NOMENCLATURE AND USAGE OF EACH CONTROL

1. Bass Level Control
A clockwise turn of the knob boosts the bass response, while counterclockwise decreases. This knob has the click-stopper of 11 points and yields flat frequency response at the centre angle of rotation. A turn-over (roll-off) frequency can be selected at either of 150Hz, 300Hz and 600Hz with the selector switch (2). This is a friction coupled dual level control and permits separate control of both right and left channels. The outer one is for the right channel, and inner for left. Usually both channels are controlled simultaneously by this knob. In order to control either of both channels you may turn the control for your desired channel whilst holding the other channel by hand. The click-stoppers are only on the inner axis of volume, i.e., for the left channel.

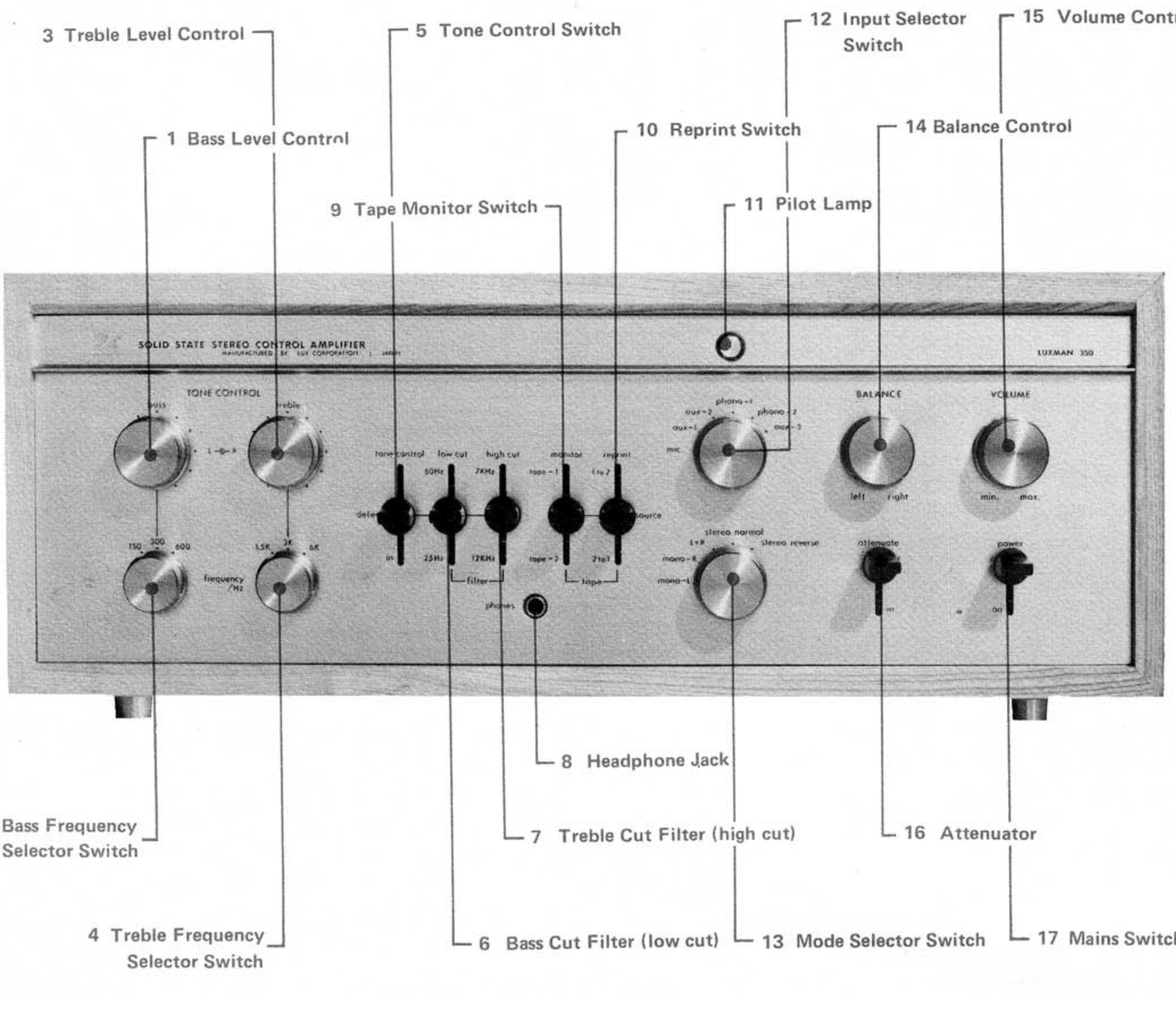
2. Bass Frequency Selector Switch
A bass turn-over (roll-off) frequency can be selected by this switch. When the desired frequency (150Hz, 300Hz or 600Hz) is set by this switch the tone control (1) starts to function at the selected frequency.

3. Treble Level Control
This is the tone control to vary the treble frequency response. To turn clockwise boosts the treble response, while counter-clockwise cuts the treble. Having 11-point click-stopper, this is of the same structure as that of Bass Level Control (1) and for operation what is expressed in (1) is similarly applicable.

4. Treble Frequency Selector Switch
Function-wise this is same with Bass Frequency Selector expressed in (2), and a treble turn-over (roll-off) frequency can be selected at 6 KHz, 3 KHz and 1.5 KHz.

5. Tone Control Switch
If this switch is set at the "defeat" position all tone controls are released, and flat response is obtained irrespective of the position of level controls and frequency selector switches. See that this switch is set at the "in" position when using tone control functions.

6. Bass Cut Filter (low cut)
When this switch is set at the upper position low



frequency range below 60Hz can be cut off, while at the lower position below 25 Hz, both at the rate of 12 dB/octave. At the centre point the filter function is released.

7. Treble Cut Filter (high cut)
The same function with the Bass Cut Filter (6). At the upper position high frequency range above 7KHz can be cut off at the rate of 12 dB/oct., while at the lower position over 12KHz according to the same slope. The filter does not function at the centre position.

8. Headphone Jack
Connection of a stereophonic headphone to this jack allows private listening. Insertion of a headphone plug into this jack stops the output signals to the speakers. The output level of a headphone can be controlled by the volume for headphone (37) on rear panel.

9. Tape Monitor Switch
When this switch is lifted up to the "tape-1" position playback from tape-recorder is feasible either from "TAPE-1" (30) or tape connector (34), while when this switch is pressed down to the "tape-2" position playback from "TAPE-2" (32) is possible. In case of 3-head tape-recorder which has playback head for playback in the course of recording simultaneous playback monitoring is feasible while recording if the signals are fed to above terminals. In this case this amplifier receives the playback signals while feeding the recording output signals to the recording output terminals REC OUT-1 (31) REC OUT-2 (33) or the tape connector (34). Check that if this switch is on function no playback from other programme sources is feasible, and see to it that this switch is usually set at the "source" position.

10. Reprint Switch
Reprinting from pre-recorded tape is easily done by this switch. Between 2 tape-recorders when the output terminals (LINE OUT) of one tape-recorder is connected to the "TAPE-1" terminals (30) of this amplifier and the AUX input terminals (LINE-IN) to the REC OUT-1 (31), and on the other tape-recorder similarly the output terminals and the AUX input to the TAPE OUT-2 (32) and the REC OUT-2 (33) respectively, reprinting either from TAPE-1 to TAPE-2 or TAPE-2 to TAPE-1 is possible by this switch. This switch must be set at the "source" position when the other programme sources are reproduced.

11. Pilot Lamp
To turn on the mains switch (17) causes to light up this lamp, which shows that the mains current is on.

12. Input Selector Switch
This switch allows to select desired programme source: you may select either of 6 positions (mic., aux-1, aux-2, phono-1, phono-2, aux-3).

13. Mode Selector Switch
Reproduction mode can be selected by this switch and 5 positions (mono L, mono R, L+R, stereo normal, stereo reverse) are provided. For further details please refer to the "Mode Selection".

14. Balance Control (BALANCE)
The volume balance between right and left channels can be adjusted by this control. Turn it clockwise and the sound volume of left channel will decrease and finally disappear, while counter-clockwise turn causes to cut off the right channel. When proper balance of volume between right and left channels is maintained, monaural reproduction sound comes from the centre of both right and left speakers, which is usually obtained at the centre position of the knob.

15. Volume Control (VOLUME)
This knob controls volume: Clockwise turn boosts volume, while counter-clockwise turn gradually decreases it until the reproduced sound becomes inaudible.

16. Attenuator
This switch is usually set at the "normal" position. When set at the "attenuate" position, the gain is attenuated by 15 dB. Useful as a temporary volume-subduing switch. e.g. when answering the telephone in a hurry.

17. Mains Switch
To press down this switch allows the mains power to the amplifier and the pilot lamp lights up.

18. Socket for Step-up Transformer
A 9-pin socket for MT tube is used as this receptacle. LUX type 6400 series transformer is available for this purpose. Please refer to the item "About Step-up Transformer for MC Type Cartridge".

19. Selector Switch for Step-up Transformer
This switch is effective on the "PHONO-2" terminals. Sound reproduction through a moving coil type cartridge of low output is feasible when a transformer is inserted at the socket (18) and this switch is set at the "in" position. At the "out" position the transformer cannot be applied.

20. AUX-3 Terminals
This is an auxiliary input terminal for playback of such programme sources as AM/FM stereo tuner, line output of tape-recorder and audio output of TV receiver. An input sensitivity can be adjusted by the level-setter (21) on rear panel.

21. Level Setter for AUX-3
This volume permits an adjustment of the input sensitivity

of AUX-3 terminals (20). Useful for adjustment of volume difference in case of selection of input source. This amplifier is usually delivered with this control set at the extreme end to clockwise direction.

22. PHONO-2 Terminals

This is for reproduction through magnetic cartridges (MM, IM, MC) and the input sensitivity is usually 2 mV against 1 V output voltage. When the step-up transformers are inserted at the sockets (18) and the switch (19) is set at the "in" position an MC type pick-up of low output can be used for reproduction. In this case the input sensitivity is 0.07 mV.

23. PHONO-1 Terminals

The function is same with that for PHONO-2, but as a step-up transformer is not applicable to this terminal an MC type cartridge cannot be connected. The input impedance can be selected by the Input Impedance Selector (24).

24. Input Impedance Selector for PHONO-1

Desired impedance can be selected by this switch among 30KΩ, 50KΩ and 100KΩ. This is provided for the purpose of correct reproduction through MM type cartridge under an appropriate load, since especially these MM cartridges tend to vary in the frequency response under different load resistance. Nowadays the pick-up of 50KΩ impedance is predominant in the market and the selector is set at 50KΩ.

25. AUX-2 Terminals

Same with AUX-3 (20) except that level adjustment is not available.

