry circuitry Preamplifier section : direct-coupled two-stage equalizer, flat and negative feedback control circuitry, FET active filter circuitry
Semiconductors	10 V-FETs, 9 FETs, 42 transistors, 31 diodes
Power requirements	120 V ac, 60 Hz
Power consumption	160 watts
AC outlets	2 switched 200 watts, 1 unswitched 200 watts
Dimensions	460 (w) × 168 (h) × 323 (d) mm (18 1/8 × 6 5/8 × 12 3/4 inches)
Weight	14.1 kg (31 lb 2 oz) net 16.7 kg (36 lb 13 oz) in shipping carton
Supplied accessories	Shorting plugs (2)

Design and specifications subject to change without notice.

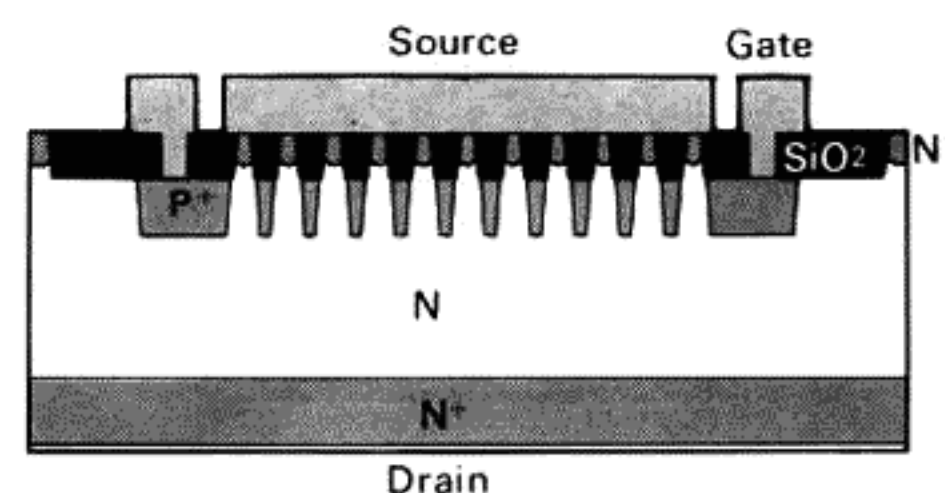
### V-FET

V-FET is the acronym for the newly developed vertical-type field-effect transistors that can handle high power outputs.

The V-FET can be characterized as follows :

- It can construct complementary-symmetry circuitry.
  - It can deliver an output current proportional to input voltages, and assure virtually distortion-free amplification.
  - There is no electric charge accumulation effect, thus assuring quick switching-time.
  - It is a voltage-controlled element, and has no local current concentration. This results in higher thermal breakdown characteristics.
  - A newly developed oxidation process has enabled the realization of mass-production.
  - Gate and source electrodes are isolated by a thick SiO<sub>2</sub> (silicon dioxide) layer resulting in extremely low input capacitance.
- The characteristics described above give the V-FET the combined advantages of a transistor and a vacuum-tube triode. Use of V-FETs in the power output stage of the TA-5650 results in a quality of reproduction hitherto not available to audiophiles.