26. AUX-1 Terminals

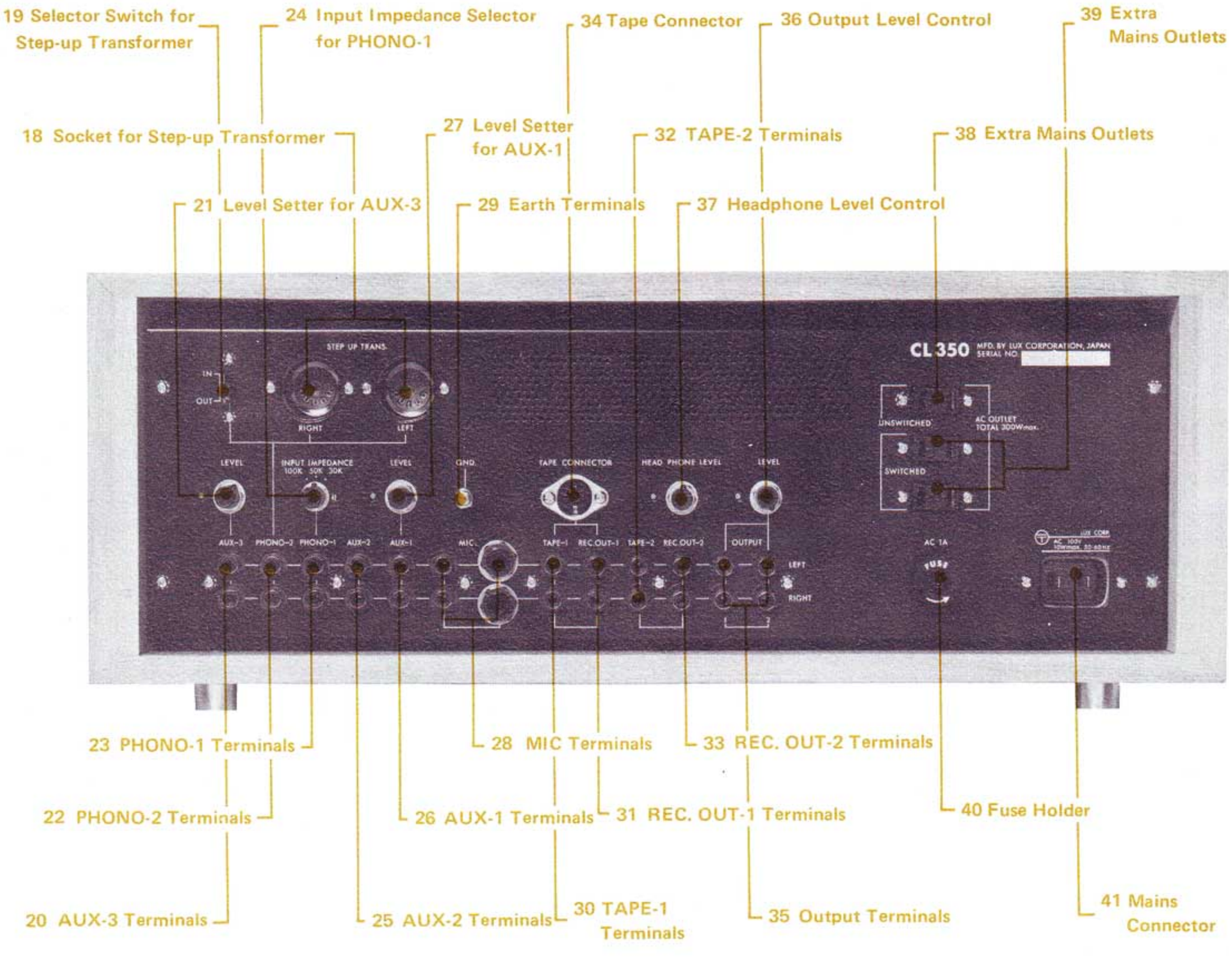
This has also the same function as AUX-3. The level setter (27) is provided and you can adjust input level as you wish.

27. Level Setter for AUX-1

Same function with that of AUX-3.

28. MIC Terminals

Connection of 2 pcs. of high impedance dynamic microphone to these terminals makes it possible to reproduce stereophonic sound with microphones. The left terminals are for pin-jack type microphone, while the right for plug type. In case both channels are simultaneously plugged in, that for a plug type will be on function.



29. Earth Terminal (GND)
Connect an earth lead wire of record player (from motor or pick-up arm). This terminal can be used for grounding of this amplifier, which is, however, not always necessary.

30. TAPE-1 Terminals
Line output signals of tape-recorder can be reproduced through this terminal. For this purpose the tape monitor switch (9) is set at the "tape-1" position. In case of 3-head tape-recorder so-called tape-monitoring is feasible-simultaneous recording and playback.

31. REC. OUT-1 Terminals
Signal for recording is taken out from this terminal. As far as input signal is given to either of the input terminals, the recording output signal is always available from this terminal. However when the reprint switch (10) is set at the "2 to 1" position the inside connection is changed to the "TAPE-2" terminals (32) and the recording signals can be taken out from the "TAPE-2" terminals.

32. TAPE-2 Terminals
Same with the TAPE-1 terminals (30) in function. Play-back from tape is possible when the tape monitor switch (9) is set at the "tape-2" position.

33. REC. OUT-2 Terminals
Same with (31), and when the reprint switch (10) is set at the "1 to 2" position output of recording signal can be changed to TAPE-1, when the switch is at "source", the signal is fed to both channels (31, 33) for recording on 2 tape-recorders.

34. Tape Connector
This connector is of DIN standard: With both recording output and tape monitor terminals in it, a single lead-wire of DIN plug permits connection for recording and play-back of tape-recorder. This circuit is coupled with TAPE-1 and REC. OUT-1 terminals, and for operation the tape monitor and reprint switches must be at the "tape-1" position.

35. Output Terminals (OUTPUT)
The output is taken out from this terminals. 2 channels provided allow simultaneous command on 2 main amplifiers. Rated output 1V Rms max. 7V Rms. With output impedance of about 100Ω, no worry about possible treble attenuation caused by pin-plug cord.

36. Output Level Control
This is to control an output voltage to coincide it with input sensitivity of main amplifier. This Amplifier is delivered with the indication of the knob at the top position.

37. Headphone Level Control
Volume to control the output of headphone. You can adjust the output level of headphone at the same level with speaker systems.

38, 39. Extra Mains Outlets
Convenient for supply of mains power to other equipments such as AM/FM tuner and record player. The terminal (38 UNSWITCHED) is independent of the mains switch (17) of this amplifier, while the other 2 outlets (39 SWITCHED) are coupled with the mains switch, and supply of the mains power depends on the mains switch. The total capacity is 300W.

40. Fuse Holder
A 7A fuse is inserted in the mains power supply circuit of this amplifier. When the fuse gets blown replace it ascertaining the cause of such blow. Replacement can be easily done by turning the fuse cap to the direction of arrow mark with ⊕ driver. Please be sure that the mains cord is disconnected from the mains power supply point when such replacement is made.

41. Mains Connector
One end of the attached mains cord should be connected to this point, while the other end with plug be inserted to the mains power supply socket.

42. Low Frequency Trimmer
This is to ensure a subtle adjustment on the RIAA curve at the middle and bass range. 3 positions are provided, and at the ⊕ position the frequency response is slightly reinforced at middle and bass range while at the ⊖ position a little attenuation takes place. At the centre point this trimmer is released and flat frequency response is obtained. This switch is adjusted by a ⊖ driver after removal of the wooden case. Take care not to scratch the wooden case when the chassis is taken out after loosening 4 screws at the bottom of the wooden case.

HOW TO CONNECT

Basic Connections

This is called a pre-amplifier which controls all other equipments in Hi-Fi stereo reproduction system. This is amplifier, however, has no power section to drive speaker systems and necessary to combine with an appropriate power amplifier. Stereophonic reproduction system is completed only when such programme sources as record-player, tape-recorder and tuner are connected to the input side of this amplifier, while a main amplifier with speaker systems is connected to the output side.

Connection to Input Terminals

Connect at the relevant terminals of this amplifier the outputs of tuner, record-player, tape-recorder and/or microphone. As to the details see the items of playback of Disc, Tuner, Tape-Recorder and Microphone.

Connection of Power Amplifier

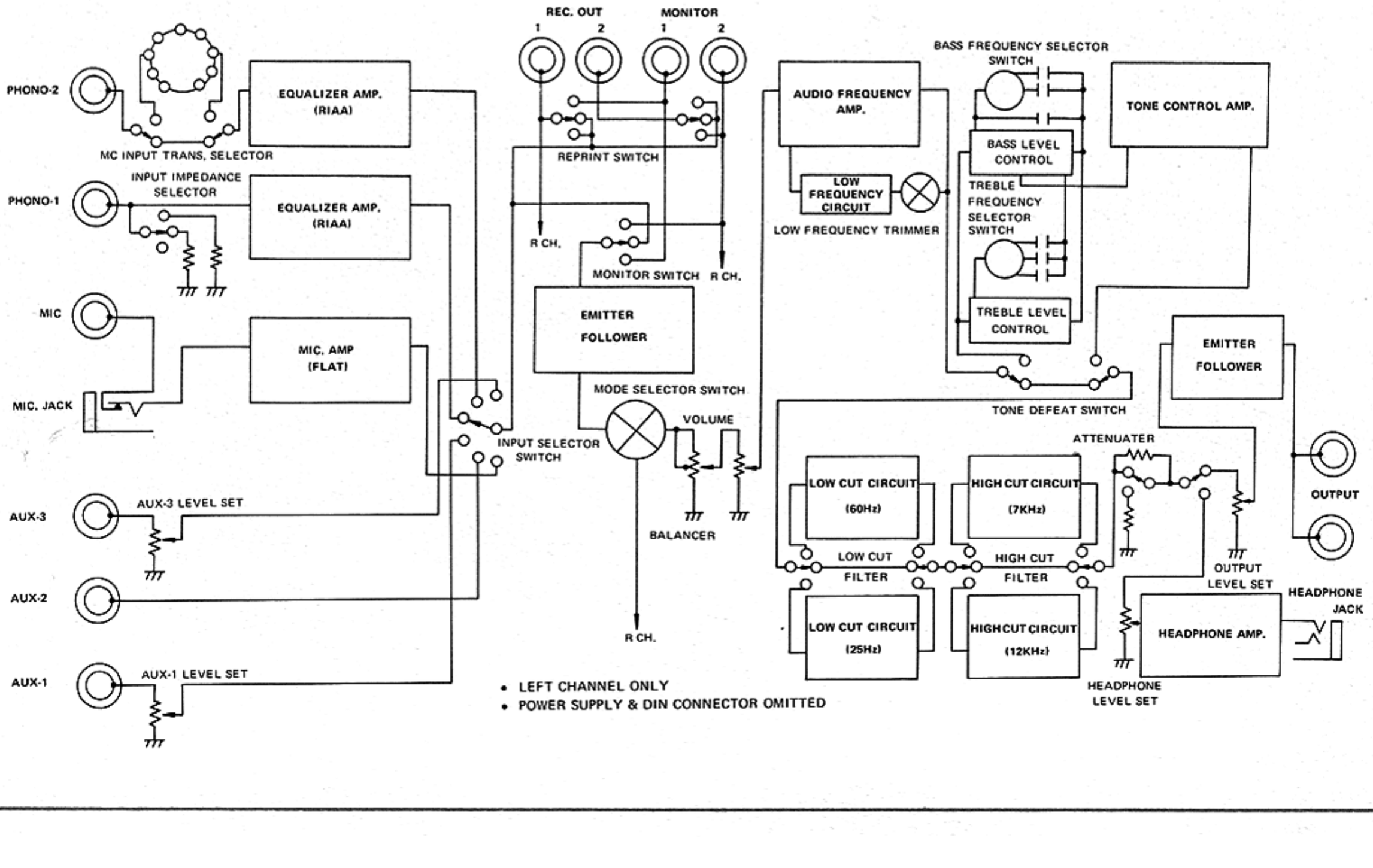
Connection should be made by pin-jack cord (shielded wire) between input terminals of the power amplifier and one of these output terminals (35) of this pre-amplifier. Be sure that correct phase matching is ensured between RIGHT and LEFT channels. In case a power amplifier has input level control, please see to it that the control is set at the extreme end of clockwise direction, i.e., at the max. volume.

Connection Cable (Cord Wire)

For protection from external noise or inductance noise shielded wire is used for connection. Usually this shielded wire has the capacitance of approx. 300pF/M, that is to say, an adoption of connection cable gives the same effect as that of insertion of capacitor in parallel with input or output circuits, which composes a kind of high-cut filter circuit. For instance 2 meters of this shielded wire has 600pF capacitance, and if this cord is used where the parallel composite value of input and output impedance is 50KΩ, it means an insertion of a high-cut filter with the cut-off frequency at about 10KHz and causes to yield an unnecessary attenuation of treble range. Use of the shortest wire is, therefore, recommended especially on the equipments of high impedance.

Choose a shielded wire of good quality and use it as short as possible for connection of this amplifier with the equipments of high impedance. In case impedance of either input or output is sufficiently low it does not effect much since the parallel composite impedance becomes lower and cut-off frequency will be shifted out of audible range. It does not matter if relatively long cable is used for the output or recording output terminals of this amplifier because they are so designed as to be sufficiently low in impedance.

BLOCK DIAGRAM



- LEFT CHANNEL ONLY
- POWER SUPPLY & DIN CONNECTOR OMITTED

Connection of Speaker to Power Amplifier

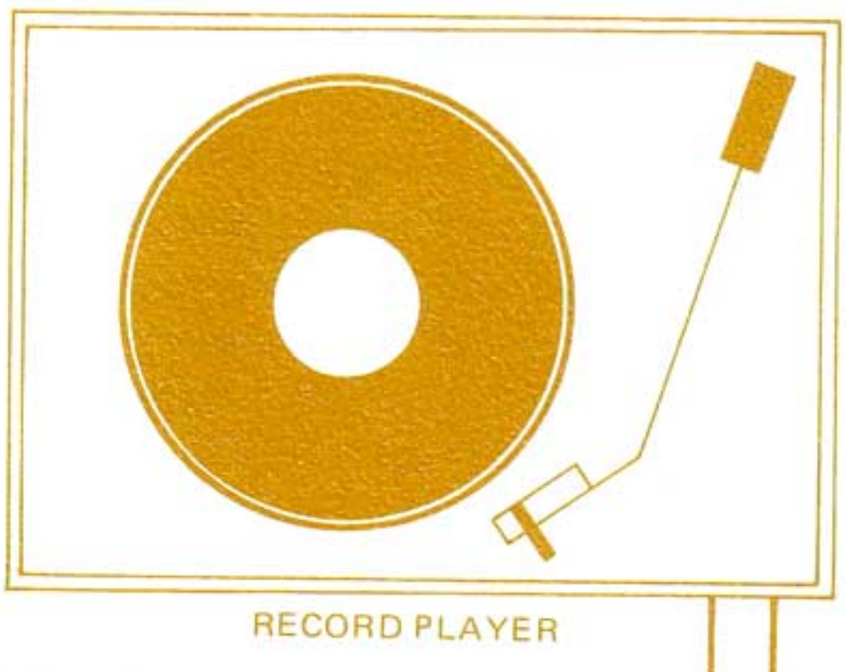
Stereophonic playback is made with a pair of speaker systems for right channel and left channel.

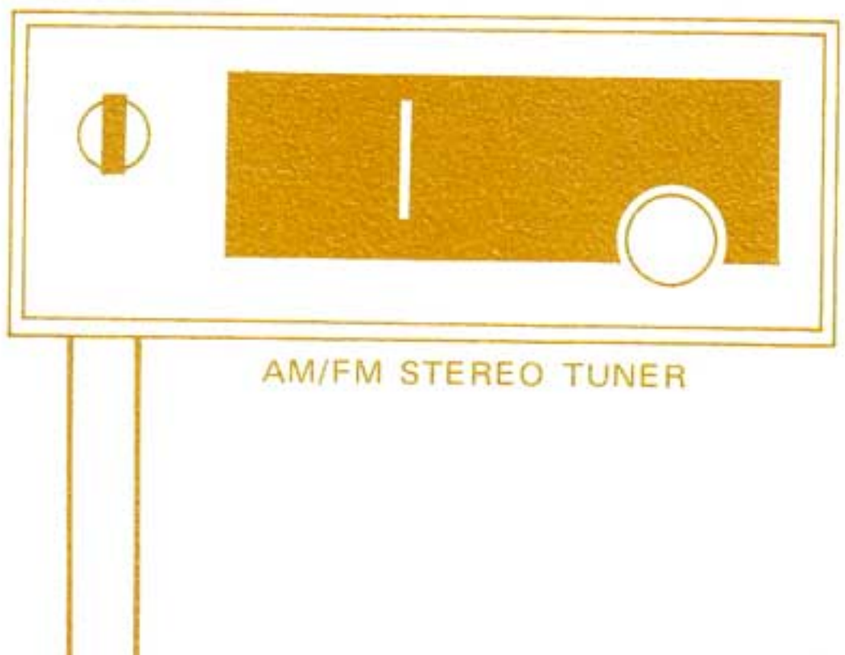
Right hand speaker system (viewed from the listener's position) should be connected to the right speaker terminals of power amplifier, while left speaker system to the left terminals.

Note that perfect sound reproduction cannot be expected if the phase is not matched between both channels. To match the phase is to connect the ⊕ terminal of the right hand speaker to ⊕ terminal in right channel and the ⊖ terminal to ⊖ one, and to do the same with left channel speaker. If mismatched for some reasons (for example mis-connection of speakers) low frequency range is subdued and constant playback cannot be realized.

Connection of Mains Power Supply Source

As the final step of preparation connect the amplifier to the mains power supply source. Attached mains cord should be connected to the mains connector of this amplifier and the other end should be plugged into the mains power supply receptacle. Then press the mains switch and the pilot lamp starts to light up and the amplifier will be on function in about 2 - 3 seconds. The mains power for other audio equipment used in combination with this amplifier can be obtained from the extra mains outlets (SWITCHED) of the amplifier. In this case repetition of ON/OFF switching on this amplifier is common to that on other annexed audio equipments. If the mains power of the amplifier is switched on, the mains switch on the other audio apparatus starts to work simultaneously.





PLAYBACK FROM RECORD DISC

Connections

Generally a record player consists of a turn-table ensuring constant rotation of the record disc, a pick-up (cartridge) whose stylus (needle) traces the sound groove of the disc converting the physical signal of the recorded sound into the electric signal, and the arm which holds this cartridge.

The player has 2 cords with pin plug at its end for both right and left channels. Connect the pin connectors to the input terminals of this amplifier [PHONO-1 (23) or PHONO-2 (22)]. A probable earth lead of player may be connected to the GND terminal (29) of this amplifier. A mains cord of the player to drive its motor may be connected to the convenient extra mains outlet (39) of this amplifier. This amplifier is provided with 2 input terminals (PHONO-1 and PHONO-2) to be selected by the input selector switch (12), which is useful for comparison test of 2 pick-ups or using 2 record players.

Signal Paths

Put the disc on the turn-table, switch on the phono motor, and set the stylus on the groove of disc. Then recorded signals begin to be fed to the amplifier. First the signals fed to the amplifier through PHONO terminals are brought to the equalizer section, where recorded signals are equalized and restored to the original frequency curve. Incidentally this equalizer curve has been standardized in the RIAA curve. The equalized signals are then fed to the input selector switch (function switch). If this switch is not set at the correct position of PHONO, the signals are blocked here and no more advance is possible.

Then the signals are devided into 2 channels, which are kept at sufficiently low impedance (which prevents possible attenuation in high frequency caused by lengthy cable or floating capacitance) by use of an emitter-follower stage annexed to the last portion of equalizer section. One line to the REC. OUT terminal, and the other to the tape monitor switch. If the monitor switch (9) is set at the "source" position, the signals are sent to the mode selector switch, balance control and volume control, but if at the "tape-1 or tape-2" position the tape monitor terminals start to function and the signals are stopped at this point. Except when the tape playback is made, the monitor switch must be kept at the "source" position. Then the signals are sent to the volume control through the mode selector and balance control. If the volume knob is turned to the extreme end of counter-clockwise direction, the signals cannot proceed ahead. It is necessary to set this control at the optimum volume.

Such controls as low-cut filter, high-cut filter, attenuator, and tone controls are for flexible and diversified adjustment of playback sound and do not block the signals completely.

Thus the signals reach the speaker systems amplified by a main amplifier connected to this pre-amplifier.

The above is the feeding path of PHONO signals starting from input terminals to the output terminals. Difficult as it may sound you can easily understand it from the attached block diagramme. For your pleasant command of this amplifier we recommend you to bear the block diagramme in your mind.

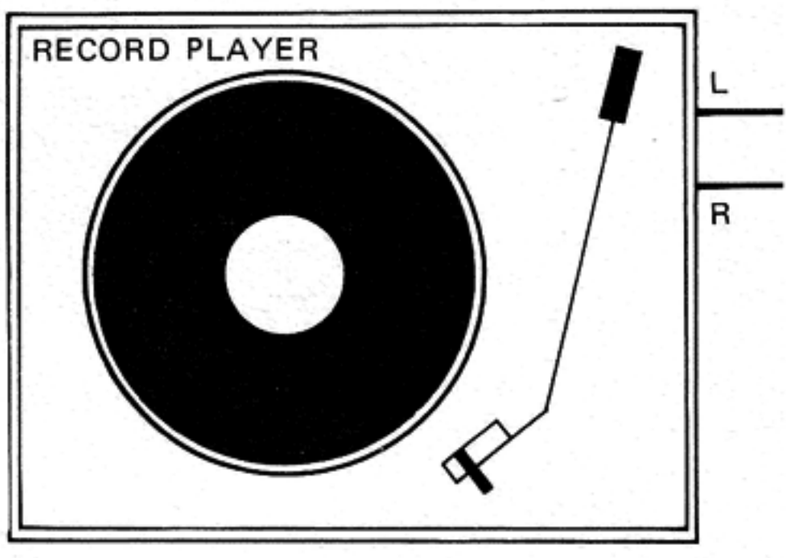
Playback Performance

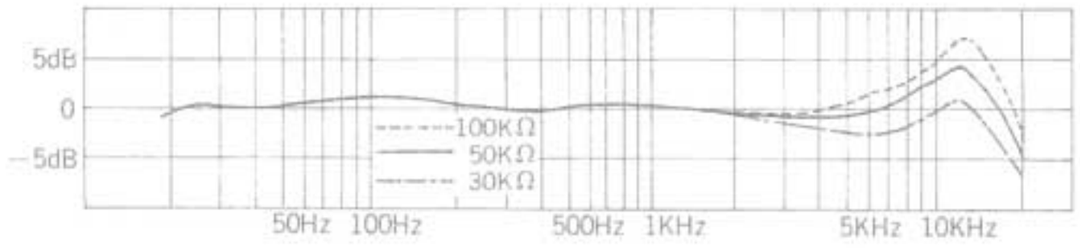
Now put a disc on the turn-table for playback performance. As the volume control is turned clockwise from the cut position, playback sound comes out from speakers. As explained in the paragraph of Signal Paths the sound playback is possible regardless of the position of Mode Selector etc. as far as these essential controls are set at the correct position such as Input Selector Switch (12), Monitor Switch (9) and Volume Control (15). Now all preparations have been completed. Check if the volume levels on both right and left speakers are identical. If deviated adjust it by the Balance Control. For stereophonic playback see to it that the Mode Selector Switch is kept at the "stereo" position, otherwise stereophonic playback is not feasible.

Impedance Selector Switch

On the PHONO-1 Terminals (23) the input impedance is interchangeable among 3 steps (30KΩ, 50KΩ, 100KΩ), which is possible by the Input Impedance Selector (24). Except some special low impedance type pick-ups, almost all currently marketed pick-ups bear recommended load impedance in the range of 30 - 100KΩ.

Among all 50KΩ pick-ups are predominant. It is known that variation of the load impedance effects on the frequency response to large extent. The chart given here clearly illustrates an example — with a low load impedance treble output is lowered while with high impedance a peak is triggered at treble range. Degree of such effect is not same among different pick-ups, but generally speaking the higher in impedance the more delicately influenced. It is therefore necessary that proper selection of input impedance is made with this control.





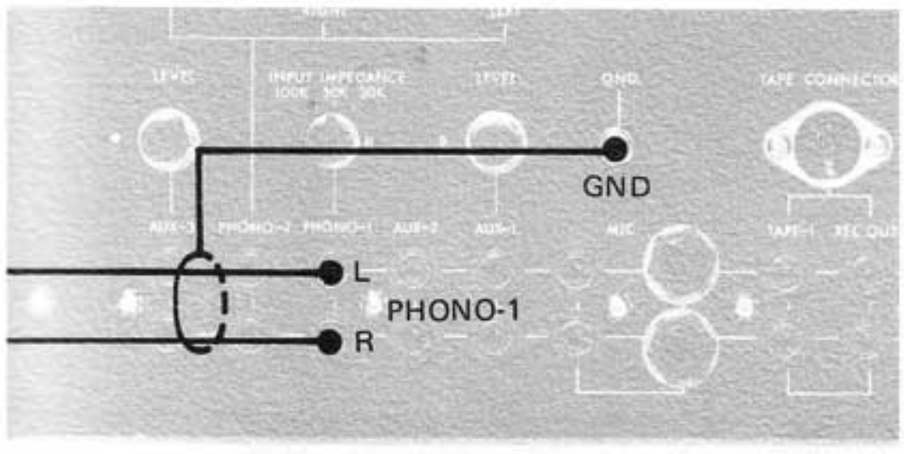
Above explanation is applicable to the predominant cartridges of magnetic type with output of more than 0.5mV, wherein included are MM (Moving Magnet), MI (Moving Iron) and IM (Induced Magnet). In case of MC (Moving Coil), however, almost all are of low output and it is necessary to insert a step-up transformer between the pick-up and the PHONO terminals of this amplifier. In case of photo-electric or electrostatic type choose appropriate input terminals according to the explanation sheet of the cartridge. Piezo-electric type (crystal and ceramic) is generally connected to the AUX terminals, but not used often for this kind of high grade amplifier because further equalization is necessary.