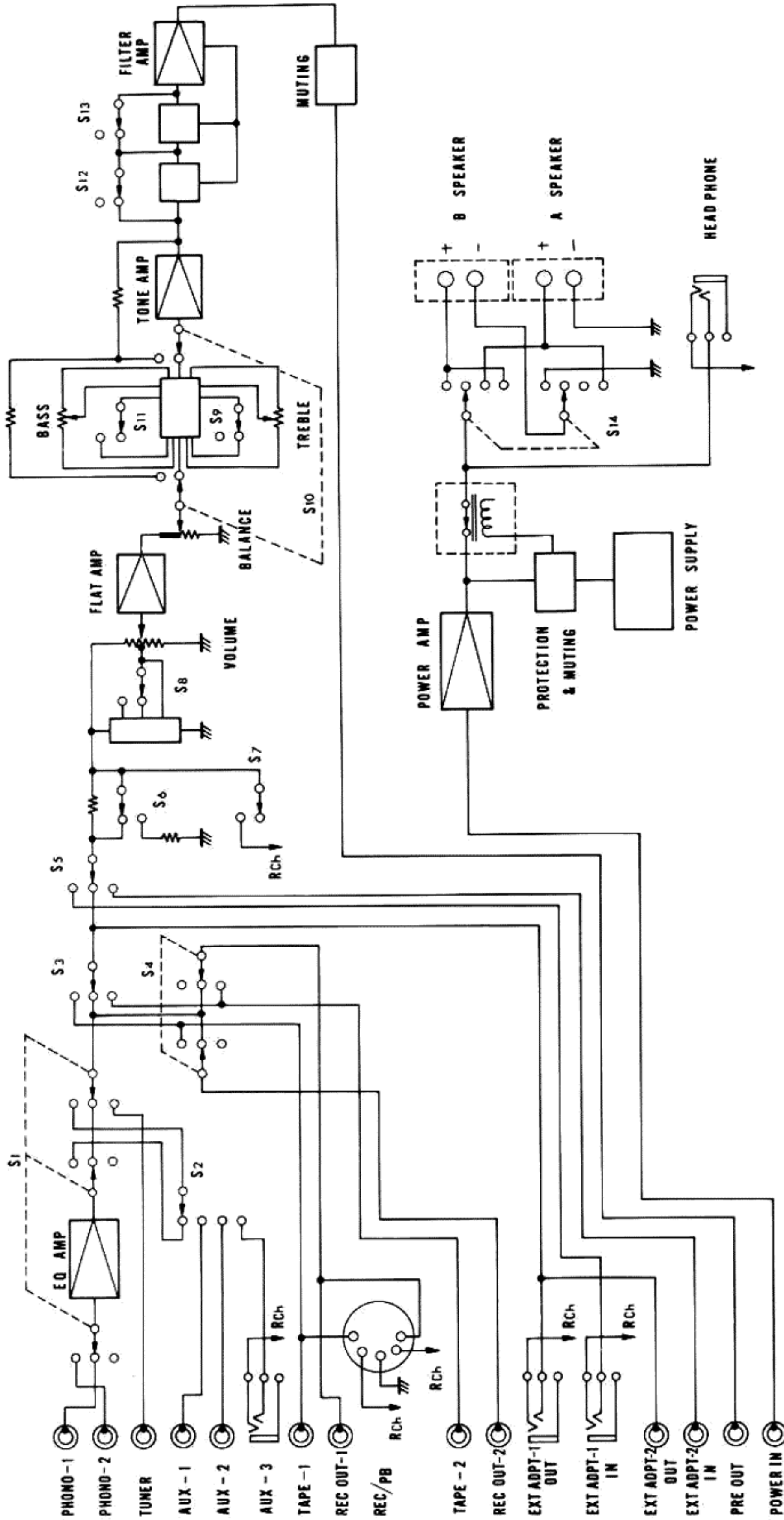
Construction of an N-channel V-FET



### LEC TRANSISTOR

"LEC" (Low Emitter Concentration) describes the most innovative semiconductor manufacturing technology of today which has succeeded in reducing impurity density of the emitter to an insignificant low, while offering a current amplification factor equal to or higher than the conventional transistor. This yields high-quality, high-reliability low-noise transistors. The use of an LEC transistor in the TA-5650 equalizer amplifier assures excellent S/N figures over a wide dynamic range.

# BLOCK DIAGRAM



- |     |                   |
|-----|-------------------|
| S1  | FUNCTION          |
| S2  | PHONO 2/AUX       |
| S3  | MONITOR           |
| S4  | TAPE COPY         |
| S5  | EXT ADPT          |
| S6  | MUTING            |
| S7  | MODE              |
| S8  | LOUDNESS          |
| S9  | TURNOVER (TREBLE) |
| S10 | TURNOVER (BASS)   |
| S11 | HIGH FILTER       |
| S12 | LOW FILTER        |
| S13 | SPEAKER           |
| S14 |                   |