Step-up Transformer for MC Type Cartridge

MC type cartridge has generally low output (0.05 - 0.1mV) due to its structure, and cannot be directly connected to the PHONO terminals of this amplifier. The exclusive step-up transformer must be used for this type of cartridge. At the rear panel of this amplifier the socket (18) is provided for exclusive use of the LUX 6400 series step-up transformer. The following models are available, of which 6421S is recommended as the standard model.

Model	Impedance Ratio	Step-up Ratio	Recommended Short-Circuit Impedance
6421S	6Ω : 5KΩ	1 : 28.8	1.5- 6Ω : 20KΩ-100KΩ
6422X	60Ω : 60KΩ	1 : 34.5	1.5- 6Ω : 60KΩ-150KΩ
6423S	60Ω : 5KΩ	1 : 10	1.5-60Ω : 20KΩ-100KΩ

For an MC cartridge the PHONO-2 terminals are used. Put the step-up transformer to the Socket (18) and the pertinent Switch (19) is set at the "IN" position, and the circuit for the step-up transformer is put on operation. When the switch is at the "OUT" position the circuit is released.



PLAYBACK FROM TAPE

Playback from Tape Monitor Terminals

Almost all of tape-recorder; and tape-decks currently marketed integrate audio amplifier in the circuit. Also there is a tape-player exclusive for playback. Connect the output terminal (LINE OUT) to the Tape Monitor Terminals (30) (32). Then set the Monitor Switch at the corresponding position to which the tape-recorder is connected, and the playback from tape is realized. If 2 tape-recorders are connected to the Terminals (30) and (32), selection between 2 tape-recorders is possible by the Monitor Switch. This amplifier can be devided into 2 sections — one before the Recording Output Terminals (REC OUT) and the other after the Tape Monitor Terminals, and 3-head tape-recorder makes it feasible to make recording with the former section and simultaneously to make playback with the latter section.

Note that normal function cannot be expected if 2 sets of tape-recorder for playback are connected to the terminals of TAPE-1 (30) and Tape Connector (34) at the same time, since these 2 are coupled in the inside circuit and effect on each other. Therefore if Tape-Monitor Terminals and Tape Connector are used the tape-recorders should be connected to the terminals of TAPE-2 (with the Monitor Switch at the position of "tape-2") and the Tape Connector.

Playback from AUX Terminals

Playback of tape is possible if the line output of tape-recorder or tape-deck is connected to the AUX terminals of this amplifier by use of pin-jack lead and the Input Selector Switch is set at the corresponding position to the AUX Terminals. All operations in this case are same with those for the Playback of Tuner. Note that when tape playback is made through AUX terminals the line input or AUX input terminals of tape-recorder should be kept free. If connected to the Recording Output Terminals (REC. OUT) of the amplifier there will be possible oscillation by feed-back of signals.

Playback from Tape Connector

This connector is of DIN norm, and very convenient for simple connection by a single cord between the tape-recorder and recording/playback connectors of this amplifier. A DIN cord should be connected between DIN connector of the tape-recorder and Tape Connector of this amplifier. Playback from Tape Connector is possible if the Monitor Switch is set at the "tape-1" position.

RECORDING ON TAPE

In case of playback of various programme sources through input terminals of this amplifier, the same signals to these reproduced in speakers are always available at the Recording Output Terminals (31, 33) and Tape Connector (34)

if the Reprint Switch is set at the "source" position. By connection of these terminals to the input terminals (AUX or LINE-IN) of the tape-recorder you can enjoy simultaneous recording and playback. These recording signals are taken out before the Tape Monitor Switch and there is no influence of such controls as Volume Controls, Tone Controls and Filters etc.

REPRINTING OF TAPE

If there are 2 tape-recorders reprinting of tape is feasible: Connect the output terminals (LINE OUT) and the input terminals (AUX or LINE IN) of one tape-recorder to TAPE-1 terminals and REC. OUT-1 terminals of this amplifier respectively, while the output and input of the other tape-recorder to TAPE-2 and REC. OUT-2 respectively, and simple operation of the Reprint Switch makes it possible to reprint the tape from one to the other or vice versa without reconnection of these pin-jack cords. Furthermore an operation of the Monitor Switch ensures listening comparison between the master tape and reprinted one.

SIMULTANEOUS RECORDING

This amplifier is provided with 2 sets of Recording Output Terminals (REC. OUT) enabling to record simultaneously on 2 tape-recorders. The same connection as reprinting of tape is OK, and if the Reprint Switch is set at the "source" position an interchange of the Monitor Switch among "tape-1", "source" and "tape-2" ensures comparison among the original sound and 2 recorded ones. See to it that the Reprint Switch must be kept at the "source" position as otherwise no signal is fed to one of the Recording Output Terminals.

If desired, combination recording on open-reel recorders and/or cassette recorders can be enjoyed. Moreover if the Tape Connector is used recording on 3 tape-recorders is possible.

This facility is useful for safer printing or effective recording etc. As the impedance at the Recording Output Terminals is kept sufficiently low (about 100Ω), mutual interference will be almost nil between the recorders under simultaneous operation.

SIMULTANEOUS PLAYBACK MONITORING

3-head tape-recorder ensures Simultaneous Playback Monitoring enabling to ascertain perfect recording. In case of 3-head tape-recorder heads and amplifiers for recording and playback exist independently in the circuit, which ensures simultaneous recording on tape and playback of the sound recorded on the tape.

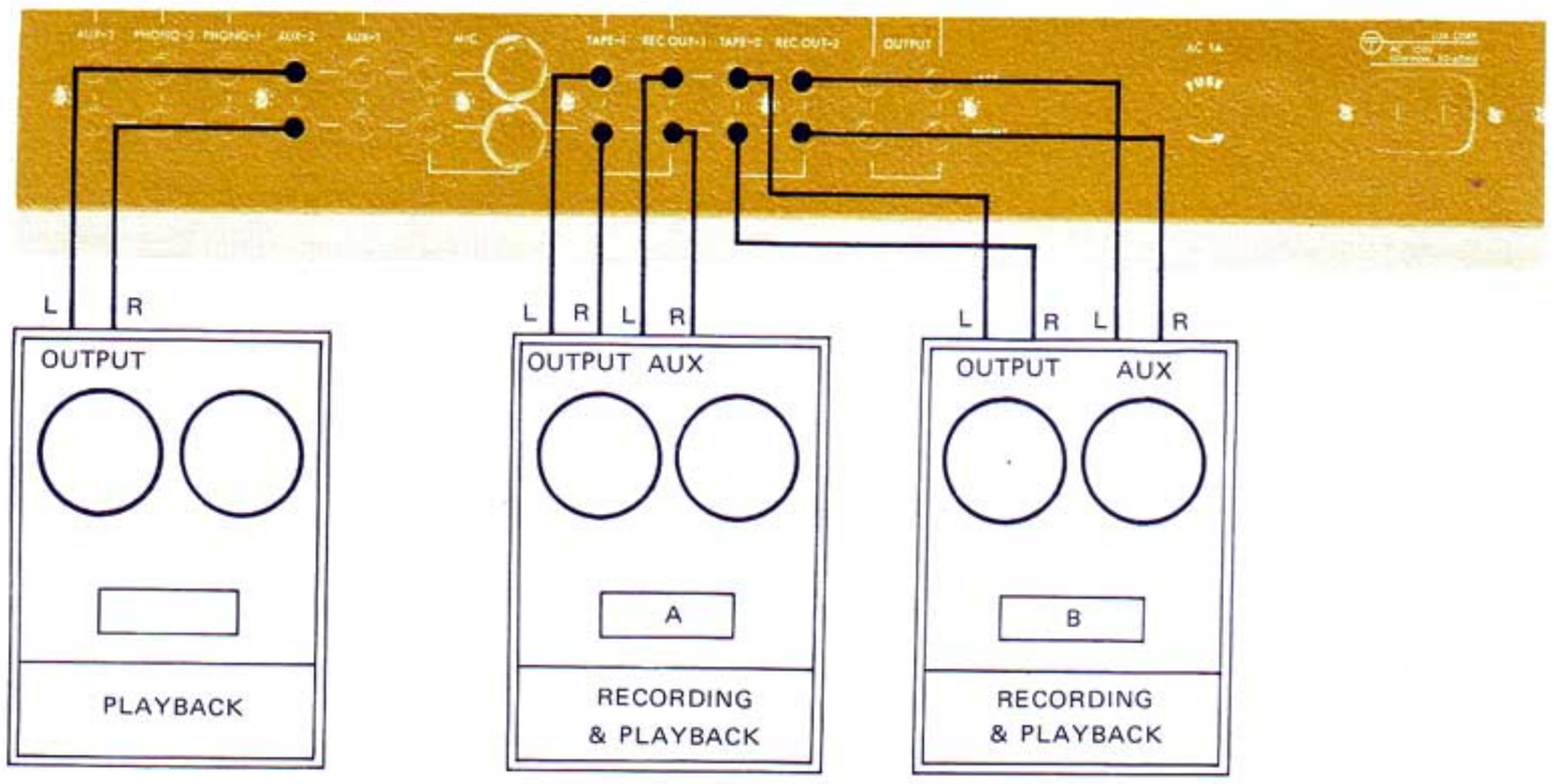
In this case recording on tape and playback of the recorded sound is practised at the same time, and connection must be made for both functions. Need to connect the Recording Output Terminals (31) or (33) to the Line Input Terminals (AUX Input) of tape-recorder, and the Tape Monitor Terminals (30) or (32) to the Output Terminals (LINE OUT) of the tape-recorder.

The Monitor Switch (9) is set at the position corresponding to the terminals to which the tape-recorder is connected, and repetition of switching between "source" and "tape-1 or tape-2" makes it feasible to compare the original sound with recorded one. Thus possible recording error can be prevented in case of 3-head tape-recorder. Incidentally note that reproduction of recorded sound becomes a little bit delayed as compared with that of original sound since there is a gap between recording head and playback head.

Simultaneous Playback Monitoring can be made through the Tape Connector (34) as well. A single piece of DIN cord ensures connection for recording and playback, and simple operation of switching between "tape-1" and "source" of the Monitor Switch is sufficient.

About DIN Tape Connector

The Tape Connector of this amplifier is provided at the rear panel. This is of DIN norm. As explained in the paragraph of Playback from Tape and Recording on Tape, if tape-recorder is equipped with DIN connector, connection by a single piece of DIN cord suffices for recording and playback.



PLAYBACK OF AM/FM BROADCASTING PROGRAMME

Connection of the output terminals of AM/FM tuner to the AUX terminal of this amplifier ensures playback of AM/FM broadcasting programme. This amplifier is provided with 3 AUX terminals (25) (26) (20) and you may connect whichever you like. The Input Selector Switch must be set at the corresponding position.

As shown in the block diagramme the input signals from tuner are directly fed to the Input Selector Switch. Afterwards the signals trace the same blocks as explained in the paragraph of Playback from Record Disc, and are reproduced from the speaker systems through a power amplifier. Both for FM stereophonic and monaural broadcasting the Mode Selector Switch can be set at the position of "stereo", for such accommodation to the input source can be made in the tuner. In case of AM programme there is possible trouble of modulation hum, which can be eliminated by varying the distance and angle of these components.

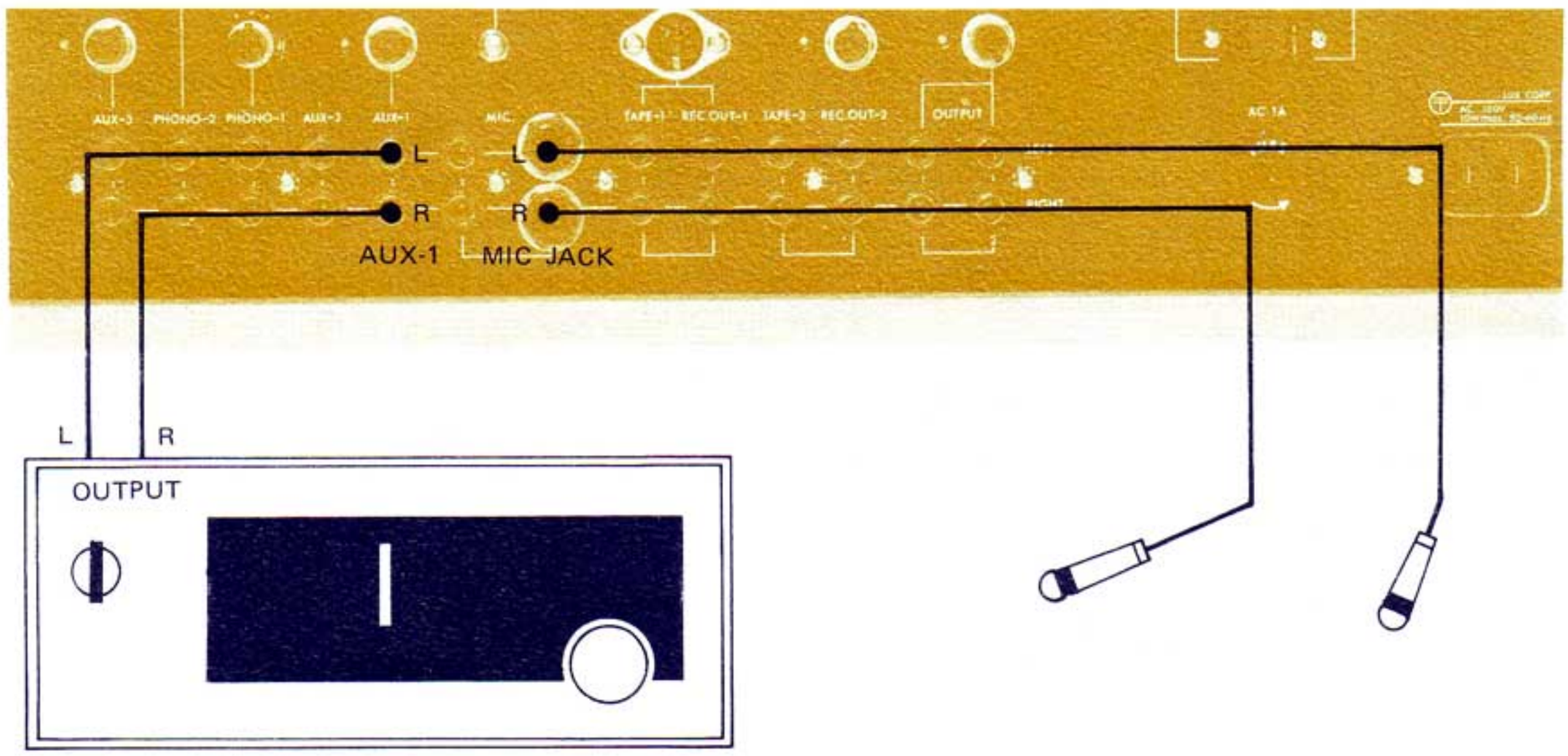
About Level Setter Volume

All AUX-1, AUX-2 and AUX-3 are same auxiliary input terminals for signals of flat frequency response, but AUX-1 (26) and AUX-3 (20) have a click-stopper volume just above the terminals. If the volume is turned to the extreme end of clockwise direction, all these 3 terminals have the same input sensitivity 110mV, while on AUX-1 and AUX-3 the volume makes it possible to change the sensitivity above 110mV. When all 3 terminals are used, if the equipment of the lowest output is connected to AUX-2 and other equipments are connected to AUX-1 and AUX-3, all 3 programme sources can be set at the same input level.

PLAYBACK FROM MICROPHONE

A pin-jack microphone can be connected to the left MIC terminals while plug-jack to right, and both are available for stereophonic playback. When both jacks are inserted only the circuit for plug-jack is on function. This terminal is for a dynamic microphone of high impedance. If a low impedance one is used gain is insufficient and impedance does not match, and therefore a low frequency transformer for line-grid purpose (i.e. LUX 6025N, 6225N, 6325N etc.) must be inserted in between the microphone and the MIC terminals.

The input signals given to the MIC terminals are amplified under flat frequency response and fed to the Input Selector Switch. Playback of microphone is feasible if this switch is set at the "mic." position. Then after the operation is same with that of Record Disc.



OPERATION OF TONE CONTROLS

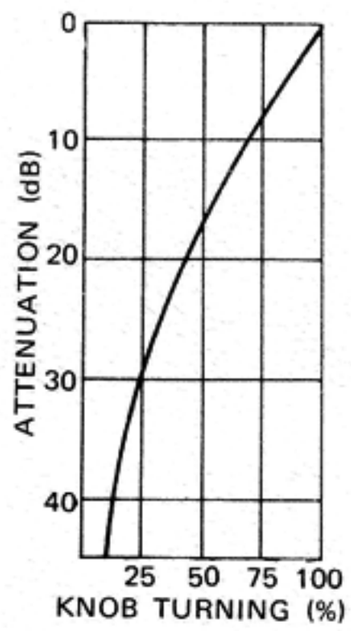
Selection of Mode (Conversion of Playback Mode)

This amplifier is for stereophonic reproduction and integrates independent amplifiers for 2 channels (right and left). Without the Mode Selector the signals fed to the right channel terminal is reproduced at the right channel speaker. The Mode Selector is placed between these 2 amplifiers to change the mode of reproduction.

knob position	connection input output	performance	use
STEREO NORMAL	R → R, L → L	normal stereo playback	for normal stereo playback
STEREO REVERSE	R → L, L → R	reversed stereo playback	when program source is reversly connected
MONO R	R → R, L → L	right input signals is reproduced from both right and left speakers	for monaural program source playback
MONO L	R → R, L → L	left input signal is reproduced from both right and left speakers	
MONO R + L	R → R, L → L	right and left input signals are integrated	for playback of monaural record with a stereo phono pick-up

Control of Volume

Sound volume can be properly adjusted by volume control. The variable resistor yields A type curve. In the attenuation characteristics of A type turning angle is proportionate to attenuation degree of dB, and the dB value and the volume audible to human ears are in the proportionate relation. That is to say, the rotation of knob is in proportion to the sound volume felt by human ears. The increasing degree of volume is felt quite natural as the knob is turned on to the clockwise direction.



Control of Volume Balance

In case of deviation between the volume levels of right and left channels, adjust unbalanced volume level by the Balance Control (14). A complete turn of the knob to either of clockwise or counter-clockwise directions causes to cut off the volume of the other end speaker. The volume balance of both channels can be adjusted so that monaural disc sound reproduced by the stereo cartridge comes from the centre of the right and left channels. Usually the volume level of both channels can be adjusted identical at the centre click-stop position of the balancer. Thus a proper balance is established through whole of playback stages. If a programme source has deviation of the volume level between 2 channels, establish correct balance with this balancer.

Tone Controls

The ultimate purpose of the audio system is to make the high fidelity reproduction of programme sources. The reproduction conditions and circumstances do not always match with recording conditions, and it is impossible to reproduce the same sound with the original one. Also there is no objective standard to judge good sound from inferior one.

The only possible solution is for every listener to create his favorite sound according to his own taste. It is therefore very important that the audio system offers such facility to permit flexible controls for creation of the best sound. This amplifier is equipped with the LUX original NF type turn-over roll-off frequency selector for subtle and minute control of the reproduced sound. Tone controls include Bass Level Control (1), Bass Frequency Selector (2), Treble Level Control (3), Treble Frequency Selector (4) and Tone Control Switch (5).

First of all note the followings: If Tone Control Switch (5) is set at the "defeat" position, whole frequency range becomes of flat frequency response irrespective of the position of all other controls.

After setting the switch (5) at the "in" position and controlling the level controls (1) and (3) as desired, if the switch is again set at the "defeat" position you can obtain flat frequency response: Controlled tone and flat tone can be easily recognized.

Bass Frequency Selector (2) has 3 points, namely, 150Hz, 300Hz and 600Hz, and from this point Bass Level Control (1) starts to function. In other words turn-over and roll-off of lower frequency range below this point can be controlled by Bass Level Control (1). Controllable range is wider by order of 150Hz, 300Hz and 600Hz, and from this point Bass Level Control (1) starts to function.

Bass Level Control which functions in conjunction with Bass Frequency Selector is a tone control on frequency response of low frequency range. It is designed so that response is flat at the electric centre point, and a clockwise turn of the knob intensifies low frequency range while counter-clockwise turn yields attenuation. For easy adjustment this control is equipped with 11 points of click-stopper.

This volume control is of friction type double structure, and usually both channels are controlled at the same time. Separate control of both channels is possible if one knob is turned fixing the other one by hand. Front one is for left channel and rear one is for right channel.

The same is applicable to Treble Level Control (3) and Treble Frequency Selector (4). The Treble Frequency Selector has 3 points, namely, 6KHz, 3KHz and 1.5KHz, (Controllable range is wider by this order) from which point the Treble Control starts to function. This knob is also with 11-point click-stopper, and a clockwise turn boosts. The knob is of same friction type double structure. For details of these tone controls' characteristics, refer to

the attached chart of response curve.

Operation of Low Cut Filter

When this filter (6) is lifted up from the "defeat" position the low frequency range below 60Hz is cut off at the attenuation rate of 12dB Octave, while when pressed down attenuation starts as of 25Hz.

Useful for removal of low frequency noise such as rumbling of phono motor. Also this can be used as an auxiliary control for Bass Level Control.

Operation of High Cut Filter

When this filter (7) is lifted up from the "defeat" position the high frequency range over 7KHz is cut off at the attenuation rate of 12dB/Octave, while when pressed down the function gets effective as of 12KHz. Useful for removal of scratch noise, hissing noise of tape etc. Also this can be used as an auxiliary control for Treble Level Control.

Operation of Attenuator Switch

This switch is usually set at the "out" position. If switched over to the "in" position attenuator starts to function and the gain will be attenuated by 15dB (about 1/6). Useful when subdued volume level is desired. Also this can be used as a momentary speaker silencing switch in case of telephone call etc. Avoid switching over to "out" at the high volume level, since sometimes such momentary big noise is reproduced as may destroy speakers. See to it that this switch is set to the "out" position after using for attenuation.

Operation of Low Frequency Trimmer

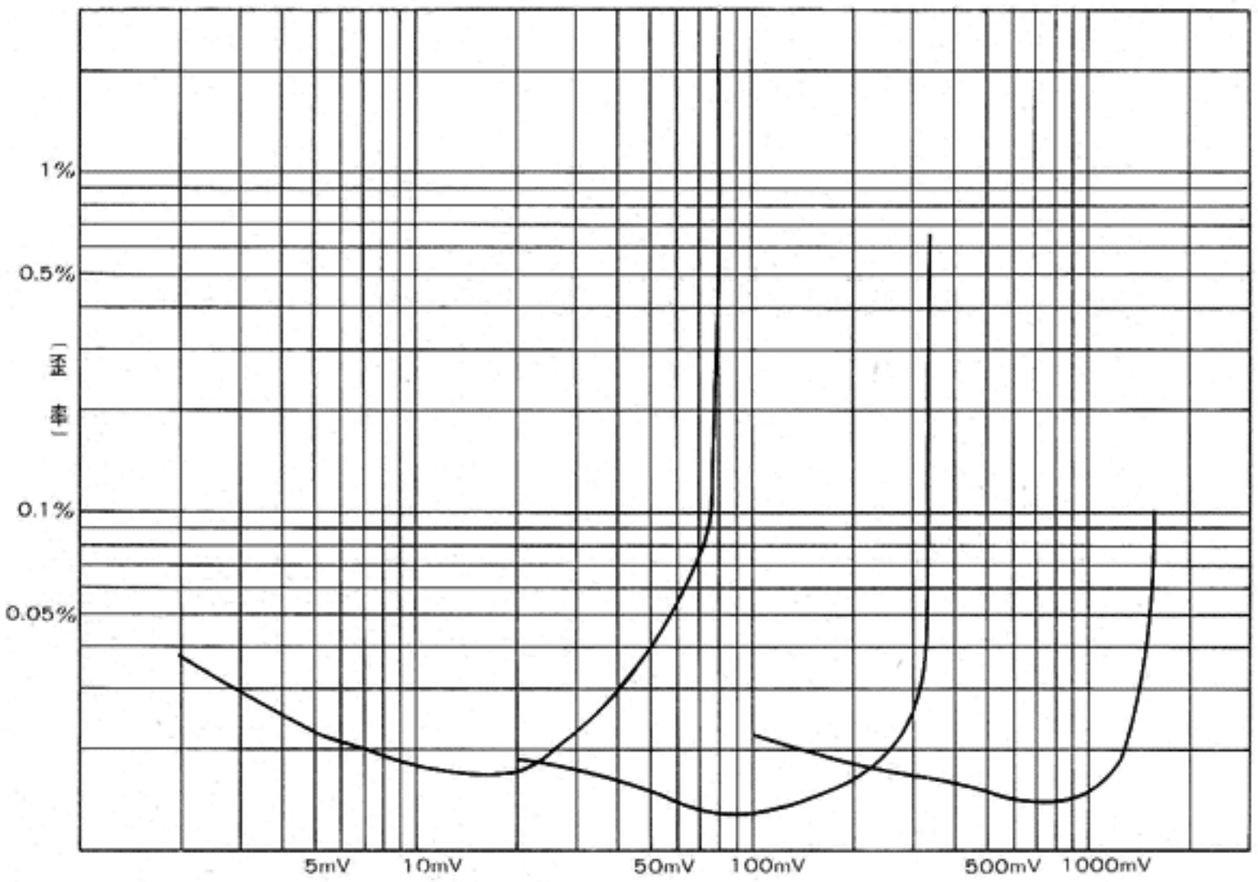
Take out the chassis carefully removing 4 screws at the bottom of the wooden case of this amplifier. You will find a knob at the upper portion, which can be controlled by a ⊖ driver. At the ⊕ position the frequency response in the range of 100 - 800Hz is a little hoisted, while at ⊖ lowered. Changeable at 250Hz by about 0.6dB. A subtle effect can be given to the RIAA curve at the frequency range most crucial to reproduced sound, which is not possible under current tone controls.

This tone control is fixed after the recording output terminals and ineffective to the recording output. This switch is released at the centre position.

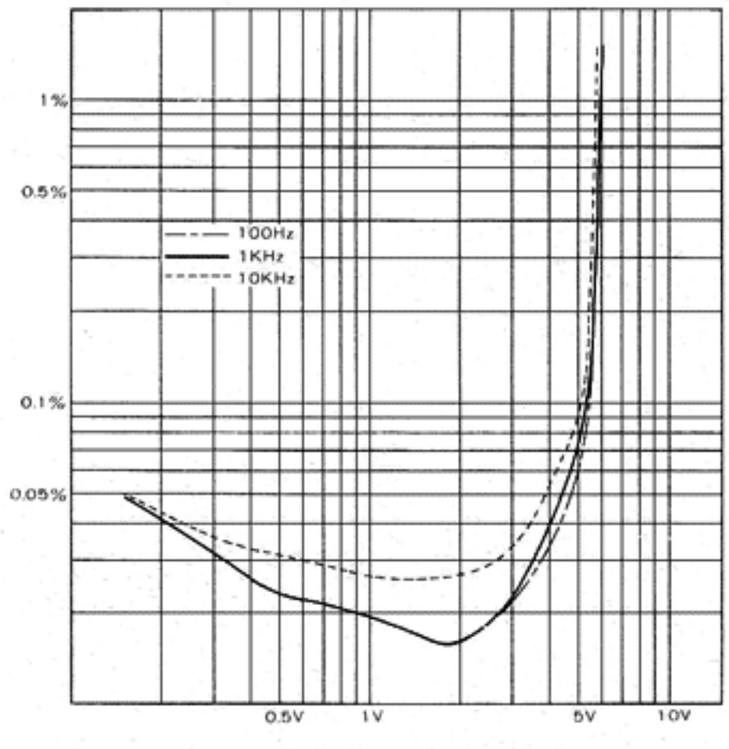
SPECIFICATIONS

COMPONENTS:	SILICON TRANSISTORS (49) DIODES (8)
FREQUENCY RESPONSE:	10～50,000Hz, less than - 1dB(AUX)
OUTPUT VOLTAGE:	1v(rated) 7v(max.)
OUTPUT IMPEDANCE:	PRE. OUT. 100Ω
INPUT SENSITIVITY:	PHONO-1/2: 2mV AUX-1/3: 110mV (level adjustable) AUX-2: 110mV microphone: 2-3mV Tape-1/2: 110mV
INPUT IMPEDANCE:	PHONO-1: 100.50.30KΩ(selection) PHONO-2: 50KΩ AUX-1/3: 50KΩ AUX-2: 100KΩ MICROPHONE: 50KΩ TAPE-1/2: 130KΩ
S/N RATIO:	PHONO: 63dB AUX: 80dB MICROPHONE: 59dB TAPE: 80dB
PHONO INPUT VOLTAGE:	more than 300mV
EQUALIZER:	RIAA 30～15,000Hz(±0.3dB)
TONE CONTROL	LUX type NF turnover frequency selection Bass frequency selection: 150,300, 600Hz Treble frequency selection: 1.5K, 3K, 6KHz
FILTER:	LOW CUT: 25Hz, 60Hz HIGH CUT: 7KHz, 12KHz
LOW FREQUENCY TRIMMER	±0.6dB (250Hz)
ANNEXED CONTROLS	ATTENUATOR, HEADPHONE AMPLIFIER (80mV output) TAPE REPRINT SWITCH, etc.
DEMENSIONS:	476mm(W) (18-3/4") x 244mm (D) (9-5/8") x 182mm(H) (7-3/16")
WEIGHT:	8.8kgs(19Lbs)

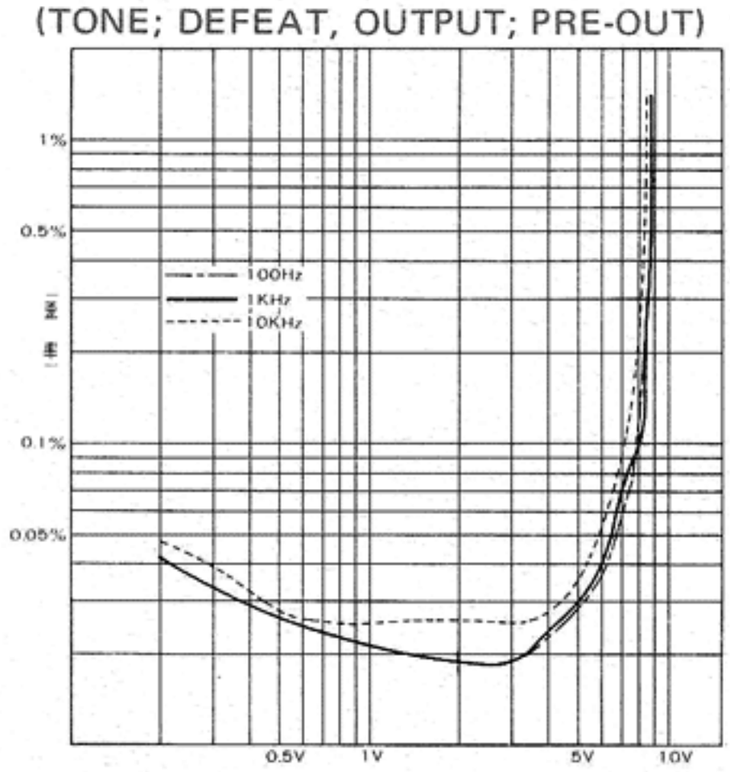
PHONO INPUT VOLTAGE (PHONO–1→REC. OUT)



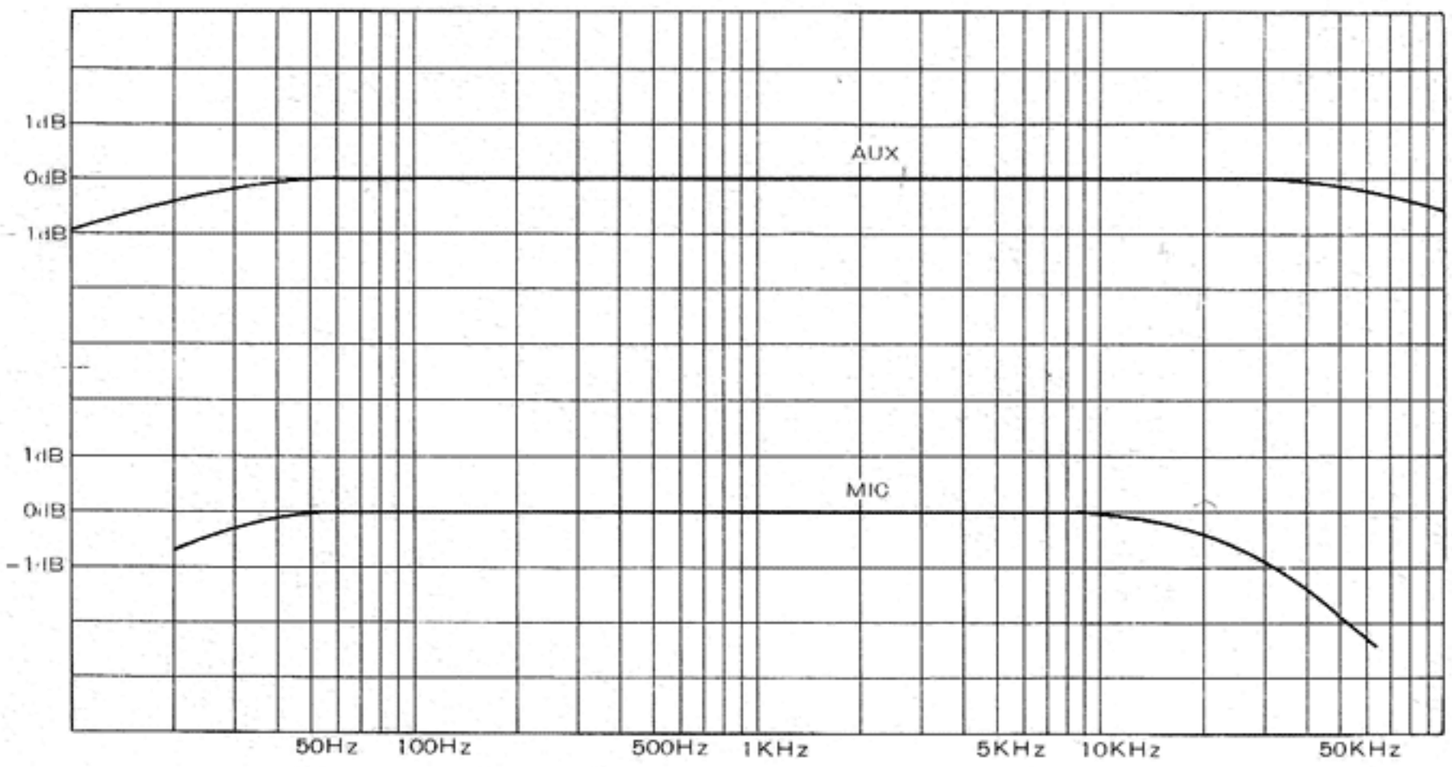
DISTORTION
(TONE; FLAT POSITION, OUTPUT; PRE-OUT)



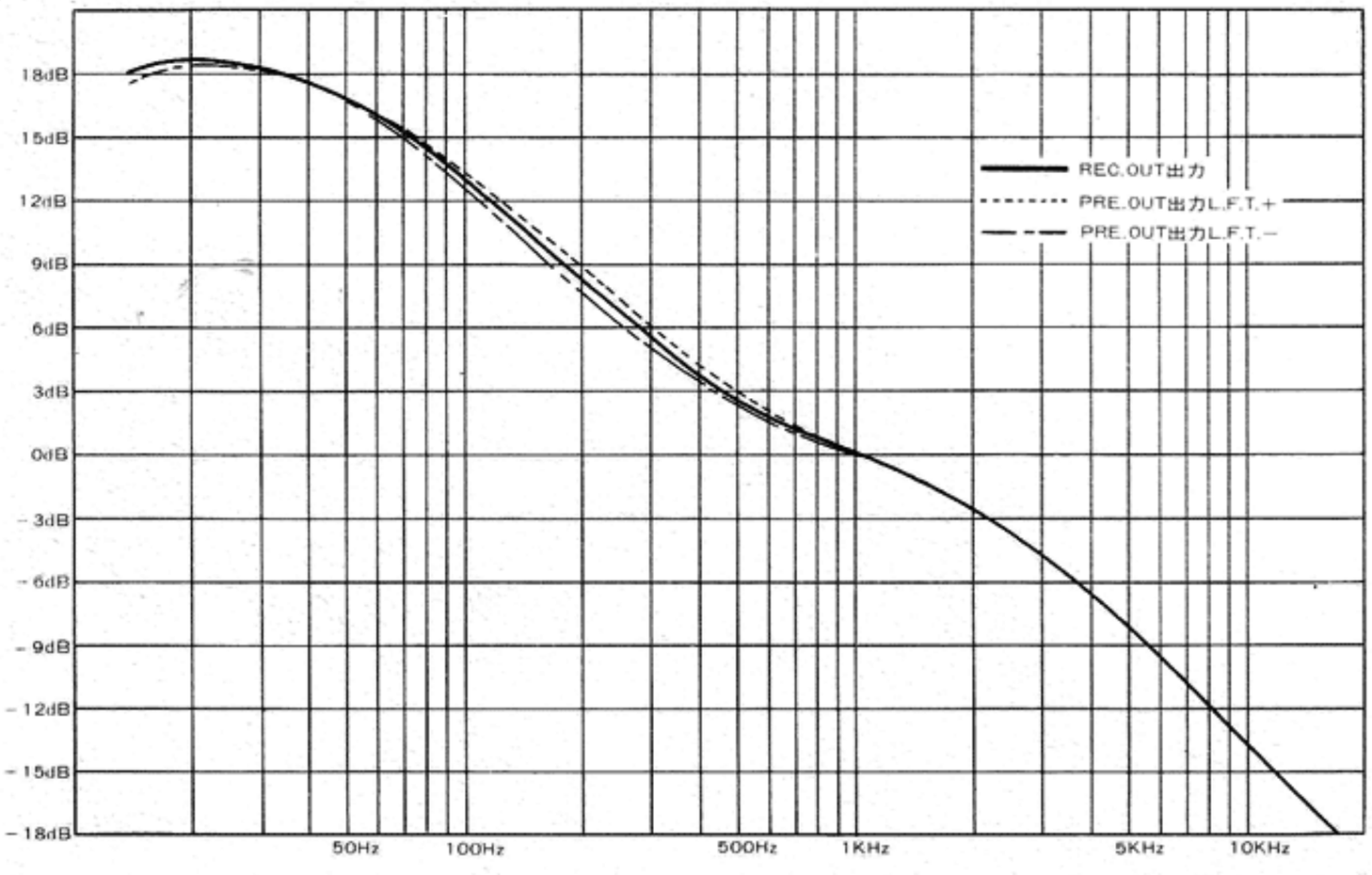
DISTORTION
(TONE; DEFEAT, OUTPUT; PRE-OUT)



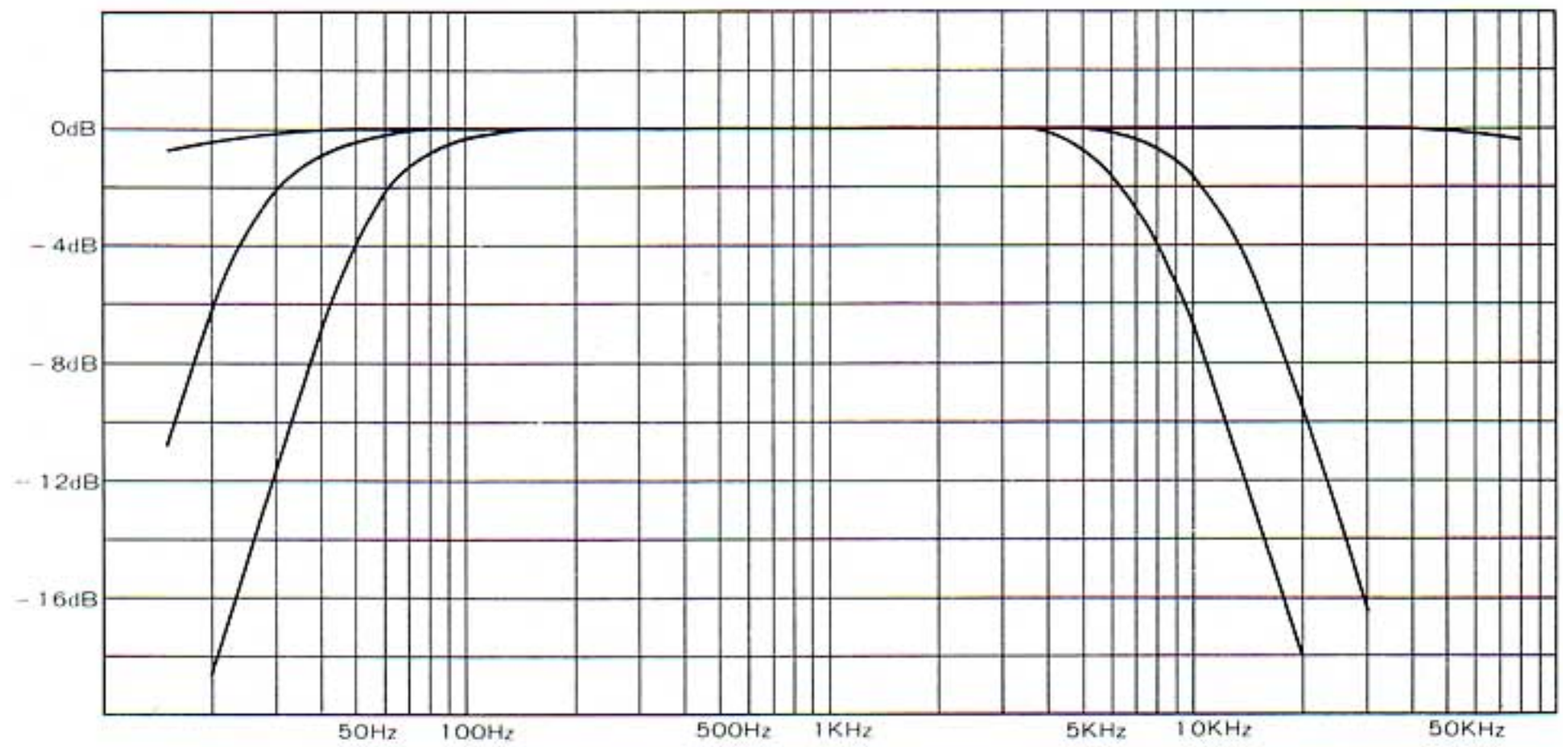
FREQUENCY RESPONSE



EQUALIZER (RIAA)

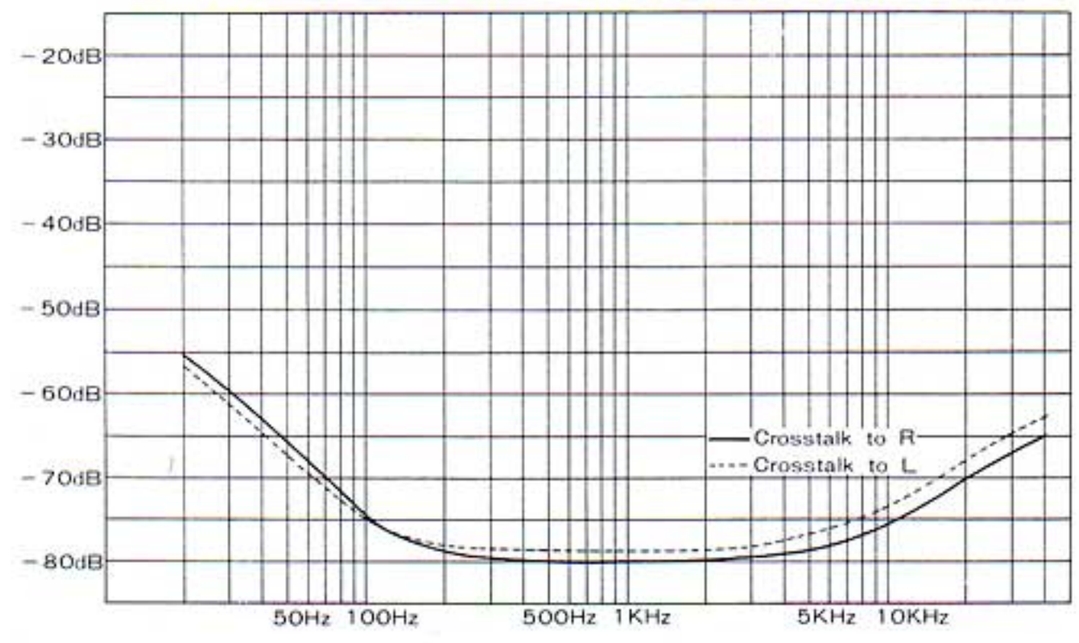


FILTER (AUX TERMINAL→OUTPUT TERMINAL)



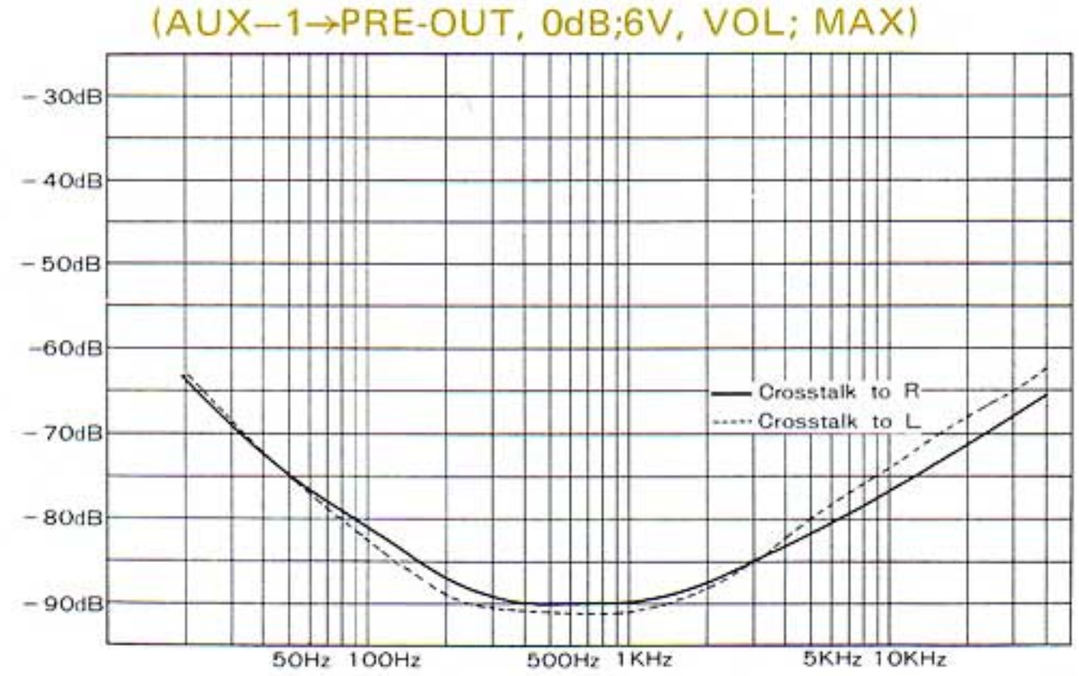
CROSSTALK

(PHONO–1→PRE-OUT, 0dB;6V, VOL; MAX)



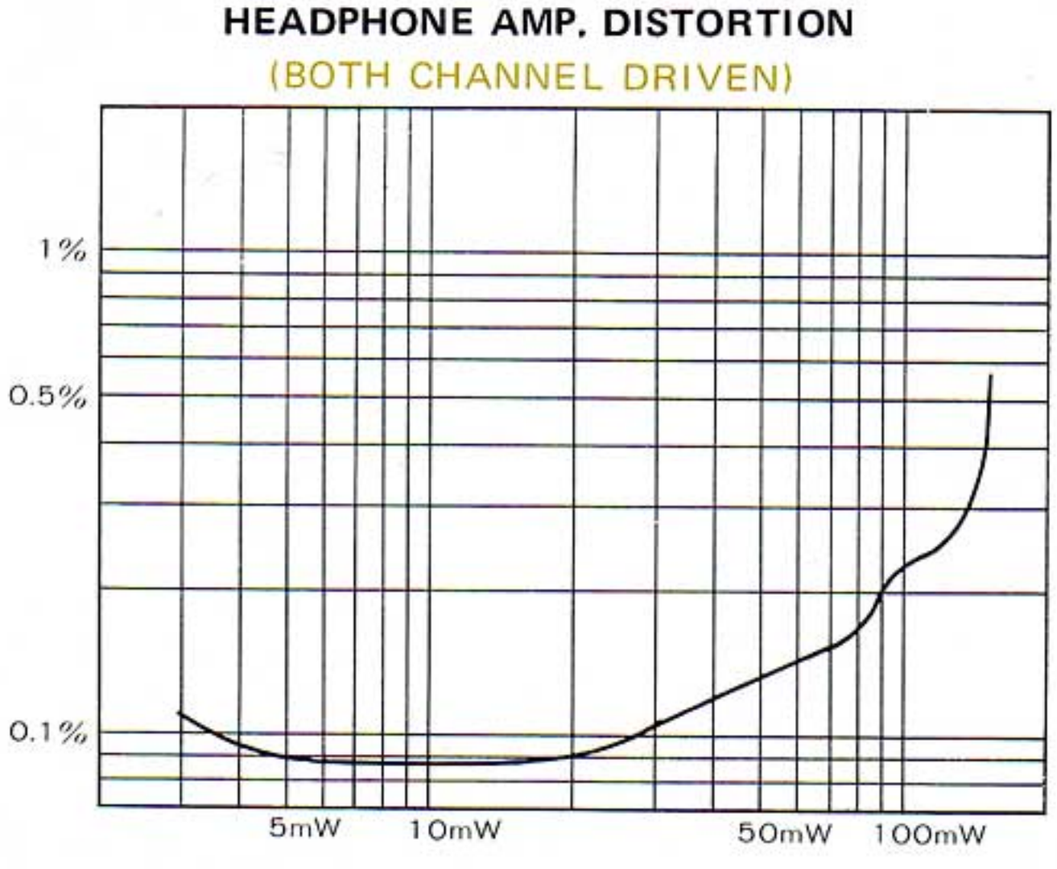
CROSSTALK

(AUX–1→PRE-OUT, 0dB;6V, VOL; MAX)



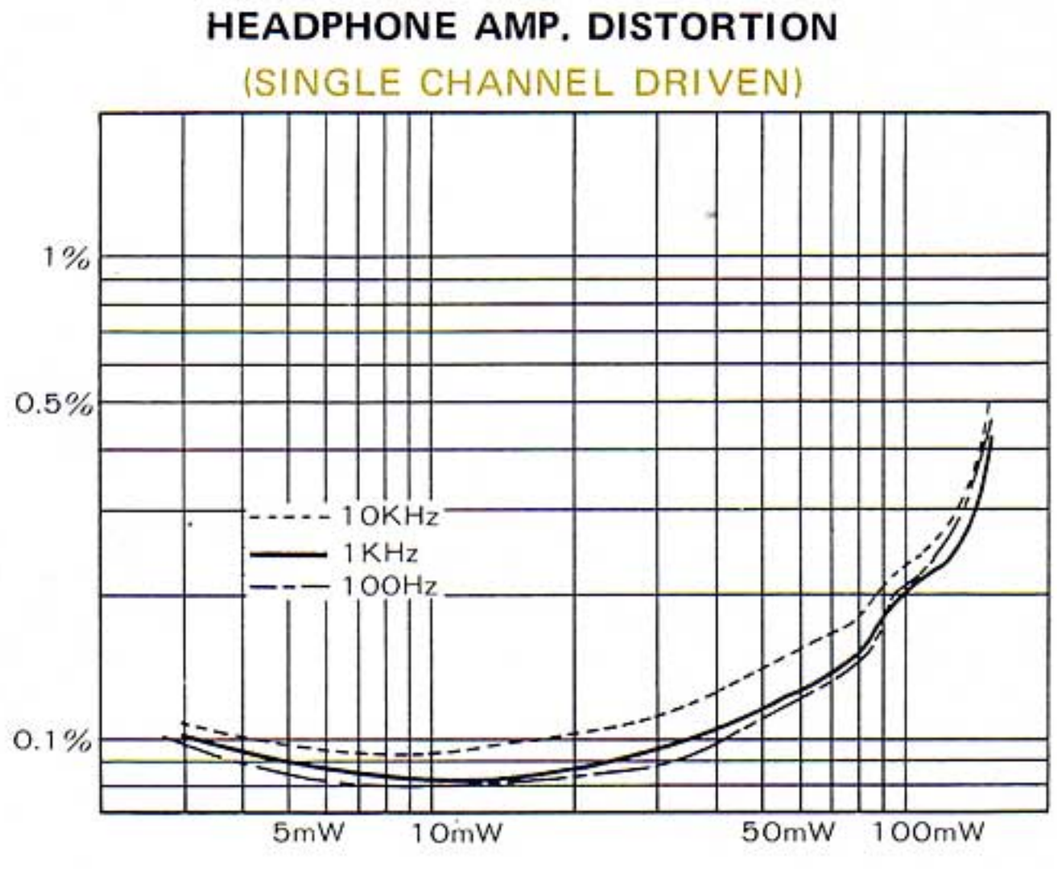
HEADPHONE AMP. DISTORTION

(BOTH CHANNEL DRIVEN)



HEADPHONE AMP. DISTORTION

(SINGLE CHANNEL DRIVEN)



LUX CORPORATION, JAPAN

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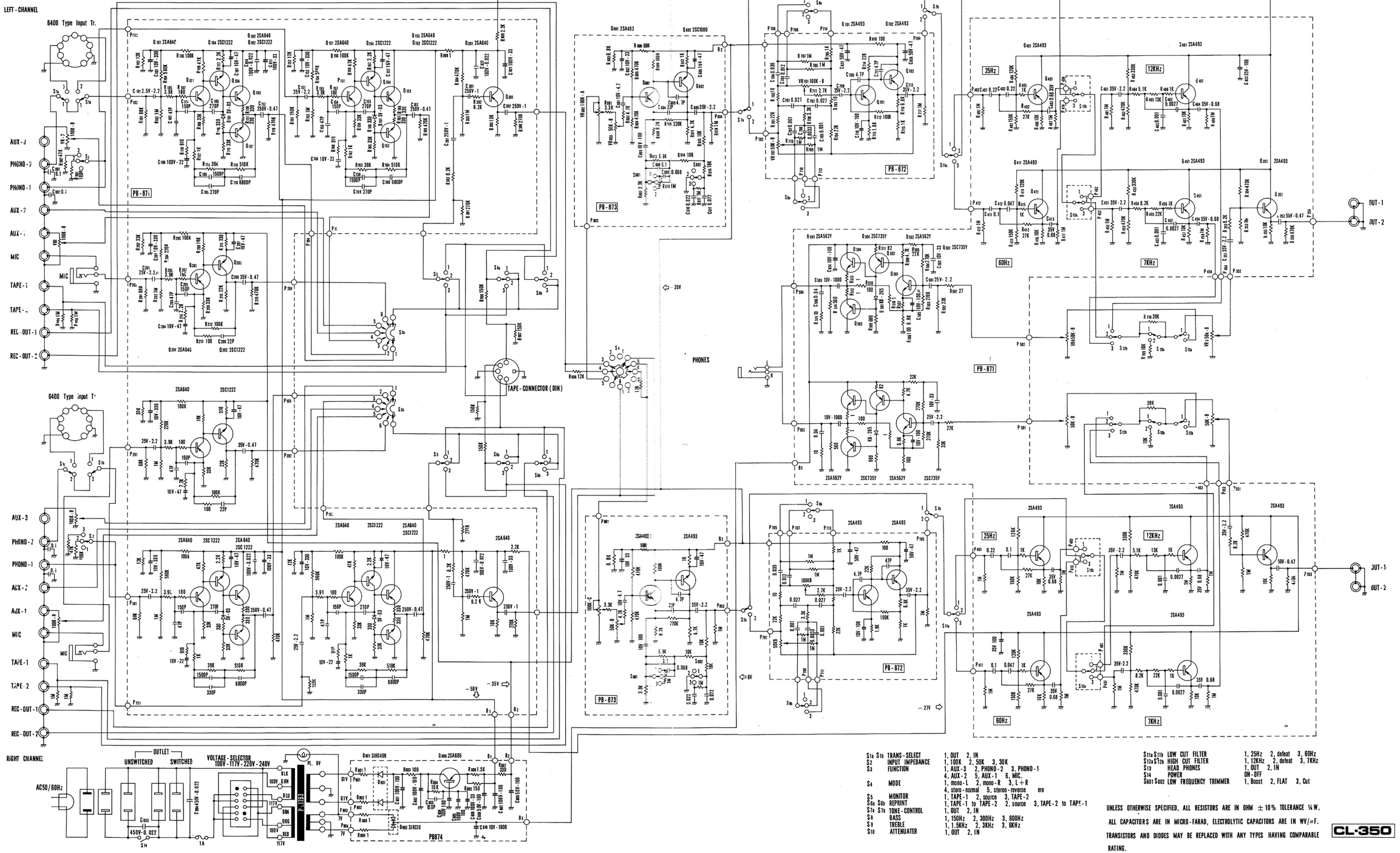
TELEX : J63694

Printed in Japan



S1a S1b	TRANS - SELECT	1, OUT 2, IN
S2	INPUT IMPEDANCE	1, 100K 2, 50K 3, 30K
S3	FUNCTION	1, AUX - 3 2, PHONO - 2 3, PHONO - 1 4, AUX - 2 5, AUX - 1 6, MIC.
S4	MODE	1, mono - L 2, mono - R 3, L + R 4, stereo - normal 5, stereo - reverse ere
S5	MONITOR	1, TAPE - 1 2, source 3, TAPE - 2
S6a S6b	REPRINT	1, TAPE - 1 to TAPE - 2 2, source 3, TAPE - 2 to TAPE - 1
S7a S7b	TONE - CONTROL	1, OUT 2, IN
S8	BASS	1, 150Hz 2, 300Hz 3, 600Hz
S9	TREBLE	1, 1.5KHz 2, 3KHz 3, 6KHz
S10	ATTENUATER	1, OUT 2, IN
S11a S11b	LOW CUT FILTER	1, 25Hz 2, defeat 3, 60Hz
S12a S12b	HIGH CUT FILTER	1, 12KHz 2, defeat 3, 7KHz
S13	HEAD PHONES	1, OUT 2, IN
S14	POWER	ON - OFF
S601 S602	LOW FREQUENCY TRIMMER	1, Boost 2, FLAT 3, Cut

UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHM ± 10% TOLERANCE ¼W.
ALL CAPACITORS ARE IN MICRO-FARAD, ELECTROLYTIC CAPACITORS ARE IN WV/μF.
TRANSISTORS AND DIODES MAY BE REPLACED WITH ANY TYPES HAVING COMPARABLE RATING.

CL-350